

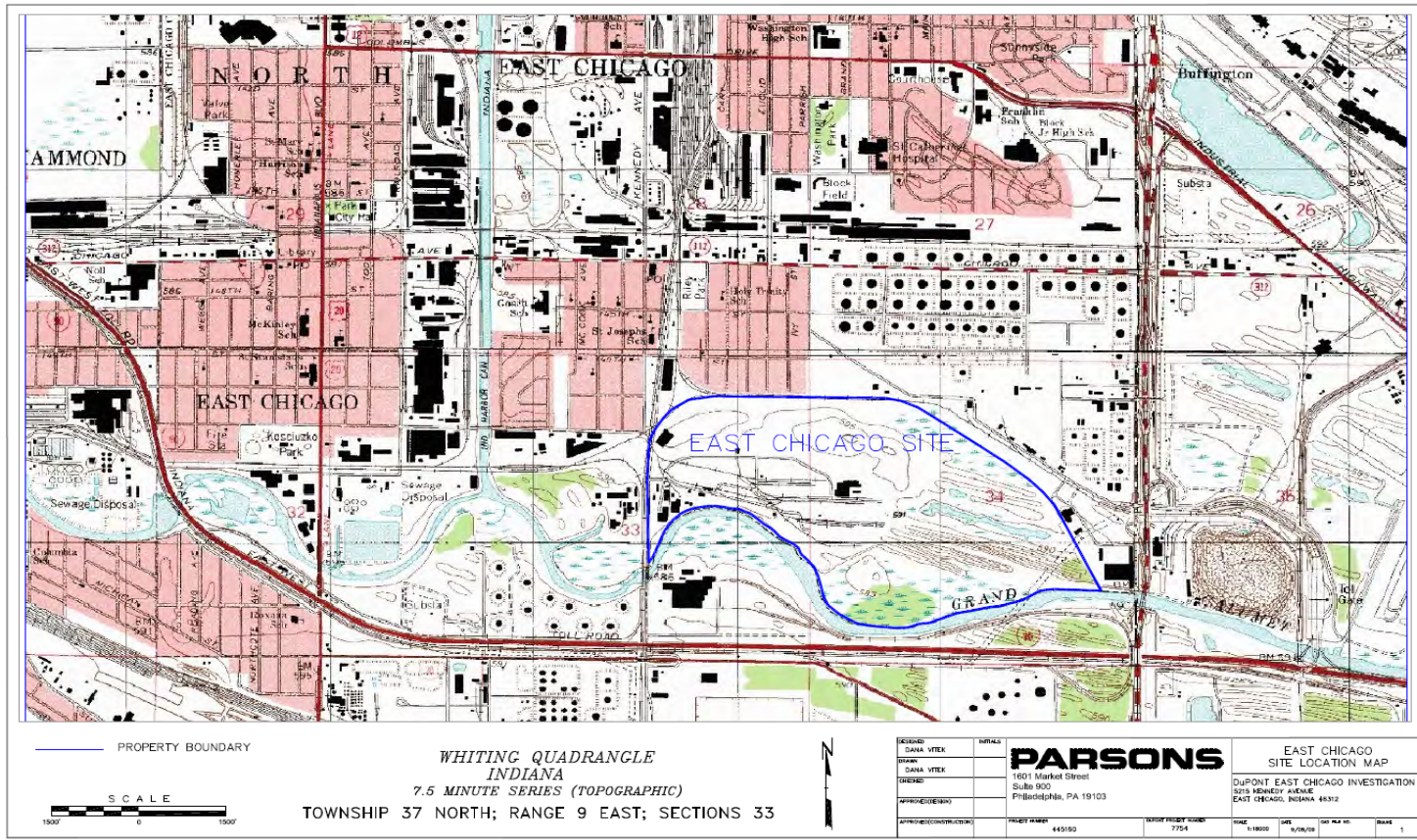
DuPont East Chicago Facility
RCRA Corrective Action
Proposed Cleanup Plan
for the
Western Portion/Industrial Area

