PADUCAH GASEOUS DIFFUSION PLANT
SITE SPECIFIC ADVISORY BOARD

padssab@apex.net *www.oro.doe.gov/pgdpssab/*

2000 McCracken Boulevard • Paducah, Kentucky 42001 • (270) 744-9010

Chair

Craig Rhodes

Board Members

Kit Atkinson
Nola Courtney
Mark Donham
Judy Ingram
Vicki Jones
Merryman Kemp
Ronald Lamb
Linda Long
Douglas Raper
Craig Rhodes
Rosa Scott
Jim Smart, Ph.D.
Bill Tanner
Rev. Gregory Waldrop

***Ex Officio* Members**

Carl Froede, Jr.
Environmental Protection Agency

Wayne L. Davis
Fish and Wildlife Resources
(Kentucky)

Tuss Taylor
Division of Waste Management
(Kentucky)

John A. Volpe, Ph.D.
Radiation Control Branch
(Kentucky)

Don Seaborg
Department of Energy

DOE Federal Coordinator
John D. Sheppard

Additional information about contacting board members directly can be obtained from the SSAB web site or by contacting Shirley Speer at (270) 744-9010.

Tentative agenda for the July 20 meeting:

5:30
Informal discussion

6:00
Call to order, introductions
Review of agenda
Approval of minutes from June

Site Manager's Comments **-- 60 minutes**
- ES&H issues, investigation
- Other
  - Board discussion
  - Public comments and questions

SSAB Recommendation Status **-- 5 minutes**

Project Status Updates **-- 20 minutes**
- EM&EF Projects
- Drum Mountain/Balance of Scrap
  - Board discussion
  - Public comments and questions

Presentations **-- 60 minutes**
1. Groundwater Operable Unit Feasibility Study
2. Potential On-site CERCLA Disposal Facility
   - Board discussion
   - Public comments and questions

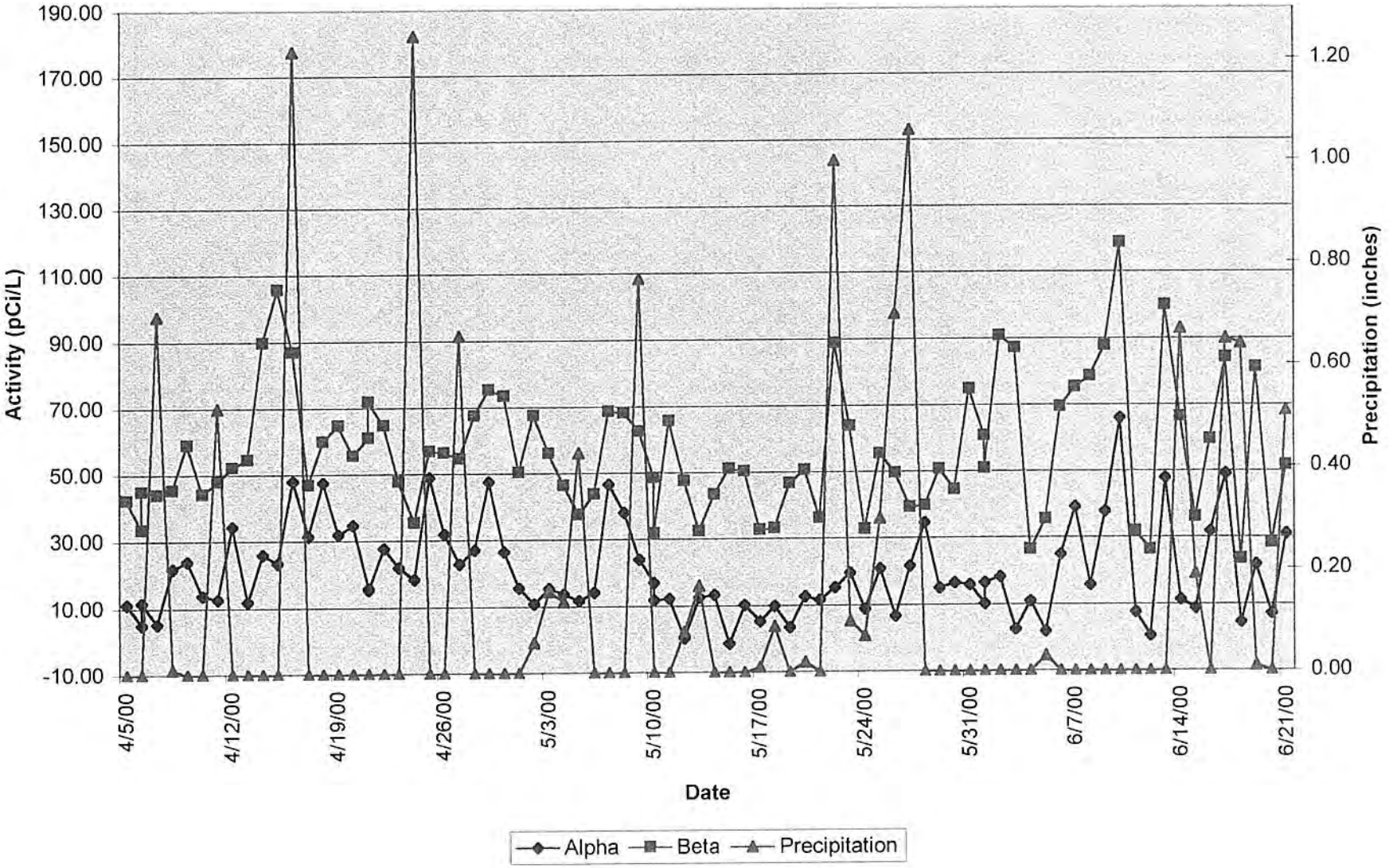
Administrative Issues **-- 15 minutes**
- Review of Workplan
- Review next agenda
- Financial update
- Retreat

SSAB Subcommittee Reports **-- 15 minutes**
- Potential On-site CERCLA Disposal Facility
- Community Relations
- Consultant
- Membership
- 2001 Budget

Adjourn

Action Items from June 15, 2000 SSAB Meeting

1. Animal Study Report
2. CERCLA Cell Report
3. GWOU Feasibility Study
4. Core Team Meeting Minutes
5. Consideration of Town Meeting with Wildlife
6. Update on Drum Mountain (air monitoring).
7. Address Ronnie Lamb's concern regarding 'hearsay' of plutonium.
8. Plan retreat.
9. Traveling exhibit ready for July meeting.
10. Get current application procedures to the board.


ISCO A - KPDES001 (4/5/00 to 6/21/00)
Activity (pCi/L)
190.00
170.00
150.00
130.00
110.00
90.00
70.00
50.00
30.00
10.00
-10.00
Precipitation (inches)
1.20
1.00
0.80
0.60
0.40
0.20
0.00
4/5/00
4/12/00
4/19/00
4/26/00
5/3/00
5/10/00
5/17/00
5/24/00
5/31/00
6/7/00
6/14/00
6/21/00
Date
Alpha
Beta
Precipitation

Health Physics Data Summary
Drum Mountain Removal Project

7/20/00

• # of Breathing Zone (BZ) Air Samples	32
• # of BZ Samples w/ Concentrations Exceeding Posting Level	0
• # of General Area (GA) Air Samples	52
• # of GA Samples w/ Concentrations Exceeding Posting Level	0
• # of Environmental Ambient (EA) Air Samples	27
• # of EA Samples Analyzed (30 day turnaround from Lab)	11
• # of EA Samples with Concentrations Exceeding NESHAPs Levels – 40CFR61 Table 2 *(of the 11 returned samples)*	0
• # of EA Samples with Activities Above Detection Limit for Plant Derived Radionuclides	0
• Number of Routine Radiological Surveys Performed	19
• Number of Special Radiological Surveys Performed	34
• Number of Instances with Contamination Above 10CFR835 Limits in Non-Contaminated Areas	0
• Number of Instances with Detectable Contamination on Respirators or Worker Specific Equipment (BZ pumps, ear protection, radios, etc)	0
• Number of TLDs Issued	190
• Number of Bioassays Submitted	35
• Number of Skin Contaminations	0

DRAFT

Paducah Gaseous Diffusion Plant (PGDP)
Site Specific Advisory board (SSAB)
2000 Workplan

ISSUE	KEY DOCUMENTS	Apr-00	May-00	Jun-00	Jul-00	Aug-00	Sep-00	Oct-00	Nov-00	Dec-00	Jan-01	Feb-01	Mar-01
Ongoing Discussion Items													
ES&H Issues		X	X	X	X	X	X	X	X	X	X	X	X
EM&EF		X	X	X	X	X	X	X	X	X	X	X	X
Scrap Metal/Drum Mountain		X	X	X	X	X	X						
ITRD			X			X			X			X	
Administrative issues and committee reports		X	X	X	X	X	X	X	X	X	X	X	X
Core Team Update				X	X								
Documents/plans for discussion and recommendations													
Ground Water Operable Unit				X	X								
Surface Water Operable Unit													
Burial Ground Operable Unit													
Soils Operable Unit													
Vortec		X											
On-site Disposal Cell			X	X	X								
PACRO			X										
FOIA					X	X							

Core Team Meeting Record

The Core Team for the Paducah Gaseous Diffusion Plant held their initial meeting March 9 and 10, 2000, in Nashville, Tennessee. The meeting was facilitated by personnel from the U.S. Department of Energy's (DOE's) headquarters office. The participants are listed on the attached Attendance List. The proposed agenda for the meeting is also attached.

Core Team Approach

Consistent with the agenda, the function and composition of the Core Team were discussed. The DOE stated the Core Team should consist of the parties to the FFA, and the Core Team representatives should have decision-making authority. The U.S. Fish and Wildlife Service and the Kentucky Department of Fish & Wildlife Resources posed questions regarding their relationship to the Core Team. The Commonwealth of Kentucky suggested that membership on the Core Team be limited, but suggested that Bechtel Jacobs Company (BJC) should be included on the Core Team. Following discussion, mutual agreement was reached regarding the members of the Core Team. Voting members of the Core Team will consist of:

- U.S. EPA (Jeff Crane and Carl Froede)
- DOE (John Sheppard and Dianna Feireisel)
- Commonwealth of Kentucky (Tuss Taylor, Mike Guffey, and John Volpe)

Everyone generally agreed that the Core Team members will be responsible for obtaining the appropriate level of input from agencies such as the U.S. Fish and Wildlife Service, the Kentucky Department of Fish & Wildlife Resources, BJC, and their respective project teams. The Core Team is charged with making programmatic decisions that will guide the technical project teams.

Ground Rules

It was suggested that formal minutes be prepared following all Core Team meetings. Communication with the SSAB was stressed. Fact sheets regarding effective core teams will be made available by DOE headquarters personnel. Mutual agreement was reached regarding ground rules for the Core Team.

The following Core Team Ground Rules were drafted for formal approval at the next Core Team meeting:

- At least one designated representative from each Core Team agency will be at each meeting, or they will be responsible for sending an approved alternate. To facilitate progress, alternates will be present at all meetings and discussions. Steve Hampson will be the alternate for Dr. John Volpe.
- Decisions will be made by consensus using the thumbs up/down/sideways method.
- The Core Team will operate with supporting staff present (i.e., BJC, US F&W, KY F&W, etc.); however, the number of people present will be limited only to those deemed necessary.
- The support staff present will be based upon the issues on the agenda and will be by invitation only.
- The Core Team is responsible for developing the agenda and running the meeting.
- During discussions, all present will have a voice when recognized by the Core Team, but there may be time limits imposed.
- Core team representatives are responsible for confirming their upper management's position on all core team decisions. (If necessary, the first order of business in core team meetings is to determine whether the management of all three agencies fully support the core team decisions from the previous meeting.)

- Meeting minutes will be recorded at each meeting. A list of key decisions and action items will be distributed to the group at the conclusion of the meeting. The DOE will be responsible for issuing a draft version of the minutes to the meeting attendees within 5 working days of the meeting's conclusion, and comments are due back within 5 working days of issuance of the draft minutes. The final version of the meeting minutes will be disseminated to the Core Team's general distribution list. A secondary method will be formulated by the Core Team to disseminate formal decisions to stakeholder organizations.
- Agendas must be circulated in a timely fashion (i.e., at least 30 days prior to the meeting.)
- Each core team member has the responsibility to focus the discussion of his or her invited personnel.
- All meeting attendees will show respect by allowing only one conversation at a time.

Agenda

The proposed agenda for the meeting was discussed, and the Core Team decided to follow the agenda and discuss the OU strategy. The team agreed to spend as much time as necessary defining the OU strategy, rather than working to the agenda timeline. It was noted that the scoping activities cannot be resolved completely until an OU strategy is determined.

Operable Unit Strategy

The Commonwealth of Kentucky stated that the OU strategy must be incorporated into the FFA following Core Team approval. BJC personnel distributed and presented a handout titled "OU Strategy FFA Project Manager's Meeting." The attendees discussed future land use assumptions. The DOE suggested that early remedial actions should be a primary goal of the OU strategy. It was generally agreed that an OU strategy must be prepared in written form and submitted to the Core Team for review and approval. The Commonwealth of Kentucky stressed that the interrelationships among the OUs need to be clearly identified, methods documents for conducting (human health and ecological) risk assessments are needed, and an Integrated Environmental Monitoring Strategy would be useful.

Following the presentation, the EPA explained that they will not accept the watershed approach as used at Oak Ridge (i.e., one large OU ROD that specifies multiple actions over many years). EPA clearly wants several RODs for each OU that present discrete actions and timeframes. DOE suggested that in many cases, removal actions (i.e., Action Memorandums) could be used instead of remedial actions (i.e., RODs). BJC noted that the GWOU lends itself to multiple actions, or RODs. The KDWM voiced general concern that if DOE breaks up OU actions into multiple RODs, they do not want actions to be postponed or delayed, but agreed that they prefer early actions. EPA stated that we should always be asking whether we have enough data to make a remedial decision. BJC noted the cost savings associated with implementing like actions in the same mobilization. BJC also distributed a table titled, "Numerical List of Paducah Release Sites and Subproject Association" and four tables identifying the WAGs and SWMUs contained in the GWOU, SWOU, SSOU, and BGOU. The participants generally agreed that land use, remedial action objectives (RAOs), and the prioritization/sequencing of OUs affect the OU strategy.

The Core Team agreed to the need for a white paper to outline the OU strategy. The Core Team worked together to develop an outline for this paper with key points of information identified. Please refer to the attachment titled "Paducah Operable Unit Strategy Outline."

Project Scoping Process

DOE headquarters personnel explained advantages associated with identifying early actions, including obtaining early involvement of the community. It was noted that conceptual models will be developed at the SWMU level, and the binning process will be conducted on a SWMU-by-SWMU basis. The EPA indicated the binning process will allow data collection efforts to be focused at the minimum level necessary. The DOE must limit the amount of work conducted prior to any scoping meetings in order to allow the EPA and Commonwealth of Kentucky to fully participate in the scoping process. The EPA wants to conduct their own data evaluations prior to any scoping meetings, but the Commonwealth of Kentucky prefers that the DOE have contaminant maps prepared and analytical data available at the initial scoping meetings. All data must be made available at the scoping phase (i.e., not just data that is of acceptable quality for use in risk assessment calculations). It was generally agreed that risk assessment has a very limited role in the early scoping phases of a project. A question was raised regarding whether electronic data should be provided to the regulatory agencies or they should be allowed direct access to the OREIS database. BJC accepted an action item to develop a listing of all data sets that are available.

The DOE indicated that they currently are preparing an SSOU scoping document and an SWOU work plan to meet FFA milestone commitments. In addition, there are two informal disputes that will need to be resolved. Everyone generally agreed that the work conducted to date on the SWOU is useful, but all parties need to formulate a new path forward for the SWOU project. Specific issues to be discussed include: early actions, binning of SWMUs, and resolution of RI/FS Work Plan comments. The Commonwealth of Kentucky suggested that if DOE can agree to take early actions, then they could agree to delaying the SWOU work plan milestone date; the EPA agreed, as long as the milestones are not delayed indefinitely. Any discussions regarding the SWOU will need to include consideration of the project path forward and identification of new/revised milestones. The Core Team agreed to suspend the deadlines for the SWOU work plan (D2) and the SSOU scoping document (D1). The DOE will prepare a letter to delay these deadlines by 90 days until a revised strategy can be developed for each of these operable units.

The Core Team outlined a strategy for proceeding during the agreed upon 90-day suspension. Refer to the attachment titled "Proposed Path Forward during Suspension." Plans and agenda items for future meetings were discussed. Everyone generally agreed that the planned meetings should use a facilitator. A question was raised regarding whether enforceable commitments can be holistically discussed if the focus is primarily on early actions (i.e., whether the outyear commitments can be fully evaluated). In the future, an enforceable commitments meeting is required to mesh the DOE's recommended milestones with the regulatory agencies' counter offer. The primary agenda items for the next four Core Team meetings were identified (see "Summary of Agreements").

A risk workgroup was briefly discussed, and each agency took an action item to begin identifying the appropriate workgroup members. The U.S. Fish and Wildlife Service noted their concern that ecological risks be evaluated at the PGDP. The Core Team generally discussed proceeding with preparation of the following documents (i.e., schedule meetings with EPA and KY), which would be further defined as part of the risk workgroup:

- Integrated Environmental Monitoring Strategy Document
- Human Health Risk Assessment Methods Document
- Ecological Risk Assessment Methods Document

Remaining agenda items

The remaining items on the Proposed Agenda were not specifically addressed. During the meeting, the following items were identified for inclusion under the "Other High Priority Items" heading:

- D&D
- Electronic Data Sharing
- Non-operational facilities
- ITRD involvement in SWOU and SSOU
- Future land use scenarios
- Human Health Risk Assessment Methods Document
- Eco-Risk Assessment Methods Document
- "Integrated Environmental Monitoring Strategy" document
- Development of OU methodology teams (human health and ecological risk)

The table on the following two pages summarizes the agreements that the Core Team formally agreed upon during this meeting.

Summary of Agreements

Voting members of the Core Team will consist of:

- U.S. EPA (Jeff Crane and Carl Froede)
- DOE (John Sheppard and Dianna Feireisel)
- Commonwealth of Kentucky (Tuss Taylor, Mike Guffey, and John Volpe)

Core Team Ground Rules drafted for approval at the next meeting:

- At least one designated representative from each Core Team agency will be at each meeting, or they will be responsible for sending an approved alternate. Steve Hampson will be the alternate for Dr. John Volpe.
- Decisions will be made by consensus using the thumbs up/down/sideways method.
- The Core Team will operate with supporting staff present (i.e., BJC, US F&W, KY F&W, etc.); however, the number of people present will be limited only to those deemed necessary.
- The support staff present will be based upon the issues on the agenda and will be by invitation only.
- The Core Team is responsible for developing the agenda and running the meeting.
- During discussions, all present will have a voice when recognized by the Core Team, but there may be time limits imposed.
- Each Core Team member/agency has the right to postpone decisions by one meeting to allow them to assess the direction of their management on that decision.
- Meeting minutes will be recorded at each meeting, and a list of key decisions will be distributed to the group at the conclusion of the meeting. A refined version will be issued (by BJC/DOE) to the meeting attendees within 5 working days, and comments are due back within 5 working days. A secondary method will be formulated by the Core Team to disseminate formal decisions to stakeholder organizations.
- Agendas must be circulated in a timely fashion. (This may be as early as 30 days prior to the meeting.)
- Each core team member has the responsibility to focus the discussion of his or her invited personnel.
- All meeting attendees will show respect by allowing only one conversation at a time.

The Core Team agreed that the OU Strategy is the top priority for resolution at this meeting.

Future land use assumptions were discussed (during the "OU Strategy" presentation). The Core Team agreed to revisit this topic to reach a consensus.

The participants generally agreed that the OU Strategy must be elaborated in writing for the Core Team to formally review it and approve it. The Team then provided input to develop a list of rationale supporting the OU strategy.

While hashing out the outline for the OU Strategy White Paper, the Core Team agreed by consensus that the prioritization strategy presented on page 20 of the SMP is appropriate. BJC and DOE headquarters personnel will draft the OU Strategy using the outline developed by the Core Team. The Core Team formally agreed by consensus that DOE has an action item to draft the OU Strategy for presentation to the Core Team for review and approval.

The team informally agreed to set up a technical working group to "hash out" data sharing issues.

The Core Team agreed by consensus to temporarily suspend the SWOU (RI/FS Work Plan) and SSOU (Scoping Document) activities for 90 days until a revised strategy can be developed for each operable unit. A good faith effort will be made to identify early actions and keep these projects moving forward.

Core Team Meeting Record
April 11-13, 2000

The Core Team for the Paducah Gaseous Diffusion Plant held a meeting April 11-13, 2000, in Atlanta, Georgia. The meeting was facilitated by personnel from the U.S. Department of Energy's (DOE's) headquarters office. Standard attachments include a Proposed Agenda for the meeting, an Attendance List, Summaries of Action Items, and a Summary of Agreements.

Opening Remarks

The group briefly discussed the draft minutes from the March 2000 meeting, development of a meeting minutes notebook, the possibility of placing the minutes on the Bechtel Jacobs Company web page, minutes of Core Team work groups, and development of a Core Team charter. The primary purpose of the meeting minutes is to document Core Team agreements and the basis for those agreements. Results of workgroup meetings will be incorporated into the Core Team minutes as the workgroups present recommendations to the Core Team for approval. Two primary purposes of a charter are to help DOE, EPA, and KY management to understand the role(s) of the Core Team and to help the project teams understand their roles with respect to the Core Team.

The group reviewed the status of each action item from the March 2000 meeting. A summary table is attached.

The group agreed upon the proposed agenda, and identified the OU Strategy and OU scoping items as priority topics.

Operable Unit Strategy

The group discussed the level of detail contained in the draft OU Strategy, and a request for additional detail was made (i.e., addition of SWMU crosswalk table and requirement to fully evaluate nature and extent of contamination at each SWMU and AOC). The Core Team agreed/voted that the purpose of the OU Strategy paper is to identify the Core Team's understanding of the OU Strategy at an appropriate level of detail; an executive summary may be developed at a later date. The OU Strategy will be used to modify the Site Management Plan, and it may be used to modify the FFA.

Project Scoping Process

The group reviewed the "Project Scoping and Evaluation Process" portion of the previously issued draft OU Strategy paper and the OU Scoping Document Outline (Attachment 1 to the OU Strategy). The following points were noted.

- It is assumed that all data will be brought to the scoping meeting (i.e., data is not to be screened out prior to the scoping meetings due to the lack of quality, etc.)
- If early actions are identified, it does not imply that a removal action needs to initiated.
- After the initial binning, it makes sense to step back and look at the proposed actions and schedules from a broader view. This may also be useful to prioritize actions based on the availability of funding.
- The importance of proceeding with some level of uncertainty was noted.

