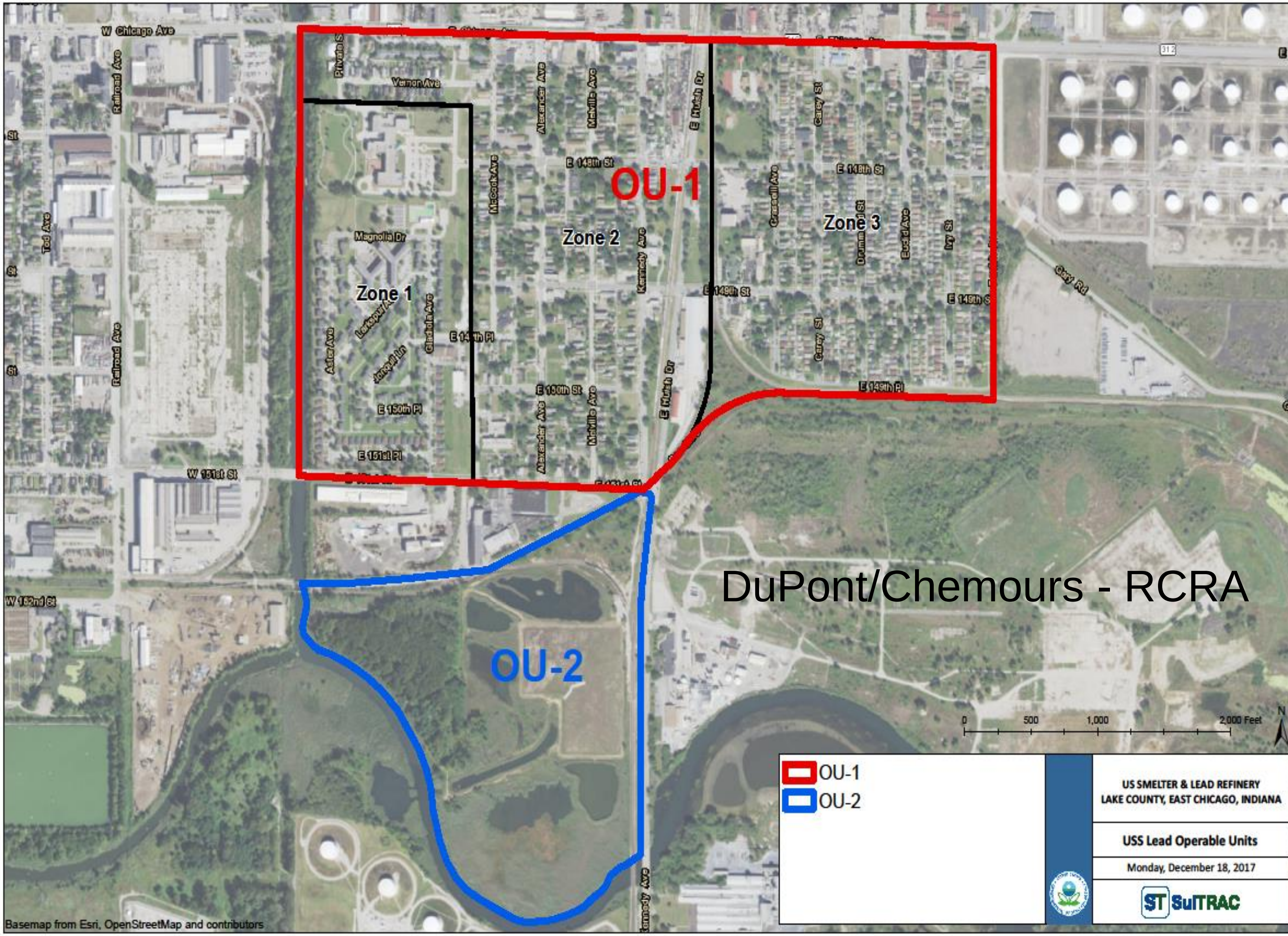
USS Lead
Zone 1 Amended Remedy
Proposed Plan

