PADUCAH GASEOUS DIFFUSION PLANT
CITIZENS ADVISORY BOARD

115 Memorial Drive • Paducah, Kentucky 42001 • (270) 554-3004 • info@pgdpcab.org • www.pgdpcab.org

Paducah Gaseous Diffusion Plant Citizens Advisory Board
Waste Disposition Subcommittee Meeting Summary
October 18, 2012

The Waste Disposition Subcommittee met at the Environmental Information Center (EIC) in Paducah, Kentucky on Monday, October 18th at 3:00 p.m.

Board members present: Ralph Young, Judy Clayton, Dianne O'Brien, Ken Wheeler, Kyle Henderson, Richard Rushing, Ben Peterson, Jim Tidwell, and Tom Grassham

U.S. Department of Energy (DOE) and contractors: Rob Seifert , DOE; Elizabeth Wyatt, Eddie Spraggs, LATA KY; Jay Beech, Stephanie Fountain, Geosyntec; Yvette Cantrell, RSI; Eric Roberts, Jim Ethridge, EHI

Waste Disposal Options Educational Session

Roberts started by explaining that this would be a general overview of the WDO project.

Seifert gave the presentation titled "Waste Disposal Alternatives Educational Session", October 18, 2012.

- History of PGDP
- Significance of Plant Size
- PGDP Regulatory drivers
- DOE EM Waste Disposal Background
- Background of Waste Disposal Alternatives at Paducah
- Projected Waste Types for Disposal
- WDA CERCLA Project
- What is CERCLA?
- The CERCLA Process at PGDP
- Current WDA Project schedule
- CERCLA Decision Process for Waste Disposal Alternatives
- Current Waste Disposal Facilities

Young: All this stuff out there has to get torn down and put away safely someplace.	**Seifert**: That's right. The basic assumption is that we will completely tear down everything at the plant. One thing that we are doing is to consider other options that will run in parallel with this decision. The WDA is considering all the buildings, materials, waste, at the plant. The reality of the situation is that we are also in talks with the community asking if they can use any of

	these facilities. We are also looking at recycling anything we can. It only makes sense that we consider a waste cell with the capacity to hold everything if needed.
Wheeler: Rob, could you talk about where Paducah stands in the larger scope of cleanup activities nationwide?	**Seifert**: DOE looks at all sites across the country to determine how much funding each site gets.
Tidwell: Assuming a good flow of funding has there been any timeline set for closing down this facility?	**Seifert**: Yes there has. We have a plan to have the remediation activities completed by 2019. We are renegotiating that date due to changes in funding.
Tidwell: So I take it you are assuming that some of these facilities will never be used again. And we could proceed right along with those, and hoping that maybe some of the facilities could be continuously used for a short time.	**Seifert**: That's right. And that's why we are trying to engage the community even before we get the facilities back. We are getting close to the end of our D&D work and closer to the shutdown of the facility by USEC. At that point we will have to renegotiate our entire site strategy with the regulators to take into consideration all of the leased facilities as well.
Wheeler: I would like to dwell just another minute on the national status compared to Paducah. I think it would be important for the group to understand what our relative expenditure of funds or some measure of relative significance in our overall cleanup activities across the country.	**Seifert**: We only compete for funds with Oak Ridge and Portsmouth. Oak Ridge is nearly at the end of their demolition. Portsmouth comes next and then Paducah.
Wheeler: I think it is important for everyone to understand that we are just a piece of a much larger picture.	
Clayton: Does this also include the Burial Grounds?	**Seifert**: Yes. **Wyatt**: We looked at a range of waste volume. **Seifert**: It would be cost effective to build a cell more to the size that you need for everything.
Clayton: Have you considered smelting to reduce the size of the waste volume?	**Seifert**: Yes. We are considering size reduction, foaming, as well as other things. **Wyatt**: One advantage of going after Oak Ridge and Portsmouth is we can use all of their lessons learned.
Wheeler: There have been several comments this last year regarding the final size of the other CERCLA cells compared to the initial estimates.	**Seifert**: I'm assuming you are talking about Oak Ridge.
Wheeler: It was indicated to me as being universal.	**Seifert**: Oak Ridge had initially designed a cell with a certain volume in mind and when they got into the execution they realized volumes were greater, contaminates were greater, so they needed additional capacity, so they had to go back and negotiate more. That's part of why we wanted to have the range in ours to be able to say based on the information we have now, we could be as low as, or as great as. We tried to be as conservative

	as we possibly realistically could. We considered things expanding or additional fill material, additional soil we would have to put in, in addition to some of the process equipment because you don't want a piece of metal sticking out that could damage the liner or cap. We have considered the greatest volume that we would need based on our experience with Portsmouth and Oak Ridge, and what we have in our own waste volume inventories.
O'Brien: Have you pursued companies like Spencer (?) Steel?	**Seifert**: We have not considered any specific group like that. In some of the ongoing work we have considered recycling or reuse of some of the materials. We did look at the regulations that would be associated with potential recycling for the RI.
Peterson: Do we have a good idea of how much of each material we have? Metal right now is one of the more valuable, do we know how much we have of each kind of metal? In case we do get to the point of being able to market it.	**Seifert**: We do have estimates.
Coleman: You mentioned the date of 2019; does that mean that this plant will be totally, completely shut down by 2019?	**Seifert**: No sir. The long range plan that we currently have is to have the plant shut down and cleaned up by 2040. The 2019 date is for plant pre-shutdown cleanup activities.
Wheeler: Are any of the sites able to reuse any of the concrete at all?	**Seifert**: Yes, we have in the past. We took down two water towers in the Wildlife Management Area and were able to contact a vendor to pick up the concrete and rebar for reuse.
Tidwell: What did they do with the concrete?	**Seifert**: A lot of it goes on roads.
Tidwell: Why is all this stuff still at the plant? When it is no longer useful, couldn't we have disposed of it at that time? Sell some of it off?	Seifert: USEC is a for profit company. Their lease allows them to leave personalty on site. Personalty is defined as material that can still function as it's intended use.
Tidwell: I'm just saying that stuff shouldn't be just sitting there. Why can't we make it be gone now?	**Seifert**: The reason is that right now it is not ours, it's USEC's.
Coleman: A lot of the people I talk with, some work at the plant and some don't, one of their concerns is what role will current employees have as we move towards closing the facility. Will current employees be utilized in any of this process?	**Seifert**: I am assuming you mean the USEC employees. USEC is a private company and they have to make business decisions such that when a plant shuts down, employees get dispositioned in a number of ways. The Department doesn't get involved in USEC's business decisions along those lines. When the plant does shut down, the Department will have a new mission, which is to do something with the plant. That will require additional resources than the currently have. There will be new opportunities for employment in DOE's new mission.
Coleman: You mentioned 53 sites. How many of	**Seifert**: I'm really not sure.