The group agreed that it is important to document decisions made during the scoping meetings, and to obtain feedback from the community in a timely fashion. Following in-depth discussions of the scoping process, the Core Team agreed upon a three-step process for conducting scoping activities, working from the OU level to the SWMU level. The flowcharts for this methodology are contained in the Attachments

titled, "Operable Unit Scoping Activity 1," "Operable Unit Scoping Activity 2," and "Operable Unit Scoping Activity 3 – Binning." The group discussed the level of data presentation and documentation necessary, and the DOE accepted an action item to prepare example scoping packages. The scoping process may be refined as the Team actually uses the proposed process, and the Core Team agreed to participate in the scoping process with the project teams for the first project (i.e., SWOU) to determine the effectiveness of the process.

Land Use

The Core Team approved the following terms with specific definitions for describing property on/near the PGDP: "offsite," "onsite," "unsecured," and "secured." (The term "restricted" was not selected as it implies the use of deed restrictions.) Land use scenarios (i.e., industrial, recreational, and residential) were discussed, and specific agreements are documented on the attachments titled Exposure Scenarios. A revised map with land use assumptions will be prepared for review at the next Core Team meeting.

Remedial Action Objectives

Remedial action objectives (RAOs) were discussed briefly, and postponed for discussion at a future Core Team meeting. The DOE accepted an action item to develop draft RAOs for each OU.

Risk Workgroup

The Core Team agreed that they want to provide the appropriate level of direction to the Risk Workgroup without being too restrictive. The information contained on the two attachments titled "Human Health Risk Criteria" and "Exposure Scenarios" was developed. Ecological risk criteria will be developed similarly by ecological risk experts on the Risk Workgroup. Concern was expressed that background data should not be obtained from Massac Creek or the Ballard Wildlife Management Area, because there are ecological stresses in those areas. It was later suggested that the Risk Workgroup should prepare levels for a residential scenario, also, for comparative purposes.

Closing Remarks

Prior to concluding the meeting, the group revised the schedule for future workgroup and project team meetings. The Core Team also agreed to hold a conference call every Monday morning from 8:00 to 8:30 a.m. central. The next Core Team meeting is scheduled to be held May 16-18, 2000, in Paducah, Kentucky.

Proposed Agenda
FFA Project Managers Meeting
April 11-13, 2000

April 11 - Day 1

1. Opening Remarks — 8:00 – 9:00
   - Nashville meeting minutes
   - Existing action items (Status)
   - Proposed Meeting Agenda

2. Operable Unit Strategy — 9:00 – 11:30
   - Executive Summary Review
   - Proposed Modifications
   - Site Management Plan Revisions

3. Lunch — 11:30 – 12:30

4. Project Scoping Process — 12:30 – 2:30
   - Existing FFA Scoping Requirements
   - Alternative Approaches
   - Scoping Document/Data Package Outline
   - Existing Data Base Sets

5. Remedial Action Objectives — 2:30 – 4:30
   - Land Use
   - Exposure Pathways
   - Receptors
   - RAO Statements

Proposed Agenda
FFA Project Managers Meeting
April 11-13, 2000

- Continued -

April 12 - Day 2

1.	Chartered Working Groups - Risk Assessment - Electronic Data Transfer - Proposed Arc-View Presentation	8:00 – 9:00
2.	Enforceable Commitments Status - Proposed FFA Modification (FY2000 Milestones) - FY2001 – FY2002 (Outstanding Issues) - Outyear Enforceable Milestones - Dispute Resolution Issues - Senior Managers Meeting	9:00 – 11:30
3.	Lunch	11:30 – 12:30
4.	Previously Identified Early Actions - General Scope - Documentation (Remedial vs. Removal)	12:30 – 2:00
5.	FY2002 Budget Request	2:00 – 3:00
6.	FFA Meeting Calendar (90 day Forecast)	3:00 – 4:00

Proposed Agenda
FFA Project Managers Meeting
April 11-13, 2000

- Continued -

April 13 – Day 3

1. Other High Priority Items	8:00 – 10:15
2. Closing Remarks - Key Agreements - Action Items - Next Meeting/Agenda	10:15 – 11:30

Attendance List
Core Team Meeting
April 2000

Name	Organization	Telephone	E-mail
Steve Golian	DOE *	301-803-7791	steven.golian@em.doe.gov
Jeff Smyth	Project Performance Corp. *	509-542-1280	Jsmyth@ppc.com
Jeff Crane	US EPA	404-562-8546	crane.jeff@epa.gov
Carl Froede, Jr.	US EPA	404-562-8550	froede.carl@epa.gov
John Richards	US EPA		
Glenn Adams	US EPA		
Steven Alexander	US Fish & Wildlife Service	931-528-6481 ext. 210	steven_alexander@fws.gov
Tuss Taylor	KDEP	502-564-6716	tuss.taylor@mail.state.ky.us
Mike Guffey	KDEP	502-564-6716	mike.guffey@mail.state.ky.us
John A. Volpe	KY Radiation Control	502-564-3700	john.volpe@mail.state.ky.us
Steve Hampson	KY Radiation Control	502-564-8390	Skhamp1@pop.uky.edu
Jim Lane	KY Dept. of Fish & Wildlife Resources	502-564-7109 ext. 366	jim.lane@mail.state.ky.us
Dianna Feireisel	DOE	270-441-6812	Feireiseldf@oro.doe.gov
John Sheppard	DOE	270-441-6804	Sheppardjd@oro.doe.gov
M'balia Tagoe	Bechtel Jacobs Company	270-441-5236	Tagoem@bechteljacobs.org
Pat Gourieux	Bechtel Jacobs Company	270-441-5062	Gourieuxpa@bechteljacobs.org
John Morgan	Bechtel Jacobs Company	270-441-5069	Morganjw@bechteljacobs.org
Bruce Ford	SAIC	270-462-4552	fordb@saiceecg.com

* Technical facilitator

Status of March 2000 Action Items

	Action Item	Responsibility	Status
(a)	Identify sources of data	Pat Gourieux	Completed
(b)	Prepare OU Strategy white paper	John Morgan, Jeff Smyth, and Steve Golian	Completed
(c)	Prepare charters for Risk Workgroup and Data-Sharing Workgroup	Jeff Crane	Completed
(d)	Identify members of Risk Workgroup	DOE, EPA, and Kentucky Core Team members	Completed during 4/12/00 Core Team meeting
(e)	Prepare letter to formally suspend the SWOU and SSOU projects for 90 days	John Sheppard	Completed

Summary of April 2000 Action Items

	Action Item	Responsibility	Due Date
(a)	Develop meeting minutes for Core Team telephone calls	DOE	Continual
(b)	Develop a Core Team meeting minutes notebook. (The minutes may later be placed on the BJC web page.)	DOE (John Morgan)	(Not specified)
(c)	Develop a draft charter for the Core Team	DOE (John Morgan)	(Not specified)
(d)	Determine whether FACCA (?) is applicable	DOE	(Not specified)
(e)	Provide a copy of the data listing to Steve Alexander	DOE (Pat Gourieux)	Completed
(f)	Draft revised Operable Unit Strategy text	Kentucky (Tuss Taylor)	May 2000 Core Team Meeting
(g)	Develop draft revisions for FFA, as appropriate.	DOE (Morgan) & EPA (Froede)	May 2000 Core Team Meeting
(h)	Prepare example scoping information for one or two example SWMUs	DOE/BJC	Prior to May 2000 Core Team Meeting
(i)	Complete the "notebook" and provide to EPA and Commonwealth of Kentucky	DOE/BJC	Prior to May 2000 Core Team Meeting
(j)	E-mail latest SWMU crosswalk to all Core Team members	DOE (John Morgan)	ASAP
(k)	Provide one or two example cases of OU Scoping "Activity 2"	DOE (BJC)	May 2000 Core Team Meeting
(l)	Provide radionuclide data set to BJC (M'balia Tagoe)	Kentucky (John Volpe)	ASAP
(m)	Obtain the legal plot of the Land Use for Jim Lane	DOE (John Morgan)	ASAP
(n)	Present map to Core Team that clearly identifies the current industrial areas	DOE (John Morgan)	May 2000 Core Team Meeting
(o)	Revise map of current land use, which includes the point-of-compliance (POC)	DOE (M'balia Tagoe)	May 2000 Core Team Meeting

Summary of April 2000 Action Items

	Action Item	Responsibility	Due Date
(p)	Prepare revised maps showing general property ownership, current land use, and assumed future land use	DOE (John Morgan)	May 2000 Core Team Meeting
(q)	Develop/refine list of areas that are considered to be "current industrial use" outside of the PGDP security fence for the revised land-use map(s)	DOE	May 2000 Core Team Meeting
(r)	Schedule site tour for Golian and Smyth	DOE (Pat Gourieux)	May 15, 2000
(s)	Provide draft RAOs to the Core Team	DOE (John Sheppard)	May 2000 Core Team Meeting
(t)	Prepare draft site-specific exposure scenarios to the Risk Workgroup	DOE (John Morgan)	4/25/00 Risk Workgroup Meeting
(u)	Provide F&W records of use within the WKWMA (recreational hunting/fishing sportsmen and recreational management personnel) to the Risk Workgroup	USFWS (Steve Alexander)	4/25/00 Risk Workgroup Meeting
(v)	Track down radiological data for eco-risk work group (requested by Alexander)	Kentucky (John Volpe) & EPA (John Richards)	4/25/00 Risk Workgroup Meeting
(w)	Search PGDP database (OREIS) and develop a "limited" list of contaminants, which the Risk Workgroup will use to develop action levels	DOE (Pat Gourieux)	4/25/00 Risk Workgroup Meeting
(x)	Check on availability of Deena Brett from SRS to chair the Human Health Risk Workgroup	Steve Golian	4/25/00 Risk Workgroup Meeting
(y)	Check on availability of Pat Kline to chair the Ecological Risk Workgroup	DOE (John Morgan)	4/25/00 Risk Workgroup Meeting
(z)	Identify schedule for meetings and conference calls	Risk Workgroup	4/19/00 Conference Call
(aa)	Revise Risk Workgroup Charter	EPA (Jeff Crane)	ASAP
(bb)	Revise meeting calendar and issue to Team	DOE (John Morgan)	ASAP
(cc)	Verify that April 25-26 ITRD meeting has been cancelled/postponed	DOE (John Sheppard)	ASAP
(dd)	Develop/maintain meeting calendar	DOE (John Morgan)	Continual/Perpetual

Summary of April 2000 Agreements

The Core Team agreed/voted that the purpose of the OU Strategy paper is to identify the Core Team's understanding of the OU Strategy.

The Core Team agreed/voted to approve the three OU Scoping Process flowcharts (see attachments), with the understanding that the process may be refined during implementation at the first operable unit.

The Core Team agreed/voted to approve the crosswalk and information package during the Core Team's May meeting.

The Core Team agreed/voted to accept the following nomenclature:

- Offsite – property not owned by the DOE (such as land leased to KDWFR)
- Onsite – property owned by the DOE
- On-site unsecured – property owned by the DOE and located outside of the secured area
- On-site secured – property owned by the DOE and located within the DOE security fence (as of this date)

The Core Team agreed/voted to accept the presumed future land use inside the plant fence as industrial.

The Core Team agreed/voted to accept the presumed future use of the DOE property leased to KDWFR as recreational, with an unrestricted exposure scenario.

With regard to the "DOE-owned Industrial Area" located near S&T landfills, the Core Team agreed/voted to keep the "permitted" portion of the area as industrial, and change the remainder of this area to residential (to match the same assumption as the DOE property leased to KDWFR).

The Core Team agreed/voted that the "WKWMA land owned by KDWFR" is assumed to be recreational.

The Core Team agreed/voted that the TVA property is assumed to be recreational; however, the location of the Shawnee Steam Plant will be shown as "TVA industrial" or "non-DOE industrial."

The Core Team agreed/voted that the "DOE-owned industrial areas" located outside of the PGDP security fence and adjacent to the plant will be (unrestricted) recreational with the exception of current industrial operations (e.g., K-landfill, C-612, C-611, C-100 plus parking lot, and C-103).

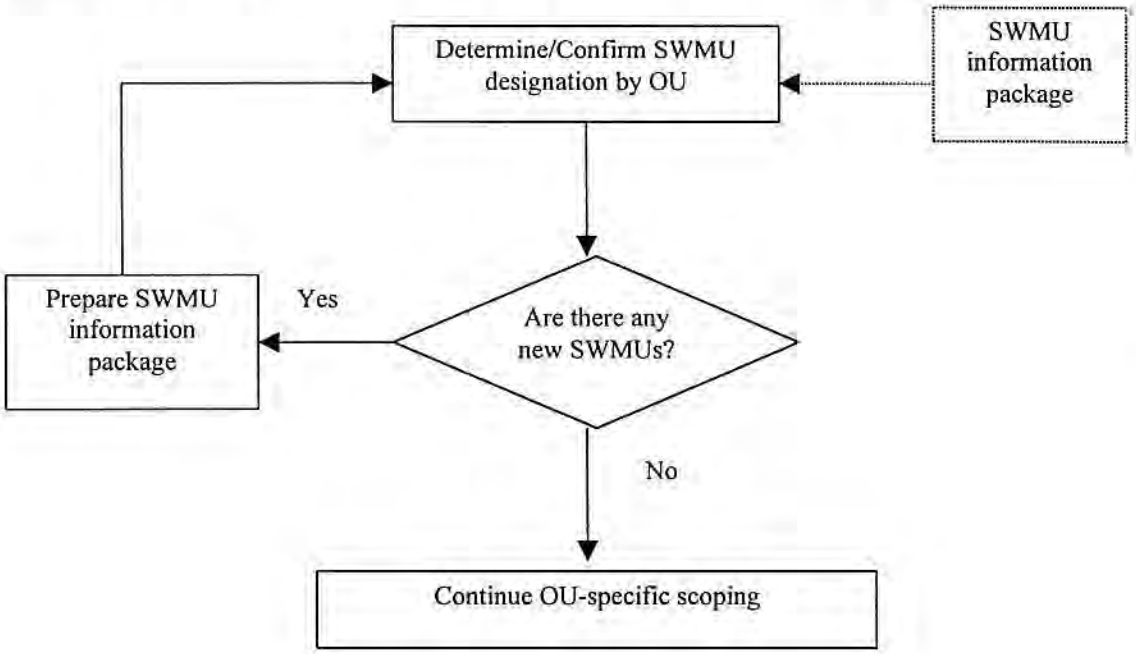
The Core Team agreed/voted to accept "Likely Future Land-Use Assumptions" (see attachment).

The Core Team generally agreed/voted that the Risk Workgroup needs to specify the trigger levels for both current and future workers.

The Core Team agreed/voted that "current" exposures will be used to prioritize actions, and "future" exposures will be used to define problems.

Operable Unit Scoping Activity 1

Purpose: Core Team agreement/understanding of program-wide SWMU/OU designation

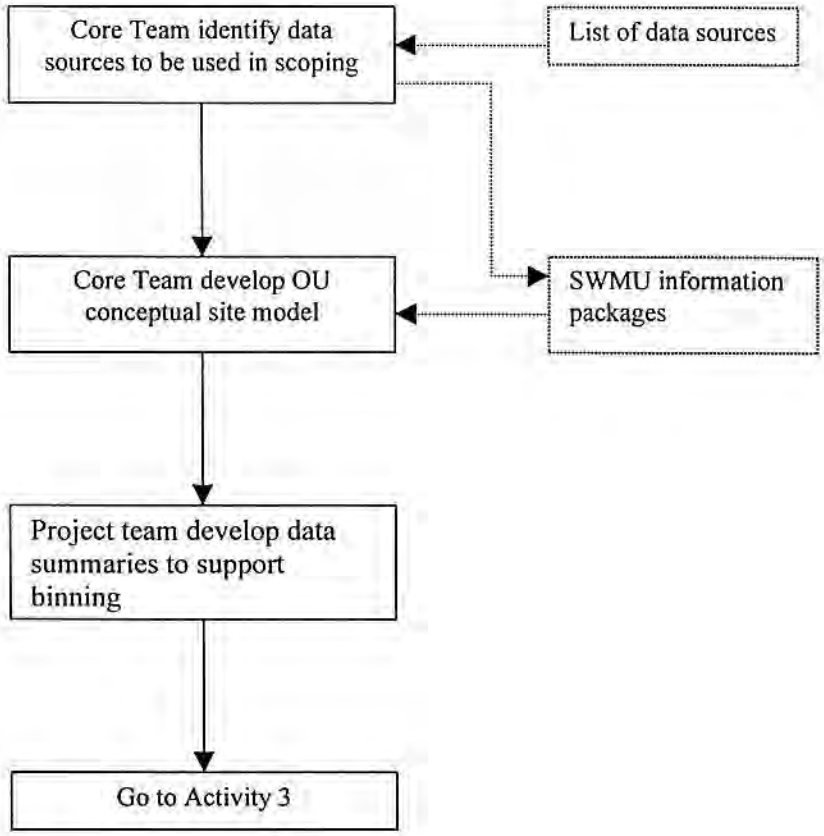


NOTE: SWMU information package consists of:

1. Notebooks organized by OU
2. For each OU:
   - Description of rationale for SWMUs in the OU
   - Crosswalk of SWMUs in OU
3. For each SWMU:
   - Photographs (existing)
   - Location map
   - Brief background (Why is it a SWMU, contaminants, impacted media, discovery date, etc.)

Operable Unit Scoping Activity 2
(OU Specific)

Purpose: Core team expectations set for project team prior to binning



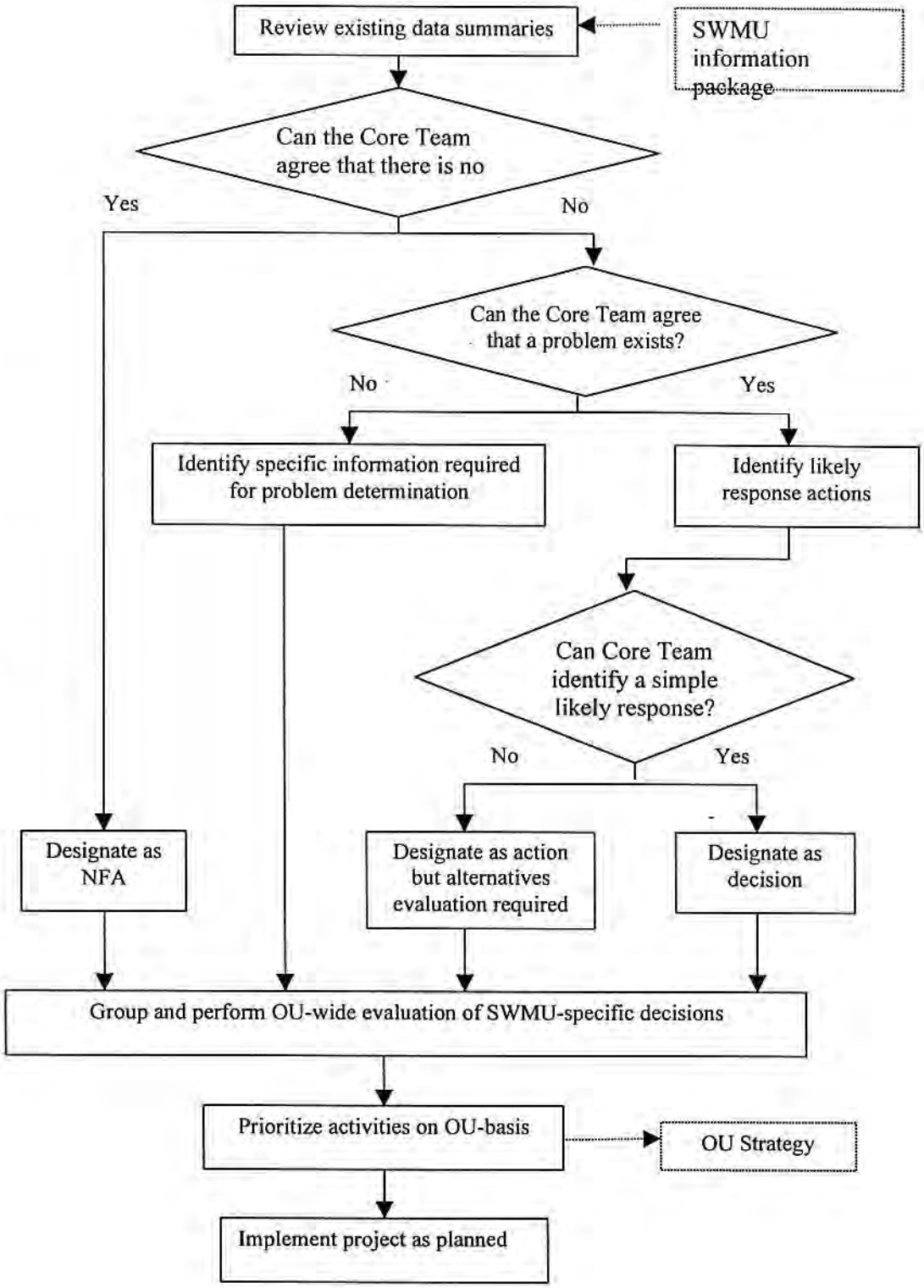
NOTE: Data summary packages need to include, by SWMU:

1. Summary-level presentation of data
   - Data summary tables (key contaminants, frequency of detects, quality)
   - Media-specific action levels
   - Number of sampling events
   - Maps (as appropriate)
   - Trends
   - Conceptual site model (SWMU-specific)
2. Other relevant information required to help make binning decisions

Operable Unit Scoping Activity 3 – Binning
(SWMU Basis)

Note:
A problem means that there is a response action required.

Note:
Risk tables and standards will be used to help make decision, as well as other information at the Core Team's disposal (e.g., leaching, speciation, etc.)



Likely Future Land-Use Assumptions

Purpose: used as the basis for cleanup decisions

On-site secure	→	Industrial	(blue inside fence)
On-site non-secured	→	Recreational	(red, blue)

... with exeptions of:

- Permitted landfills

On-site non-secured	→	Industrial

- Waste treatment plant/lagoons
- SWMU 8 (landfill)
- Areas to be determined by Core Team
- C-103 building

WKWM owned by KDWFR	→	Recreational (green)
TVA-owned land	→	Recreational (purple) - and portions will be TVA-industrial

Note: site-specific exposure scenarios will be developed for each land use to represent, for example, local residents who use recreational land on a more frequent basis than non-residents.

Human Health Risk Criteria

"No Problem"	$<10^{-6}$ HH + standards <0.1 or 1 HI
"Problem"	$>10^{-4}$ HH + standards >3 or 10 HI

- Provide range of risk values for review.
- Recommend pathways/receptors that are relevant to Paducah future land use.
- Identify "standards" or guidance that could be used to "bin."
- Recommend COC list for Paducah (e.g., 95% of the representative contaminants at PGDP).

Members:

- Chair (tentative): Deena Brett (WSRS)
- Glenn Adams (EPA)
- John Richards (EPA)
- John Volpe (KDPH)
- Steve Hampson (KDPH)
- John Morgan (BJC)
- Jeff Crane (EPA)
- Rich Bonczek (SAIC)
- Dianna Feireisel (DOE)
- Gary Bodenstein (DOE)
- Al Westerman (KDEP)

Exposure Scenarios

1. Define human health exposure scenarios/receptors for each likely future land use.
2. Identify ecological exposure scenarios
3. Set expectations for Risk Workgroup:
   - Develop human health $10^{-4}/10^{-6}$ thresholds (HI for non-carcinogen)
   - Identify existing standards (e.g., MCLs) that can be sued to make decisions
   - Develop ecological high/low benchmarks
   - Identify existing standards/benchmarks (e.g., AWQC) that can be used to make decisions
   - Background
4. Confirm risk team members and format for results

INDUSTRIAL (on-site secured/unsecured discrete)

Office & outside worker
Current & future

Soils
- Direct contact
- Ingestion
- Inhalation(?)

