PADUCAH GASEOUS DIFFUSION PLANT
CITIZENS ADVISORY BOARD

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Paducah Gaseous Diffusion Plant Citizens Advisory Board
Waste Disposition Subcommittee Meeting Summary
February 7, 2013

The Waste Disposition Subcommittee met at the Environmental Information Center (EIC) in Paducah, Kentucky on Thursday, February 7th at 5:03 p.m.

Board members present: Ralph Young, Ken Wheeler, Richard Rushing, Maggie Morgan, Jim Tidwell, Diane O'Brien, Mike Kemp, and Tom Grassham

U.S. Department of Energy (DOE) and contractors: Buz Smith , Rob Seifert, Jennifer Woodard, Rich Bonczek, Greg Simonton, DOE; Elizabeth Wyatt, Craig Jones, Joe Walker, LATA KY; Stephanie Fountain, Geosyntec; Jim Skridulis, Jacobs; Eric Roberts, Jim Ethridge, EHI

Waste Disposal Options Subcommittee Meeting

Roberts opened the meeting and called for introductions. He then reviewed the progress the subcommittee had made so far. The meeting then was turned over to ***Fountain*** for a presentation about the preliminary waste acceptance criteria for the waste cell.

Wheeler: How long has the CERCLA process been in use?	**Fountain:** Since 1984.
Wheeler: There are CERCLA cells that are closed and in a sampling mode?	**Fountain:** Yes.
Wheeler: Is it safe to say that all those cells are in conformance with their waste acceptance criteria (WAC)?	**Fountain:** It is a little complicated because the laws changed in 2002, but they all go through their five year review cycle, and if they are out of compliance they must make adjustments.
Wheeler: I think if we could say that all the other cells are in compliance, that it would be a good statement to make to support putting a cell here. **Tidwell:** Ken, I think that would be an excellent thing to find out. Also, are there any of them that are similar to our situation? **Kemp**: Would this be built according to RCRA standards?	**Fountain:** It would be a Subtitle C equivalent landfill, which means it would at a minimum have what would be a RCRA hazardous waste landfill.
Tidwell: Considering the volume of material we have to dispose of, will any one of those sites be able to take it all?	**Fountain: A**ll of those sites could be built out to accommodate the volume.
Tidwell: Considering the soil conditions, would we ever have to look at two sites in order to be able to take the worst and the best of the material?	**Seifert:** I don't think that using two sites was ever considered.

Tidwell: Then any of those sites are designed to take all the volume?	**Seifert:** Yes.
O'Brien: So what is the estimated height of the cell?	**Fountain:** We estimated 60-80 feet. **Wyatt**: No matter which site we look at, two things remain the same. That's the conceptual design that we are looking at for each of the sites, and the contaminant list. The only thing that does change for each site are the geologic settings for each site. **Fountain**: Site 11 is a lower terrace site and site 3a is an upper terrace site. We chose those two sites for the report because they are representative of the two geologies. Site 11 PWAC values are higher that site 3a values, meaning that you could put higher amounts of contamination here than in 3a, and have the same level of protectiveness.
Morgan: Site 9 would be a good choice for the reason that it is not green space. How would you take care of materials generated during demolition until that site could be ready to accept the materials?	**Fountain:** That would be one of the more challenging sites. One of the issues would be the fact that the ground under the cell has to be stable and able to support the weight of the cell and it's contents.
Morgan: Would you have to store the waste until the cell is ready to accept it or would you ship it offsite?	**Fountain:** If it met the WAC, it could be staged and then put in.
Young: Are there any items on the list of contaminants that would make you say "this can't go in Fernald, or this can't go in Oak Ridge?"	**Seifert:** I think Oak Ridge's list is the same as our list. What would be different based on the geology and the design of the cell itself would be the concentrations of the contaminants.
Young: Any perception that our site's WAC is too easy is bad. Another thing that we were considering, say a waste is hazardous by ph, you could do some stabilization or treatment that would put it into the non-hazardous category.	**Seifert:** That's a decision we are leaving up to the individual projects. It will be up to them to determine is the waste meets the WAC.
Kemp: I know you are looking at individual compounds base on a risk to the public. Theoretically the cell should be secure; there should be no leakage. So if the cell is secure, why do we care what goes into it? Doe the modeling account for possible failure, or compatibility of liner materials?	**Fountain:** We look at the way different things affect the cell. We are assuming that the liner will start to degrade at year 200, and essentially be gone by year 600.
Wheeler: When could we see some kind of visual representation of the cell and the effects of an earthquake would have?	**Seifert:** We will circle back with you on that in a couple of weeks.
Kemp: In the model, is the no action level based on immediate collapse?	**Fountain:** We used the gradual failure from 200 to 600 years for the feasibility study.
Kemp: This landfill is going to be used for decades, correct?	**Fountain:** Forty years or so.
Kemp: Does the model take into effect the different interim cover used as opposed to the final cover used?	**Fountain:** During the operational phase we are assuming that the leachate collection system is functioning. And there would be personnel there

