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of Engineers  
Buffalo District**



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*Status of FUSRAP  
Tonawanda Landfill and  
Mudflats Area and  
Seaway Site*

*September 23, 1999*

**[REDACTED]**  
Commander  
Buffalo District  
U.S. Army Corps of Engineers



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# Agenda

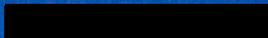
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- Tonawanda Landfill and Mudflats Area
- Seaway - Proposed Plan preparation



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## *Status of FUSRAP Tonawanda Landfill and Mudflats Area Vicinity Property of the Linde FUSRAP Site*

  
Project Engineer  
Buffalo District  
U.S. Army Corps of Engineers



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## Tonawanda Landfill and Mudflats Area



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## Tonawanda Landfill and Mudflats Area





## Site Background

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- **Town of Tonawanda Landfill**
  - Operated by Town from mid-1930s to 1989.
  - Accepted waste included incinerator ash, municipal solid waste, sewage treatment plant sludge, and leaves.
- **Mudflats Area**
  - Incinerator at western end of Mudflats Area operated by Town of Tonawanda from 1940s to early 1980s.
  - Incinerator burned municipal solid waste and sewage treatment plant sludge.
- **No known MED activities at either location. Source of contamination is unknown.**



## Previous Investigations

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- **1990 Mobile Gamma Scanning Survey (DOE)**
  - Survey of area surrounding Linde Site to assess whether residual materials were transported off-site.
  - Anomaly detected in Mudflats Area.
- **1991 Radiological Site Survey (DOE)**
  - Detailed characterization of Landfill and Mudflats.
  - Identified isolated locations with soil concentrations of Ra-226, Th-230, and U-238 above DOE guidelines. Material similar to by-product from Linde processing.
  - Portions of property with MED-related contamination designated as FUSRAP Vicinity Property.



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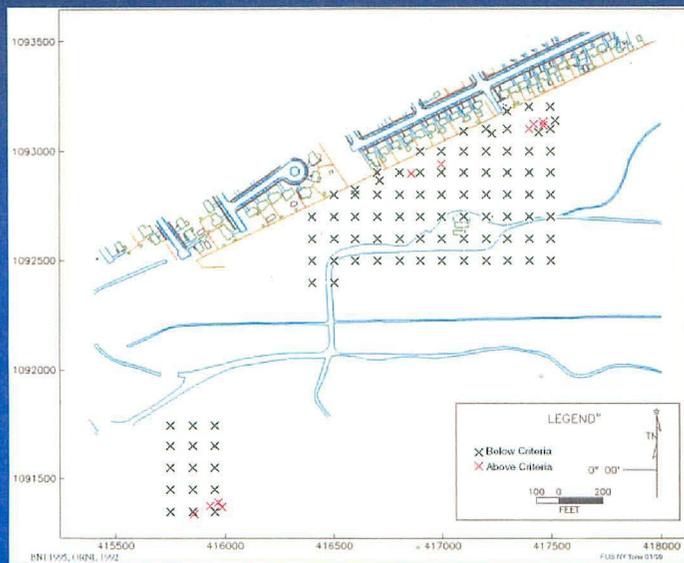
## Previous Investigations (Cont.)

- **1994 Additional Site Characterization (DOE)**
  - Conducted to determine depth of MED contamination at locations identified in 1991 survey.
  - MED contamination detected above guidelines to depth of 11.5 feet in one location in Landfill.
  - Remainder of MED contamination within upper 1.5 feet.



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## Previous Investigations (Cont.)





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## Previous Investigations (Cont.)

