



October 18, 2012

Chair
Ralph Young

Vice-Chair
Maggie Morgan

Board Members
Glenda Adkisson
Judy Clayton
Robert Coleman
Eddie Edmonds
David M. Franklin
Tom Grassham
Kyle Henderson
Jonathan Hines
Mike Kemp
Kevin L. Murphy
Dianne O'Brien
Ben Peterson
Richard Rushing
Jim Tidwell
Roger Truitt
Ken Wheeler

Board Liaisons
Reinhard Knerr
DOE DDFO

Buz Smith
DOE Federal Coordinator

Todd Mullins
*Division of Waste
Management*

Turpin Ballard
*Environmental Protection
Agency*

Mike Hardin
Fish and Wildlife Resources

Stephanie Brock
Radiation Health Branch

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Agenda for the October Board Meeting

6:00

Call to order, introductions
Review of agenda

DDFO's Comments

-- 5 minutes

Federal Coordinator Comments

-- 5 minutes

Liaison Comments

-- 10 minutes

Administrative Issues

-- 20 minutes

- Election of Chair
- Election of Vice-Chair
- Adopt 2013 Work Plan

Subcommittee Chair Comments

-- 10 minutes

Public Comments

-- 15 minutes

Final Comments

-- 5 minutes

Adjourn



PADUCAH GASEOUS DIFFUSION PLANT CITIZENS ADVISORY BOARD

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Paducah Gaseous Diffusion Plant Citizens Advisory Board Meeting Minutes October 18, 2012

The Citizens Advisory Board (CAB) met at the Environmental Information Center (EIC) in Paducah, Kentucky on Thursday, October 18th at 6:00 p.m.

Board members present: Ralph Young, Judy Clayton, Dianne O’Brien, Ken Wheeler, Robert Coleman, Kyle Henderson, Kevin Murphy, David Franklin, Johathan Hines, Mike Kemp, Richard Rushing, Ben Peterson, Jim Tidwell, and Tom Grassham.

Board Members absent: Glenda Adkisson, Roger Truitt, Maggie Morgan, and Eddie Edmonds.

Board Liaisons and related regulatory agency employees: Todd Mullins (by teleconference)

DOE Deputy Designated Federal Official: Rob Siefert

U.S. Department of Energy (DOE) related employees: Craig Jones, Kelly Layne, Eddie Spraggs, LATA Environmental Services of Kentucky (LATA); Yvette Cantrell, Restoration Services Incorporated (RSI); Steve Penrod, United States Enrichment Corporation (USEC); Eric Roberts, Jim Ethridge, EHI Consultants (EHI).

Public: Tony Graham, Ricky Ladd, Monica Williams, S. McLaughlin, Renie Borger, Terra Hays, Lanny Hays, Greg Lahndorff, Robert Hogg.

Introductions

Young called the meeting to order at 6:00 pm. *Young* called for introductions, and then turned the meeting over to *Seifert* for the DDO presentation. *Seifert* then presented project updates to the Board.

Wheeler asked for more detail about the dispute from the State of Kentucky. *Craig Jones*, LATA, offered an explanation.

Wheeler: Could you elaborate on the basis of the dispute a little bit more?	Jones: The basis of the dispute has to do with what type of cover we actually place on the SWMU. There is some associated regulations with that. We met this week and resolved several of the conditions except for the one that I just mentioned.
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Siefert reported on the mentoring arrangement with Heath Middle School, talking about a recent site visit and tour by the students.

T. Hays (public): With regards to the tour by bus, do you feel that it was 100% safe for them?	Seifert: Yes. Absolutely.
Hays: How long were they inside the security fence?	Layne: Thirty to forty-five minutes, tops.

Hays: Were they on a bus provided by the school?	Layne: Yes.
	Young: If we want to pursue this anymore, it would be through the Public Comment period.

Kemp: I have a question related to the dispute. Wasn't land cover related to how the property might be used after completion?	Jones: That's right.
Kemp: Everything we are doing now relates to how can the land be used after cleanup.	Jones: A soil cover could be anything from a couple of feet to ten or twelve feet. It depends on the material that is in the landfill. That is where we are working with the other agencies to obtain agreement on what that would be.
Hines: Is it true that they don't know what is in all the landfills?	Jones: We actually have documented records from the past where we know what's in them.

Federal Coordinator Comments: *Smith* was absent.

Liaison Comments: *Mullins* (on phone) had no comment.

Administrative Issues: *Young* turned the meeting over to *Roberts* to conduct elections of Chair and Vice-Chair.

Roberts called for nominations. *Young* was nominated for Chair. A motion to elect *Young* was made, seconded and passed by acclamation.

Roberts then called for nominations for Vice-Chair. *Peterson* was nominated for Vice-Chair. A motion to elect *Peterson* was made, seconded and passed by acclamation.

Young asked for everyone to review the 2013 Work Plan. A motion was made to adopt the Work Plan, it was seconded, and approved by acclamation.

Young then pointed out the subcommittee assignments he set up and indicated that if anyone wished to be assigned to a different subcommittee to let him know. Upcoming subcommittee meetings and topics were reviewed also.

Young explained the four recommendations that were developed at the recent Chairs meeting. They were voted on and approved by the Board. They are listed below.

- WIPP recommendation to expand the mission of this plant to accept other types of waste. **Wheeler** questions why this technology is not used by other sites. **Roberts** explained that some other sites had waste stored and was excited about the prospect of being able to ship it to WIPP for disposal.
- DOD waste division recommendation would split DOE waste from DOD waste for disposal.
- EM budget recommendation to recommend that funding in the areas of research and development not be restricted.
- Recycling recommendation to support recycling as a part of the D&D activities.

Young indicated that past Executive Committee summaries were available to the Board for their information.

Public Comments:

<p>Landorff: My name is Greg Landorff. I am a board member of NOVA. That's the Neighbors for an Ohio Valley Alternative. We formed a non-profit organization to plan for both the Paducah and Piketon sites that will eliminate the need for an onsite waste cell and maximize redevelopment options for these sites. Our board members are comprised of professors, doctors, attorneys, water and waste management professionals. We formed this organization because we feel like we might benefit in the development of the site out there. Some of the board members are former workers out there so we are well aware of what's going on out there. And what has gone on out there. The main question that I have for you tonight is a simple question. It requires a yes or no answer. And that is has DOE been made aware of the higher levels of plutonium in the plant that was previously released? The amount of plutonium that is in the plant.</p>	<p>Young: I think we will have to get back to you on that question.</p>
<p>Landorff: It's yes or no. There's no getting back to me. Were you aware of the higher levels than was previously announced?</p>	<p>Cantrell: We will have to get back to you. This is not a Q&A session. We will be glad to take public comments.</p>
<p>Landorff: When would I be expecting a comment to come back?</p>	<p>Cantrell: We will have to get with DOE.</p>
<p>Landorff: When could I expect an answer? An estimate?</p>	<p>Cantrell: Do you have an email?</p>
<p>Landorff: Yes I do.</p>	<p>Cantrell: If you will get that to me, we will send you a response.</p>
<p>Landorff: When could I expect an response.</p>	<p>Cantrell: You can expect an response when we get you a response.</p>
<p>Landorff: You have to ask DOE to tell you if you are aware of it or not?</p>	<p>Cantrell: Well, I'm not aware of it personally.</p>
<p>Landorff: That's a no.</p>	<p>Cantrell: I'm not DOE.</p>
<p>Landorff: No, I'm asking the CAB, are you aware of higher levels in the plant than was announced by DOE?</p>	<p>Cantrell: Again, this is the CAB time for Public Comments. It is not...</p>
<p>Landorff: Yall are the CAB. Do yall know that the levels are higher out there than DOE announced?</p>	<p>Tidwell: I'm not sure that they are higher. Do you have some kind of documentation?</p>
<p>Landorff: Yes, we do. You got an email, I'll send it to you.</p>	<p>Cantrell: I do. Would you like it?</p>
<p>Landorff: Yes I would.</p>	<p>Cantrell: It is ycantrell at rsienv dot com. If you will send me that report we will have it distributed.</p>
<p>Landorff: OK, I'll send it to you as soon as I get my answer.</p>	<p>Young: Thank you.</p>

<p>Ladd: My name is Ricky Ladd. I'm a former CAB member and former employee at BWCS. I appeared before the CAB approximately a year ago asking DOE a question; if they had conducted their complete ISMS audit of BWCS. And I'm just wondering, I've never heard any more from it, and I was wondering what the status of that audit is, or if it is ongoing or if it is expected?</p>	<p>Young: We will have to get back to you on that one too.</p>
<p>Ladd: The other question that I would like to ask the CAB I guess; when I was a member of the CAB, in 2004, we were looking at the end-state of the plant. It appears like we are still dealing with that same issue. You know, that's a lot of years. 2004 to 2012, and frankly today I didn't see we were any farther along that what we were in 2004, maybe it is, it just wasn't shown here tonight. The one question I have is are all the mission statements for all the Citizens Advisory Boards across the United States the same?</p>	<p>Young: I think they are probably a little different. You could go to each web site and find it.</p>
<p>Ladd: The reason I'm asking that question, you know I watch Hanford quite a bit because they have some serious issues out there. Also we have some of the serious issues from Hanford at Paducah from years past, not recently. One of the questions I would like to ask is are there reactor returns stored in the cylinder yards at Paducah and are there reactor return tails stored in the cylinder yards at Paducah? And that will complete my comments. Thank you so much.</p>	<p>Roberts: Thank you Mr. Ladd.</p>

<p>Hays: My name is Terra Hays. I've got several questions. The school project where middle schoolers were brought onto the grounds in the school buses, what type of information was provided to the school and to the parents regarding that trip?</p>	
<p>Hays: Whenever they visited, was it a normal day of operation?</p>	
<p>Hays: OK. And you said it was 100% safe for the children to be there.</p>	
<p>Hays: A hundred percent?</p>	
<p>Hays: No I said a hundred percent.</p>	
<p>Hays: OK, with it being 100% safe for the children to be there, there is no worry for any contamination from inside of a building coming out?</p>	
<p>Hays: None at all. Are you aware that often in some of the buildings animal droppings are found, and that is showing that animals are coming in and out. Well if animals are coming in and out, that</p>	

means that toxic substances that are inside the facilities are also coming in and out.	
Hays: Has that been brought to your attention?	
Hays: From time to time, I have a picture if you would like to see it from inside C-340, which is just one of the buildings, with heavy droppings showing a large amount of animal activity within the building. So how can something be 100% contained and safe for children to be exposed to if there is no containment? Would you like to see the picture? Do you have an answer for the question? The question was if there is no containment of the hazardous materials within the facility, how could those children be 100% safe?	
Hays: Right, thirty years, which means that everything in that facility...	
Hays: OK. What I'm driving at ...	
Hays: Would you like me to answer the question?	
Hays: Finish talking and then I'll answer.	
Hays: I'm driving at...	
Hays: I want an answer to know that children being brought onto a place that is extremely toxic are safe. How could anyone in good conscience bring children onto the grounds? That's what I driving at.	
Hays: I don't want to answer that question.	
Hays: So you are saying that it was the parents' responsibility to do the research.	
Hays: I am a citizen of the area, concerned about children's well-being as well as others.	
Hays: Is it not? Is it not a highly toxic area? An area that contains hazardous material. OK then, even slightly toxic. I have documentation also showing where there are concerns with the protection of the public and the environment, and that some of the hazards are actually airborne. So if the children never left the bus, the fact that it is in the air, it's not airborne, it's never traveled anywhere off the facility. I never said that. Does it matter. Why does it matter? So you're saying that the people that live close to the facility are responsible for their children's well-being by living there. OK, by living there they are responsible for their children's well-being because they should know better than to live there. I thought I had time to talk. This is exactly what this is for.	

