



January 8, 2015

**Burial Grounds Committee
Chair**
Mike Kemp

Committee Meeting Agenda

Committee Members
Judy Clayton
Tom Grassham
Jonathan Hines
Kevin L. Murphy
Jim Tidwell

5:30 pm

Call to order, introductions

Introduction of Burial Grounds SWMUs 5&6

Kemp

Ben Peterson, CAB chair

Presentation: Burial Grounds Overview

Woodard

Renie Barger, CAB Vice-
Chair

- **Questions**
- **Discussion**

Jennifer Woodard
DOE DDFO

**Discussion of Recommendation 13-07: Delay of Remedial Action
Implementation for the Burial Grounds Operable Unit (BGOU)**

Kemp

Buz Smith
DOE Federal Coordinator

Path Forward

Board Liaisons

Todd Mullins
*Division of Waste
Management*

Jennifer Tufts
*Environmental Protection
Agency*

Mike Hardin
Fish and Wildlife Resources

Stephanie Brock
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PADUCAH GASEOUS DIFFUSION PLANT CITIZENS ADVISORY BOARD

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Paducah Gaseous Diffusion Plant Citizens Advisory Board Burial Grounds Committee Meeting Summary January 8, 2014

The Citizens Advisory Board (CAB) Burial Grounds Committee met at the Environmental Information Center (EIC) in Paducah, Kentucky on Monday, January 8th at 5:30 p.m.

Board members present: Ben Peterson, Mike Kemp, Ken Wheeler, Ralph Young, Tom Grassham, Renie Barger, Judy Clayton, Jonathan Hines, and Jim Tidwell

DOE present: Jennifer Woodard, Lisa Santoro

Subcontractors present: Elizabeth Wyatt, Bruce Ford, Fraser Johnstone, Eddie Spraggs, and Jim Ethridge.

Liaison present: Gaye Brewer, Jennifer Tufts (on phone)

Kemp opened the meeting and asked for introductions. He then talked about the status of the Burial Grounds and why the meeting was being held. He indicated that the Committee had been on hold because of the Board needing to make a decision about a waste cell being located onsite before addressing issues concerning the Burial Grounds at the site. He also said that the Committee wanted to know some of the reasons for the decision by DOE and regulators to cap Burial Grounds SWMUs 5&6. He raised the question of if there was going to be an onsite waste cell, why not put the materials in SWMUs 5&6 in the waste cell instead of just capping the area.

Woodard indicated that DOE had received comments on the Proposed Plan for SWMUs 5&6, but they had not received anything from Kentucky regulators. Also, she said that once they receive that information from Kentucky, they had thirty days to incorporate comments and issue the document and get public comments at that point.

Tidwell asked what the alternatives were. **Santoro** said that the alternatives were no action, capping and excavation. **Tidwell** said that he thought that reindustrialization should be taken into account when making the decision on which alternative to use. **Young** asked if the site would still be considered a Superfund site if only looking at SWMUs 5&6. **Tufts** said that the site would probably not be a NPL site with only SWMUs 5&6 being considered.

Kemp then turned the meeting over to **Ford** for a burial grounds presentation. **Woodard** said that SWMU 4 had higher risk and was being considered first because of a TCE source at that location.

Tidwell: Upon excavation, what is done with the material that is taken out of there?	Woodard: We haven't done a feasibility study, but it would be like any other burial ground. We would be looking at onsite disposal, if that is available, or offsite disposal.
Tidwell: And that decision is yet to be made?	Woodard: Correct. Santoro: Some of the waste might need to be treated before going into the CERCLA cell. It depends on their waste acceptance criteria.
Peterson: What about (SWMUs) 7 and 30?	Woodard: Capping.
Tidwell: So that decision has been made?	Woodard: No. It's just for budget planning. We thought that was the more likely decision for those SWMUs.