East Chicago Public Meeting
DuPont Statement of Basis
March 6, 2018

Jennifer Dodds, EPA, LCD



DuPont East Chicago





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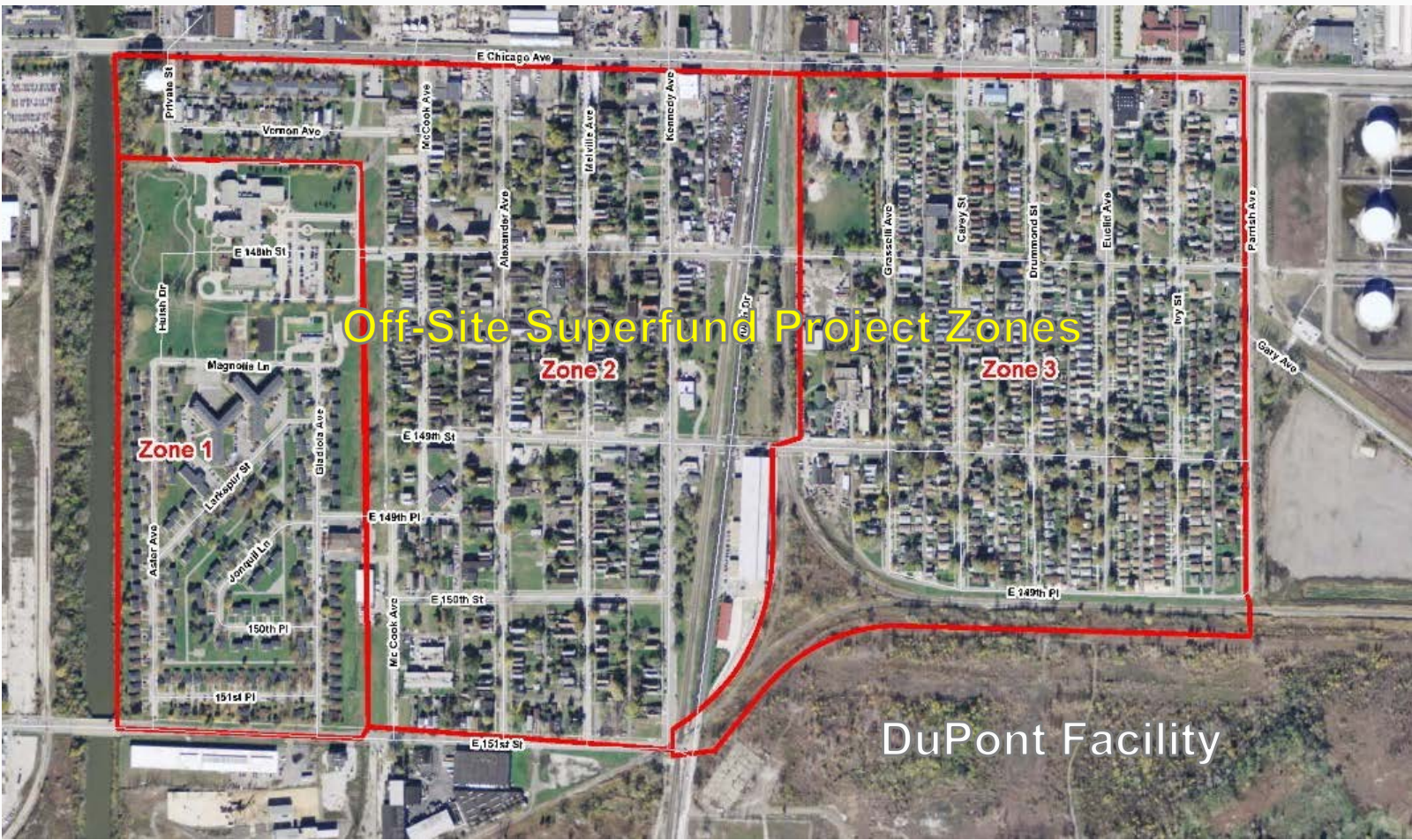