Sediments
- Direct contact
- Ingestion

Surface Water
- Inhalation(?)
- Direct contact

RECREATIONAL

Local resident who uses land for recreational uses
"Normal" recreational user – hunting/fishing sportsman
Recreational manager(s) – may be a resident?

Soils
- Direct contact
- Ingestion
- Inhalation(?)

Sediments
- Direct contact
- Inhalation(?)

Surface Water
- Inhalation(?)
- Direct contact
- Ingestion

Exposure Scenarios (continued)

ECOLOGICAL

Surface water
- AWQC
- Warm water aquatic habitat standards

Sediment/Floodplain soils
- Canadian standards
- EPA draft standards

Soils
- (?)

Other benchmarks
- Region 9
- Oak Ridge

Ecological Agenda

1. What "standards" (qualitative or quantitative) are readily available to make problem/no problem decisions? Also, how should they be applied?
2. What pathways and receptors are relevant for ecological decisions at Paducah?

Ecological Risk Team
- Chair (tentative): Pat Kline
- Lynne Wellman (EPA)
- Steve Alexander (USFWS)
- Al Westerman (KDEP)
- Tom Burns (DOE/BJC/SAIC)
- John Maybriar (KDEP)
- Jim Lane (KY FWS)

Core Team Meeting Record
May 16-18, 2000

The Core Team for the Paducah Gaseous Diffusion Plant held a meeting May 16-18, 2000, in Paducah, Kentucky. The meeting was facilitated by personnel from the U.S. Department of Energy's (DOE's) headquarters office. Standard attachments include a Proposed Agenda for the meeting, an Attendance List, and Summaries of Action Items.

Operable Unit Strategy

The first topic of discussion was the OU Strategy. The importance for the Core Team members to obtain the approval of their management on the OU Strategy (including the revised Land Use Map, exposure scenarios, and risk-based screening values) was stressed. The group agreed to initiate the SWOU binning on a limited number of SWMUs using draft (i.e., unapproved) risk values at the next meeting. Members of the Core Team's Risk Workgroup provided brief updates of their recent meeting(s). Members of the (ecological) Risk Workgroup are planning to conduct a tour of the PGDP area on June 14, 2000, to identify habitats. The USFWS plans to conduct telemetry studies on Indiana bats within the next few months. Due to concerns associated with potential recontamination, it was suggested that on-site sources should be remediated prior to remediating any of the off-site creeks. A copy of the November 1999 Land Boundary Survey was distributed to the Core Team members. The following areas outside of the PGDP security fence were identified as industrial areas for the Land Use Map: (a) C-611 water treatment plant area, (b) SWMU 8 landfill area, (c) C-616 lagoons area, and (d) C-746-S and -T landfill areas. The following topics were suggested for discussion at a future Core Team meeting: (a) groundwater point-of-compliance (POC) vs. point-of-exposure (POE), (b) modeling from soils to creeks, (c) modeling from soils to groundwater, then through groundwater to the POC and POE. It also was suggested that the DOE should utilize their ITRD program to address any sedimentation basin questions associated with the SWOU.

Operable Unit and SWMU Crosswalks

The listings of SWMUs for each operable unit were presented, discussed, and modified as agreed upon by the Core Team.

- All burial grounds and other SWMUs that are suspected of contributing contamination to groundwater were added to the Groundwater Operable Unit (GWOU) listing with a footnote indicating that remedial actions for contaminated groundwater beneath the burial grounds will be deferred until remedial action occurs at those burial grounds.
- The Commonwealth of Kentucky suggested that the C-746-S and -T Landfills possibly be moved from regulation under their solid waste program into the FFA/CERCLA program. With no objection from the DOE and EPA, the Commonwealth of Kentucky agreed to pursue this with the Kentucky Division of Waste Management (KDWM) management and, if approved, provide a formal letter to the DOE.
- SWMU 196 was moved from the GWOU to the Soils OU.
- SWMU 211 will be modified to include the C-720 area, instead of just the northwest corner of the building.

Groundwater Operable Unit ROD Strategy

The remedial strategy and remedial alternatives being evaluated in the pending GWOU feasibility study were presented to the Core Team. Following discussion, the group generally agreed that because multiple actions will be required for the GWOU, more than one ROD will be necessary. At a minimum, the actions

will focus on remediation of: (a) on-site sources (including secondary sources such as DNAPLs), (b) off-site dissolved-phase groundwater plumes, and (c) potential "fenceline" containment or treatment actions. Advantages and disadvantages associated with the order of these actions were discussed (i.e., fenceline, then off-site actions, followed by on-site source actions, etc.). It was agreed that the public should be consulted for their input on the remedial alternatives and the sequencing of the actions. The DOE is already planning to conduct a public meeting for the GWOU in mid-July. One of the federal regulators suggested that technical impracticability should be considered. The three treatability studies that are being planned at the PGDP were briefly discussed (i.e., permeable treatment zone, 6-Phase Heating, and C-Sparge ozonation).

Ecological Evaluation at Drum Mountain

This topic was added to the agenda. The DOE handed out a March 1999 report titled "Drum Mountain Small Mammals Sampling" and briefly explained the contents. The group discussed concerns with the sample volumes, laboratory methods, and the lack of analyses for metals. The regulatory agencies informed DOE that it is acceptable to proceed with remedial activities at Drum Mountain as planned. It was suggested that a workgroup be formed to discuss future ecological evaluations at the PGDP.

Operable Unit Strategy (continued)

After further review of the draft OU Strategy paper, the group continued their discussion of the OU Strategy. Uncertainties associated with future land use were discussed. The state regulators indicated that they will require remediation and/or risk management to an excess lifetime cancer risk (ELCR) of 10^{-6}, but the federal regulators indicated that they may disagree with the state's approach if the cost is significantly greater than achieving an ELCR less than 10^{-4}. It was also noted that ecological risks may drive some remedial actions to achieve human health risk levels near or less than 10^{-6}. The Core Team's Risk Workgroup previously agreed that remedial actions must provide adequate protection for residents living in the WKWMA. In addition, the LUCAP may be considered as a tool that allows management of uncertainties associated with future land use.

The timing of activities at the PGDP was briefly discussed. Several CERCLA actions are planned for the next one to two years. It was suggested that FY 2001 be spent conducting the planned actions, conducting the SWMU binning to identify early actions, and beginning to develop workplans for the identified early actions. Then, in FY 2002, CERCLA actions can be continued and any additional assessment activities can be conducted for the appropriate SWMUs. With respect to the North-South Diversion Ditch (NSDD), the group agreed that it is important to scope out the anticipated removal action and obtain input from the public as early as possible. The importance of involving the state and federal Fish and Wildlife Agencies' representatives in any public meeting was agreed upon.

Remedial Action Objectives

Site-wide remedial action objectives (RAOs) were discussed, and the group agreed upon the five following RAOs:

- Return surface waters to their classified use(s), to the maximum extent practicable.
- Return groundwater to its classified use(s), to the maximum extent practicable.
- Ensure media (e.g., soil, sediment, air) pose no unacceptable human health risk for industrial land use for those areas with a future industrial land use designation.
- Ensure media (e.g., soil, sediment, air) pose no unacceptable human health risk for recreational land use by land managers and nearby residents for those areas with a future recreational land use designation.

- Protect ecosystems and ecological receptors from exposure to contaminated media.

Surface Water Operable Unit: Scoping Activity 1

The following personnel were identified as the Surface Water Operable Unit (SWOU) "core team:"
- Jeff Crane – EPA
- Linda Martin and Steve Hampson – Commonwealth of Kentucky
- Raul Castenada – DOE (including subcontractor support)

The list of SWMUs contained in the SWOU was presented. The group briefly discussed some of the Soils OU SWMUs that may be contributing contamination to surface water, SWMU 8, the storm sewer system and the sanitary sewer system, runoff from the active and abandoned process buildings, and the potential need for a sedimentation basin at KPDES Outfall 001. No SWMUs were added to or deleted from the SWOU, but it was modified with footnotes. This completed Scoping Activity 1 for the SWOU.

Surface Water Operable Unit: Scoping Activity 2

The first step of Activity 2 consists of identifying data sources to be used for scoping. A DOE representative distributed the "Paducah Environmental Data Catalog" that lists the projects contained in the Paducah OREIS database. The state's AIP database and USEC data were identified as additional sources of information. The group discussed and agreed that the projects in the following table should be considered for SWOU scoping.

Data Sources to be Considered for SWOU Scoping

1. AIP (SW, KPDES outfall, sediment)
2. Phase I
3. Phase II
4. NW Plume P&T discharge data
5. BM
6. TLD
7. River plane data
8. Precipitation data / Atmospheric data
9. Gauging information
10. Bank soil investigation
11. NSDD
12. WAG 13 lagoons
13. USEC surface water – Big & Little Bayou Creeks
14. USEC Ohio River
15. USEC sediment (check on USEC Soil to verify)
16. USEC KPDES / storm water
17. USEC toxicity data
18. HP survey for posted units
19. Mice data 1997
20. WAG 22 – SW data only
21. WAG 23 – sediment data only
22. USEC discharge data from C-616 Lagoon
23. Outfall 011/012 time critical removal
24. WAGs 1&7
25. WAG 15 sediments from ditch only (diesel spill from above ground tank)
26. PCB study
27. Biological monitoring program

28. C-746-K landfill monitoring (SW)
29. C-746 S&T landfill monitoring (SW only)
30. C-746-K leachate data
31. C-746-K shallow monitoring well data
32. C-746-U lanfill monitoring (SW only)
33. Surface water monitoring data
34. Deer, rabbit, quail, and raccoon sampling for eco (potentially)
35. Annual sediment sampling
36. EMP surface water
37. Bimonthly SW
38. WAG 23 excavation sampling (SW only)
39. WAG 27 excavation sampling (SW only)
40. WAG 27 RI sampling (SW only)
41. WAG 6 sampling (SW only)
42. WAGs 9 & 11 (sediments)
43. Big Picture
44. WAG 8 (SW & sed)
45. WAG 28 (SW & sed)
46. WAG 3 (SW & sed)
47. Data gaps (SW & sed)
48. Historical data for WAG 28 (SW)
49. Historical data for WAGs 9&11 (SW)
50. C-746-K (SW & shallow monitoring wells)
51. All KPDES data
52. Special monitoring at K002 for RCW spill
53. C-746-K (SW data) *(See item #50.)*
54. False Claims Investigation (SW & sediment)
55. KPDES special (tritium sampling)
56. Special Investigation (residential sampling)
57. Handicap pond data
58. Safe drinking water sampling (potentially)
59. USEC SW
60. Toxicity fromC-746-U
61. Miscellaneous:
    - Also, Sitewide PCB evaluation – discharge reports from USEC and DOE
    - And LMES' (i.e., Milne's) fat trap study
    - Any other data relating to process history

It was suggested that the dates associated with each data source be identified. The need for atmospheric data was also noted (i.e., barometric pressure, temperature, etc.). A request for contaminants that may result from the process buildings was made, and it was noted that studies have already been conducted to answer this question. The DOE asked the regulators if they are aware of any additional data, and personnel from the state indicated that they have radionuclide data for KPDES Outfalls 003 and 011. They also indicated that they have the data from the studies conducted by Dr. Birge and others, but noted these data sets are in multiple formats. The DOE subcontractors agreed to work with personnel from the Commonwealth of Kentucky to place their data in a format consistent with that of OREIS. This completed the first step of scoping Activity 2.

The second step of Activity 2 consists of developing the OU conceptual site model. The conceptual site model contained in Figure 1-3 of the *Scoping Document for the Surface Water Operable Unit at the Paducah Gaseous Diffusion Plant* (DOE/OR/07-1798&D1 dated March 1999) was displayed and explained. DOE provided rationale for using the 100-year floodplain as the downstream cutoff for the

SWOU boundary, due to influences from the Ohio River and upstream sources of contaminants to the river. The following SWOU scope was developed and agreed upon by the Core Team:

SWOU Scope

1. D&D handles buildings and pipes within structure.
2. SWOU covers from outside of building to releases/discharges to surface water (SWMU 102).
3. All SWMUs in SWOU are part of scope (as noted on the crosswalk).
4. Extent of contamination in off-site waterways (e.g., Little Bayou and Bayou Creeks). Current assumption: PGDP contaminants have the potential to extend to the Ohio River within the 100-year floodplain. This is an uncertainty (i.e., source of contamination at the confluence) that will be addressed during assessment.
5. Vertical boundary of OU will be formed by extent of contamination (e.g., GW vadose zone) except groundwater under off-site creeks.

The group also identified the following preliminary list of priorities for the SWOU:

SWOU Priorities

Action	Priority
NSDD contamination onsite/offsite as a migration pathway/source (SWMU 58/59)	3
Drum mountain removal action (SWMU 12a)	1
Scrap metal (SWMUs 13-16)	4
Sedimentation basins associated with Drum Mountain & NSDD: • KPDES Outfall 001 • NSDD	2
Other KPDES outfalls/sedimentation basins: • 15, 10, 11, 12, 8, 17, 9	5 (subject for SWOU binning)

The current NOVs associated with the KPDES outfalls were discussed. The applicability of the Warm Water Aquatic Habitat standards (401 KAR 5:031) in the offsite creeks also was discussed.

Surface Water Operable Unit KPDES Outfall Data Presentations

Representatives from the Commonwealth of Kentucky made three separate presentations. First, a presentation was made on Warm Water Aquatic Exceedances, and outfalls that are currently in Toxicity Reduction Evaluation (TRE) were identified. Second, a presentation was made on surface water toxicity exceedances due to elevated metals. Third, a presentation was made on radionuclide concentrations being detected downgradient of the KPDES outfalls. One representative of the state indicated that DOE headquarters has committed (to the Governor of Kentucky) to constructing at least four sedimentation basins at the PGDP.

Scoping Data Presentation

A representative of the DOE presented example maps like those planned for scoping/binning of the SWMUs. Draft data packages were also presented for review. Based on separate discussions, the DOE will begin adding the state's AIP database to the OREIS database, and the EPA and Commonwealth of Kentucky soon will have access to the DOE's OREIS database. The group agreed that non-detects should be calculated as one-half of the detection limit, and all data within the area of review will be evaluated (i.e., not just data from the media of primary concern). The group generally agreed to the example maps and data packages.

Arcview Presentation

Representatives of the EPA presented an Arcview extension program that they are developing for scoping. The EPA indicated that they could provide a copy of the program to the DOE. When asked if this program should be used for the upcoming scoping activities, the EPA suggested that the DOE continue to prepare the scoping packages as planned.

Closing Remarks

Prior to concluding the meeting, the DOE provided the EPA and Commonwealth of Kentucky with a draft of the budget request for FY2002. The group also reviewed the schedule for future workgroup and project team meetings. The next Core Team meeting is scheduled to be held May 31 – June 2, 2000, in Nashville, Tennessee.

The Core Team reached the following agreements during this meeting.

Summary of May 2000 Agreements

The Core Team agreed/voted to accept the proposed revisions to the Operable Unit SWMU listings.

The Core Team agreed/voted to the revised land use text (to clarify the term "recreational") that was developed for the draft OU Strategy document.

The Core Team agreed/voted to approve the following remedial action objectives (RAOs).

- Return surface waters to its classified use(s), to the maximum extent practicable.
- Return groundwater to its classified use(s), to the maximum extent practicable.
- Ensure media (e.g., soil, sediment, air) pose no unacceptable human health risk for industrial land use for those areas with a future industrial land use designation.
- Ensure media (e.g., soil, sediment, air) pose no unacceptable human health risk for recreational land use as resident by wildlife land managers and nearby residents for those areas with a future recreational land use designation.
- Protect ecosystems and ecological receptors from exposure to contaminated media.

The Core Team reached agreement and completed SWOU Scoping Activities 1 and 2.

Proposed Agenda
Paducah Gaseous Diffusion Plant
May 16 – 18, 2000

Location:

Drury Inn at I-24/U.S 60
Next door to Outback Steak House
(270) 443-3313

May 16 - Day 1

I.	Opening Remarks - Agenda - Risk Working Group Update - Atlanta Meeting Minutes - Status of Action Items	8:00 – 9:00
II.	Operable Unit/SWMU Crosswalk	9:00 – 10:30
III.	Newly Identified SWMUs Project	10:30 – 11:30
IV.	Lunch	11:30 – 12:45
V.	Scrap Metal EE/CA Update	12:45 – 1:30
VI.	D&D Program Plan Scoping	1:30 – 2:00
VII.	Groundwater ROD Strategy	2:00 – 4:00

May 17 - Day 2

I.	Surface Water OU Path Forward	8:00 – 9:00
II.	Sediment Control Measures	9:00 – 10:00
III.	Surface Water OU Scoping - Activity 2	10:00 – 11:30
IV.	Lunch	11:30 – 12:30
V.	Surface Water OU Scoping - Activity 2	12:30 – 4:30

Proposed Agenda

Paducah Gaseous Diffusion Plant
May 16 – 18, 2000

- Continued -

May 18 - Day 3

I.	Data Summary Packages – Binning Process - Table Format - Maps, etc.	7:30 – 10:00
II.	Closing Remarks	10:00 – 11:00
III.	Adjourn	11:00

Attendance List

Core Team Meeting

May 16 – 18, 2000

Name	Organization	Telephone	E-mail
Steve Alexander	US Fish & Wildlife Service	931-528-6481 ext. 210	steven_alexander@fws.gov
Brian Begley	KDEP	502-564-6716 ext. 669	
Gary Bodenstein	DOE	270-441-6831	bodensteingw@oro.doe.gov
Gaye Brewer	KDEP	270-441-5278	gaye.brewer@mail.state.ky.us
Tracey Brindley	CDM Federal	270-462-3006	brindleytl@cdm.com
Raul Castenada	DOE (SWOU)	270-441-6809	castenadajr@oro.doe.gov
Marissa Colburn	Project Performance Corp.	703-748-7076	mcolburn@ppc.com
Jeff Crane *	US EPA	404-562-8546	crane.jeff@epa.gov
Ken Davis	SAIC	270-462-4553	davisk@saiceecg.com
Dianna Feireisel *	DOE	270-441-6812	feireiseldf@oro.doe.gov
Bruce Ford	SAIC	270-462-4552	fordb@saiceecg.com
Carl Froede, Jr. *	US EPA	404-562-8550	froede.carl@epa.gov
Steve Golian	DOE	301-803-7791	steven.golian@em.doe.gov
Pat Gourieux	Bechtel Jacobs Company	270-441-5062	gourieuxpa@bechteljacobs.org
Mike Guffey *	KDEP	502-564-6716	mike.guffey@mail.state.ky.us
Richard Hammond	US EPA (Arcview expert)	(404) 562-8535	hammond.richard@epa.gov
Steve Hampson	KY Radiation Control	502-564-8390	skhamp1@pop.uky.edu
Fraser Johnstone	SAIC	270-462-4549	johnstonef@saiceecg.com
Craig Jones	Bechtel Jacobs Company	270-441-5114	N8E@bechteljacobs.org
Jim Lane	KY Dept. of Fish & Wildlife Resources	502-564-7109 ext. 366	jim.lane@mail.state.ky.us
Chris Marshall	Bechtel Jacobs Company	270-441-5083	Q12@bechteljacobs.org
Linda Martin	KDEP	502-564-6716 ext. 633	linda.martin@mail.state.ky.us
Dave Massey	Bechtel Jacobs Company	270-441-5071	Z22@bechteljacobs.org

Name	Organization	Telephone	E-mail
Jon Maybriar	KDEP	502-564-6716 ext. 621	
Bruce Meadows	TetraTech	270-441-5119	BM3@bechteljacobs.org
John Morgan	Bechtel Jacobs Company	270-441-5069	morganjw@bechteljacobs.org
Bobby Moss	KHAFRA Engineering for US EPA (Arcview expert)		
Todd Mullins	KDEP		todd.mullins@mail.state.ky.us
Greg Shaia	Bechtel Jacobs Company	270-441-5223	GXZ@bechteljacobs.org
John Sheppard *	DOE	270-441-6804	sheppardjd@oro.doe.gov
Jeff Smyth	Project Performance Corp.	509-542-1280	jsmyth@ppc.com
M'balia Tagoe	Bechtel Jacobs Company	270-441-5236	tagoem@bechteljacobs.org
Tuss Taylor *	KDEP	502-564-6716	tuss.taylor@mail.state.ky.us
John Volpe *	KY Radiation Control	502-564-3700	john.volpe@mail.state.ky.us

Notes:
* - Core Team members

Summary of Action Items

May 16-18, 2000

	Action Item	Responsibility	Date Identified	Status or Due Date
1.	Identify sources of data	Pat Gourieux	March 2000	Completed
2.	Prepare OU Strategy white paper	John Morgan, Jeff Smyth, and Steve Golian	March 2000	Completed
3.	Prepare charters for Risk Workgroup and Data-Sharing Workgroup	Jeff Crane	March 2000	Completed
4.	Identify members of Risk Workgroup	DOE, EPA, and Kentucky Core Team members	March 2000	Completed during 4/12/00 Core Team meeting
5.	Prepare letter to formally suspend the SWOU and SSOU projects for 90 days	John Sheppard	March 2000	Completed
6.	Develop meeting minutes for Core Team telephone calls	DOE	April 2000	As needed
7.	Develop a Core Team meeting minutes notebook. (The minutes may later be placed on the BJC web page.)	DOE (John Morgan)	April 2000	Ongoing
8.	Develop a draft charter for the Core Team	DOE (John Morgan)	April 2000	(Not specified)
9.	Determine whether FACA is applicable	DOE (Feireisel)	April 2000	(Not specified)
10.	Provide a copy of the data listing to Steve Alexander	DOE (Pat Gourieux)	April 2000	Completed
11.	Draft revised Operable Unit Strategy text	Kentucky (Tuss Taylor)	April 2000	May 2000 Core Team Meeting
12.	Develop draft revisions for FFA, as appropriate.	DOE (Morgan) & EPA (Froede)	April 2000	May 2000 Core Team Meeting
13.	Prepare example scoping information for one or two example SWMUs	DOE/BJC	April 2000	Prior to May 2000 Core Team Meeting
14.	Complete the "OU notebook" and provide to EPA and Commonwealth of Kentucky	DOE/BJC	April 2000	Prior to May 2000 Core Team Meeting