<p>What is the time limit? What is the allotted time limit for each speaker?</p> <p>Is that written somewhere that I could see?</p> <p>I have other questions that I would like answered. I would like to know if obviously the children were there on the school bus, there was a member with them who gave them the tour, informed them about the different places that they were seeing, and told them about the goings on to the best of their ability within the facility. Was the member a DOE official, a worker at the facility, who was the DOE official that approved the field trip?</p> <p>You are with DOE? Can you tell me who the DOE official was that approved the field trip for the children?</p> <p>First, who gave the tour, and who was the one that approved the field trip?</p> <p>OK, is there some sort of documentation that shows who would have approved the field trip? It wouldn't have been documented?</p> <p>It being the type of place that it is, because of the security measures, someone would have had to approve it.</p> <p>Is there any way that I could find that out? Who gave the approval for the field trip.</p> <p>I also have concerns about the airborne toxins, if the school buses were inspected as they left to make sure they didn't pick up any contamination. Because not only were the children that went on the field trip with the parents signed consent on the bus, but then the same buses that took the children had other children that parents didn't sign consent get on the school buses and ride those home.</p> <p>This one is about being ahead of schedule. You said you were ahead of schedule on the remediation project, often there are reports of violation of ALARA. Why would people be violating ALARA if you are ahead of schedule? The question is, often the stay times are increased inside the facilities. Inside the buildings that are being de-constructed, the stay times are increased which violates ALARA.</p> <p>By definition that violates ALARA, yes it does.</p>	
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<p>Hays: My name is Lanny Hays. That's my wife over there. I worked out there. I worked in 340. I worked in 410. I know there are dangerous things out there, and if the kids were brought on, did they have pNad's on, at least pNad's?</p> <p>Yall were saying it was safe, what if they had a</p>	
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release out there? That's my statement. A release can happen at any time. I've been out there. Those kids are in danger. So your kids are more important than my kids, is that what you are telling me? What about my kids? No, I'm done.	
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Young asked for any final comments from DOE and the state of Kentucky, and there wasn't any.

Hines gave a status update on the Cold War Patriots Project.

Young asked for any further comments. There being none, the meeting was adjourned at 7:15 pm.

Paducah Citizens Advisory Board

DDFO Presentation

Rob Seifert, Paducah Federal Project Director

October 18, 2012



CITIZENS
ADVISORY BOARD



EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

Presentation Agenda

- Inactive facilities removal
- Groundwater cleanup
- Burial grounds cleanup
- Upcoming documents
- Middle School Science Program
- DUF₆ plant update

Inactive Facilities Removal: C-410 Feed Plant

- Completed capital projects Aug. 24, ahead of Sept. 30 HQ milestone.
- Asbestos abatement and cold trap stabilization continues.
- Demolition to slab anticipated by end of September 2013.



Inactive Facilities Removal: C-340 Metals Plant

- LATA KY began transite siding removal Aug. 22.
- LVI Services (LATA subcontractor) started demolition Sept. 26.
- Project is three months ahead of baseline schedule.
- Demolition to slab anticipated by January 2013.

Re

Administration area before removal.



Administration area after removal.



Groundwater Cleanup: Southwest Plume Source Removal

- Soil sampling began July 18, ends in late October.
- Work is two months ahead of baseline schedule.
- Results will be used to:
 - Fill data gaps in oil landfarm and C-720 area.
 - Help narrow remedy decision at C-720.



Soil sampling at the northeast corner of C720 was completed in early October and has moved to the southeast corner of the building.

Groundwater Cleanup: C-400 Source Removal Phase IIa

- Field work for electrical resistance heating system began Sept. 26.
- Installation to be completed by spring 2013.
- Operation planned for summer 2013.



Workers use an auger to make electrode borings near C-400.

Burial Grounds Cleanup: SWMU 4 Soil Sampling

- 65 passive soil gas samplers were deployed Sept. 24 as part of the first phase of a five-phase, two-year sampling program.
- Analyses will determine relative level of certain vapors, particularly TCE, and distribution in the SWMU 4 area.
- Shallow soil sampling began Oct. 15 week.

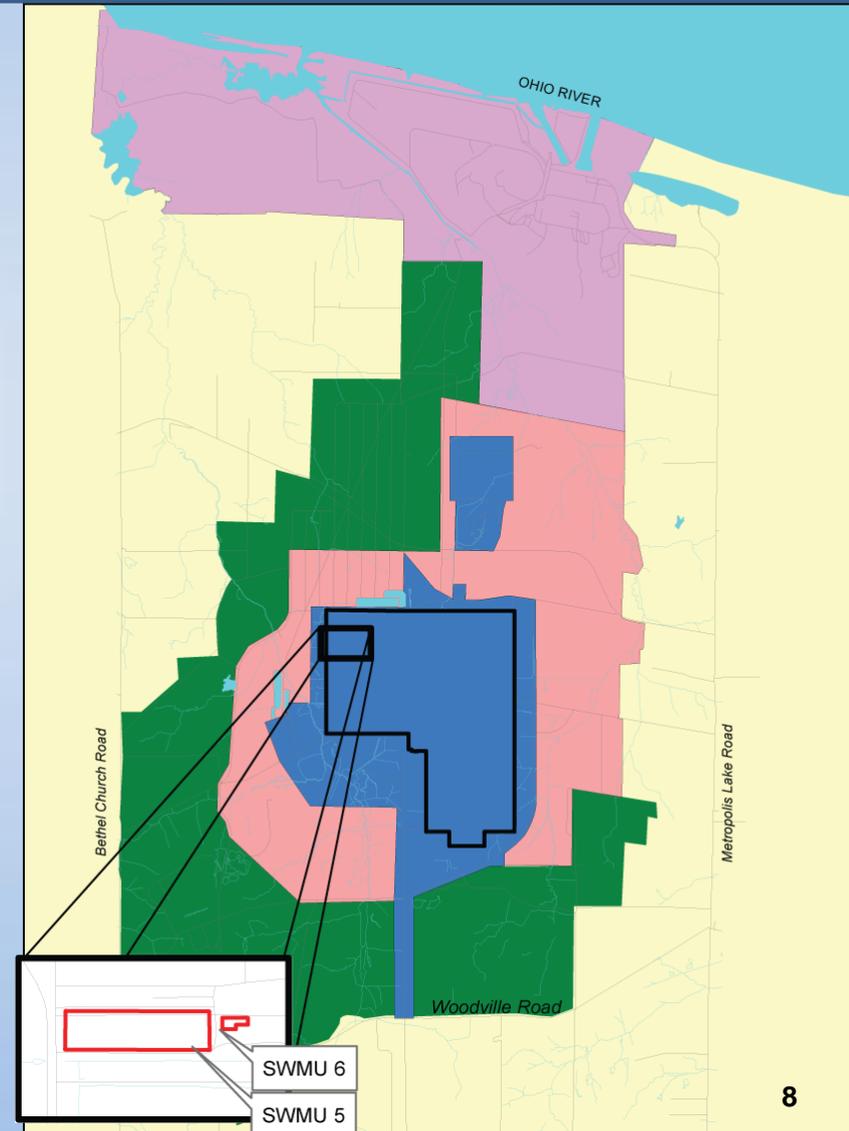


Workers install passive soil gas samplers in the SWMU 4 area.



Burial Grounds Cleanup: SWMUs 5 and 6 Informal Dispute

- DOE issued revised FS for SWMUs 5 & 6 in early August.
- EPA and Kentucky Division of Waste Management (KDWM) issued nonconcurrence letters and invoked informal dispute in late September.
- DOE is working with EPA and KDWM to resolve all comments and develop dispute agreement within 30-day deadline.



Informal Dispute Process

May be invoked by any party for any action generating a dispute



Good faith effort to resolve informally prior to resorting to formal dispute



Written Statement of Informal Dispute:

1. Set forth nature of dispute
2. Work affected by dispute
3. Disputing party's position with respect to dispute
4. Information supporting disputing party's position



Limited to 30-days of receipt of written statement



May be automatically extended by 15-days if requested by any of the parties



Parties may agree to extend informal dispute even further – confirmed in writing.



Formal Dispute:

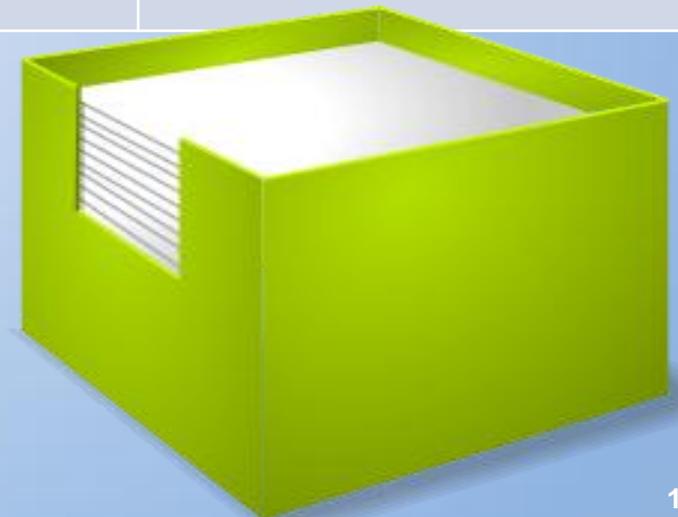
Invoke no later than 15-days after the end of informal dispute.

Disputing party must forward a written statement of formal dispute to Dispute Resolution Committee

Documents Recently Submitted to Regulators

Document	Submittal Date	Regulatory Review Period
Soils OU – Remedial Investigation Report (D2)	October 1, 2012	30 Days
Groundwater OU – SW Plume Remedial Design Report – 60% (D1)	September 25, 2012	90 Days (DOE requested 45-day review)
Burial Grounds OU – Proposed Plan, SWMUs 5 and 6 (D1)	August 29, 2012	45 Days
Burial Grounds OU – Feasibility Study, SWMUs 5 and 6 (D2/R1) ¹	August 6, 2012	30 Days
Groundwater OU - C-400 Phase IIa Remedial Action Work Plan (D2)	July 2, 2012	30 Days (Approved)

¹ Currently in dispute resolution



Middle School Science Program

- Middle school G&T science program expanded to include about 50 students from Heath, Lone Oak.
- Topic: reindustrialization/reuse.
- Students toured plant Sept. 28 during orientation.
- Teams are studying facilities/infrastructure, environmental considerations, and socioeconomic factors.
- Each school will present ideas Jan. 11, 2013, on how to best reuse PGDP.



Depleted Uranium Hexafluoride (DUF₆) Plant



- Babcock & Wilcox Conversion Services achieved full plant operation in September with all eight conversion units operating for longer than two weeks.
- BWCS processed 2,791 metric tons of DUF₆ in FY 2012, ending Sept. 30.
- In FY 2013, BWCS will achieve higher throughput in stages and determine the sustainable ramp-up to steady conversion rate.

Board Discussion...



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EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

Waste Disposal Options Project

CAB Briefing Paper

October 11, 2012

Purpose: Provide a summary of the Waste Disposal Options (WDO) project, to date. This summary is intended to provide new members of the CAB with a general understanding of the project and past topics that have generated interest. It should establish a benchmark for the varied knowledge that the more senior members possess. Combined with the session presentation, this should prepare all members to receive additional information that will aid them in fully participating in the upcoming dry run for the CAB-sponsored public workshop.