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U.S. Environmental Protection Agency

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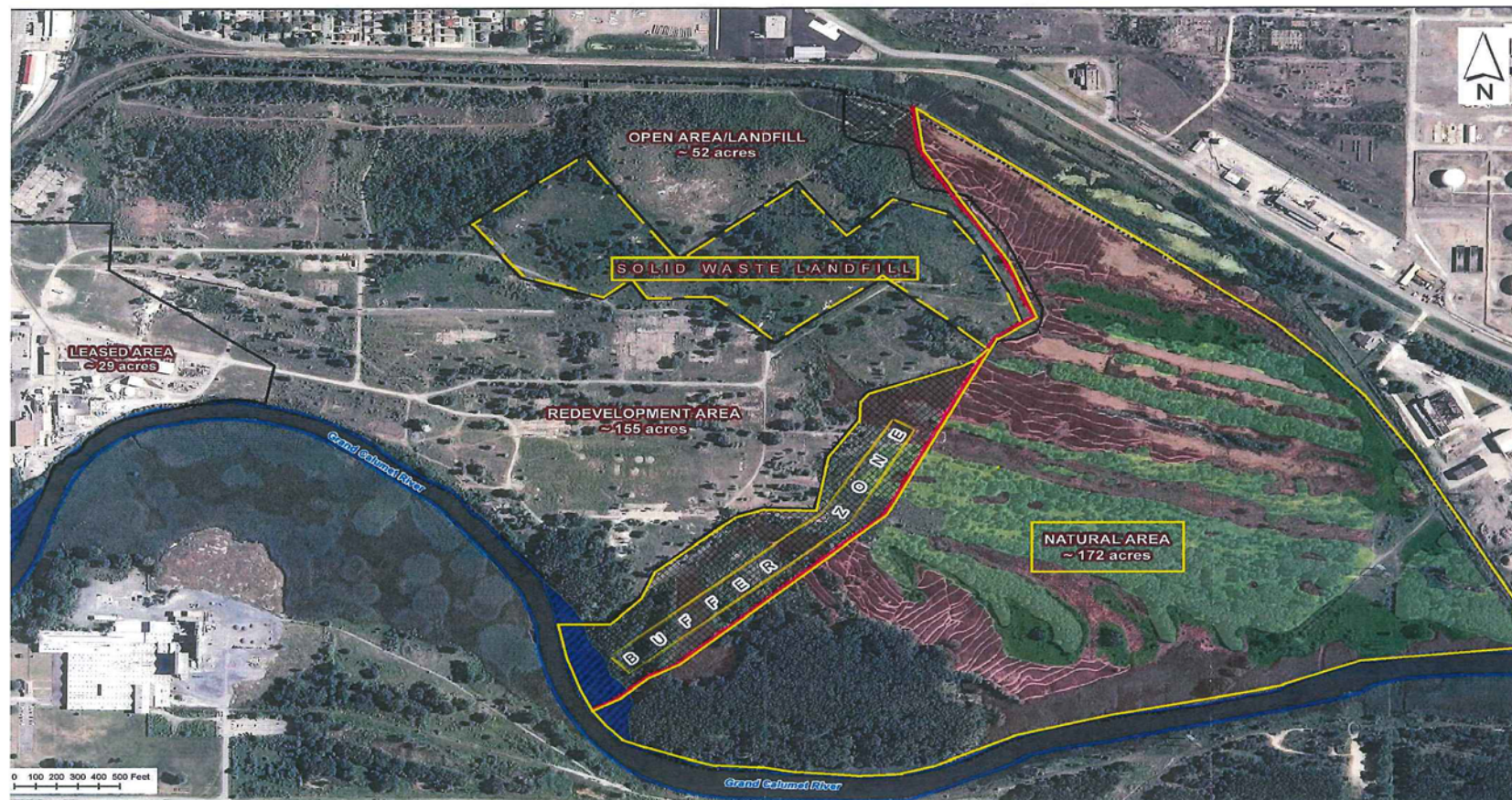
DuPont East Chicago





