UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

SEP 30 2014

REPLY TO THE ATTENTION OF

MEMORANDUM

SUBJECT: DuPont Facility Natural Area and Buffer Zone Final Decision Document

FROM: Jose G. Cisneros, Chief
Remediation and Reuse Branch

TO: Margaret M. Guerriero, Director
Land and Chemicals Division

I recommend you sign this Final Decision (FD) which identifies the final remedies selected for the DuPont Facility Natural Area and Buffer Zone (DuPont) located in East Chicago, Indiana, pursuant to the Resource Conservation and Recovery Act (RCRA) Section 3008(h). Included in this FD is a summary of conditions found at the Facility, the risks posed by those conditions, the interim measures taken, and the final corrective action alternatives that EPA has selected. Additional details relating to the Site conditions, the measures taken and all the alternatives considered are available in the Statement of Basis issued by EPA in August 2014. Prior to issuing this FD, EPA presented the Statement of Basis to the public and stakeholders for review and comment from August 13, 2014- September 12, 2014. No comments were received by EPA during the public comment period.

EPA is selecting the following remedy to address contaminated soil, surface water, sediment, and groundwater in the Natural Area and Buffer Zone:

- *Soil, Surface Water, and Sediment - A combination of treatment and disposal, monitoring, and no immediate action consistent with the Conservation Easement and continued protection of rare, threatened or endangered plant and wildlife species.*

- *Groundwater - Monitoring and no immediate action consistent with the Conservation Easement and protection of rare, threatened or endangered plant and wildlife species.*

- *Voluntary Habitat Restoration.*

- *Institutional Controls - Record an Enforceable Environmental Covenant to restrict site activities.*

- *Financial Assurance - Provide funds to complete the remedy including long-term OM&M.*

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- *A Statement of Basis and Final Decision/Response to Comments document will be developed for the remaining industrial portion of the facility at a later date.*

Attachment

Final Decision

Soil, Surface Water, Sediment and Groundwater Cleanup

For

DuPont Facility
Natural Area and Buffer Zone

East Chicago, Indiana

EPA I.D. No. IND 005 174 354

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
FINAL DECISION

September 2014

DuPont Facility
Natural Area and Buffer Zone
East Chicago, Indiana
EPA ID #: IND 005 174 354

INTRODUCTION

The U.S. Environmental Protection Agency (EPA), Region 5, presents this Final Decision (FD), which identifies the final remedies selected for the DuPont Facility Natural Area and Buffer Zone located in East Chicago, Indiana, pursuant to the Resource Conservation and Recovery Act (RCRA) Section 3008(h). Included in this FD is a summary of conditions found at the facility, the risks posed by those conditions, the interim measures taken, and the final corrective action alternatives that EPA has selected. Additional details relating to the Site conditions, the measures taken and all the alternatives considered are available in the Statement of Basis (Attachment 1) issued by EPA in August 2014. Prior to issuing this FD, EPA presented the Statement of Basis to the public and stakeholders for review and comment from August 13, 2014- September 12, 2014. No comments were received by EPA during the public comment period.

SELECTED REMEDIES

EPA is selecting the following remedy to address contaminated soil, surface water, sediment, and groundwater in the Natural Area and Buffer Zone:

- *Soil, Surface Water, and Sediment - A combination of treatment and disposal, monitoring, and no immediate action consistent with the Conservation Easement and continued protection of rare, threatened or endangered plant and wildlife species.*

  Dispose of approximately 77,000 cubic yards of interim remedial measure (IRM) excavated soil/sediment stockpiled on-site within an Area of Contamination (AOC) in or near the existing on-site solid waste landfill. The approximately 5,800 cubic yards of IRM soil identified as hazardous waste that exhibits the toxicity characteristic for lead will be treated in the AOC and rendered non-hazardous before placement into the landfill. The treated waste may be required to meet the Indiana Department of Environmental Management (IDEM) restricted waste sites waste criteria found at 329 IAC 10-9-4. The landfill design, closure, and post-closure requirements may be subject to IDEM Article 10 Solid Waste Land Disposal Facilities requirements.

DuPont will perform monitoring of plant communities, surface water, and soil/sediment in the Natural Area, Buffer Zone, and former industrial property consistent with the long-term monitoring plan provided in the DuPont July 2013 Natural Area Evaluation, Risk Assessment, and Monitoring Plan, as modified by EPA. Modifications include coverage for all major swales and long-term groundwater monitoring of the Natural Area and Buffer Zone to ensure that water quality standards are being met and to assess the relationship between groundwater elevations and quality with surface water and soil/sediment present in the swales. Baseline soil and sediment conditions were established during confirmation sampling which was conducted following completion of the remedial measures for each area as documented in the *2013 Interim Remedial Measures, Buffer Zone Area Completion Report*. This baseline and subsequent five year monitoring program for soil, sediment, and water quality will be evaluated to determine whether conditions are constant relative to baseline conditions or if significant changes are occurring compared to baseline conditions due to runoff, soil erosion, or groundwater migration.

DuPont will prepare an assessment report which will indicate whether statistically significant differences in water quality parameters are observed in the monitoring stations over the five year monitoring period. Monitoring beyond 2018 will continue at sampling locations if a significant trend in increasing concentrations is determined for a given monitoring parameter. Additional soil and sediment data will also be collected in the vicinity of areas showing increased trends to determine potential contaminant sources. If no significantly increasing trend is observed, then the monitoring will cease after five years.

In consideration of the rare, threatened or endangered plant and wildlife species present at the site and the active habitat restoration performed by IDNR and TNC, there are no immediate actions planned to further address the soil/sediment and surface water in the Natural Area and Buffer Zone that do not meet cleanup goals. However, if monitoring or new information indicates that habitat at or near the Natural Area continues to be contaminated by runoff, soil erosion, and/or groundwater migration, DuPont will collect additional data to determine the potential contaminant sources and will identify and implement additional soil/sediment or groundwater remedial activities to protect the environment provided these additional activities do not detrimentally impact the rare, threatened or endangered plant and wildlife species present and their sensitive habitat.

- *Groundwater - Monitoring and no immediate action consistent with the Conservation Easement and protection of rare, threatened or endangered plant and wildlife species.* Perform monitoring of plant communities, surface water, and soil/sediment in the Natural Area, Buffer Zone, and former industrial property consistent with the long-term monitoring plan provided in the DuPont July 2013 Natural Area Evaluation, Risk Assessment, and Monitoring Plan, as modified by EPA. Modifications include coverage

for all major swales and long-term groundwater monitoring of the Natural Area and Buffer Zone to ensure that water quality standards are being met and to assess the relationship between groundwater elevations and quality with surface water present in swales.

If the monitoring program or any new information shows that contaminated groundwater migration continues to impact areas at or near the Natural Area, DuPont will identify and implement additional remedial activities that control groundwater contaminant migration sufficiently to be protective of the environment and rare, threatened or endangered plant and wildlife species, and their sensitive habitat.

- *Voluntary Habitat Restoration.*

  DuPont voluntarily agrees to provide funding through at least 2017 to the TNC for continued habitat restoration of the Natural Area and where appropriate, the Buffer Zone. Additional restoration is also currently being performed in about 12 acres of the Natural Area as part of the Great Lakes Legacy Act sediment remediation project for the Grand Calumet River.

- *Institutional Controls - Record an Enforceable Environmental Covenant to restrict site activities.*

  DuPont will record an EPA-approved environmental covenant with the Lake County Recorder of Deeds to restrict future land use, access, groundwater use, and excavations considering the landfill boundaries and identified metals contamination in environmental media, and will provide that the State or EPA may enforce the covenant.

  In addition, DuPont has installed and will maintain a six-foot high chain-link permanent fence at the western boundary of the Buffer Zone. The purpose of the fence is to separate the area being restored by TNC workers from that portion of the former industrial property where access is restricted and land use will remain industrial.

  The Buffer Zone was remediated by the IRM and DuPont has demonstrated that conditions there do not pose an unacceptable risk to people, plants, and/or wildlife using criteria established in the risk assessments. DuPont may add the Buffer Zone or a portion of the area to the Natural Area conservation easement, if they so desire.

- *Financial Assurance - Provide funds to complete the remedy including long-term operation, maintenance, and monitoring (OM&M).*

  The total estimated cost of EPA's proposed remedy is approximately $8 million. DuPont is required to provide financial assurance to ensure that the proposed remedy can be

implemented over its expected lifetime of 30 years. DuPont will provide an updated cost estimate for implementation of the final remedy to EPA for approval pursuant to 40 CFR §§ 264.142 and 264.144 including the construction and long-term operation, maintenance, and monitoring (OM&M). Upon EPA approval of the updated cost estimate, DuPont will provide financial assurance using the option(s) allowed for at 40 CFR §§ 264.143 and 264.145.

FACILITY BACKGROUND

The DuPont facility is located at 5215 Kennedy Avenue in East Chicago, Lake County Indiana. The Natural Area and Buffer Zone subject to this SB comprise the 195-acre eastern portion of the overall DuPont facility. An industrial area along Gary and Cline Avenues roughly forms the eastern and northern boundary, Grand Calumet River the southern boundary, and the former DuPont manufacturing area the western boundary (*see figure*). Land use near the Natural Area and Buffer Zone is mostly industrial with a residential area (Riley Park community of East Chicago) to the northwest.

The IDNR Division of Natural Preserves holds a conservation easement on the 172-acre Natural Area. DuPont transferred a conservation easement of the Natural Area to IDNR as part of the settlement of the natural resource damage claim with the State and Federal Natural Resource Trustees for the East Branch of the Grand Calumet River. TNC has managed the Natural Area since 1999 and DuPont has agreed to voluntarily fund restoration work at the site through 2017.

