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DECISION DOCUMENT FOR THE REMEDIATION OF

Operable Unit 6 of the Diamond Shamrock Painesville Works

Lake County, Ohio

prepared by

THE OHIO ENVIRONMENTAL PROTECTION AGENCY

October 6, 2005

**I certify this to be a true and accurate copy of the
official document as filed in the records of the Ohio
Environmental Protection Agency.**

Dorey Jacobs date 11-2-05

DECLARATION

SITE NAME AND LOCATION

Operable Unit 6 of the Diamond Shamrock Painesville Works
Lake County, Ohio

STATEMENT OF BASIS AND PURPOSE

This Decision Document presents the selected remedial action for Operable Unit 6 (OU6) of the Diamond Shamrock Painesville Works in Lake County, Ohio, chosen in accordance with the policies of the Ohio Environmental Protection Agency, statutes and regulations of the State of Ohio, and the National Contingency Plan, 40 CFR Part 300.

ASSESSMENT OF THE SITE

Actual and threatened releases of industrial and/or hazardous wastes and substances from previous industrial activities on the property, including coal coking operations and the collection and refining of coal tar byproducts, if not addressed by implementing the remedial action selected in the Decision Document, constitute a substantial threat to public health or safety and are causing or contributing to air or water pollution or soil contamination.

DESCRIPTION OF THE SELECTED REMEDY

Two (2) preferred remedial alternatives have been selected by Ohio EPA, based on the future end-use of the property. Currently, Site developer Lakeview Bluffs LLC, is in the process of applying for a Clean Ohio Revitalization Fund grant from the State of Ohio. If the application is approved for funding, the end-use of the property will be upgraded from active industrial to a combination of residential, recreational and commercial use. In order to address this potential upgrade in end-use, Ohio EPA has presented both remedies as part of this document.

Active Industrial End-Use

- Removal and off-Site disposal or recycling of waste piles currently located within the boundaries of the OU.
- Stabilization of the Lake Erie shoreline to prevent or slow additional erosion.
- Demolition of the Boiler House on the northern portion of the OU and appropriate disposal of the demolition debris.
- Remediation of soils in planned industrial areas which exceed the direct contact risk goal for active industrial use, through the placement of a clean soil cover to achieve a minimum two-foot (2') point of compliance (POC).

Maintenance of the point of compliance will be performed under an operation and maintenance (O&M) agreement.

- Conduct confirmatory sampling and a risk assessment to ensure that the appropriate risk and/or hazard goals have been met for the OU or calculate Site-specific cleanup standards for contaminants of concern (COCs) on the property and demonstrate through confirmatory sampling that these standards have been met.
- Implementation of an Environmental Covenant (activity and use limitations) to allow the use of the property for a mixture of inactive industrial and active industrial use, prohibition of the use of groundwater on the property for potable and non-potable purposes except for groundwater monitoring and treatment, prohibition of construction of subsurface structures (i.e., basements, crawl spaces), prohibition of new construction of habitable structures in areas where VOC levels exceed the indoor air-based risk goals or utilize appropriate vapor control technologies below structures in such areas (eg. vapor barriers or passive vent systems), and implementation of an O&M agreement to limit the excavation of soils on the property in order to maintain a minimum two-foot (2') POC.
- Development of a risk management plan (RMP) to address future issues related to the excavation of soils and potential contact with groundwater on the property during redevelopment and maintenance activities.

Residential / Recreational/Commercial End Use

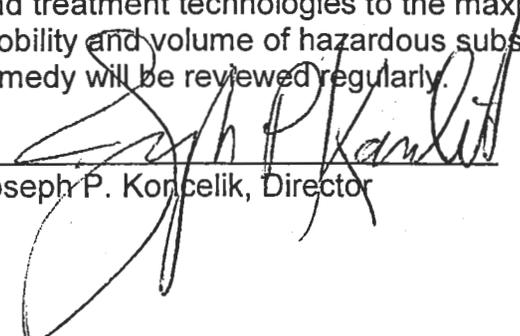
- Removal and off-Site disposal or recycling of waste piles currently located within the boundaries of the OU.
- Stabilization of the Lake Erie shoreline to prevent or slow additional erosion.
- Demolition of all existing structures on the property, including the railroad berms, and appropriate disposal of the demolition debris.
- Remediation of soils in planned commercial and recreational areas which exceed the direct contact risk goal for commercial and recreational use, through the placement of clean soil cover to achieve a minimum two-foot (2') POC. Maintenance of the point of compliance will be performed under an operation and maintenance (O&M) agreement.
- Remediation of soils in planned residential areas which exceed the direct contact risk goal for residential use, through a combination of excavation and placement of clean soil cover to achieve a minimum four-foot (4') POC. Excavated soils which meet the direct contact risk goal for recreational use

will be managed on-Site in areas limited to recreational use only. Maintenance of the point of compliance will be performed under an operation and maintenance (O&M) agreement.

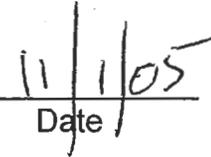
- Conduct confirmatory sampling and a risk assessment to ensure that the appropriate risk and/or hazard goals have been met for the OU or calculate Site-specific cleanup standards for contaminants of concern (COCs) on the property and demonstrate through confirmatory sampling that these standards have been met.
- Implementation of an Environmental Covenant to limit the use of specific portions of the property to commercial or recreational use while allowing residential development on the remainder of the property, prohibition of the use of groundwater on the property for potable and non-potable purposes except for groundwater monitoring and treatment, prohibition of new construction of habitable structures in areas where VOC levels exceed an indoor air-based risk goal or utilize appropriate vapor control technologies below structures in such areas (eg. vapor barriers or passive vent systems), prohibiting the construction of sub-surface structures (i.e., basements and crawl spaces) and implementation of an O&M agreement to limit the excavation of soils on the property in order to maintain a minimum four-foot (4') POC in residential areas and a two-foot (2') POC in recreational and commercial areas.
- Development of a RMP to address future issues related to the excavation and management of soils and potential contact with groundwater on the property during redevelopment and maintenance activities.

STATUTORY DETERMINATIONS

The selected remedial action is protective of human health and the environment, complies with legally applicable state and federal requirements, is responsive to public participation and input and is cost-effective. The remedy utilizes permanent solutions and treatment technologies to the maximum extent practicable to reduce toxicity, mobility and volume of hazardous substances at the Site. The effectiveness of the remedy will be reviewed regularly.



Joseph P. Koncelik, Director



Date

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DECISION SUMMARY

for Operable Unit 6 of the Diamond Shamrock Painesville Works
Lake County, Ohio

1.0 SITE BACKGROUND

1.1 Site History

The Diamond Shamrock Painesville Works is an approximately 1100 acre former chemical manufacturing facility located in Lake County, Ohio (see Figure 1). The Grand River bisects the Diamond Shamrock Painesville Works and Lake Erie borders it to the north. The Diamond Shamrock Painesville Works facility operated from 1912 through 1977 and manufactured a variety of products including, but not limited to, soda ash, baking soda, chromium compounds, carbon tetrachloride, hydrochloric and sulfuric acids, chlorinated wax, and coke. A number of solution mining wells were located on the property for the purpose of extracting salt from deposits located below the Diamond Shamrock Painesville Works for use in manufacturing processes (see Figure 2). They also generated their own electricity in an on-site power plant. A number of individuals and companies purchased property from Diamond Shamrock and operated industrial facilities within the boundaries of the former facility, including an aluminum smelting plant, a polyvinyl chloride monomer facility and a coke plant.

In 1995, Director's Final Findings and Orders (DFFOs) for the performance of a remedial investigation (RI) and feasibility study (FS) at the Diamond Shamrock Painesville Works were signed by Ohio EPA and the following potentially responsible parties (PRPs): Chemical Land Holdings, Inc.; Maxus Energy Corporation; Occidental Chemical Corporation; Painesville Township Board of Trustees; Uniroyal Chemical Company, Inc.; Village of Fairport Harbor; and The Painesville PRP Group. These DFFOs were issued based on historical data collected by Ohio EPA, U.S. EPA and others.

The Diamond Shamrock Painesville Works has been divided into nineteen (19) operable units (OUs, see Figure 3). This Decision Document outlines the remediation of one of the nineteen (19) OUs, known as OU6, formerly known as Parcel 2C1.

OU6 is approximately forty-one (41) acres in size and is located north of Fairport Nursery Road in the north-central portion of the Diamond Shamrock Painesville Works, adjacent to Lake Erie. Coal coking operations formerly took place on this OU, first by Diamond Shamrock and later by the Erie Coke and Chemical Company. Coking operations were discontinued in 1982, and the buildings, tanks and storage vessels were abandoned. Hazardous wastes, PCBs and friable asbestos containing materials, which remained on-Site following abandonment in 1982, were removed by Chemical Land Holdings in 2002 under a time-critical removal Order with the U.S. Environmental Protection Agency.

Currently, Parcel 2C1 is owned by Tierra Solutions, Inc. (TSI - formerly known as Chemical Land Holdings).

1.2 Summary of the Remedial Investigation

The RI was conducted by the Painesville PRP Group and other signatories to the 1995 DFFOs for the Diamond Shamrock Painesville Works and included a number of tasks to identify the nature and extent of site-related chemical contaminants. The Phase I and Phase II Remedial Investigation Reports were approved by Ohio EPA on June 28, 1999, and September 22, 2003, respectively. The investigation included sampling of surface and subsurface soils and groundwater on the property, as well as surface water and sediment sampling from Lake Erie and the Grand River. The data obtained from the RI was used to conduct a baseline risk assessment and to determine the need to evaluate remedial alternatives. This Decision Document contains only a brief summary of the findings of the RI and FS. Please refer to the Phase I Remedial Investigation Report (SECOR, 1999), the Phase II Remedial Investigation Report (SECOR, 2003), the Addendum to the Phase II Remedial Investigation Report (SECOR, 2003), the Lake Erie and Grand River Baseline Risk Assessment (Hull, 2004), and the Feasibility Study Report for OU6 (Hull, 2004) for additional information on contaminant concentrations.

The nature and extent of contamination within OU6 of the Diamond Shamrock Painesville Works, in each environmental medium, and the contaminants of concern (COCs) attributable to this Site, are described below.

1.2.1 Soil Contamination

A total of 200 soil samples were collected from OU6 during the Phase I and Phase II RI. A total of 72 soil samples (29 surface soil and 43 subsurface soil samples) were collected from areas that were not covered by a waste pile. An additional 128 soil samples (63 surface and 65 subsurface soil samples) were collected beneath waste piles. Soil samples were analyzed for metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, hexavalent chromium, cyanide, asbestos, total petroleum hydrocarbons (TPH) and polychlorinated biphenyls (PCBs).