Project: *CERCLA Waste Disposal Alternatives Evaluation for the Paducah Gaseous Diffusion Plant*

Background: The U.S. Department of Energy's (DOE's) Environmental Management (EM) Program is responsible for the cleanup and disposal of environmental legacy waste from operation of the nuclear weapons program that ceased with the end of the cold war era in the 1980s. Paducah Gaseous Diffusion Plant (PGDP) is one of those sites, but, due to commercial interests, has remained operational under the control of the United States Enrichment Corporation (USEC). USEC has projected operations will cease at the site in the 2013–2016 time frame. In the interim, since 1988, DOE EM has instituted a program to clean up environmental projects that did not impact uranium enrichment operations.

Based on lessons learned from previous decontamination and decommissioning (D&D) sites, DOE began preliminary planning for full scale D&D once USEC ceases operation. One of the first decisions to be made is the disposal path for approximately 3.6 million cubic yards (mcy) of waste generated primarily as a result of demolition of over 500 plant facilities at the site.

Past Waste Disposal Practices: Prior to full scale D&D, DOE sites across the complex used a combination of off-site disposal facilities and on-site landfills for project waste disposal. With the onset of full scale D&D of major facilities, both the characteristics of the waste and the amount of waste prompted risk-based evaluations of waste disposal at individual DOE sites.

Current Waste Disposal Practices at the Paducah Site: The most routinely used options are (1) the existing on-site industrial landfill (C-746-U) (2) an existing commercial waste disposal facility in Clive, Utah, or (3) a DOE-owned facility in Nevada (Nevada National Security Site, NNSS).

PGDP D&D Planning Data: Continued environmental remediation activities and future full scale D&D of PGDP are projected to generate roughly 3.6 mcy of waste. The projected waste is anticipated to consist of 1 mcy of nonhazardous waste and 2.6 mcy of hazardous waste (over 95% will be low level radioactive waste).

Types of Waste: During the cleanup, we expect to have the following types of waste. This waste will be generated in the following forms, percent shown relative to total waste:

- Concrete/General Construction Debris – 34% (generated primarily from building demolition);
- Soils – 44% (generated primarily from soils beneath and around the building slabs and includes sludge and sediment);
- Other dry solids – 1% (includes items such as Personal Protective Equipment);
- Scrap Metal – 20% (generated primarily from building demolition and includes such metal as steel and nickel); and

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Asbestos – 1% (generated from building demolition).

CERCLA Waste Disposal Alternatives Evaluation for the Paducah Gaseous Diffusion Plant Project Definition: Using the **CERCLA decision process**, DOE will conduct a study to identify and evaluate the most appropriate alternatives for disposal of waste generated by the upcoming D&D of PGDP.

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What is CERCLA? CERCLA is an acronym for the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), a United States federal law designed to clean up sites contaminated with hazardous substances. It is commonly referred to as the Superfund. PGDP was placed on the CERCLA National Priorities List in 1994.

Who is responsible for CERCLA at PGDP? DOE entered into a Tri-Party Agreement (i.e., Federal Facility Agreement with EPA and Kentucky) in 1998, establishing the procedural requirements for Site Cleanup.

- DOE, as the facility owner/operator, is responsible for implementing CERCLA.
- Kentucky Department for Environmental Protection—Division of Waste Management, is the state regulatory agency for CERCLA.
- U.S. Environmental Protection Agency (EPA), Region 4, is responsible for administering CERCLA regulatory oversight.
- DOE employs contractors to implement CERCLA work at the Paducah Site (LATA Kentucky).

How is a CERCLA decision made? CERCLA has a regimented process for making a cleanup decision. The decision process is composed of the following:

(1) Remedial Investigation/Feasibility Study Work Plan

- *Describes how the RI and FS will be implemented, summarizes data availability and data gaps, and describes each waste disposal alternative.*

(2) Remedial Investigation/Feasibility Study (RI/FS) Report

- Determine the nature and extent of hazardous substances present;
- Assess risks to human health and the environment; and
- Evaluate alternative remedies

(3) Proposed Plan(PP)

The results of the RI/FS will lead to the selection of a preferred remedy that will be presented to the public in a Proposed Plan.

(4) A Record of Decision (ROD)

Following the Proposed Plan, a ROD will be signed formally documenting the selected remedy.

Once the decision is formally recorded, the CERCLA process continues with the implementation of the chosen remedy and potential long-term monitoring of the selected remedy.

Waste Disposal Options Project

CAB Briefing Paper

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What alternatives are being evaluated in for the WDO project? Three alternatives are being evaluated:

- (1) No action—No change to current waste disposal practices.
- (2) Off-site—Ship all waste that do not meet the requirements of the existing on-site C-746-U industrial landfill to off-site disposal facilities
- (3) On-site—Design, build, and operate an on-site waste disposal facility for waste that does not meet the requirements of the existing C-746-U on-site industrial landfill.

**All alternatives will have some portion of waste going to off-site disposal, including alternative 3.

Why is DOE making this decision now?

DOE initiated this decision to facilitate D&D planning. Initially the project decision and implementation would coincide with cleanup of the burial grounds and the planning for post-closure D&D of the site. The burial grounds project has been delayed due to flat funding impacts delegated by the current administration. At this point, the impending shutdown of USEC will continue to drive post-closure D&D planning. To maximize the potential for future funding sources, DOE wants to ensure that a documented waste disposal decision is ready to be presented.

Where are we in the CERCLA decision process for the Waste Disposal Options at Paducah?

DOE has submitted the D1 RI/FS (D1 is a designation for the Draft 1 copy of the document that is sent to the regulatory agencies for comment). The CAB was provided the D1 of the RI/FS Executive Summary on May 15, 2012, with a note that a full report was available by request. On August 14, 2012, an e-mail that explained how to access the full report from CAB iPads was sent to the CAB membership.

The regulators have provided comments and DOE currently is working to resolve these comments. The results of the comment resolution will be documented, as appropriate, in the D2 version of the Report (D2 is a designation for the Draft 2 copy of the document that is sent to the regulatory agencies for approval once the document has been revised based upon comments on the D1 version).

What are the primary concerns associated with the decision?

Both off-site and on-site alternatives present challenges that need to be considered. Some of these concerns are stakeholder driven (long-term stewardship, future use, schedule delays, state equity), while other concerns [waste acceptance criteria (WAC), seismic, transportation risks, and cost] will be addressed as part of the formal CERCLA evaluation. Stakeholder concerns will be addressed in more detail during the educational session.

On-site challenges

- Long Term Stewardship—Concerns over long term surveillance and maintenance of an onsite landfill once the site is cleaned up.
- WAC—Again, simply put, how do we ensure that what is being placed in the cell meets the criteria that were established to ensure safety of human health and the environment?
- Seismic Design—Based on seismic concerns in the area, can a landfill be designed to qualified standards?
- Future Use/site aesthetics/siting—Will an on-site landfill impact future development of the site?

Waste Disposal Options Project
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Off-site challenges

- Schedule delays—What is the impact to projects and resource allocations if waste shipments are halted due to off-site facility issues
- Transportation risks—What risks exist with increased disposal? What is the probability of a waste incident shutting down waste disposal to off-site locations?
- State Equity—How will wastes be handled if states with off-site disposal facilities or states the waste travels through ban their use?
- Cost—How is D&D and future use of the site impacted by the cost of waste disposal?

Other topics, raised by the CAB

Raising the Authorized Limits of the C-746-U Landfill—What impact would raising the authorized limits of the currently operating C-746-U landfill have on the project decision?

Recycling—What is DOE's position on recycling and how does it impact the amount of waste generated?

Impact to West Kentucky Wildlife Management Area—Will location of a potential on-site waste disposal facility cause impacts to the West Kentucky Wildlife Management Area?

Past CAB recommendations related to the WDO Project The CAB has produced Recommendations 05-02, 08-03, 08-05, 08-07, 10-06 related to the WDO project. In addition, Recommendation 07-04 includes a portion that focuses on the WDO project. They are available for review on the CAB website or through the CAB office at (270) 554-3004.

Summary of Community/Stakeholder Involvement

November 2008
Public Information Session
Topic—RI/FS Process

May 2009
Public Information Session
Topic—RI/FS Work Plan and siting study approach

June 2009
Regulator visit to Oak Ridge CERCLA Waste Disposal Facility

October 2009
Paducah CAB visit Oak Ridge facility, met with Tennessee Department of Environment and Conservation and the Oak Ridge SSAB

December 2009
Public Information Session
Topic—Continued education of CERCLA decision process and project update

April 2010
PUPAU visited Oak Ridge waste disposal facility, TDEC, and met with city/county mayors

June 2010
Public Information Session
Topic—Paducah site overview and future cleanup

January 2011
Public Information Session
Topic—continued education on project and status update

November 2011
Paducah CAB visited Fernald waste disposal facility

June 2008—June 2010
Paducah CAB subcommittee meetings

June 2007—September 2012
Monthly regulatory meetings

EM SSAB Chairs Meeting
Washington, D.C.
Draft Chairs' Recommendation
October 3, 2012

The EM SSAB has noted with considerable interest and support that the Waste Isolation Pilot Plant (WIPP) has been remarkably successful in disposing of transuranic waste (TRU) throughout the DOE complex for approximately ten years. The success of the TRU waste program is among DOE's most notable achievements during this time frame.

The EM SSAB is also aware that the mission of the WIPP is being assessed for possible expansion to include disposal of some surplus plutonium from defense programs weapons production activities and certain other nuclear waste such as Greater-Than-Class-C Waste from NRC-related programs.

The success and activity of the WIPP program represents an opportunity for the DOE to make still further progress in addressing some of DOE's legacy waste streams.

The EM SSAB encourages the DOE to evaluate additional storage and disposal options for DOE legacy waste that could result from an expansion of the WIPP disposal mission.

For example, one specific test program that would support this concept involves shipment of a small number of SRS Defense Waste Processing Facility Canisters from SRS to WIPP for storage and evaluation for disposal. Such a test program would permit DOE to evaluate significant issues in DOE's complex-wide high-level waste disposition program such as:

- Shipment container development issues
- Packaging and shipment/receipt issues for both the shipper and the receiver
- Other transportation issues
- Dealing with consent-based approvals

It is the intent of this test program to provide valuable input and to serve as a precursor for the DOE program for the disposal of DOE's high-level waste.

EM SSAB Chairs Meeting
Washington, D.C.
Draft Chairs' Recommendation
October 3, 2012

The EM SSAB would like to offer one recommendation that should increase the effectiveness and timeliness of addressing the disposal of DOE high-level waste.

It is recommended that DOE work with other national leaders to separate the disposition programs for the Defense Program high-level waste and the commercial nuclear industry high-level waste.

The DOE high-level waste program is at a more advanced stage relative to disposition than the commercial nuclear power industry waste-disposal program. For example, DOE presently has over 3,000 canisters at SRS awaiting the next step in the disposition process. Further, the waste form characterization and content is well known and understood. The same will be true for the waste forms in canisters that will be produced at Hanford and Idaho.

Also, the amount of DOE high-level waste is only 10% of the commercial nuclear volume. It is the intent of this recommendation to afford DOE an opportunity to address a much reduced quantity of high-level waste with well known forms. Disposition of the smaller volume in this manner could serve as an excellent learning tool for addressing the commercial high-level waste-disposition program.

EM SSAB Chairs Meeting
Washington, D.C.
Draft Chairs' Recommendation
October 3, 2012

The EM budget is composed of several components, including costs to maintain the EM complex in a safe 'operations ready' state, out-year compliance costs to meet future regulatory milestones, current-year compliance costs to meet regulatory milestones in the current fiscal year and other costs not directly tied to regulatory milestones.

Included in these costs is funding for the development of new technology that will improve the productivity of cleanup projects across the complex. The enhanced solvent for the Salt Waste Processing Facility at SRS is an example of a successful R&D project.