On June 17, 1997, DuPont signed a RCRA Corrective Action Administrative Order on Consent (Order) with EPA to conduct a RCRA Facility Investigation (RFI) to determine the nature and extent of any releases of hazardous waste and/or hazardous constituents at or from the facility and a Corrective Measures Study (CMS) to identify and evaluate alternatives for the corrective action necessary to prevent or mitigate their migration. The Order also provides that DuPont may initiate IRMs to control immediate threats to human health and the environment and/or minimize the spread of contaminants prior to implementing a final remedy.

DuPont sample results from the Buffer Zone and Natural Area in 2011 identified immediate risks to the Natural Area environment. DuPont proposed an IRM cleanup plan to immediately address these unacceptable environmental risks. IDEM, IDNR, TNC, FWS, and ACE reviewed and supported the proposed plans. In February 2012, DuPont submitted a technical memorandum to EPA detailing the risk reduction associated with the proposed IRM activities. EPA provided comments and the final IRM plans were approved and implemented in August 2012. As part of the IRM, DuPont removed 77,000 cubic yards of contaminated soils from 20 acres of Buffer Zone and the Natural Area. The IRM is supported by the Administrative Record. An Index to the Administrative Record is attached to this SB.

With EPA concurrence, DuPont undertook the IRM to protect the Natural Area while the long-term corrective measures for the industrial property at the facility continued to be evaluated and developed. A CMS for the entire facility is being prepared by DuPont for submittal in 2014. A SB for the entire DuPont facility will be prepared by EPA after review of the CMS.

RCRA Facility Investigation Results

An RFI was conducted to fully characterize the nature and extent of contamination at the Natural Area and Buffer Zone. DuPont analyzed soils for metal contamination (i.e., aluminum, antimony, arsenic, barium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, titanium, vanadium, and zinc). Cadmium, lead, and zinc were used as the main indicators of contamination due to their prevalence at the site and the identified exceedances of the risk-based reference concentrations (RBRC) for these metals. The RBRC were developed as cleanup goals to protect small mammals and birds in the environment at the site and vary from 0.91 to 1.82 mg/kg for cadmium, 36 to 145 mg/kg for lead, and 117 to 574 mg/kg for zinc in surface soil. Meeting the RBRC would reduce adverse effects to small mammals and birds such as the shrew, mouse, sparrow, and robin.

The RFI found that cadmium, lead, and zinc exceeded their RBRC for all four small species. Average metal concentrations in surface soil were 5.66 mg/kg for cadmium, 274 mg/kg for lead, and 1,480 mg/kg for zinc. However, these average metal concentrations in soil did not exceed the RBRC developed for larger species such as groundhog, deer, fox, goose, and hawk.

For surface water in the eight swales in the Natural Area, zinc and manganese levels in two swales exceed the toxicity reference values (TRV) developed as cleanup goals for amphibians. Of the seven swales in the Buffer Zone adjacent to the former industrial property, arsenic and zinc exceeded TRVs in one area and manganese for another.

Metals concentrations were analyzed in leaves and roots of various grasses, sedge, horsetail, and goldenrod on dune/ridge and reed, bulrush, plantain, sedge, pepper, and grass in the swale. There is generally a low transfer of metals from soil to plant tissue except for zinc in the dune/ridge habitat. The investigations also concluded that there was no direct correlation between elevated soil metals concentrations and habitat quality on either the ridge or swale. The abundance of plant species could be best explained by soil moisture and active habitat management by TNC. There was a marginal relationship between soil zinc concentrations on ridge habitat and species abundance (i.e., there may be some reduction in the number of plant species on soils with higher zinc concentrations).

SUMMARY OF FACILITY RISKS

Groundwater

Description: A groundwater divide is present beneath the middle of the former DuPont industrial property along an east-west line. Groundwater north of the divide flows north toward the Riley Park residential area of East Chicago. Groundwater south of the divide flows south to the Grand Calumet River with some eastward migration to the Natural Area. Contaminated groundwater flowing to the Natural Area may intermittently intersect the shallow water table in the swales and emerge as surface water.

Major site contaminants such as arsenic and zinc (lead was not detected) are present in groundwater beneath the Natural Area and have their highest concentrations in the western portion closest to the former industrial property and immediately downgradient of site contaminant source areas. For the five monitoring wells installed in the Natural Area, arsenic concentrations ranged from 7 to 193 ug/l and zinc concentrations ranged from non-detect to 24,000 ug/l.

Human Health Risk: The long-term cleanup goal for groundwater is based on the maximum contaminant levels for drinking water. Throughout the western-half of the Natural Area, the cleanup goal for arsenic of 10 ug/l is exceeded. The cleanup goal for zinc of 5,000 ug/l is exceeded in the western edge near the solid waste landfill. These levels of arsenic and zinc appear to be associated with the migration of site contaminants to the east from the industrial area. Groundwater at the DuPont facility is not currently used for drinking water or industrial use.

The cleanup goal is based upon potential exposure to trespassers and workers within the Natural Area. Sampling shows that the risk from exposure to all metals associated with dermal contact and ingestion of surface water in swales within the Natural Area and Buffer Zone that could mix with contaminated groundwater was low and acceptable for workers and trespassers.

Ecological Risk: The high arsenic and zinc concentrations in groundwater could contribute to potentially adverse effects for amphibians contacting surface water in swales (see surface water discussion below). The short-term cleanup goal for arsenic in groundwater discharging to surface water bodies is the Indiana chronic water quality standard for waters within the Great Lakes system of 148 ug/l. The highest values of arsenic in groundwater were 193 ug/l which exceed the cleanup goal. This slight exceedance may pose an unacceptable risk in a small portion of the Natural Area and Buffer Zone. Since nearby contaminated soils were removed in the Buffer Zone to protect the Natural Area, improvements in groundwater quality could occur in the future.

Surface Water

Description: Surface water accumulates intermittently in swales within the Natural Area. Limited surface water data from the western portion of five swales was collected prior to the IRM performed in 2012. Six wet areas in the Buffer Zone were also sampled and evaluated.

Human Health Risk: The short-term cleanup goal is based upon potential exposure to trespassers and workers within the Natural Area. Sampling shows that the risk from exposure to all metals associated with dermal contact and ingestion of surface water in swales within the Natural Area and Buffer Zone that could mix with contaminated groundwater was low and acceptable for workers and trespassers.

Ecological Risk: Metal contaminant levels in surface water were compared to TRV developed as cleanup goals that if exceeded could adversely affect amphibian species such as toads, frogs, and salamanders. TRV for chronic exposure to manganese and zinc levels were slightly exceeded in two of the Natural Area swales. Two swale areas in the Buffer Zone had exceedances of manganese in one and arsenic and zinc in another. These levels of arsenic and zinc appear to be associated with the migration of site contaminants to the east from the industrial area. These exceedances may pose an unacceptable risk in a small portion of the Natural Area and Buffer Zone. Since nearby contaminated soils were removed from the Buffer Zone to protect the Natural Area, improvements in surface water quality could occur in the future.

Soil/Sediment

Human Health Risk: The human health risk assessment determined that there are no unacceptable cancer or non-cancer risks associated with exposure to metal concentrations in surface soil/sediment within the Natural Area and Buffer Zone for workers and trespassers.

Ecological Risk: Risk associated with exposure to metals in surface soil/sediment within the Natural Area for nine bird and mammal species was evaluated in the baseline ecological risk assessment (BERA). For highly mobile species such as the red fox, white-tailed deer, red-tailed hawk, and Canada goose, no risk of adverse effects from exposure to surface soil/sediment was found. For small foraging range species such as the deer mouse, short-tailed shrew, American robin, and song sparrow, soil/sediment concentrations of lead, zinc, and cadmium exceeded RBRC for these species. These risks are increased if data from the Buffer Zone is included in the evaluation where average metals concentrations are higher and metals such as antimony, chromium, and copper also exceed RBRC concentrations for these species. Metals concentrations in soil/sediment within some areas of the Natural Area may pose a risk to small birds and mammals.

SUMMARY OF ALTERNATIVES CONSIDERED

The potential remedy alternatives evaluated by DuPont to address soil, surface water, sediment, and groundwater are presented below. These alternatives are discussed in the Natural Area Evaluation, Risk Assessment and Monitoring Plan dated July 22, 2013, and the Technical Memorandum dated September 11, 2013.

Contaminated Soil Removal: In 2012, DuPont excavated about 77,000 cubic yards of soils contaminated with metals impacting the Natural Area and Buffer Zone, as approved by EPA. The excavated area was contoured, seeded, and restored for habitat under the guidance of IDNR and TNC.

Contaminated Soil Disposal: Contaminated soil may be managed by one of these alternatives:

1) On-site treatment and disposal in an AOC within the footprint of the solid waste landfill located in the east-central portion of the former industrial property and adjacent to the Natural Area and Buffer Zone (*see figure*);

2) On-site treatment of the hazardous soil in an AOC and off-site disposal of all contaminated soil at a permitted off-site solid waste facility; or

3) Disposal of all contaminated soil off-site in permitted hazardous waste and solid waste facilities.

Monitored Natural Attenuation (MNA): The protection of small species from metals contamination could be addressed by MNA since active remedial actions would disrupt valuable habitat and detrimentally impact rare, threatened or endangered species, including the Karner blue butterfly. MNA allows natural processes to address the contamination and achieve remediation objectives within a reasonable time frame, to be documented by facility monitoring.

It is important to note that the remedy alternative proposed by DuPont for the Natural Area is not entirely consistent with the typical MNA concept and EPA guidance for MNA (OSWER Directive 9200.4-17P). For example, the potential remedy alternative in itself may not effectively reduce the dissolved concentrations and toxic forms of the metal contaminants in soil and groundwater, and it does not directly address remediation objectives for contaminated soil at certain locations on the dry sand ridges. Future remediation of the highly contaminated former industrial property may be required before MNA can be considered an effective remedy component for the Natural Area and Buffer Zone.

