HARSHAW CHEMICAL COMPANY SITE
CLEVELAND, OHIO

FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM

Proposed Plan for Operable Units 1 and 2

Public Meeting
April 2, 2019

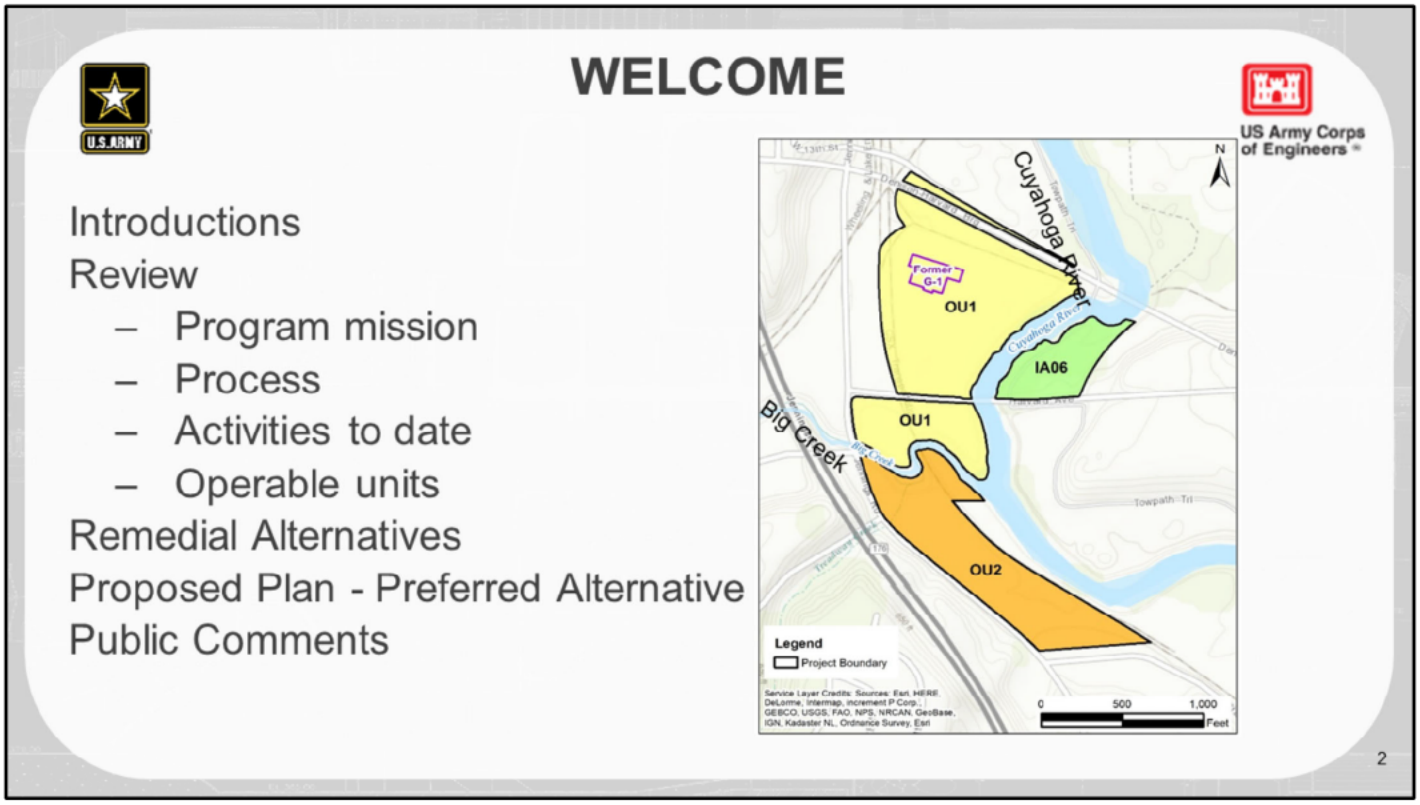
U.S.ARMY

US Army Corps of Engineers ®

[redacted] Good evening. Please be seated; once everyone is seated, we will begin the meeting.

I would like to introduce to you, [redacted], the Commander of the United States Army Corps of Engineers Buffalo District.

[redacted]: Good evening!



Welcome to our meeting tonight regarding the Harshaw Chemical Company Formerly Utilized Sites Remedial Action Program Site and our proposed plan to address the site.

Before we get started on our formal presentation, I'd like to recognize our elected officials and agency representatives that are in the audience.

I would also like to have the members of the Corps team stand up so that you will recognize them at the poster session after the formal meeting.

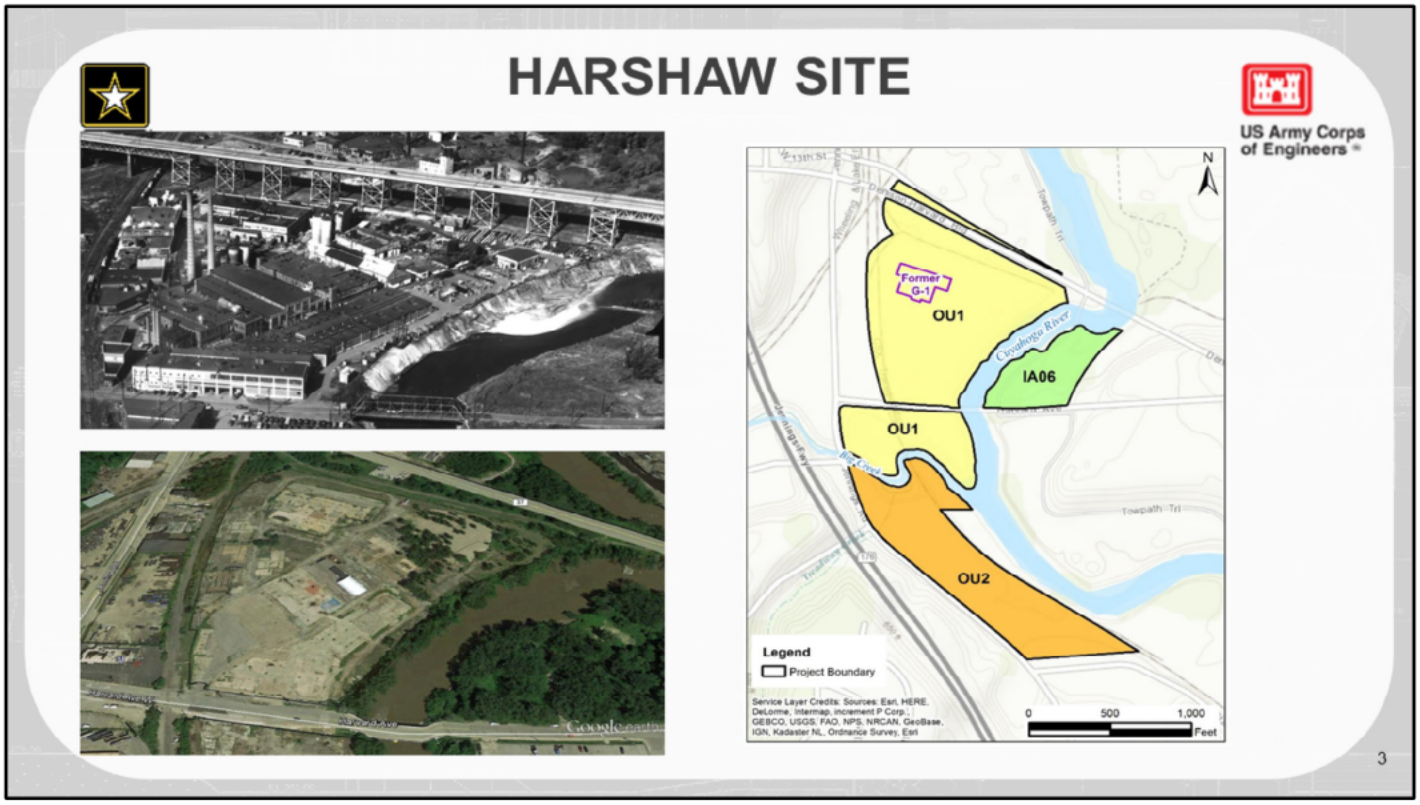
The Buffalo District serves the people and the watersheds of the lower Great Lakes, from Massena, New York to the Indiana State Line, and we've done so since 1857. We have many projects within this large area, but this one is close to home. We have a Cleveland area office, some of our employees are members of this community, and we all care deeply about serving and safeguarding our fellow citizens.

As we investigate and remediate sites like these, our number one priority is protection of human health and the environment – this guides our decision-making process.

Mainly, I would like to thank all of you for being here tonight. We value your input and look forward to listening to your comments during the comment portion of the meeting. Your comments will be factored into the final decision for remedial action at the Harshaw Chemical Company Site.

We ask that you save your comments tonight until the end of the presentation, so they can be accurately recorded. If you have a comment you would like recorded tonight, please make sure that you have checked the box on the card that you filled out when you came in. Jake, has cards if you need one. You may also submit your comments in writing by placing them in the comment box or mailing them to us by May 14, 2019.

Let me now turn this presentation over to [redacted], project manager for the site.



1. The photos on the left are from 1949 (top) and 2018 (bottom) and show the change on the 55-acre former Harshaw Chemical Company Site, which is located at 1000 Harvard Avenue, approximately five miles southwest of downtown Cleveland in Cuyahoga County, Ohio.

2. Site is in a low-lying area next to the Cuyahoga River and Big Creek (point out on slide) and is surrounded on three sides by industries. The main portion of the facility at one time included over 30 buildings on about 16 acres of land.

3. The former Harshaw Chemical Company was contracted by the Manhattan Engineer District, later the Atomic Energy Commission, to support the nation's early atomic weapons program.

4. From 1944 to 1959, 5,000 tons of uranium materials were processed in Building G-1 (which was located here at the Harshaw Site). Building G-1 was demolished in winter 2015 to address health and safety hazards and to enable further investigation of contamination beneath the building.

5. Early investigations to addressed residual radiological contamination at the site were conducted from 1976 to 1979. The current property owners conducted additional investigations in the 1990s and numerous buildings were demolished.

6. The map on the right shows the two operable units we are talking about tonight. Operable Unit (OU) 1 is to the north and Operable Unit 2 is to the south. I'll explain the differences between the two a little later.