As the current federal budgeting activities continue to constrain EM cleanup activities, the EM SSAB recommends that DOE not constrain funding in areas of technology research and development. The EM SSAB recognizes that without innovative solutions for the future, the cost and timing of cleanup projects could jeopardize compliance with regulatory milestones and extend cleanup costs beyond reasonable expectations.

PRE-DECISIONAL DRAFT

EM SSAB Chairs Meeting
Washington, D.C.
Draft Chairs' Recommendation
October 3, 2012

The EM SSAB recommends that DOE place more emphasis and priority on evaluating technologies that could make recycling excess materials cost effective. Decontaminating these materials for resale can have many positive benefits:

- Saving space in onsite CERCLA disposal cells
- Adding more dollars for cleanup from the sale of excess
- Reducing cumulative environmental insult
- Reducing long-term monitoring and stewardship costs

To facilitate continuous cost-effective recycling, the EM SSAB recommends that DOE identify and establish a national recycling center of excellence, incentivize contractors to recycle and repurpose items, and add a recycling and repurposing element to future Requests for Proposals.

PRE-DECISIONAL DRAFT



U.S. DEPARTMENT OF
ENERGY

Waste Disposal Alternatives Educational Session

U.S. Department of Energy
Paducah CAB

October 18, 2012



EM *Environmental Management*

safety ❖ performance ❖ cleanup ❖ closure

www.em.doe.gov

Introduction/Purpose

- **Provide a background of the Waste Disposal Alternatives Project**
- **Explain how CERCLA will be used to make cleanup decisions**
- **Summarize current CERCLA schedule and progress**
- **Discuss individual topics of stakeholder importance**
- **Establish a path forward to meet project (DOE and CAB) needs**

History of Paducah Gaseous Diffusion Plant

- Construction of PGDP began in 1951
- Initiated Operation in 1952
- Managed by DOE and predecessor agencies until 1993
- USEC leases and operates plant today
- The PGDP is located on federally owned property; DOE is the site landlord



C-300 Central Operations Building during 1950's construction

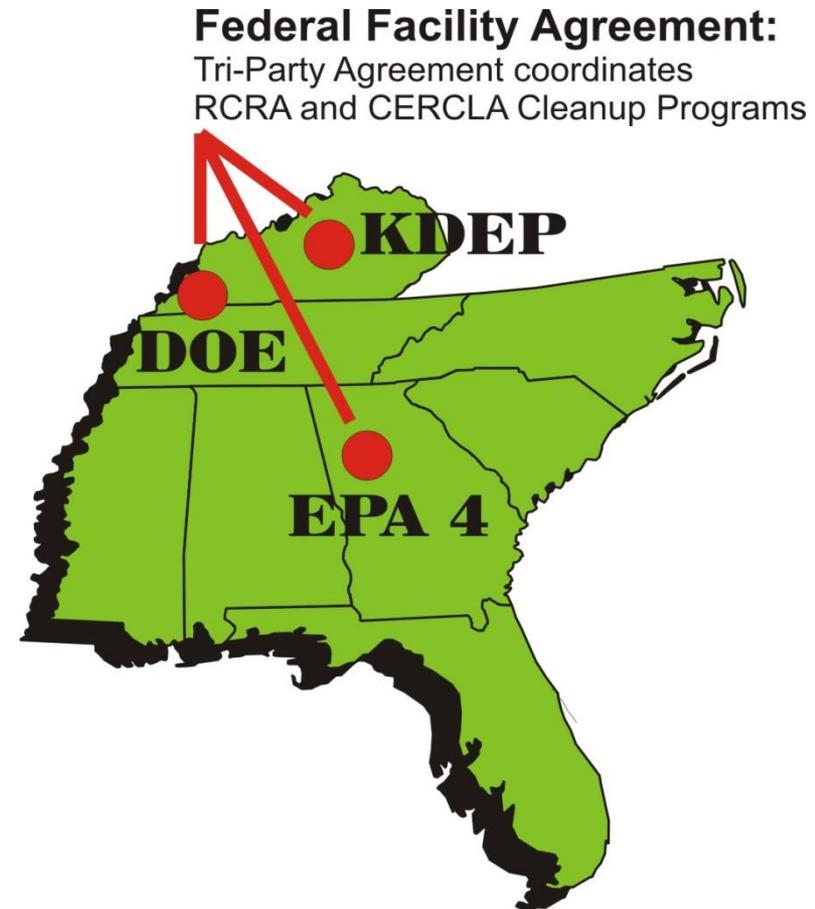
Significance of Plant Size

- Federal Site Acreage: 3,556
- Plant Site Acreage: Approximately 750
- Number of Buildings: over 500
- Process Buildings: 4
- Process Building Acreage Under Roof: 74 acres (*once 2nd largest structure under roof in the world*)



PGDP Regulatory

- Past operational practices led to current environmental challenges
- PGDP was placed on CERCLA's National Priorities Listing (NPL) in 1994
- Kentucky Natural Resources and Environmental Protection Cabinet, EPA, and DOE signed the CERCLA Federal Facility Agreement in 1998
- The Federal Facility Agreement is the binding agreement that oversees the cleanup of PGDP



DOE EM Waste Disposal Background

- 1996 *Paths to Closure* document centered on a detailed management approach to achieve cleanup of the 53 remaining sites to be closed
- 2001 *Top to Bottom* report was a programmatic review of the EM program that found that DOE needed to improve performance:
 - ✓ Centralized a core mission of EM to provide safe cleanup and closure
 - ✓ EM cleanup and closure should be run like a business
- Due to the waste characteristics and volumes associated with the decontamination and decommissioning of the site within the complex, a risk based approach to waste disposal should be considered

Paducah WDA Background

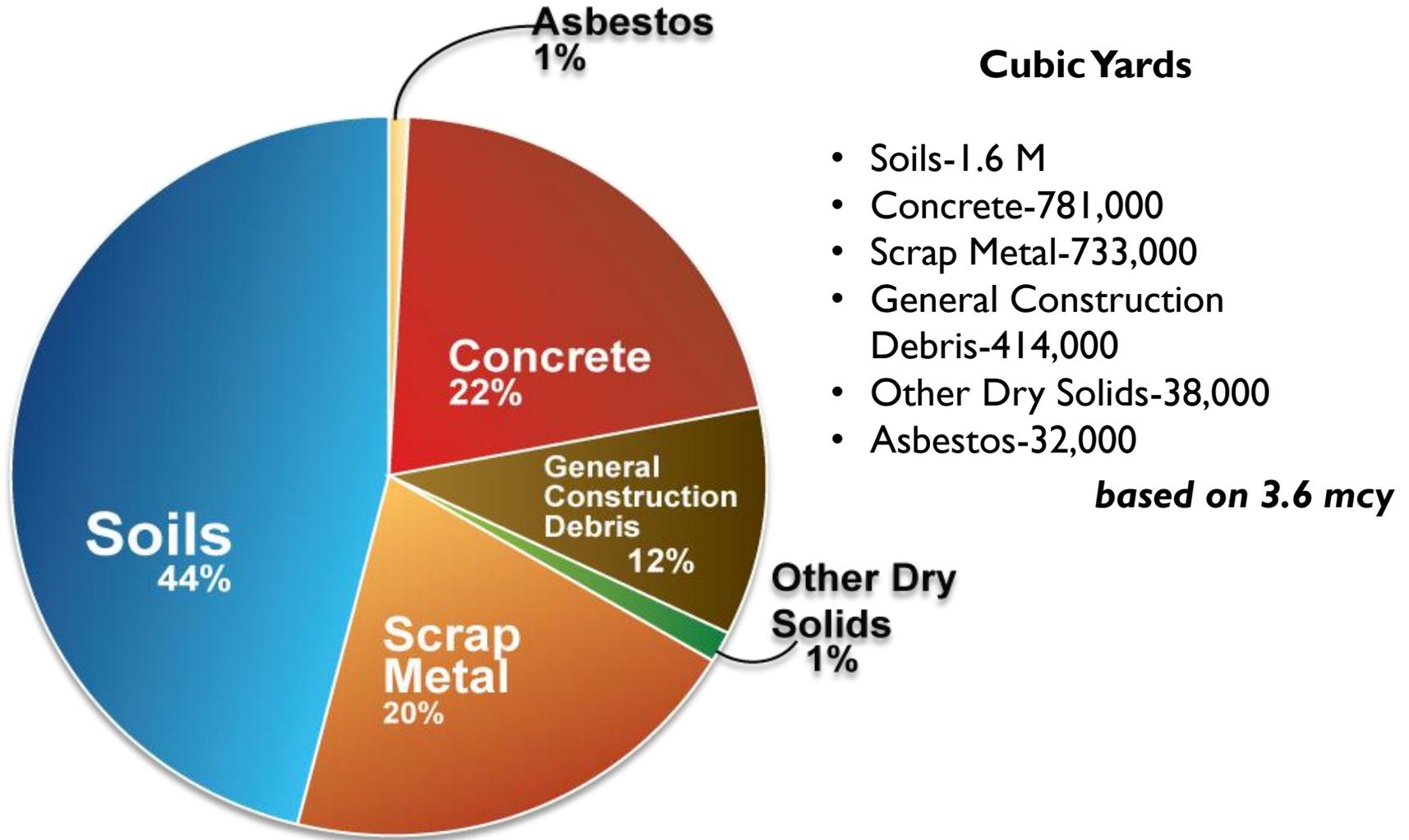
Approximately 3.6 million cubic yards (mcy) of waste is expected to be generated from D&D of the facilities and from final environmental remediation of soils

- Over 500 buildings and facilities
- ~3.1 mcy D&D construction debris
- Additional 500,000 cy of remediated soils

DOE is responsible for D&D and cleanup of the site, including waste management of soils and D&D material generated from the cleanup of PGDP



Projected Waste Types for Disposal



WDA CERCLA Project



WDA Scope Summary and Approach

- Identify CERCLA projects and their waste volumes
- Identify and develop waste disposal alternatives
- Evaluate and compare each waste disposal alternative
- Reach a CERCLA waste disposal Record of Decision

What is CERCLA?