November 29, 2018


OU-1
Zone 1
Zone 2
Zone 3
OU-2
DuPont/Chemours - RCRA
W Chicago Ave
Vernon Ave
Magnolia Dr
E 148th St
E 149th St
E 150th St
E 150th Pl
E 151st Pl
W 151st St
W 152nd St
Gary Rd
0 500 1,000 2,000 Feet
N
OU-1
OU-2
US SMELTER & LEAD REFINERY
LAKE COUNTY, EAST CHICAGO, INDIANA
USS Lead Operable Units
Monday, December 18, 2017
SulTRAC
Basemap from Esri, OpenStreetMap and contributors

Future Use for Zone 1

- Future use determined by owner
  - East Chicago Housing Authority/City of East Chicago
- EPA cleans up property based on future use
- Current future use is residential
- Letter from East Chicago stating future use was industrial or commercial (September 10, 2018)
  - Two developers interested in property
- After discussions with Mayor Copeland - committed to residential until a concrete commercial proposal is submitted

Record of Decision

November 2012

- Zone 1 – excavate to residential standards (2 feet at 400 ppm lead/26 ppm arsenic), add visible marker & off-site disposal of soils
- No excavation under hardscapes (houses, streets, sidewalks)
- Approximately $25 million (Zones 1, 2 and 3)
- Likely now over $100 million will be spent on cleanup activities

History

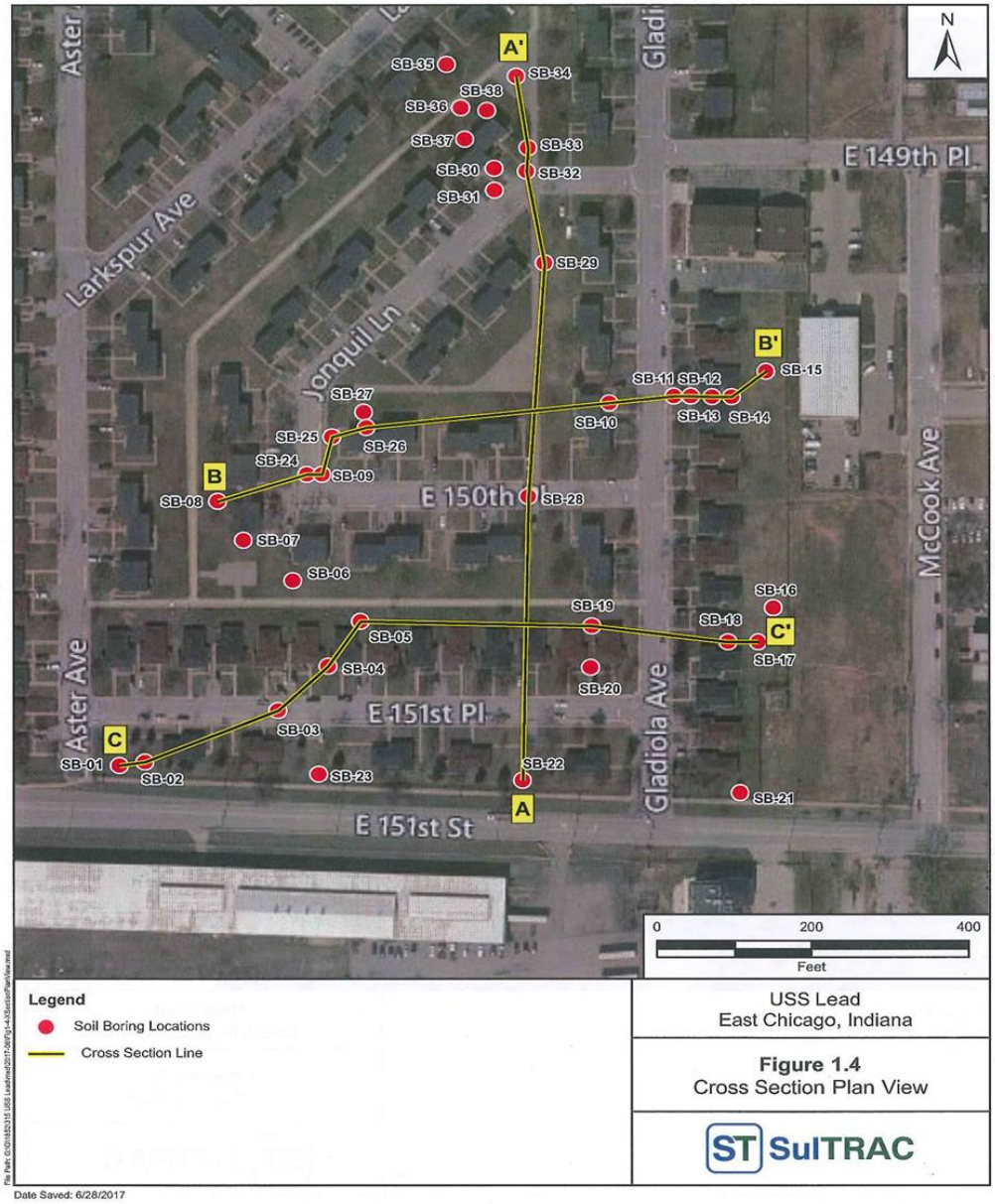
- Settlements with responsible parties in 2014 & 2017
  - Polluter Pays
- Mayor closes West Calumet Housing complex in summer 2016/demolition of complex begins spring 2018
- Cleanup of homes in Zone 2 and Zone 3 begin in fall of 2016
- West Calumet Housing Complex demolition completed fall of 2018
- EPA reevaluating remedy due to closure/demolition of housing complex