Habitat Restoration: DuPont will voluntarily fund TNC through 2017 to support habitat improvements in the excavated area and throughout the Natural Area and Buffer Zone. TNC will control invasive plant species and establish a diverse native plant population.

Access Controls: A fence has been constructed to restrict access to the former industrial property and contaminated soil that may pose an unacceptable risk to people and wildlife.

Monitoring: Long-term monitoring will be performed to evaluate the effectiveness of the remedy and habitat improvement actions. Monitoring would consist of soil and water sampling, and plant community characterization.

Cost: DuPont estimates the cost of these remedy alternatives over an operation, maintenance and monitoring (OM&M) period of 30 years to range from $7.6 to $9.8 million. The exact cost is dependent on the disposal method for the contaminated soil. Financial assurance will be provided for all remedy and OM&M costs.

SELECTED REMEDY

EPA is proposing that DuPont should implement the following remedy to address contaminated soil, surface water, sediment, and groundwater in the Natural Area and Buffer Zone:

- *Soil, Surface Water, and Sediment - A combination of treatment and disposal, monitoring, and no immediate action consistent with the Conservation Easement and continued protection of rare, threatened or endangered plant and wildlife species.*

  Dispose of approximately 77,000 cubic yards of IRM excavated soil/sediment stockpiled on-site within an AOC in or near the existing on-site solid waste landfill. The approximately 5,800 cubic yards of IRM soil identified as hazardous waste that exhibits the toxicity characteristic for lead will be treated in the AOC and rendered non-hazardous before placement into the landfill. The treated waste may be required to meet IDEM restricted waste sites waste criteria found at 329 IAC 10-9-4. The landfill design, closure, and post-closure requirements may be subject to IDEM Article 10 Solid Waste Land Disposal Facilities requirements.

  DuPont will perform monitoring of plant communities, surface water, and soil/sediment in the Natural Area, Buffer Zone, and former industrial property consistent with the long-term monitoring plan provided in the DuPont July 2013 Natural Area Evaluation, Risk Assessment, and Monitoring Plan, as modified by EPA. Modifications include coverage for all major swales and long-term groundwater monitoring of the Natural Area and Buffer Zone to ensure that water quality standards are being met and to assess the relationship between groundwater elevations and quality with surface water and soil/sediment present in the swales. Baseline soil and sediment conditions were established during confirmation sampling which was conducted following completion of the remedial measures for each area as documented in the *2013 Interim Remedial Measures, Buffer Zone Area Completion Report*. This baseline and subsequent five year monitoring program for soil, sediment, and water quality, will be evaluated to determine

whether conditions are constant relative to baseline conditions or if significant changes are occurring compared to baseline conditions due to runoff, soil erosion, or groundwater migration.

DuPont will prepare an assessment report which will indicate whether statistically significant differences in water quality parameters are observed in the monitoring stations over the five year monitoring period. Monitoring beyond 2018 will continue at sampling locations if a significant trend in increasing concentrations is determined for a given monitoring parameter. Additional soil and sediment data will also be collected in the vicinity of areas showing increased trends to determine potential contaminant sources. If no significantly increasing trend is observed, then the monitoring will cease after five years.

In consideration of the rare, threatened or endangered plant and wildlife species present at the site and the active habitat restoration performed by IDNR and TNC, there are no immediate actions planned to further address the soil/sediment and surface water in the Natural Area and Buffer Zone that do not meet cleanup goals. However, if monitoring or new information indicates that habitat at or near the Natural Area continues to be contaminated by runoff, soil erosion, and/or groundwater migration, DuPont will collect additional data to determine the potential contaminant sources and will identify and implement additional soil/sediment or groundwater remedial activities to protect the environment provided these additional activities do not detrimentally impact the rare, threatened or endangered plant and wildlife species present and their sensitive habitat.

Groundwater - Monitoring and no immediate action consistent with the Conservation Easement and protection of rare, threatened or endangered plant and wildlife species.

Perform monitoring of plant communities, surface water, and soil/sediment in the Natural Area, Buffer Zone, and former industrial property consistent with the long-term monitoring plan provided in the DuPont July 2013 Natural Area Evaluation, Risk Assessment, and Monitoring Plan, as modified by EPA. Modifications include coverage for all major swales and long-term groundwater monitoring of the Natural Area and Buffer Zone to ensure that water quality standards are being met and to assess the relationship between groundwater elevations and quality with surface water present in swales.

If the monitoring program or any new information shows that contaminated groundwater migration continues to impact areas at or near the Natural Area, DuPont will identify and implement additional remedial activities that control groundwater contaminant migration sufficiently to be protective of the environment and rare, threatened or endangered plant and wildlife species, and their sensitive habitat.

- *Voluntary Habitat Restoration.*

  DuPont voluntarily agrees to provide funding through at least 2017 to the TNC for continued habitat restoration of the Natural Area and where appropriate, the Buffer Zone. Additional restoration is also currently being performed in about 12 acres of the Natural Area as part of the Great Lakes Legacy Act sediment remediation project for the Grand Calumet River.

- *Institutional Controls - Record an Enforceable Environmental Covenant to restrict site activities.*

  DuPont will record an EPA-approved environmental covenant with the Lake County Recorder of Deeds to restrict future land use, access, groundwater use, and excavations considering the landfill boundaries and identified metals contamination in environmental media, and will provide that the State or EPA may enforce the covenant.

  In addition, DuPont has installed and will maintain a six-foot high chain-link permanent fence at the western boundary of the Buffer Zone. The purpose of the fence is to separate the area being restored by TNC workers from that portion of the former industrial property where access is restricted and land use will remain industrial.

  The Buffer Zone was remediated by the IRM and DuPont has demonstrated that it does not pose an unacceptable risk to people, plants, and/or wildlife using criteria established in the risk assessments. Based upon this information, EPA has no objection to DuPont adding the Buffer Zone or a portion of the area to the Natural Area conservation easement already in place.

- *Financial Assurance - Provide funds to complete the remedy including long-term OM&M.*

  The total estimated cost of EPA's proposed remedy is approximately $8 million. DuPont is required to provide financial assurance to ensure that the proposed remedy can be implemented over its expected lifetime of 30 years. DuPont will provide an updated cost estimate for implementation of the final remedy to EPA for approval pursuant to 40 CFR §§ 264.142 and 264.144 including the construction and long-term OM&M. Upon EPA approval of the updated cost estimate, DuPont will provide financial assurance using the option(s) allowed for at 40 CFR §§ 264.143 and 264.145.

PUBLIC PARTICIPATION ACTIVITIES

EPA held a public comment period from August 13, 2014 to September 12, 2014 to receive comments on the proposed remedies presented in the Statement of Basis. The Statement of Basis was available in the local repository and on EPA's website. The public was notified of this comment period through direct mailings and a newspaper advertisement. EPA did not receive any comments or requests for a public meeting during the comment period.

CORRECTIVE ACTION COMPLETE DETERMINATION

Once DuPont believes it has met its corrective action obligations, it may submit a request with supporting information to EPA Region 5 for a corrective action complete determination (CACD). Once EPA receives this request, we may issue a CACD based on the content and completeness of information provided by DuPont. At a minimum, the facility's CACD request must: 1) demonstrate that construction activities are complete, 2) demonstrate that all required institutional controls have been implemented, 3) demonstrate that the cleanup goals and objectives have been achieved.

ADMINISTRATIVE RECORD

The administrative record can be found at the local repository located within the East Chicago Public Library and at EPA's Chicago office, addresses below. Information on the DuPont facility can also be found at EPA's website, http://www.epa.gov/region5/cleanup/rcra/dupont/ and at the following locations:

East Chicago Public Library
1008 W. Chicago Avenue
East Chicago, Indiana 46312

and

U.S. EPA, Region 5
Land and Chemicals Division Records Center
77 West Jackson Boulevard, 7th Floor
Chicago, Illinois 60604
(312) 353-5821
Hours: Mon-Fri, 8:30 a.m. - 5:00 p.m.

DECLARATION

Based on the information in this Final Decision and the Administrative Record compiled for this corrective action site, the EPA has determined that the selected remedies at the DuPont Facility Natural Area and Buffer Zone are appropriate and will be protective of human health and the environment.

Date: 10/6/2014

Margaret M. Guerriero, Director
Land and Chemicals Division
United States Environmental Protection Agency,
Region 5

ATTACHMENT 1

STATEMENT OF BASIS

DuPont Facility
Natural Area and Buffer Zone
East Chicago, Indiana

EPA ID No. IND 005 174 354

August 2014

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Figure. LAND USE AND BOUNDARY OF THE NATURAL AREA AND BUFFER ZONE

List of Acronyms

ACE	- U.S. Army Corps of Engineers
AOC	- Area of Contamination
BERA	- baseline ecological risk assessment
CFR	- Code of Federal Regulations
CMS	- Corrective Measures Study
EPA	- U.S. Environmental Protection Agency
FWS	- U.S. Fish and Wildlife Service
IDEM	- Indiana Department of Environmental Management
IDNR	- Indiana Department of Natural Resources
IRM	- Interim Remedial Measures
mg/kg	- milligrams per kilogram or ppm
MNA	- monitored natural attenuation
OM&M	- operation, maintenance and monitoring
ppb	- part per billion
ppm	- part per million
RBRC	- risk-based reference concentration
RCRA	- Resource Conservation and Recovery Act
RFI	- RCRA Facility Investigation
SB	- Statement of Basis
TNC	- The Nature Conservancy
TRV	- toxicity reference value
ug/l	- micrograms per liter or ppb

Statement of Basis for the Proposed Remedy at the DuPont Facility Natural Area and Buffer Zone Located in East Chicago, Indiana

INTRODUCTION

This Statement of Basis (SB) presents the proposed remedy to address contaminated soil, surface water, sediment, and groundwater in the Natural Area and Buffer Zone located in the eastern portion of the DuPont facility in East Chicago, Indiana (*see figure for land use at DuPont and boundary of Natural Area and Buffer Zone*).