Young: Was there any bright line established early on that said cap versus dig up?	Woodard: Ever since we discovered that SWMU 4 was a TCE source, it was considered for excavation. For SWMU 2 and 3, kind of the same thing for different components.
Kemp: Is there anything tentatively identified in SWMUs 5&6 that would not meet the waste acceptance criteria for the CERCLA cell?	Ford: Not that we are aware of. It would depend on what the final waste acceptance criteria were. We believe the vast majority of it could go into the U landfill or the CERCLA cell, or a combination of the two.
Kemp: And is there anything about the nature of the waste that would make it too hazardous to excavate?	Ford: Not that we're aware of.
Young: I looked at the sampling report on SWMU 5 and you sampled pretty thoroughly around the edges, but nothing down the middle. Is that because you think the waste is pretty consistent throughout?	Ford: That is because the waste itself was not sampled due to the classified nature of the waste. Woodard: And that's not unusual. Some of those samples were slanted samples.
Young: I also noticed that there were fewer samples on 5 than there were on 6, and it is smaller.	Ford: That comes back to the nature of the waste. The classification issue.
Clayton: How does the fact the classified burial yard being classified complicate excavation?	Ford: As you might expect, that throws a lot more controls into it. There would be cost increases for the personnel involved, for security, how things are characterized. Things like that.
Peterson: Would shipping it offsite change the number of controls to excavate it and ship it?	Woodard: The controls would be exactly the same. The cost would be different. Santoro: The difference would be 240(M) for offsite and 80(M) for onsite.
Clayton: If we were to excavate it, and we were to have an onsite disposal cell, would our onsite disposal cell automatically become a classified burial ground?	Woodard: The disposal cell outlined in the RIFS, has all the requirements to hold classified waste. It changes nothing for us because that was part of our plan.
Clayton: So it is just the excavation costs that would up the ante.	Ford: The excavation would be the same. If we dispose onsite or somewhere else, the excavation costs would be the same.
Brewer: If SWMU 5 was not classified, what would the cost difference be for excavation?	Woodard: We can get you that answer. I think it was about a third.
Young: The document says that SWMU 5 has this "work for others" stuff in it. That's always had this cloud of uncertainty. Is that going to add to the remedy decision?	Ford: That is part of the uncertainty, knowing exactly what is in there. Work for others essentially means it is material shipped in from other facilities.
Tidwell: Is there a ratio of cost between burial onsite and disposal offsite?	Ford: If we can wait a few minutes, I will cover that on a later slide.
Young: Is there any beryllium involved in the work for others?	Ford: I don't think we have any record of that. Santoro: We do have a list of what the contaminants are based on what was disposed of there. After looking at the document, beryllium was detected as a COC (contaminate of concern) in 5 and 6.

Kemp: Wouldn't excavation provide a safer alternative given the uncertainty?	Ford: It would be safer in the long term.
Kemp: What kind of land use would you anticipate?	Ford: If waste were to be left in place, there would be a lot of prohibitions. You wouldn't be able to build on the cap...
Peterson: It would be completely unusable because it would still be a classified burial yard.	Ford: And that's the bottom line in this situation.
Young: It would not reduce the DOE footprint, correct?	Woodard: Correct.
Clayton: I understand it's really low in there. Was it just	Ford: We don't believe it's a spring or a stream.