The following COCs were found in both surface soils and total soils within this OU: aluminum; arsenic; cadmium; chromium; hexavalent chromium; copper; lead; manganese; mercury; nickel; thallium; vanadium; VOCs; PCBs; and polycyclic aromatic hydrocarbons (PAHs). Please refer to the Baseline Human Health Risk Assessment, located in Appendix A of the Feasibility Study for Operable Unit OU 6 (Hull, 2004), for the concentrations of COCs detected in surface soils and total soils on the OU.

1.2.2 Waste Pile Contamination

A total of 238 waste piles were identified within the boundaries of OU6. In 2001, through an agreement with the Painesville PRP Group, 128 waste piles, which were

smaller than 10 yd³ in size, were segregated, characterized and appropriately disposed off-Site as either solid or hazardous waste. The remaining 110 large waste piles were segregated into groups using x-ray fluorescence (XRF). A representative number of samples of the waste pile materials were then collected from each group. A total of 131 samples were collected from the large waste piles. These samples were analyzed for target compound list (TCL) metals, including hexavalent chromium and cyanide, VOCs, SVOCs, pesticides, PCBs, and pH, as well as the full list of TCLP (toxicity characteristic leaching procedure) parameters listed in the Ohio Administrative Code (OAC) Section 3745-51-24, Table 1.

A total of twenty-nine (29) COCs were identified in OU6 waste pile materials. These included a variety of metals, pesticides, PCBs and PAHs. Please refer to the Baseline Human Health Risk Assessment, located in Appendix A of the Feasibility Study for Operable Unit OU 6 (Hull, 2004), for the concentrations of COCs detected in waste pile materials on the OU.

1.2.3 Ground Water Contamination

The geology of this portion of the Diamond Shamrock Painesville Works consists predominantly of glacial till and near-surface anthropogenic fill. Fill materials are comprised of gravel cinders, coke residuals and other debris and are generally less than two (2) to three (3) feet in thickness. Native soils consist of a medium to dark gray silty clay with lesser amounts of sand and gravel. This glacial till extends laterally across the entire Site to depths of approximately sixty-two (62) to sixty-eight (68) feet below ground surface. Shale bedrock is present beneath the till. Monitoring wells on the Site are generally completed at depths of thirty (30) to forty (40) feet below ground surface.

Groundwater beneath OU6 flows north-northwest toward Lake Erie and is generally encountered at approximately fifteen (15) feet below ground surface. The water table is relatively flat in this area and becomes steeper to the north along the lake.

Groundwater yield is very limited in this area and very few wells exist in the vicinity of the Site. The closest well is located upgradient, approximately 6,000 feet to the southeast of the Diamond Shamrock Painesville Works, on the opposite side of the Grand River.

Eighteen (18) groundwater samples were collected from this OU. Samples were analyzed for metals, including cyanide and hexavalent chromium, VOCs, SVOCs, pesticides, PCBs and total dissolved solids (TDS). A number of constituents were detected in the groundwater samples. These included metals, VOCs, SVOCs, pesticides, PCBs and TDS. Please refer to the Baseline Human Health Risk Assessment, located in Appendix A of the Feasibility Study for Operable Unit OU 6 (Hull, 2004), for the concentrations of chemicals detected in groundwater on the Site. Groundwater impacts to surface water are discussed in the following section (Section 1.2.4) of this decision document.

1.2.4 Surface Water Contamination

The Lake Erie and Grand River Baseline HRA (Hull, 2003), submitted as part of the Phase II Remedial Investigation Report, Appendix S-I (SECOR, 2003) evaluated both potential releases of COCs from groundwater discharges to the Grand River and Lake Erie using a groundwater fate and transport model (BIOSCREEN) and impacts to surface water, sediment and biota currently posed by the Diamond Shamrock Painesville Works. The evaluation was performed, in part, to determine the potential for contaminants from the Diamond Shamrock Painesville Works to impact persons involved in recreational activities in the Grand River and Lake Erie, as well as people eating fish from the Grand River. Fish ingestion was quantitatively evaluated using historical data, with the current Ohio Department of Health fish advisories for the Grand River and Lake Erie taken into account.

All chemicals detected in groundwater at concentrations above their respective Outside the Mixing Zone Average (OMZA) water quality standards were evaluated for their potential to migrate and discharge into Lake Erie and/or the Grand River. The BIOSCREEN model was used to predict concentrations of chemicals of interest in groundwater at the point of discharge to surface water, assuming the maximum detected concentration in each well migrates to the lake and/or river by the shortest groundwater flow path. The predicted surface water concentrations at the point of discharge to surface water were compared to surface water quality standards for the protection of human health and the environment (non-drinking water standards). Cyanide in groundwater at OU6 was projected, through fate and transport modeling, to exceed the OMZA at the groundwater/surface water interface adjacent to OU6.

Two rounds of surface water sampling were conducted for confirmation of groundwater fate and transport modeling projections. Based on the results, although the model predicts that levels of cyanide in groundwater at OU6 at the point of discharge to Lake Erie may exceed surface water standards, in fact, there are no detected levels of cyanide in the surface water. These findings support a conclusion that if COCs within groundwater are being released, they are not causing a detectable change in ambient water quality within Lake Erie.

Near the bluff, soils containing COCs may reach Lake Erie via surface water runoff, wave action and erosion processes. This was taken into account during evaluation of potential remedies for this OU.

1.2.4 Air Releases

Releases of VOCs to outdoor and indoor air were evaluated through modeling for OU6. Indoor air concentrations are exceeded for a number of VOCs within OU, including acenaphthene, benzene, 1,1-Dichloroethane, and 2-Methylnaphthalene, when the property is evaluated for all use scenarios.

1.2.5 Impacts to Biological Resources

An ecological risk assessment was performed to determine impacts to biological resources. The risk assessment was performed utilizing data collected as part of the Phase I and Phase II Remedial Investigations for the Site. The results of the ecological risk assessment are discussed in Section 2.2, below.

1.3 Interim or Removal Actions Taken to Date

In 2002, Tierra Solutions, Inc. performed a time critical removal under the oversight of U.S. EPA. Asbestos containing materials, PCBs and listed or characteristic hazardous wastes were removed from the property. This included liquids and sludges located in the gas ball, railroad tank car, above ground storage tanks, and piping, as well as a large black tar pile that was characteristically hazardous. The summary report of the interim action work was submitted to U.S. EPA in December 2002.

2.0 SUMMARY OF SITE RISKS

A baseline risk assessment was conducted following U.S. EPA guidance to evaluate current and potential future risks to human health from contaminants present at the Site. The results demonstrated that the existing concentration of contaminants in environmental media pose risks to human receptors at a level sufficient to trigger the need for remedial actions. A residual human health risk assessment was performed, in order to determine that the level of risk that would remain on-Site following implementation of a remedy would be acceptable. In addition, a baseline ecological risk assessment was performed to determine current and potential future impacts to ecological receptors.

2.1 Risks to Human Health

2.1.1 Baseline Human Health Risk Assessment

The objectives of the baseline human health risk assessment were as follows:

- To determine the Site-specific chemicals of interest (COCs);
- To evaluate the complete exposure pathways in OU6 with respect to current and future conditions;
- To estimate the potential exposures to potential receptors via the complete exposure pathways; and,
- To estimate potential non-cancer hazards and cancer risks associated with the COCs for each potential receptor.

The chemical constituents addressed by the baseline human health risk assessment were determined using data collected as part of the Phase I and Phase II Remedial Investigations. Chemical constituents detected in analytical samples from the property were screened against Site-specific background concentrations and health-based screening levels (i.e., U.S. EPA Region IX Preliminary Remediation Goals). Those constituents which exceeded background and health-based screening levels continued through the risk assessment process.

A Site conceptual model was developed in order to visually present a list of the potential receptors (people performing various types of activities) and the types of contaminated media with which they could potentially come into contact (see Figure 5). The types of receptors evaluated for OU6 included the industrial worker, construction/excavation worker, commercial worker, trespasser, resident (both adult and child), and recreator (both adult and child).

Risk and hazard values were calculated for each of the different types of receptors identified for this OU, using U.S. EPA risk assessment guidance. Exposure to multiple chemicals was taken into account in these calculations. In addition, in order to be protective of potential future residents and recreators within OU6, potential risk posed by exposure to Grand River surface water, sediments and fish were added to the cumulative human health risks calculated for future residents and recreators. Potential risks posed by exposure to Lake Erie surface water, sediments and fish were qualitatively assessed.

Ohio EPA requires that remedial alternatives be proposed for a site if it is determined that unacceptable risk exists. For cancer-causing contaminants, the total excess lifetime carcinogenic risk goal (with all contaminants evaluated together) is set at $1E-5$. This equates to a 1 in 100,000 chance of developing cancer from site-related contaminants and is in excess of the background cancer risk that people incur through exposure to carcinogens in everyday life (eg.- cigarette smoke, exposure to gasoline fumes, etc.). For non-carcinogenic (non-cancer) compounds, the non-cancer hazard goal is equal to a Hazard Index (HI) of 1. The HI is determined by adding, as appropriate, multiple hazard quotient (HQ) values which are calculated for each individual contaminant and receptor exposure combination as evaluated in the baseline risk assessment.

Cumulative (total) risks were determined for the active industrial worker (exposure to surface soils, soil volatilizing to indoor air, and groundwater volatilizing to indoor air), construction worker (exposure to total soils and groundwater), resident (exposure to surface soils, Grand River surface water and sediments, soil volatilizing to indoor air, and groundwater volatilizing to indoor air), and recreator (exposure to surface soils and Grand River surface water and sediments). A summary of risk posed to the various types of receptors is as follows:

Receptor Type	Non-Carcinogenic Risk (HI)	Carcinogenic Risk
Industrial Worker	0.8	1 x 10⁻³
Construction /Excavation Worker	12	2 x 10⁻⁴
Trespasser	0.1	2 x 10⁻⁵
Commercial Worker	0.5	1 x 10⁻³
Resident	32 (Adult) / 139 (Child)	2 x 10⁻² (Adult) / 3 x 10⁻² (Child)
Recreator	0.2 (Adult) / 1 (Child)	9 x 10⁻⁵ (Adult) / 1 x 10⁻⁴ (Child)

* Values in **bold** represent risk in excess of risk and/or hazard goals.

2.1.2 Residual Human Health Risk Assessment

Residual risks are those remaining after a remedy is assumed to have been implemented. Residual risks were calculated using the same equations and methodologies presented in the baseline human health risk assessment. Only those potential receptors and media that exceeded non-carcinogenic or carcinogenic risk goals in the baseline human health risk assessment were carried through in the residual human health risk assessment. Maximum concentrations of the COCs driving the risk or hazard were removed from the data set and replaced with the next highest concentration of that COC until the target non-carcinogenic hazard (HI) and the target carcinogenic risk goals were met for each residual exposure scenario. In effect, risks are re-calculated assuming exposure to COCs in these areas that drive risk levels have been remedied in some manner.