them are already closed?	**Cantrell**: We can get that from Lexington. **Roberts**: We are going to capture that question. **Wyatt**: Lexington management has a good web site we can get that information from. **Cantrell**: In 1996 there were 118 sites original EM sites. Of those most were really small, so 10 I think were the bigger sites like Idaho, and Savannah River.
Peterson: Could you spend a little time about how does the CAB fit into this timeline here (slide 12)? Since I have been on the CAB, we have been *about* to make a decision on this and seemingly we end up back in this room talking about this again because we keep having turnover so we never make a decision. Where are we at in that?	**Seifert**: First of all, that's a very fair point. We have been on the edge of making a decision for a very long time. I know you have made visits to some of the other cells in the country. We are working closely with Portsmouth to make sure we are as consistent as we can be in making decisions. **Cantrell**: The CAB can make a recommendation at any time in this process if they feel they have enough information to make a recommendation. A couple of years ago a subcommittee asked us to not present any more information until we were closer to having this RIFS was submitted, because we kept adjusting things. We decided when the D1 of the FS was presented, we would ramp things back up. **Roberts**: Part of the job of the CAB in this process is to bring the concerns of the community into consideration. The CERCLA process is the same for the DOD as it is for any other agency, and the CAB's recommendations during that process have been implemented. Recycling has been considered and will be used as much as it can be.
Peterson: Part of my frustration is really confusion. Who and when is the decision made for (a) are we even going to have a cell or not and (b) where will it be located, and (c) what is going to go in it? Just simple questions without getting too technical.	**Seifert**: Excellent question? There is significant sensitivity to being pre-decisional. The process requires itself to be paid attention to. I understand the frustrations of having to get through the technical stuff to get to a simple answer.
Tidwell: Would the cell be on site?	**Seifert**: Yes, the cell would be on site.
Peterson: That's the decision that hasn't been made yet. Are we going to have a cell on site or not.	**Seifert**: Right. The decision itself is required by the process to be mutual between DOE and the regulators. **Beech**: EPA and Kentucky take into consideration everyone's comments too. **Seifert**: This is what DOE does too. There is a section in the Record of Decision where we have to address the significant comments.
Peterson: While we can make comments throughout the whole process as a CAB, the most likely place is after the Proposed Plan is	**Cantrell**: Actually we talked a little bit about this before at the CAB. That's the formal public comment. The CAB is a little bit different than

submitted?	the general public. The point is for you to be involved in this process. What we've talked about before is a logical place for the CAB to make a decision about an alternative selection for anything is when the FS is done because that evaluates all the alternatives. So through this period you learn about the project, learn what's being considered. You look at the FS and say here is all the alternatives based on our knowledge and our discussions with DOE and the regulators. It is we make this recommendation. You can comment in the process earlier, and that's kind of the point, to give you more freedom to help us with deciding. The CAB is intended to have more freedom and make comments all during the process.
Peterson: So currently we are at D1, and the regulators are reviewing that and hopefully are providing comments any day now. So once we have their input to consider as well, we need to be starting our process.	**Cantrell**: Yes.
Young: One of the things the Executive Committee has kicked around was to establish some core values that the CAB would have in their heart that said whatever this decision says or does or decides it needs to have these core values that we have. And just as an example one of the core values is the location of a cell, if we go that way, should not take priority over, say a site on the plant that would we ideal for reuse or a plant or something like that. So the priority would be for adaptive reuse of that location on the property versus no you can't have that because the cell's got to go there.	**Seifert**: And that's part of what you will have the opportunity to comment on in the Proposed Plan. If the onsite landfill is selected, along with that would be a proposed site for the landfill. Not only would you be able to weigh in on whether or not to have the cell, but also to comment on its location.
Young: Their process looks at risks and this location might be the safest place to put it but no, it's also the best site for a new plant or operation, so we said let's go with plan B to put it here. It may not be the safest place on the location because of groundwater and other stuff, or maybe it costs a little bit more, but it's what the community feels. **O'Brien**: And another thing about addressing risk, it's one thing to have concrete pads that you blew up over here that are not exposed, it's another thing to have the center of those cascades and say we're going to stick that out here in a landfill. I have an obligation to ask if we put this cell over by the river and we have a big earthquake, what kinds of things could happen tomorrow? And I hope that's the kind of things	**Seifert**: Yes, it is. In the evaluation, not only for the onsite, but also the offsite alternatives, we had to consider the risk factor. A lot of the modeling that took us so long, was to effectively those alternatives, not only in terms of can it be built, but can it be built effectively, or can we ship it offsite safely. All the different areas of evaluation were considered with risk in mind. Any alternative that we consider has to be safe and compliant. If it isn't, it doesn't make it to the next round.

you put into your equation.	
O'Brien: You're telling me you can build an apparatus that can check and keep things from happening in the future?	**Seifert**: In the modeling we did, we modeled out thousands of years into the future. No one has a crystal ball to predict exactly what is going to happen, but to the extent that the modeling experts could predict, those are the kinds of things they took into consideration looking at the long term effectiveness of a CERCLA cell. **Fountain**: In terms of long term effectiveness, there's also a regulatory component that comes in as part of the CERCLA process, the five year review period. So every five years, the regulatory agencies will take a look at the remedy and the current situation. So it is just another check to make sure everything is going as planned. And that's another opportunity to take a look and see if there needs to be further corrective action. **Seifert**: That's in addition to real time monitoring that would be in place. Every five years we are required by law to evaluate the effectiveness of that. **Beech**: At Lexi Management on their web site, there is data on other sites on how they are performing. With that you have a benchmark to see if our facility is performing as well as others.
O'Brien: I read that at another site, Sandia I think, they had gone in and changed the standards of what goes in, and that is troublesome to me.	**Seifert**: Any time that you are reevaluating, you discover something that could not have been known. That's why we try to build as much flexibility into this analysis as possible. Our hope would be that we would not have to ask for more space. **Wyatt**: As far as are we going to have the cell or not, that is what this FS did. It looked at the alternatives and said are you going to be safe offsite, check, are you going to be safe onsite, check, you going to be safe with no action, check, and then you go through each of these nine criteria, and as long as each of them all have check marks beside them, if there is one that is different, that is the one to focus on, and that would be the discriminating criteria. So that is where you take the alternatives that you look at, and that is what you would base your decision on. Again the FS didn't make the decision.
Peterson: Again, the difficulty for us would be that is what *you* would base the decision on because of the technical feasible stuff, but when we think about the community, and potential locations and some of that, hopefully we consider a much bigger picture and a much larger look than possibly an engineer would , or a regulator would,	**Seifert**: We assumed what the projects assume. We are not assuming that every burial ground gets excavated. **Wyatt**: When you see burial grounds with volume listed beside it, that's just the burial grounds that will get dug up. You mentioned going to a burial grounds meeting so you are