<p>one year that they found seeps coming out of it, or is it an underground stream, or spring, or...</p>	<p>Johnstone: In 1997, the state inspector went out and saw some; well his field description said “red frothy water” in a shallow ditch on the south side of the SWMU. We have not observed that since. I take that back. We did see red staining this spring. We went out and sampled that. We believe its iron stain. We think the iron came off of some shallow metal or the security fence that borders the SWMU. Ford: The way the cap is constructed, it would prevent water from going into the cell and keep that causing a seep.</p>
<p>Clayton: I thought it was maybe a percolating effect and undermining the value of the cap.</p>	<p>Ford: We don’t think it’s a spring or artesian well, which naturally occur in some areas.</p>
<p>Kemp: Apparently EPA , the state and DOE all agree that the uncertainty of what is contained in the burial grounds is so severe that a cap would be insufficient to overcome that uncertainty. Is that a fair statement?</p>	<p>Tufts: That is true. We have groundwater data surrounding the SWMU which indicated that it’s not contaminated at the same level as some of the other burial grounds are. It doesn’t appear to be as contaminated as these other burial grounds.</p>
<p>Young: How stable is this situation, where if we waited another five years would it get worse or kind of stay the same.</p>	<p>Ford: Quite frankly, we are not seeing any issues with this unit. We feel like it is fairly stable. If it was postponed for any length of time, we don’t feel like that there would be any added risk.</p>
<p>Kemp: From a CAB point of view, it seems that it is something that really can’t be evaluated in the FS. It really boils down to do we reduce the footprint or not.</p>	<p>Santoro: I just wanted to explain that the preference for reindustrialization does not come into the evaluation process. The guidance does not consider that issue.</p>
<p>Peterson: But you have based your entire document on risk factors associated with it being industrial land use. So that is built into it to that point.</p>	<p>Ford: And state and community acceptance can bring up those points.</p>
<p>Young: Was this perceived as “low hanging fruit” years ago?</p>	<p>Ford: We go from alternative 1 to alternatives 5&6. Alternatives 2, 3, and 4 were less robust and have been removed.</p>
<p>Kemp: The CAB is looking at site cleanup from a holistic viewpoint and what is good for the site as a whole. Peterson: In the past, we had an operating plant and looked at what we could get done while it was in operation. Now we can look at things differently and make decisions based on the whole site and its future.</p>	<p>Tufts: You are making a good point. I would like to make a plea to let us go ahead and finalize a Proposed Plan so the CAB can weigh in formally, so then we can take those comments into consideration along with the preferred alternative and respond. I think that sitting on the document is not serving the CERCLA process very well. I think you guys have made great points and will definitely be considered. You know budget concerns are definitely out there. A lot of the decisions we make are based on those budget decisions. But we have this CERCLA process that we need to follow and we would like to at least get the project back on a track where decisions are made as part of that process and formalized and dealt with in a way the CERCLA process was set up to deal with them.</p>
<p>Peterson: Great comments and I’m actually glad to hear you make them. It gives me confidence moving forward because in the past I don’t know that we, as a CAB, have had any confidence that our comments carried that kind of consideration.</p>	<p>Tufts: We do take your comments and wishes about the direction you would like to see the site head in very seriously and take them into consideration when making decisions.</p>
<p>Wheeler: I do dispute the use of a \$5M or \$10M per acre criteria because the location of these cells, their impact on the overall utilization of the site is certainly greater than</p>	