Revised Zone 1

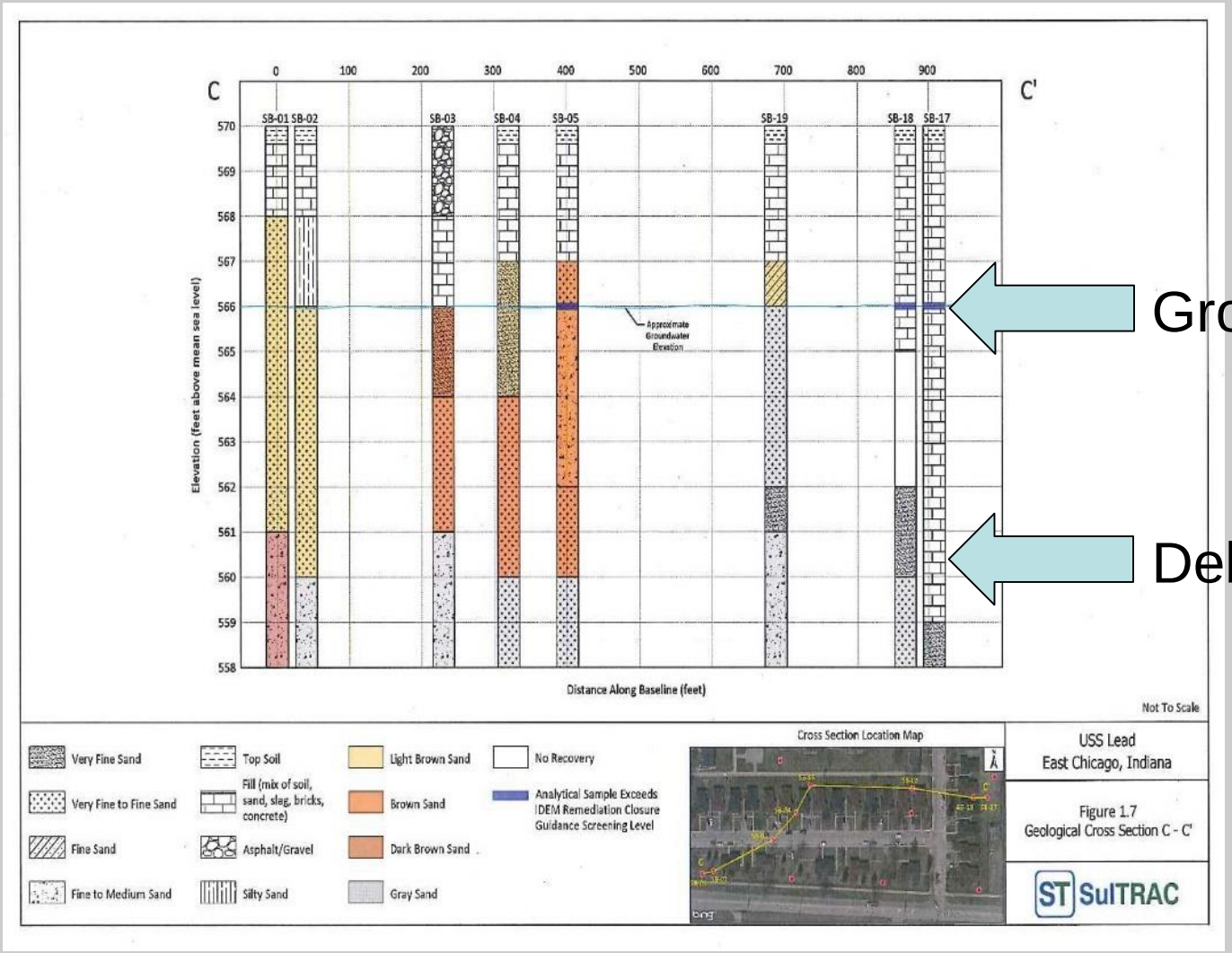
- Over 1,000 soil samples by EPA in Zone 1 during investigation and design phase