The Natural Area is a 172-acre undeveloped tract of original lakeplain/dunes land with alternating dry sand ridges and wet organic swales (*see photo below*). It is home to many rare, threatened or endangered plant and wildlife species. The Buffer Zone is a 23-acre area at the western boundary of the Natural Area contaminated by historical industrial activities. The Grand Calumet River lies to the south of the Natural Area and Buffer Zone, and the former DuPont industrial area is to the west (*see figure*).

The entire DuPont facility is approximately 440 acres. The eastern portion contains the 172-acre Natural Area and adjacent 23-acre Buffer Zone subject to this SB. The western portion of the facility contains a solid waste landfill, the former industrial property available for light industry redevelopment, open and/or filled land, and leased industrial property (*see figure*).

DuPont established the 172-acre Natural Area by transferring a conservation easement to the Indiana Department of Natural Resources (IDNR) in accordance with a federal consent decree involving the restoration of the Grand Calumet River. With funding from DuPont and other sources, the IDNR and The Nature Conservancy (TNC) are restoring the Natural Area to provide valuable habitat for native plants and wildlife, including endangered species such as the Karner blue butterfly. Nine "patches" (areas containing plants and conditions favorable to the Karner blue butterfly) have been restored to meet the minimum requirements for the Karner blue butterfly. Three of these patches are now occupied by the butterfly.

This SB addresses environmental contamination within the Natural Area and adjacent Buffer Zone only. For purposes of this SB, the remedy may also include the use of a portion of the 30-acre solid waste landfill (*see figure*) located adjacent to the Natural Area and Buffer Zone for potential disposal of contaminated soil currently stockpiled on-site. In the future, EPA will follow up with another SB for public comment that fully addresses the remaining acreage of DuPont's industrial property, its potential redevelopment, and releases of contamination at and from the former industrial area to soil, groundwater, and the Grand Calumet River.

This SB is issued by the EPA as part of its public participation responsibilities under the Resource Conservation and Recovery Act (RCRA). This SB summarizes the investigations and the potential remedial alternatives evaluated for the Natural Area and Buffer Zone. This information can be found in greater detail in plans and reports contained in the RCRA Administrative Record. An Index to the Administrative Record is attached.

EPA encourages the public to review these documents to gain a more comprehensive understanding of the RCRA corrective action activities conducted at the DuPont facility. EPA will select a final remedy after a 30 day public comment period and consideration of all substantive public comments. EPA may modify the proposed remedy or select another remedy based on new information or public comments.

The Administrative Record supporting this proposed remedy is available at the East Chicago Public Library, 1008 W. Chicago Avenue, East Chicago, Indiana 46312 and the U.S. EPA, Region 5 Record Center (7th Floor), 77 West Jackson Boulevard, Chicago, Illinois 60604.

EPA PROPOSED REMEDY

DuPont investigations in 2011 found that releases from their former industrial property had contaminated western portions of the Natural Area being managed by IDNR and TNC. To

immediately protect the Natural Area and improve the quality of its unique habitat, EPA and DuPont met with stakeholders in 2012 to develop a cleanup plan. Stakeholders include IDNR, TNC, Indiana Department of Environmental Management (IDEM), U.S. Fish and Wildlife Service (FWS), and U.S. Army Corps of Engineers (ACE). A cleanup plan was developed that reduced the risks posed to the unique habitat of the Natural Area. To this end, DuPont performed an Interim Remedial Measure (IRM) to remove the highest risk material in a manner that would be least disruptive to the unique habitat and rare, threatened or endangered plant and wildlife species, including the Karner blue butterfly, found in the Natural Area.

The IRM performed in the fall of 2012 by DuPont removed about 77,000 cubic yards of soil that had high concentrations of metals (mostly lead, arsenic and zinc). Twenty acres of the Buffer Zone and a small portion of the Natural Area were cleaned up and the soil stockpiled on the contaminated industrial property. DuPont then brought in and placed about 15,000 cubic yards of clean soil in portions of the excavated areas to properly grade the land and promote surface drainage.

Because of its unique habitat and the native plant and animal species found in the Natural Area, DuPont entered into a management agreement with IDNR and TNC to support their efforts to improve and restore the area as a habitat, and to conduct long-term monitoring consistent with the long-term stewardship of the 172-acre conservation easement granted to IDNR. The risk to workers, visitors, and trespassers from the contaminated soils in the Natural Area is very low. To protect rare, threatened or endangered plant and wildlife species, and restore and maintain their habitat, and to be consistent with the recorded conservation easement, EPA proposes the following remedy for public comment to address contaminated soil, surface water, sediment, and groundwater in the Natural Area and Buffer Zone.

- *Soil, Surface Water, and Sediment - A combination of treatment and disposal, monitoring, and no immediate action consistent with the Conservation Easement and continued protection of rare, threatened or endangered plant and wildlife species.*

  Dispose of approximately 77,000 cubic yards of IRM excavated soil/sediment stockpiled on-site within an Area of Contamination (AOC) in or near the existing on-site solid waste landfill. The approximately 5,800 cubic yards of IRM soil identified as hazardous waste that exhibits the toxicity characteristic for lead will be treated in the AOC and rendered non-hazardous before placement into the landfill. The treated waste may be required to meet IDEM restricted waste sites waste criteria found at 329 IAC 10-9-4. The landfill design, closure, and post-closure requirements may be subject to IDEM Article 10 Solid Waste Land Disposal Facilities requirements.

  DuPont will perform monitoring of plant communities, surface water, and soil/sediment in the Natural Area, Buffer Zone, and former industrial property consistent with the long-term monitoring plan provided in the DuPont July 2013 Natural Area Evaluation, Risk Assessment, and Monitoring Plan, as modified by EPA. Modifications include coverage for all major swales and long-term groundwater monitoring of the Natural Area and

Buffer Zone to ensure that water quality standards are being met and to assess the relationship between groundwater elevations and quality with surface water and soil/sediment present in the swales. Baseline soil and sediment conditions were established during confirmation sampling which was conducted following completion of the remedial measures for each area as documented in the *2013 Interim Remedial Measures, Buffer Zone Area Completion Report*. This baseline and subsequent five year monitoring program for soil, sediment, and water quality, will be evaluated to determine whether conditions are constant relative to baseline conditions or if significant changes are occurring compared to baseline conditions due to runoff, soil erosion, or groundwater migration.

DuPont will prepare an assessment report which will indicate whether statistically significant differences in water quality parameters are observed in the monitoring stations over the five year monitoring period. Monitoring beyond 2018 will continue at sampling locations if a significant trend in increasing concentrations is determined for a given monitoring parameter. Additional soil and sediment data will also be collected in the vicinity of areas showing increased trends to determine potential contaminant sources. If no significantly increasing trend is observed, then the monitoring will cease after five years.

In consideration of the rare, threatened or endangered plant and wildlife species present at the site and the active habitat restoration performed by IDNR and TNC, there are no immediate actions planned to further address the soil/sediment and surface water in the Natural Area and Buffer Zone that do not meet cleanup goals. However, if monitoring or new information indicates that habitat at or near the Natural Area continues to be contaminated by runoff, soil erosion, and/or groundwater migration, DuPont will collect additional data to determine the potential contaminant sources and will identify and implement additional soil/sediment or groundwater remedial activities to protect the environment provided these additional activities do not detrimentally impact the rare, threatened or endangered plant and wildlife species present and their sensitive habitat.

- *Groundwater - Monitoring and no immediate action consistent with the Conservation Easement and protection of rare, threatened or endangered plant and wildlife species.*

  Perform monitoring of plant communities, surface water, and soil/sediment in the Natural Area, Buffer Zone, and former industrial property consistent with the long-term monitoring plan provided in the DuPont July 2013 Natural Area Evaluation, Risk Assessment, and Monitoring Plan, as modified by EPA. Modifications include coverage for all major swales and long-term groundwater monitoring of the Natural Area and Buffer Zone to ensure that water quality standards are being met and to assess the relationship between groundwater elevations and quality with surface water present in swales.

If the monitoring program or any new information shows that contaminated groundwater migration continues to impact areas at or near the Natural Area, DuPont will identify and implement additional remedial activities that control groundwater contaminant migration sufficiently to be protective of the environment and rare, threatened or endangered plant and wildlife species, and their sensitive habitat.

- *Voluntary Habitat Restoration.*

  DuPont voluntarily agrees to provide funding through at least 2017 to the TNC for continued habitat restoration of the Natural Area and where appropriate, the Buffer Zone. Additional restoration is also currently being performed in about 12 acres of the Natural Area as part of the Great Lakes Legacy Act sediment remediation project for the Grand Calumet River.

- *Institutional Controls - Record an Enforceable Environmental Covenant to restrict site activities.*

  DuPont will record an EPA-approved environmental covenant with the Lake County Recorder of Deeds to restrict future land use, access, groundwater use, and excavations considering the landfill boundaries and identified metals contamination in environmental media, and will provide that the State or EPA may enforce the covenant.

  In addition, DuPont has installed and will maintain a six-foot high chain-link permanent fence at the western boundary of the Buffer Zone. The purpose of the fence is to separate the area being restored by TNC workers from that portion of the former industrial property where access is restricted and land use will remain industrial.