	working and monitoring the leachate levels.
Tidwell: Do you think you have pretty good estimates of the volume of each contaminant that would go into the landfill?	**Fountain:** We have used surrogate information from Oak Ridge because we don't have site data on some of the waste streams projected for this landfill. We take their estimates and use them to determine estimates here of the contamination levels in the waste.
Roberts: Basically, several years down the road, someone could drink the water from a well located next to the cell, and no harm would result.	**Fountain:** Yes, if there was no issues with the five-year review cycle under CERCLA where you have to demonstrate that you are still meeting all the criteria. **Seifert**: That is an important component that you have to meet the protectiveness levels every five years.
Wheeler: If we could show the success of other CERCLA cells, that would help the confidence of the community in this type of cell. **O'Brien**: Have any of the lining materials been in existence for twenty-five years?	**Fountain:** These materials have been in use about that long.
Tidwell: You talk about a five year review, but there would be a monitoring system that would send up a red flag if something went wrong during that five year period.	**Wyatt:** Yes.
O'Brien: Is DOE still buying water for about 100 families?	**Wyatt:** That is still true.
O'Brien: What happens to that contamination that is already there, in buying water for those 100 families?	**Wyatt:** That is part of the CERCLA five year review, and the question is are those families still protected. **Seifert:** This action on the waste cell won't impact any of that. All of the CERCLA are included in the review at one time.

Actions:

1. Look at landfills that are closed and see if they are still functioning, as well as what kind of monitoring they use. (LATA)
2. Find out if there was a failure at Fernald and see why they chose to put their cell where they did.
3. Also see some of the California seismic reports that have been published.
4. Develop a visual seismic tool to be used in a future public meeting.
5. See information from the Oak Ridge site on their waste cell.
6. See the results from the leachate monitoring at the C-746-U landfill at PGDP.

Young: Oak Ridge is using some kind of new temporary cover on their cell aren't they?	**Fountain:** I think I heard they are using some kind of spray adhesive. **Jones**: It's called a posishell, and it basically locks down the contaminants, and has been used in the industry for years. Kentucky actually approved that.
Morgan: All of the leachate is being collected and treated in Oak Ridge, right?	**Fountain:** Yes. I believe they say that it is so lightly contaminated that it would almost meet

	discharge standards.

Wyatt pointed out that the Feasibility Study would not pick a site if it was decided to put it onsite. Right now all they are looking for is which would be the best alternative, onsite or shipping offsite. **Seifert** indicated that the next document in the process, the Proposed Plan, is where the best site is chosen. **Wheeler** indicated that it might be helpful for the Board to say which sites that they consider would not be the best choice to locate a cell.

Wheeler and **Young** agreed to develop recommendation on waste disposal options at PGDP.

Young suggested that future use would take priority over placement of the CERCLA cell at a particular proposed site.