Results of the baseline human health risk assessment indicated that evaluation of remedial alternatives is warranted for the industrial worker (for soil acting as a source to indoor air only), adult and child residents (for direct-contact pathways and soil acting as a source to indoor air) and the construction worker. Figures 3 and 4 illustrate the results of the residual human health risk assessment and the approximate areas that exceed risk and hazard goals for OU6, and therefore require remedial action. More detailed information regarding the remediation that will be required to meet acceptable risk is included in the Feasibility Study for Operable Unit OU6 (Hull, 2004).

2.2 Risks to Ecological Receptors

The objectives of the Baseline Ecological Risk Assessment were as follows:

- To identify the COCs for the waste pile materials and surface soil (0 - 4'), based on data collected during Phase I and Phase II RI sampling activities;
- Compare the concentrations of the COCs to screening-level soil quality

benchmarks for soil flora and fauna;

- Determine the potential risks to wildlife using a food web model based on Ohio EPA and U.S. EPA guidance.

The receptors of interest (ROIs) selected to represent the ecological resources in OU6 were (1) soil flora and fauna, including plants, soil invertebrates such as earthworms and microbes, and (2) wildlife species, including plant-eating (herbivorous) and invertebrate-eating (invertivorous) birds and mammals. The wildlife species selected as ROIs for this ecological risk assessment were the northern bobwhite (*Colinus virginianus*) and the meadow vole (*Microtus pennsylvanicus*) as terrestrial herbivores, and the American woodcock (*Scolopax minor*) and the short-tailed shrew (*Blarina bevicauda*) as terrestrial invertivores.

The ecological risk assessment results indicated that risks to ecological receptors potentially present at OU6 under current Site conditions are significant. The risk is a result of exposure to ten (10) COCs in waste piles and eleven (11) COCs in surface soils. Please refer to the Ecological Risk Assessment for OU6 (Hull, 2003), which has been included as Appendix C in the Feasibility Study for Operable Unit OU6 (Hull, 2005).

3.0 FEASIBILITY STUDY

A FS was conducted by the Painesville PRP Group and other signatories to the 1995 DFFOs for the Diamond Shamrock Painesville Works to define and analyze appropriate remedial alternatives. That study was conducted with oversight by Ohio EPA, and was approved on April 20, 2005. The RI and FS are the basis for the selection of Ohio EPA's preferred remedial alternative.

4.0 REMEDIAL ACTION OBJECTIVES

As part of the RI/FS process, remedial action objectives (RAO's) were developed in accordance with the National Contingency Plan (NCP), 40 CFR Part 300, which was promulgated under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended, and U.S. EPA guidance. The RAOs are goals that a remedy should achieve in order to ensure the protection of human health and the environment. The goals are designed specifically to reduce the potential adverse effects of site contaminants present in environmental media to an acceptable risk level.

The following RAOs have been established for the Diamond Shamrock Painesville Works, including OU6, in order to address risk posed by exposure to all media including the Grand River:

- **A carcinogenic risk goal of 1E-5.** This Site-specific risk goal has been established for the Diamond Shamrock Painesville Works and OU6, in compliance with the National Oil and Hazardous Substances Pollution Contingency Plan (“NCP”, U.S. EPA, 1994) and Ohio EPA Division of Emergency and Remedial Response guidance. The NCP identifies a human health carcinogenic risk range of 1E-4 (1 in 10,000) to 1E-6 (1 in 1,000,000) be met following Site remediation. As previously discussed, the risk accounted for within the Site-specific goal is that which is in excess of normal everyday risks to which people are exposed.
- **A non-carcinogenic hazard goal of 1.** This hazard goal was established for the Site in compliance with requirements specified under the NCP and DERR guidance.

It should be noted that both the carcinogenic and non-carcinogenic human health risk and hazard goals for this OU include risks posed by contact with Lake Erie and Grand River water and sediment, as well as the ingestion of fish. Although important ecological resources (e.g., endangered species) are not currently an issue within this OU, if they do exist in the future, suitable risk-based standards will be applied to this Site.

5.0 SUMMARY OF REMEDIAL ALTERNATIVES

A total of four (4) remedial alternatives were considered in the FS. A brief description of the major features of each of the remedial alternatives follows. More detailed information about these alternatives can be found in the Feasibility Study for Operable Unit OU6 (Hull, 2005).

5.1 Alternative ALT OU6-A

FS Alternative ALT OU6-A is a “no action” remedial alternative. The NCP requires evaluation of a “no action” alternative in order to establish a baseline for the comparison of other remedial alternatives. Under this alternative, no remedial activities or monitoring are performed.

5.2 Alternative ALT OU6-B

FS Alternative ALT OU6-B is an inactive industrial/active industrial land use alternative, which meets risk goals through a combination of the following: establishment of an Environmental Covenant (activity and land use limitations); waste pile removal and off-Site disposal or recycling; shoreline protection; demolition of the Boiler house; covering impacted soils that exceed direct contact RAOs for active industrial use; and implementation of an RMP. The Environmental Covenant would include: limiting portions of the Site to inactive industrial use, while allowing active industrial use on the remaining portions; prohibiting groundwater extraction for potable and non-potable use

with the exception of groundwater monitoring and treatment; prohibiting the construction of subsurface structures (i.e., basements and crawl spaces); prohibiting new construction of habitable structures in areas where VOC levels exceed indoor air-based RAOs or exposed soils exceed direct contact RAOs; and maintaining a minimum two-foot (2') point of compliance (POC) in areas of active industrial land use. The RMP would be designed to prevent unacceptable exposures to maintenance and construction workers needing access to limited areas and/or involved in construction, excavation or Site maintenance activities.

5.3 Alternative ALT OU6-C

FS Alternative ALT OU6-C is a combined residential, commercial, and recreational land use alternative, which meets risk goals through a combination of the following: establishment of an Environmental Covenant (activity and land use limitations); waste pile removal and off-Site disposal or recycling; shoreline stabilization; demolition of existing structures (including railroad berms); covering of impacted soils in areas that exceed direct contact RAOs for commercial and/or recreational use; combining excavation and covering of impacted soils in areas that exceed direct contact RAOs for residential use with on-Site management of excavated soils that meet recreational direct contact risk goals; and an RMP. The Environmental Covenant would include: limiting portions of the Site to recreational or commercial use, while allowing residential use in the remaining portions of the Site, as appropriate; prohibiting groundwater extraction for potable and non-potable use with the exception of groundwater monitoring and treatment; prohibiting the construction of subsurface structures (i.e., basements and crawl spaces); prohibiting new construction of habitable structures in areas where VOC levels exceed indoor air-based RAOs, or utilizing appropriate vapor control technologies (i.e., vapor barriers or passive vent systems), to address potential indoor air concerns; and maintaining a minimum two-foot (2') POC in areas of commercial and recreational land use and a minimum four-foot (4') POC in areas of residential land use. As with the other alternatives, the RMP would be designed to prevent unacceptable exposures to maintenance and construction workers during post-remedial activities.

5.4 Alternative ALT OU6-D

FS Alternative ALT OU6-D is identical to Alternative ALT OU6-C, except that excavated soils would be disposed off-Site, rather than managed on-Site. It is anticipated that most, if not all, of the excavated soils generated under this alternative would be disposed off-Site as a solid waste.

6.0 COMPARISON AND EVALUATION OF ALTERNATIVES

6.1 Evaluation Criteria

In selecting the remedy for this Site, Ohio EPA considered the following eight criteria as outlined in U.S. EPA's National Contingency Plan (NCP) promulgated under CERCLA (40 CFR 300.430):

1. Overall protection of human health and the environment - Remedial alternatives shall be evaluated to determine whether they can adequately protect human health and the environment, in both the short- and long-term, from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the Site.
2. Compliance with ARARs - Remedial alternatives shall be evaluated to determine whether a remedy will meet all of the applicable or relevant and appropriate requirements under State and Federal and Local environmental laws;
3. Long-term effectiveness and permanence - Remedial alternatives shall be evaluated to determine the ability of a remedy to maintain reliable protection of human health and the environment over time, once pollution has been abated and RAOs have been met. This includes assessment of the residual risks remaining from untreated wastes, and the adequacy and reliability of controls such as containment systems and institutional controls;
4. Reduction of toxicity, mobility, or volume through treatment - Remedial alternatives shall be evaluated to determine the degree to which recycling or treatment are employed to reduce toxicity, mobility, or volume, including how treatment is used to address the principal threats posed by the Site;
5. Short-term effectiveness - Remedial alternatives shall be evaluated to determine the following: (1) Short-term risks that might be posed to the community during implementation of an alternative; (2) Potential impacts on workers during remedial action and the effectiveness and reliability of protective measures; (3) Potential environmental impacts of the remedial action and the effectiveness and reliability of mitigative measures during implementation; and (4) Time until protection is achieved;
6. Implementability - Remedial alternatives shall be evaluated to determine the ease or difficulty of implementation and shall include the following as appropriate: (1) Technical difficulties and unknowns associated with the construction and operation of a technology, the reliability of the technology, ease of undertaking additional remedial actions, and the ability to monitor the effectiveness of the remedy ; (2) Administrative feasibility, including activities needed to coordinate with other offices and agencies and the ability and time required to obtain any

necessary approvals and permits from other agencies (for off-Site actions); and (3) Availability of services and materials, including the availability of adequate off-Site treatment, storage capacity, and disposal capacity and services; the availability of necessary equipment and specialists, and provisions to ensure any necessary additional resources; the availability of services and materials; and the availability of prospective technologies;

7. Cost - Remedial alternatives shall evaluate costs and shall include the following: (1) Capital costs, including both direct and indirect costs; (2) Annual operation and maintenance costs (O&M); and (3) Net present value of capital and O&M costs.; The cost estimates include only the direct costs of implementing an alternative at the Site and do not include other costs, such as damage to human health or the environment associated with an alternative. The cost estimates are based on figures provided by the Feasibility Study.
8. Community acceptance - Remedial alternatives shall be evaluated to determine which of their components interested persons in the community support, have reservations about, or oppose.

Evaluation Criteria 1 and 2 are threshold criteria required for acceptance of an alternative that has accomplished the goal of protecting human health and the environment and complied with the law. Any acceptable remedy must comply with both of these criteria. Evaluation Criteria 3 through 7 are the balancing criteria for picking the best remedial alternatives. Evaluation Criteria 8, community acceptance, was determined, in part, by written responses received during the public comment period and statements offered at the public meeting.