- **1999 Human Health Assessment (USACE)**

- Evaluated doses and risks to human health for current site use, as well as potential closure scenarios.
- Dose and risk for recreational user under current site conditions are as follows:

	Dose	Risk
Landfill	10 mrem/yr	$5.4 \times 10^{-5}$
Mudflats	2.9 mrem/yr	$1.5 \times 10^{-5}$

- **Dose and risk are within guidelines.**



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## Issues

- **Groundwater**

- One of two samples collected from shallow aquifer by DOE had radionuclides above guidelines.
- Sample collected from open borehole - high sediments.
- No radionuclides above guidelines in monitoring wells sampled biannually by Town of Tonawanda.
- Aquifer is not used for drinking water.
- Migration potential limited, as radiological COCs are generally insoluble, and soils are generally silt and clay.
- **MED contamination unlikely to pose a threat to groundwater. Further documentation may be required.**



## Issues (Cont.)

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- **Extent of Landfill Contamination**

- DOE investigations examined limited portion of landfill.
- Eastern portion investigated for Am-241 by Town of Tonawanda.
- Samples collected by NYSDEC from five locations in the Am-241 contaminated area did not contain Ra-226, U-238, Th-230 above guidelines.
- **Extent of MED contamination within DOE-sampled area is well defined. Extent outside of area is uncertain.**



## Issues (Cont.)

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- **Extent of Mudflats Contamination**

- DOE investigations examined small portion of the site near the incinerator.
- No other sampling conducted in Mudflats Area.
- **Extent of MED contamination within DOE-sampled area is well defined. Extent outside of area is uncertain.**



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## Tonawanda Landfill and Mudflats Area



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## Decision on Lead Agency

- USACE may address MED contamination under FUSRAP authority, following the CERCLA process.
- Town of Tonawanda may address MED contamination as part of the landfill closure and seek reimbursement from Federal Government.
- **Town must make decision on lead agency before remediation process can continue.**



## CERCLA Process

- **Remedial Investigation**
  - Historical records search and data review
  - Field sampling
  - Baseline risk analysis
- **Feasibility Study**
  - Propose and evaluate remedial alternatives
- **Proposed Plan/Record of Decision**
  - Public review and comment
- **Remedial Design/Remedial Action**



## Estimated CERCLA Schedule

<u>Action Item</u>	<u>Completion Date*</u>
RI/FS	Feb. 2001
Proposed Plan	Apr. 2001
Public Review	June 2001
Issue ROD	July 2001
Remedial Design	Oct. 2001
Remedial Action	Dec. 2002

\* Assumes start date of Oct. 1999



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## *Status Update Seaway FUSRAP Site*

  
Project Engineer  
Buffalo District  
U.S. Army Corps of Engineers



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## Outline

- Briefing purpose
- Site background
- Documentation completed
- Alternatives considered
- Comparison of alternatives
- Recommended alternative



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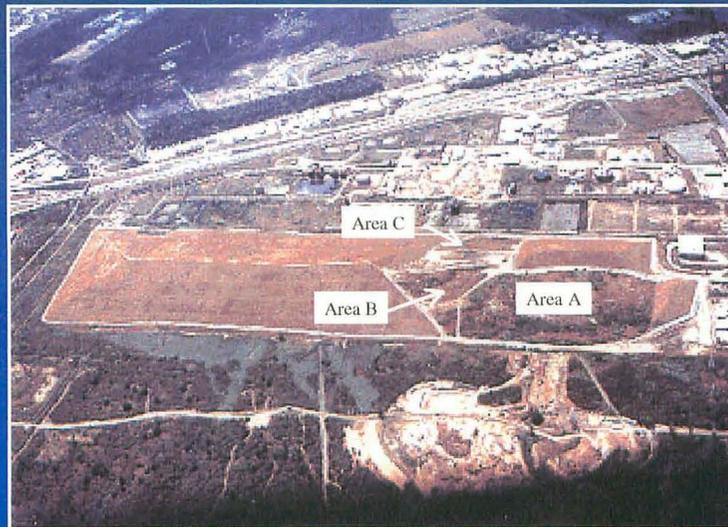
## Briefing Purpose

- Discuss the preferred alternative for the Seaway Site (Alternative 6 - Containment)
- Provide further update regarding the Seaway Site since the detailed update provided to you on February 25, 1999
- Discuss how we arrived at our current thoughts regarding the preferred alternative for the Seaway Site (Alt. 6: Containment)
- Receive your feedback