7. The area labeled IA06 is already complete with a no action necessary record of decision signed in 2011.

FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM

US Army Corps of Engineers

1. Identify and evaluate sites

2. Clean up and control radioactive material

3. Protect human health and the environment

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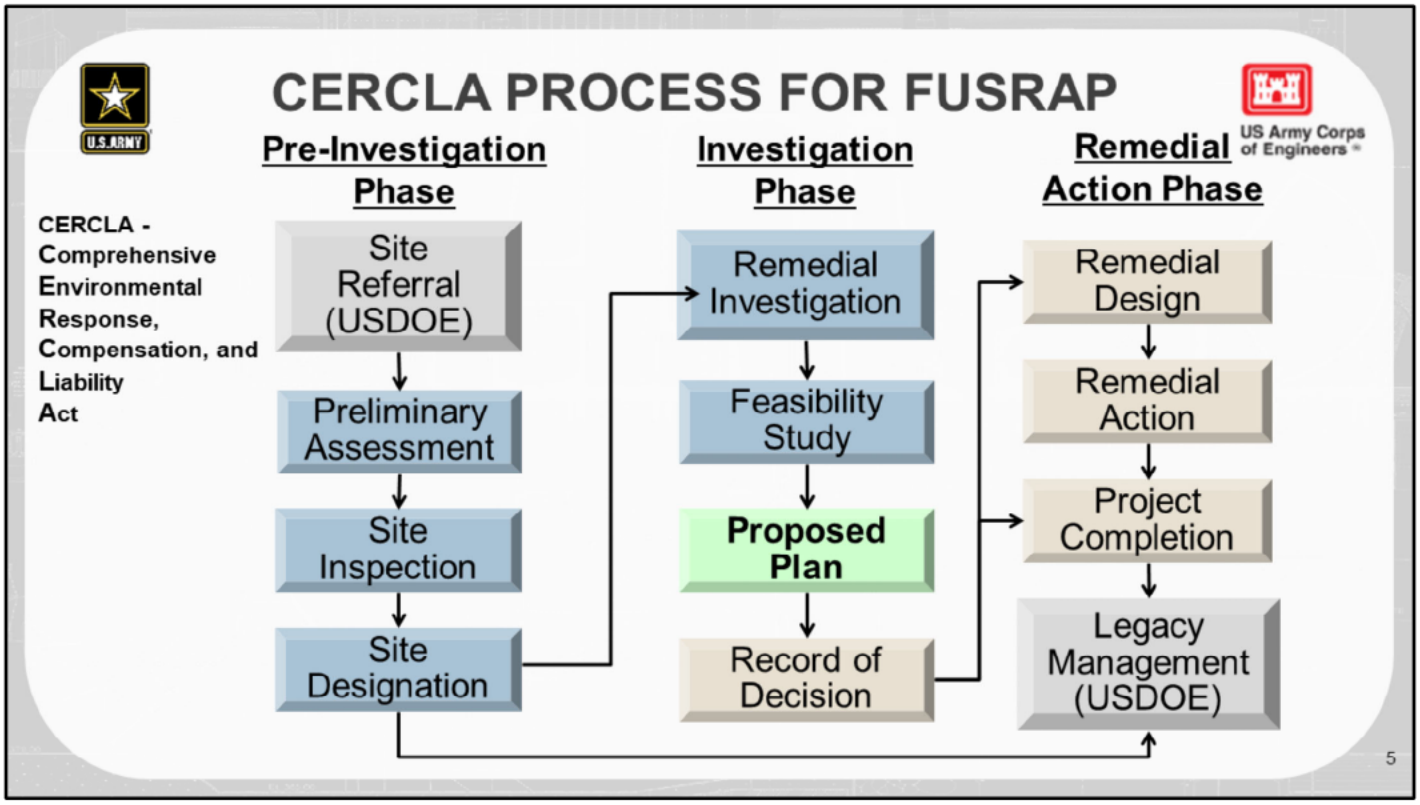
1. The federal program that is being used to address the former Harshaw Chemical Company Site is the Formerly Utilized Sites Remedial Action Program, or FUSRAP.

2. The program was initiated in 1974 to identify, investigate, and if necessary, clean up or control sites throughout the United States contaminated as a result of Manhattan Engineer District or early Atomic Energy Commission activities.

3. Objectives for FUSRAP are identified on this slide.

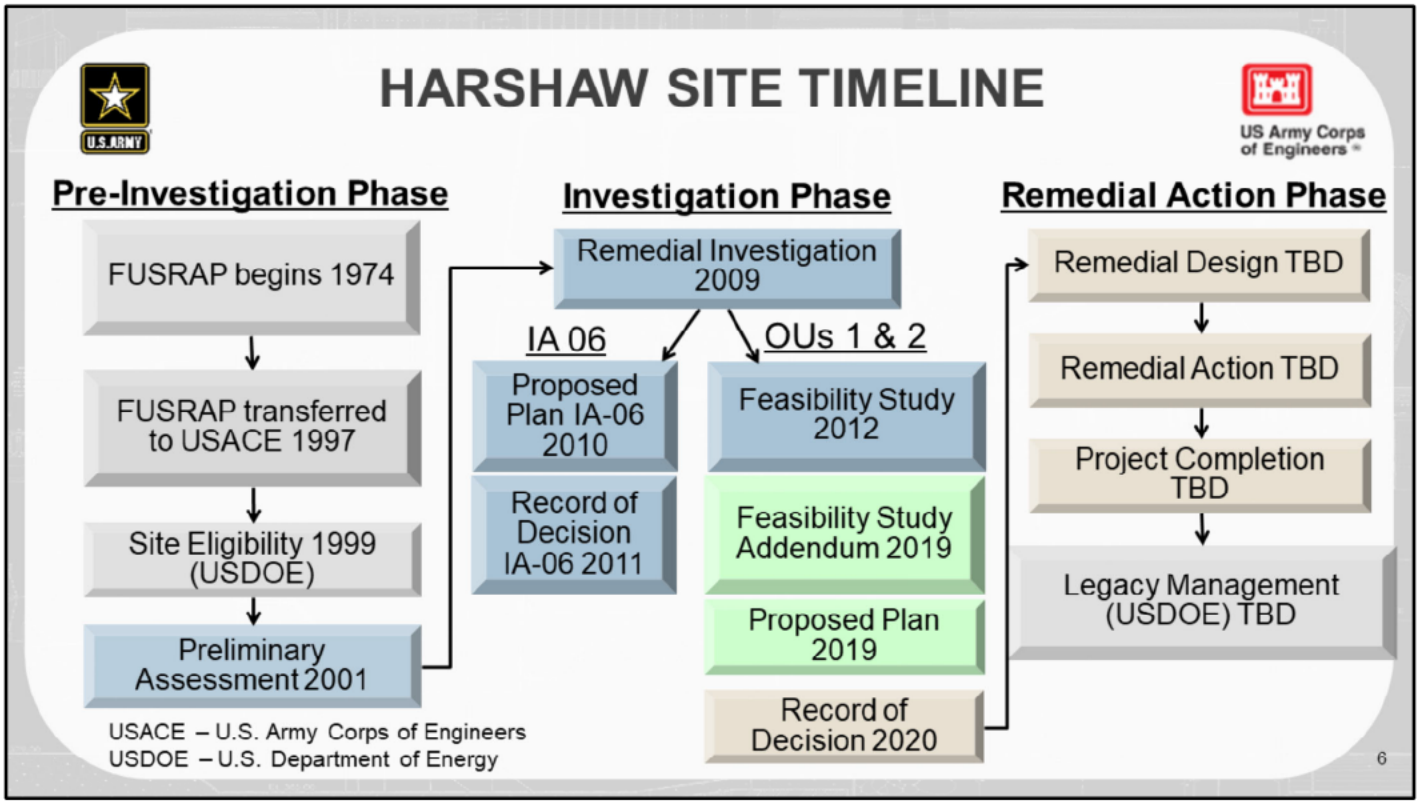
4. Our top priority while performing activities at the site is protecting the health & safety of the community and site workers, and protection of the environment.



1. This slide shows the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process we are required to follow for FUSRAP sites.

2. Actions at the Harshaw site were started by U.S. Department of Energy with a referral letter to the Corps of Engineers in 1999.

3. Tonight we are at the Proposed Plan phase of the process for Operable Units 1 and 2.



1. This slide shows the timeline for activities at the Harshaw Site as it fits into the CERCLA process.

2. As mentioned previously, FUSRAP began in 1974. The Harshaw site was included in FUSRAP in 2001 for further characterization of FUSRAP-related contaminants.

3. The Corps of Engineers completed the remedial investigation of the site in 2009, to determined the nature and extent of FUSRAP-related contamination and potential impacts to human health and the environment.

4. The feasibility study, which evaluates remedial alternatives for the site, was completed is 2012.

5. In March of this year, we released the feasibility study addendum, which adjusted our alternatives based on investigations performed after the demolition of Building G-1, and we also released the proposed plan for Operable Units 1 and 2.

6. We need to gather and consider your input regarding our preferred alternatives before a remedy is selected for each operable unit. Once that happens in the record of decision, the steps in the remedial action column will occur.

FUTURE LAND USES

US Army Corps of Engineers

Operable Unit 1

Reasonable future land uses:
- Industrial
- Commercial
- Recreational

Critical group:
- Construction worker

Operable Unit 2

Reasonable future land use:
- Residential

Critical group:
- Resident

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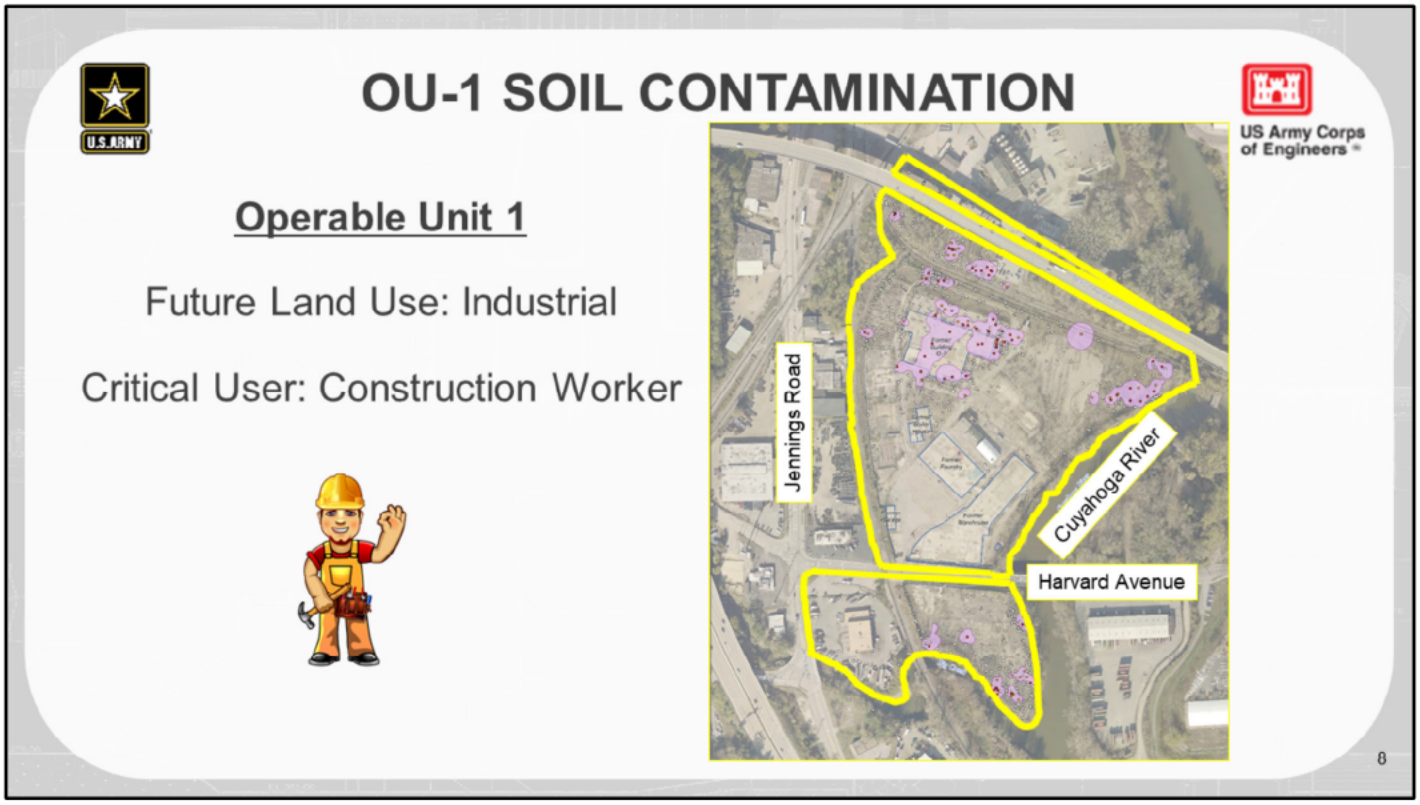
1. The reason there are two operable units has to do with determining the reasonable future land use and associated critical group.