that are looking at certain criteria. I guess the other part that gets confusing after a while, when we talk about a CERCLA cell and how that fits in the overall site and the reuse, we talk about ranges of cubic yards assume every burial ground will be excavated. When I go to a burial grounds meeting, I hear we are talking about the most likely scenario for some of those will be to cap them in place and the material will be left there and will just be monitored.	aware that that project is constantly changing right now. **Seifert**: We spend a lot of time talking about the onsite alternative, and it almost seems pre-decisional. The reason you hear about the onsite stuff, is because the offsite stuff has already gone through this process. They have already gone through the analysis that we are doing. So we have the benefit of just saying we can send it there. In order for us to make a decision, we have to bring up our onsite knowledge so we are able to compare apples to apples with the offsite alternatives that we currently have available to us. Equally important are the offsite alternatives as the onsite ones. We have Utah, Nevada, and Texas facilities that we could ship to, but you are looking at anywhere between 1,000 and 2,000 miles of transportation between here and an offsite facility. These other sites are open to the nation, not just Paducah, and they are a finite resource. Other considerations would include dealing with the Department of Transportation, each state that the shipment would travel through, as well as the site's waste acceptance criteria. No one wants someone else's waste in their back yard. The only ones that do are the companies that will profit from it. Utah and Texas sites are run by a private company. Nevada is a federal repository for waste.
O'Brien: With all due respect, Paducah enriched uranium for the whole country.	**Seifert**: That is a good point. I was just letting you know that one of the challenges for this is the fact that there are other stakeholders that are bringing things to bear. As we consider the offsite alternatives, there are obvious benefits to it. They already exist, we can ship them right now, they have space available, and they have the waste acceptance criteria to accept it. It is' an easy off the shelf type of thing to do. The risks go up as you package and ship. There can be a traffic accident during shipment, as well as, it would be a risk to us if they don't handle the waste properly that we send to them. The main thing that I wanted to get across to you with this map (slide 14), is what offsite options we have available, and that we did equally consider the offsite as well as the onsite alternatives.

Roberts: We are two hours in and I want to recap where we are. One: there is 3.6 million cubic yards of waste, buildings, burial grounds have been identified that are going to come up, and they are going to be disposed of somewhere. The question becomes where that site will be. To help DOE and EPA make that decision we are going through a formal regulatory process. As stakeholders we provide

input. To help make the decision there are nine benchmarks. The first is safety and health of the environment. If it doesn't get through that, the option of an onsite location is taken off the table. We know that somewhere along 2013 they will come out with a Proposed Plan. To get there they will be discussing with EPA and the state all kinds of things. It seems best for you guys to get involved early and provide input and feedback to let them know if you are OK with this.

Clayton: Are we going to resume this at a later date then?

Roberts: It is up to the Board. I don't think we are ready to go to the Public Meeting yet, because there are still 45 slides to get through to give everyone a thorough understanding of the project.

Cantrell: I don't think we need to wait very long before having another session to continue this because you will lose context. We also need to explain some of the non-evaluative criteria concerning this project, like future use.

O'Brien: Employment is a big consideration. The more hazardous waste that you leave out there that puts off people that might come out there and use that site.

Cantrell: What I mean is that is subjective. During the Public Meeting we will go over the nine criteria that were used to formally evaluate the FS. What we will discuss next are those things that are subjective.

Clayton: This piece that we asked DOE to make, an explanation of the design and the safety factors included. I really think that that is an important piece that this CAB needs to understand.

Seifert: Yes. We wanted to make sure everyone was on the same page with the information.

Clayton: We went to Oak Ridge and Frenald, and we got to actually feel the liner material and see more about the construction of the cell.

Cantrell: We have samples of those kinds of things and we can provide them and talk about that sort of thing in the next session. The first question would be does the CAB feel like we need to have another session to prepare for the Public Meeting. The second thing is that there was a request to take an onsite tour of the proposed sites.

Rushing: In the rest of the presentation are there statistics on cost?

Cantrell: In this presentation there are not, because the dry run of the workshop is the evaluation of the FS which is all of that detail.

Rushing: The reason I asked that, since I have been a member here we were given statistics on the cost to put this in the ground, here or in those offsite facilities, and I just thought that night we assumed the cost was so overwhelming to go offsite, nobodies going to approve that. The flip side of that coin is the people we represent are going to say "I don't want that 40 acre landfill, 80 feet high sticking up out here", and you'll never locate an industry here if you do that. But that is not going to override the amount of money that it is going to cost to ship it out west, in my personal opinion.

Roberts: I'm sensing from you guys that you want to do another session and get into more details about the project. We will also look at setting up an onsite tour.

Rushing: That Federal agreement on land. I know that's been in effect for billions of years, but the thought crossed my mind, when all of this goes back to DOE, and they are owners of everything out there, after it is cleaned up or whatever, what it they put a yellow tape around it, padlock an 18 foot high fence and say "Closed, No Trespassing" and leave it like it is?

Seifert: The FFA stays in effect. The Federal Facilities Agreement is our regulatory framework through our mission. We already have a post-shutdown consideration in the FFA. What we do is all under the auspices of the FFA.

Rushing: Who would come after DOE if you don't do anything? The government is suing the government.

Seifert: The state of Kentucky. The state has authority to force cleanup action on DOE if they don't like the way things go.

Roberts adjourned the session.

Action Items:

1. Question to be answered: How many DOE sites have become closure sites?
2. Collect additional questions and comments by October 26, 2012, and submit to be answered. (see Attachment)