  The Buffer Zone was remediated by the IRM and has demonstrated to not pose an unacceptable risk to people, plants, and/or wildlife using criteria established in the risk assessments. DuPont may add the Buffer Zone or a portion of the area to the Natural Area conservation easement.

- *Financial Assurance - Provide funds to complete the remedy including long-term OM&M.*

  The total estimated cost of EPA's proposed remedy is approximately $8 million. DuPont is required to provide financial assurance to ensure that the proposed remedy can be implemented over its expected lifetime of 30 years. DuPont will provide an updated cost estimate for implementation of the final remedy to EPA for approval pursuant to 40 CFR §§ 264.142 and 264.144 including the construction and long-term operation, maintenance, and monitoring (OM&M). Upon EPA approval of the updated cost estimate, DuPont will provide financial assurance using the option(s) allowed for at 40 CFR §§ 264.143 and 264.145.

FACILITY BACKGROUND

The DuPont facility is located at 5215 Kennedy Avenue in East Chicago, Lake County in Indiana. The Natural Area and Buffer Zone subject to this SB comprise the 195-acre eastern portion of the facility. An industrial area along Gary and Cline Avenues roughly forms the eastern and northern boundary, Grand Calumet River the southern boundary, and the former DuPont manufacturing area the western boundary (*see figure*). Land use near the Natural Area and Buffer Zone is mostly industrial with a residential area (Riley Park community of East Chicago) to the northwest.

The IDNR Division of Natural Preserves holds a conservation easement on the 172-acre Natural Area. DuPont transferred a conservation easement of the Natural Area to IDNR as part of the settlement of the natural resource damage claim with the State and Federal Natural Resource Trustees for the East Branch of the Grand Calumet River. TNC has managed the Natural Area since 1999 and DuPont has agreed to voluntarily fund the restoration work through 2017.

On June 17, 1997, DuPont signed a RCRA Corrective Action Administrative Order on Consent (Order) with EPA to conduct a RCRA Facility Investigation (RFI) to determine the nature and extent of any releases of hazardous waste and/or hazardous constituents at or from the facility and a Corrective Measures Study (CMS) to identify and evaluate alternatives for the corrective action necessary to prevent or mitigate their migration. The Order also provides that DuPont may initiate IRM to control immediate threats to human health and the environment and/or minimize the spread of contaminants prior to implementing a final remedy.

DuPont sample results from the Buffer Zone and Natural Area in 2011 identified immediate risks to the Natural Area environment. DuPont proposed an IRM cleanup plan to immediately address these unacceptable environmental risks. IDEM, IDNR, TNC, FWS, and ACE reviewed and supported the proposed plans. In February 2012, DuPont submitted a technical memorandum to EPA detailing the risk reduction associated with the proposed IRM activities. EPA provided comments and the final IRM plans were approved and implemented in August 2012. As part of the IRM, DuPont removed 77,000 cubic yards of contaminated soils from 20 acres of Buffer Zone and the Natural Area. The IRM is supported by the Administrative Record. An Index to the Administrative Record is attached to this SB.

With EPA concurrence, DuPont undertook the IRM to protect the Natural Area while the long-term corrective measures for the industrial property at the facility continued to be evaluated and developed. A CMS for the entire facility is being prepared by DuPont for submittal in 2014. A SB for the entire DuPont facility will be prepared by EPA upon review of the CMS.

RCRA Facility Investigation Results

An RFI was conducted to fully characterize the nature and extent of contamination at the Natural Area and Buffer Zone. DuPont analyzed soils for metal contamination (i.e., aluminum, antimony, arsenic, barium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, titanium, vanadium, and zinc). Cadmium, lead, and zinc were used as the main indicators of contamination due to their prevalence at the site and the identified exceedances of the risk-based reference concentrations (RBRC) for these metals. The RBRC were developed as cleanup goals to protect small mammals and birds in the environment at the site and vary from 0.91 to 1.82 mg/kg for cadmium, 36 to 145 mg/kg for lead, and 117 to 574 mg/kg for zinc in surface soil. Meeting the RBRC would reduce adverse effects to small mammals and birds such as the shrew, mouse, sparrow, and robin.

The RFI found that cadmium, lead, and zinc exceeded their RBRC for all four small species. Average metal concentrations in surface soil were 5.66 mg/kg for cadmium, 274 mg/kg for lead, and 1,480 mg/kg for zinc. However, these average metal concentrations in soil did not exceed the RBRC developed for larger species such as groundhog, deer, fox, goose, and hawk.

For surface water in the eight swales in the Natural Area, zinc and manganese levels in two swales exceed the toxicity reference values (TRV) developed as cleanup goals for amphibians. Of the seven swales in the Buffer Zone adjacent to the former industrial property, arsenic and zinc exceeded TRVs in one area and manganese for another.

Metals concentrations were analyzed in leafs and roots of various grasses, sedge, horsetail, and goldenrod on dune/ridge and reed, bulrush, plantain, sedge, pepper, and grass in the swale. There is generally a low transfer of metals from soil to plant tissue except for zinc in the dune/ridge habitat. The investigations also concluded that there was no direct correlation between elevated soil metals concentrations and habitat quality on either the ridge or swale. The abundance of plant species could be best explained by soil moisture and active habitat management by TNC. There was a marginal relationship between soil zinc concentrations on ridge habitat and species abundance (i.e., there may be some reduction in the number of plant species on soils with higher zinc concentrations).

SUMMARY OF FACILITY RISKS

Groundwater

Description: A groundwater divide is present beneath the middle of the former DuPont industrial property along an east-west line. Groundwater north of the divide flows toward the Riley Park residential area of East Chicago. Groundwater south of the divide flows south to the Grand Calumet River with some eastward migration to the Natural Area. Contaminated groundwater flowing to the Natural Area may intermittently intersect the shallow water table in the swales and emerge as surface water.

Major site contaminants such as arsenic and zinc (lead was not detected) are present in groundwater beneath the Natural Area and have their highest concentrations in the western portion closest to the former industrial property and immediately downgradient of site contaminant source areas. For the five monitoring wells installed in the Natural Area, arsenic concentrations ranged from 7 to 193 ug/l and zinc concentrations ranged from non-detect to 24,000 ug/l.

Human Health Risk: The long-term cleanup goal for groundwater is based on the maximum contaminant levels for drinking water. Throughout the western-half of the Natural Area, the cleanup goal for arsenic of 10 ug/l is exceeded. The cleanup goal for zinc of 5,000 ug/l is exceeded in the western edge near the solid waste landfill. These levels of arsenic and zinc appear to be associated with the migration of site contaminants to the east from the industrial area. Groundwater at the DuPont facility is not currently used for drinking water or industrial use.

The cleanup goal is based upon potential exposure to trespassers and workers within the Natural Area. Sampling shows that the risk from exposure to all metals associated with dermal contact and ingestion of surface water in swales within the Natural Area and Buffer Zone that could mix with contaminated groundwater was low and acceptable for workers and trespassers.

Ecological Risk: The high arsenic and zinc concentrations in groundwater could contribute to potentially adverse effects for amphibians contacting surface water in swales (see surface water discussion below). The short-term cleanup goal for arsenic in groundwater discharging to surface water bodies is the Indiana chronic water quality standard for waters within the Great Lakes system of 148 ug/l. The highest values of arsenic in groundwater were 193 ug/l which exceed the cleanup goal. This slight exceedance may pose an unacceptable risk in a small portion of the Natural Area and Buffer Zone. Since nearby contaminated soils were removed in the Buffer Zone to protect the Natural Area, improvements in groundwater quality could occur in the future.

Surface Water

Description: Surface water accumulates intermittently in swales within the Natural Area. Limited surface water data from the western portion of five swales was collected prior to the IRM performed in 2012. Six wet areas in the Buffer Zone were also sampled and evaluated.

Human Health Risk: The short-term cleanup goal is based upon potential exposure to trespassers and workers within the Natural Area. Sampling shows that the risk from exposure to all metals associated with dermal contact and ingestion of surface water in swales within the Natural Area and Buffer Zone that could mix with contaminated groundwater was low and acceptable for workers and trespassers.

Ecological Risk: Metal contaminant levels in surface water were compared to TRV developed as cleanup goals that if exceeded could adversely affect amphibian species such as toads, frogs, and salamanders. TRV for chronic exposure to manganese and zinc levels were slightly exceeded in

two of the Natural Area swales. Two swale areas in the Buffer Zone had exceedances of manganese in one and arsenic and zinc in another. These levels of arsenic and zinc appear to be associated with the migration of site contaminants to the east from the industrial area. These exceedances may pose an unacceptable risk in a small portion of the Natural Area and Buffer Zone. Since nearby contaminated soils were removed from the Buffer Zone to protect the Natural Area, improvements in surface water quality could occur in the future.

Soil/Sediment

Human Health Risk: The human health risk assessment determined that there are no unacceptable cancer and non-cancer risks associated with exposure to metal concentrations in surface soil/sediment within the Natural Area and Buffer Zone for workers and trespassers.

Ecological Risk: Risk associated with exposure to metals in surface soil/sediment within the Natural Area for nine bird and mammal species was evaluated in the baseline ecological risk assessment (BERA). For highly mobile species such as the red fox, white-tailed deer, red-tailed hawk, and Canada goose, no risk of adverse effects from exposure to surface soil/sediment was found. For small foraging range species such as the deer mouse, short-tailed shrew, American robin, and song sparrow, soil/sediment concentrations of lead, zinc, and cadmium exceeded RBRC for these species. These risks are increased if data from the Buffer Zone is included in the evaluation where average metals concentrations are higher and metals such as antimony, chromium, and copper also exceed RBRC concentrations for these species. Metals concentrations in soil/sediment within some areas of the Natural Area may pose a risk to small birds and mammals.