2. The governing regulation (10 CFR 20.1003) defines the "*critical group*" as "*the group of individuals reasonably expected to receive the greatest exposure to residual radioactivity for any applicable set of circumstances*."

3. Critical group for Operable Unit 1 is the construction worker. The reasons for this is because:
    - Future land use at OU-1 is anticipated to be a combination of uses, including industrial, commercial, and recreational
    - Construction worker is reasonably expected to received the greatest exposure for any applicable set of circumstances.

4. Critical group for Operable Unit 2 is the resident. The reasons for this is because:
    - OU-2 is anticipated to remain undeveloped for the foreseeable future, HOWEVER…
    - Future planning by the city of Cleveland indicates that a portion of OU-2 may be rezoned to residential, so we assumed that it could be used for residential development.



1. We'll start with Operable Unit 1. We also have a poster for this graphic.

2. The pink areas are modeled areas of FUSRAP-related soil contamination (radium-226, thorium-230, thorium-232, total uranium) that would pose a risk to our critical user, the construction worker.

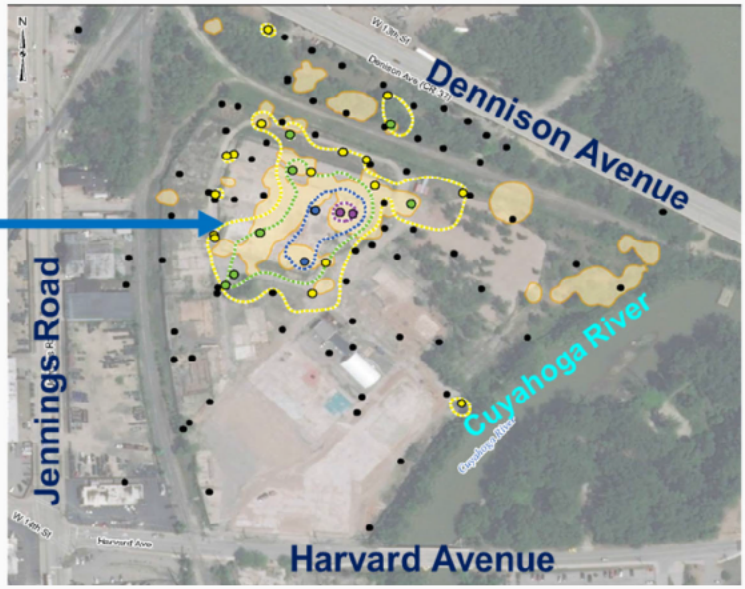
3. The dots inside the shaded areas represent locations where samples were collected. There were many other soil samples collected beyond the shaded areas as well, and can be seen better on the posters.

4. Reasonable future land use for OU-1 is industrial, and the critical group is the construction worker.

OU-1 GROUNDWATER

US Army Corps of Engineers

Uranium in groundwater found under and near soil impacts around former Building G-1.



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1. This slide shows impacts to groundwater from FUSRAP-related contaminants.

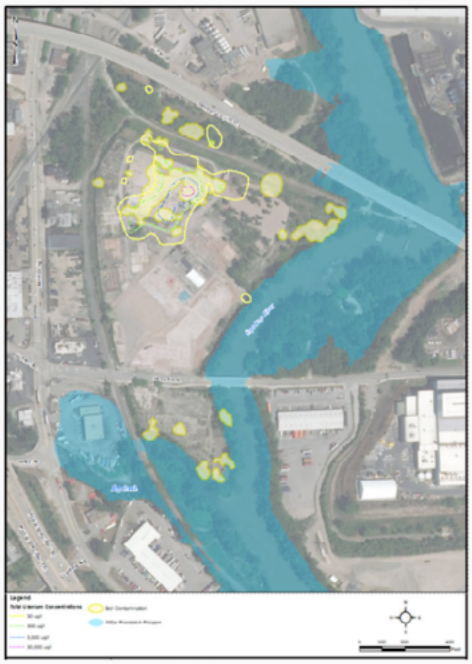
2. Notice how the impacts are centered around Building G-1 area.

3. The primary water-bearing zones underneath the site are not used as a drinking water source for the surrounding Cleveland area, which obtains it's drinking water from Lake Erie.

4. Groundwater from the Harshaw site discharges to the Cuyahoga River and Big Creek.

5. As long as the groundwater is not used as a drinking water source, exposure to contamination in the groundwater would not pose a risk to workers on the site.

OU-1 SURFACE WATER



- River sampling shows surface-water quality is not affected by the site
- Groundwater model predicts uranium transport will not increase future risk
- Hydraulic modeling assessed the potential for erosion along the Cuyahoga River and Big Creek
- Remedial alternatives include methods to reduce erosion risk

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1. This map shows the contaminated soil excavation areas in yellow, contours of groundwater contamination, and the blue shaded area shows the 100-year flood inundation zone.

2. Our groundwater model predicts that uranium transport will not increase future risk to surface water.

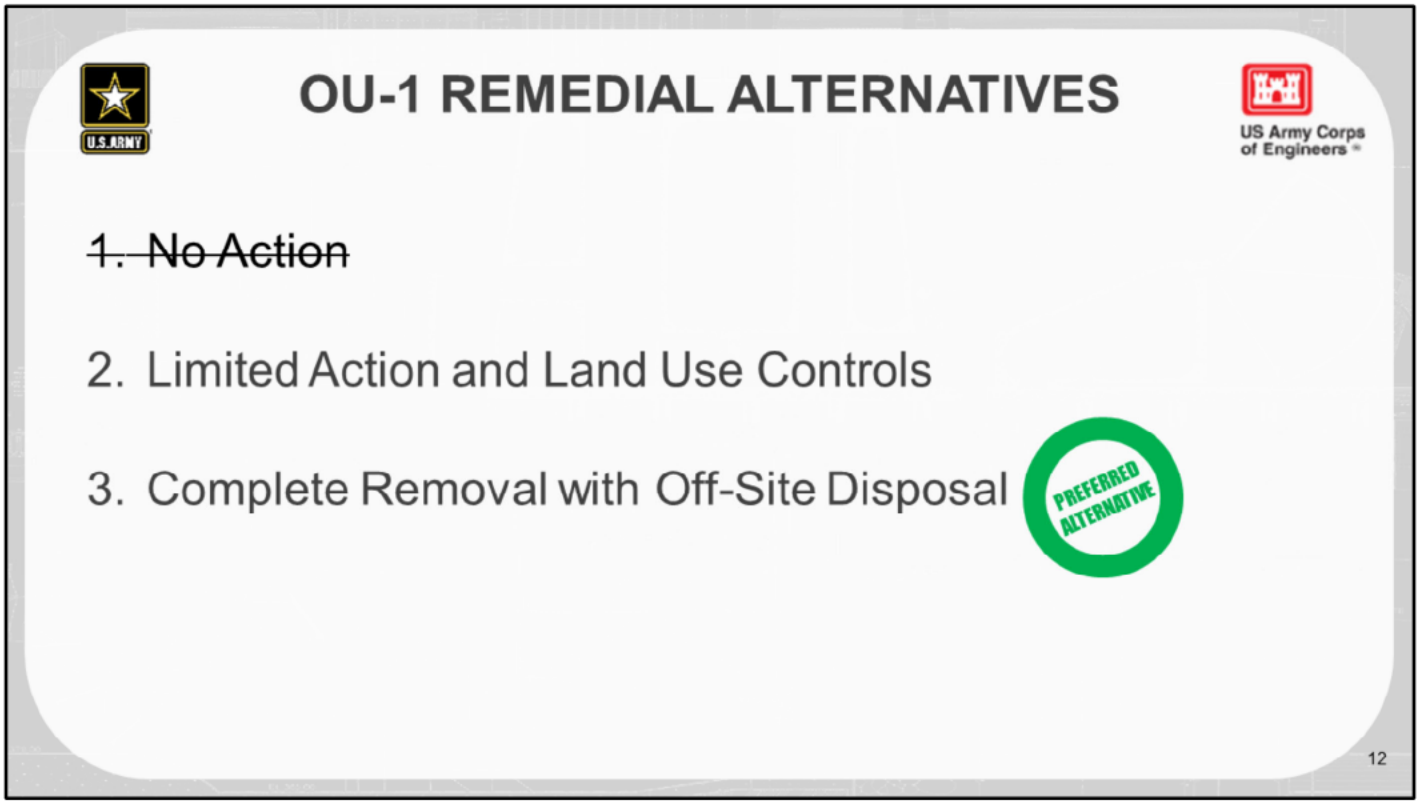
3. We also conducted hydraulic modeling to determine the potential for erosion at the site over a 1,000 year period along the Cuyahoga River and Big Creek.

OU-1 ECOLOGY

- Ecological risk assessment performed
- No action required for the protection of ecological receptors

1. We conducted an ecological risk assessment as part of the Remedial Investigation to determine potential adverse effects on the environment.