U.S. DEPARTMENT OF ENERGY

Waste Disposal Alternatives Educational Session

U.S. Department of Energy

Paducah CAB

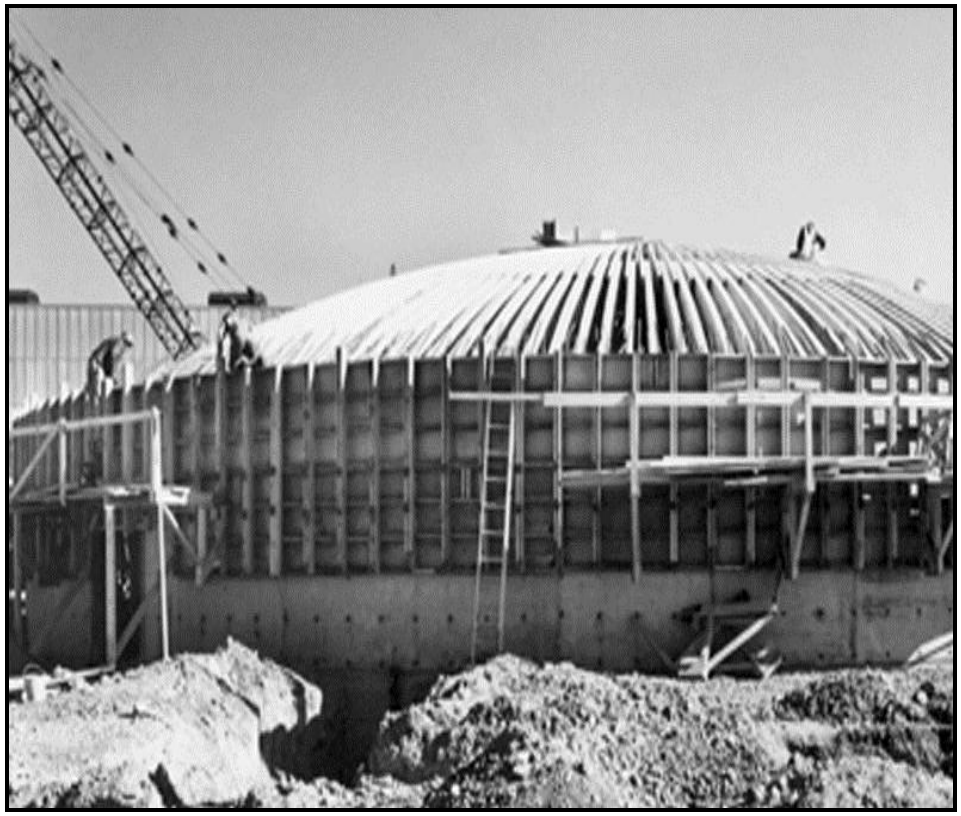
October 18, 2012

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



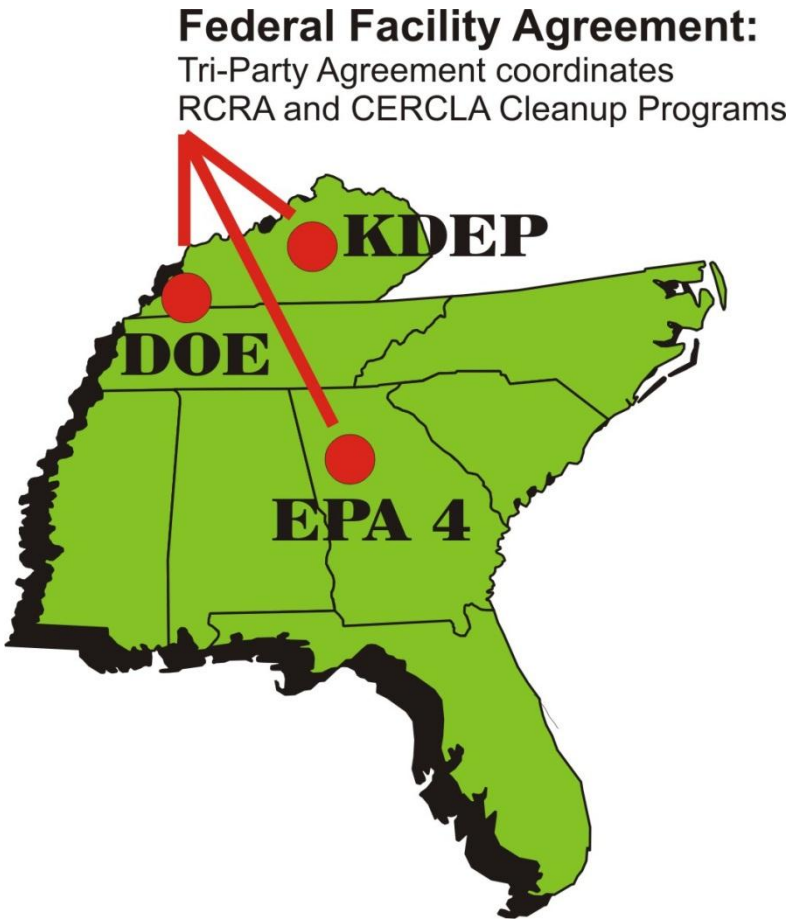
C-300 Central Operations Building during 1950's construction

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

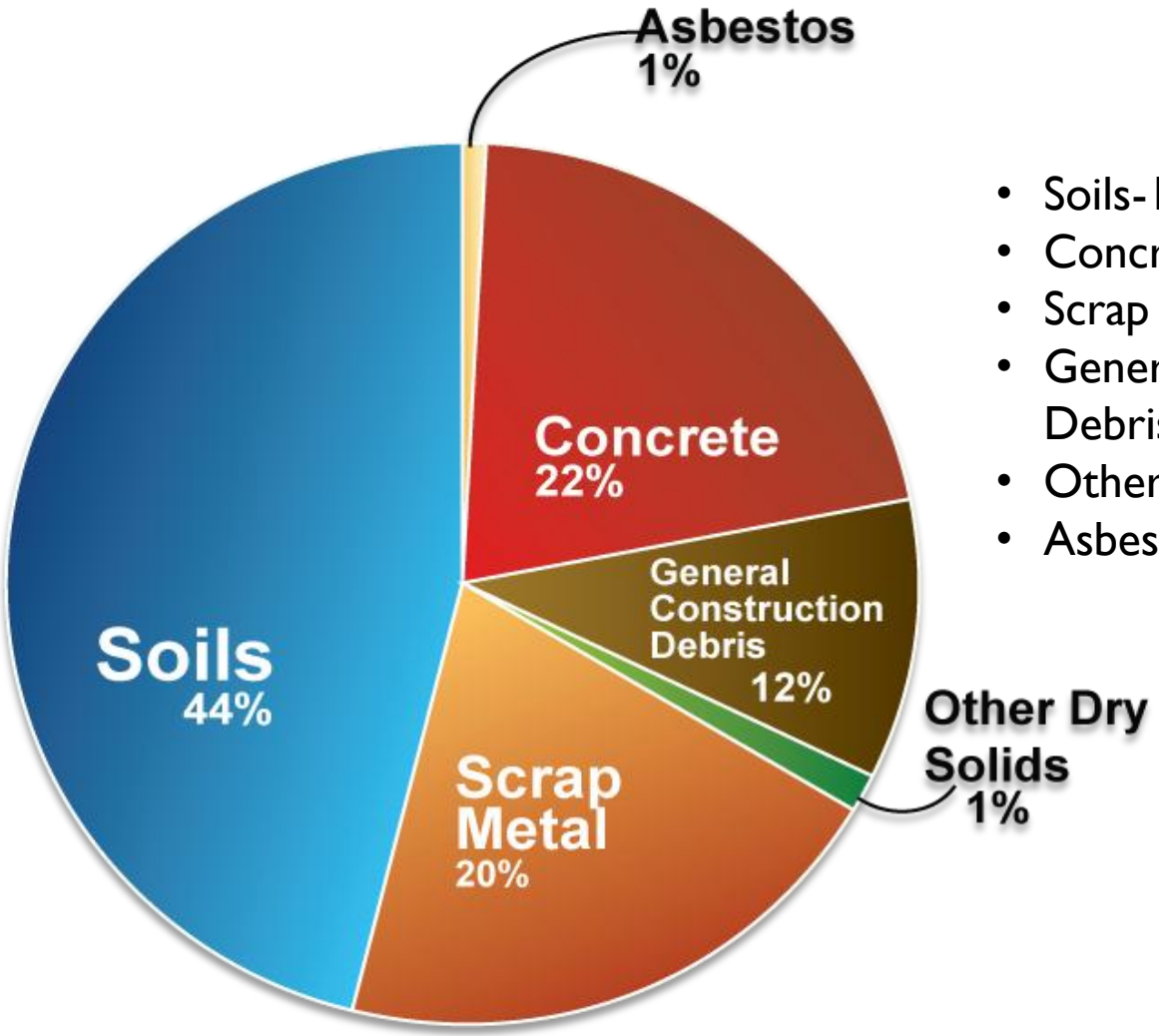
Paducah WDA Background

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



Cubic Yards

- Soils-1.6 M
- Concrete-781,000
- Scrap Metal-733,000
- General Construction Debris-414,000
- Other Dry Solids-38,000
- Asbestos-32,000

based on 3.6 mcy

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

CERLCA 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)