<p>their actual footprint. If I were a developer coming in to try to use a 5,000 acre site, I wouldn't be analyzing each individual package; I'd be looking at the entire site. I feel sure that any future use that occurs for this facility will have to use those criteria. So it's not as though anybody can build a plant that works around one little five acre site. Too many competing sites for any kind of installation of the magnitude that we are talking about. If this site continues to be considered a waste dump in any kind of fashion I think it automatically severely restricts if not eliminates the entire opportunity for any kind of reindustrialization. I'll be the first to say that I have not been a big advocate of the fact that there is a candidate site, any possibility for reindustrialization of the site. But as we work our way through all the alternatives, and all the thoughts that come out of this meeting, about potentials and some of the non-industrial utilization that have been proposed for the site, I think all of those are going to look at the entire site in a holistic way and not as any one piece. I guess I'd like to argue against using the criteria of so many dollars per acre. What I think is much more important is what the relation of any of those costs are to the entire \$13B target number that we have for cleanup of the entire site. Then if you do that, the difference between these two numbers becomes miniscule.</p>	
<p>Clayton: It's 5 or 6 feet now, so that (the cap) would make it 10 to 12 feet above grade.</p>	<p>Ford: Correct. If the cap were built on top of what's there.</p>
<p>Peterson: We are talking about an up to six and a half foot tall peak on top of what's already out there. So that would potentially make it about a eleven or twelve foot tall mound on top of an extremely flat topographic background. That is an aesthetic concern but it is a concern that affects all of the things that Ken (Wheeler) was saying. So I think that would be a community concern also.</p>	<p>Ford: Another concern that was mentioned was the depth to groundwater. Because this is a historical burial ground, it would be a remedial action and the depth to groundwater is not a regulatory concern.</p>
<p>Young: Are the groundwater withdrawal wells inside of that?</p>	<p>Santoro: They are outside. Wyatt: And the groundwater data that you now have shown that 5&6 are not leaking anything into the groundwater.</p>
<p>Peterson: But the current regulations for an engineered cell or landfill are much safer than digging a hole, throwing crap in it and then putting a cap on it. Nine feet to groundwater. Just because it's a new regulation doesn't mean that it is any less safe than what is currently just setting there.</p>	<p>Ford: That is correct. Woodard: But just so you understand, this waste has sat in water since the day it was placed in there.</p>
<p>Kemp: No groundwater contamination has occurred, so you are saying it is safe to cap.</p>	<p>Ford: Correct. This cap would not have a liner under the waste.</p>

Kemp then stated that he thought there was ample opportunity to issue a recommendation concerning SWMUs 5&6 at a later stage in the process. There was discussion about changing the "push" for a recommendation to SWMU 4 and away from 5&6, for now. **Clayton** indicated that there was a previous recommendation on SWMU 4 asking DOE to expedite the work because it was affecting the groundwater. **Woodard** indicated that SWMU 4 was on a track to coincide with the

waste cell. Overall, the members were leaning toward excavation instead of putting a cap on the SWMUs 5&6 burial grounds.

Clayton asked **Woodard** and **Tufts** to look at the site holistically. She then asked if a recommendation was needed to ask the site be looked at overall and how the burial grounds fit into that plan.

Grassham asked where things were in the process concerning a CERCLA cell. **Woodard** indicated that DOE was resolving conditions from EPA and the state. After getting an approved Feasibility Study then they would move to a Proposed Plan, and hopefully have a signed Record of Decision in 2016.

After discussion, the Committee agreed to wait to issue a recommendation concerning SWMUs 5&6.

Kemp adjourned the meeting at 7:35 pm.

Burial Grounds Overview

January 8, 2015



CITIZENS
ADVISORY BOARD



EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

BGOU Overview

- The Burial Grounds Operable Unit (BGOU) consists of areas of contamination associated with burial areas and landfills concentrated in the northwest quadrant of the plant.
 - There are 10 burial areas within the Burial Grounds Operable Unit.
 - These areas typically have items buried less than 20 feet from the surface.
- SWMU 2: C-749 Uranium Burial Ground
 - SWMU 3: C-404 Low-Level Radioactive Waste Burial Ground
 - SWMU 4: C-747 Contaminated Burial Yard and C-748-B Burial Area
 - SWMU 5: C-746-F Burial Yard
 - SWMU 6: C-747-B Burial Ground
 - SWMUs 7 and 30: C-747-A Burial Ground and Burn Area
 - SWMU 145: Area P (residential/inert borrow area) and old North-South Diversion Ditch (NSDD); SWMUs 9 and 10 lie within the footprint of SWMU 145.