SCOPE OF CORRECTIVE ACTION

Corrective measures are necessary at the DuPont facility to address potential risks associated with metals contamination present in groundwater, surface water, soil and sediment in the Natural Area and Buffer Zone. The BERA determined that cleanup goals were not met and that the elevated metal contaminants pose potential adverse effects on the growth and survival of mammals, birds, and amphibians. The effects include the inability to survive and reproduce due to elevated levels of arsenic in groundwater, elevated levels of lead, zinc, cadmium, antimony, chromium, and copper in soil, and elevated levels of manganese, zinc, and arsenic in surface water.

The immediate cleanup objective is to properly dispose of stockpiled IRM soils. Other immediate cleanup objectives are to limit site access to those workers conducting the ongoing restoration activities and to control trespassers. These objectives require an enforceable environmental covenant to manage site use as part of the conservation easement. A fence has been constructed to restrict restoration workers' access to that portion of the Buffer Zone which is for industrial use only.

Short and long-term cleanup objectives are to monitor the remedy to ensure that it is effective in minimizing exposure to metals concentrations that may pose an unacceptable risk and to achieve cleanup goals consistent with the protection of rare, threatened or endangered plant and wildlife species present in the Natural Area and Buffer Zone soils, surface water, and sediment; achieve water quality standards for groundwater discharging to swales and the Grand Calumet River; and the beneficial restoration of groundwater.

SUMMARY OF POTENTIAL REMEDY ALTERNATIVES

The potential remedy alternatives evaluated by DuPont to address soil, surface water, sediment, and groundwater are presented below. These alternatives are discussed in the Natural Area Evaluation, Risk Assessment and Monitoring Plan dated July 22, 2013, and the Technical Memorandum dated September 11, 2013.

Contaminated Soil Removal: In 2012, DuPont excavated about 77,000 cubic yards of soils contaminated with metals impacting the Natural Area and Buffer Zone, as approved by EPA. The excavated area was contoured, seeded, and restored for habitat under the guidance of IDNR and TNC.
Contaminated Soil Disposal: Contaminated soil may be managed either by:

1) On-site treatment and disposal in an AOC within the footprint of the solid waste landfill located in the east-central portion of the former industrial property and adjacent to the Natural Area and Buffer Zone (*see figure*);

2) On-site treatment of the hazardous soil in an AOC and off-site disposal of all contaminated soil at a permitted off-site solid waste facility; or

3) Disposal of all contaminated soil off-site in permitted hazardous waste and solid waste facilities.

Monitored Natural Attenuation (MNA): The protection of small species from metals contamination would be addressed by MNA since active remedial actions would disrupt valuable habitat and detrimentally impact rare, threatened or endangered species, including the Karner blue butterfly. MNA allows natural processes to address the contamination and achieve remediation objectives within a reasonable time frame, to be documented by facility monitoring.

It is important to note that the remedy alternative proposed by DuPont for the Natural Area is not entirely consistent with the MNA concept and EPA guidance for MNA (OSWER Directive 9200.4-17P). For example, the potential remedy alternative in itself may not effectively reduce the dissolved concentrations and toxic forms of the metal contaminants in soil and groundwater, and it does not directly address remediation objectives for contaminated soil at certain locations on the dry sand ridges. Future remediation of the highly contaminated former industrial property may be required before MNA can be considered an effective remedy component for the Natural Area and Buffer Zone.

Habitat Restoration: DuPont will voluntarily fund TNC through 2017 to support habitat improvements in the excavated area and throughout the Natural Area and Buffer Zone. TNC will control invasive plant species and establish a diverse native plant population.

Access Controls: A fence has been constructed to restrict access to the former industrial property and contaminated soil that may pose an unacceptable risk to people and wildlife.

Monitoring: Long-term monitoring will be performed to evaluate the effectiveness of the remedy and habitat improvement actions. Monitoring would consist of soil and water sampling, and plant community characterization.

Cost: DuPont estimates the cost of these remedy alternatives over an operation, maintenance and monitoring (OM&M) period of 30 years to range from $7.6 to $9.8 million. The exact cost is dependent on the disposal method for the contaminated soil. Financial assurance will be provided for all remedy and OM&M costs.

EVALUATION OF THE POTENTIAL REMEDY ALTERNATIVES AND THE EPA PROPOSED REMEDY

Threshold criteria for evaluating remedy alternatives include protection of human health and the environment, attainment of media cleanup standards, controlling the sources of releases, and complying with applicable standards for waste management. Alternatives that successfully meet the threshold criteria are then evaluated against balancing criteria. Balancing criteria include long-term reliability and effectiveness, reduction in the toxicity, mobility or volume of wastes, short-term effectiveness, implementability, and cost.

Contaminated Soil Removal: Soil removal has already occurred at areas with high metals contamination in the Buffer Zone, and to a much lesser extent, the Natural Area. The purpose of the removal is to protect the Natural Area environment from the migration of contaminants from the former industrial area. Media cleanup standards were attained and the sources of releases controlled. Contaminated soil is temporarily stockpiled in an AOC. No further action to remediate these contaminated soils would have resulted in the failure to attain the threshold criteria.

Contaminated Soil Disposal: All three disposal alternatives effectively meet the threshold criteria. Any on-site disposal would be engineered in a manner as to meet the required IDEM standards for land disposal. Off-site disposal would be at a permitted facility subject to state and federal standards.

Implementability may be easier for off-site rather than on-site disposal since the remedy alternative requires only placement of the soil in trucks for off-site transportation as opposed to engineered landfilling. However the current on-site landfill may require closure under IDEM

regulations and the additional contaminated soil placed into the fill area may aid in properly closing and constructing final contours for the area. Potential spills/accidents would also be avoided by not trucking the soil off-site. No hazardous wastes would be placed in the on-site landfill.

Cost for on-site disposal is about $2 million less than the off-site alternatives.

MNA: As an alternative to MNA, active removal or covering of soil in this valuable dune-and-swale habitat is not protective of the environment. Rare, threatened or endangered plant and wildlife species would be destroyed. Media cleanup standards would be met but at the expense of habitat and species destruction.

Habitat Restoration: Restoration of the habitat by TNC is essential in protecting the environment and minimizing invasive species that can take over the wetlands. Without human intervention, species such as phragmites (common reed) would dominate the swale habitat.

Access Controls: No access controls would allow trespassers and workers to enter property that may pose a risk to their health. A fence has been constructed to restrict restoration workers' access to that portion of the Buffer Zone which is for industrial use only.

Monitoring: Environmental monitoring is essential to determine the long-term reliability and effectiveness of soil removal and MNA. It will be used to determine if other remedies may be necessary to further protect human health and the environment.

The following discussion profiles the performance of the EPA proposed remedy against the threshold and balancing criteria for evaluating a remedy.

1. **Protect Human Health and the Environment.** The overall protection of human health and the environment at the Natural Area and Buffer Zone are expected to be effectively addressed by the IRM that removed contaminated soil and sediment in 2012, and the long-term monitoring to assess its effectiveness. Contingencies are in place to perform additional remediation activities if the IRM is found not to be entirely effective for protecting the Natural Area. An enforceable environmental covenant to restrict land use and access is an effective method to protect human health and the environment when combined with IRM and monitoring activities.

2. **Attain Media Cleanup Standards.** Potential contaminant source areas were addressed by selective removal of contaminated soil and sediment during the IRM. Removal of contaminant mass is a quick and effective corrective measure to minimize the risks to human health and the environment. Cleanup goals have been met in most of the Natural Area for surface soil, surface water, and sediment. Groundwater will be monitored to see if cleanup goals are achieved with time.

A risk management decision has been made that attainment of all cleanup goals of soil in the Natural Area would detrimentally impact rare, threatened or endangered plant and wildlife

species given the disruptive/destructive nature of excavation and capping. Further, biological indices were not significantly reduced in areas with elevated metals concentrations and there is relatively low transfer of metals from soil into plants. Monitoring of the IRM will be performed to see if all media cleanup goals are achieved over time.

3. **Control the Sources of Releases.** Select removal of contaminated soil and sediment in the Buffer Zone will help control future releases to the Natural Area. Consolidation of contaminated soil and sediment in a landfill may be subject to IDEM solid waste closure/post-closure requirements which will eliminate the exposures and potential releases of metals from excavated IRM soils. These actions provide an effective source control program to ensure the long-term effectiveness and protectiveness of the remedy.

4. **Comply with Any Applicable Standards for Management of Wastes.** Representative samples of waste generated during implementation of the IRM were properly characterized for hazardousness, separated, and stockpiled. These wastes will be treated within the AOC and rendered non-hazardous before on-site disposal. IRM soils will be disposed of at or in the vicinity of the on-site solid waste landfill area and may be subject to IDEM solid waste closure/post-closure requirements.

5. **Long-term Reliability and Effectiveness.** Reliability of the proposed remedy is evaluated through OM&M requirements, demonstrated effectiveness of the IRM, and achievement of cleanup goals of surface water, sediment, and soil in most areas. Soil removal/disposal is a simple proven technology and the attainment of most cleanup goals was assessed during IRM confirmation sampling. Proper disposal of the IRM soils in the on-site landfill area will be assessed based on appropriate engineering properties for disposal sites and solid waste landfill engineering design. The IRM disposal area may be subject to IDEM closure and post-closure care requirements for solid waste which will ensure long-term reliability and effectiveness. Inspections will be conducted and necessary actions will be performed to ensure the reliability and effectiveness of the landfill cap.