Summary of Action Items
May 16-18, 2000

	Action Item	Responsibility	Date Identified	Status or Due Date
15.	E-mail latest SWMU crosswalk to all Core Team members	DOE (John Morgan)	April 2000	ASAP
16.	Provide one or two example cases of OU Scoping "Activity 2"	DOE (BJC)	April 2000	May 2000 Core Team Meeting
17.	Provide radionuclide data set to BJC (M'balia Tagoe)	Kentucky (John Volpe)	April 2000	ASAP
18.	Obtain the legal plot of the Land Use for Jim Lane	DOE (John Morgan)	April 2000	May 2000 Core Team Meeting
19.	Present map to Core Team that clearly identifies the current industrial areas	DOE (John Morgan)	April 2000	May 2000 Core Team Meeting
20.	Revise map of current land use, which includes the point-of-compliance (POC)	DOE (M'balia Tagoe)	April 2000	May 2000 Core Team Meeting
21.	Prepare revised maps showing general property ownership, current land use, and assumed future land use	DOE (John Morgan)	April 2000	May 2000 Core Team Meeting
22.	Develop/refine list of areas that are considered to be "current industrial use" outside of the PGDP security fence for the revised land-use map(s)	DOE	April 2000	May 2000 Core Team Meeting
23.	Schedule site tour for Golian and Smyth	DOE (Pat Gourieux)	April 2000	May 15, 2000
24.	Provide draft RAOs to the Core Team	DOE	April 2000	May 2000 Core Team Meeting
25.	Prepare draft site-specific exposure scenarios to the Risk Workgroup	DOE (John Morgan)	April 2000	4/25/00 Risk Workgroup Meeting
26.	Provide F&W records of use within the WKWMA (recreational hunting/fishing sportsmen and recreational management personnel) to the Risk Workgroup	USFWS (Steve Alexander)	April 2000	4/25/00 Risk Workgroup Meeting
27.	Track down radiological data for eco-risk work group (requested by Alexander)	Kentucky (John Volpe) & EPA (John Richards)	April 2000	4/25/00 Risk Workgroup Meeting

Summary of Action Items
May 16-18, 2000

	Action Item	Responsibility	Date Identified	Status or Due Date
28.	Search PGDP database (OREIS) and develop a "limited" list of contaminants, which the Risk Workgroup will use to develop action levels	DOE (Pat Gourieux)	April 2000	4/25/00 Risk Workgroup Meeting
29.	Check on availability of Deena Brett from SRS to chair the Human Health Risk Workgroup	Steve Golian	April 2000	4/25/00 Risk Workgroup Meeting
30.	Check on availability of Pat Kline to chair the Ecological Risk Workgroup	DOE (John Morgan)	April 2000	4/25/00 Risk Workgroup Meeting
31.	Identify schedule for meetings and conference calls	Risk Workgroup	April 2000	4/19/00 Conference Call
32.	Revise Risk Workgroup Charter	EPA (Jeff Crane)	April 2000	ASAP
33.	Revise meeting calendar and issue to Team	DOE (John Morgan)	April 2000	ASAP
34.	Verify that April 25-26 ITRD meeting has been cancelled/postponed	DOE (John Sheppard)	April 2000	ASAP
35.	Develop/maintain meeting calendar	DOE (John Morgan)	April 2000	Continual
36.	Review April Core Team meeting minutes for discussion/approval.	Core Team Members (EPA, DOE and Commonwealth of Kentucky)	May 2000	Prior to June 2000 Core Team Meeting
37.	Place approved meeting minutes on a web page.	John Morgan (BJC)	May 2000	Unidentified
38.	Draft text for GWOU decision documents indicating that "source control actions will be taken at SWMUs 2, 3, and 4" for EPA & KY review.	John Morgan (BJC)	May 2000	Prior to June 2000 Core Team Meeting
39.	Investigate moving the jurisdiction of groundwater at C-746-S and -T Landfills from the solid waste program to the FFA, and they will provide a letter to the DOE.	Commonwealth of Kentucky	May 2000	Provide status at June 2000 Core Team Meeting

Summary of Action Items

May 16-18, 2000

	Action Item	Responsibility	Date Identified	Status or Due Date
40.	Submit a revised SWMU Assessment Report for SWMU 211, and change the title to include the C-720 area. The description will reflect the three areas of contamination.	DOE/BJC	May 2000	Provide status at June 2000 Core Team Meeting
41.	Discuss the term "recreational" with the Risk Workgroup.	Steve Hampson (Commonwealth of Kentucky)	May 2000	Risk Work Group conference call to be held week of May 22, 2000
42.	Revise the SWOU list of SWMUs by adding the comments and footnotes agreed upon at the Core Team meeting.	DOE/BJC	May 2000	Prior to June 2000 Core Team Meeting
43.	Resend AIP data in one package/transmittal to BJC.	Commonwealth of Kentucky	May 2000	ASAP
44.	Provide BJC with SW data from the TVA canal that indicates the presence of Tc-99.	Jon Maybriar (Commonwealth of Kentucky)	May 2000	ASAP
45.	Provide copies of the data and electronic copies of the maps used in Linda Martin's presentation to DOE/BJC (Chris Marshall).	Brian Begley and/or Linda Martin (Commonwealth of Kentucky)	May 2000	ASAP
46.	Provide copies of the studies and graphs used in Jon Maybriar's presentation to DOE/BJC (Raul Castenada).	Jon Maybriar (Commonwealth of Kentucky)	May 2000	ASAP
47.	Obtain better quality information for the outfall ditches.	BJC	May 2000	Prior to SWOU Scoping/Binning Meeting
48.	Provide copy of Arcview extension program to DOE/BJC (Pat Gourieux)	DOE (Jeff Crane)	May 2000	Unidentified
49.	Discuss coordination of a multi-agency trip to the on-site disposal cell at the Fernald site.	John Morgan (BJC) to coordinate with Jim Skridulis (BJC)	May 2000	Provide status at June 2000 Core Team Meeting

Core Team Meeting Record
May 31 – June 1, 2000

The Core Team for the Paducah Gaseous Diffusion Plant held a meeting May 31 – June 1, 2000, in Nashville, Tennessee. The meeting was facilitated by personnel from the U.S. Department of Energy's (DOE's) headquarters office. Standard attachments include a Proposed Agenda for the meeting, an Attendance List, and Summaries of Action Items.

Summary of Risk Work Group Recommendations: Ecological

The chairperson of the Ecological Risk Work Group presented suggested guidance for conducting ecological risk assessments at the PGDP. The contents of the paper were presented to the Core Team and discussed. During the discussion, it was noted that, with the exception of uranium, ecological screening values were not developed for radionuclides. The Work Group developed "no action" screening levels, only, indicating that there are no imminent/acute ecological threats at the PGDP. The adequacy of EPA's standard SW-846 sampling protocol for biota was questioned, but it was noted that biotic data will not be used to bin the SWMUs because there is no acute risk to biota. Ecological screening values for soil and water are complete, but sediment values are still under development. Sediment modeling was recommended as a topic for the next modeling group meeting at the PGDP. The ecological screening values apply only at the receptor location, and they are not intended to be used in modeling to a point of exposure. The following overhead slide was developed to summarize the list of recommendations from the Ecological Risk Work Group:

Summary of Ecological Risk Work Group Recommendations

Binning Support

1. Will provide media-specific "no-action" levels.
   - Are conservative (i.e., probably not much will pass this screen).
   - Are based on abiotic data (i.e., does not consider bioaccumulation).
   - Must still use judgment to understand ramification of no-further-action (i.e., is it a source to runoff in addition to direct exposure?).
   - Will identify areas of minimal ecological concern (i.e., lack of habitat) on site that would allow response actions to address human health
2. Existing information does not suggest need for immediate actions.
   - Data set may be incomplete.
   - Human health will likely take care of high priority ecological concerns.
3. Suspect most SMWUs will be "further assessment" from an ecological perspective.
   - Propose eco-risk person be present at binning to help w/ prioritization of SWMUs.
   - Screening values will be used to help prioritize activities (e.g., response and assessment).

Long-Term Issues

1. Sampling protocol (specifically biotic).
   - Propose workgroup to review and revise methods before sampling starts.
2. Cleanup levels.
   - Sediment modeling.
   - Site-specific data.
   - Action-specific (e.g., excavation).
3. Plant discharge permits vs. DOE permits vs. ecological concerns.
   - Need to develop set of consistent requirements (state).
4. SWOU boundaries.
   - Recommend further assessment of Ohio River.

Summary of Risk Work Group Recommendations: Human Health

The chairperson of the Human Health Risk Work Group presented assumptions and risk-based screening values. The "action" values represent an excess lifetime cancer risk (ELCR) of $1x10^{-4}$, and the "no action" values represent an ELCR of $1x10^{-6}$. It was noted that these screening values were developed for comparison to individual constituents (i.e., they do not include cumulative effects), and they are intended solely for use in the SWMU binning process. The group discussed recalculation of the screening values based on central tendency factors, but decided that it would not be advantageous to revise the screening values. The Risk Workgroup plans to provide additional screening values within the next two to three weeks. With regard to background values, the group generally agreed to screen against the background values previously presented in the DOE's Risk Methods document. The group briefly discussed whether screening values for leachability should be considered and decided that this should not be disregarded.

Operable Unit Strategy

The Core Team discussed specific revisions to the draft OU Strategy. The path forward for the GWOU feasibility study was discussed with respect to the strategy being developed for the other SWMUs. The group agreed that the D1 GWOU FS report will be issued as scheduled, and they agreed to bin the GWOU SWMUs for consistency with the other OUs and for documentation purposes. The Core Team discussed finalization of the OU Strategy for presentation to DOE, EPA, and Commonwealth of Kentucky management and the SSAB. The group briefly discussed agenda topics for future meetings.

NSDD Removal Action Scoping

A previous determination was made to conduct a removal action of the North-South Diversion Ditch (NSDD). A DOE representative provided a history of the NSDD and identified the areas that are posted for radionuclide contamination pursuant to 10 CFR 835. Detailed discussions of the NSDD were divided into three discrete portions.

- On-site NSDD: This portion of the ditch is limited to that length located on DOE property inside of the PGDP security fence. Additional background and flow information was presented. A draft data scoping package was presented to the group, and sample locations that exceeded the risk-based action screening levels (i.e., draft values for human health $>10^{-4}$) were identified on a map. Based on these exceedances in the southern portion of the NSDD, radionuclide levels, and process knowledge, the Core Team decided that a "problem" warranting action exists in the on-site NSDD. The Core Team agreed that one objective of any action is to minimize the need for radionuclide postings.

- Off-site NSDD: This portion of the ditch, located entirely on DOE property, consists of that length outside/downgradient of the PGDP security fence northward to where the NSDD discharges into Little Bayou Creek. Additional background and flow information was presented. A draft data scoping package was presented to the group, and sample locations that exceeded the risk-based action screening levels (i.e., draft values for human health $>10^{-4}$) were identified on a map. A brief summary of the data recently collected by the Department of Justice was presented and discussed.

  The Core Team agreed that unacceptable conditions, which warrant an action, exist in that offsite portion of the NSDD located between the plant fence and Ogden Landing Road, based on analytical data/exceedence of risk thresholds, process knowledge, radionuclide levels, and PCB exceedances for ecological risks.

  After reviewing the available data, the Core Team agreed that inadequate data exists to make any decisions on the NSDD located north of Ogden Landing Road. After discussion, the group agreed that the Commonwealth of Kentucky would conduct an expedited radionuclide screen of the NSDD north of Ogden Landing Road, and the DOE will conduct a concurrent screen for PCBs using field test kits. Although these screens will not detect metals, the radionuclide and PCB screens will be used as indicators of potential problems areas in the NSDD for further study and/or action. In addition, the Commonwealth of Kentucky's Waste Management Division will provide any available data on this portion of the NSDD to the DOE.

- Abandoned NSDD: This portion, located entirely on DOE property, is located partially under the cap (subsurface) for the C-746-S and -T landfills. When abandoned, it was filled with flyash and other wastes from nearby waste deposits, now identified as SWMU 145. The Core Team agreed that inadequate data exists to make any decisions on the abandoned NSDD. The group identified the abandoned NSDD as a potential source of groundwater contamination, but acknowledged that the contents of the ditch itself are minimal when compared to the waste material in this area (i.e., SWMU 145). The Core Team agreed to pursue placing the abandoned NSDD, along with SWMU 145, in both the BGOU and GWOU. Although the landfill cap prevents any direct contact with the wastes in the abandoned NSDD, the group discussed the possibility of surrounding it with a fence to prevent intrusions into the wastes.

Closing Remarks

Prior to concluding the meeting, the group discussed agenda items for the next Core Team meeting, which is scheduled to be held June 20-22, 2000, in Nashville, Tennessee.

The Core Team reached the following agreements during this meeting.

Summary of Agreements
May 31 – June 1, 2000

The Core Team formally voted/agreed to allow DOE to issue the D1 GWOU FS report as scheduled, then bin GWOU SMWUs, determine a path forward/strategy for all GWOU SWMUs, and develop corresponding schedule and milestones.

Based on analytical results that exceed the human health screening values, radionuclide levels, and process knowledge, the Core Team formally voted/agreed that a "problem" warranting action exists in the on-site NSDD.

The Core Team formally voted/agreed that unacceptable conditions, which warrant an action, exist in that offsite portion of the NSDD located between the PGDP security fence and Ogden Landing Road, based on analytical data/exceedence of risk thresholds, process knowledge, radionuclide levels, and PCB exceedances for ecological risks.

After reviewing the available data, the Core Team formally voted/agreed that inadequate data exists to make any decisions on the NSDD located north of Ogden Landing Road.

The Core Team agreed that inadequate data exists to make any decisions on the abandoned NSDD, and formally voted/agreed to place the abandoned NSDD in SWMU 145, which is part of the BGOU.

Proposed Agenda

Paducah Gaseous Diffusion Plant
May 31 – June 1, 2000

May 31 - Day 1

I. Media-Specific Action Levels

II. Other Outstanding Items
- OU Strategy
- Etc.

June 1 - Day 2

I. N/S Ditch Scoping

Attendance List
Core Team Meeting
May 31 – June 1, 2000

Name	Organization	Telephone	E-mail
Glenn Adams	EPA	404-562-8667	adams.glenn@epa.gov
Steve Alexander	US Fish & Wildlife Service	931-528-6481 ext. 210	steven_alexander@fws.gov
Rich Bonczek	SAIC	865-481-4679	richard.r.bonczek@saic.com
Dena Brett	Westinghouse Savannah River Company	803-952-6031	dena.brett@srs.gov
Tom Burns	SAIC	865-481-8772	burnst@saic.com
Raul Castenada	DOE (SWOU)	270-441-6809	castenadajr@oro.doe.gov
Marissa Colburn	Project Performance Corp.	703-748-7076	mcolburn@ppc.com
Jeff Crane *	US EPA	404-562-8546	crane.jeff@epa.gov
Dianna Feireisel *	DOE	270-441-6812	feireiseldf@oro.doe.gov
Kathleen Ferguson	Dynamac	301-407-6093	kferguson@dyanmac.com
Bruce Ford	SAIC	270-462-4552	fordb@saiceecg.com
Pat Gourieux	Bechtel Jacobs Company	270-441-5062	gourieuxpa@bechteljacobs.org
Mike Guffey *	KDEP	502-564-6716	mike.guffey@mail.state.ky.us
Steve Hampson	KY Radiation Control	502-564-8390	skhampl@pop.uky.edu
Jim Lane	KY Dept. of Fish & Wildlife Resources	502-564-7109 ext. 366	jim.lane@mail.state.ky.us
Chris Marshall	Bechtel Jacobs Company	270-441-5083	Q12@bechteljacobs.org
Linda Martin	KDEP	502-564-6716 ext. 633	linda.martin@mail.state.ky.us
John Morgan	Bechtel Jacobs Company	270-441-5069	morganjw@bechteljacobs.org
John Purdy	KDEP	502-564-6120	john.purdy@mail.state.ky.us
Jon Richards	EPA	404-562-8648	richards.jon@epa.gov
Jeff Smyth	Project Performance Corp.	509-542-1280	jsmyth@ppc.com
M'balia Tagoe	Bechtel Jacobs Company	270-441-5236	tagoem@bechteljacobs.org

Name	Organization	Telephone	E-mail
Larry Taylor	KDEP	502-564-6120	larryc.taylor@mail.state.ky.us
Tuss Taylor *	KDEP	502-564-6716	tuss.taylor@mail.state.ky.us
John Volpe *	KY Radiation Control	502-564-3700	john.volpe@mail.state.ky.us

Notes:
* - Core Team members

Summary of Action Items
May 31 – June 1, 2000

	Action Item	Responsibility	Date Identified	Status or Due Date
1.	Identify sources of data	Pat Gourieux	March 2000	Completed
2.	Prepare OU Strategy white paper	John Morgan, Jeff Smyth, and Steve Golian	March 2000	Completed
3.	Prepare charters for Risk Workgroup and Data-Sharing Workgroup	Jeff Crane	March 2000	Completed
4.	Identify members of Risk Workgroup	DOE, EPA, and Kentucky Core Team members	March 2000	Completed during 4/12/00 Core Team meeting
5.	Prepare letter to formally suspend the SWOU and SSOU projects for 90 days	John Sheppard	March 2000	Completed
6.	Develop meeting minutes for Core Team telephone calls	DOE	April 2000	As needed
7.	Develop a Core Team meeting minutes notebook. (The minutes may later be placed on the BJC web page.)	DOE (John Morgan)	April 2000	Ongoing
8.	Develop a draft charter for the Core Team	DOE (John Morgan)	April 2000	Prior to July Core Team meeting
9.	Determine whether FACA is applicable	DOE (Feireisel)	April 2000	Prior to August Core Team meeting
10.	Provide a copy of the data listing to Steve Alexander	DOE (Pat Gourieux)	April 2000	Completed
11.	Draft revised Operable Unit Strategy text	Kentucky (Tuss Taylor)	April 2000	Completed by DOE/BJC
12.	Develop draft revisions for FFA, as appropriate.	DOE (Morgan) & EPA (Froede)	April 2000	Ongoing
13.	Prepare example scoping information for one or two example SWMUs	DOE/BJC	April 2000	Completed
14.	Complete the "OU notebook" and provide to EPA and Commonwealth of Kentucky	DOE/BJC	April 2000	Completed (distributed at June Core Team meeting)

Summary of Action Items
May 31 – June 1, 2000

	Action Item	Responsibility	Date Identified	Status or Due Date
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16.	Provide one or two example cases of OU Scoping "Activity 2"	DOE (BJC)	April 2000	Completed
17.	Provide radionuclide data set to BJC (M'balia Tagoe)	Kentucky (John Volpe)	April 2000	Completed
18.	Obtain the legal plot of the Land Use for Jim Lane	DOE (John Morgan)	April 2000	Completed at May Core Team Meeting
19.	Present map to Core Team that clearly identifies the current industrial areas	DOE (John Morgan)	April 2000	Completed
20.	Revise map of current land use, which includes the point-of-compliance (POC)	DOE (M'balia Tagoe)	April 2000	Completed as part of Action Item #21
21.	Prepare revised maps showing general property ownership, current land use, and assumed future land use	DOE (John Morgan)	April 2000	Completed
22.	Develop/refine list of areas that are considered to be "current industrial use" outside of the PGDP security fence for the revised land-use map(s)	DOE	April 2000	Completed
23.	Schedule site tour for Golian and Smyth	DOE (Pat Gourieux)	April 2000	Completed May 15, 2000
24.	Provide draft RAOs to the Core Team	DOE	April 2000	Completed
25.	Prepare draft site-specific exposure scenarios to the Risk Workgroup	DOE (John Morgan)	April 2000	Completed
26.	Provide F&W records of use within the WKWMA (recreational hunting/fishing sportsmen and recreational management personnel) to the Risk Workgroup	USFWS (Steve Alexander)	April 2000	Completed
27.	Track down radiological data for eco-risk work group (requested by Alexander)	Kentucky (John Volpe) & EPA (John Richards)	April 2000	Completed

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May 31 – June 1, 2000

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29.	Check on availability of Dena Brett from SRS to chair the Human Health Risk Workgroup	Steve Golian	April 2000	Completed
30.	Check on availability of Pat Kline to chair the Ecological Risk Workgroup	DOE (John Morgan)	April 2000	Completed
31.	Identify schedule for meetings and conference calls	Risk Workgroup	April 2000	Completed
32.	Revise Risk Workgroup Charter	EPA (Jeff Crane)	April 2000	Completed
33.	Revise meeting calendar and issue to Team	DOE (John Morgan)	April 2000	Completed
34.	Verify that April 25-26 ITRD meeting has been cancelled/postponed	DOE (John Sheppard)	April 2000	Completed
35.	Develop/maintain meeting calendar	DOE (John Morgan)	April 2000	Continual
36.	Review April Core Team meeting minutes for discussion/approval.	Core Team Members (EPA, DOE and Commonwealth of Kentucky)	May 2000	Discuss during next Core Team meeting
37.	Design Core Team web page on Paducah public home page and post approved Core Team meeting minutes.	John Morgan (BJC)	May 2000	Discuss during next Core Team meeting
38.	Draft text for GWOU decision documents indicating that "source control actions will be taken at SWMUs 2, 3, and 4" for EPA & KY review.	John Morgan (BJC)	May 2000	Completed
39.	Investigate moving the jurisdiction of groundwater at C-746-S and -T Landfills from the solid waste program to the FFA, and they will provide a letter to the DOE.	Commonwealth of Kentucky	May 2000	Discuss during next Core Team meeting

Summary of Action Items
May 31 – June 1, 2000

	Action Item	Responsibility	Date Identified	Status or Due Date
40.	Submit a revised SWMU Assessment Report for SWMU 211, and change the title to include the C-720 area. The description will reflect the three areas of contamination.	DOE/BJC (John Morgan and Craig Jones)	May 2000	Discuss during next Core Team meeting
41.	Discuss the term "recreational" with the Risk Workgroup.	Steve Hampson (Commonwealth of Kentucky)	May 2000	Completed
42.	Revise the SWOU list of SWMUs by adding the comments and footnotes agreed upon at the Core Team meeting.	DOE/BJC	May 2000	Completed
43.	Resend AIP data in one package/transmittal to BJC.	Commonwealth of Kentucky	May 2000	Pending
44.	Provide BJC with SW data from the TVA canal that indicates the presence of Tc-99.	Jon Maybriar (Commonwealth of Kentucky)	May 2000	Discuss during next Core Team meeting
45.	Provide copies of the data and electronic copies of the maps used in Linda Martin's presentation to DOE/BJC (Chris Marshall).	Brian Begley and/or Linda Martin (Commonwealth of Kentucky)	May 2000	Completed
46.	Provide copies of the studies and graphs used in Jon Maybriar's presentation to DOE/BJC (Raul Castenada).	Jon Maybriar (Commonwealth of Kentucky)	May 2000	Discuss during next Core Team meeting
47.	Obtain better quality information for the outfall ditches.	BJC	May 2000	Completed (part of SWOU binning)
48.	Provide copy of Arcview extension program to DOE/BJC (Pat Gourieux)	DOE (Jeff Crane)	May 2000	Discuss during next Core Team meeting
49.	Discuss coordination of a multi-agency trip to the on-site disposal cell at the Fernald site.	John Morgan (BJC) to coordinate with Jim Skridulis (BJC)	May 2000	Discuss during next Core Team meeting
50.	Provide Ecological Risk Work Group (Kathleen Ferguson) with background information	John Morgan (BJC)	May 31, 2000	Completed

Summary of Action Items
May 31 – June 1, 2000

	Action Item	Responsibility	Date Identified	Status or Due Date
51.	Obtain KPDES limits (DOE & USEC outfalls) for SWOU binning meeting.	BJC/SAIC	May 31, 2000	Completed (part of SWOU binning)
52.	Obtain revised/updated sediment values from Lynn Wellman (EPA) and provide the values to BJC	Jeff Crane (EPA)	May 31, 2000	Completed
53.	Inform Alauddin Kahn (modeling group chairperson) to include sediment modeling in the scope and to begin involving Steve Alexander.	Bruce Ford (SAIC)	May 31, 2000	Completed
54.	Develop upper-risk numbers for screening/binning activities and provide guidance for use.	Ecological Risk Work Group (Kathleen Ferguson and/or Tom Burns)	May 31, 2000	Completed
55.	Develop ARAR-based values for the screening activities.	BJC/SAIC	May 31, 2000	Completed
56.	Revise OU Strategy to indicate that the GWOU feasibility study will be completed prior to conducting scoping/binning, as previously planned.	John Morgan (BJC)	May 31, 2000	Verify during next Core Team meeting
57.	Provide revised SWMU crosswalks to Core Team facilitator Jeff Smyth.	Bruce Ford (SAIC)	May 31, 2000	Completed
58.	With regard to the statistical analysis of the SWMU analytical data, determine how non-detections are calculated, and clarify the data sets that are used.	Bruce Ford (SAIC)	June 1, 2000	Completed
59.	Conduct expedited screening of the North-South Diversion Ditch between Ogden Landing Road and Little Bayou Creek for radionuclides and PCBs.	Radionuclides: John Volpe (Commonwealth of Kentucky) PCBs: Chris Marshall (BJC) and Bruce Ford (SAIC)	June 1, 2000	Completed
60.	Revise NSDD-scoping maps to correct the location of SWMU 145 and the abandoned portion of the NSDD.	Chris Marshall (BJC) and Bruce Ford (SAIC)	June 1, 2000	Completed

FACT SHEET

INTEGRATED NUCLEAR MATERIALS MANAGEMENT: A STRATEGIC APPROACH TO INTEGRATING THE LONG-TERM MANAGEMENT OF NUCLEAR MATERIALS

Purposes:

The Integrated Nuclear Materials Management Plan serves multiple purposes. First, the report has been the catalyst for action on unresolved issues related to the disposition of nuclear materials that are a legacy of the Cold War. Second, it serves as a blueprint for future action by the Department, including the modernization of an aged infrastructure. Third, the report provides the first consolidated account to Congress and the public of the Department's unclassified inventory of nuclear materials and a description of how and where we manage these materials. Finally, the report examines opportunities for achieving increased integration, coordination, and efficiency and commits the Department to a twenty-five point, multi-year action agenda.