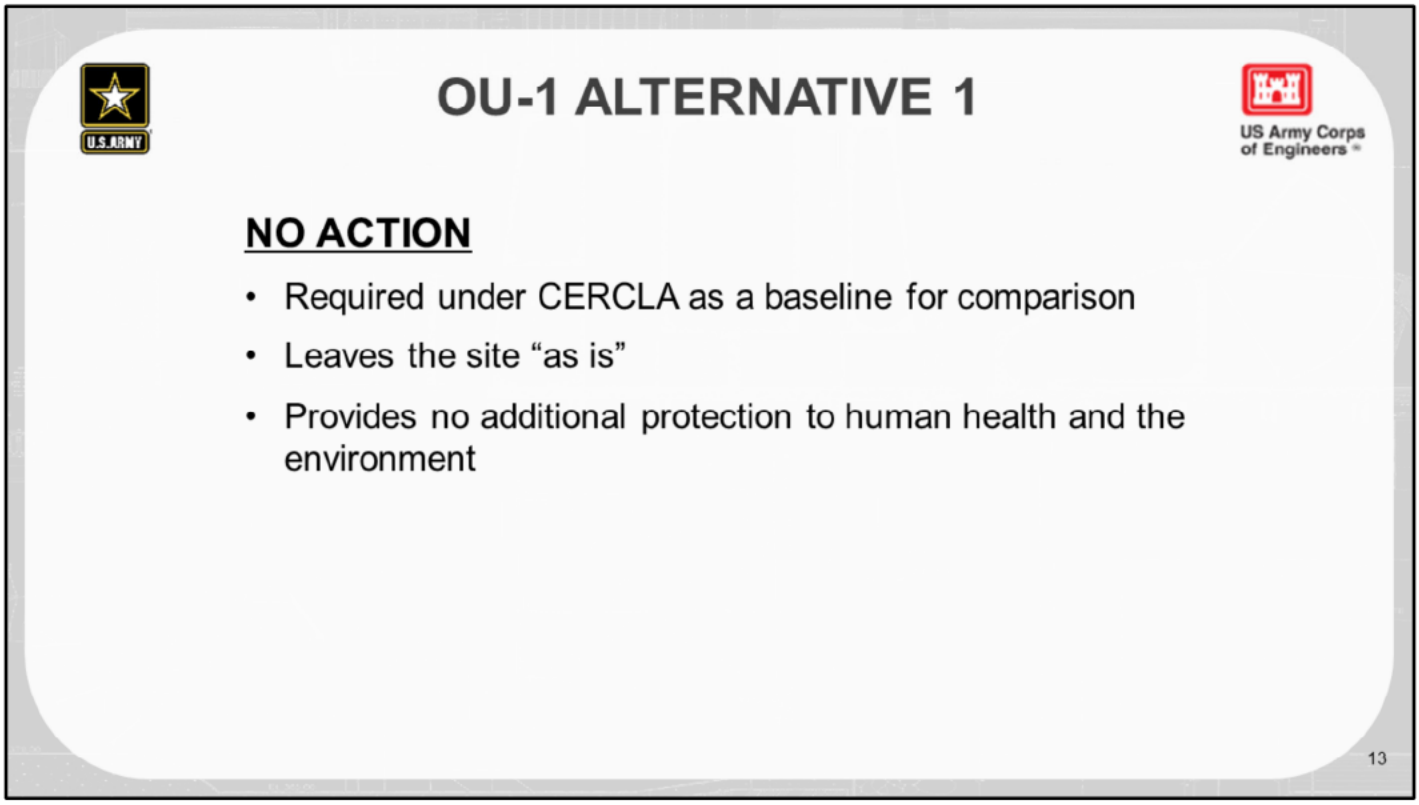
2. The results indicated that no action is required for the protection of ecological receptors, e.g., plants, animals, and fish.



1. These are the alternatives identified in the feasibility study for Operable Unit 1.

2. Alternative 1 was established for comparison purposes only as required by CERCLA. Since it was not protective of human health or the environment, it was removed from further consideration.

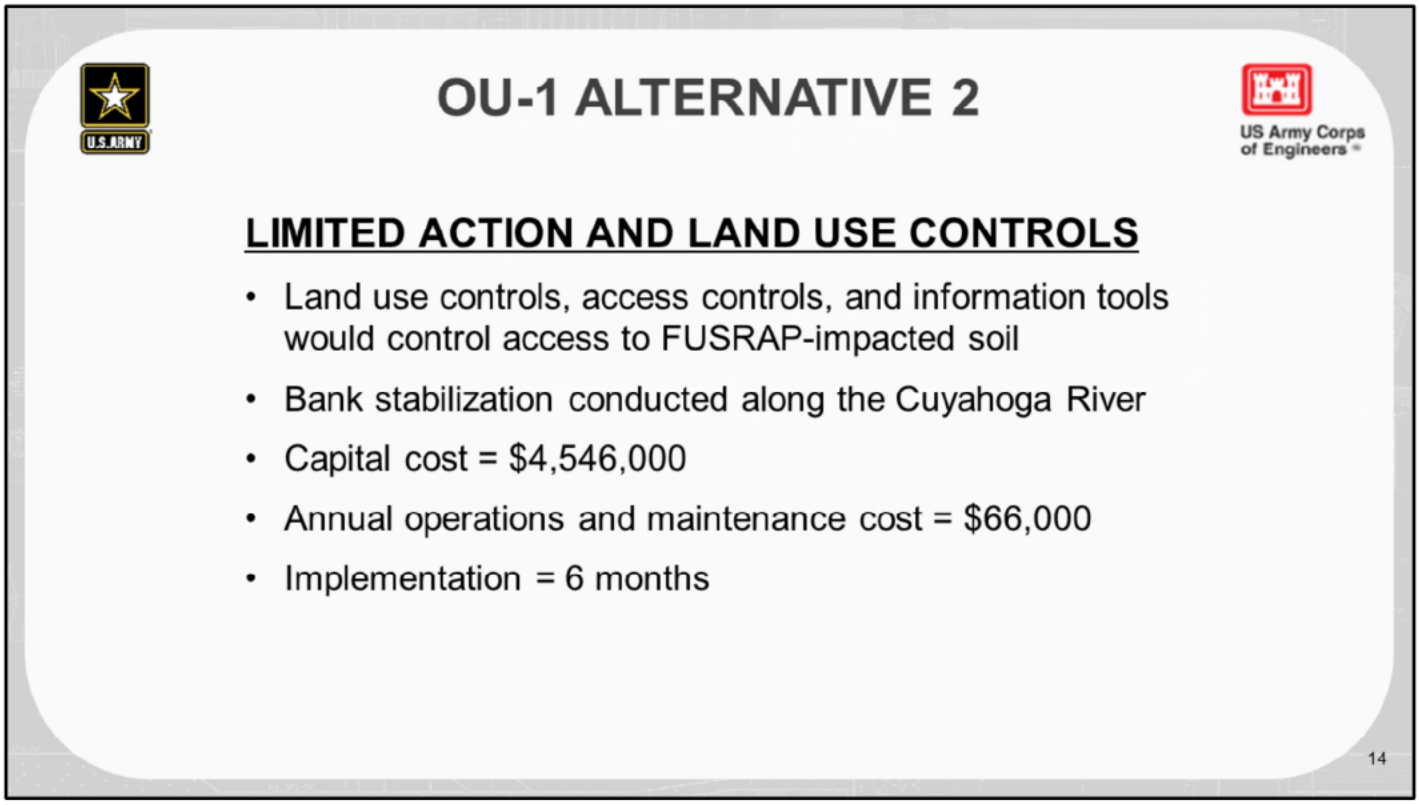
3. Alternative 3 is the preferred alternative for reasons we'll get to in a moment.



1. Alternative 1 is the No Action alternative.

2. It means just what is sounds like.

3. No Action alternative is required by CERCLA as a baseline to compare the other alternatives against.



1. Alternative 2 is Limited Action and Land Use Controls

2. Land use controls would include environmental covenants applied to the land to restrict future uses of the site where concentrations of FUSRAP contaminants remain above clean-up goals.

3. Access controls would reduce the potential for human exposure for the critical group (construction worker) to FUSRAP contamination at the site. Access controls would include fencing that is already in place plus additional fencing.

4. Informational tools would include posting signs and placards to indicate the presence of hazardous substances and warn against intruding on the site.

5. The land use control plan, prepared after the record of decision, would detail specific implementation action items.

6. Bank stabilization would be conducted along the Cuyahoga River to minimize:
   - potential bank erosion which could expose contaminated soils, and
   - potential impacts on the environment.

7. Under this alternative, the land could be used for passive recreation (e.g., concrete bike or walking paths).

8. Five year reviews would be required because hazardous substances will remain on-site above levels that permit unlimited use and unrestricted exposure (UU/UE).

9. The duration for implementation of Alternative 2 is six months, with an initial capital cost of about $4.5 million, and a total annual O&M cost of $66,000.

OU-1 ALTERNATIVE 3

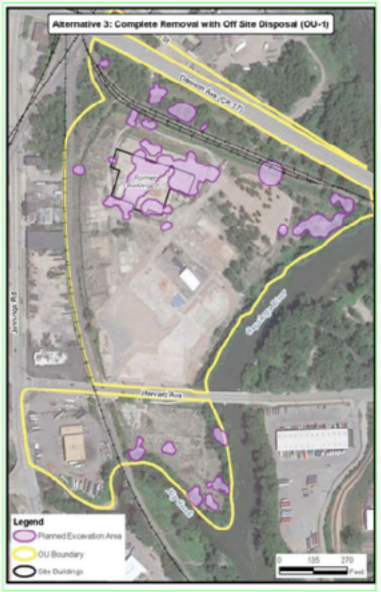
US Army Corps of Engineers

COMPLETE REMOVAL WITH OFF-SITE DISPOSAL

- Excavate impacted soil above clean-up goals for the protection of a construction worker
- Dispose of excavated soil at a properly permitted off-site facility
- Capital cost = $32,552,000
- Annual operations and maintenance cost = $9,000 per year
- Implementation = 2.5 years

PREFERRED ALTERNATIVE

Excavation areas



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1. Alternative 3 consists of excavating approx. 10,000 CY of impacted soil exceeding the cleanup goals (developed for protection of the construction worker) and off-site disposal to a properly permitted disposal facility. THIS IS THE PREFERRED ALTERNATIVE.