6.2 Analyses of Evaluation Criteria

This section looks at how each of the evaluation criteria is applied to each of the remedial alternatives found in Section 5.0 and compares how the alternatives achieve the criteria.

6.2.1 Overall Protection of Human Health and the Environment

The assessment of cancer risks and non-cancer hazards to human receptors requires that exposure pathways be identified and the risks and hazards of each pathway be numerically estimated. The following chemical exposure routes have been identified: direct contact to soils; direct contact to groundwater; exposure to volatile contaminants from soils and groundwater; direct contact to Grand River surface water and sediments; and the ingestion of fish from the Grand River and Lake Erie. A variety of human receptors, including industrial and construction workers, recreators and residents were evaluated for exposure to COCs through these routes of exposure. A discussion of the results of risks posed to human health is presented in Section 2.0 of this decision document.

Although unacceptable risk to ecological receptors is present within the OU, remedial goals have not been established to address ecological risks, since the proposed remedial alternatives presented within this decision document will result in the elimination of habitat for those receptors. This being the case, only protection of human health is discussed within this section.

Alternative ALT OU6-D would provide the most protection for human health because it would involve the removal of not only waste pile materials from the OU, but also soils which exceed direct contact in residential use areas. Residential, commercial and recreational areas which do not currently meet risk-based standards would be excavated and/or covered with clean soils, in order to meet their respective minimum POCs of four-feet (4') and two-feet (2'), respectively. Buildings would not be allowed to be located in areas where risk-based standards cannot be met due to the potential for indoor-air contamination from VOCs. Groundwater use would be limited for potable and non-potable purposes except for groundwater monitoring and treatment and a RMP will be developed to address risks posed to commercial workers through direct contact with soils and groundwater.

Alternative ALT OU6-C would provide similar protection for human health, with the only difference being that soils exceeding residential risk-based standards would be managed on-Site, instead of disposed off-Site. Contaminated soils managed on-Site would have to meet recreational risk-based standards.

Alternative ALT OU6-B is protective for the active industrial worker only. Since the remedy does not clean up the property to residential and recreational standards, an Environmental Covenant (activity and use limitations) would be required to limit the property to active industrial usage. A minimum two-foot (2') POC would be required to insure protection of human receptors under this alternative. As with ALT OU6-C and ALT OU6-D, waste pile materials would be removed from the OU.

Alternative ALT OU6-A is not protective of human receptors, since, as a “no action” baseline alternative, ALT OU6-A does not include any remedial activities or activity and land use limitations.

Although it has been determined that, at the present time, significant risk exists to ecological receptors on OU6, Alternatives ALT OU6-B, ALT OU6-C and ALT OU6-D would result in reuse of the property in such a way that habitat for significant ecological receptors would be eliminated. Therefore, these alternatives would adequately address ecological risk by severing the pathway between the receptors (plants and animals) and contaminated soils on the OU.

Alternative ALT OU6-A would not be protective of ecological receptors, since this “no action” alternative does not remediate contaminants which pose potential risk to flora and fauna.

6.2.2 Compliance with (ARARs)

Alternatives ALT OU6-B, ALT OU6-C, and ALT OU6-D would all be in compliance with ARARs as long as the appropriate institutional activity and use limitations are maintained. At a minimum, a stormwater construction permit from Ohio EPA, Division of Surface Water, and construction permits from the U.S. Army Corps of Engineers and Ohio Department of Natural Resources would be required for installation of the shoreline protection structure.

Alternative ALT OU6-A is not in compliance with ARARS, because it does not meet the risk goals for the OU. Human health is not protected for either direct contact with contaminated soils, ingestion of contaminated soils or contact with groundwater.

6.2.3 Long-Term Effectiveness and Permanence

Alternative ALT OU6-D meets the long-term effectiveness and permanence criteria more satisfactorily than the other remedial alternatives presented in the FS. This remedial alternative is the only one involving the removal of contaminated soils and , waste pile materials. The required minimum two- to four-foot (2' - 4') POC would be maintained, as necessary, through the placement of clean soils, which would be performed under an O&M agreement. An Environmental Covenant would be put into place to address activity and use limitations on the property.

Alternatives ALT OU6-B and ALT OU6-C also meet this criteria through the maintenance of applicable POCs and an Environmental Covenant. Both of these alternatives would require not only the removal of waste pile materials, but also the placement of clean soils.

Alternative ALT OU6-A does not meet this criteria because, as a “no action” alternative, it does not involve any remedial activities to reduce risk to acceptable levels.

6.2.4 Reduction of Toxicity, Mobility or Volume Through Treatment

All of the proposed remedial alternatives are equal in this criterion, since none of them involve either recycling or treatment.

6.2.5 Short-Term Effectiveness

Alternatives ALT OU6-B, ALT OU6-C, and ALT OU6-D, provide the same general level of short-term effectiveness. Risk to the community would be slightly increased due to construction traffic. Potential exposure of workers to contaminated soils and waste pile materials may occur during the implementation of the remedy and ecological impact may occur during these activities. In addition, impact to ecological receptors and Lake Erie may occur during shoreline stabilization activities. Remedial activities for all three of these remedies would be completed in six (6) to twelve (12) months.

Alternative ALT OU6-A does not comply with the risk-based goals established for the Site, and therefore does not meet the criteria for short-term effectiveness.

6.2.6 Implementability

Alternatives ALT OU6-B, ALT OU6-C, and ALT OU6-D are comparable in levels of implementability. Excavation and placement of soils, removal of waste pile materials and construction of a shoreline stabilization system can be performed using standard construction and remediation techniques. Clean soils and materials needed for stabilization of the Lake Erie shoreline are easily obtained. Permits will be required from the U.S. Army Corps of Engineers and the Ohio Department of Natural Resources to construct the shoreline stabilization system. Alternative ALT OU6-C may require Ohio EPA approval for on-Site management of excavated soils.

Alternative ALT OU6-A is the easiest of the alternatives to implement because it does not involve any remedial action. However, since this remedy does not meet the risk goals identified for the Site, it cannot be selected as Ohio EPA's preferred remedial alternative.

6.2.7 Cost

The present worth cost (2005 value) for each remedial alternative, including operation and maintenance, is as follows:

Alternative	Description / End Use	Cost (including O&M)
ALT OU6-A	No Action Alternative	\$0
ALT OU6-B	Active Industrial	\$ 6,140,000
ALT OU6-C	Recreational / Residential / Commercial	\$ 9,483,000
ALT OU6-D	Recreational / Residential / Commercial	\$ 17,554,000

6.2.8 Community Acceptance

The Ohio EPA received comments on the Preferred Plan from interested parties during the public comment period and at the public meeting held at the Painesville Township Hall on July 7, 2005. Those comments and Ohio EPA's responses are included in the Responsiveness Summary.

7.0 SELECTED REMEDIAL ALTERNATIVE

Two (2) remedial alternatives have been selected by Ohio EPA for remediation of OU6 of the Diamond Shamrock Painesville Works. These remedial alternatives differ due to the planned end-use of the property. Based on historical use of the property, Ohio EPA is not requiring a remedy beyond active industrial use. However, since the potential exists for development of the property for residential use in the future, Ohio EPA is recommending that a contingency remedy be selected which complies with a residential/recreational commercial end use. The major components of both remedial alternatives are provided below.

7.1 Alternative ALT OU6-B - Active Industrial End-Use

Alternative ALT OU6-B is an active industrial end-use remedy. This remedial alternative consists of the following:

- Placing two-feet (2') of clean soils over areas IND-2 through IND-9, which exceed direct contact standards for active industrial use, and seeding portions of areas IND-2 through IND-9 which will not be developed for active industrial use (e.g. parking lots, buildings or other facilities) in order to promote vegetative growth for landscaping purposes.
- Conducting confirmatory sampling and a risk assessment to ensure that the appropriate risk and/or hazard goals have been met for the OU.
- Establishing an enforceable Environmental Covenant which allows for active industrial use across much of the Site, prohibits the location of future buildings on OU6 in one area (Area IND-1), limits the construction of buildings to slab-on-grade (no basements or crawl-spaces permitted), and prohibits the construction of habitable structures in areas where VOC levels exceed the indoor air-based risk goals or requires the utilization of appropriate vapor control technologies below structures in such areas (e.g., vapor barriers or passive vent systems). In addition, the potable and non-potable use of groundwater beneath OU6 will be prohibited except for groundwater monitoring and treatment and the limitation will specify the duty to inform persons, as necessary, of the environmental conditions of the property and the elements of the RMP. The RMP will outline specific safety components for construction workers and those maintenance workers, if any, that perform infrequent excavation activities in the future on the property and will address the management of excavated materials.
- Removing and either recycling or disposing waste pile materials in a licensed solid waste disposal facility.
- Demolition and disposal of the Boiler House located on the bluff overlooking Lake Erie.

- Establishment of an O&M Agreement between Ohio EPA and the PRPs to demonstrate that the activity and use limitations specified in the Environmental Covenant (including the maintenance of the minimum two-foot (2') POC across the OU) remain in effect and are not being violated.
- Establishment and Ohio EPA approval of an RMP for the areas of OU6 that do not meet direct contact risk and hazard goals for the construction worker receptor in order to protect them from exposure to contaminated soils and groundwater during post-remedial construction/ development activities and will also address the management of excavated materials.

7.1.1 Removal of Waste Piles

The remedial components of ALT OU6-B include the off-Site transportation of waste pile materials. Waste pile materials will be temporarily staged on-Site prior to off-Site transportation and disposal or recycling. Due to their categorization as a solid waste, the waste pile materials must be staged within the foot-print of the original area of disposal.

Performance Standards

- The performance standard is met if all waste piles existing within the boundaries of the OU are removed under a work plan approved by Ohio EPA and the waste pile materials are handled in either of the following ways: (1) disposed as a solid waste; or (2) separated to permit recycling, with the non-useable portion (i.e., materials other than coal or coke) disposed as a solid waste.
- The performance standard is met if within thirty (30) days following shipment of the waste pile materials from OU6, written verification (e.g., waste manifests) of the appropriate disposal or recycling of the material is submitted to Ohio EPA.

7.1.2 Placement of Soils and Maintenance of Cover

Alternative ALT OU6-B involves a significant amount of earthwork. Fill materials will be utilized to establish a minimum two-foot (2') POC in areas of the OU which currently do not meet the direct contact risk and/or hazard goals for active industrial use, except for area IND-1, which will be subject to an Environmental Covenant that prevents unauthorized access and prohibits future development.

A survey will be performed following the completion of filling and grading activities at OU6. This survey will consist of: (1) verification that appropriate surface elevations have been met through an elevation survey; and (2) verification that soil depths are compliant with POC requirements through the collection of soil borings.