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## Seaway





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## Site History

- In 1974, approximately 6,000 cubic yards (yd<sup>3</sup>) of the residues were removed from Ashland 1 and placed on the ground surface of the Seaway Landfill (Areas A, B, and C)
- MED waste was located in areas B and C during 1978 site investigations
- Up to 40 feet of refuse was placed over these areas
- Landfill operations continued through 1993 and completed closure in 1995
- Seaway Landfill is capped to NYSDEC closure standards except in Areas A, B and C, as shown earlier



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## Disposal Volumes

Based upon studies and computer modeling, the volumes of soils estimated are:

	<b>TOTAL</b>	<b>PARTIAL</b>
<b>A</b>	<b>94,700</b>	<b>61,400</b>
<b>B</b>	<b>7,900</b>	<b>0</b>
<b>C</b>	<b>35,600</b>	<b>11,200</b>
<b>TOTAL</b>	<b><u>138,300</u></b>	<b><u>72,600</u></b>



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## CERCLA Documentation History

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- **Existing Principle CERCLA Documents**

- Remedial Investigation Report for Tonawanda Sites (1993)
- Baseline Risk Assessment for Tonawanda Sites (1993)
- Feasibility Study for Tonawanda Sites (1993)
- Proposed Plan for the Tonawanda Sites (1993)

- **Supporting Documents**

- Seaway Areas B and C Additional Surface Characterization Technical Memorandum (1999)
- Synopsis of Volume Calculations for Seaway Site Areas A, B, and C Technical Memorandum (1999)
- Seaway Modeling of Radiological Risk Technical Memorandum (1999)



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## Summary of Recent Activities

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- **Prepared a Feasibility Study Addendum**
- **Draft Feasibility Study and Proposed Plan currently being reviewed within the Corps**
- **Alternatives evaluated**
  - Risks
  - Costs
  - Other CERCLA Criteria



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## Seaway Alternatives Evaluated

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- Alt. 1: No Action
- Alt. 2: Complete Excavation, Off-Site Disposal
- Alt. 3: Complete Excavation, On-Site Disposal (N/A)
- Alt. 4: Partial Excavation, Off-Site Disposal
- Alt. 5: Partial Excavation, On-Site Disposal (N/A)
- Alt. 6: Containment (Preferred)



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## Alternative 1: No Action

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- Leave material in place
- Apply institutional controls
- Conduct 5-year reviews



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## Alternative 2: Complete Excavation, Off-Site Disposal

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- Remove soils necessary to comply with the standards
- Ship excavated soils exceeding criteria offsite for disposal
- Cover excavated area



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## Alternative 4: Partial Excavation, Off-Site Disposal

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- Remove soils in Areas A, B and C which exceed the standards until trash/refuse is encountered (approximately the top four (4) feet )
- Ship excavated materials offsite for disposal
- Cover Areas A, B and C with minimum 5-foot cover
- Apply minimal institutional controls
- Conduct 5-year reviews



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## Alternative 6: Containment

- All material will be contained within the Seaway Landfill
- Cover Areas A, B and C with minimum 5 feet of cover
- Apply more comprehensive institutional controls
- Conduct 5-year reviews



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## CERCLA Criteria

- The draft Proposed Plan includes an assessment of the alternatives to the CERCLA criteria
- CERCLA criteria
  - Threshold criteria
    - Compliance with ARARs
    - Overall protectiveness
  - Balancing criteria
    - Long-term effectiveness and permanence
    - Short-term effectiveness and environmental impacts
    - Reduction in toxicity, mobility or volume through treatment
    - Implementability
    - Cost
  - Modifying criteria of State and community acceptance is assessed after receipt of comments



## Principle ARARs

- **40 CFR 192, Subpart A**
  - Designs for control must be effective for at least 200 years and, to the extent reasonably achievable, for 1,000 years
  - Releases of radon-222 (Rn-222) from residual radioactive materials to the atmosphere will not exceed an average release rate of 20 pCi/m<sup>2</sup>/sec
  - Maximum groundwater concentrations as follows:
    - Combined Ra-226 and Ra-228 - 5 pCi/L
    - Combined U-234 and U-238 - 30 pCi/L
    - Gross Alpha (excluding radon and uranium) - 15 pCi/L
- **40 CFR 192, Subpart B**
  - 5/15 pCi/g Ra-226 in soils