- Soil Borings completed prior to demolition by East Chicago Housing Authority
  - Borings to a depth of 12 feet
  - Groundwater at 4 feet
  - Debris in many borings with debris at 11 feet in some locations
  - Soil and groundwater sampling

- Boring data used with EPA soil sampling data to calculate soil volumes for remedial alternatives



Cross Sections



Groundwater

Debris

Summary of Zone 1 Sampling Results		
Contaminant/Depth	Average (ppm)	Median (ppm)
Lead at 0 to 6 inches	1,602	831
Lead at 6 to 12 inches	3,722	1,821
Lead at 12 to 18 inches	5,397	2,066
Lead at 18 to 24 inches	5,204	1,830
Lead at 24 to 30 inches	3,590	1,449
Arsenic at 0 to 6 inches	60	46
Arsenic at 6 to 12 inches	114	66
Arsenic at 12 to 18 inches	141	69
Arsenic at 18 to 24 inches	165	66
Arsenic at 24 to 30 inches	189	70

Data shows contamination over entire 50.5 acres

Feasibility Study Addendum

- Future use is residential; cleanup standard is 400 ppm lead (IEUBK default values) and 26 ppm arsenic
- Assuming all soil greater than 400 ppm lead/26 ppm for arsenic in FS down to 30 inches
- Evaluated a suite of Alternatives
  - Stabilization, soil washing, containment
- Excavation with off-site disposal only viable option
- Separate study for groundwater underway

Alternative 4A

Industrial Standard

Excavation to 1 foot, off-site disposal, ex situ treatment and institutional controls

- Due to redevelopment opportunities Alternative remained in evaluation
- 81,473 cubic yards (122,208 tons) plus ICs
- Over 50% soils likely require treatment before disposal
- Cost = $13,990,000 (10% Contingency)
- 5 months to complete

Alternative 4B

Preferred Alternative

Residential Standard

Excavation to 2 feet, off-site disposal, ex situ treatment and institutional controls
Similar to current remedy except soil under hardscapes will be removed

- 157,206 cubic yards (235,809 tons) plus ICs
- Assume 5,000 cubic yards of concrete removal
- Over 50% soils likely require treatment before disposal
- Cost = $26,500,000 (10% Contingency)
- 7 months to complete
- Consistent with Zone 2 & Zone 3 remedies