As part of the redevelopment, the clean soil cover will either be seeded with grass or other vegetative cover or covered with pavement and structures (where appropriate). Establishment of a vegetative layer and implementation of stormwater and erosion control measures during redevelopment construction are considered components of the cover installation. The approximate limits of remedial excavation and cover activities for an active industrial remedy are shown in Figure 4.

An O&M Agreement between Ohio EPA and the PRPs will be established to maintain the required POC on the property. Long-term landscaping and general property maintenance activities such as mowing, mulching, etc., are expected to adequately address any long-term maintenance needs that may arise. Periodic reviews will be conducted to ensure that the POC is met across OU6.

Performance Standards

Construction Worker

The performance standard is met by the establishment of and adherence to a RMP for the entirety of OU6. A notice of the RMP will be recorded on the property deed at the Lake County Recorder's Office, and will include requirements necessary to protect construction workers (e.g., safety planning, air monitoring, soil handling procedures) from exposure to contaminated soils and groundwater in excess of risk and hazard goals during post-remedial construction and development activities. The RMP will require that Ohio EPA be notified 15 days prior to the planned initiation of construction activities involving excavation.

Active Industrial Areas

The performance standard is met if the areas identified on Figure 4 as IND-2 through IND-9, to be utilized for active industrial purposes, based on current Site redevelopment plans, meet a two-foot (2') point of compliance (POC), as demonstrated through the following:

-Upon completion of excavation, filling and grading activities, confirmation sampling will be performed across the entirety of OU6, with the exception of the portion of the OU identified as IND-1 on Figure 4, extending to a depth of 2'. Confirmatory sampling will be designed to be statistically representative and will be performed using a random grid method, as described in SW-846, Chapter 9 (U.S. EPA, 1986). Analytical results will be used to perform an OU-wide risk assessment utilizing the methodologies and assumptions provided in Appendix A of this Decision Document. Results of the risk assessment must demonstrate that the cumulative risk goal of 1E-5 and cumulative hazard goal of 1 have been met for all chemicals and media of concern impacting receptors in OU6. The post-remedy risk assessment shall be submitted to Ohio EPA within sixty (60) days following the completion of filling and grading activities.

- Upon completion of filling and grading activities, a survey will be performed on OU6 in order to demonstrate that the applicable 2' minimum POC has been achieved in all active industrial areas. Results of the survey, demonstrating compliance with the applicable minimum POC, will be submitted to Ohio EPA within sixty (60) days following the completion of filling and grading activities. Periodic reviews will be conducted under and O&M agreement to ensure that the applicable POC is met in active industrial areas.

7.1.3 Boiler House Demolition/Disposal

The Boiler House located on the bluff overlooking Lake Erie will be removed. Demolition and disposal activities will be performed in compliance with State and Federal rules and regulations. Asbestos abatement will be required prior to building demolition and will be performed with the oversight of Ohio EPA and the Lake County General Health District. Any wastes remaining on the property must be characterized for proper disposal, including those found within the Boiler House.

Performance Standards

- The performance standard is met if the Boiler House structure on the property is removed. Building demolition will occur under the required State, Federal and local permits, licenses and authorizations and wastes created by the demolition will either be (1) reused on the property, if it is determined to be "clean, hard fill" and does not cause an exceedence of risk and/or hazard goals for the OU, (2) disposed in a licensed facility as demolition debris, (3) disposed in a licensed facility as a solid waste, or (4) disposed in a licensed facility as a hazardous waste.
- The performance standard is met if within (60) days following completion of demolition activities, written verification (e.g., letter of notification for reuse or waste manifests) of the appropriate disposal or reuse of structure materials is provided to Ohio EPA.

7.1.4 Shoreline Protection Structure Installation

In order to slow or prohibit additional erosion along the Lake Erie shoreline within this OU, an engineered shoreline protection structure will be installed as part of the remedy for the Site. This structure will be installed across the entire length of the OU.

Performance Standards

- The performance standard is met if the engineered shoreline protection structure is installed across the entire length of the OU under a work plan approved by Ohio EPA, including copies of all applicable permits from both the U.S. Army Corps of Engineers and the Ohio Department of Natural Resources.

- The performance standard is met if a construction completion report, providing specific details regarding shoreline protection structure location and construction, is supplied to Ohio EPA within sixty (60) days of the completion of the installation of the engineered structure.

7.1.5 Environmental Covenant and O&M Agreement

An Environmental Covenant specifying activity and use limitations will be employed to preclude the construction of habitable subsurface structures (i.e. basements and crawl-spaces) on the entirety of OU6 and the construction of habitable structures in areas which exceed the indoor air-based risk goals unless appropriate vapor control technologies are utilized below structures in such areas (e.g., vapor barriers or passive vent systems). Additionally, the areas associated with IND-1, which exceeds direct contact risk and/or hazard goals for active industrial use, will be fenced and subject to activity and use limitations precluding the use of that portion of the OU for industrial activities. The Environmental Covenant will also prohibit groundwater use for potable and non-potable purposes except for groundwater monitoring and treatment. The applicable minimum POC will be maintained through an O&M Agreement. Specifically, a 2' minimum POC will be established for soils in areas which exceed direct contact risk and/or hazard goals for active industrial use (with the exception of area IND-1).

Performance Standards

- The performance standard is met if an Environmental Covenant, which includes activity and use limitations that: a) prohibit the construction of habitable subsurface structures (e.g., basements, crawl-spaces) on OU6; b) prohibit the construction of habitable structures in areas which exceed the indoor air-based risk goals unless appropriate vapor control technologies (e.g., vapor barriers or passive vent systems) are utilized below structures in such areas; c) fence off and prohibit the use of the area designated on Figure 4 as IND-1 on OU6; d) prohibit potable and non-potable groundwater usage on the entirety of OU6 with the exception of groundwater monitoring and treatment; and e) require all post-remedial construction activities be completed under an RMP, is executed between Ohio EPA and the PRPs.
- The performance standard is met if within thirty (30) days of the execution of the Environmental Covenant, documentation is provided to Ohio EPA that the executed Environmental Covenant has been recorded at the Lake County Recorder's Office.
- The performance standard is met if periodic monitoring, per an O&M Agreement between Ohio EPA and the PRPs, demonstrates that the activity and use limitations specified in the Environmental Covenant remain in effect and are not being violated.

7.2 Alternative ALT OU6-C - Residential / Commercial / Recreational End Use

Alternative ALT OU6-C is a combination residential, commercial and recreation end use alternative which consists of the following activities:

- In residential areas where direct-contact risk and/or hazards exist, a four-foot (4') point of compliance will be achieved by one or more of the following actions:
 - Removal of soils that exceed risk and/or hazard goals for residential use to depths of up to four feet (4'), with placement of clean fill soil as necessary to meet residential RAOs in the top four feet (4') of soil; and/or
 - Placement of four feet (4') of clean soil cover over areas where soils exceed risk and/or hazard goals for residential use.
- In commercial and recreational areas where direct-contact risk and/or hazards exist, a two-foot (2') point of compliance will be achieved by one or more of the following actions:
 - Removal of soils that exceed risk and/or hazard goals for recreational and/or commercial use to depths of up to two feet (2'), with placement of clean fill soil as necessary to meet recreational RAOs in the top two feet (2') of soil; and/or
 - Placement of two feet (2') of clean soil cover over areas where soils exceed risk and/or hazard goals for recreational and/or commercial use.
- Conducting confirmatory sampling and a risk assessment to ensure that the appropriate risk and/or hazard goals have been met for the OU. Risk and/or hazards presented by exposure of residents and recreators to Grand River surface water, sediments and fish will be included in this cumulative risk assessment (see Appendix A, Table 8 for the summary of risks and/or hazards which must be added to the risks and/or hazards calculated for OU6 media).
- Removing and either recycling or disposing waste pile materials in a licensed solid waste disposal facility.
- Demolishing existing above-grade structures, including all remaining buildings, a gas storage structure, and railroad berms that run across the southern and eastern portions of the OU. Miscellaneous debris, including abandoned vehicles, will be removed. Asbestos abatement activities will be completed prior to building demolition, and all residuals will be appropriately managed.

- Establishing an enforceable Environmental Covenant which allows for combined residential, commercial and recreation use of the property, limits the construction of habitable buildings within OU6 to specified areas, limits the construction of buildings to slab-on-grade (no basements or crawl-spaces permitted), and prohibits residential development in designated on-Site Soil Management Areas, limiting these areas to recreational use only. In addition, the use of groundwater beneath OU6 will be prohibited for potable and non-potable purposes with the exception of groundwater monitoring and treatment and the limitation will specify the duty to inform persons, as necessary, of the environmental conditions of the property and the elements of the RMP. The RMP will outline specific safety components for construction workers and those maintenance workers, if any, that perform infrequent excavation activities in the future on the property and will address the management of excavated materials.
- Establishment of an O&M Agreement between Ohio EPA and the PRPs to demonstrate that the activity and use limitations specified in the Environmental Covenant remain in effect and are not being violated.
- Establishment and Ohio EPA approval of an RMP for the areas of OU6 that do not meet direct contact risk and hazard goals for the construction worker receptor in order to protect them from exposure to contaminated soils and groundwater during post-remedial construction and development activities.

7.2.1 Removal of Waste Piles

The remedial components of ALT OU6-C include the off-Site transportation of waste pile materials. Waste pile materials will be temporarily staged on-Site prior to off-Site transportation and disposal or recycling. Due to their categorization as a solid waste, the waste pile materials must be staged within the original area of disposal.

Performance Standards

- The performance standard is met if all waste piles existing within the boundaries of the OU are removed under a work plan approved by Ohio EPA and the waste pile materials are handled in either of the following ways: (1) disposed as a solid waste; or (2) separated to permit recycling, with the non-useable portion (i.e., materials other than coal or coke) disposed as a solid waste.
- The performance standard is met if within thirty (30) days following shipment of the waste pile materials from OU6, written verification (e.g., waste manifests) of the appropriate disposal or recycling of the material is submitted to Ohio EPA.

7.2.2 Soil Excavation and Placement of Clean Soils

In general, ALT OU6-C consists of achieving a four-foot (4') point of compliance for planned residential areas and a two-foot (2') point of compliance for planned

commercial and recreational areas through a combination of soil removal and placement of clean soil cover to eliminate direct contact exposure to contaminated soils. The depth of soil removal may range from zero (0) to four (4) feet or greater, with placement of clean soil fill where confirmation sampling data indicate that residual risks and/or hazards remain above the remedial goals. Relocation of soils onto other portions of the OU must be performed in compliance with Federal, State and local laws, rules and regulations. Soils from off-Site sources may be utilized as fill on the property and must be sampled prior to placement on the Site. It is the PRP's responsibility to ensure that soils brought onto the property do not lead to an exceedence of risk and/or hazard goals established for OU6. This will be documented within the post-remediation risk assessment, conducted using data from confirmatory sampling. Where confirmation sampling data demonstrate that soil removal alone is sufficient in achieving risk goals for residential use, no clean soil cover will be necessary. Confirmation sampling will be performed across the entirety of OU6 and will extend to the appropriate depth of either 2' or 4', in order to demonstrate that the point of compliance is achieved. Sampling will be performed in a random manner utilizing methodologies presented in SW-846, Chapter 9 (U.S. EPA, 1986). Samples will be analyzed for TAL metals, TCL volatiles, TCL semivolatiles, TCL pesticides and PCBs, hexavalent chromium and cyanide.