Congressional Directive:

The Integrated Nuclear Materials Management Plan (Plan) has been prepared in response to Section 3172 of the National Defense Authorization Act for FY-2000.

Plan Objectives:

1. Provide for an integrated, corporate approach for achieving Departmental missions through effective and integrated cradle-to-grave management of fissile materials and other nuclear materials in a way that:
   - Provides continued risk reduction
   - Provides for cost savings and budgetary efficiencies
   - Promotes non-proliferation /arms control
   - Advances integrated management of nuclear materials and improved effectiveness
2. Support ongoing Departmental missions responsibilities in: (a) Arms Control; (b) Nonproliferation; (c) National Security; (d) Environment; (e) Science; and (f) Energy.

Scope of the Plan:

The report addresses the integrated management of: (1) national security materials; (2) non-national security materials; and (3) excess materials. Nuclear materials contained in low level waste, transuranic waste, and high level waste are outside the scope of the Plan. Nuclear materials in several broad groups are evaluated, including uranium materials, plutonium materials, spent nuclear fuel, and other nuclear materials (e.g., sealed sources, special isotopes).

Content of the Plan:

- Identifies current baseline plans for management of nuclear materials.
- Identifies improvements to existing policy, organizational arrangements, and operational practices
- Addresses facilities, transportation, and technology development, *i.e.*, issues that cross-cut the management of different types of materials.

Copies Available:

The INMMP can be secured by visiting www.policy.energy.gov/nmsi.html. A "hard copy" request can be mailed to the following address:

DOE INMMP
Office of Policy, Mail Code PO-4, Room 7C034
1000 Independence Avenue, SW
Washington, D.C. 20585
An e-mail request can be made to INMMP@hq.doe.gov

7/12/00

Paducah Site-Specific Advisory Board
FY 2000 Costs

Item	Budget	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	YTD	Remaining
General Support to SSAB															
Office Rental	5,000.00	776.00			776.00	776.00		388.00	1,140.00	679.00				4,535.00	465.00
Member Travel	33,000.00						1,098.00							1,098.00	31,902.00
Admin. Support	72,331.00	3,438.00	4,988.00	3,330.00	4532.00	4,706.00	7,310.00	4,985.00	4,812.00	5,086.00				42,987.00	29,344.00
Information & Communication	45,090.00	480.00	480.00	480.00	720.00	3,450.00	9,390.00	480.00	480.00	1,581.00				17,541.00	27,549.00
Support to Subcommittees															
Community Outreach															
Travelling Exhibit	9,000.00													0	9,000.00
Exhibit Revisions	900.00													0	900.00
Media Announcements	3,630.00		484.00					1,452.00						1,936.00	1,694.00
Newsletter	6,658.00													0	6,658.00
Fact Sheets	1,440.00					960.00								960.00	480.00
Mailing List Maintenance	1,824.00	152.00	152.00	152.00	152.00	152.00	152.00	152.00	152.00	152.00				1,368.00	456.00
Web Page Maintenance	1,500.00													0	1,500.00
Policy & Personnel															
Technical Advisor	25,000.00													0	25,000.00
Total	205,373.00	4,846.00	6,104.00	3,962.00	6,180.00	10,044.00	17,950.00	7,457.00	6,384.00	7,498.00	0	0	0	70,425.00	134,948.00

Notes: Office Rental includes:
- office supplies

EM SITE-SPECIFIC ADVISORY BOARD (SSAB)

FINAL AGENDA, SEMI-ANNUAL CHAIRS MEETING

AUGUST 3-5, 2000 AMARILLO, TX

Thursday, August 3, 2000: EM SSAB CHAIRS MEETING (DAY 1)

Location: *The Ambassador Hotel*
3100 I-40 West
Amarillo, TX 79102
Phone: 806//358-6161
Fax: 806/358-9869
Toll Free Reservations: 800/817-0521 **(make your reservations prior to 7/13)**
(Mention the SSABs meeting for the price)

07:30 B 8:15 a.m.	Registration (complimentary juice, coffee, bagels, donuts)
08:15 - 08:45	Opening Remarks/Welcome (Martha Crosland, Director, EM-11 Hqtrs and John Bernier, Deputy Manager, DOE, Amarillo Area Office)
08:45 - 09:00	Welcoming/Ground Rules (Facilitator)
09:00 - 11:30	Round robin (limit to 20 min or less/each site) A representative(s) from each SSAB will discuss: B Site issues of concern B Site Ground water Issues/Technologies BBoard Outreach to the Community (as requested by Oak Ridge SSAB) 1. Fernald 2. Hanford 3. Idaho 4. Los Alamos 5. Nevada
10:00 - 10:15	Break
	6. Oak Ridge 7. Paducah 8. Pantex 9. Rocky Flats 10. Sandia

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724 South Polk, Suite 300
Amarillo, TX 79101

The Pantex CAB administrator has arranged a wonderful buffet lunch on Friday, however, she needs the money prior to the meeting (Please send $15 which includes your meal and gratuity) to Christy at the above address and make your check payable to: "Pantex Plant CAB".

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Friday August 4, 2000: EM SSAB CHAIRS MEETING (DAY 2)

07:30 - 08:20	Continental Breakfast in meeting room
08:30 - 08:45	Opening Remarks - Martha Crosland & Dr. James Hallmark, Facilitator
08:50 - 10:00	Ground water Contamination Presentation, Paul Beam, Office of Integration and Disposition, EM-20, DOE, Headquarters)
	$ Overview presentation on ground water contamination around the complex and remediation of such contamination
	$ Discussion of the integration of these issues (problems and solutions) around the complex
	$ Discussion of the technologies for characterizing and remediating ground water contamination around the complex
10:00-10:15 a.m.	Break
10:15 - 11:30 a.m.	Conflict of Interest Discussion (Gregg Burgess, General Counsel, DOE Headquarters) (will include question & answer period)
11:30 - 12:30	DOE-EM Informational and Status Updates (Martha Crosland)
	$ SSAB Guidance Document
	$ Stewardship Activities
	$ NEPA (EIS/EA) Status Updates
	$ National Nuclear Security Administration
	$ Enviro nmenta l Manag

ement Adviso ry Board

12:30 B 02:00 p.m.	**Lunch in the Hotel Atrium (Southwest Buffet)**
02:00 - 02:30	Pantex case study B what is being done to solve the problem (likely to be given by State of Texas regulators and by site representative)
02:30 - 02:45	Break

Friday August 4, 2000: EM SSAB CHAIRS MEETING (DAY 2) (Cont=d)

03:00 - 03:45	SSAB Common Values (Martha Crosland, Director, EM-11)
	$ Discussion and finalization of SSAB Common Values
04:00 - 04:30	Wrap up Day 2 session - (Dr. Hallmark)

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Saturday, August 5, 2000: EM SSAB CHAIRS MEETING (DAY 3)

07:30 - 08:20	CONTINENTAL BREAKFAST (MEETING ROOM)
08:30 B 08:45	Opening Remarks (Martha Crosland & Dr. Hallmark)
08:45 - 09:30	Planning for Rocky Flats SSAB Stewardship Workshop Ken Korkia, Rocky Flats Advisory Board
09:30 - 09:45	Break
10:00 B 10:30	General discussion items: Martha Crosland -- Location and subject of the next SSAB Chairs= Meeting -- Future EM SSAB Seminars/Workshops -- New business
10:30 - 11:00	Public comment period
11:00 - 11:30	Closing remarks/wrap-up session (Dr. Hallmark)
11:35	Meeting adjournment (Martha Crosland)

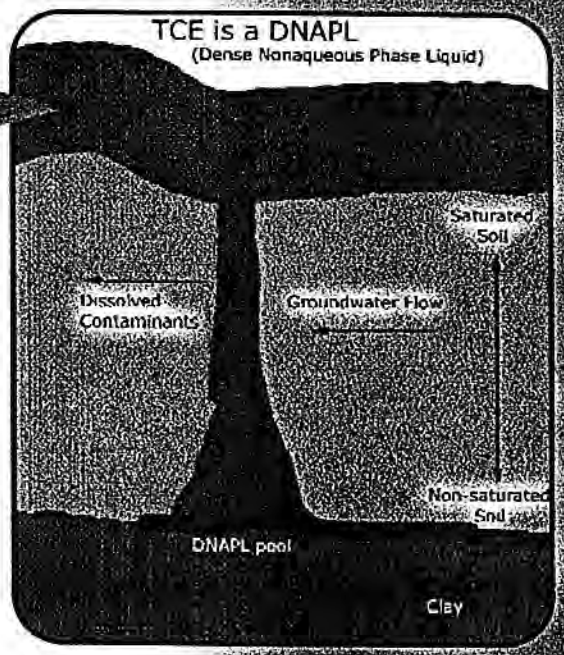
Clean up will be challenging

TCE IS A VERY HEAVY LIQUID, AND MOVES VERY SLOWLY

THINK OF IT LIKE MOLASSES. THEN PICTURE IT SPREAD THROUGHOUT YOUR CARPET.

BECAUSE TCE

IS HEAVIER THAN WATER, IT SINKS WELL BELOW THE SURFACE. IT IS ALSO RELATIVELY INSOLUBLE AND REMAINS IN THE SUBSURFACE FOR LONG PERIODS, SLOWLY DISSOLVING AND CONTAMINATING WATER MOVING BY.



COMPLICATIONS

SOME TCE SOURCES ARE VERY LARGE.

FOR EXAMPLE, AN ESTIMATED TENS OF THOUSANDS OF GALLONS OF TCE ARE UNDER THE C-400 CHEMICAL CLEANING FACILITY NEAR THE MIDDLE OF THE PLANT.

TC-99, HOWEVER

IS VERY SOLUBLE. THIS MEANS TC-99 CONTAMINATION SPREADS QUICKLY THROUGH THE GROUNDWATER.

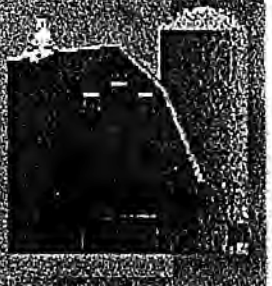
CONTAMINANTS ARE DISSOLVED IN GREAT VOLUMES OF WATER

CONTAMINATION USUALLY IS MEASURED IN VERY SMALL INCREMENTS, OFTEN PARTS PER BILLION

A NEEDLE IN A HAYSTACK IS LARGE BY COMPARISON

DRINKING WATER STANDARDS FOR TCE ARE 5 PARTS PER BILLION.

THAT'S LIKE 5 KERNELS OF CORN IN A 45-FOOT TALL, 16-FOOT WIDE SILO



PUBLIC HEALTH ISSUES

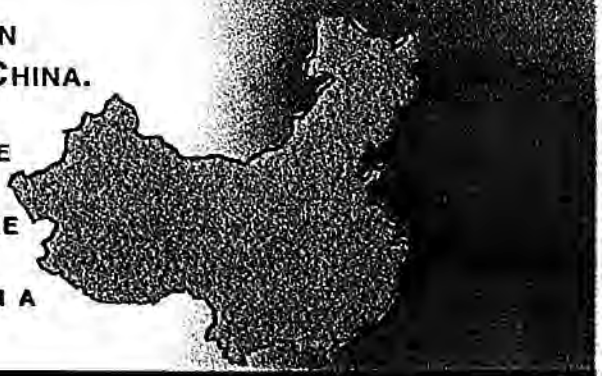
CONCENTRATIONS IN SOME CASES EXCEED FEDERAL DRINKING WATER STANDARDS. THAT IS WHY DOE HAS TAKEN ACTIONS TO GET POTENTIALLY AFFECTED PEOPLE OFF WELL WATER AND ONTO CITY WATER.

IT'S LIKE FINDING ... → ONE PERSON IN ALL OF CHINA.

AN IMPORTANT TERM TO KNOW

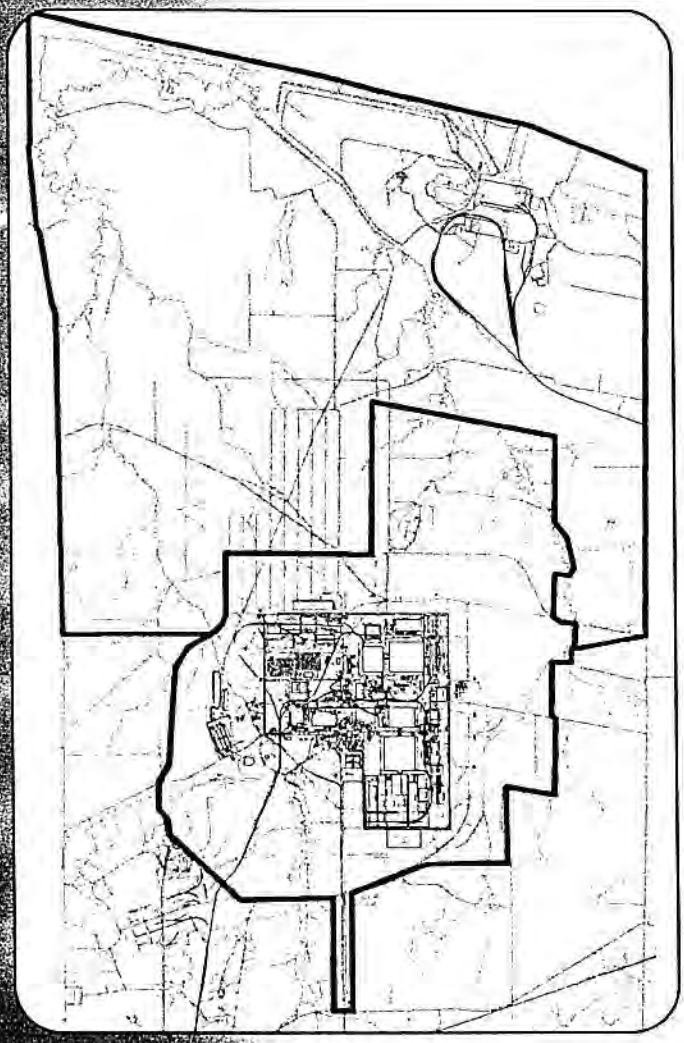
ug/L = MICROGRAM PER LITER, OR ONE PART PER BILLION

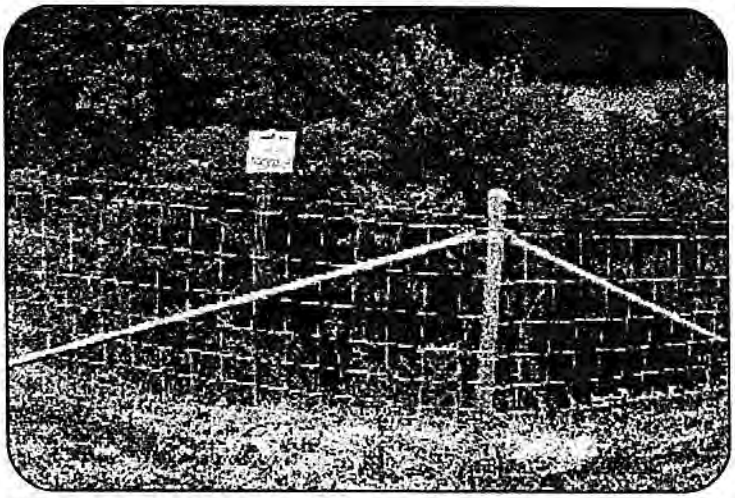
FINDING ONE PERSON IN CHINA IS THE EQUAL OF ONE PART IN A BILLION.



Protecting the public

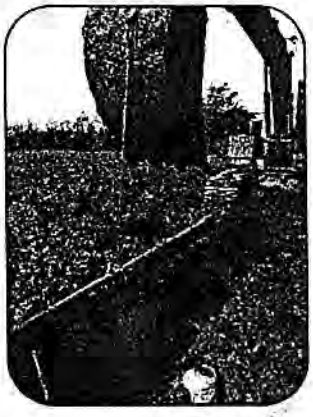
DISCOVERY OF GROUNDWATER CONTAMINATION LED TO ACTIONS





DOE has fenced off and/or posted warning signs around potentially contaminated surface water sources. This works with the restrictions on groundwater use to reduce public exposure to contaminated water.

DOE installed water lines to more than 100 homes and businesses that might be affected by groundwater contamination. Landowners inside the "Water Policy" boundary (shown at left) are eligible to receive city water at no charge. DOE paid for the installation of water lines (shown at right) for those landowners.



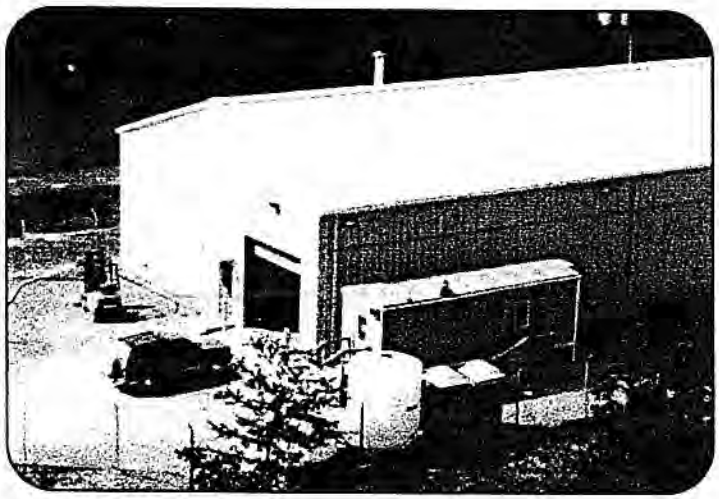
The next step

■ DOE IS MOVING TO CREATE LAND USE RESTRICTIONS ON DOE PROPERTY IN PADUCAH. THE "LAND USE CONTROL ASSURANCE PLAN" WILL PREVENT CONTAMINATED GROUNDWATER BELOW DOE PROPERTY FROM BEING USED.

■ DOE'S CURRENT WATER POLICY PROTECTS PEOPLE FROM USING CONTAMINATED GROUNDWATER. THIS POLICY IS BEING EVALUATED TO DETERMINE IF THERE IS A BETTER WAY OF ENSURING THE PROTECTION OF HUMAN HEALTH FOR THE LONG TERM.

Containing the problem

After creating measures to protect the public, DOE moved to contain the contamination



Two pump-and-treat systems were built to contain or clean the most contaminated parts of the plumes.

Facilities were built to treat high-concentration zones in both the Northwest and Northeast plumes.

Through the summer of 2000, these facilities have cleaned and released back into the environment more than 700 million gallons of drinkable water.

In one day...

Our two pump-and-treat facilities handle more than 500,000 gallons of water — enough to supply a community of nearly 5,000.

But, it's a very slow process.

At the end of the average day, we have removed enough TCE to fill about one 2-liter bottle.

Pump-and-treat facilities were built as interim actions for containment only, and are doing their job.

Pump-and-treat would take centuries to clean up the contamination. Natural dilution would take an estimated years to reduce contamination to safe drinking

Knowing this, DOE, federal and state environmental began to look for ways to speed up the contam

Seeking long-term solutions

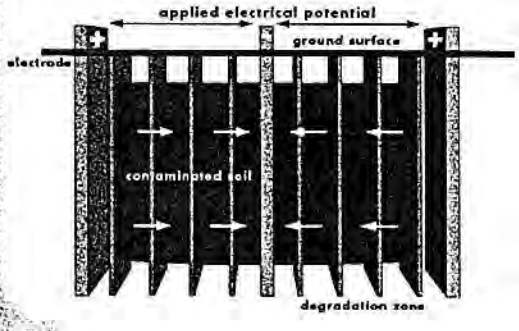
To remove contaminant sources, DOE must develop and use innovative new methods

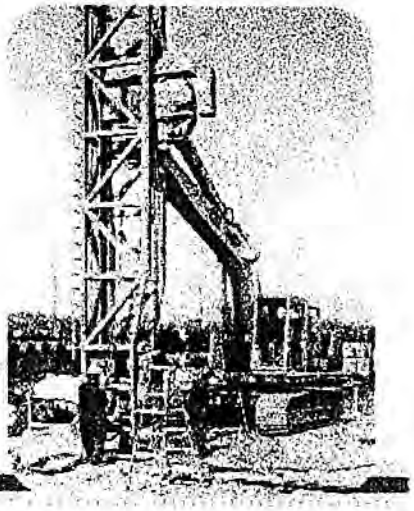
Cooking up a Solution

This revolutionary method for removing TCE from soil was developed by a public-private partnership led by DOE. It could prevent the spread of additional groundwater contamination. The process uses electricity to move groundwater to treatment zones where TCE is trapped and degraded into harmless components. The process is named for its use of layered treatment zones.