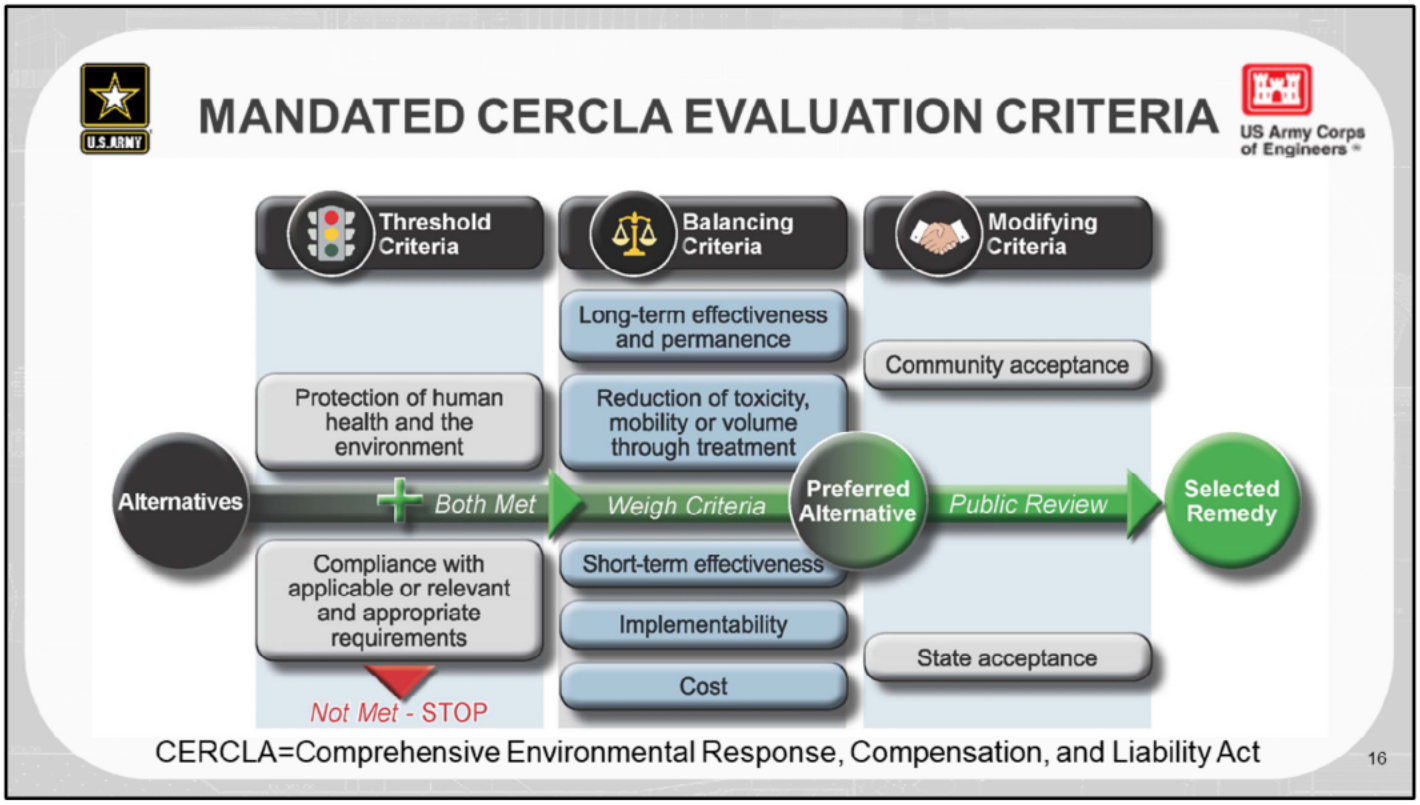
2. The soils excavated from Operable Unit 1 would be characterized as:
   - low activity radioactive waste – would be disposed at a disposal facility without treatement
   - mixed waste - impacted with both low activity radiological and inorganic contaminants, and requires treatment prior to land disposal to comply with the Resource Conservation and Recovery Act Land Disposal Restrictions.

3. Five year reviews would be required because hazardous substances will remain on-site above levels that permit Unlimited Use/Unrestricted Exposure.

4. Since this action will address only soil impacted by Manhattan Engineer District/Atomic Energy Commission activities, stakeholder coordination would also be required to address non-FUSRAP-impacted soil left on-site.

5. Capital cost of $32,552,000, and annual Operation and Maintenance cost of $9,000.

6. The duration of active remediation for Alternative 3 is 2.5 years.

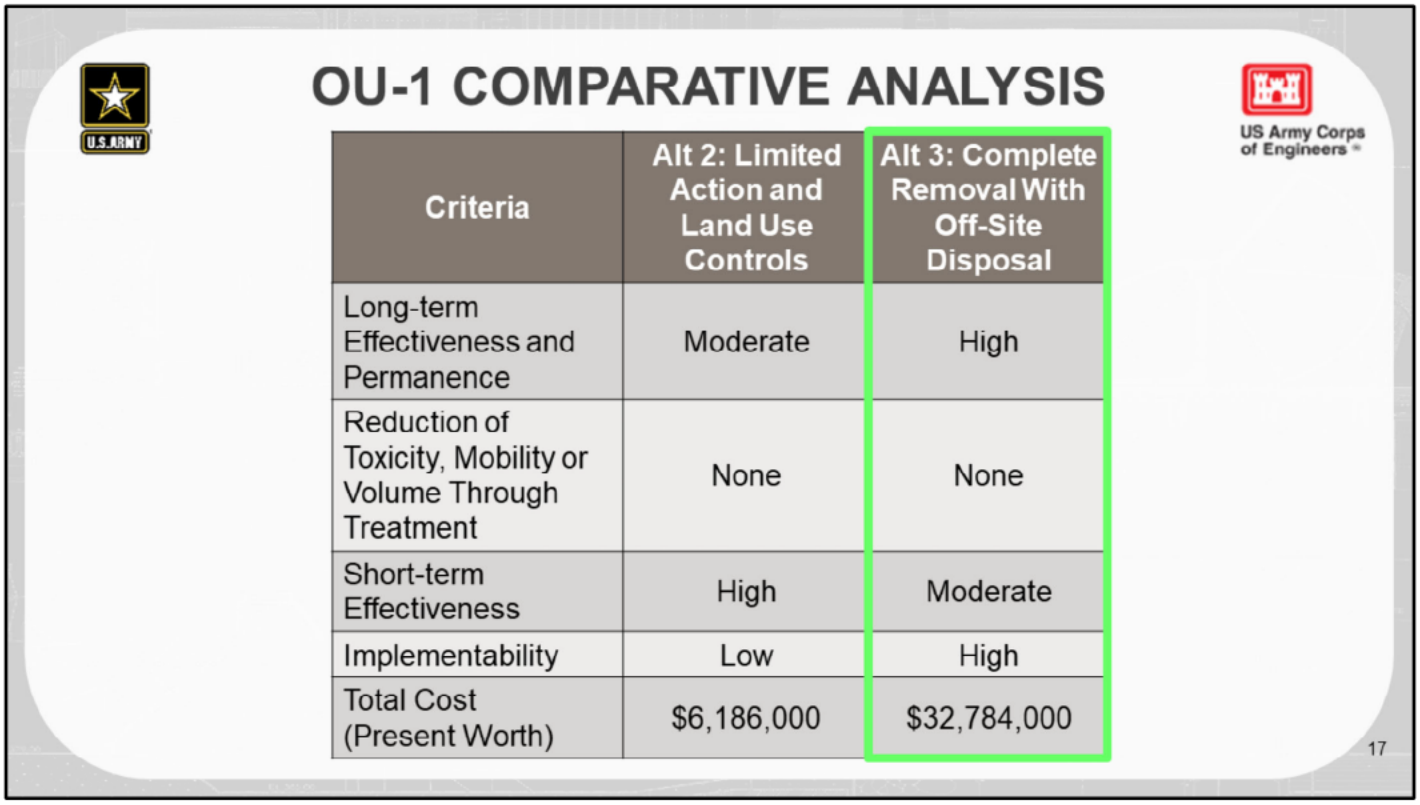


1. These nine criteria are used to move from the alternatives in the feasibility study to a selected remedy. Read from left to right.

2. In the first column, both threshold criteria must be met by any remedial alternative for it to be considered a viable remedy.

3. Next, the five balancing criteria are used to weigh major trade-offs among the alternatives, and represent the primary criteria upon which the detailed analysis is based.

4. The remaining two CERCLA criteria, referred to as modifying criteria, are evaluated following the public comment period on the proposed plan, and will be addressed during preparation of the record of decision.



Criteria	Alt 2: Limited Action and Land Use Controls	Alt 3: Complete Removal With Off-Site Disposal
Long-term Effectiveness and Permanence	Moderate	High
Reduction of Toxicity, Mobility or Volume Through Treatment	None	None
Short-term Effectiveness	High	Moderate
Implementability	Low	High
Total Cost (Present Worth)	$6,186,000	$32,784,000

1. For Operable Unit 1, Alternative 1 (No Action) did not meet the threshold criteria and was removed from further consideration.

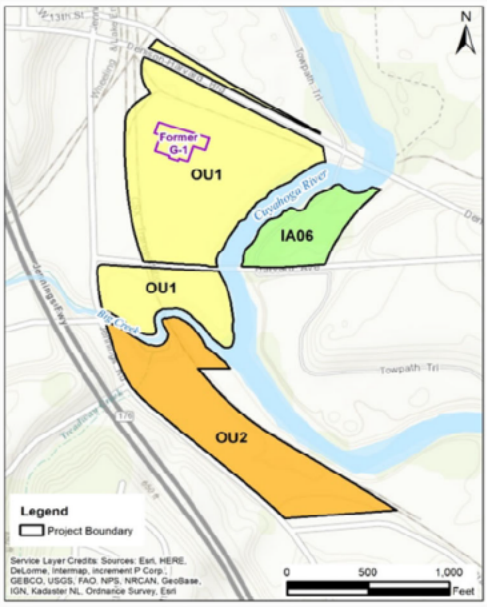
2. Alternatives 2 and 3 both meet the threshold criteria, and were evaluated for how they met the 5 balancing criteria.

3. Alternative 3 (Complete Removal with Off-Site Disposal) provides the best balance of tradeoffs when compared to Alternative 2.

4. Alternative 3 provides a higher degree of long-term effectiveness and permanence and implementability. We determined that these balancing criteria outweigh the higher cost of Alternative 3.

HARSHAW SITE

US Army Corps of Engineers



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Next we'll talk about Operable Unit 2.

OU-2 SOIL CONTAMINATION

US Army Corps of Engineers

Operable Unit 2

Future Land Use: Residential

Critical Group: Resident

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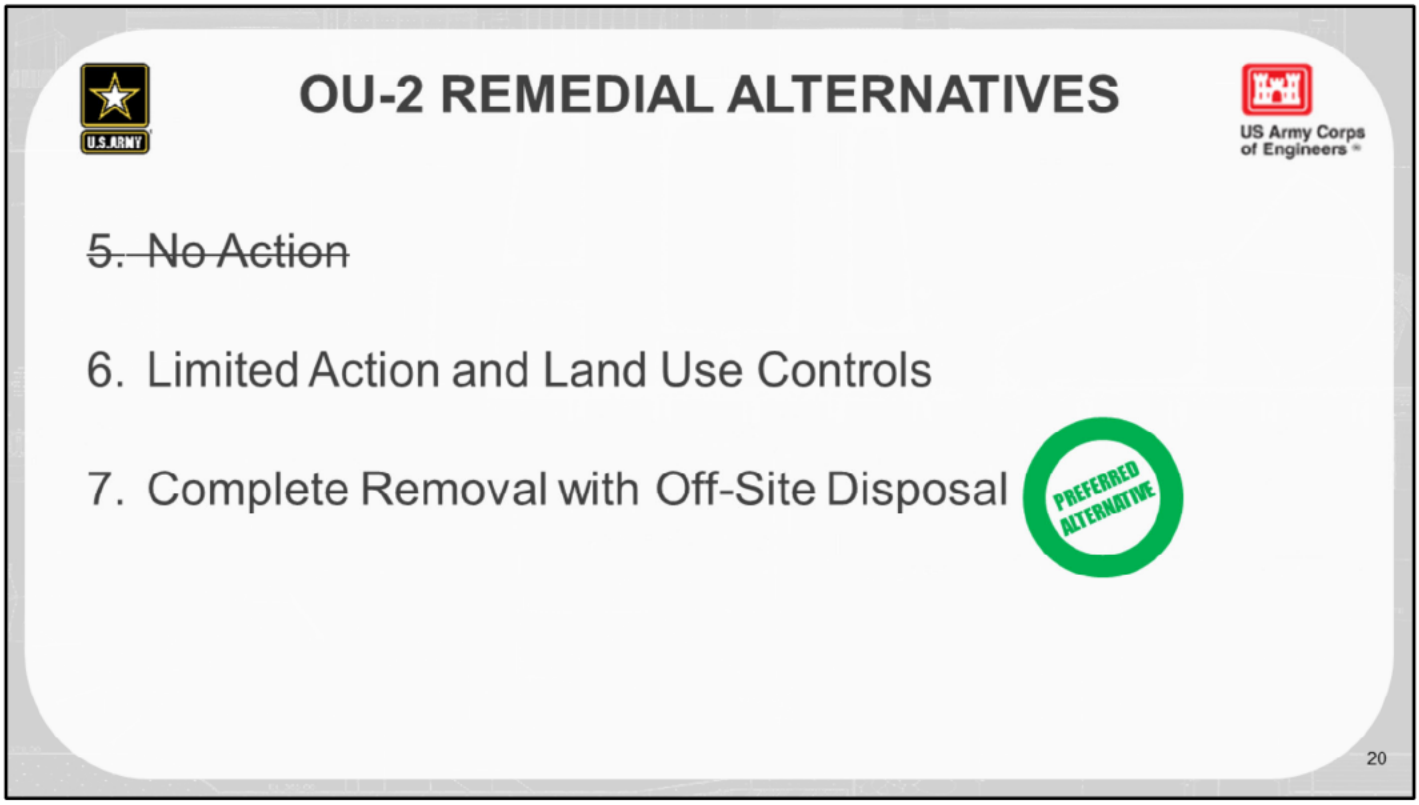
1. This figure is zoomed-in on Operable Unit 2. We also have a poster for this graphic.