A 4-foot point of compliance (POC) is proposed to account for limited landscaping activities that may be conducted by future residents in residential areas. Because subsurface structures (i.e., basements and crawl spaces) will be prohibited through an Environmental Covenant, a deeper point of compliance is not required. Buildings located over these areas will be restricted to slab-on-grade (i.e., no basements or crawl spaces). The performance standards for the Environmental Covenant are discussed in Section 7.2.5, below.

The various components of ALT OU6-C involve a significant amount of earthwork, including on-Site and off-Site transportation of soils. Assuming a uniform cut of four (4) feet in all designated residential areas, a maximum estimate of 62,000 cubic yards (cy) of soils would be removed and managed in designated areas on-Site. An estimated 3,500 cy of additional soil would be removed as part of slope regrading activities, and an additional 28,000 cy would be handled during railroad berm demolition activities. Excavated soils from residential areas would be temporarily staged on-Site prior to placement in designated on-Site Soil Management Areas within recreational or commercial areas. Approximately 73,000 cy of clean soil fill would be transported to the Site to fill excavated areas and achieve a two-foot (2') or four-foot (4') POC, as appropriate.

A survey will be performed following the completion of excavation, filling and grading activities at OU6. This survey will consist of: (1) verification that appropriate surface elevations have been met through an elevation survey; and (2) verification that soil depths are compliant with POC requirements through the collection of soil borings.

As part of the redevelopment, the clean soil cover will either be seeded with grass and other vegetation or covered with pavement and structures (where appropriate).

Establishment of a vegetative layer and implementation of stormwater and erosion control measures during redevelopment construction are considered components of the cover installation. The approximate limits of remedial excavation and cover activities are shown on Figure 4.

An O&M Agreement between Ohio EPA and the PRPs will be established to maintain the required POCs on the property. Long-term landscaping and general property maintenance activities (e.g., mowing, mulching) will assist in addressing long-term maintenance needs that may arise. Periodic reviews will be conducted to ensure that the POC is met in both residential and recreational areas.

Performance Standards

Construction Worker

The performance standard is met by the establishment of and adherence to a RMP across the entirety of OU6. A notice of the RMP will be recorded on the property deed at the Lake County Recorder's Office, and will include requirements necessary to protect construction workers (e.g., safety planning, air monitoring, soil handling procedures) from exposure to contaminated soils and groundwater in excess of risk and hazard goals during post-remedial construction/ development activities and will address the management of excavated materials. The RMP will require that Ohio EPA be notified 15 days prior to the planned initiation of construction activities involving excavation.

Residential Areas

The performance standard is met if all portions of OU6 to be utilized for residential purposes, based on current Site redevelopment plans (i.e., RES-1 through RES-6, as identified on Figure 4), meet a four-foot (4') minimum point of compliance (POC), as demonstrated through the following:

- Upon completion of excavation, filling and grading activities, confirmation sampling will be performed across all residential portions of OU6, extending to a depth of 4'. Confirmatory sampling will be designed to be statistically representative and will be performed using a random grid method, as described in SW-846, Chapter 9 (U.S. EPA, 1986). Analytical results will be used to perform an OU-wide risk assessment utilizing the methodologies and assumptions provided in Appendix A of this Decision Document. Results of the risk assessment must demonstrate that the cumulative risk goal of 1E-5 and cumulative hazard goal of 1 have been met for all chemicals and media of concern impacting receptors in OU6. The post-remedy risk assessment shall be submitted to Ohio EPA within sixty (60) days following the completion of excavation, filling and grading activities.
- Upon completion of excavation, filling and grading activities, a survey will be performed on OU6 in order to demonstrate that the applicable 4' minimum

POC has been achieved in all residential areas. Results of the survey, demonstrating compliance with the applicable minimum POC, will be submitted to Ohio EPA within sixty (60) days following the completion of excavation, filling and grading activities.

Commercial / Recreational Areas

The performance standard is met if all portions of OU6 to be utilized solely for commercial or recreational purposes, based on current Site redevelopment plans, meet a two-foot (2') minimum POC, as demonstrated through the following:

- Upon completion of excavation, filling and grading activities, confirmation sampling will be performed across all commercial and recreational areas of OU6, extending to a depth of 2'. Confirmatory sampling will be designed to be statistically representative and will be performed using a random grid method, as described in SW-846, Chapter 9 (U.S. EPA, 1986). Analytical results will be used to perform an OU-wide risk assessment utilizing methodologies and assumptions provided in Appendix A of this Decision Document. Results of the risk assessment must demonstrate that the cumulative risk goal of $1E-5$ and cumulative hazard goal of 1 have been met for all chemicals and media of concern impacting receptors in OU6, including Grand River recreators. The post-remedy risk assessment shall be submitted to Ohio EPA within sixty (60) days following the completion of excavation, filling and grading activities.
- Upon completion of excavation, filling and grading activities, a survey will be performed on OU6 to demonstrate that the applicable 2' POC has been achieved in all commercial and recreational areas. Results of the survey, demonstrating compliance with the applicable minimum POC, will be submitted to Ohio EPA within sixty (60) days following the completion of excavation, filling and grading activities.

7.2.3 Structure Demolition and Railroad Berm Removal

Structures currently existing on the property, including all buildings and storage tanks will be removed. Demolition and disposal activities will be performed in compliance with State and Federal rules and regulations. Asbestos abatement will be required prior to building demolition and will be performed with the oversight of Ohio EPA and the Lake County General Health District. Any wastes remaining on the property must be characterized for proper disposal, including those found within buildings or tanks.

Railroad berms currently existing within the OU will be removed. Berm material will be characterized to determine if it meets applicable risk-based standards for reuse on the OU as fill or if it requires disposal as a solid or hazardous waste. This characterization may be performed prior to or after excavation of the berm material has taken place. However, if the material is excavated prior to characterization, it will be required to be

stored in a manner which prevents contact with soils located outside of the footprint of the railroad berms (i.e., store in covered roll-offs, on top of and covered by a tarp, etc.), in order to comply with State and Federal rules and regulations.

Performance Standards

- The performance standard is met if all existing structures on the property (including all buildings and storage tanks) are removed in order to make way for the creation of the required minimum 2' commercial and recreational POC on the OU. Building demolition will occur under the required State, Federal and local permits and wastes created by the demolition will either be (1) reused on the property, if it is determined to be "clean, hard fill" and does not cause an exceedence of risk and/or hazard goals for the OU, (2) disposed in a licensed facility as demolition debris, (3) disposed in a licensed facility as a solid waste, or (4) disposed in a licensed facility as a hazardous waste.
- The performance standard is met if all railroad berms existing within the boundaries of OU6 are removed under a work plan approved by Ohio EPA and the railroad berm material is appropriately characterized and, depending on analytical results, either (1) reused as fill material within the OU, as long as the material does not cause an exceedence of risk and/or hazard goals for the OU, (2) disposed in a licensed facility as a solid waste, or (3) disposed in a licensed facility as a hazardous waste.
- The performance standard is met if within (60) days following completion of demolition of all structures and excavation of all railroad berm material on OU6, written verification (e.g., letter of notification for reuse or waste manifests) of the appropriate disposal or reuse of structure and berm materials is provided to Ohio EPA.

7.2.4 Shoreline Protection Structure Installation

In order to slow or prohibit additional erosion along the Lake Erie shoreline within this OU, an engineered shoreline protection structure will be installed as part of the remedy for the Site. This structure will be installed across the entire length of the OU.

Performance Standards

- The performance standard is met if the engineered shoreline protection structure is installed across the entire length of the OU under a work plan approved by Ohio EPA. The work plan shall include copies of all applicable permits from both the U.S. Army Corps of Engineers and the Ohio Department of Natural Resources.
- The performance standard is met if a construction completion report, providing specific details regarding shoreline protection structure location and construction,

is supplied to Ohio EPA within sixty (60) days of the completion of the installation of the engineered structure.

7.2.5 Environmental Covenant and O&M Agreement

An Environmental Covenant specifying activity and use limitations will be employed to preclude the construction of habitable subsurface structures (i.e. basements and crawl-spaces) on the entirety of OU6. Additionally, the areas associated with RIA-1 through RIA-5, which exceed soil to indoor air risk and/or hazard goals for residential use, will be subject to activity and use limitations precluding the construction of any habitable structures unless Agency-approved engineered controls are put into place which sever the indoor air pathway. Areas included in REC-1 and REC-2 will be limited to commercial and recreational use only and REC-1 will also be subject to activity and use limitation precluding the construction of any habitable structures. The Environmental Covenant will also prohibit groundwater use for potable and non-potable purposes with the exception of groundwater monitoring and treatment. The applicable minimum POC will be maintained through an O&M Agreement. Specifically, a 4' minimum POC will be established in planned residential areas, where soils exceed direct contact risk and/or hazard goals for residential use and a 2' minimum POC will be established in planned commercial and recreational areas, where soils exceed direct contact risk and/or hazard goals for commercial and recreational use.

Performance Standards

- The performance standard is met if an Environmental Covenant, which includes activity and use limitations that: a) prohibit the construction of habitable subsurface structures (e.g., basements, crawl-spaces) on OU6; b) prohibit the construction of any habitable structures in areas exceeding soil to indoor air risk and/or hazard goals (RIA-1 through RIA-5 and REC-1) unless Agency-approved engineered controls are put into place which sever the indoor air pathway; c) prohibit residential use of areas REC-1 and REC-2; (d) prohibit potable and non-potable groundwater usage on the entirety of OU6 with the exception of groundwater monitoring and treatment; and e) require all post-remedial construction activities be completed under an RMP, is executed between Ohio EPA and the PRPs.
- The performance standard is met if within thirty (30) days of the execution of the Environmental Covenant, documentation is provided to Ohio EPA that the executed Environmental Covenant for OU6 has been recorded.
- The performance standard is met if periodic monitoring, per an O&M Agreement between Ohio EPA and the PRPs, demonstrates that the activity and use limitations specified in the Environmental Covenant remain in effect and are not being violated.