DuPont East Chicago

- Entire DuPont East Chicago Site is ~440 acres
- For the purposes of describing the hazardous waste investigations and proposed cleanup approaches, the DuPont East Chicago facility has been divided into 5 areas.
- 2 areas were cleaned up under a separate Natural Area and Buffer Zone Final Decision in 2014
- ~77,000 cubic yards of contaminated soil removed
 - **Natural Area/Eastern Area:** This undeveloped area occupies approximately 172 acres and contains original plains/dunes geomorphology and associated plant communities.
 - **Buffer Zone Area:** This area occupies approximately 20 acres and is located directly east of the Open and Redevelopment Areas and separates these areas from the adjacent Natural Area.



<p>PARSONS Commercial Technology Group 10 S. Riverside Plaza Chicago, IL</p>	<p>Figure Natural Area Ridge and Swale Vegetation</p> <p>Natural Area Evaluation and Management Plan DuPont East Chicago Facility East Chicago, Indiana</p>	Current Easement Boundary	Swale (Wetland)	River
		New Fence	Dune/Ridge - Mesic Prairie	Property Boundary
		Extended Buffer Zone (~23 acres)	Dune/Ridge - Oak Barrens	
		Future GCR-SRP Shell Wetlands		

Prepared by: Garnet Peterson	Date: 8/3/2013	DuPont Project 507942
Reviewed by: Carina Victoria	Figure	PARSONS Proj 449650



DuPont East Chicago

The three remaining areas totaling ~ 235 acres are included as part of the 2017 Western Portion/Industrial Area Statement of Basis

- **Redevelopment Area:** This area occupies approximately 155 acres and encompasses the former manufacturing areas located in the central and west portions of the property
- **Open Area:** This area occupies approximately 50 acres and includes an approximately 30-acre former solid waste landfill
- **Leased Area:** DuPont has leased this 30-acre active manufacturing area to W.R. Grace & Co. and Grace Davison since early 2000, but Chemours maintains ownership



Identification of Risks

- Order signed in 1997 – RCRA Facility Investigations Reports in 2002 and 2004 – First Corrective Measures Study in 2006 - EPA required additional investigations
- Based on years of previous sampling, studies, and risk assessments, arsenic, lead, zinc, and cadmium are the primary contaminants in the soil (from about 0 to 10 feet below ground surface).
- Arsenic is considered the primary contaminant in groundwater, based on its distribution and elevated concentrations.



Industrial Area **Remediation Approach**

- 1. Manage/clean up the contaminated groundwater plumes**
 - Improve the groundwater quality before it exits the DuPont property
 - Speed up time to achieving clean up goals

- 2. Reduce ongoing groundwater contamination**
 - Cover or remove contaminated soils – remove significant amount of the contaminated soils serving as a ongoing source to groundwater contamination

- 3. Reduce risk by preventing exposure to areas with metals contaminated surface soil**
 - Remove or cover contaminated soil
 - Incorporate redevelopment into remediation if possible



Soil

Arsenic, lead, zinc, and cadmium are the primary contaminants in the soil (from about 0 to 10 feet below ground surface)