Alternative 4C

Excavation to groundwater/native sand, off-site disposal, ex situ treatment and institutional controls

- 226,244 cubic yards (339,366 tons) plus ICs
- Assume 10,000 cubic yards of concrete removal
- Over 45% soils likely require treatment before disposal
- Cost = $39,850,000 (20% Contingency)
- 9 months to complete

Alternative 4D

Excavation to native sand, off-site disposal, ex situ treatment

- 243,186 cubic yards (364,779 tons)
- Assume 15,000 cubic yards of concrete removal
- Over 45% soils likely require treatment before disposal
- All debris/waste removed at depth, sheet piling and on-site water treatment
- Cost = $48,750,000 (25% contingency)
- 14 months to complete

Alternative 4B
vs
Alternative 4C

Excavation to 2 feet
vs
4 feet (groundwater/native sand)

- Both Alternatives leave contamination in place and require institutional controls due to contamination below excavation depths
- Alternative 4C will provide little additional risk reduction to the community
- Alternative 4C costs $13 million more than Alternative 4B
- Alternative 4C more difficult to implement due to possibly encountering/managing groundwater
- Alternative 4C not as consistent with approach for Zones 2 and 3 remedies

Alternative 4B
vs
Alternative 4D
Excavation to 2 feet
vs
Native Sand

- Large amount of contingency due to implementability issues with 4D
- Information regarding contamination and debris at depth on portions of site is limited
- Excavation within groundwater challenging
  - Sheet piling and water treatment
- 4D nearly $22 million more

Nine Evaluation Criteria

- Overall Protection of Human Health and the Environment
- Compliance with ARARs
- Long-Term Effectiveness and Permanence
- Reduction of Toxicity, Mobility, or Volume Through Treatment
- Short-Term Effectiveness
- Implementability
- Cost
- State Acceptance
- Community Acceptance

ARARs= Applicable or Relevant and Appropriate Requirements

Evaluation of Proposed Remedies

Evaluation Criterion	Alt. 1	Alt. 4A	Alt. 4B*	Alt. 4C	Alt. 4D
Overall Protection of Human Health and the Environment	○	○	●	●	●
Compliance with ARARs	○	●	●	●	●
Long-term Effectiveness and Permanence	○	○	●	●	●
Reduction of Toxicity, Mobility, or Volume through Treatment	○	◉	●	●	●
Short-term Effectiveness	N/A**	◉	◉	◉	◉
Implementability	N/A**	●	●	●	●
Alternative Cost ($ millions)	$0	$14	$26.5	$39.9	$48.8
State Acceptance	Will be evaluated after comment period.				
Community Acceptance	Will be evaluated after comment period.				

● Fully meets criterion ◉ Partially meets criterion ○ Does not meet criterion

* EPA's recommended alternative

** N/A: not applicable, since no remedy is being implemented in the No-Action Alternative

Summary of Excavation Alternatives

	Alternative 4B Preferred Alternative	**Alternative 4A**	**Alternative 4C**	**Alternative 4D**
Land Use	Residential	Commercial	Residential	Residential
Depth to Excavation	2 feet	1-foot	Groundwater/Native Sand	Native Sand
Volume Removed	157,206 cubic yards	81,473 cubic yards	226,244 cubic yards	243,186 cubic yards
Time to Implement	7 months	5 months	9 months	14 months
Cost (contingency)	$26,500,000 (10%)	$13,990,000 (10%)	$39,850,000 (20%)	$48,750,000 (25%)
Institutional Controls	Yes + visible demarcation	Yes + visible demarcation	Yes + visible demarcation	Likely
Issues/concerns	ICs necessary State supports this Alternative Consistent with Zone 2 & Zone 3 remedies	Not protective if residential ICs necessary	Construction may be difficult ICs necessary	Construction difficult ICs likely

Summary

- Preferred Alternative 4B similar to original remedy
- Implementabilty gets more difficult the deeper you excavate due to groundwater/debris
- Redevelopment may influence final remedy
- State of Indiana supports preferred remedy