The meeting adjourned at 6:50 pm.

PWAC Session PGDP CAB

February 7, 2013

PWAC/WAC

- PWAC/WAC are different for every geographical location and landfill site. They will vary based on conditions such as those below but will have the same level of protectiveness.
  - Site location
  - Design
  - Waste properties

PWAC

- What is a PWAC?
  - Preliminary waste acceptance criteria
  - Used for alternative development and analysis in the feasibility study and alternative recommendation in the Proposed Plan
    - Can enough waste be projected to meet the PWAC such that the On-Site Alternative is a safe and cost-effective remedy?
  - Derived by modeling the amount of contaminants in waste that may migrate to groundwater
  - Other exposure scenarios are analyzed qualitatively in the feasibility study
  - Tied to the remedial action objectives for the waste disposal alternatives project that set the established protectiveness levels for the potential on-site disposal of CERCLA waste

PWAC*

- Based on informed assumptions regarding critical components
- Several sites considered
- Site properties assumed
  - Geology and groundwater
- Conceptual design
  - Liner system and leachate collection/detection
  - Cover system
- Assumed waste properties
  - Soil
  - Not containerized

*Must meet the same established protectiveness level

WAC

- What is a WAC?
  - Waste acceptance criteria
  - Follows selection of the remedial action
  - Developed during design
  - Used for operation of the landfill
    - Defines what may be placed in the landfill
  - Tied to the remedial action objectives for the waste disposal alternatives project that sets the established protectiveness levels for the potential on-site disposal of CERCLA waste