8.0 BIBLIOGRAPHY

Hull & Associates, Inc., *Lake Erie and Grand River Baseline Human Health Risk Assessment for Site-Wide Issues, Appendix S-I*, June 2003.

Hull & Associates, Inc., *Feasibility Study Report for Operable Unit OU6 of the Diamond Shamrock Painesville Works Site*, April 2005

SECOR International Incorporated., *Phase I Remedial Investigation Report for the Diamond Shamrock Painesville Works Site*, 1999.

SECOR International Incorporated., *Phase II Remedial Investigation Report for the Diamond Shamrock Painesville Works Site*, June 2003.

U.S. EPA, *SW-846, Chapter 9*, 1986.

9.0 GLOSSARY

ARARs -	Applicable or relevant and appropriate regulations. Those rules which strictly apply to remedial activities at the Site, or those rules whose requirements would help achieve the remedial goals for the Site.
Baseline Risk Assessment -	An evaluation of the risks to humans and the environment posed by a site.
Carcinogen -	A chemical that causes cancer.
CERCLA -	Comprehensive Environmental Response, Compensation and Liability Act. A federal law that regulates cleanup of hazardous substances sites under the U.S. EPA Superfund Program.
Decision Document -	A statement issued by the Ohio Environmental Protection Agency giving the Director's selected remedy for a site and the reasons for its selection.
Ecological Receptor -	Animals or plant life exposed to chemicals released from a site.
Environmental Covenant -	A servitude arising under an environmental response project that imposes activity and use limitations and that meets the requirements established in section 5301.82 of the Revised Code.
Exposure Pathway -	Route by which a chemical is transported from the Site to a human or ecological receptor.
Feasibility Study -	A study conducted to ensure that appropriate remedial alternatives are developed and evaluated such that relevant information concerning the remedial action options can be presented to a decision-maker and an appropriate remedy selected.
Hazardous Substance -	A chemical that may cause harm to humans or the environment.
Human Receptor -	A person exposed to chemicals released from a site.

NCP -	National Contingency Plan. A framework for remediation of hazardous substances as specified in CERCLA.
O&M -	Operations and Maintenance. Long-term measures taken at a site, after the initial remedial actions, to assure that a remedy remains protective of human health and the environment.
Preferred Plan -	The plan that evaluates the remedial alternatives presented in the Feasibility Study and identifies the preferred remedial alternative selected Ohio EPA to remediate the Site in a manner that best satisfies the evaluation criteria.
Remedial Action Objectives (RAO) -	Specific goals of the remedy for reducing risks posed by the Site.
Remedial Investigation -	A study conducted to collect information necessary to adequately characterize the Site for the purpose of developing and evaluating effective remedial alternatives.
Responsiveness Summary-	A summary of all comments received concerning the Preferred Plan and Ohio EPA's response to all issues raised in those comments.
Risk Management Plan-	A plan developed to address risk to workers on a Site during post-remedial activities.
PAHs	Polynuclear aromatic hydrocarbons. Class of semi-volatile chemicals including multiple six-carbon rings. Often found as residue from coal-based chemical processes.
PCBs	Polychlorinated biphenyls. An oily chemical typically used in electrical equipment.

FIGURES

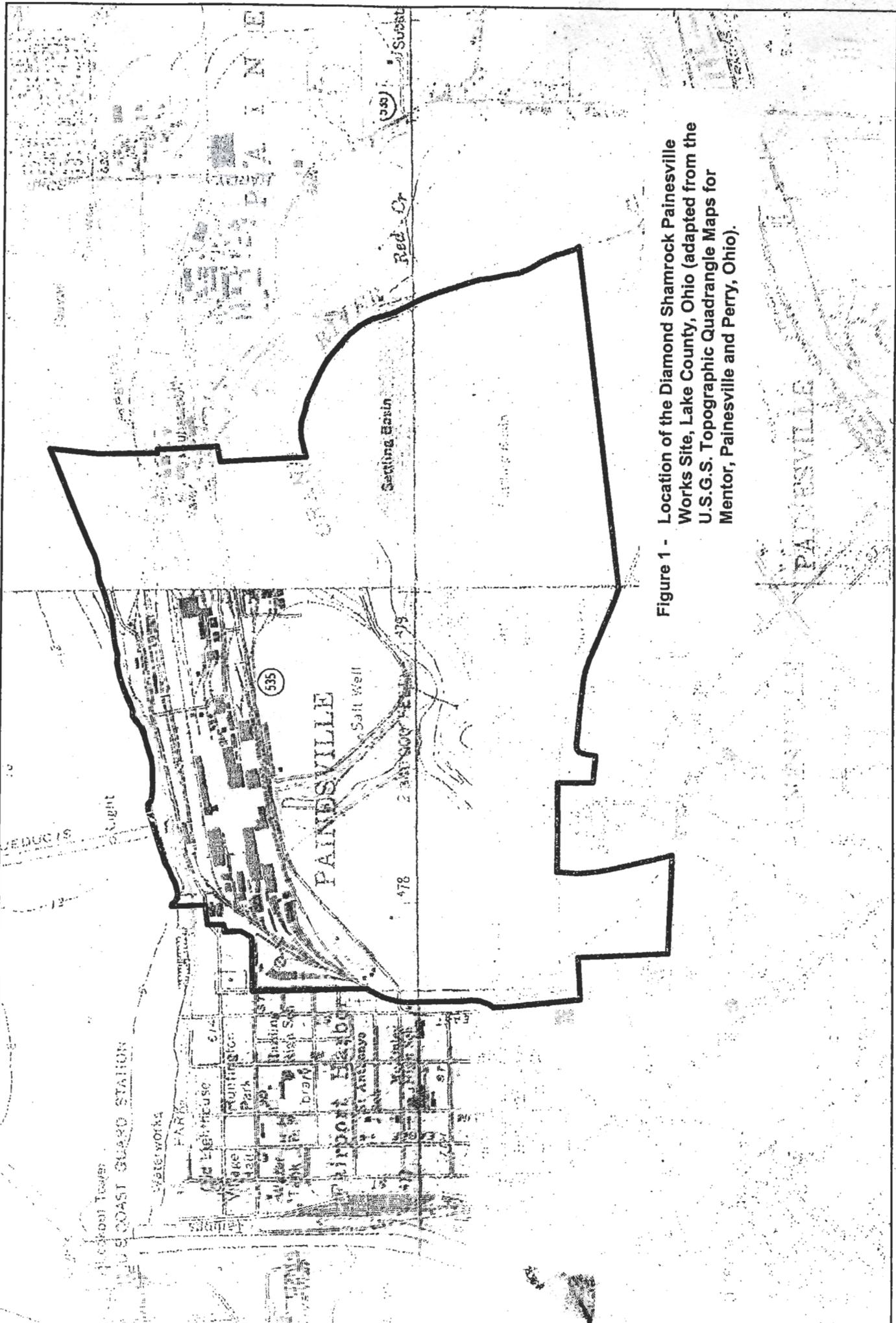


Figure 1 - Location of the Diamond Shamrock Painesville Works Site, Lake County, Ohio (adapted from the U.S.G.S. Topographic Quadrangle Maps for Mentor, Painesville and Perry, Ohio).



FEASIBILITY STUDY OPERABLE UNITS
(PARCEL GROUPINGS)

- OU1N- SEE FIGURE 2
- OU18- SEE FIGURE 2
- OU2- 1C3/1C4
- OU3- 3A1/3B1 (MINUS ONE-ACRE SITE)
- OU4- 7C1/7C2
- OU5- 7C3
- OU6- 2C1
- OU7- 4A1/4A3/4B1/4B2/4C1/1A7
- OU8- 4B3
- OU9- 4A2
- OU10- ONE-ACRE SITE
- OU11- 1A (FORMERLY THE EASTERN HALF OF PARCEL 1C4) INCORPORATED INTO OU2, DECEMBER 2003.
- OU12- 1A1/1A2/1A3/1A4/1A5/1A6/1A7/1A9/1A10/1C1/1C2/ (WEST STUDY AREA 1)
- OU13- 7B1
- OU14- 7B2
- OU16- 1B1/1B2/ B1
- OU16- 6B1 (UPT. 3D)
- OU17- 1C5
- OU18- 1B3
- OU19- 7C4
- OU20- 6B1 (SLOPE/LOWLANDS)



FEASIBILITY STUDY
REVISED: 11/11/03

Figure 2. Map of the Diamond Shamrock Palmesville Works Site indicating individual operable units (Hull & Associates, 2003).

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PROJECT NO.: 338001	SUBMITTAL DATES: APRIL 2006
CAD AND FILE: T3E001-000-0009	PLOT DATES: 4/19/06

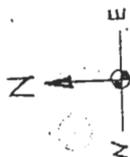
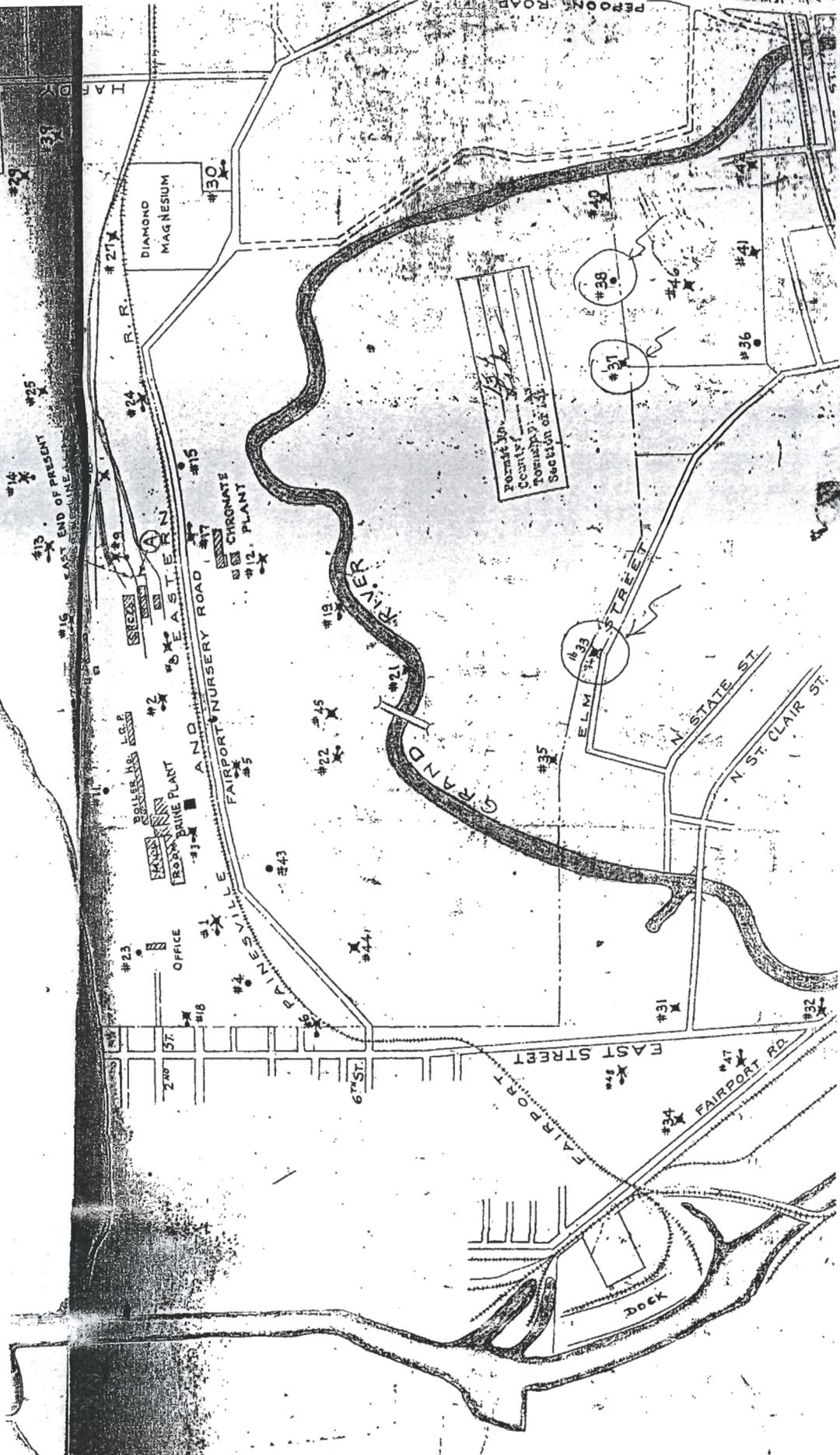