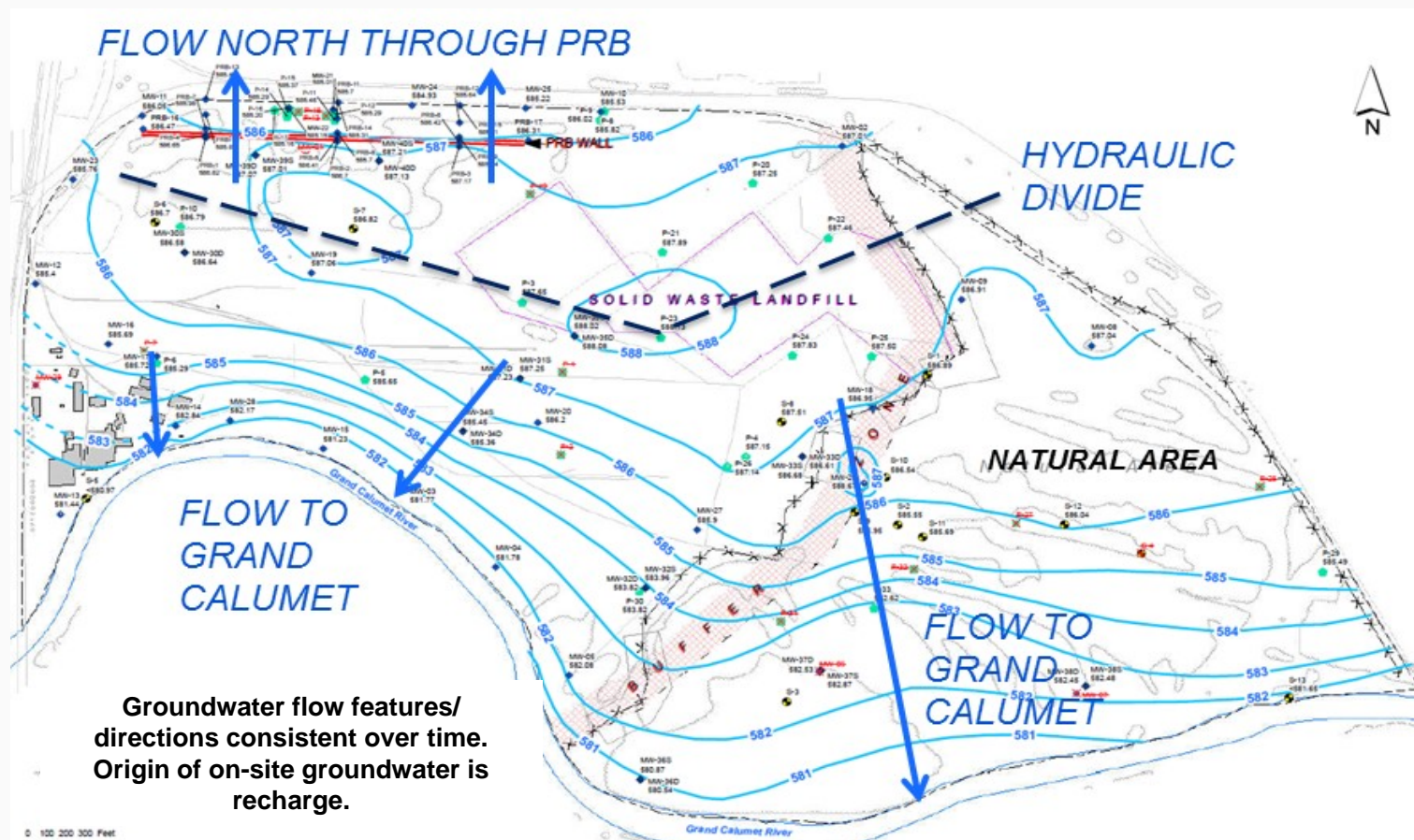
- Achieve clean up goal through clean up of contaminated soils and soil covers
 - Achieve a residual target cancer risk of one additional cancer case out of 10,000 people
 - Achieve EPA's acceptable residual risk criteria for non-cancer contaminants (i.e. zinc)