6. **Reduction in the Toxicity, Mobility, or Volume of Wastes.** Removal and proper disposal of about 77,000 cubic yards of soil contaminated with metals will reduce the volume and toxicity of available metals at the DuPont facility and help minimize the uncontrolled migration of site contaminants to surface water, sediment, and soil in the Natural Area and Buffer Zone. Monitoring will assess the reduction in mobility of residual contamination to surface water, sediment, and soil in the Natural Area and Buffer Zone.

7. **Short-term Effectiveness.** DuPont will develop an OM&M program to ensure the remedy is safe. Corrective measure activities proposed by DuPont and associated with contaminated media at the facility will include a health and safety plan to protect workers. On-site disposal will minimize threats to the local community from off-site truck traffic and spills. Air monitoring will be performed during implementation to ensure any risks to dust exposure are low to workers and off-site residential areas.

8. **Implementability.** IRM soils have been excavated and are stockpiled on-site near the solid waste landfill. Disposal will be performed under AOC guidance. IDEM solid waste disposal requirements for closure and post-closure will be followed. If necessary, state and federal permits will be obtained for remediation of wetlands as during the IRM activities. Institutional controls in the form of an EPA-approved enforceable environmental covenant will be placed on the property to restrict land use and excavation activities, and a fence will be constructed to restrict access. Restoration of the Natural Area will be consistent with work performed since 1999 by TNC and IDNR.

9. **Cost.** The total estimated cost of the potential remedy alternative considered by DuPont to address site contamination ranges from $7.6 to $9.8 million. The IRM performed in 2012 to protect the Natural Area cost $1.78 million. The estimated cost of the EPA proposed remedy is $8 million. Additional costs include a more robust groundwater and surface water monitoring program, contingencies for additional sampling, and if necessary, remediation work in select Natural Area swales based on the results of the monitoring program. This slightly more costly remedy alternative is necessary to adequately protect human health and the environment.

Based on information currently available, the EPA proposed remedy provides the best balance with respect to the standards described above. EPA believes that the proposed remedy is protective of human health and the environment, and will effectively control human and environmental exposure to contaminants in soil, surface water, sediment, and groundwater. All applicable standards regarding surface water protection, worker protection, and onsite/offsite waste management will be addressed and complied with during implementation of the remedy.

PUBLIC PARTICIPATION

EPA seeks input from the local community on its proposed remedy to address contaminated soil, surface water, sediment, and groundwater at the Natural Area and Buffer Zone portion of the DuPont facility. There will be a 30 day comment period for the public to participate in selecting the final remedy. If enough interest is shown, EPA will schedule a public meeting to answer questions and accept comments. The Administrative Record supporting this SB is available online at http://www.epa.gov/Region5/waste/permits/actions.htm and at the following locations:

East Chicago Public Library
1008 W. Chicago Avenue
East Chicago, Indiana 46312

and

U.S. EPA, Region 5
RCRA Records Center
77 West Jackson Boulevard, 7th Floor
Chicago, Illinois 60604-3590
(312) 886-0902
Hours: Mon-Fri, 9:00 a.m. - 4:00 p.m.

After consideration of public comments on the proposed remedy, EPA will select a final remedy and document its selection in a Final Decision and Response to Comments. In addition, EPA will summarize public comments and provide responses. The Final Decision and Response to Comments will be drafted at the conclusion of the public comment period and incorporated into the Administrative Record.

To request information on the public comment period for the proposed remedy at the DuPont facility, please contact:

Mr. Rafael Gonzalez
Community Relations Coordinator
U.S. Environmental Protection Agency, Region 5
77 West Jackson Boulevard
Land and Chemicals Division, LP-9J
Chicago, Illinois 60604-3590
(312) 886-4188
E-mail: gonzalez.rafaelp@epa.gov

To send written comments or request technical information, please contact:

Ms. Jennifer Dodds
EPA Project Manager
U.S. Environmental Protection Agency, Region 5
77 West Jackson Boulevard
Corrective Action Section, LU-9J
Chicago, Illinois 60604-3590
(312) 886-1484
E-mail: dodds.jennifer@epa.gov

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DuPont Located in East Chicago, Indiana
IND 005 174 354

Document Number	Date	Description/Author
DuPont - 001	6/17/97	RCRA Corrective Action Order for the DuPont East Chicago facility is effective.
DuPont - 002	4/22/10	DuPont submits the Preliminary Supplemental Corrective Measures Study Investigation Results report.
DuPont - 003	4/29/10	EPA comments on the Preliminary Supplemental Corrective Measures Study Results submitted on 4/22/10.
DuPont - 004	6/1/10	Conservation Easement filed with the County Recorder for the DuPont East Chicago Natural Area consisting of approximately 172 acres.
DuPont - 005	6/28/10	DuPont submits a report providing investigation results for the East Chicago facility, including the Natural Area, and a plan for additional environmental sampling.
DuPont - 006	7/10	Various e-mails between EPA and DuPont discussing the Natural Area investigation results, observations, and additional sampling.
DuPont - 007	8/24/10	Letter from Indiana Dept. of Natural Resources to DuPont providing information on endangered, threatened, or rare species in the area.
DuPont - 008	9/14/10	Letter from US Fish and Wildlife Service to DuPont providing endangered species information for the area.
DuPont - 009	9/27-28/10	E-mails between DuPont and EPA regarding Natural Area sampling.

The Administrative Record for DuPont East Chicago is found at these locations.

U.S. EPA, Region 5
77 W. Jackson Blvd.
Chicago, IL 60604
7th Floor Record Center

East Chicago Public Library
Robert A. Pastrick Branch
1008 W. Chicago Ave.
East Chicago, IN 46312

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Document Number	Date	Description/Author
DuPont - 010	10/10	DuPont submits a draft scoping document for the Baseline Ecological Risk Assessment for the DuPont East Chicago Site.
DuPont - 011	10/10	DuPont submits a draft scoping document for the Human Health Risk Assessment for the DuPont East Chicago Site.
DuPont - 012	10/12/10	E-mail from EPA to DuPont providing comments submitted to the US Army Corps of Engineers regarding restoration of the Natural Area.
DuPont - 013	10/22/10	E-mail from EPA to DuPont providing recommendations for soil sampling in the Natural Area (includes meeting agenda).
DuPont - 014	10/28/10	E-mail from EPA to The Nature Conservancy discussing a pathway for restoring the Natural Area.
DuPont - 015	10/28/10	Letter from EPA to US Fish and Wildlife Service requesting consultation on activities to be performed within the Natural Area.
DuPont - 016	11/10	EPA fact sheet on investigations and cleanup at the DuPont East Chicago site.
DuPont - 017	11/2/10	E-mail from EPA to DuPont providing comments on the Draft Scoping Document, Human Health Risk Assessment for the DuPont East Chicago Site submitted in October 2010.

The Administrative Record for DuPont East Chicago is found at these locations.

U.S. EPA, Region 5
77 W. Jackson Blvd.
Chicago, IL 60604
7th Floor Record Center

East Chicago Public Library
Robert A. Pastrick Branch
1008 W. Chicago Ave.
East Chicago, IN 46312

Index to the Administrative Record
EPA Proposed Remedy for the Natural Area at
DuPont Located in East Chicago, Indiana
IND 005 174 354

Document Number	Date	Description/Author
DuPont - 018	11/3/10	Letter from US Fish and Wildlife Service to EPA providing consultation on the activities to be performed within the Natural Area.
DuPont - 019	11/4/10	E-mail from EPA to US Fish and Wildlife Service providing Natural Area sampling update.
DuPont - 020	11/15/10	E-mail from EPA to DuPont providing comments on the Draft Scoping Document, Baseline Ecological Risk Assessment for the DuPont East Chicago Site submitted in October 2010.
DuPont - 021	2/15/11	E-mail from DuPont to EPA providing a summary of the 2010 investigation results for the Natural Area and Buffer Zone.
DuPont - 022	2/18/11	E-mail from EPA to DuPont providing draft comments on the 2010 investigation results for the Natural Area and Buffer Zone submitted on 2/15/11.
DuPont - 023	3/9/11	Letter from DuPont to EPA submitting the Baseline Ecological Risk Assessment and Screening Level Ecological Risk Assessment for the DuPont East Chicago Site, along with a response to EPA comments from 11/15/10.
DuPont - 024	3/25/11	E-mail from EPA to DuPont providing comments on the Baseline Ecological Risk Assessment and Screening Level Ecological Risk Assessment submitted on 3/9/11.

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Document Number	Date	Description/Author
DuPont - 025	5/10/11	Letter from DuPont to EPA submitting the Preliminary Supplemental Corrective Measures Study Investigation Results for the DuPont East Chicago Site, including the Natural Area and Buffer Zone. The work was performed in accordance with the 6/28/10 sampling plan (electronically available on CD in EPA Chicago Record Center).
DuPont - 026	5/10/11	E-mail from DuPont to EPA providing a draft sampling approach for the Natural Area.
DuPont - 027	5/27/11	E-mail from DuPont to EPA providing a draft sampling plan for additional sampling in the Natural Area.
DuPont - 028	6/1/11	E-mail from EPA to DuPont providing comments on the draft sampling plan for additional sampling in the Natural Area submitted on 5/27/11.
DuPont - 029	6/2/11	E-mail from EPA to DuPont providing additional comments on the draft sampling plan for additional sampling of the Natural Area.
DuPont - 030	7/27/11	Dupont submits a final sampling and analysis plan for the Natural Area.
DuPont - 031	8/1-4/11	E-mails from EPA to DuPont requesting additional sampling sites in the Natural Area and DuPont's concurrence.
DuPont - 032	8/5/11	E-mail from DuPont to EPA providing a revised figure with the additional sampling sites.