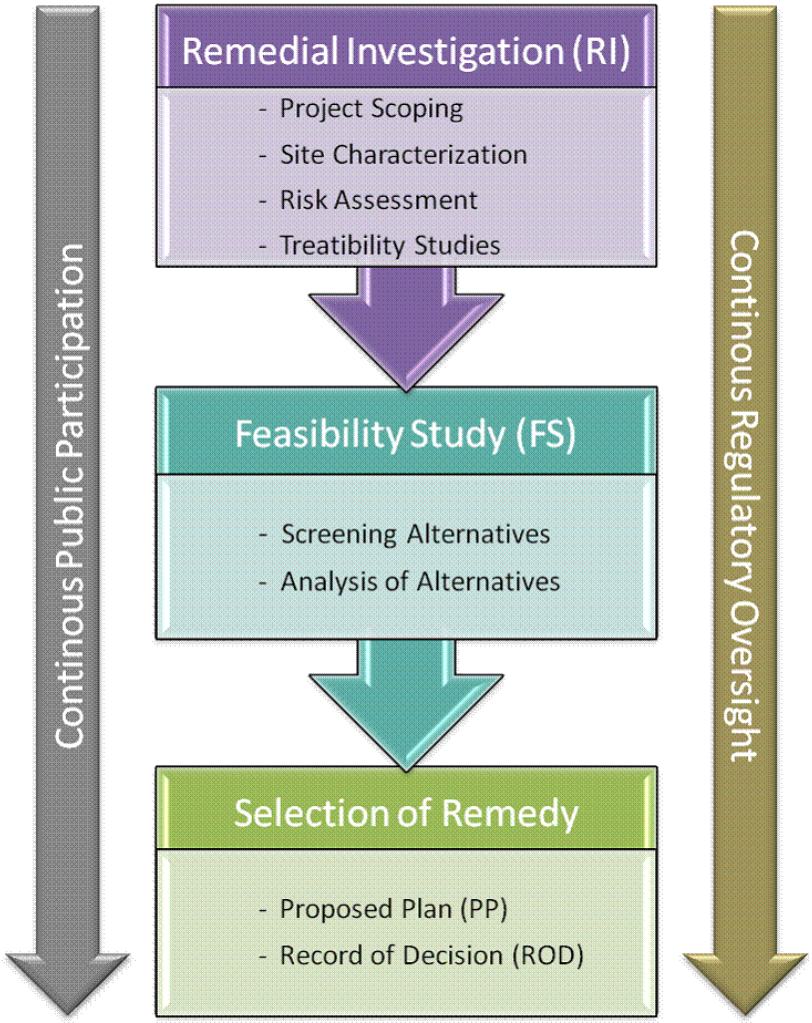
Under the FFA, DOE has agreed to provide KDEP and EPA enhanced involvement that includes review and concurrence throughout the CERCLA process.

Examples include:

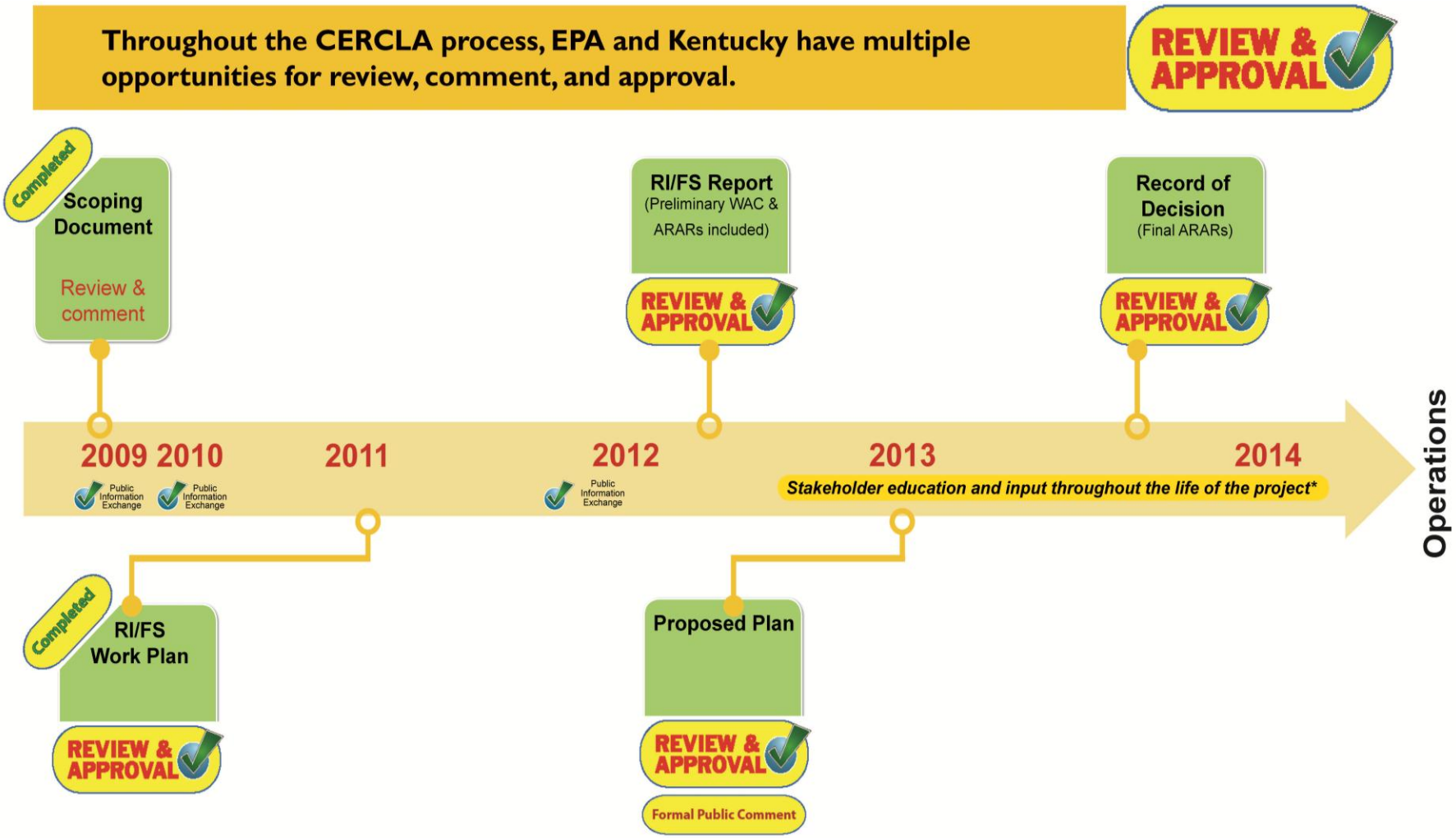
- RI/FS Work Plan
- RI/FS Report
- Proposed Plan
- Record of Decision

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

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
- Energy*Solutions* 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?