Comprehensive **E**nvironmental **R**esponse, **C**ompensation, and **L**iability **A**ct (CERCLA) is the federal authority to deal with threats to human health and the environment from hazardous substances or waste sites

- CERCLA was designed to clean up hazardous waste sites not covered by other federal regulations
- Increased importance of permanent remedies and the use of treatment technologies
- Incorporated other state and federal regulations
- Increased state involvement in the process
- Increased focus on human health
- Encouraged greater citizen participation in decision making

CERCLA is commonly referred to as the Superfund

CERCLA Process at PGDP

CERCLA states DOE is required to enter into an agreement with the Regulators for remedy selection (e.g. Proposed Plan, Record of Decision)

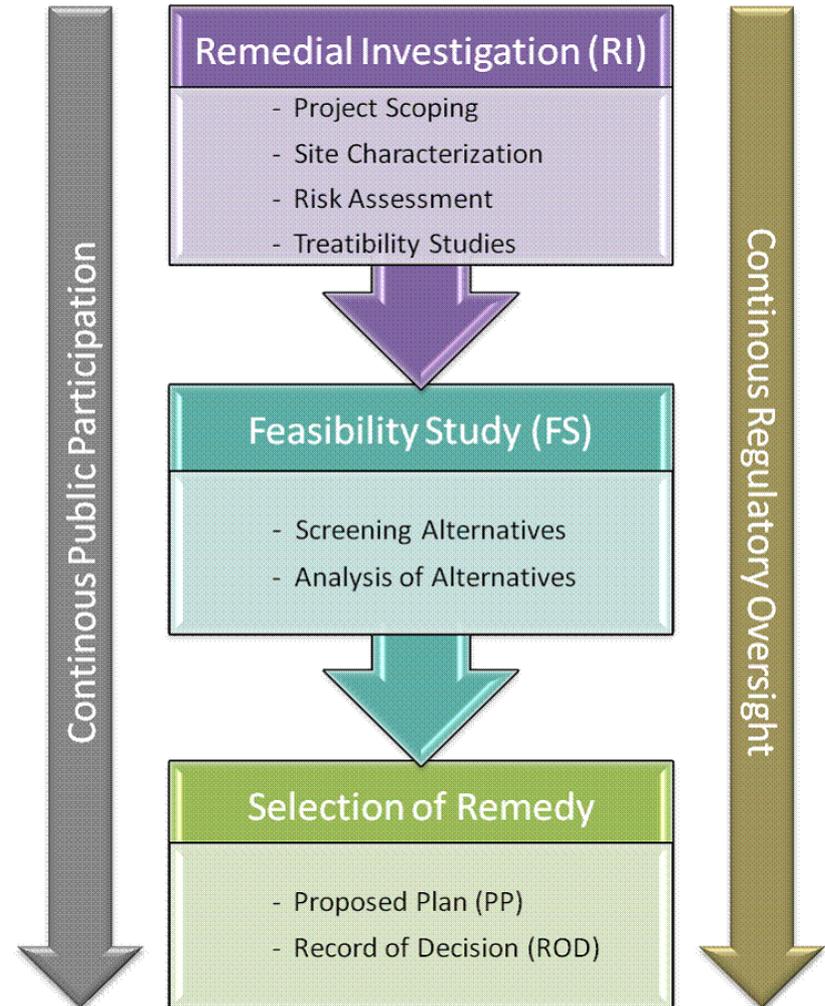
Under the FFA, DOE has agreed to provide KDEP and EPA enhanced involvement that includes review and concurrence throughout the CERCLA process.

Examples include:

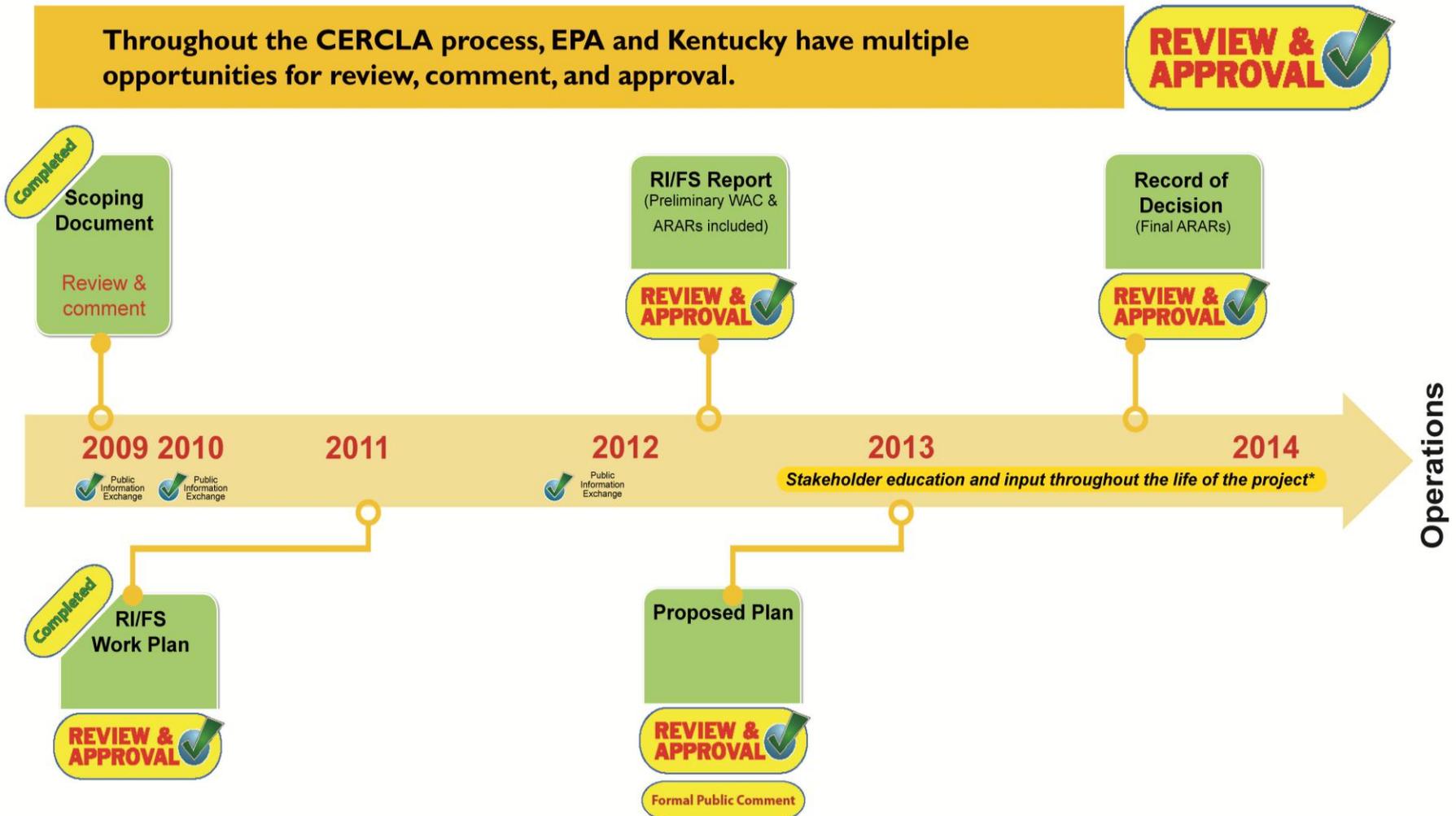
- RI/FS Work Plan
- RI/FS Report
- Proposed Plan
- Record of Decision

A complete record of the review and approval process conducted by KDEP and EPA is available to the public for review in the Administrative Record file.

CERCLA Decision Process



Current WDA Project Schedule



*If necessary, dependent on final Record of Decision

CERCLA Decision Process for Waste Disposal Alternatives

Alternatives to be evaluated:

Off-site alternative—The continuation of current off-site disposal practices for waste disposal

On-site alternative—The disposal of waste in a new waste disposal facility that would be constructed on property currently owned by DOE

No action alternative —Current practice of waste disposal would continue on a project-by-project basis

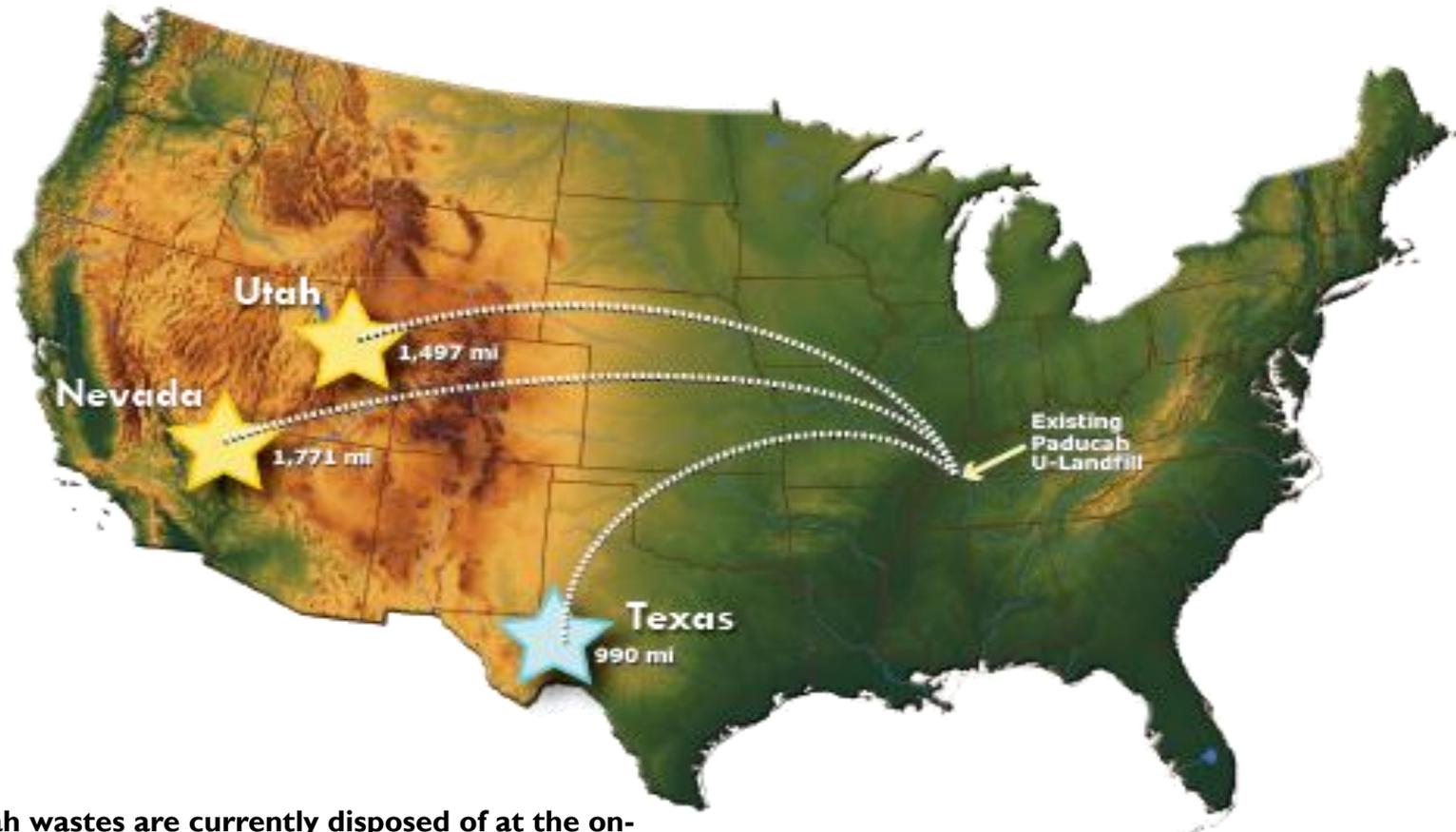
All scenarios assume the C-746-U Landfill will continue operation

For all scenarios, some portion of the waste is assumed to be disposed of in an off-site facility



Current Waste Disposal Facilities

Locations of Currently Permitted Waste Facilities



Paducah wastes are currently disposed of at the on-site C-746-U Landfill and Utah and Nevada disposal sites. Potential future options include the Andrews, TX, disposal facility and an on-site CERCLA cell.