Soil

- Excavate ~61,780 cubic yards of highly contaminated soil in the redevelopment area
 - Excavate down to saturated zone (where soil meets groundwater)
 - Treatment of saturated soil at the bottom of the excavations will further decrease arsenic mobility – in-situ stabilization (ISS)
 - Backfill with clean soil
- Maintain existing pavement or install soil covers to reduce dispersal and human health and ecological risks
- Leased Area - Excavate ~14,000 cubic yards of contaminated soil and maintain existing pavement or other barriers

Groundwater Flow within DuPont East Chicago Site





Groundwater

- Arsenic is considered the primary contaminant in groundwater, based on its distribution and elevated concentrations.
- Clean up goals:
 - Groundwater, northern property boundary
 - Long-term: Arsenic MCL, 10 $\mu\text{g/L}$
 - Short-term: Measurable improvement in groundwater quality (5 years after remediation is complete)
 - Groundwater, southern property boundary
 - Long-term: IDEM surface water standard, 148 $\mu\text{g/L}$
 - Short-term: Measureable improvement in groundwater quality (5 years after remediation is complete)



Groundwater

Reduce arsenic levels in groundwater through...

- **Contaminant Fixation**
 - Groundwater treatment across transects
 - Northern and southern plumes
- **Soil Removal**
 - Surface soil hot spots are primary source areas to elevated arsenic concentrations in shallow and deep groundwater



Groundwater

Enhanced Microbial Sulfate Reduction Injections

- Multiple treatment zones transecting the northern and southern arsenic plumes – over 100 injection points
- **Feed naturally anaerobic bacteria with organic carbon source** (corn syrup) along with a source of **iron and sulfate** (ferrous sulfate)
- Anaerobic bacteria **generate iron sulfide minerals** which **bind the arsenic** and other metals
- Intercept and “traps” arsenic from migrating in groundwater



Groundwater

Enhanced Sulfate Reduction Bio-Barrier

- Trench backfilled with source of solid organic substrate such as wood chips or wood mulch to stimulate microbial sulfate reduction
- Chemically “trap” arsenic on the facility (zones of iron sulfides)
- Significantly reduces or eliminates arsenic migration beyond property boundary



Groundwater

- On-site pilot tests saw over 70% reduction in As concentrations - levels steady over 1.5 year period
- Other metals, such as zinc, cadmium, and lead also remain immobilized
- No aeration or additional bacteria are added to the soil - methods work to feed naturally occurring anaerobic bacteria
- Anaerobic bacteria create iron sulfide minerals in the soil which bind or trap the arsenic and keep it from moving in the groundwater



Environmental Restrictive Covenant and Deed Restrictions

- Record, implement and maintain institutional controls
 - Prohibit non-industrial/commercial use of property
 - Prohibit installation of on-site drinking water supply wells
 - Require permits for all non-potable groundwater production wells
 - Maintain all barriers and security fences
 - Health and safety plans to protect on-site workers – personal protective equipment
- Record deed restrictions in an EPA-approved environmental restrictive covenant and deed restriction that runs with the land
- If the property is sold, the purchaser must either accept these restrictions as part of the deed transfer or further clean up the property



Financial Assurance

- DuPont/Chemours are required to provide financial assurance
 - Ensure proposed remedy can be implemented over remedy's lifetime
 - Update cost estimates
 - Include long term operation, maintenance and monitoring
- Require five-year remedy reviews – adjust remedy and financial assurance requirements if needed
- Issue corrective action implementation order to ensure compliance with the final clean up decision



Potential Redevelopment

- EPA promotes re-use and redevelopment at Corrective Action sites
 - Most, if not all, former industrial sites have residual contamination
- Final remedial decision will be selected and implemented independent of any potential redevelopment
 - any new owner and DuPont/Chemours would need to sign on to the Corrective Measures Implementation Order ensuring that the EPA selected Final Remedy is properly and completely implemented including long term maintenance and monitoring
- Any redevelopment subject to EPA, State, County, and City requirements