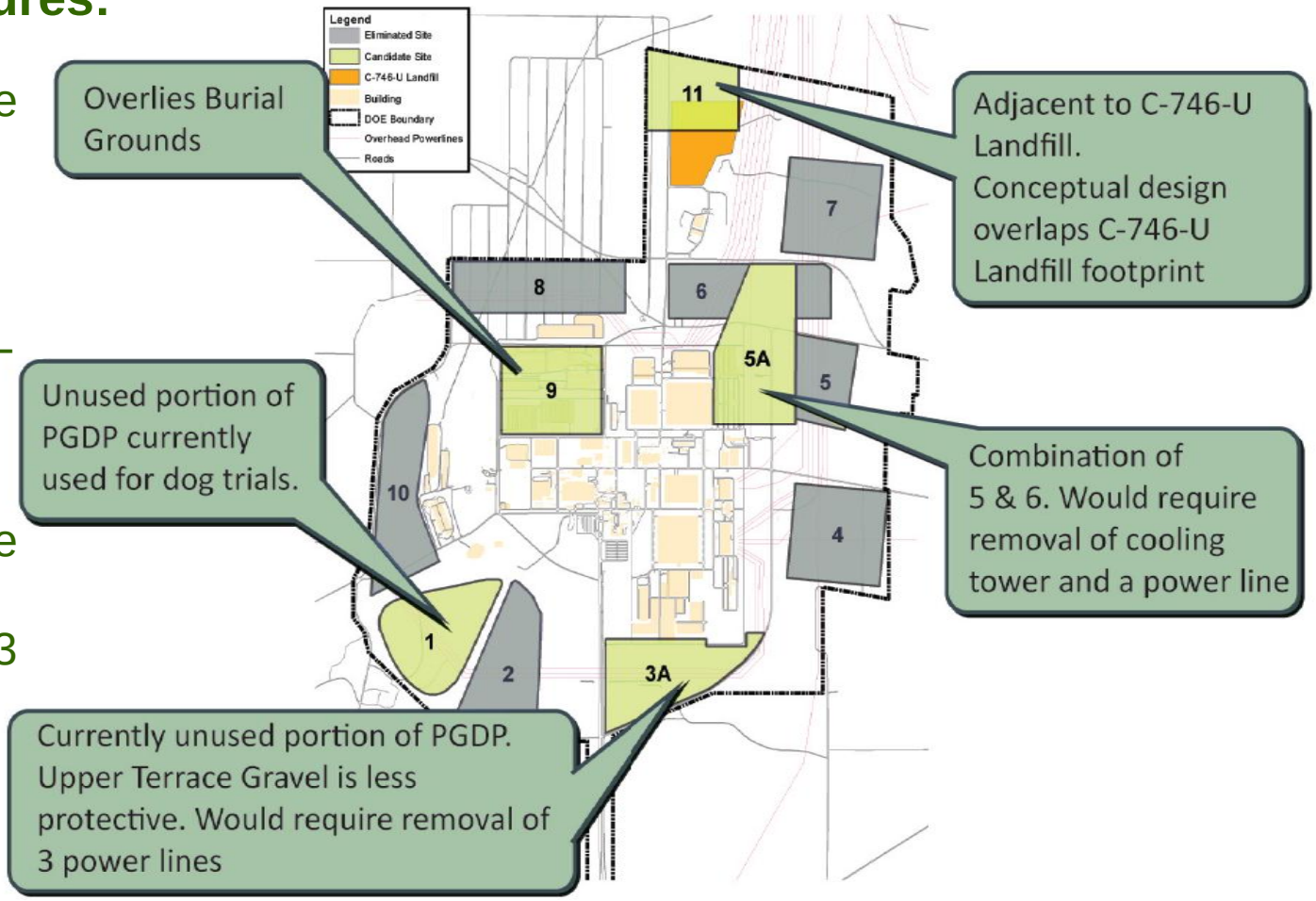
DOE has experience in working with local communities to enhance the post closure environment

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 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

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

CERCLA Decision Process—Cost

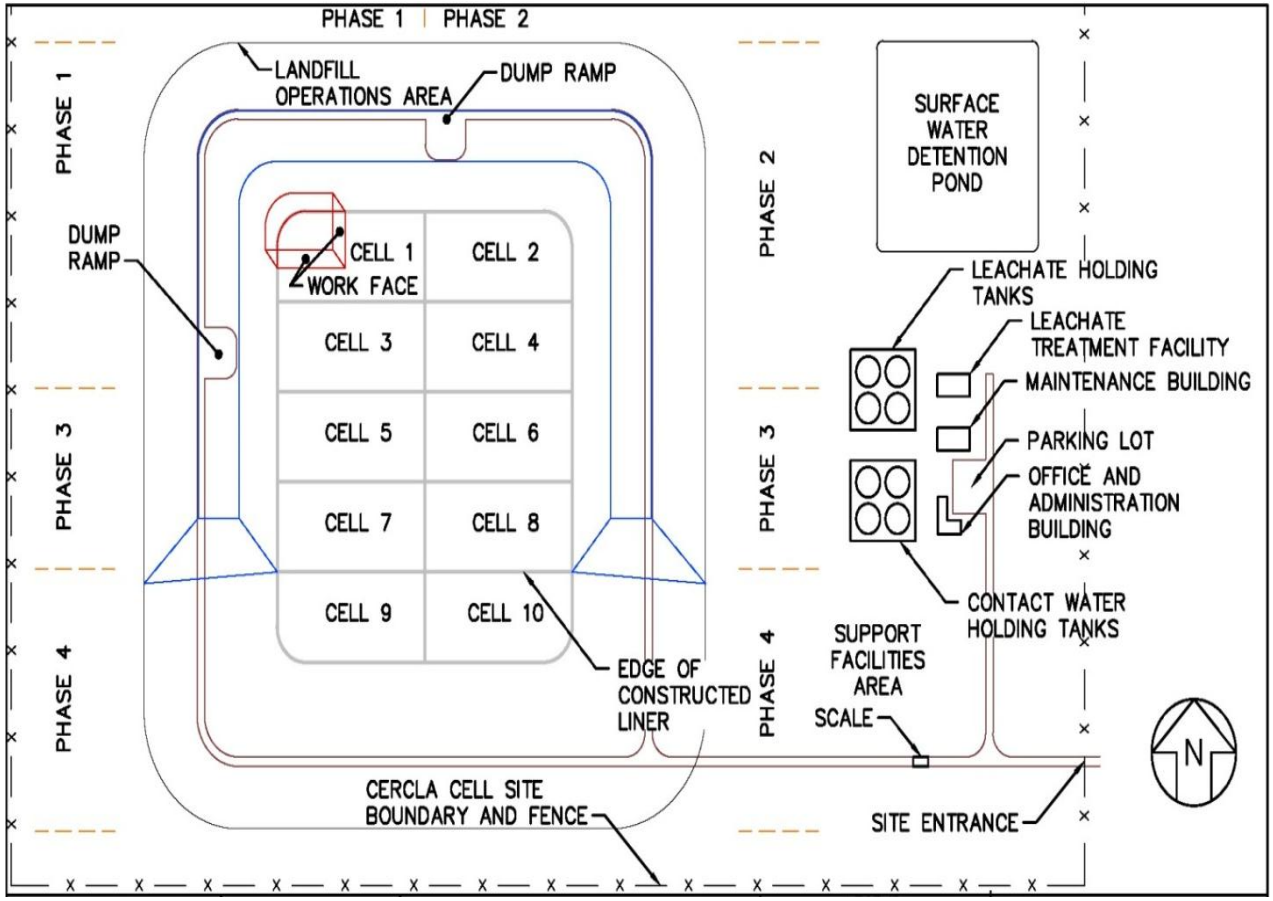
For the No Action, On-site, and Off-site disposal actions, the following costs are addressed:

- 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

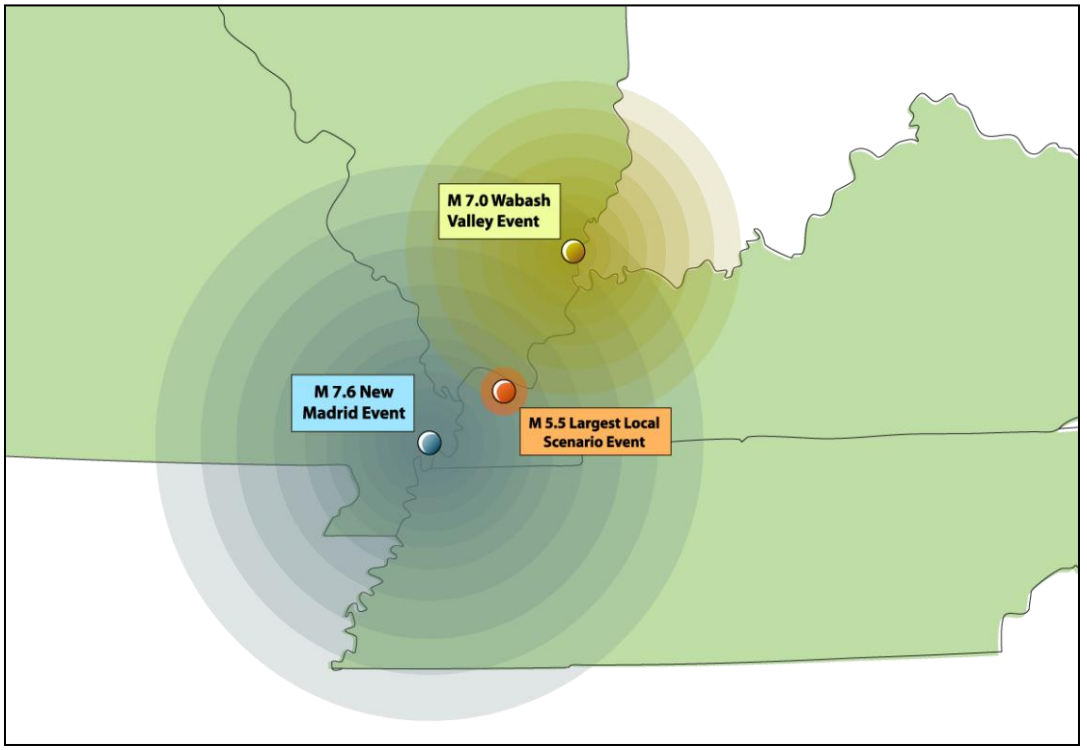


In the event of an on-site disposal decision, a detailed design would be developed by DOE and approved by Kentucky and EPA before construction begins