Alternative Challenges

Off-site challenges

- **D&D cleanup schedule**
- **State equity**
- **Transportation risks**
- **Cost**

On-site challenges

- **Long-term stewardship**
- **Future use**
- **Conceptual/Seismic Design**
- **Waste Acceptance Criteria (WAC)**

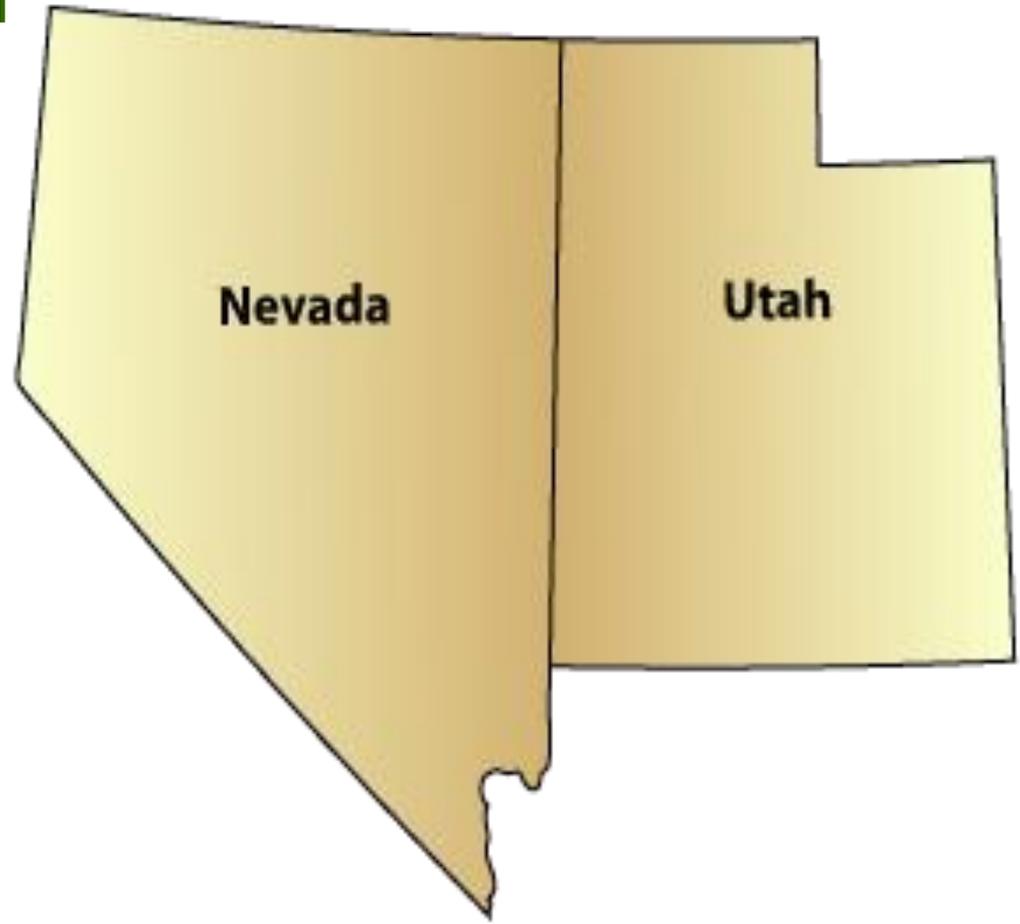
Additional topics presented by the CAB include these: U-Landfill capacity, recycling, and WKWMA

D&D Cleanup Schedule

- Unexpected regulatory shutdown of off-site facilities could cause site domino effect, impacting resources and causing project delays
- Higher off-site transportation costs result in less funding available for D&D
- Nevada National Security Site (formerly NTS) is scheduled for site closure in 2027
- *EnergySolutions* is scheduled to close before Paducah D&D is scheduled to be complete

State Equity

- Both Nevada and Utah have expressed continued concerns over waste disposal
- Continued growth creates community anxiety related to transportation routes



Long-Term Stewardship

The FFA and CERCLA impose ongoing responsibilities at the site related to the following:

- Future transfers
- Ongoing obligations
- CERCLA Five-Year Reviews ensure remedy still is effective
- Land Use Control Implementation Plans

DOE created the Office of Legacy Management to transition sites to post-closure activities



DOE and the federal government cannot walk away from the Paducah Site

Long-Term Stewardship

DOE Order 450.1

An environmental compliance audit and review program that identifies compliance deficiencies and root causes of non-compliance.

Clearly articulated roles and responsibilities at all appropriate levels to ensure accountability for less than desired environmental performance.

Activity	Fernald—Closed	Weldon—Closed	Oak Ridge—Post Closure	Hanford—ERDF Post Closure	Paducah—TBD
Site Maintenance	Legacy Management - EM	Legacy Management - EM	TDEC*	Legacy Management – EM	Using current models, during cleanup activities, site maintenance would be performed by DOE on-site cleanup contractor. Post closure activities would be assumed by EM Office of Legacy Management
Emergency Event	Legacy Management - EM	Legacy Management - EM	Legacy Management - EM	Legacy Management – EM	
Monitoring	Legacy Management - EM (Stoller)	Legacy Management - EM (Stoller)	TDEC*	Legacy Management – EM	
Reporting	Annually	Quarterly/Annually	Quarterly*	TBD	
Cell Ownership	DOE/Federal Government				

*Postclosure activities will be assumed by the Tennessee Department of Environment and Conservation through a perpetual care trust fund established under state law.

Future Use

What is the impact of an on-site landfill impact future development of the site?

DOE has experience in working with local communities to enhance the post closure environment

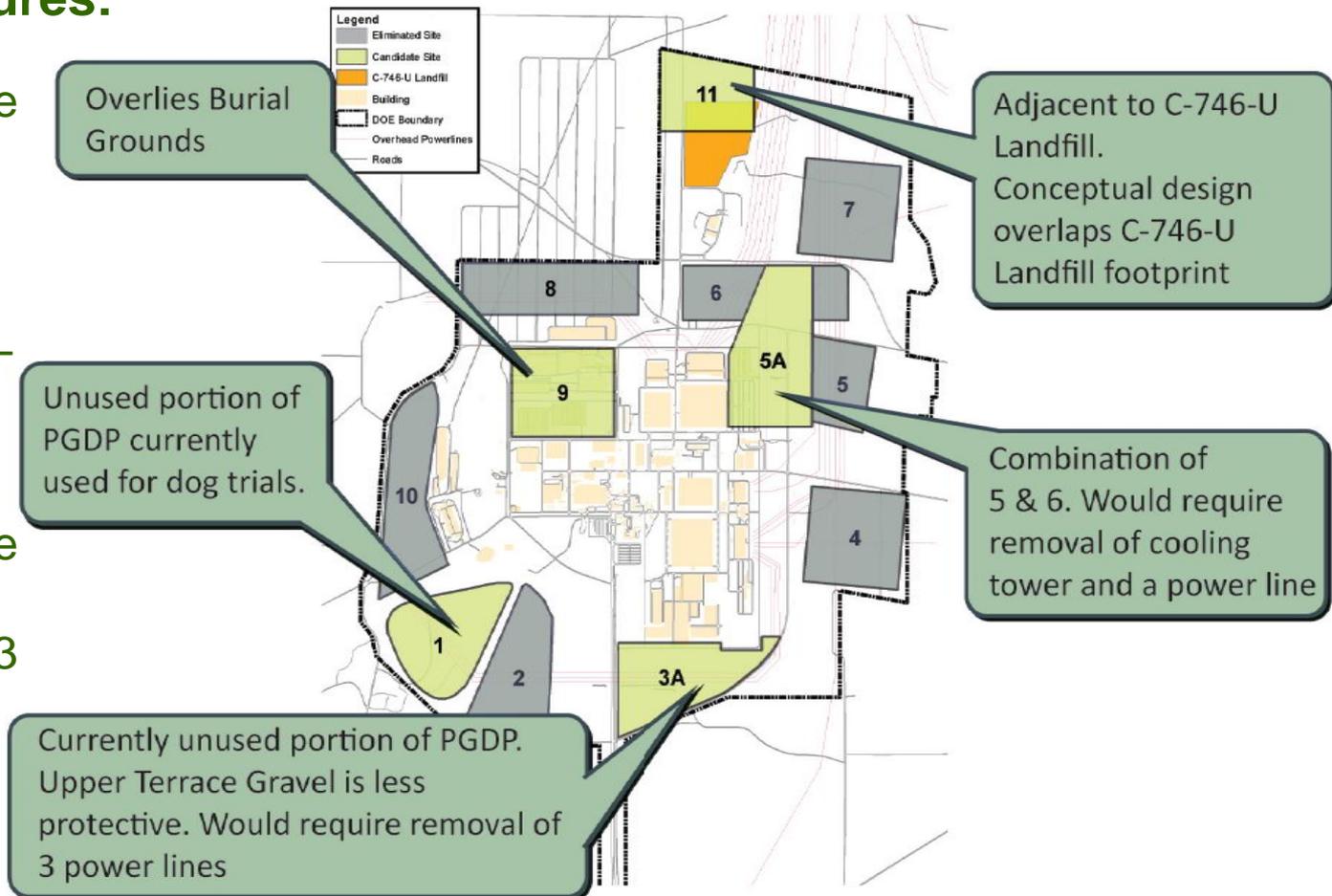
Waste disposal facility aesthetics and site selection options can be maximized to provide for limited impact on future use opportunities



Siting

Based on high end waste volume assumptions (~3.6 million), the current conceptual design has the following features:

- Maximum waste disposal footprint—29 acres
- Total waste disposal facility—87 acres (post closure)
- Maximum waste disposal facility height—up to 113 ft (includes liner, waste, and cap)



CAB Topics

Raising the Authorized Limits of the U Landfill—What impact would raising the authorized limits of the currently operating C-746-U Landfill have on the project decision?

Assuming all currently permitted phases of the U-Landfill are constructed, the design capacity could accommodate approximately 1.2 mcy of waste. In the most likely scenario of the draft WDA RI/FS Report, 1 mcy of CERCLA waste will be disposed of at the U Landfill.

The most likely scenario projects 2.6 mcy of waste to be placed in a potential on-site waste disposal facility. If the additional 200,000 cy of waste noted above was placed in the U Landfill, the remaining waste that would go to the waste disposal facility exceeds the break-even volume of 300,000 cy. The break-even volume is the volume where on-site disposal becomes more cost effective than shipping waste off-site.

Bottom line—the U Landfill essentially will be used to the maximum capacity. The cost considerations already take this into account.

CAB Topics

Recycling—What is DOE's position on recycling and how does it impact the amount of waste generated?

DOE Paducah supports recycling efforts and will perform recycling activities within funding and regulatory constraints.

Impact to WKWMA—Will location of a potential on-site waste disposal facility cause impacts to WKWMA?

Input from WKWMA is being considered as a part of the siting process. DOE will work with WKWMA and Paducah Economic Development to mitigate any impact that a potential on-site cell might create.