## Principle ARARs (Cont.)

- **40 CFR 192, Subpart B: Where habitable structures are/will be located:**
  - Design to achieve 0.02 Working Levels (WL) of radon concentration including background
  - In any case, shall not exceed 0.03 WL of radon concentration



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## Evaluation of Threshold Criteria

	Alternative			
	No Action	Complete Removal	Partial Removal	Containment
<b>Compliance with ARARs</b>				
5/15 pCi/g radium	✗	✓	✓	✓
0.03 WL of indoor radon	✗	✓	✓	✓
≤20 pCi/m <sup>2</sup> /sec of radon-222 average	✗	✓	✓	✓
effective for at least 200 years	✗	✓	✓	✓
Groundwater protection	✓	✓	✓	✓
<b>Protectiveness</b>				
CERCLA Risk Range (10 <sup>-4</sup> – 10 <sup>-6</sup> )	✗	✓	✓	✓



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## Alternative 2: Complete Excavation - Assessment to CERCLA Criteria

Balancing Criteria	Advantages	Disadvantages
<i>Long-term Effectiveness and Permanence</i>	<ul style="list-style-type: none"> <li>• Materials of Concern removed</li> <li>• No Institutional Controls</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>
<i>Short-term Effectiveness and Environmental Impacts</i>	<ul style="list-style-type: none"> <li>• Materials of Concern removed</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental impacts associated with excavation</li> <li>• Transportation risks</li> </ul>



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## Alternative 2: Complete Excavation - Assessment to CERCLA Criteria (Cont.)

<i>Balancing Criteria</i>	<i>Advantages</i>	<i>Disadvantages</i>
<i>Reduction in Toxicity, Mobility or Volume through Treatment</i>	<ul style="list-style-type: none"><li>• None</li></ul>	<ul style="list-style-type: none"><li>• None</li></ul>
<i>Implementability</i>	<ul style="list-style-type: none"><li>• Technology available</li></ul>	<ul style="list-style-type: none"><li>• Most Difficult to Implement</li><li>• Added concerns due to excavation of trash/refuse</li></ul>
<i>Cost</i>	<ul style="list-style-type: none"><li>• Minimal Future Liabilities</li></ul>	<ul style="list-style-type: none"><li>• Most Costly (\$94.3M)</li></ul>



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## Alternative 4: Partial Excavation - Assessment to CERCLA Criteria

<i>Balancing Criteria</i>	<i>Advantages</i>	<i>Disadvantages</i>
<i>Long-term Effectiveness and Permanence</i>	<ul style="list-style-type: none"><li>• Accessible soils removed</li></ul>	<ul style="list-style-type: none"><li>• Relies on institutional controls</li><li>• Relies on periodic reviews</li><li>• Long-term O&amp;M required</li></ul>
<i>Short-term Effectiveness and Environmental Impacts</i>	<ul style="list-style-type: none"><li>• Precludes environmental impacts associated with excavation of trash/refuse</li></ul>	<ul style="list-style-type: none"><li>• Transportation risks</li></ul>



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## Alternative 4: Partial Excavation - Assessment to CERCLA Criteria (Cont.)

<i>Balancing Criteria</i>	<i>Advantages</i>	<i>Disadvantages</i>
<i>Reduction in Toxicity, Mobility or Volume through Treatment</i>	<ul style="list-style-type: none"><li>• None</li></ul>	<ul style="list-style-type: none"><li>• None</li></ul>
<i>Implementability</i>	<ul style="list-style-type: none"><li>• Technology available</li></ul>	<ul style="list-style-type: none"><li>• None</li></ul>
<i>Cost</i>	<ul style="list-style-type: none"><li>• Least costly of removal alternatives (\$58.2M)</li></ul>	<ul style="list-style-type: none"><li>• Potential future liability</li></ul>



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## Alternative 6: Containment - Assessment to CERCLA Criteria