Current Status

Current Status: SWMUs 2, 3, 7 and 30

- DOE issued FS (D2) June 2014
- KY issued comments November 2014
- EPA issued comments December 2014
- DOE currently is resolving EPA and KY comments and developing revised Feasibility Study (D2/R1)
- Remedial action is scheduled to begin in 2024

Current Status: SWMU 4

- EPA and KY approved the Addendum to the Work Plan (D2/A2/R2) July 2012
- Phase I (64 passive soil gas and 154 soil samples) fieldwork completed October 2012
- Phase II (22 shallow borings) fieldwork completed April 2013
- Phase III (10 deep borings) fieldwork completed October 2014
- Phase IV fieldwork scheduled April 2015
- Phase V fieldwork scheduled September 2015
- RI Report (D1) is scheduled to be issued May 2016
- Remedial action is scheduled to begin in 2020

Document Key

D1 – First regulatory review
D2 – Changes made from D1 review
R# - Revision based on additional reviews
A# - Additional text added to previously approved documents

Current Status (continued)

Current Status: SWMU 5 and 6

- DOE issued Feasibility Study (D2/R3) February 2013
- EPA and KY approved Feasibility Study (D2/R3) February 2013

- DOE issued Proposed Plan (D2) July 2013
- EPA provided conditional approval of Proposed Plan (D2) October 2013
- KY has extended their review of Proposed Plan (D2) through January 2015
- Public Comment Period for Proposed Plan (D2) is scheduled for April 2015

- Record of Decision is scheduled to be signed January 2016

- Remedial action is scheduled to begin in mid-2017

Document Key

D1 – First regulatory review

D2 – Changes made from D1 review

R# - Revision based on additional reviews

A# - Additional text added to previously approved documents

SWMU 5

Site Background and History

- Located in western section of the PGDP
- Operated from 1965 to 1987
- Literature indicates operating area was approximately 168,000 ft²
- Disposal pits were located on a grid system and consisted of 10 ft x 10 ft cells excavated to depths of 6 to 15 ft below ground surface
- Literature indicates that pits were used for the burial of security-classified weapons components, some radionuclide-contaminated scrap metal, and slag from nickel and aluminum smelters
- Some of the wastes may be chemically unstable and/or incompatible compounds or metals (speculation based on underground fire in SE corner of SWMU boundary which burned for several weeks in 1976)
- Waste placed in disposal pits was covered with 2 to 3 ft of soil
- Total quantity and specific types of wastes buried at the yard are unknown
- Surface water drains to the north, west, and south with discharge into KPDES Outfall 001
- Site is not believed to be a source of TCE contamination

SWMU 6

Site Background and History

- Located in western section of PGDP east of SWMU 5
- Operated from 1960 to 1976
- Literature indicates that there are five separate burial cells (identified as Areas H, I, J, K, and L) that cover an area of 5200 ft²
- Depth of cells is reported to be 6 ft to 10 ft below ground surface
- No previous investigations have been conducted specifically at SWMU 6

Known Waste Inventories

Area H: 75 ft³ magnesium scrap

Area I: 8 exhaust fans contaminated with perchloric acid

Area J: 1100 ft³ aluminum scrap

Area K: 150 ft³ magnesium scrap

Area L: UF₆ condenser

SWMUs 5 & 6

SWMUs 5 & 6 Remedial Investigation Findings

- Waste materials have limited mobility
- No identified groundwater threats at either SWMU
- Seeps observed along south edge of SWMU 5 in 1997
- PAHs identified as COC in surface soils at SMWU 5
- Limited SWMU 5 surface soil data results in uncertainty of surface soil conditions
- No waste sampling data results in uncertainty of source conditions

What do these mean from a risk perspective?

- Eliminate direct contact with waste and impacted soil
- Resolve uncertainty associated with surface soils and seeps (SMWU 5)

Considerations for FS alternative evaluation

- Wastes are not amenable to treatment
- Removal addresses all issues, but costly
- Land Use Controls and Containment (cap) both prevent direct contact
- Monitoring can identify unanticipated COC migration from the SWMU

SWMUs 5 & 6 FS Alternatives

- All developed action alternatives meet threshold criteria (overall protection of human health and the environment and compliance with ARARs).
- Developed alternatives provide trade-offs between balancing criteria such as short-term effectiveness, long-term effectiveness, and cost.