2. The pink areas are modeled areas of FUSRAP-related soil contamination that would pose a risk to our critical user, the resident.

3. The dots inside the shaded areas represent locations where samples were collected. There were many other soil samples collected beyond the shaded areas as well, and can be seen better on the posters.

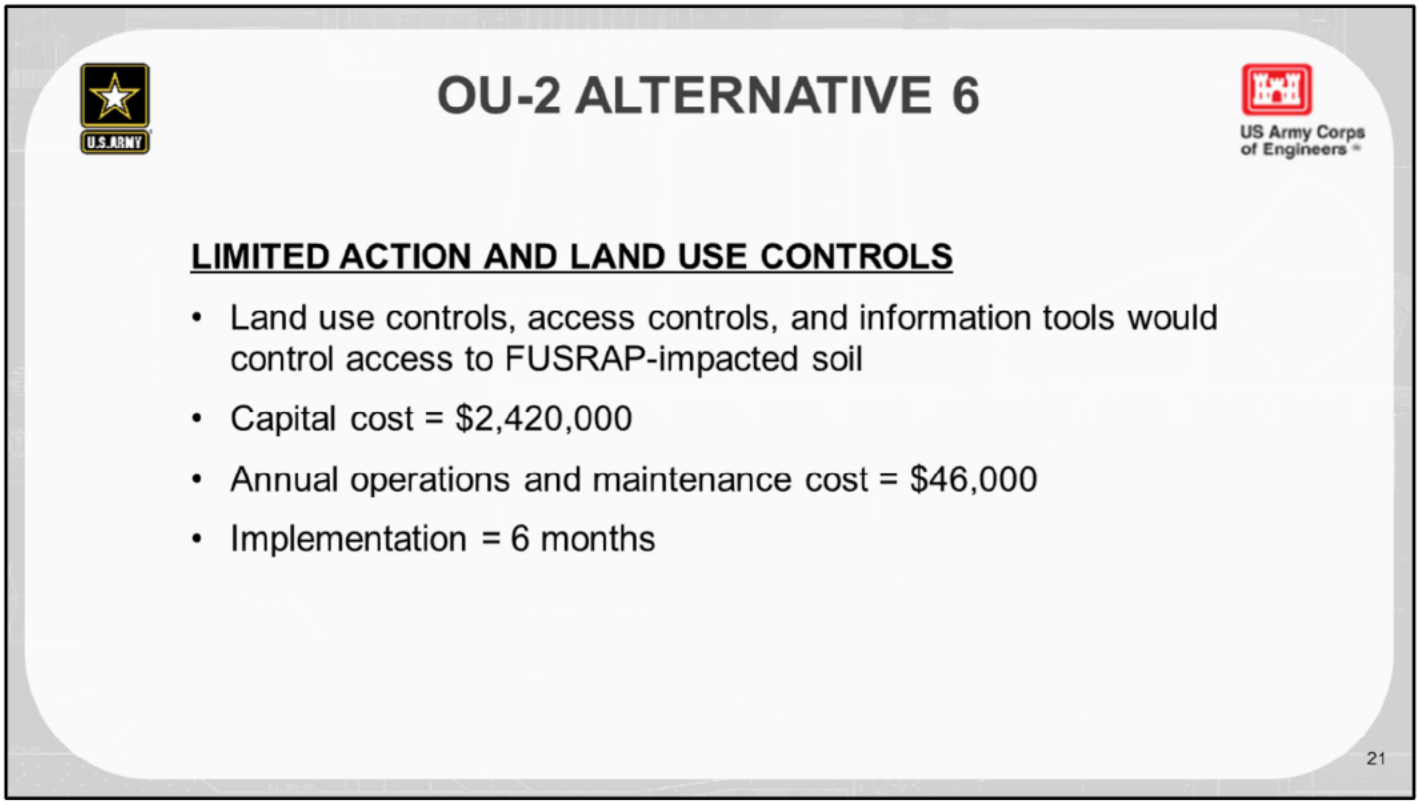
4. Reasonable future land use for OU-2 is residential, and the critical group is the resident.



1. These are the alternatives identified in the feasibility study for Operable Unit 2.

2. Alternative 5 was established for comparison purposes only as required by CERCLA. Similar to Alternative 1, it did not meet the threshold criteria and was removed from further consideration.

3. Alternative 7 is the preferred alternative for reasons we'll get to in a moment.



1. Alternative 6 is Limited Action and Land Use Controls

2. Land use controls would include environmental covenants applied to the land to restrict future uses of the site and buildings where concentrations of FUSRAP contaminants remain above cleanup goals.

3. Access controls would reduce the potential for human exposure for the critical group (resident) to FUSRAP contamination at the site. Access controls would consist of installing fencing to limit access to the site.

4. Informational tools would include posting signs and placards to indicate the presence of hazardous substances and warn against intruding the site.

5. The land use control plan, prepared after the record of decision, would detail specific implementation action items.

6. Under this alternative, the land could be used for passive recreation (e.g., concrete bike or walking paths).

7. Five year reviews would be required because hazardous substances will remain on-site above levels that permit unlimited use and unrestricted exposure (UU/UE).

8. Initial capital cost of $2,420,000 and a total annual O&M cost of $46,000.

9. Duration of implementation for Alternative 6 is six months.

OU-2 ALTERNATIVE 7

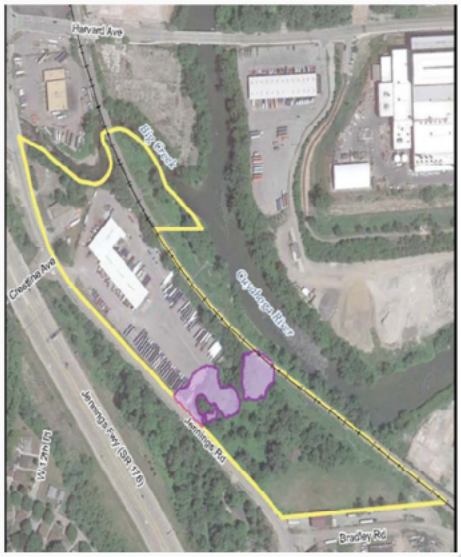
US Army Corps of Engineers

COMPLETE REMOVAL WITH OFF-SITE DISPOSAL

- Excavate impacted soil above clean-up goals for the protection of a resident
- Dispose of excavated soil at a properly permitted off-site facility.
- Capital cost = $5,910,000
- Implementation = 1.5 years

PREFERRED ALTERNATIVE

Excavation areas



22

1. Alternative 7 consists of excavating approx. 800 CY of impacted soil exceeding the cleanup goals (developed for protection of the construction worker) and off-site disposal to a properly permitted disposal facility. THIS IS THE PREFERRED ALTERNATIVE.

2. The soils excavated from Operable Unit 2 would be characterized as:
   - low activity radioactive waste – would be disposed at a disposal facility without treatement
   - mixed waste - impacted with both low activity radiological and inorganic contaminants, and requires treatment prior to land disposal to comply with the Resource Conservation and Recovery Act Land Disposal Restrictions.

3. Since this action will address only soil impacted by Manhattan Engineer District/Atomic Energy Commission activities, stakeholder coordination would also be required to address non-FUSRAP-impacted soil left on-site.

4. Capital cost of $5,910,000.

5. The duration of active remediation for Alternative 7 is 1.5 years.

OU-2 COMPARATIVE ANALYSIS

Criteria	Alt 6: Limited Action and Land Use Controls	Alt 7: Complete Removal With Off-Site Disposal
Long-term Effectiveness and Permanence	Moderate	High
Reduction of Toxicity, Mobility or Volume Through Treatment	None	None
Short-term Effectiveness	High	Moderate
Implementability	Low	High
Total Cost (Present Worth)	$3,650,000	$5,910,000

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1. Alternatives 6 and 7 both meet the threshold criteria, and were evaluated for how they met the 5 balancing criteria.

2. Alternative 7 (Complete Removal with Off-Site Disposal) provides the best balance of tradeoffs when compared to Alternative 6.

3. Alternative 7 provides a higher degree of long-term effectiveness and permanence and implementability. We determined that these balancing criteria outweigh the higher cost of Alternative 7.

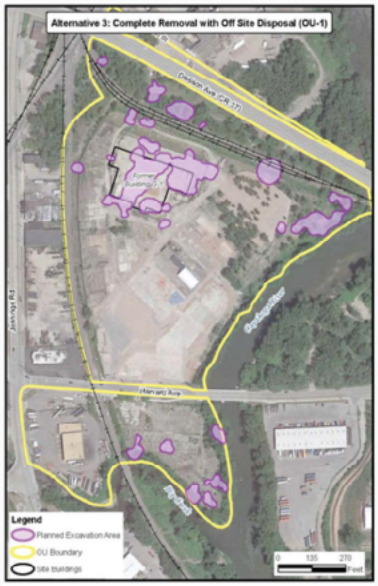
PREFERRED ALTERNATIVE OU-1
ALTERNATIVE 3 - COMPLETE REMOVAL AND OFF-SITE DISPOSAL

US Army Corps of Engineers

PREFERRED ALTERNATIVE

- Excavate impacted soil above clean-up goals for the protection of a construction worker
- Dispose of excavated soil at a properly permitted off-site disposal facility
- Capital cost = $32,552,000
- Annual operations and maintenance cost = $9,000
- Implementation = 2.5 years

Excavation areas



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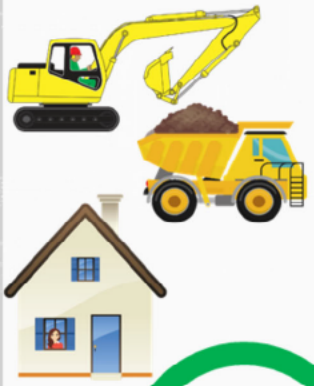
So to review, Alternative 3 is the preferred alternative for Operable Unit 1.