Lasagna™ Process

Lasagna Cross-section





In December 1999

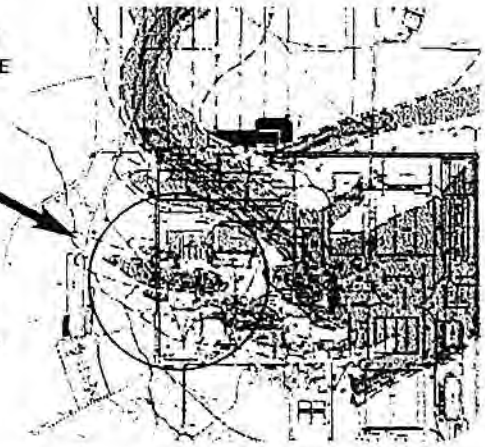
the switch was thrown to start the Lasagna™ Process. It will take about two years to clean up the one-acre site where it has been deployed, preventing the contamination of millions of gallons of groundwater.

Coming this summer ...

Permeable Treatment Zones, a new cleanup method

Groundwater flows through zones filled with iron filings that degrade TCE and trap the Tc-99.

This summer's test involves building a treatment zone about 100 feet long about 120 feet below the ground. The zone will be built within the plant's southwest plume.

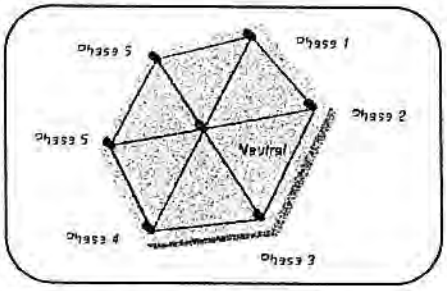


Monitoring wells will test how much TCE is removed.

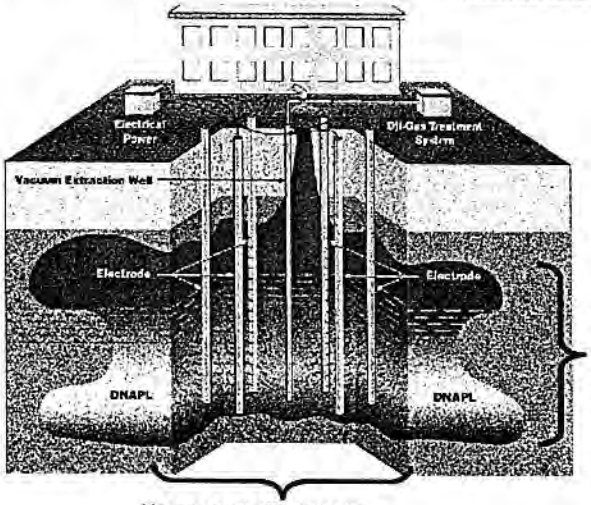
through new technologies

THESE TWO TECHNOLOGIES WILL BEGIN TESTING NEXT YEAR
ALTHOUGH THESE METHODS HAVE BEEN USED ELSEWHERE, THEY MUST BE PROVEN TO WORK IN PADUCAH'S SOIL

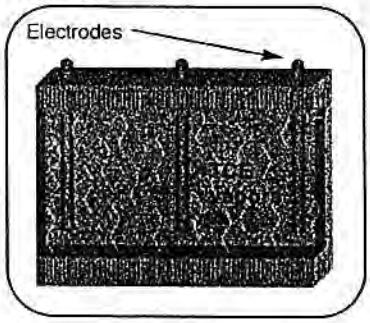
6-Phase Heating



6-PHASE HEATING REACHES SOURCES UNDER OPERATING FACILITIES



SIX BURIED ELECTRODES HEAT THE GROUND TO ABOVE 85 DEGREES CELSIUS (185F)

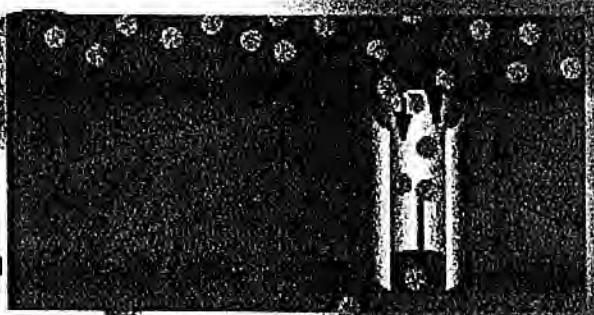


TCE IS VAPORIZED BY THE HEAT

VAPORS RISE AND ARE COLLECTED BELOW THE SURFACE FOR TREATMENT

C-Sparge

AIR MIXED WITH OZONE IS PUMPED INTO THE GROUND

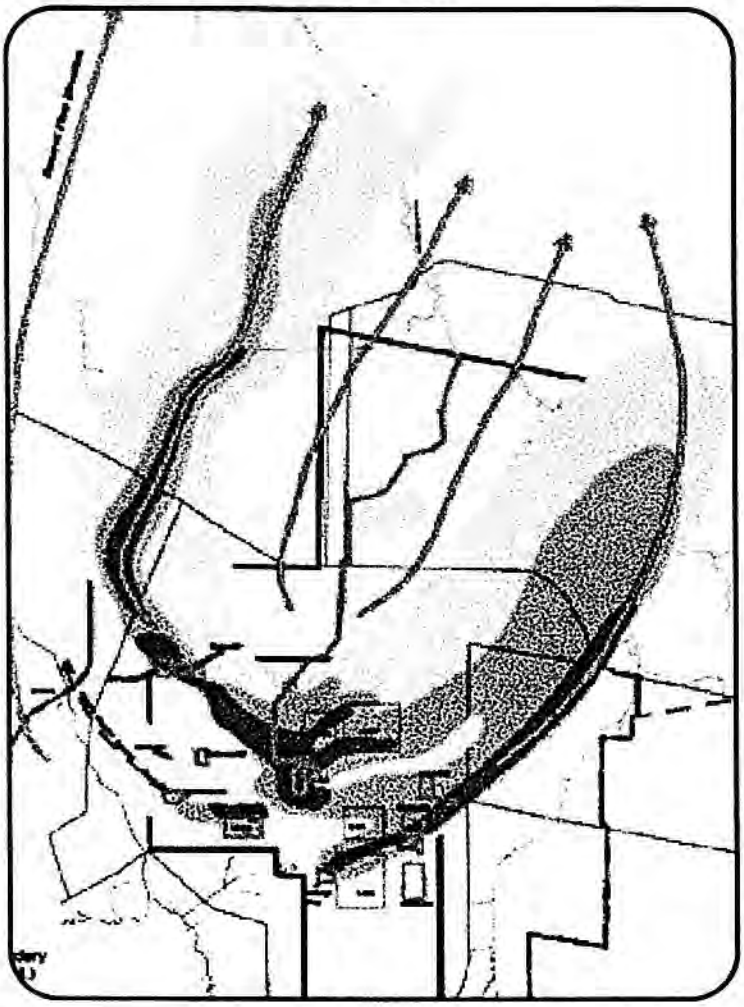


The C-Sparge System destroys degreasers such as TCE from soil and groundwater

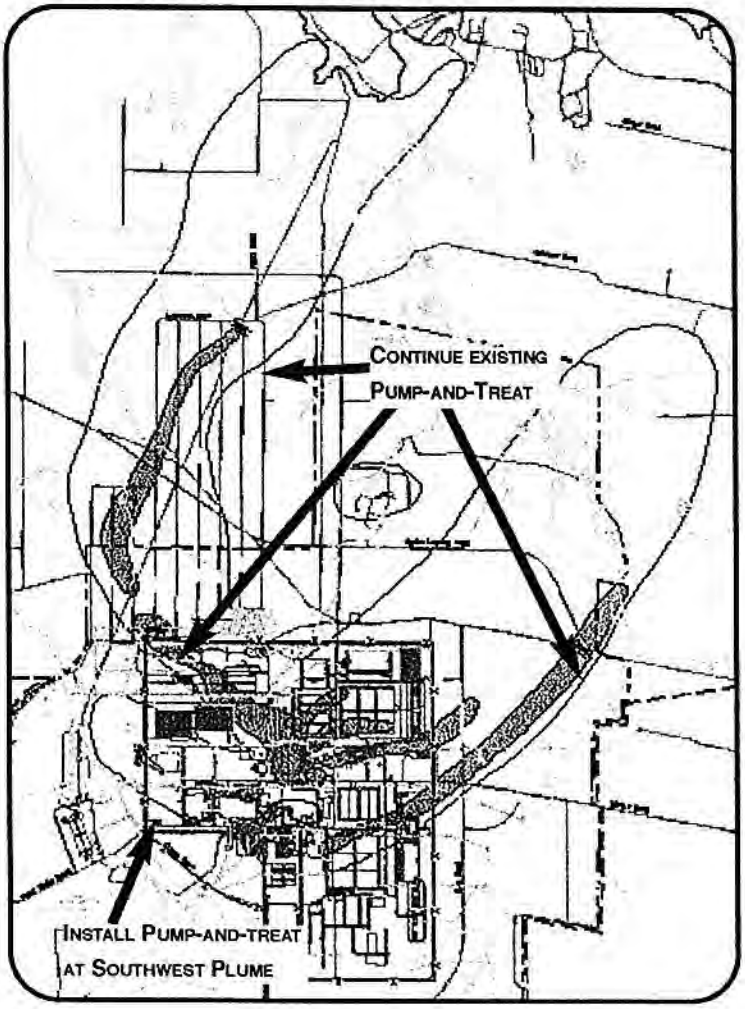
OZONE REACTS WITH TCE, RENDERING IT HARMLESS

Weighing alternatives

Alternative One: No Action



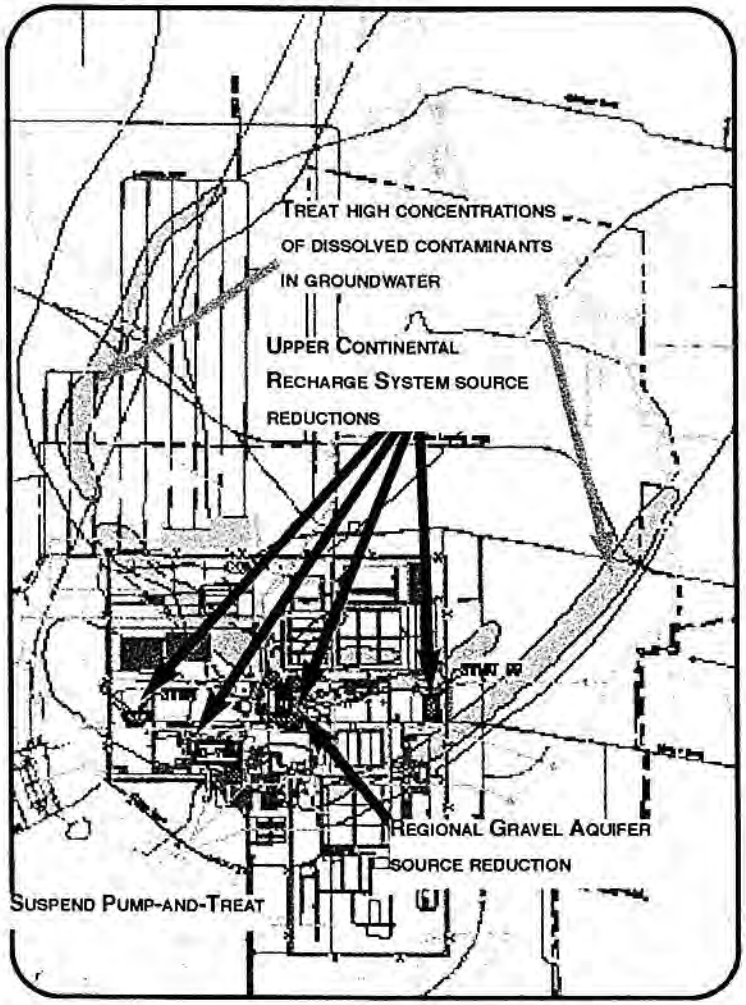
Alternative Two: Limited Action



Goal	No action: provides a basis for evaluation and comparison for other alternatives	Goal	**Contain and treat high-concentration zones of dissolved contaminants in groundwater**
Present Cost	None	Present Cost	**$111.2 million**
Monitoring	No	Monitoring	**Yes**
Residual Risk	High (no reduction in risk)	Residual Risk	**Moderate to high**
Short-Term Impact	None	Short-Term Impact	**Minimal or none**
Time to Complete	About 7,000 years	Time to Complete	**About 7,000 years**
Time to clean offsite groundwater	About 7,000 years	Time to clean offsite groundwater	**About 7,000 years**
Technologies	None	Technologies	**Pump-and-Treat**

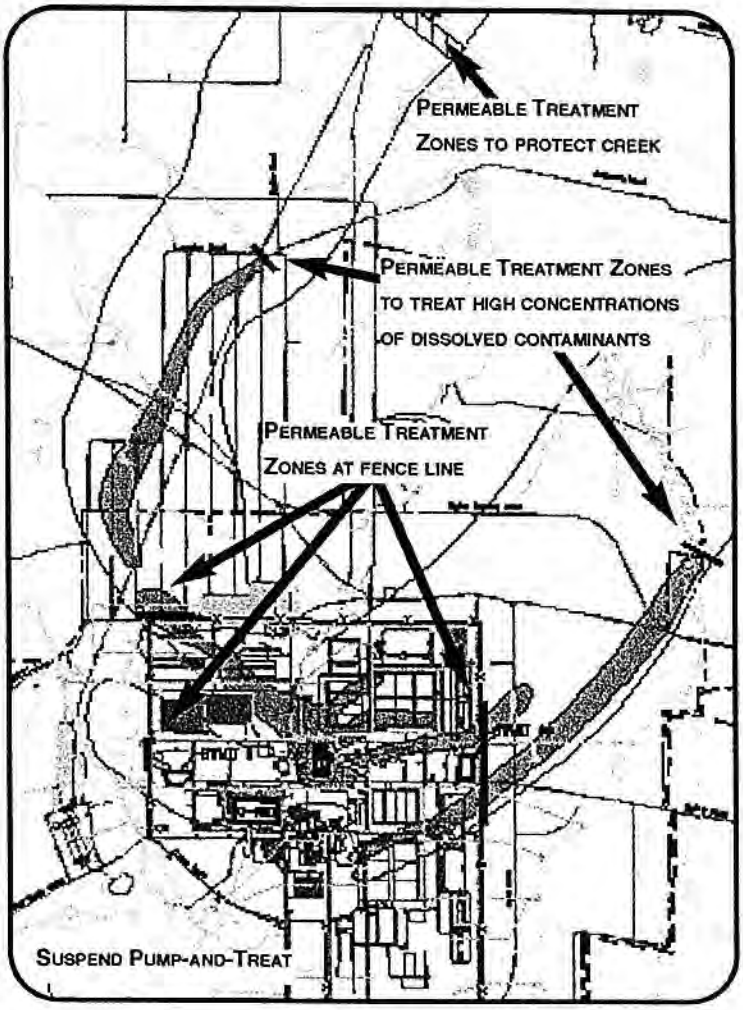
Weighing alternatives

Alternative Three: Contaminant Reduction



Goal	Source reduction; treatment of high concentrations in groundwater
Present Cost	$68.3 million
Monitoring	Yes
Residual Risk	Low
Short-Term Impact	Little or none
Time to Complete	About 2,000 years
Time to clean offsite groundwater	About 2,000 years
Technologies	Underground Stripping; C-Sparge; Dual Phase Extraction; Steam Flooding

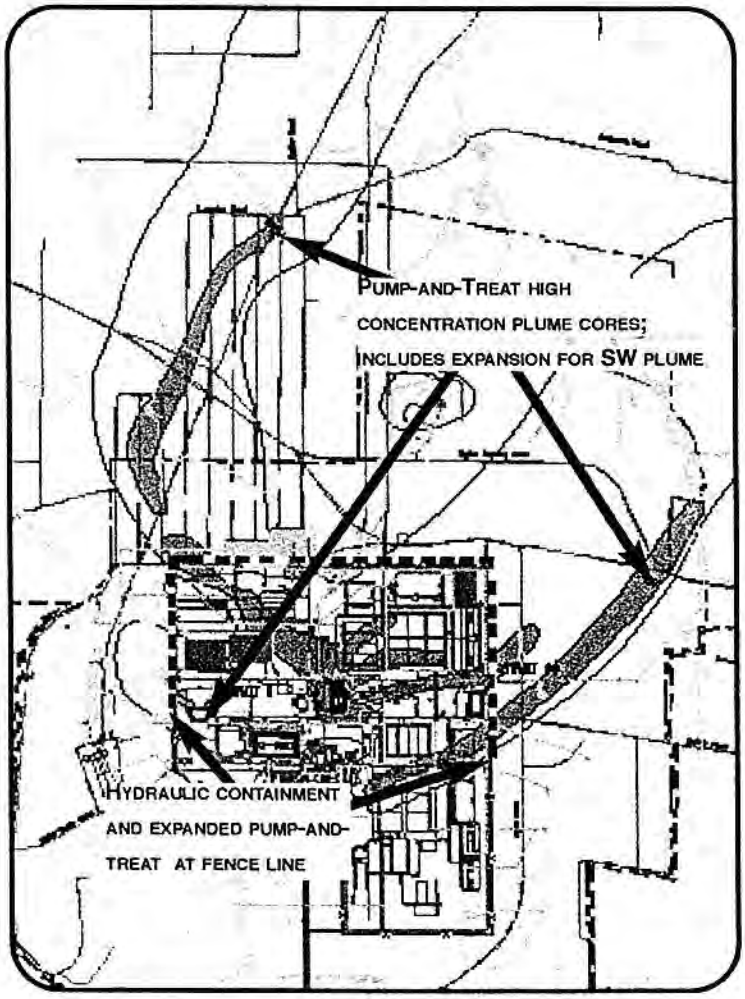
Alternative Four: Plume Treatment



Goal	Contain and treat contamination on site; protect streams from high contaminant concentrations
Present Cost	$136.5 million
Monitoring	Yes
Residual Risk	Moderate
Short-Term Impact	Minimal or none
Time to Complete	About 7,000 years
Time to clean offsite groundwater	50 to 100 years
Technologies	Permeable Treatment Zones

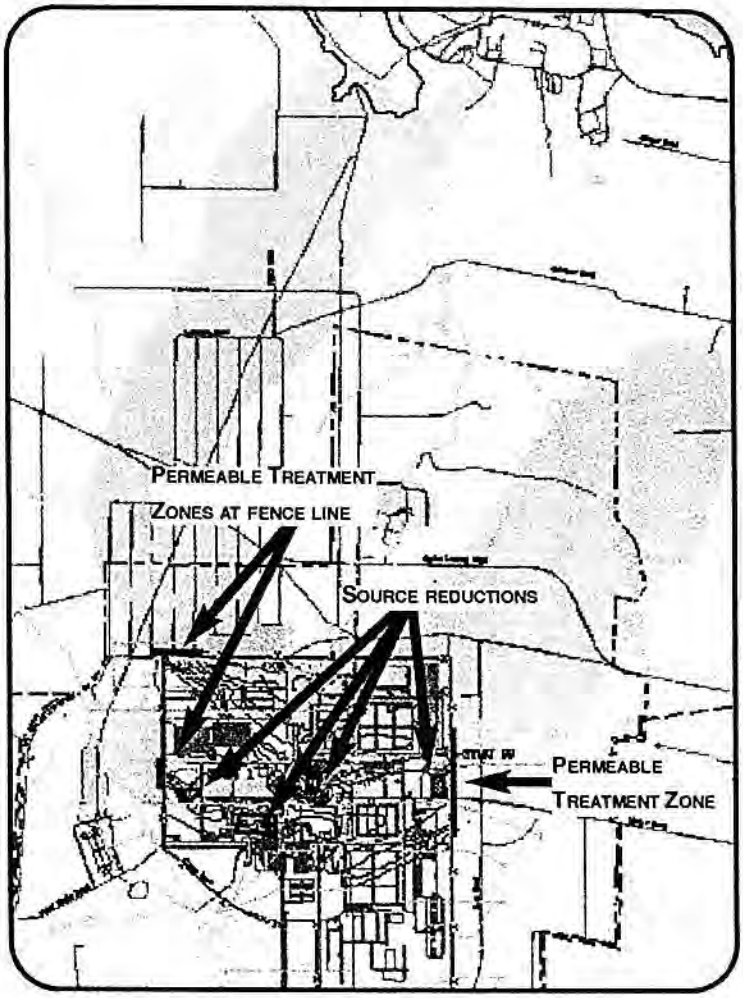
Weighing alternatives

Alternative Five: Containment and Treatment



Goal	**Sitewide containment of contaminants with treatment of high-concentration plumes**
Present Cost	**$131.3 million**
Monitoring	**Yes**
Residual Risk	**Moderate**
Short-Term Impact	**Little or none**
Time to Complete	**About 7,000 years**
Time to clean offsite groundwater	**50 to 100 years**
Technologies	**Pump-and-Treat with TCE air stripped; catalytic oxidation for vapors**

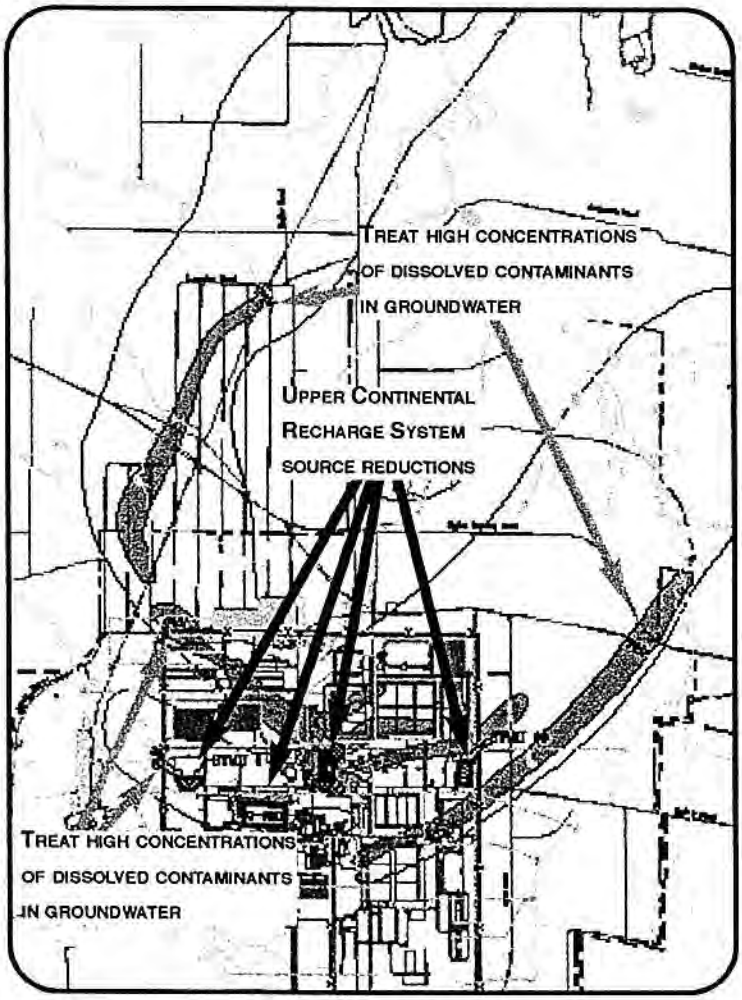
Alternative Six: Source Reduction and Treatment