<i>Balancing Criteria</i>	<i>Advantages</i>	<i>Disadvantages</i>
<i>Long-term Effectiveness and Permanence</i>	<ul style="list-style-type: none"><li>• Isolates material from public and environment</li></ul>	<ul style="list-style-type: none"><li>• Relies on institutional controls</li><li>• Relies on periodic reviews</li><li>• Long-term O&amp;M required</li></ul>
<i>Short-term Effectiveness and Environmental Impacts</i>	<ul style="list-style-type: none"><li>• Minimal environmental impacts</li><li>• No transportation risks</li></ul>	<ul style="list-style-type: none"><li>• None</li></ul>



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## Alternative 6: Containment - Assessment to CERCLA Criteria (Cont.)

<i>Balancing Criteria</i>	<i>Advantages</i>	<i>Disadvantages</i>
<i>Reduction in Toxicity, Mobility or Volume through Treatment</i>	<ul style="list-style-type: none"><li>• None</li></ul>	<ul style="list-style-type: none"><li>• None</li></ul>
<i>Implementability</i>	<ul style="list-style-type: none"><li>• Easiest to implement of action alternatives</li></ul>	<ul style="list-style-type: none"><li>• None</li></ul>
<i>Cost</i>	<ul style="list-style-type: none"><li>• Least costly (\$11.0M) of protective alternatives</li></ul>	<ul style="list-style-type: none"><li>• Potential future liability</li></ul>



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## Information on Alternatives

<i>Alternative</i>	<i>Range of Risks</i>	<i>Cost</i>
<i>No Action</i>	$10^{-3}$ to $10^{-7}$	\$3.0M
<i>Complete Removal</i>	$10^{-5}$ to $<10^{-7}$	\$94.3M
<i>Partial Excavation</i>	$10^{-6}$ to $<10^{-7}$	\$58.2M
<i>Containment</i>	$10^{-6}$ to $<10^{-7}$	\$11.0M



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## Summary Information on Alternatives Seaway Area A

Alternative	Doses (mrem/yr) <sup>1</sup>			
	Recreational		Industrial/Comm.	
	No Cover	Cover	No Cover	Cover
No Action	11	N/A	110	N/A
Complete Removal	<1	<1	7	<1
Partial Removal	3	<1	29	<1
Containment	N/A <sup>2</sup>	<1	N/A <sup>2</sup>	<1

<sup>1</sup> Data presented is for Area A only.

<sup>2</sup> Same as No Action alternative with no cover



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## Summary Information on Alternatives Seaway Areas B and C

Alternative	Doses (mrem/yr) <sup>1</sup>			
	Recreational		Industrial/Comm.	
	No Cover	Cover	No Cover	Cover
No Action	<1	N/A	4	N/A
Complete Removal	1	<1	11	<1
Partial Removal	5	<1	51	<1
Containment	N/A <sup>2</sup>	<1	N/A <sup>2</sup>	<1

<sup>1</sup> Data presented is maximum for Areas B and C.

<sup>2</sup> Same as No Action alternative with no cover



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## Consideration of Modifying Criteria

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- State and community input on the 1993 Proposed Plan
- State and community inputs on other Buffalo District FUSRAP actions



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## Current Corps Thoughts on Preferred Alternative

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- **Future use of the Seaway Site is already restricted by law**
  - No use allowed that involves disturbance of the cap (e.g., no structures with subsurface areas, no subsurface utilities, etc.)
  - Local zoning
- **Proceed with Alternative 6: Containment**
- **Supplement current governmental controls to ensure control over future land use**
- **Conduct five year reviews**
- **Protective of human health and the environment**



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## Various Institutional Control Mechanisms Evaluated

- **Existing institutional controls**
  - Government controls
    - Zoning
    - Siting restrictions
      - NYSDEC existing controls
      - Local building codes
- **The Corps identified additional institutional controls to consider**
  - Proprietary controls
    - easements
    - covenants
- **Evaluated effectiveness and appropriateness of government and proprietary controls for the Seaway Site**



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## What to Expect Next

- **Proposed Plan is being prepared for public review**
- **Signed Record of Decision and Responsiveness Summary early 2000**