PREFERRED ALTERNATIVE OU-2
ALTERNATIVE 7 - COMPLETE REMOVAL WITH OFF-SITE DISPOSAL

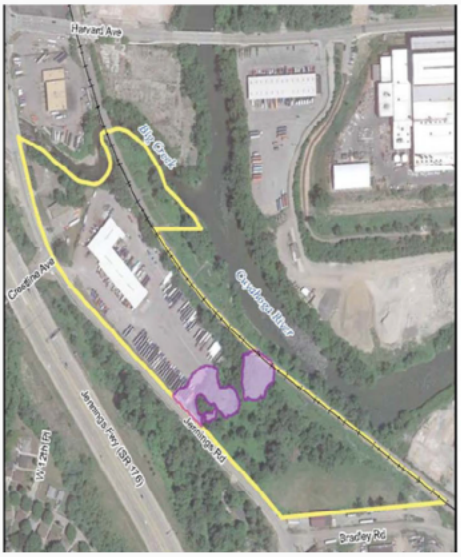
US Army Corps of Engineers



- Excavate impacted soil above clean-up goals for the protection of a resident
- Dispose of excavated soil at a properly permitted off-site disposal facility
- Capital cost = $5,910,000
- Implementation = 1.5 years

PREFERRED ALTERNATIVE

Excavation areas



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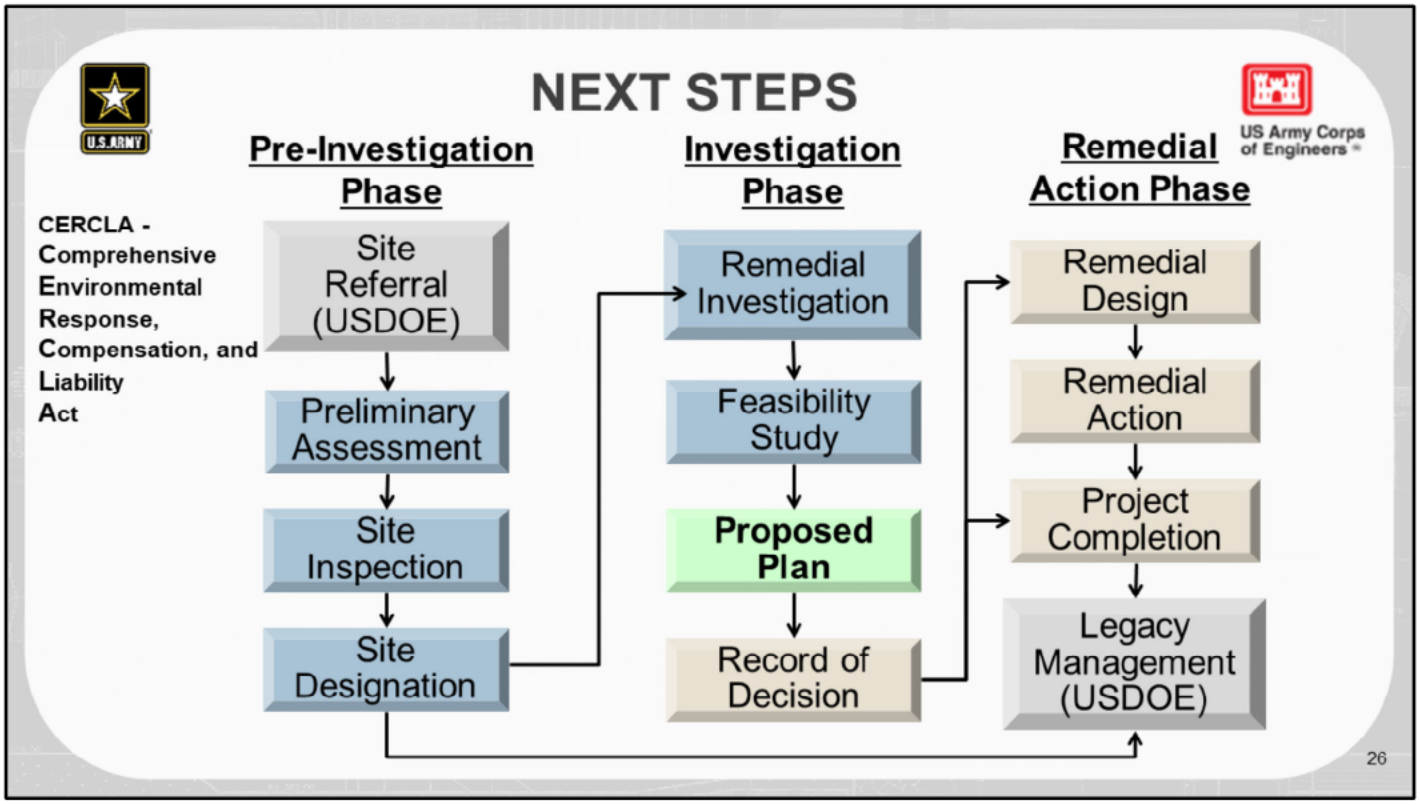
Alternative 7 is the preferred alternative for Operable Unit 2.



1. The public comment period for the proposed plan started on March 14, and will end on May 14.

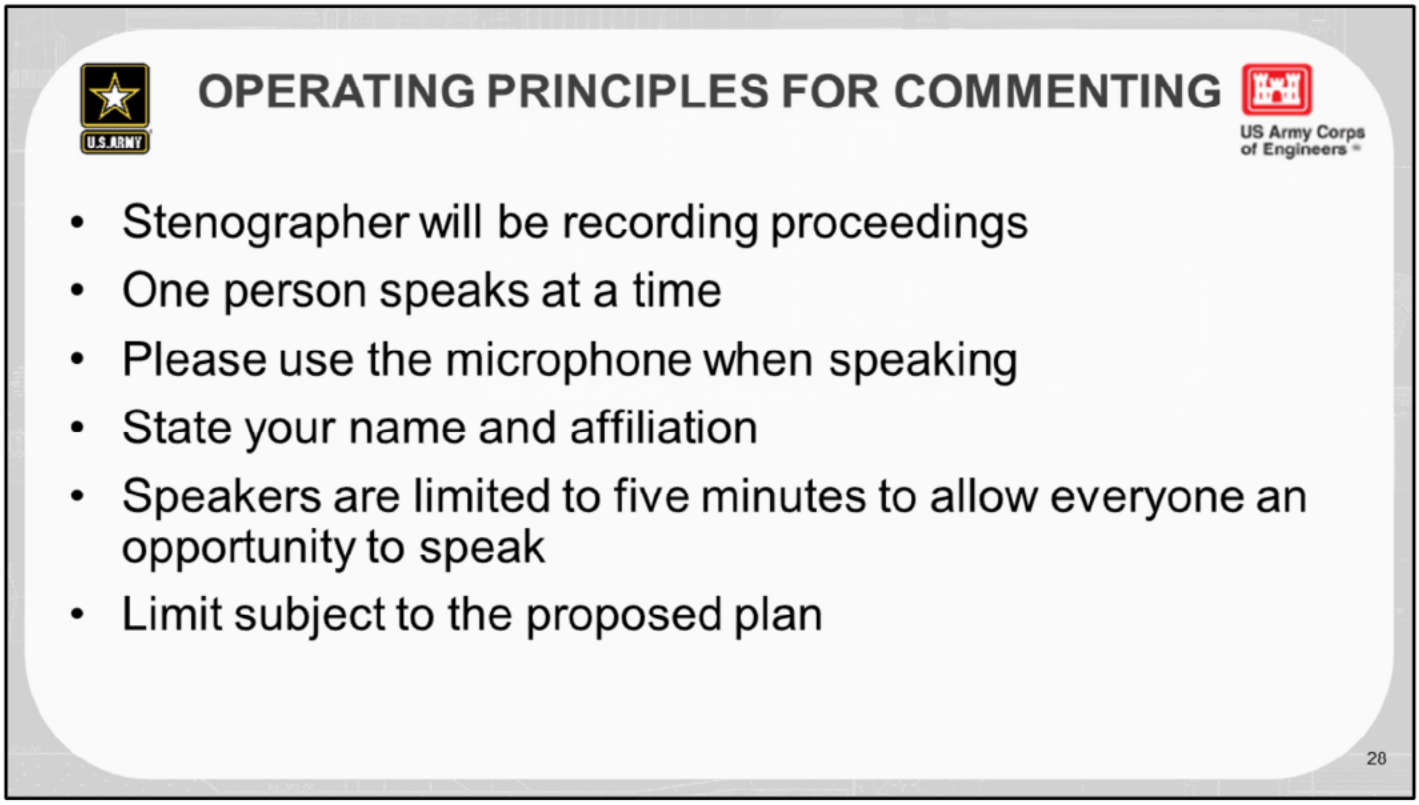
2. After careful consideration of all comments received, the Corps of Engineers will select a final remedies to address the FUSRAP-related material in Operable Units 1 and 2. These selections will be documented in the record of decision.

3. The record of decision is currently scheduled for completion in the fall of 2020.

4. Start of the remedial design and remedial action will be dependent on the completion of other sites currently undergoing cleanup, and the availability of funding in the national FUSRAP Budget.

5. That completes the presentation. I will now turn this back over to [redacted] to begin the comment period.

COMMENT PERIOD



Thank you.

I would now like to open the meeting for formal comments to be entered into the public record.

When you came in you received a sign-in card with a box on it that indicates you wish to speak.

We will begin with elected officials and then call up those people who indicated on the sign-in card that they wanted to make a comment; and then, time permitting, we will open the floor to others who wish to make a comment.

I just want to reiterate the operating principles we have on the screen.