Goal	**Source reduction; sitewide containment and treatment; bioremediation of offsite plume**
Present Cost	**$172.9 million**
Monitoring	**Yes**
Residual Risk	**Moderate to low**
Short-Term Impact	**Minimal or none**
Time to Complete	**About 2,000 years**
Time to clean offsite groundwater	**About 2,000 years**
Technologies	**Permeable Treatment Zones; Dual Phase Extraction; Pump-and-Treat; Bioremediation**

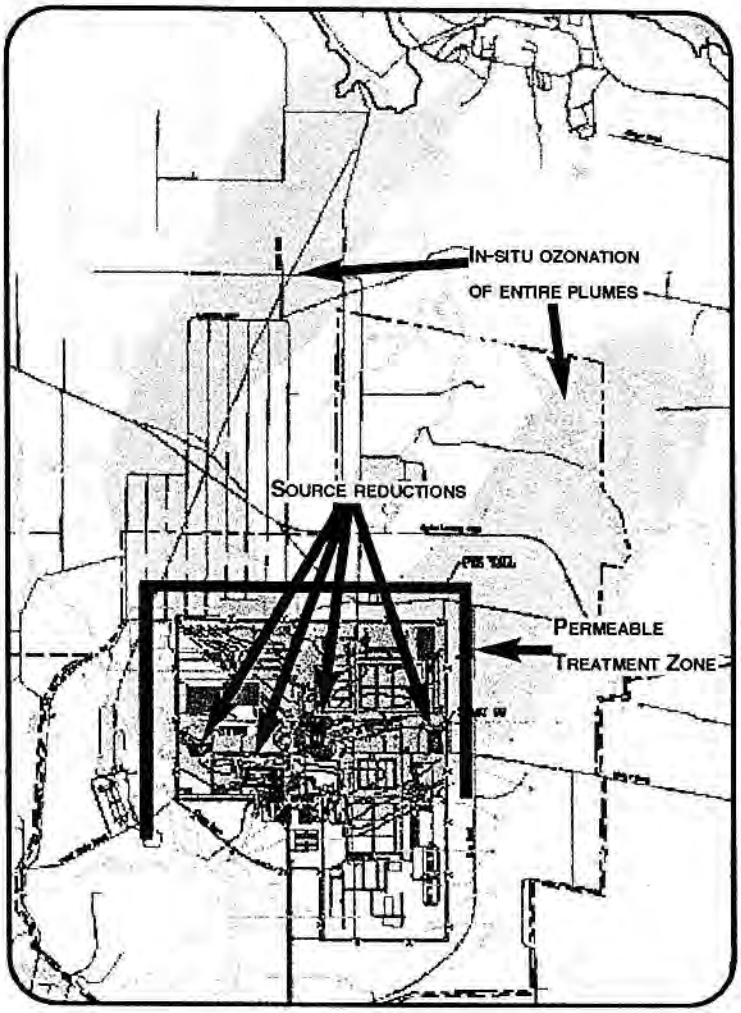
Weighing alternatives

Alternative Seven: Source Reduction and Containment



Goal	**Source reduction; treatment of high concentrations in groundwater**
Present Cost	**$129.4 million**
Monitoring	**Yes**
Residual Risk	**Low**
Short-Term Impact	**Little or none**
Time to Complete	**About 1,000 years**
Time to clean offsite groundwater	**About 1,000 years**
Technologies	**Pump-and-Treat; 6-Phase Heating or similar**

Alternative Eight: Source Reduction and Treatment



Goal	**Sitewide source reduction and treatment**
Present Cost	**$917.8 million**
Monitoring	**Yes**
Residual Risk	**Very low**
Short-Term Impact	**Minimal or none**
Time to Complete	**About 15 years**
Time to clean offsite groundwater	**About 15 years**
Technologies	**Permeable Treatment Zones; 6-Phase Heating; Ozonation; Chemical Oxidation**

Balancing the risks

IF YOU DON'T USE THE GROUNDWATER, THERE IS NO RISK.

Groundwater used for irrigation, bathing, watering livestock or drinking does present a risk. How much? Compare the lifetime risk of getting cancer from using the most contaminated groundwater outside the plant with these common occurrences:

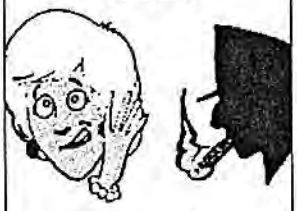
Pack a day (or more) smoking

80 in 1,000

Natural radon in your home

10 in 1,000

Second-hand smoke



7 in 1,000

Contaminated groundwater use

3 in 1,000

Chemicals in food

1 in 100,000

Cosmic radiation and outdoor radon

1 in 1,000

Skin cancer from the Sun

33 in 1,000

SINCE THERE IS NO RISK IF THE GROUNDWATER IS NOT USED,

DOE'S EFFORTS SO FAR HAVE BEEN TO STOP GROUNDWATER USAGE.

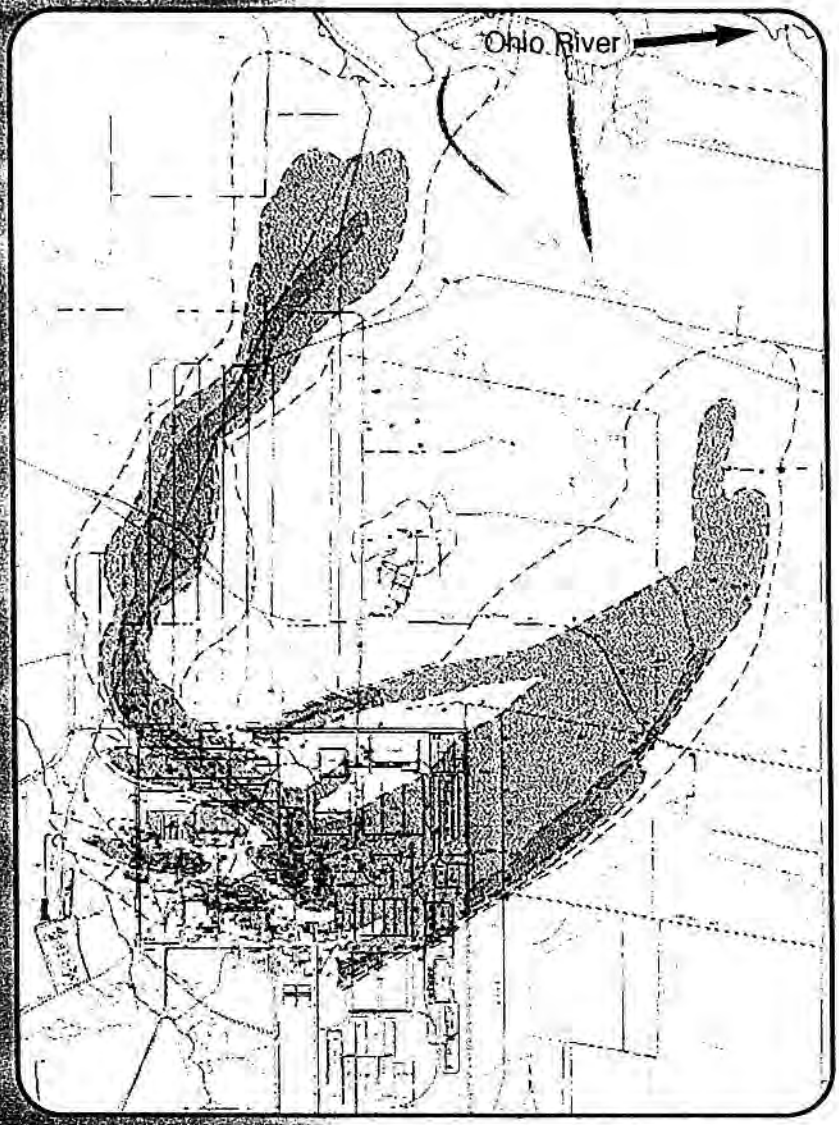
Now, DOE is looking at what to do next. Total cleanup would cost a billion dollars. should the government fund a complete cleanup? Should it do a partial cleanup, post warnings and restrict access to the water and let dilution over time solve the problem?

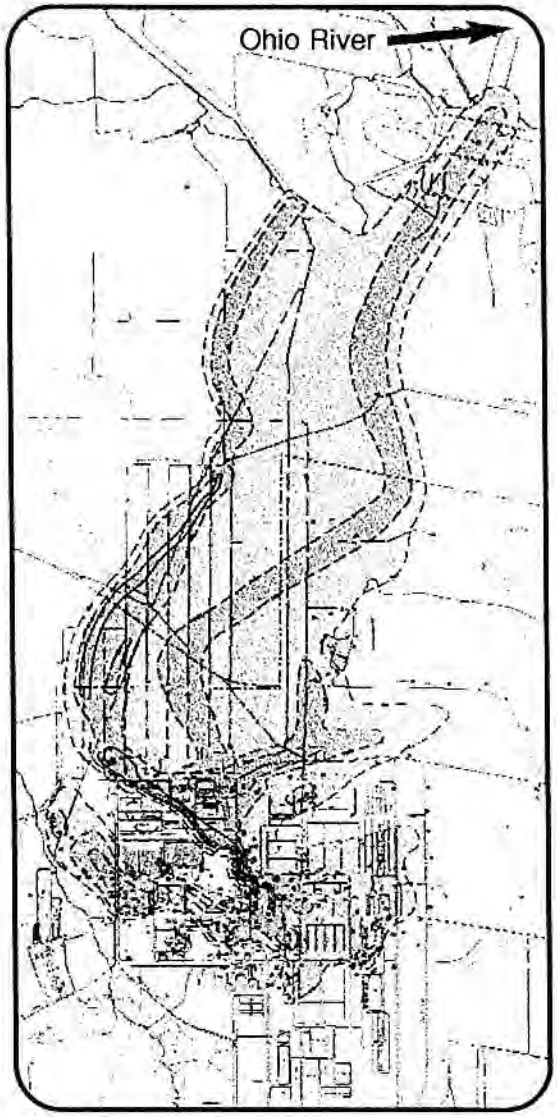
NO DECISION HAS BEEN MADE

WHAT YOU THINK MAKES A DIFFERENCE

Groundwater concerns

GROUNDWATER CONTAMINATION AT THE PGDP
TRICHLOROETHYLENE AND TECHNETIUM-99 ARE THE PRIMARY CONTAMINANTS FOUND OFFSITE.





TCE in groundwater
ug/L = micrograms/Liter

- Lowest level, 5-100 ug/L
- 100-1,000 ug/L
- 1,000-10,000 ug/L
- 10,000-100,000 ug/L
- Highest level, 100,000+ ug/L

TCE IS A DEGREASER THAT WAS USED IN INDUSTRIAL PLANTS. **TCE** USE WAS PROHIBITED AT THE **PGDP** IN **1993.**

Tc-99 in groundwater
pCi/L = picocuries/Liter

- Lowest level, 25-99 pCi/L
- 100-899 pCi/L
- 900-3,789 pCi/L
- 3,790-10,000 pCi/L
- Highest level, 10,000+ pCi/L

TECHNETIUM-99 WAS INTRODUCED TO THE **PADUCAH** PLANT IN REACTOR RETURNS RECYCLED AT THE PLANT.

CONTAMINANT SOURCES

EPA United States Environmental Protection Agency
Office of Water

Office of Ground Water and Drinking Water

List of Contaminants

Drinking Water and Health

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:

National Primary Drinking Water Regulations

Consumer Factsheet on: TRICHLOROETHYLENE

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Trichloroethylene and how is it used?

Trichloroethylene is a colorless or blue organic liquid with a chloroform-like odor. The greatest use of trichloroethylene is to remove grease from fabricated metal parts and some textiles.

The list of trade names given below may help you find out whether you are using this chemical at home or work.

Trade Names and Synonyms:

1,1,2-Trichloroethylene
Acetylene trichloroethylene
Algylen
Anameth
Benzinol
Chlorilen
CirCosolv
Germalgene
Lethurin
Perm-a-chlor
Petzinol
Philex
TRI-Plus M
Vitran

Why is Trichloroethylene being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for trichloroethylene has been set at zero because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has been set at 5 parts per billion (ppb) because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the Health Effects?

Some people who drink water containing trichloroethylene in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.

How much Trichloroethylene is produced and released to the environment?

Production of trichloroethylene has increased from just over 260,000 lbs. in 1981 to 320 million lbs. in 1991. Major environmental releases of trichloroethylene are due to air emissions from metal degreasing plants. Wastewater from metal finishing, paint and ink formulation, electrical/electronic components, and rubber processing industries also may contain trichloroethylene.

From 1987 to 1993, according to the Toxics Release Inventory, trichloroethylene releases to water and land totalled over 291,000 lbs. These releases were primarily from steel pipe and tube manufacturing industries. The largest releases occurred in Pennsylvania and Illinois. The largest direct releases to water occurred in West Virginia.

What happens to Trichloroethylene when it is released to the environment?

Trichloroethylene released to soil will either evaporate or leach into ground water. If released to water, it will also quickly evaporate. It has only a moderate potential to accumulate in aquatic life.

How will Trichloroethylene be Detected in and Removed from My Drinking Water?

The regulation for trichloroethylene became effective in 1989. Between 1993 and 1995, EPA required your water supplier to collect water samples every 3 months for one year and analyze them to find out if TCE is present above 0.5 ppb. If it is present above this level, the system must continue to monitor this contaminant until the system has taken immediate steps to remediate the problem or the State has determined that the contaminant will remain reliably and consistently below the MCL.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of TCE so that it is consistently below that level. The following treatment methods have been approved by EPA for removing TCE: Granular activated carbon in combination with Packed Tower Aeration.

How will I know if Trichloroethylene is in my drinking water?

If the levels of trichloroethylene exceed the MCL, 5 ppb, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

Mclg: zero

Mcl: 5 ppb

Trichloroethylene Releases to Water and Land, 1987 to 1993 (in pounds):

		Water	Land
TOTALS (in pounds)		**100,293**	**191,088**
	Top Six States*		
PA	0	33,450	
IL	0	30,711	
GA	3,742	17,532	
TX	0	21,000	
MA	0	19,920	
WV	12,822	0	
	Major Industries		
Steel pipe, tubes		31	39,288
Misc. Indust. Organics		27,708	0
Car parts, access.		4,405	19,920
Plating, polishing		3,342	20,100
Wool fabric mills		3,942	18,081

* State totals only include facilities with releases greater than 10,000 lbs.

Learn more about your drinking water!

EPA strongly encourages people to learn more about their drinking water, and to

support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone books government listings are a good starting point.

Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general, call: EPAs Safe Drinking Water Hotline: (800) 426-4791.

For additional information on the uses and releases of chemicals in your state, contact the: Community Right-to-Know Hotline: (800) 535-0202.

Search

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Office of Water

Comments

Revised *December 23, 1998*

Office of Ground Water and Drinking Water

http://www.epa.gov/OGWDW/dwh/c-voc/vinylchl.html

SIX-PHASE HEATING SHOWS SIGNIFICANT PROMISE FOR LNAPL TREATMENT

May 1999

Jerry Wolf
Project Leader, Current Environmental Soltuions

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INTRODUCTION

Current Environmental Solutions, LLC was contracted in the fall of 1998 to complete a pilot study to determine the effectiveness of using Six-Phase Heating™ (SPH) in combination with soil vapor extraction (SVE) for the remediation of Light Non-aqueous Phase Liquids (LNAPL) at an island location on a river in the Midwest.

Hydrocarbon-stained soils were discovered on an island in Ohio in May 1993 during the installation of a monitoring well. The stained soils may have resulted from a past release from a pipeline system that was once operated to convey petroleum products from a former refinery to a terminal on the river. The pipeline system consisted of five, six-inch diameter steel pipelines that were buried at depths ranging from two to four feet below ground surface (bgs). Each pipeline was typically dedicated to conveying a separate refined product; jet and aviation fuel, diesel fuel, and three grades of gasoline. Additional test borings and monitoring wells were installed to characterize and

Additional test borings and monitoring wells were installed to characterize and delineate the extent of petroleum hydrocarbon impact on the island.

A soil vapor extraction (SVE) system was installed in the summer and fall of 1995. The SVE system consisted of sixteen vapor extraction wells constructed with screened intervals ranging from 9 to 19 feet bgs. The wells were connected to a 25-hp vacuum pump via a network of buried 2- to 6-inch diameter PVC collection piping. A catalytic oxidation unit, capable of handling approximately 700 cubic feet per minute (htm) treated extracted soil vapor. The vacuum pump, moisture separator, and catalytic oxidation unit were mounted on an elevated platform above the 100-year flood elevation. The SVE system has been operated seasonally during lower groundwater levels since October 1995. Seasonal operation generally has occurred between July and December.

Previous site work had shown that volatile organic compound (VOC) contamination extended from approximately six feet to 30 feet bgs. For the purpose of the SPH pilot test, a treatment zone covering a diameter of approximately 50 feet was selected between three existing extraction wells.

SUBSURFACE CONDITIONS

The site generally consists of clayey silt and silty clay from grade surface to a depth of three to six feet bgs. The region from approximately six feet bgs to 23 feet bgs is comprised of fine to medium grain sand mixed with gravel. Below this depth, site soil consists of medium to coarse grain sand to a bedrock formation at nearly 60 feet bgs. Vadose zone soils have an organic carbon content of 0.7%.

Grade surface in the pilot study area is at approximately 474 feet above mean sea level (msl). The water table at the site fluctuates seasonally from between 460 feet above msl to greater than 480 feet above msl, with the greatest elevations occurring during the late winter and early spring seasons. This fluctuation causes periodic intermittent flooding of the island to levels as high as 12 feet above grade surface. Groundwater levels during the pilot study remained approximately 15 feet bgs. Groundwater beneath the site flows toward the south and southeast, at a velocity of approximately 1 ft/day.

PROCESS

Developed by Battelle's Pacific Northwest National Laboratories (PNNL), Six Phase Heating™ (SPH) is a patented, multi-phase electrical technique that uses readily available 60 Hz electricity to resistively heat soil and groundwater. Heating between the SPH electrodes creates an *in-situ* source of steam to strip volatile and semi-volatile contaminants from the subsurface. Soil Vapor Extraction (SVE) is then used to capture the off-gases for above-ground treatment.

SPH operates under the principal that electrical current passing through a resistive component, such as soil, will generate heat. By heating the subsurface to the boiling point of water, an *in-situ* source of steam is created which strips contaminants from the soil. The steam serves two purposes. First, its" physical action drives contaminants out of portions of the soil that tend to lock in the contaminants via capillary forces. Second, the steam acts as a carrier gas for the contaminants, enabling the contaminants to be swept out of the soil into the

the contaminants, enabling the contaminants to be swept out of the soil into the vacuum vent by increasing the permeability of the soil. The subsurface temperature rise also aids in the volatilization of contaminants in the treatment area by increasing the vapor pressure of the VOCs trapped in the subsurface. Each of these actions is unaffected by the heterogeneity of the soil, since the difference in electrical conductivity between various soil types is relatively minor.

SPH uses conventional single-phase transformers to convert standard three-phase electricity into six-phase electricity. This power is then delivered to an electrode array consisting of six (6) steel electrodes arranged in a hexagonal pattern, with one neutral electrode placed in the center.

Each electrode is connected to a separate transformer to provide it with an individual electrical phase. The physical spacing of the electrodes, as well as the electrical phases, are both 60 degrees apart, which results in a uniform ratio of physical distance to potential difference between all electrodes in the array. This uniform ratio helps balance the delivery of power to the subsurface based on the electrical resistivity of the soil between electrodes, since each electrode will conduct electricity to every other electrode. This even distribution of power results in thorough heating of the subsurface throughout the treatment area as indicated in following infrared photograph.The shades of color represent variation of temperature. Note the evenness of the color patterns throughout the heated region.

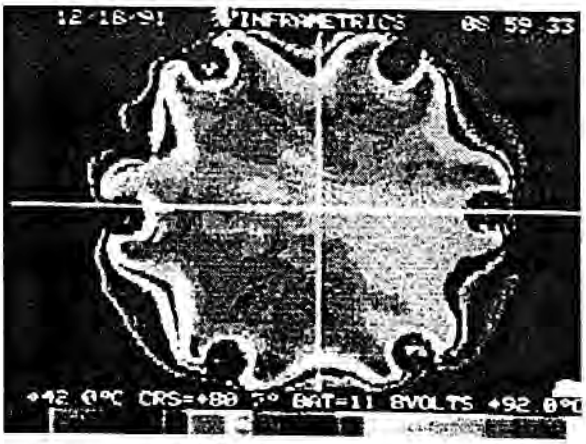

Figure 1 shows the even heating of soil between 6 electrodes.

SITE-SPECIFIC APPLICATION

For the purpose of conducting the pilot study, the SPH process was operated using a single 35-foot diameter hexagonal electrode array. Electrodes were installed to 24 feet bgs. Each of the electrodes was constructed to focus the electrical energy input to depths of between five and 12 feet bgs, and between 19 and 24 feet bgs. In addition, the electrodes were electrically insulated from grade surface to a depth of 3.5 feet bgs. The actual heated region extended outside the array diameter, to a diameter approximately equal to 50 feet. The total heated volume for the pilot study was about 1,800 cubic yards.

Additional components of the SPH system are listed below:

- A central SVE well was installed approximately two feet to the northeast of the neutral electrode in the array. The well was installed to a depth of 14 feet bgs and was constructed of 4-inch diameter CPVC with a 10-foot long screen. The screen extended from a depth of 4 to 14 feet bgs. The central vapor extraction well extracted steam at a rate of about 350 shtm, which was then delivered to an air-to-air heat exchanger.
- A 21,000-gallon steel water storage tank was installed on site to collect condensate generated during the SPH operation. The condensate collected by the condenser was pumped to the storage tank where it was periodically removed via a vacuum truck for disposal at the facility's wastewater treatment plant.
- A 480 Volt power feed for the SPH system was supplied from a portable 750kW-diesel generator. The diesel generator was supplied fuel via gravity feed from an external diesel-fuel storage vessel with a capacity of 2,300 gallons.

Subsurface temperatures were measured to monitor the status of site heating. These measurements were taken at intervals from grade surface to 26 feet bgs. The thermocouples were installed within a 3/4" CPVC pipe located equidistant between two power electrodes and the neutral electrode. Once the thermocouples were installed, the pipe was filled with sand to minimize airflow channels within the pipe.