CERCLA Decision Topics—Transportation Risks

- Statistics from a DOE transportation handbook were used to calculate how many fatalities and injuries could occur based on how many miles were traveled
- Other transportation issues include incidents with waste packaging and profiling



<i>Trucks to Commercial or DOE Facility</i>		<i>Rail Cars to Commercial Facility</i>	
<i>Off-site/No Action</i>	<i>On-site</i>	<i>Off-site/No Action</i>	<i>On-site</i>
10,000 shipments	—	30,000 rail cars	1,600 rail cars

CERCLA Decision Process—Cost

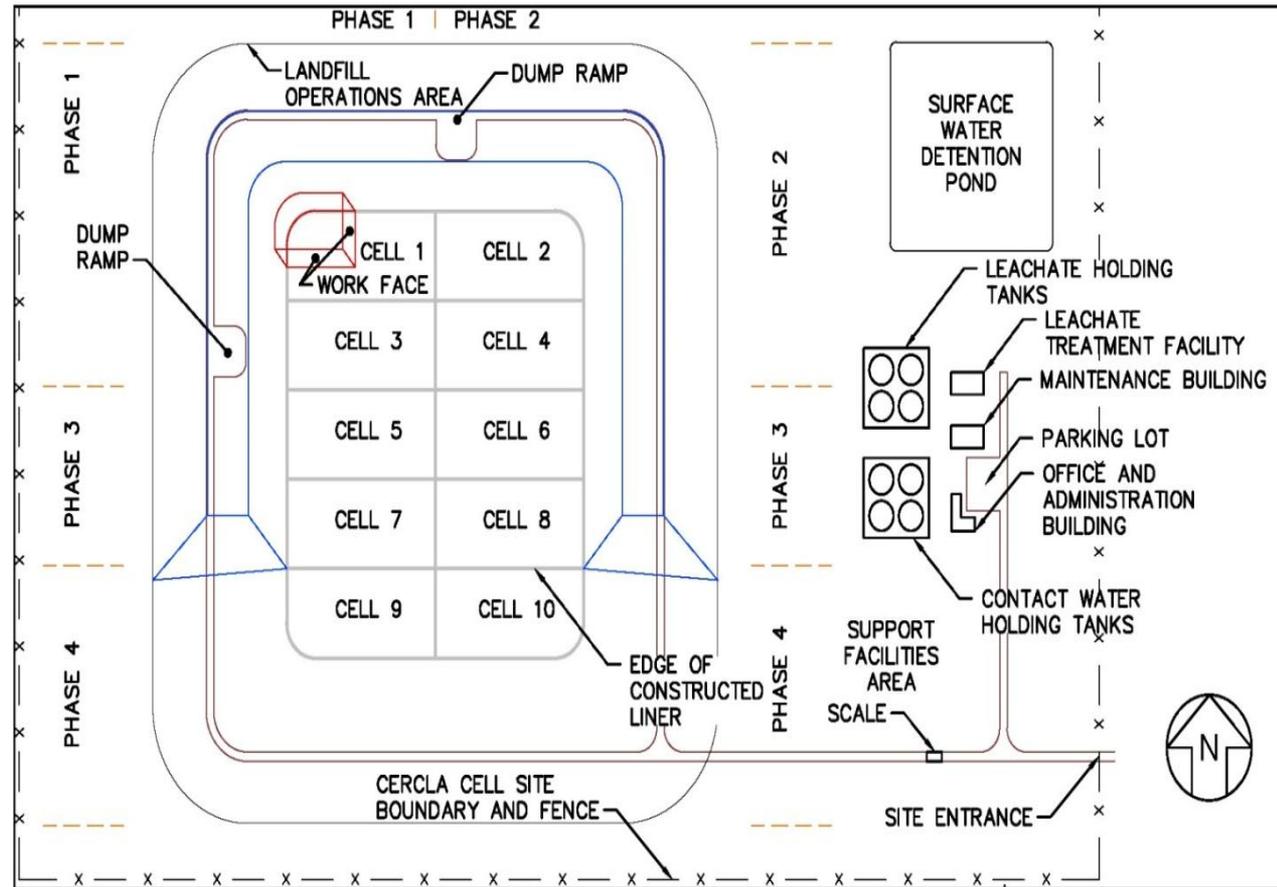
For the No Action, On-site, and Off-site disposal actions, the following costs are addressed:

- Direct and indirect costs—expenditures required to initiate and perform a remedial action, including characterization, design, and construction.
- Waste disposal operation costs include (1) cost of containers, long distance transportation, and fees paid to off-site disposal facilities; (2) waste and handling placement, facility maintenance, and monitoring during on-site operations
- Surveillance and Maintenance are long-term costs that would occur after closure of an on-site facility

Conceptual Design

A conceptual design has been developed at the appropriate level to support that an on-site disposal facility is feasible

- Seismic
- Environmental protectiveness (cap and liners)
- Leachate collection, detection, and treatment
- Surface water controls

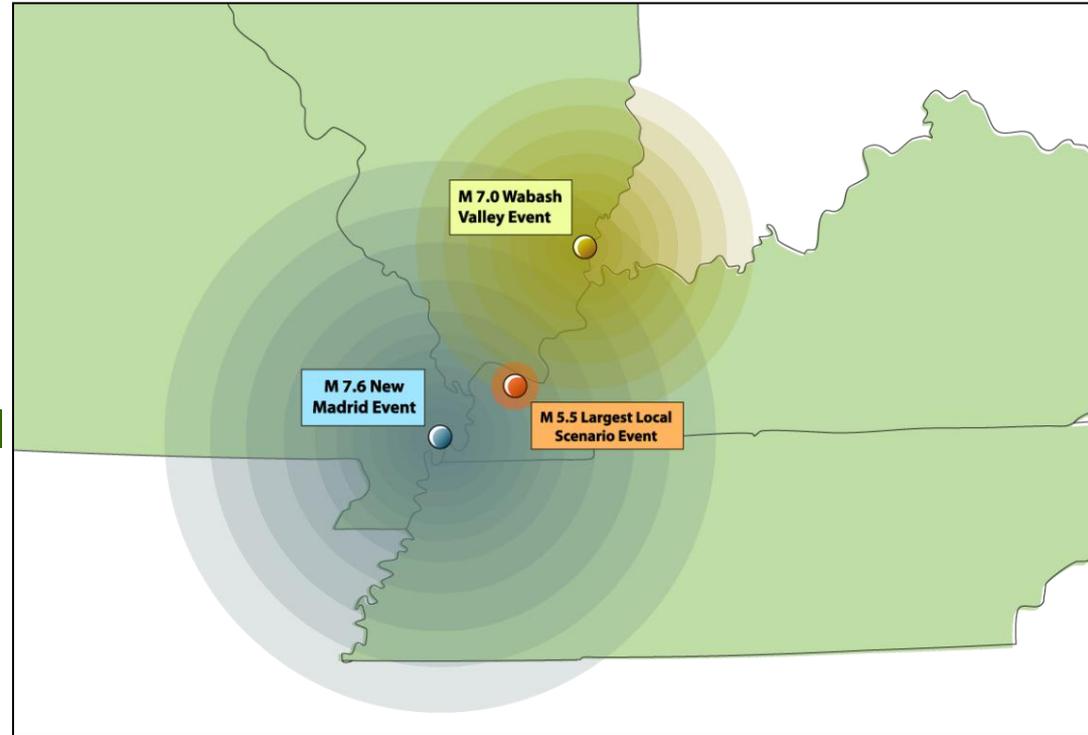


In the event of an on-site disposal decision, a detailed design would be developed by DOE and approved by Kentucky and EPA before construction begins

Conceptual Design

The site seismicity and site geologic conditions are documented in eight site-specific studies, referenced in the RI/FS

The potential waste disposal facility would be designed to resist the critical maximum credible earthquake (MCE) event, Magnitude 7.6, predicted at the New Madrid Fault



Seismic analyses completed in 2012 for the C-746-U Landfill at PGDP, provide confidence that an on-site waste disposal facility can be designed to resist the MCE in this area

Potential WDF Design and WAC

If selected, an on-site cell design

- Would meet RCRA Subtitle C design criteria and DOE 435.1 performance standards
- Would be a highly regulated state-of-the-art design
- Would accept only DOE's PGDP FFA material, including D&D

If selected, WAC

- Would be protective of human health and the environment
- Would be developed with regulatory approval

Basis for Preliminary WAC

- The preliminary WAC development determines the level of protection necessary where someone could be exposed in the future
- Fate and transport modeling is developed based on the landfill design, waste characteristics, and environmental characteristics
- Waste profiles used to develop contaminant profiles for the PGDP D&D and BGOU waste came from Oak Ridge GDP data because of the design, process, and historical operation similarities between the PGDP and the former K-25 (Oak Ridge) GDP
- Waste profiles were used to support the preliminary WAC that “actually” were disposed of in EMWMF

Preliminary WAC Development

Calculate Preliminary WAC

- Take the groundwater concentration at each point of assessment and compare that to the appropriate risk-based exposure values
- Increase or decrease the concentration of each contaminant in the waste and repeat the process until either the contaminant is at a theoretical maximum or the appropriate risk-based exposure values at each point of assessment are satisfied
- The preliminary WAC for each contaminant is the lowest of the concentrations derived for the three points of assessment
- Contaminant concentrations in groundwater change over time as contaminants migrate, t peak concentrations from 0 to 1,600 years are used

Summary

- Assumes on-site child resident within an area designated for DOE industrial use
- Assumption of on-site child resident groundwater user implies protectiveness outside of DOE property
- Assumes the most contaminated groundwater is used at each point of compliance
- No credit for man-made liner components after year 600

Past CAB Recommendations

Recommendation 05-02

The CAB recommended that DOE review and update, as needed, the waste projections for the site remediation and plant decommissioning activities to achieve a sufficient level of precision to support investigation of disposal options.

DOE agreed with the recommendation and submitted for review the waste generation forecast for 2006-2019 to the CAB.

Recommendation 08-03

The CAB recommended a series of public involvement activities for the WDO project.

DOE agreed with the recommendation and has implemented subelements since 2008.

Recommendation 08-05

The CAB recommended that DOE develop and implement a public education program, with suggestions of what should be included.

DOE agreed with the recommendation and has implemented the subelements since 2008.

Recommendation 08-07 The CAB recommended that DOE develop a program to segregate material.

DOE agreed with the recommendation, with limitations, and has implemented subelements since 2008.

Recommendation 10-06 Order to adequately address stakeholder concerns and issues during the siting study of a potential CERCLA cell, the PGDP CAB recommends that DOE give appropriate weighting and consideration to "non-technical" factors, such as, but not limited to:

DOE agreed in principle with the recommendation and applied the factors in accordance with the CERCLA process.

Stakeholder Involvement/Community Outreach

November 2008—Public Information Session

May 2009—Public Information Session

June 2009—Regulators visit Oak Ridge Waste Cell

October 2009 —Paducah CAB visits Oak Ridge Cell, TDEC, and ORSSAB

December 2009—Public Information Session

April 2010—PUPAU visits OR Waste Cell, TDEC, and Mayors

June 2010—Public Information Session

January 2011—Public Information Session

November 2011—Paducah CAB visits Fernald site

June 2008—October 2012
Paducah CAB multiple subcommittee meetings on Waste Cell Decision Process