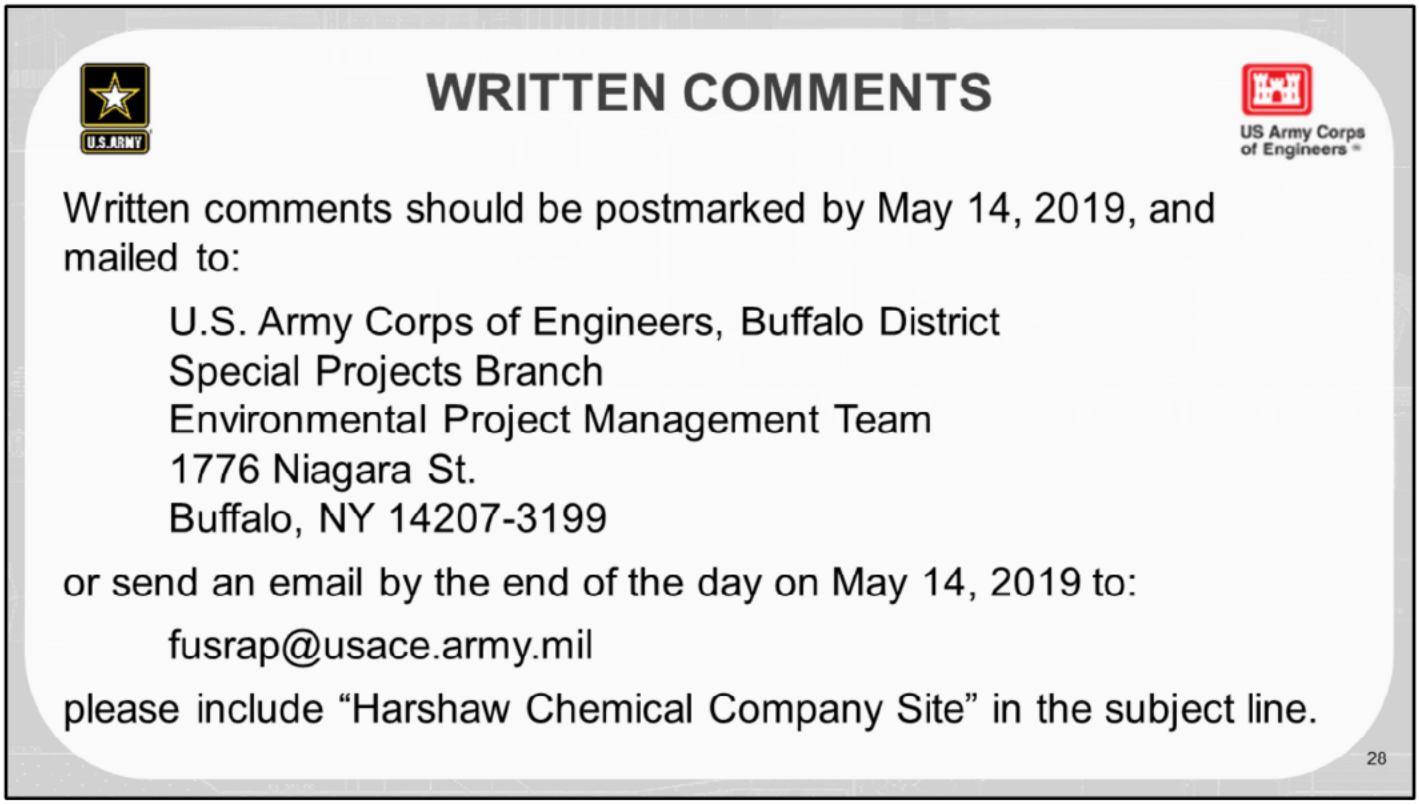
Please only one person speaking at a time. Please use the microphone so that we can accurately record your comment.

Please state your name and affiliation before providing your comment

To allow everyone that wishes to the opportunity to speak, please limit your comments to five minutes. [redacted] will be watching the clock and will let you know if it is time to wrap up your comm t.

Thank you. I would now like to call to the microphone_____

Thank you for your comments. Is there anyone else who would like to make a formal comment tonight?



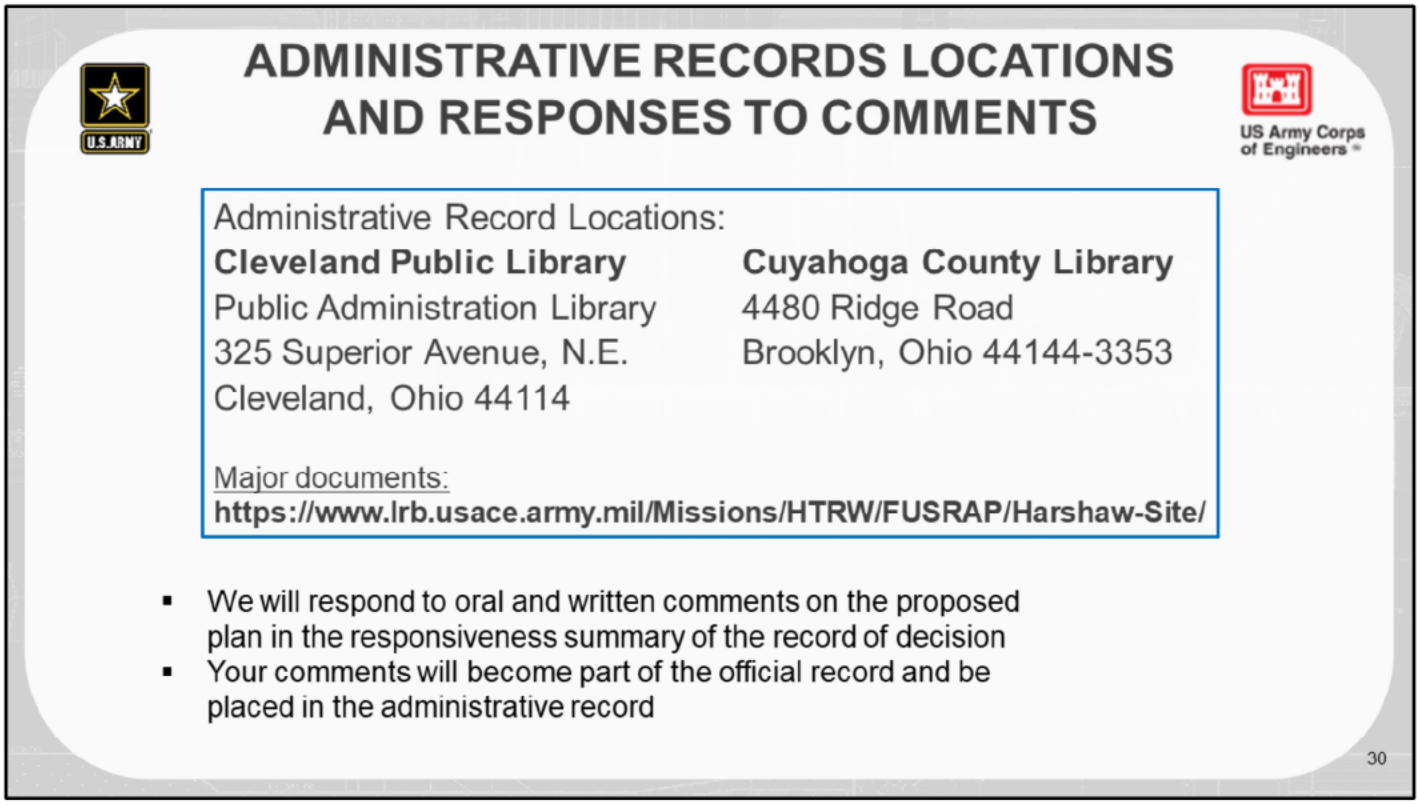
This concludes the formal comment portion of the public meeting. Please feel free to view the displays and talk with our staff in the open house area.

Remember that there are other ways to give us your comments:
- You may write them down and leave them with us tonight.
- You may mail your comments to us at the address on the slide.
- You may also email them to the address listed on the slide.

Ensure that your comments are mailed or emailed by the end of the day May 14th.

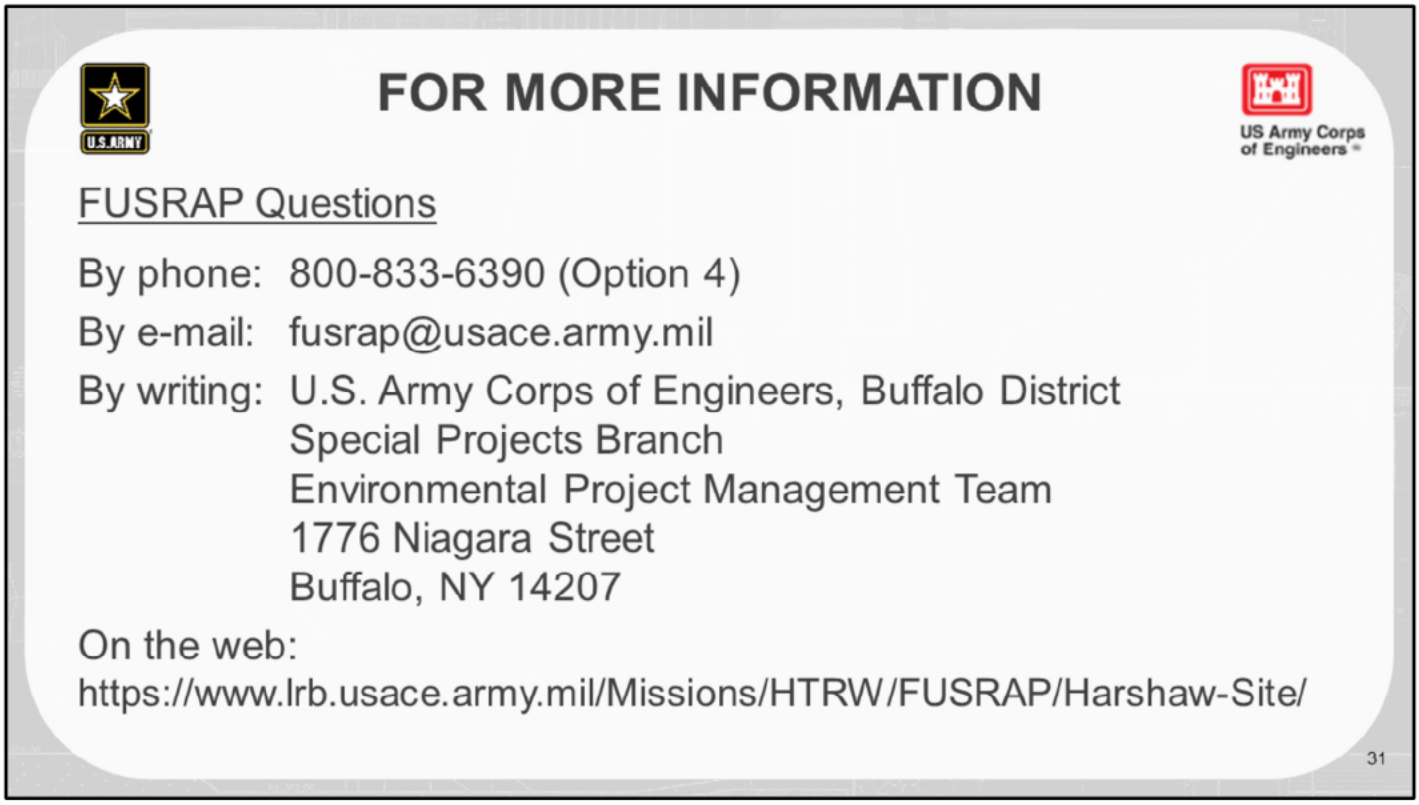
Your comments and all responses to them will become a part of the official administrative record which can be viewed at the Corps office in Buffalo.

Thank you for coming tonight and we do appreciate your taking the time to attend tonight and your desire to give us feedback. We value your input during this decision-making process.



The administrative record for the Harshaw Chemical Company Site is available electronically in the Cleveland Public Library and the Cuyahoga County Library. The administrative record contains major reports and the supporting documentation used for our decision making for the site. Most of the major documents are on the project website listed on the slide

Responses to your comments will be provided in the responsiveness summary that is part of the record of decision.



If you would like additional information, please use one of these methods to contact us.

Thank you again! The team will be available at the posters for the rest of the evening. Please drive safely on your way home.