REMEDIATION GOALS

Based on existing data from the site, maximum initial concentrations of benzene in the soil and groundwater in the pilot test area were estimated to be 24,000 parts per billion (ppb) and 2,000 ppb, respectively. The average initial concentration of benzene in the soil was determined to be 2,700 ppb, with a high of 24,000 ppb measured in one well. Average benzene concentration in groundwater was 300 ppb, with a high of 2,000 ppb measured in one well. Since the area to be remediated was located near the center of the overall site contaminant plume, the target area was subject to renewed contamination throughout the project. For the purpose of determining the effectiveness of the SPH pilot study, cleanup goals of 98% removal of benzene were established for both soil and groundwater. This goal was based on operating the SPH system to reach the boiling point of water in the subsurface, and maintaining this temperature for a period of 60 days.

Groundwater monitoring probe clusters were installed at three locations along a line evenly spaced across the treatment area. The purpose was to monitor groundwater concentrations upgradient, within, and downgradient of the remediated area. Each cluster consisted of four probes placed in separate borings at depths of 1, 4, 7, and 10 feet below the water table, with depth to water at approximately 15 feet bgs. Two additional vacuum monitoring probes were installed at right angles to the transection on the approximate edge of the remediation area. The purpose was to permit monitoring of soil vacuum, and adjustments of vapor removal rates during vapor sampling.

During installation of the monitoring probes, soil samples were collected for headspace screening and select samples were submitted for chemical analysis. The purpose of sampling and analysis was to provide a baseline for comparison with post-treatment data to evaluate the effectiveness of the SPH

field test. In addition, select samples were submitted for microbial enumeration and evaluation to provide background information, prior to the field test, for comparison with recovery of the microbial population after testing.

Groundwater samples were collected from the probes via polyethylene tubing and a peristaltic pump. In order to provide sufficient baseline data to evaluate natural variability in the various constituents of interest at the site, four rounds of groundwater sampling were performed prior to initiation of the field test. One round of sampling was performed approximately two weeks before the field test and the three remaining rounds were collected every other day during the week prior to the field test.

OPERATIONS

Power was applied to the soil and groundwater on October 19, 1998. The off-gas temperature at the head of the SVE well was used as the basis for determining when the site had reached boiling. By October 29th, the off-gas had reached 93°C, where it stabilized for the remainder of the test. This stabilization of the off-gas temperature was an indication that the majority of the site had reached the boiling point of site groundwater.

In addition to monitoring off-gas temperature, the subsurface temperature was monitored using thermocouples installed in the temperature-monitoring pipe. This pipe was located equidistant from the neutral electrode and two electrodes located on the eastern side of the array. Data from this location indicated that the entire site was boiling within 15 days of startup, at depths from 7 to 14 feet bgs. Temperatures deeper in the water table, at 20 to 26 feet bgs, rose to nearly 30°C, then remained relatively constant throughout the heating period. A graph of temperatures versus time is included as **Figure 2**.

Review of the data seems to indicate that as the temperature in the deeper water zone rose, the warmer water rose toward the surface. It was then replaced by cooler water from outside the treatment area, in a "natural circulation" pattern. A groundwater temperature reading taken from monitoring well MW-67 during the study further supports this theory. This temperature had risen to almost 30°C, despite being located more than 30 feet outside the perimeter of the treatment area, in a direction perpendicular to the natural direction of groundwater flow. A larger scale application of the SPH process would be more efficient, since there would be less mixing of cool water in the heated region.

Once temperatures in the subsurface reached the boiling point of water, they were maintained there for a period of 31 days. On November 30th, the power supply was turned off and groundwater samples were taken from the three groundwater-monitoring point clusters. In addition, soil samples were obtained from locations immediately adjacent to these wells two days after the shutdown. **Table 1** compares the results of pre-test and post-test analyses.

PRELIMINARY GOAL		SOIL 300 pb	GROUNDWATER 50 ppb
Average Concentration	Pre-Test	2,700 ppb	300 ppb
	Post-Test	72.9 ppb	8.8 ppb
	Percent C/U	97%	97%

	Percent C/U	97%	97%
Highest Concentration	Pre-Test	24,000 ppb	2,000 ppb
	Post-Test	490 ppb	43 ppb
	Percent C/U	98%	98%

Table 1 Analytical Comparison for Benzene

While the data indicates that the SPH pilot test fell just short of achieving the predetermined goal of 98% average cleanup, all groundwater samples taken were below the preliminary cleanup goal of 50 ppb. We feel that had the system continued to operate for an additional 7 to 10 days, the preliminary cleanup goal for soil would also have been achieved. Cost considerations, as well as the threat of flooding on the island dictated a somewhat reduced operating schedule. This total operating period was 42 days from date of first application of power to the subsurface. The original intent had been to raise the temperature of the site to the boiling point of water, then hold at that temperature for 60 days.

In addition to the time consideration, other factors are believed to have played a part in the slow removal of benzene from the site. An essential factor is the effect of the diesel components in the treatment area. Due to Raoult's Law, the presence of semi-volatile diesel components in solution tends to inhibit the removal of benzene by reducing its vapor pressure and limiting its ability to volatilize in the presence of steam and vacuum. However, this same phenomenon may be responsible for the extraction of some diesel components that otherwise wouldn't have been anticipated. By combining the volatile component benzene with the semi-volatile diesel, the diesel will have a higher vapor pressure than it would in its pure state.

Samples taken at the conclusion of the test reveal that total petroleum hydrocarbons such as diesel (TPH-DRO), were reduced in soil by as much as 66% and in groundwater by as much as 98%, with average concentrations being reduced by 80% in groundwater and 7% soil. Contaminant reduction graphs showing the average reduction of contaminants in soil and groundwater are included as **Figure 3** and **Figure 4**.

Throughout the pilot study, steam was extracted from the central VE well and passed through the heat exchanger for condensing. The condensate was then pumped to the water storage tank for disposal. Prior to removing condensate from the storage tank, a discriminating liquid sensor was lowered into the tank to measure the amount of free-floating hydrocarbons on the surface. 51,154 gallons of water were removed during the test, as well as approximately 265 gallons of free product. This product had the general consistency and odor of a kerosene-type fuel. However, no laboratory analysis was performed to quantify its specific composition.

Civil & Environmental Consultants, Inc. (CEC) has calculated mass removal rates prior to, during, and after the application of subsurface resistive heating. Their data shows that the vapor extraction system alone had removed a total of 280 pounds of contaminants over the 10 week operating period preceding application of SPH. Over the ensuing 12 weeks, the combined system had removed an additional 3,890 pounds of contaminant. This is an increase in mass removal of nearly 1,400%.

CEC also compiled data comparing pre- and post-test soil microbial counts at

CEC also compiled data comparing pre- and post-test soil microbial counts at the site. General indications are that heterotrophic counts remained relatively constant throughout the study, at approximately 1.E+07 to 1.E+08 cells/ml. Petrophilic microbial counts increased by as much as a factor of 1,000, as measured three months following shutdown of the SPH system. Average petrophilic counts increased by a factor of 100. This data shows that heating of the site was highly beneficial to the overall population of petroleum hydrocarbon degraders. The increase in degraders will increase the natural biodegradation of the site, resulting in continued reduction of contaminants at the site long after SPH operations have ceased.

SUMMARY

The results of the pilot study indicate that the Six-Phase Heating technology is a highly successful mechanism for removal of LNAPL. The results clearly indicate:

- A significant increase in mass removal rates over straight SVE (~1400%)
- A 98% reduction of overall benzene concentrations
- The successful removal of 80% of diesel components (TPH-DRO) from groundwater
- A significant increase in petroleum hydrocarbon degraders
- The rapid removal of contaminants, with the above results achieved in only 42 days of SPH application

Based on these results, the client is currently evaluating the full-scale application of SPH throughout the site to achieve proposed cleanup goals. It is anticipated that the next phase of this SPH project will begin in the second half of 1999.

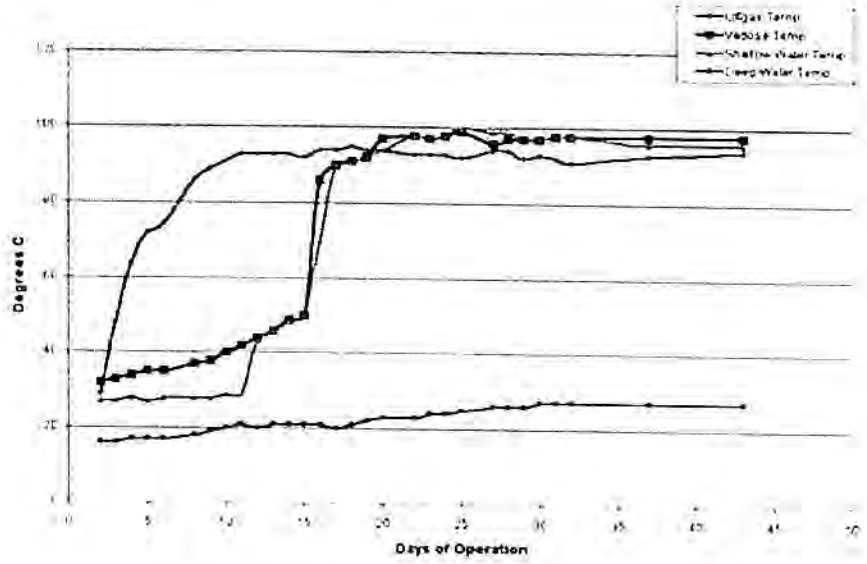

Figure 2. Temperature vs. Days of Operation

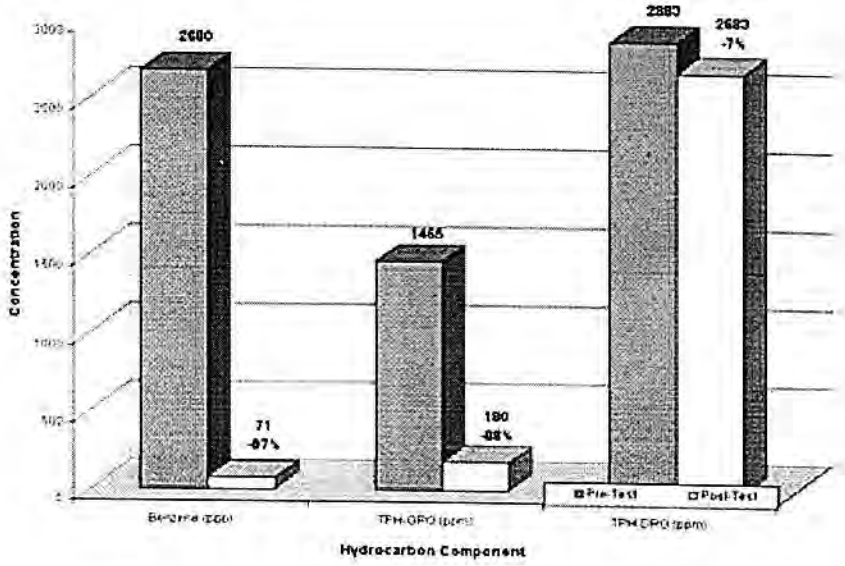

Figure 3 Average Soil Concentration Reduction

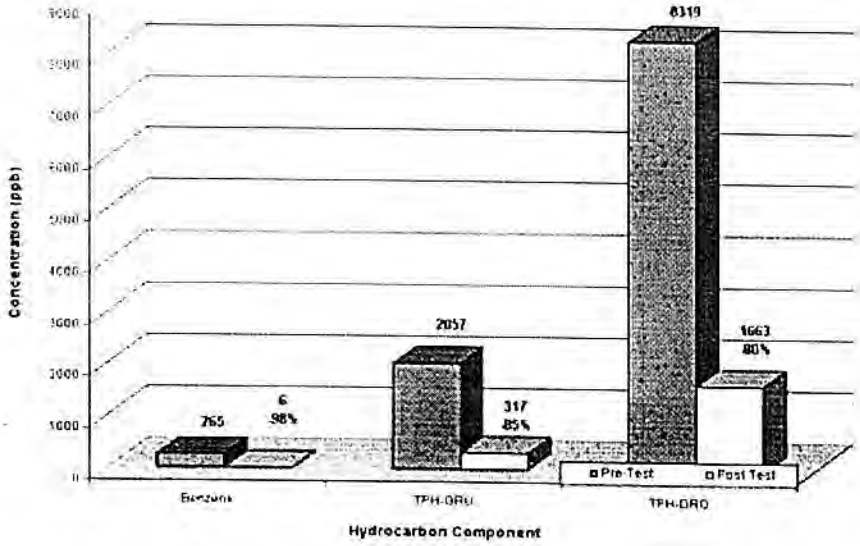

Figure 4 Average Groundwater Concentration Reduction

Department of Energy
Washington, DC 20585

June 15, 2000

Mr. Craig Rhodes
Chairperson
Paducah Site Specific Advisory Board
3883 Mt. Pleasant Road
Brookport, Illinois 62910

Dear Mr. Rhodes:

This is in response to your May 18, 2000, letter to Secretary Richardson regarding the Vortec Corporation demonstration project at the Paducah Gaseous Diffusion Plant (PGDP) at Paducah, Kentucky.

I want to thank you and the Site Specific Advisory Board for your recommendation about the demonstration of the Vortec Centrifugal Melter at PGDP. I appreciate your concerns with respect to the use of incineration as part of a waste treatment strategy. The Vortec technology is not in a strict sense an incinerator, but we are aware that some of the concerns that are inherent to thermal treatment processes may also be applicable to the Vortec technology.

We recently conducted a review of the Vortec technology to provide a better understanding of technical, cost, and waste stream issues. An Environmental Assessment under the National Environmental Policy Act was also performed on the Vortec technology and has resulted in a Finding of No Significant Impact.

Given the magnitude and complexity of a full demonstration, the Department has determined that it is in the best interest of the Department and the public to limit the demonstration at the PGDP. The limited demonstration would not include operation of the cyclone melter, but would be limited to testing the waste pretreatment and conditioning subsystem using surrogates representative of Paducah waste streams.

The limited demonstration activities would consist of completing the design and procurement of the remaining equipment for a waste feed preparation, blending, and waste characterization subsystem. The activities would also include startup, shakedown, site utilities, facilities, and operational features that will allow the feed preparation/blending/characterization subsystem to be demonstrated. The objective is to determine whether the waste pretreatment and conditioning subsystem can produce a homogeneous feedstock.

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This approach allows the Department of Energy to evaluate the cost and performance of this subsystem and to assess the applicability of the subsystem to other waste streams at other sites.

If you have further questions, please contact me at (202) 586-7709, visit our home page at www.em.doe.gov, or contact Mr. Gerald Boyd, Deputy Assistant Secretary for Science and Technology, at (202) 586-6382.

Sincerely,

Carolyn L. Huntoon

Carolyn L. Huntoon
Assistant Secretary for
Environmental Management

Permeable Treatment Zones

EM Fact Sheet

U.S. Department of Energy — Paducah Gaseous Diffusion Plant July 2000

Background

In 1988, groundwater contaminated with the degreaser trichloroethlyene (TCE) and the radioactive element technetium-99 was discovered outside the Paducah Gaseous Diffusion Plant (PGDP).

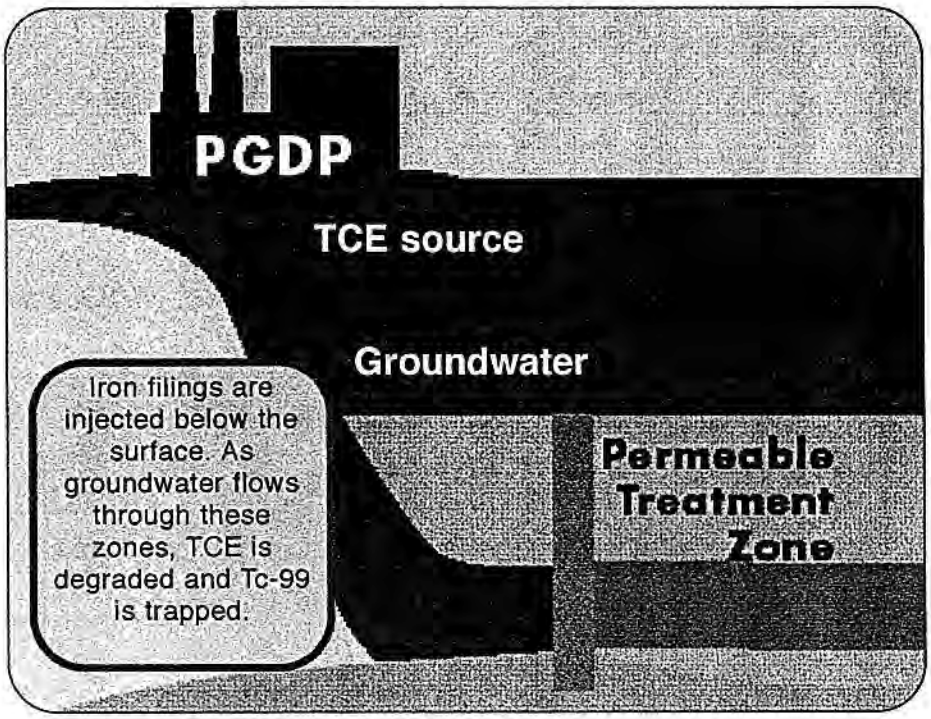
Three plumes of contaminated groundwater have been discovered moving from the plant site toward the Ohio River. DOE took steps in 1988 to place people with contaminated or potentially contaminated wells on city water.

In the mid-1990's, DOE began a pump-and-treat program that has pulled more than 750 million gallons of contaminated water from the ground, cleaned it and returned it to the environment.

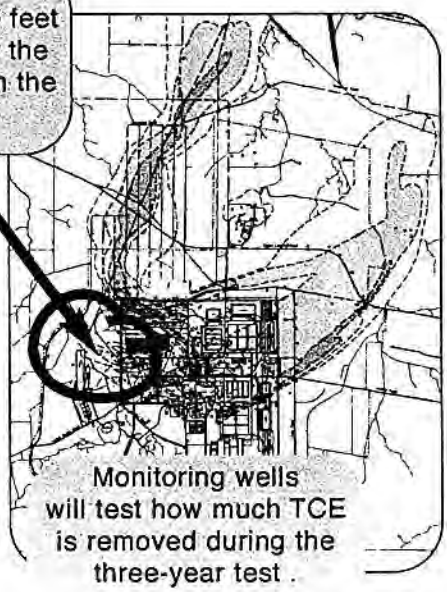
However, pump-and-treat is an interim action, designed to remove contaminants from high concentration areas, and more permanent solutions are being sought.

A technology called Permeable Treatment Zones (PTZ) is being tested beginning in the summer of 2000. This test will determine if PTZs hold promise for long-term passive remediation of Paducah's groundwater contamination.

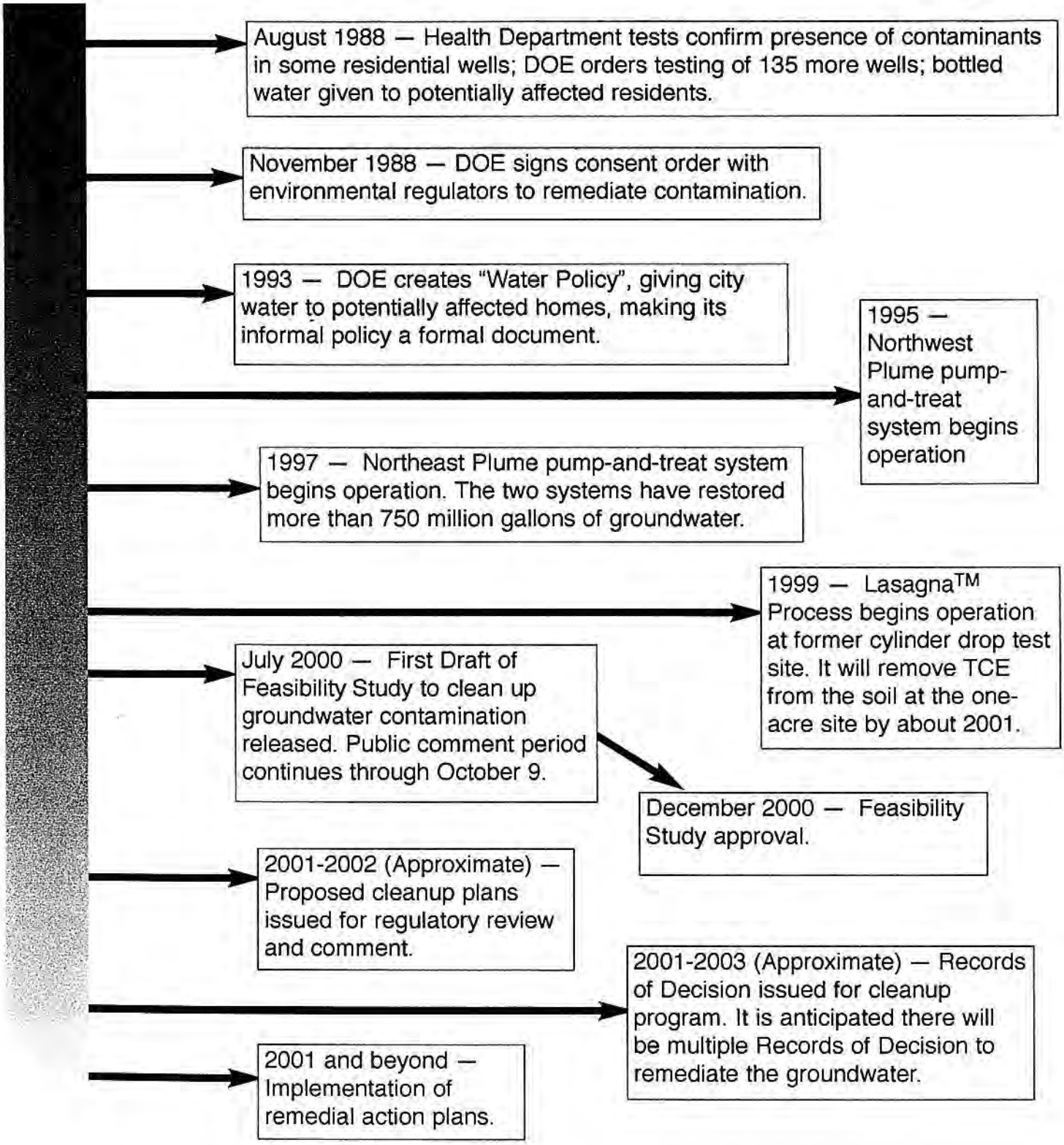
How a PTZ works



This summer's test involves building a treatment zone about 100 feet long, between 50 to 120 feet below the surface. The zone will be built within the plant's southwest plume.



The PTZ test is called a "Treatability Study" and is a key part of the Feasibility Study for the Groundwater Operable Unit at the Paducah site. The Feasibility Study was released for public comment in July 2000 and is available at the DOE Environmental Information Center in Kevil (Phone: 270-462-4564). DOE will make a decision on how to clean up contaminated groundwater based both upon test results and the community's input.

Paducah Gaseous Diffusion Plant

Key Groundwater Events Timeline 1988-2000