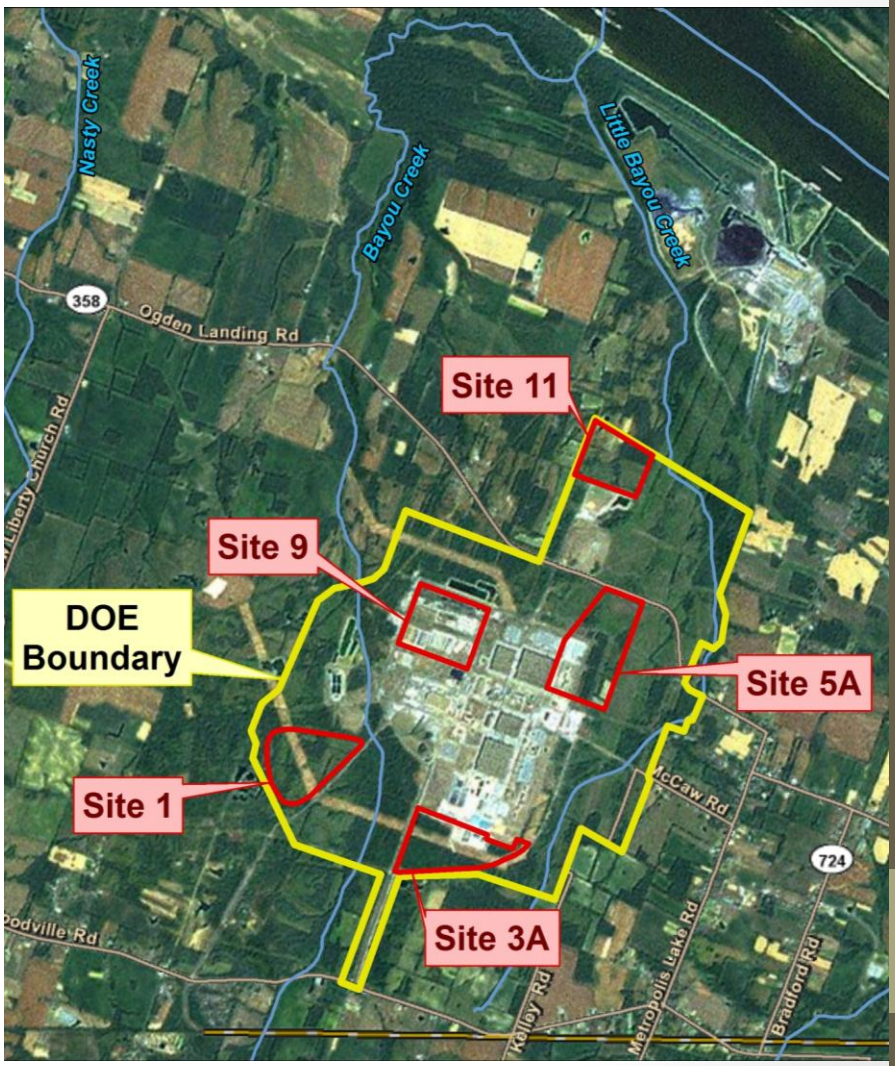
WAC*

- Based on actual conditions resulting from the final CERCLA decision
- Site selected
- Site properties known
  - Geology and groundwater
- Final design
  - Liner system and leachate collection/detection
  - Cover system
- Waste a mixture of soil and debris

*Must meet the same established protectiveness level

Candidate Sites

- Examples of things that change for different sites:
  - 2 Basic geologic settings at PGDP
    - Upper terrace
    - Lower terrace
- Things that stay the same for different sites:
  - Conceptual design layers
  - Contaminant list