Detailed Analysis Summary for SWMUs 5 and 6

	Alternative 1 No Action	Alternative 5 Kentucky Subtitle D Cap, LUCs, and Monitoring	Alternative 6 Excavation and Disposal of Waste Materials and Affected Soils	Alternative 6a Excavation and Disposal of Waste Materials and Affected Soils (at Proposed On-Site Disposal Unit)
Overall Protection of Human Health and the Environment	Does not meet the threshold criterion	Meets the threshold criterion	Meets the threshold criterion	Meets the threshold criterion
Compliance with ARARs	No ARARs identified	Meets the threshold criterion	Meets the threshold criterion	Meets the threshold criterion
Long-term Effectiveness and Permanence	Low	Moderate to High	High	High
Reduction of Toxicity, Mobility, or Volume through Treatment	None	None	No reduction through treatment other than incidental to treatment of collected waste to meet disposal facility waste acceptance criteria. Water collected as incidental to excavation would be treated and discharged to existing ditches.	No reduction through treatment other than incidental to treatment of collected waste to meet disposal facility waste acceptance criteria. Water collected as incidental to excavation would be treated and discharged to existing ditches.
Short-term Effectiveness	High	High	Moderate	Moderate
Implementability	High	High	High	High (applicable only if an on-site disposal cell is available)
Cost	Low	Moderate	High	Moderate to High
Net Present Worth Cost	\$0	\$10,006,000	\$240,408,000	\$72,919,000

SWMUs 5 & 6

Cap Description from Feasibility Study

Excerpt from: Section 3.3.5.3 Install Kentucky Subtitle D Cap

This type of cover is designed to meet performance objectives for a Subtitle D landfill (i.e., Contained Landfill under 401 KAR 48:080) and will prevent direct exposure to the waste and cover areas where surface water could penetrate and leach COCs ... The cover will include the components.

- A filter fabric or other approved material
- A 12-inch sand gas venting system with a minimum hydraulic permeability of 1E-03
- A filter fabric or other approved material
- An 18-inch clay layer with a maximum permeability of 1E-07 cm/sec
- A 12-inch drainage layer with a minimum permeability of 1E-03 cm/sec for areas of the final cap with a slope of less than 15%
- A 36-inch vegetative soil layer

Alternative specifications may be used if approved by KDEP and EPA through the CERCLA process, provided the alternative results in similar performance with respect to safety, stability, and environmental protection. For example, a gas venting layer may not be an appropriate design feature for installations involving inorganic wastes that will not generate methane as they decompose. Also, an alternative design may substitute a synthetic liner of 40 mil for the 18-inch clay layer.

SWMUs 5 & 6

Excavation Volume Estimates from Feasibility Study

Excerpt from: Table 5.3. SWMUs 5 and 6 Waste Disposition Estimate

Area (ft ²)	Quantity (lcy) w/ sorbent	% Offsite Disposal	On-site Disposal	Off-site Disposal (lcy) (Rounded)	On-site Disposal (lcy) (Rounded)
SWMU 5	137,002	61%	39%	83,000	54,000
SWMU 6	7,498	22%	78%	1,600	5,800
Total	(rounded)	59%	41%	84,600	59,800

ACRONYMS

ARARs	applicable or relevant and appropriate requirements
bcy	bank cubic yards (<i>in situ</i> , or in place)
BGOU	Burial Grounds Operable Unit
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminant of concern
cy	cubic yard
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FS	feasibility study
KAR	Kentucky Administrative Regulation
KDEP	Kentucky Department for Environmental Protection
KPDES	Kentucky Pollutant Discharge Elimination System
KY	Kentucky (such as Kentucky Division of Waste Management)
lcy	loose cubic yards (<i>ex situ</i> , or excavated)
LUCs	land use controls
PGDP	Paducah Gaseous Diffusion Plant
RI	remedial investigation
ROD	record of decision
SWMU	Solid Waste Management Unit