June 2007—October 2012
Monthly FFA meetings



Additional educational sessions

Tour of identified sites at Paducah

Dry run of CAB/DOE-sponsored public workshop

CAB/DOE-sponsored public workshop

Backup Slides

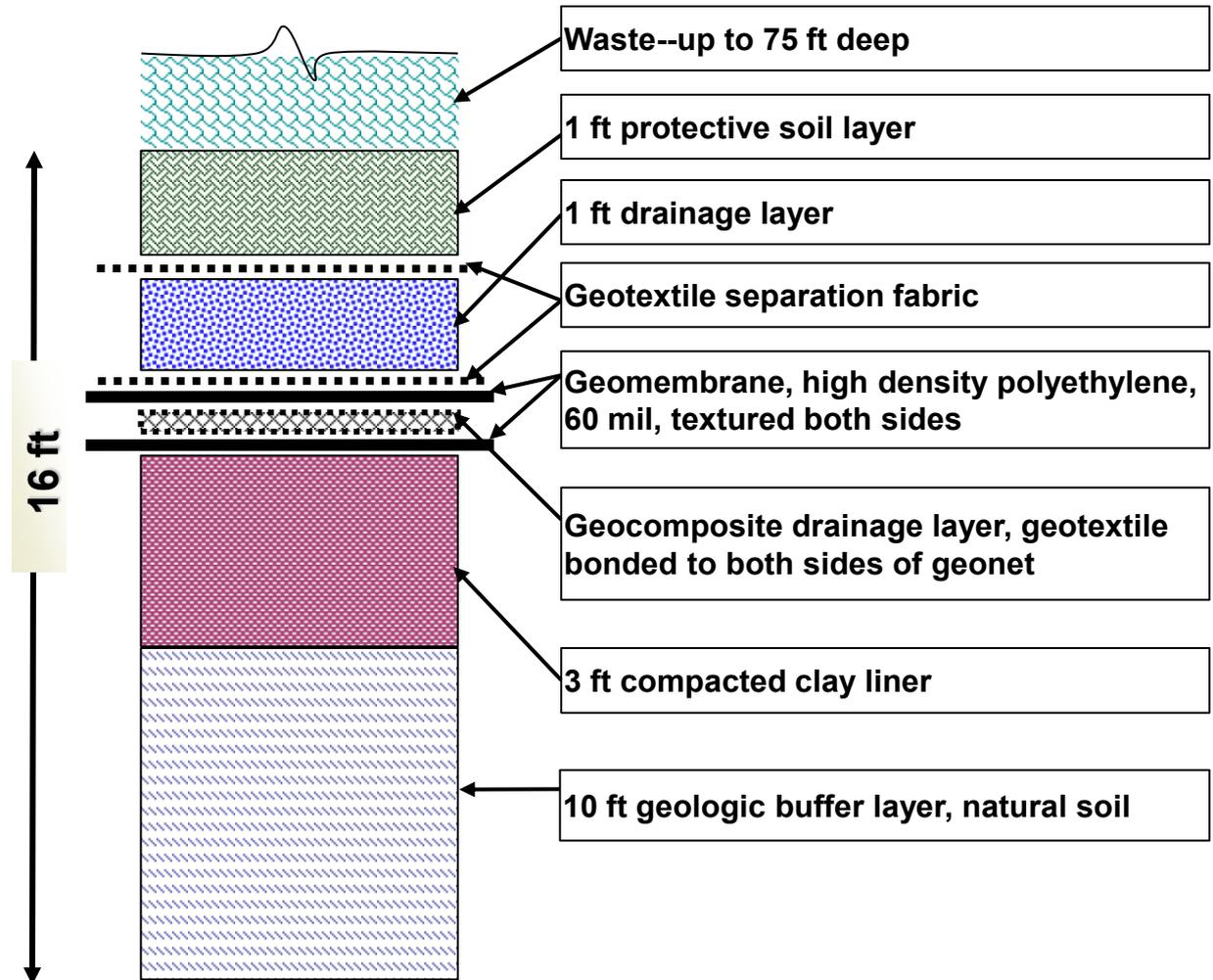
Preliminary WAC versus Final WAC

- The preliminary WAC is developed using assumptions to guide a go/no-go decision
 - ✓ A preliminary WAC is developed, often with limited site-specific information to evaluate the feasibility of an on-site waste disposal facility
 - Provides a basis for determining the adequacy of the landfill design
 - Allows evaluation of changes to the design
 - Provides a determination of approximate volume of waste acceptable for disposal
 - Allows cost breakpoint evaluation to determine if an on-site waste disposal facility is economically viable
- The final WAC also requires regulator acceptance and becomes the determiner for all waste acceptance
 - ✓ A final WAC refines the preliminary WAC to take the final design into account
 - ✓ A final WAC is only developed if an on-site waste disposal facility is the selected remedy

A Cap and Liner System Would Be Constructed to Maintain Waste Stability

LINER SYSTEM DESIGN

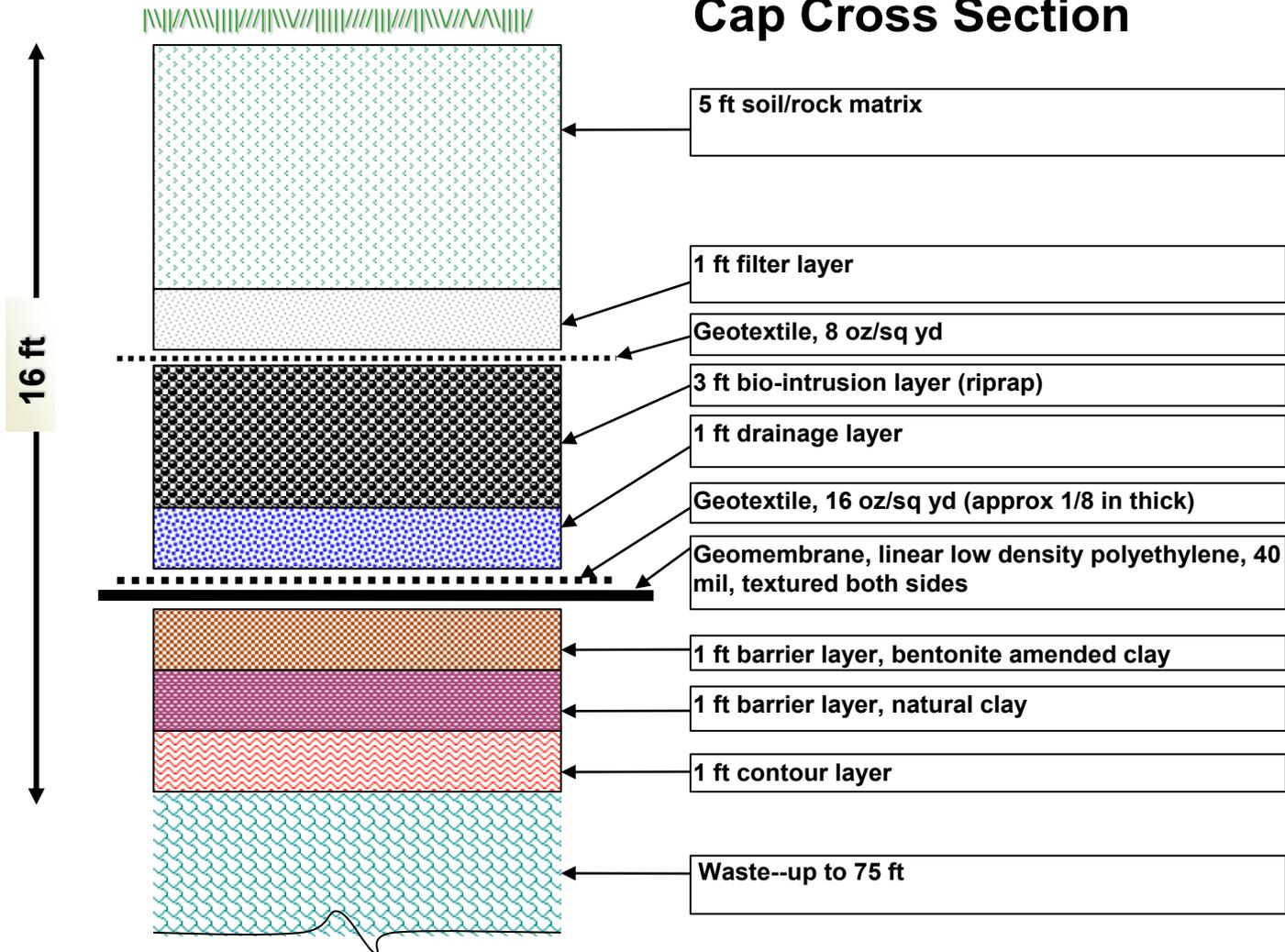
Design would include a double-liner of both low-permeability materials and impermeable synthetic liner



A Cap and Liner System Would Be Constructed to Maintain Waste Stability

COVER SYSTEM DESIGN

Cap Cross Section



What about Classified Waste?

- A small portion of the waste will be classified from a security perspective
- Classified material that may be placed in a potential on-site facility poses no greater risk than other waste disposed of in the facility
- PGDP currently has classified waste on-site
- Classified waste is not determined by level or type of contamination
- Fundamental radiological and chemical characteristics of classified waste will be made public
- Nuances that are not publicly available will be made available, under provisions in the FFA, to appropriately cleared personnel on a need-to-know basis
- Designated state personnel will be provided clearances as long as they meet AEA requirements
- Other sites successfully manage classified material

An On-site Cell Can Be Designed to Blend with the Local Environment

Conceptual Design

- *Schematic Site Plan indicating generic components of a disposal facility*
- *Typical cross sections indicating the geological buffer, cell base liner system, operational cell internal drainage control, long- term and permanent cover system high*
- *Water Management Summary indicating the water control measures implemented during the operation of a disposal facility*
- *Scaled drawings indicating proposed location on PGDP property, plan view of area, footprint of the facility at full capacity, contours and elevations of the earthfill dike, and support facility locations*

Typical 30% design submittals include

This is the best point in the Contract Document development phase to check on design development efforts, make corrections to the design development documents, and incorporate project criteria changes.

- *An updated, detailed cost estimate*
- *Elevations*
- *Building sections*
- *Structural, mechanical, plumbing, communication, and electrical plans with details*
- *Site and landscaping plans*
- *All the analyses and discussions that were part of the Conceptual design submittal*
- *Specifications in rough draft*
- *Updated design analysis*
- *Check status of any required waivers or exemptions (DDESB, design criteria, etc.)*

Equipment layouts with necessary clearances and utility support also should be shown at this stage of design

Typical 60% design submittals include

At this stage, all basic design decisions should have been made, and design development is in full progress.

- *An updated, detailed cost estimate*
- *Any changes necessary to comply with the 30% design review comments*
- *Complete plans and specifications*
- *Final design analysis*
- *Check status of any required waivers or exemptions (DDESB, design criteria, etc.)*

Typical 90% design submittals include

- *An updated, detailed cost estimate*
- *Any changes necessary to comply with the Preliminary Design review comments*
- *Complete plans and specifications*
- *Final design analysis*
- *Check status of any required waivers or exemptions (DDESB, design criteria, etc.)*

Remedial Action Objectives

- Prevent releases of CERCLA waste from a disposal cell that result in contaminant concentrations that exceed a maximum contaminant level (MCL) or background concentration at the point of compliance.
- Prevent exposure by a human receptor to contaminants in or migrating from CERCLA waste that results in a cumulative human health risk in excess of lifetime cancer risk (ELCR) greater than the EPA risk range of 1×10^{-4} to 1×10^{-6} or hazard index (HI) greater than 1 (within 0 to 1,600 years). When groundwater modeling predicts that a single contaminant will be present in groundwater at a point of exposure at the waste facility boundary or DOE property boundary, the MCL for the chemical will be used as a protective value consistent with EPA guidance (EPA 1991).

Preliminary WAC Development

Receptor, Exposure Pathway, and Point of Assessment

- Residential child
- Groundwater use (including consumption)
- Assessment locations
 - ✓ Edge of waste
 - ✓ Waste Disposal Facility Boundary (about 100 meters from the edge of waste)
 - ✓ DOE property boundary or surface water feature

Risk-Based Values

- Edge of waste—greater of MCLs or background concentrations
- Waste Disposal Facility Boundary
 - ✓ Cumulative cancer risk <1 in 10,000 and HI < 1 for the first 1,600 years
 - ✓ Cumulative cancer risk <1 in 10,000 and HI < 3 for the first 1,600 years
- DOE property boundary or surface water feature
 - ✓ Cumulative cancer risk < 1 in 1,000,000 and HI <1 for the first 1,600 years
 - ✓ Cumulative cancer risk < 1 in 100,000 and HI <3 after 1,600 years
- Establish Risk Goals (EOW is individual criteria, downgradient are cumulative criteria)
 - ✓ Cancer risk <1 in 10,000 and health index <3 after 1,600 years
- Radiological criteria are based upon dose and cancer risk
 - ✓ Determined from MCLs based on allowable beta and gamma dose

Preliminary WAC development

Models

HELP Model

- Estimates infiltration of precipitation to the landfill that can leach contaminants from the waste
- Considers evapotranspiration, runoff, drainage, and infiltration
- Cap and liner geosynthetics and clay layers are assumed to degrade over time
- HELP often overestimates infiltration

DUST-MS Model

- Estimates contaminants leaching from the waste and migration through the waste and to the groundwater
- 100% of projected waste is considered homogeneous soil, overestimating leached concentrations

MODFLOW Model

- Estimates groundwater movement from the waste disposal facility to the receptor

AT123D Model

- Estimates contaminant transport in groundwater using output from DUST-MS and MODFLOW

Preliminary WAC Development