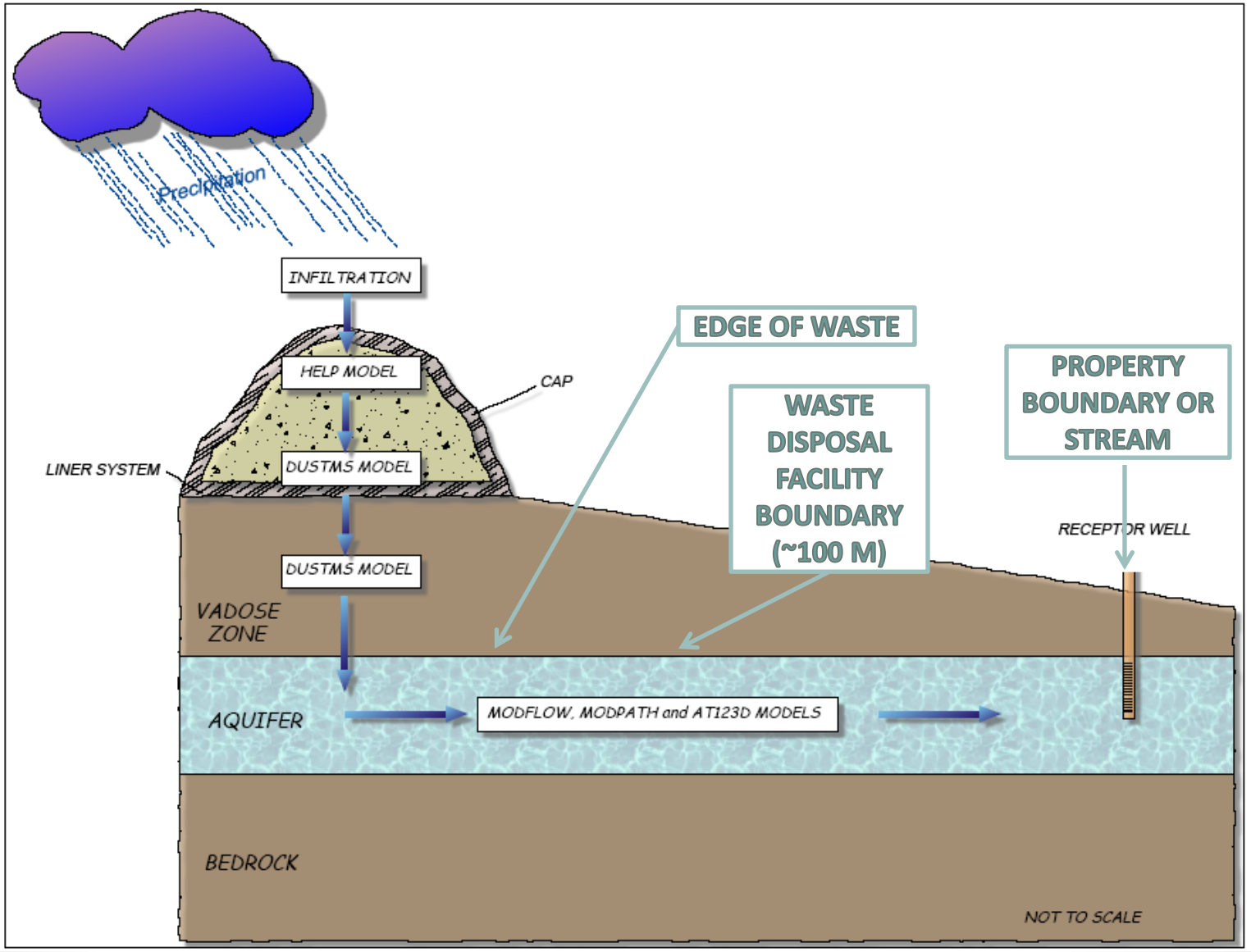


PWAC Contaminants

- Metals—16
  - Beryllium, mercury, copper, etc.
- Organics—68
  - PCBs, TCE, etc.
  - Surrogates for different organic groups modeled
- Radionuclides—12
  - Tc-99, uranium, etc.

Organic Chemicals	
Chloroform	Di-n-octyl phthalate
cis-1,2-DCE	Fluoranthene
Methylene chloride	Fluorene
Vinyl Chloride	Napthalene
TCE	**Pentachlorophenol**
PCE	Phenanthrene
Acetone	Pyrene
2-Butanone	Tetrachlorophenol (2,3,4,6-)
1-Butanone	BEHP
Hexanone (2-)	**Benzo(a)pyrene**
Methyl-2-pentanone (4-)	Benzo(b)Fluoranthene
Chlorobenzene	Benzo(k)Fluoranthene
Dimethylbenzene (1,2-)	Benzo(g,h,i)perylene
Benzene	Dibenzo(a,h)anthracene
Cumene	Indeno(1,2,3-cd)pyrene
Ethylbenzene	Arochlor-1016
Toluene	Arochlor-1221
Acenaphthene	Arochlor-1232
Acetophenone	Arochlor-1242
Benzoic Acid	Arochlor-1248
Carbazole	Arochlor-1254
Chloro-3-methylphenol(4-)	Arochlor-1260
o-Cresol	**Total PCBs**
p-Cresol	beta-BHC
Dibenzofuran(s)	DDD (4,4-)
Methyl napthalene (2-)	DDE (4,4-)
Methylphenol (3&4-)	DDT (4,4-)
Phenol	Dieldrin
Anthracene	Endosulfan II
Benzo(a)anthracene	Endosulfan sulfate
Butyl benzyl phthalate	Endrin
Chrysene	Endrin Aldehyde
Diethyl phthalate	**Gamma-chlordane**
Di-n-butyl phthalate	Heptachlor epoxide

Conceptual Model



Calculating the PWAC

- Assume contamination concentrations in the waste
- Model infiltration from precipitation into the landfill
- Model migration of contaminants from the waste to leachate
- Model migration of leachate to groundwater
- Estimate level of each contaminant in groundwater from leachate migration
- Compare contaminant concentrations in groundwater to established protectiveness levels
- Repeat the model run after adjusting contaminant concentrations in waste
- Stop when the modeled contaminant concentrations in groundwater match the established protectiveness levels

Major PWAC Findings

- PWAC are protective
- Less than 1% of the total projected waste volume does not meet the PWAC derived for Site 11
- Enough waste is projected to meet the PWAC such that the On-Site Alternative is a safe and cost-effective remedy