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Document Number	Date	Description/Author
DuPont - 033	9/22/11	DuPont resubmits the Baseline Ecological Risk Assessment.
DuPont - 034	11/1/11	E-mail from EPA providing additional comments on the Human Health Risk Assessment for the DuPont East Chicago Site.
DuPont - 035	11/4/11	E-mail from EPA providing two additional comments on the Human Health Risk Assessment for the DuPont East Chicago Site.
DuPont - 036	11/15/11	Letter from US Fish and Wildlife Service to EPA providing consultation on the proposed Interim Remedial Measures activities to protect the Natural Area.
DuPont - 037	11/25/11	E-mail from EPA to DuPont providing final comments on the Baseline Ecological Risk Assessment and Screening Level Ecological Risk Assessment submitted on 9/22/11.
DuPont - 038	12/21/11	Letter from DuPont to the US Army Corps of Engineers providing notification of the proposed Interim Remedial Measures activities in wetlands within the Natural Area, including a wetlands delineation and pre-jurisdictional determination report (dated January 2012) for the wetlands located within the proposed excavation areas.
DuPont - 039	1/18/12	E-mail from EPA to DuPont providing the remedial goals for arsenic in groundwater.

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Document Number	Date	Description/Author
DuPont - 040	1/20/12	Letter from DuPont to Indiana Dept. of Environmental Management providing notification of the proposed Interim Remedial Measures activities in wetlands within the Natural Area.
DuPont - 041	2/7/12	Letter from DuPont to EPA submitting the revised Human Health Risk Assessment for the DuPont East Chicago Site, including a response to EPA comments from November 2011 (electronically available on CD in EPA Chicago Record Center).
DuPont - 042	2/17/12	E-mail from DuPont to EPA submitting a technical memorandum showing the risk reduction associated with the proposed Interim Remedial Measure activities.
DuPont - 043	2/24/12	DuPont submits the revised Baseline Ecological Risk Assessment.
DuPont - 044	2/29/12	E-mails between EPA and DuPont describing the Area of Contamination approach for managing remediation waste generated during the Interim Remedial Measures activities.
DuPont - 045	3/12/12	E-mail from EPA to DuPont providing a decision tree for managing remediation waste at the DuPont East Chicago Site.
DuPont - 046	3/28/12	Letter from US Fish and Wildlife Service to Indiana Dept. of Environmental Management supporting the Interim Remedial Measures work to remove contaminated soil in wetland areas to protect the Natural Area.

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Document Number	Date	Description/Author
DuPont - 047	4/2/12	E-mail from EPA to DuPont providing final comments on the revised Baseline Ecological Risk Assessment submitted in February 2012.
DuPont - 048	4/3/12	E-mail from EPA to DuPont providing comments on the Interim Remedial Measures post-excavation soil sampling plan.
DuPont - 049	5/24/12	E-mail from DuPont to EPA submitting a technical memorandum for managing soil remediation waste (Soil Management Plan) generated during the Interim Remedial Measures.
Dupont - 050	5/30/12	E-mail from DuPont to EPA submitting a draft technical memorandum for evaluating the Natural Area data (Plant Communities and Soil Data Evaluation).
DuPont - 051	6/6/12	E-mail from EPA to DuPont providing revisions for the Interim Remedial Measures Soil Management Plan that were agreed to during a 6/5/12 meeting.
DuPont - 052	8/29/12	E-mail from DuPont to EPA submitting the final Interim Remedial Measures Soil Management Plan, including air monitoring and dust control plans.
DuPont - 053	8/29/12	E-mails between DuPont and EPA discussing the schedule and permits for the Interim Remedial Measures.

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Document Number	Date	Description/Author
DuPont - 054	9/6/12	E-mail from EPA to DuPont discussing no further comments on the Interim Remedial Measures plan and a future site visit.
DuPont - 055	9/19/12	E-mail from EPA to The Nature Conservancy discussing observations made during a site visit.
DuPont - 056	3/27/13	DuPont submits the Interim Remedial Measures Buffer Zone Area Completion Report (electronically available on CD in EPA Chicago Record Center).
DuPont - 057	5/7/13	Letter from EPA to DuPont approving with comments, the Interim Remedial Measures Buffer Zone Area Completion Report submitted on 3/27/13.
DuPont - 058	5/15/13	DuPont submits an updated Baseline Ecological Risk Assessment to address EPA final comments and other recent activities.
DuPont - 059	7/8/13	Letter from DuPont to Indiana Dept. of Environmental Management proposing closure of the on-site industrial waste landfill and consolidation of contaminated soil within an Area of Contamination.
DuPont - 060	7/22/13	DuPont submits the Natural Area Evaluation, Risk Assessment and Monitoring Plan for the DuPont East Chicago Site.

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Document Number	Date	Description/Author
DuPont - 061	7/24/13	E-mail from EPA to Indiana Dept. of Environmental Management providing a history of waste management in the area of the DuPont on-site industrial waste landfill.
DuPont - 062	9/11/13	Technical Memorandum from DuPont to EPA providing costs for the IRM performed in 2012 and cost estimates for managing the IRM soils under three alternatives.

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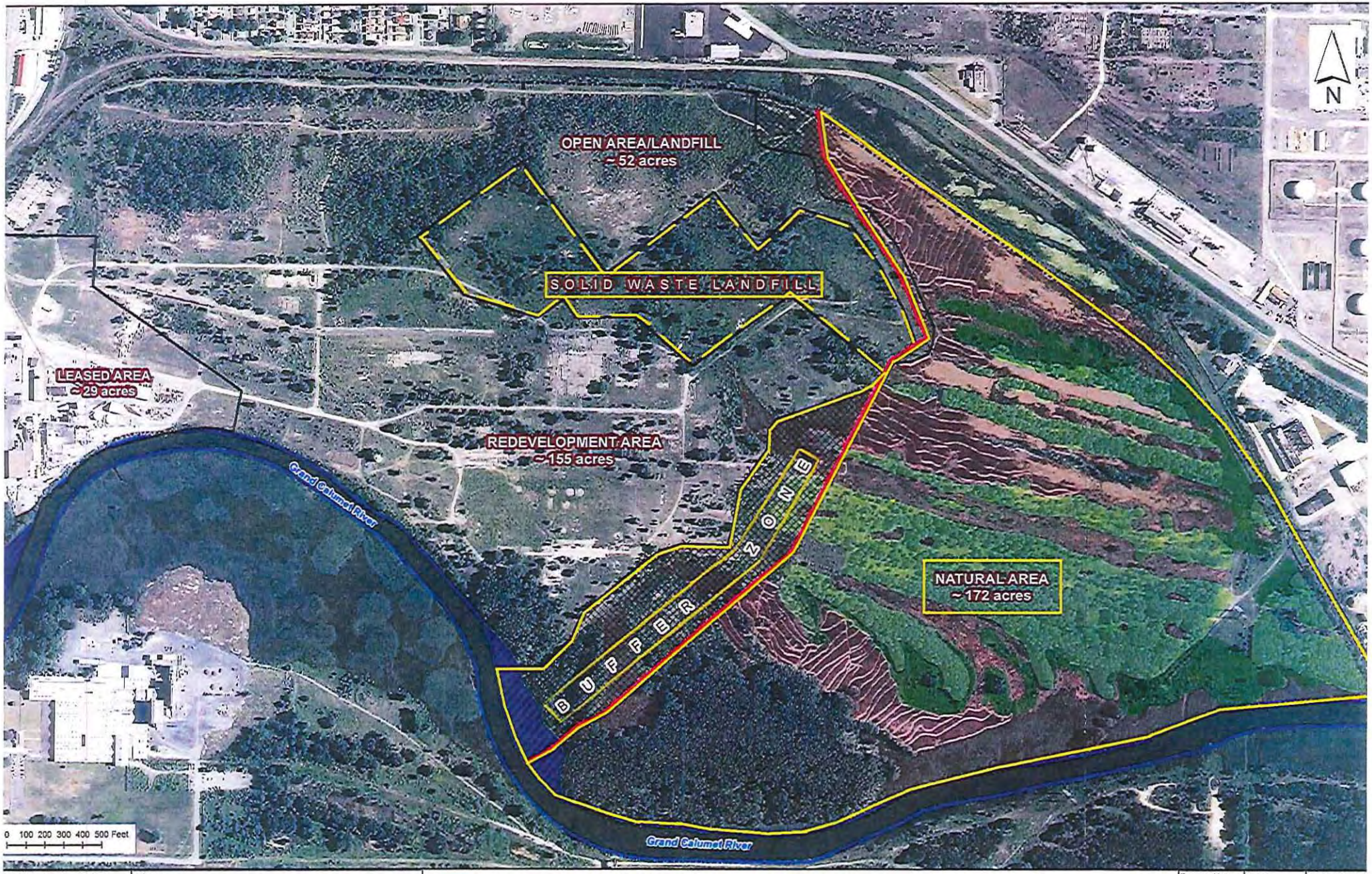
FIGURE 1



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DUPONT

Figure
Natural Area Ridge and Swale Vegetation

Natural Area Evaluation and Management Plan
DuPont East Chicago Facility
East Chicago, Indiana

Current Easement Boundary
New Fence
Extended Buffer Zone (~23 acres)
Future GCR-SRP Shelf Wetlands

Plant Community Mapping
Swale (Wetland)
Dune/Ridge - Mesic Praire
Dune/Ridge - Oak Barrens

River
Property Boundary

Prepared by: Garner Peterson	Date: 6/3/2013	DuPont Project 507942
Reviewed by: Carlos Victoria	Figure	PARSONS Proj 446650

t East Chicago\DUPONT\GIS\East_Chicago\2012- 2013 Remediation\Bufferzone IR\MXDs\NatAreaEvalAndMonitorPlan\Fig_2_Natural_Area_Ridge_and_Swale_Vegetation.mxd