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

Path Forward

Additional educational sessions

Tour of identified sites at Paducah

Dry run of CAB/DOE-sponsored public workshop

CAB/DOE-sponsored public workshop

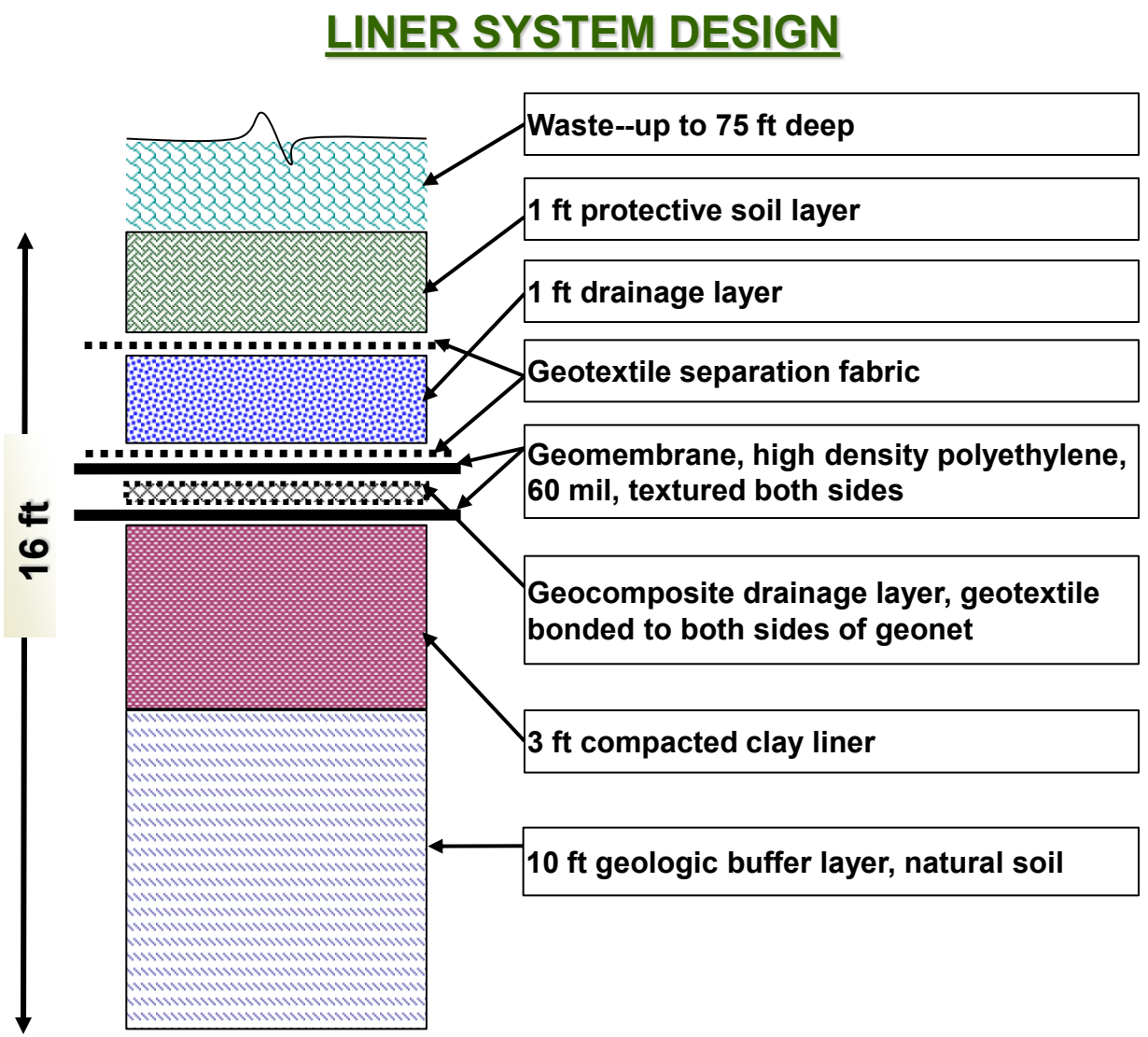
Backup Slides

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

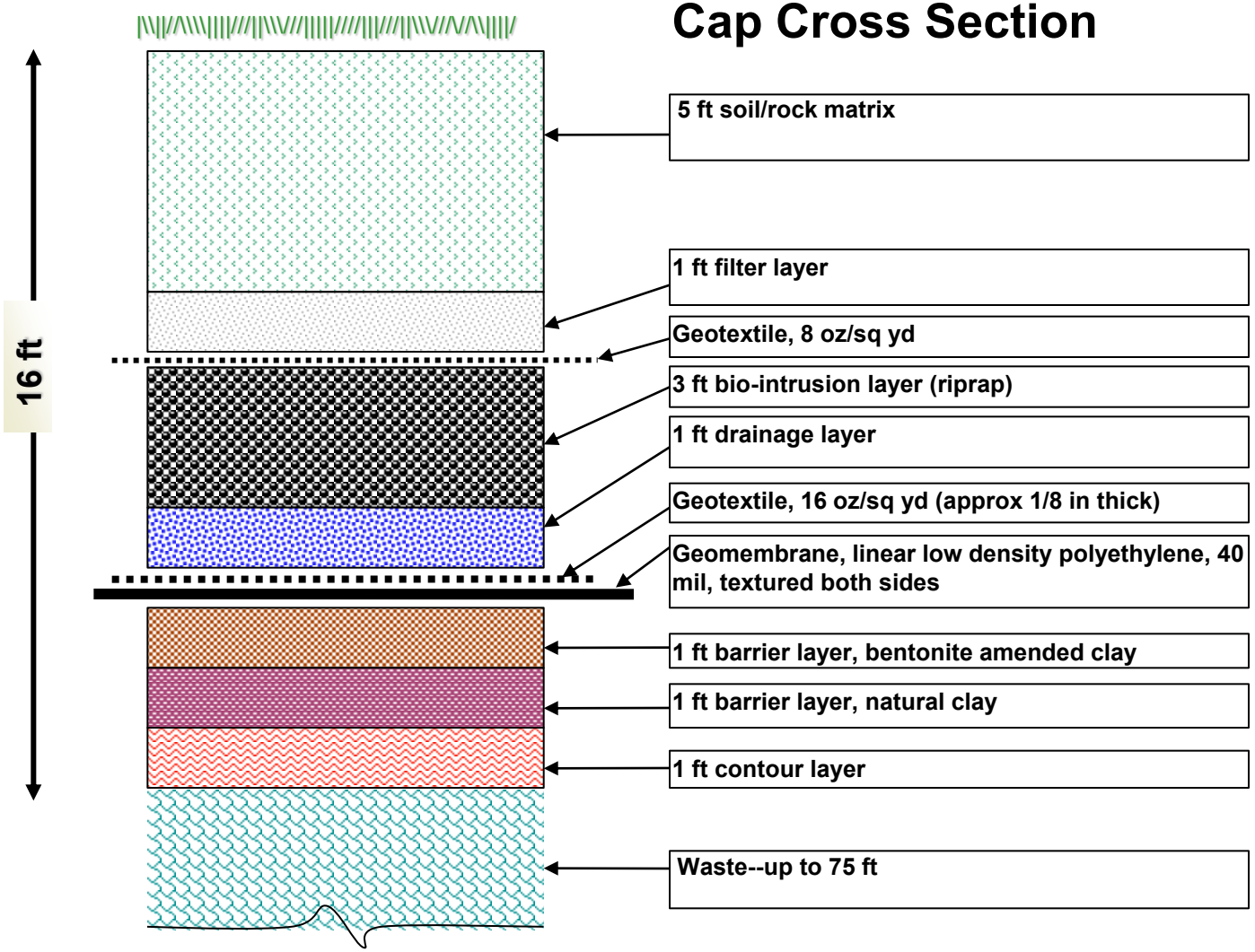
Design would include a double-liner of both low-permeability materials and impermeable synthetic liner



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

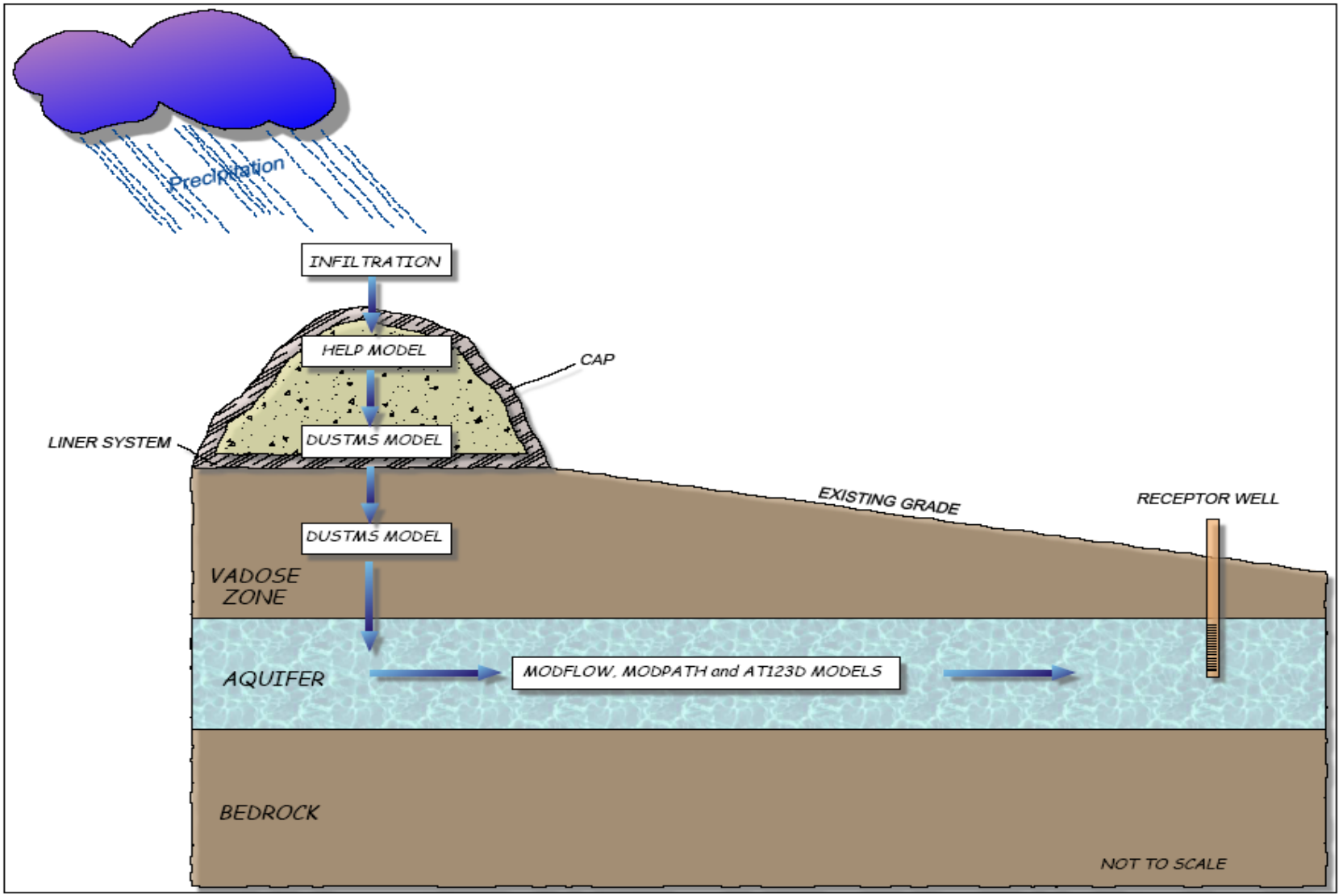
MODFLOW Model

- 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



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

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.

Waste Disposal Options Project
CAB Briefing Paper
October 11, 2012

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
October 11, 2012

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
CAB Briefing Paper
October 11, 2012

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