Figure 2 - Map of Present and Propose Brine Wells.
Diamond Alkali Company
(submitted to Ohio EPA by the Lake County
General Health District - 7/14/05)



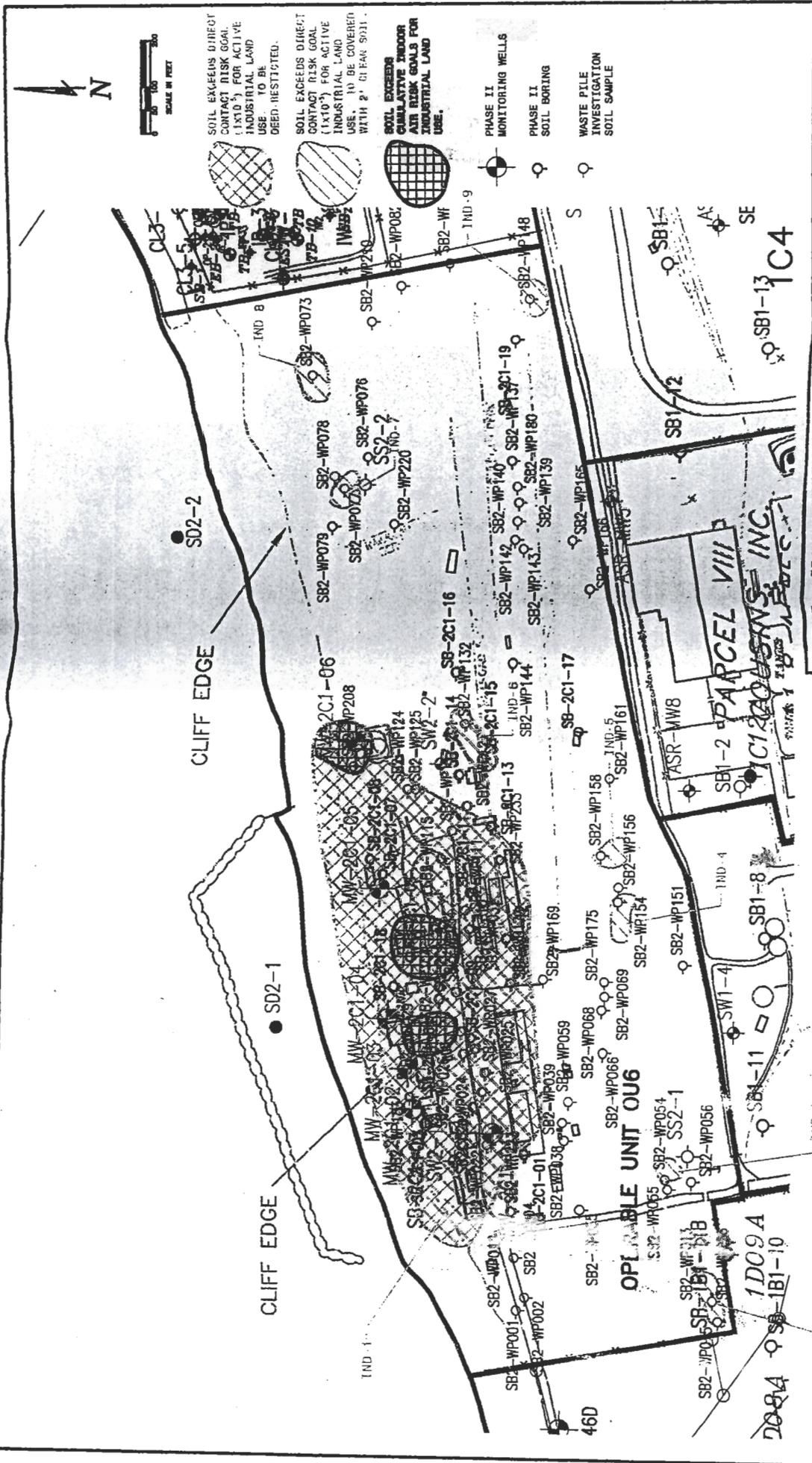


Figure 3 - Map of Operable Unit OUG6, indicating areas which exceed direct contact and indoor air risks for active industrial use (Hull & Associates, 2005).

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THIS FIGURE WAS CREATED USING INFORMATION OBTAINED BY SECOR INTERNATIONAL INC.

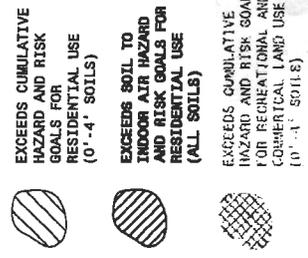
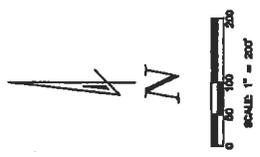
PROJECT NO.: T1001	SUBMITTAL DATE: APRIL 2005
CDL USE FILE: T1001.000.0031	PLAT DATE: 4/20/05

REC-1 EXCEEDS DIRECT CONTACT GOALS FOR RESIDENTIAL LAND USE, MEETS GOALS FOR RECREATIONAL USE. AREA IS TO BE RESTRICTED TO RECREATIONAL USE, WITH NO HABITABLE STRUCTURES.

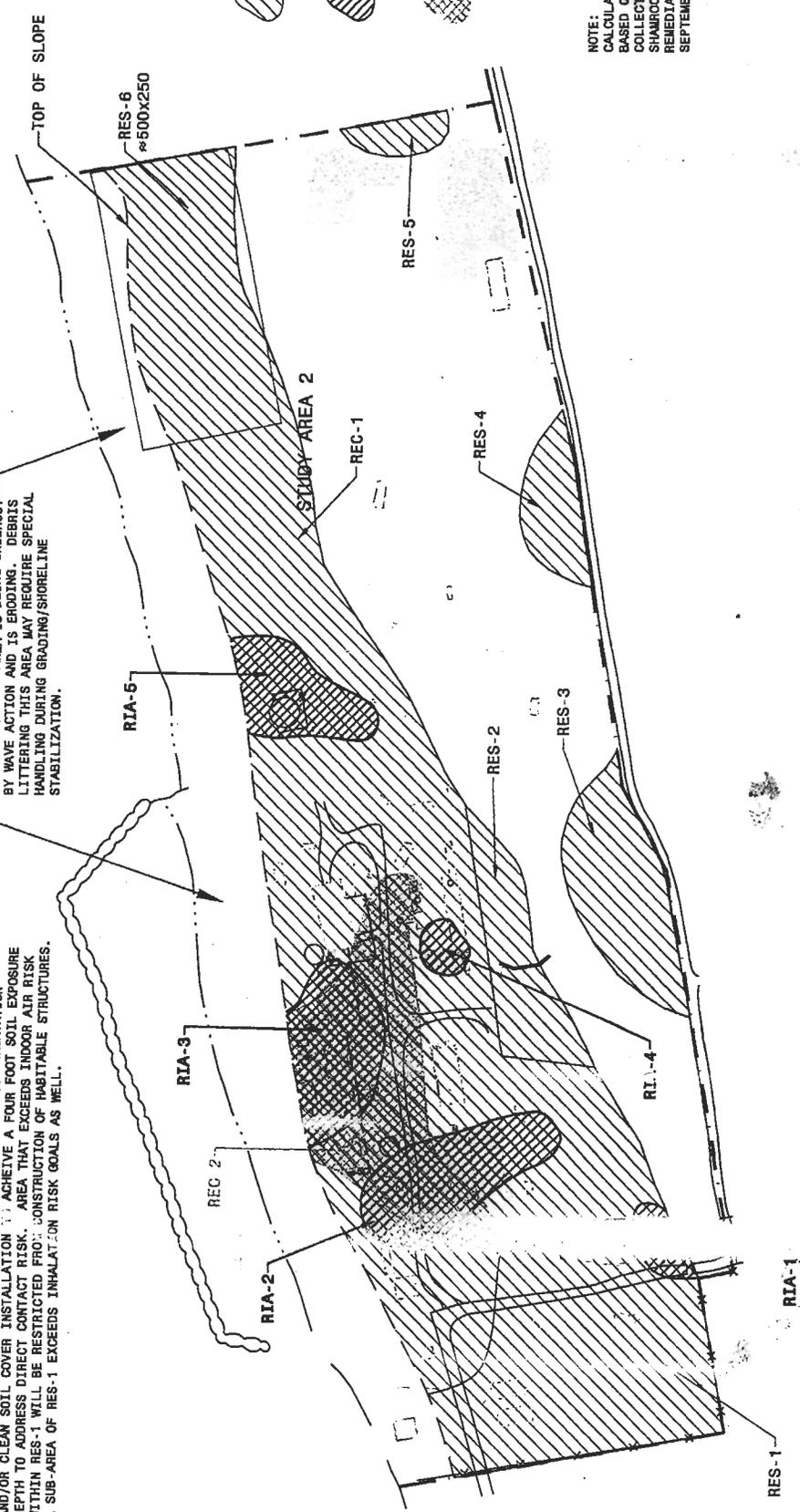
REC-2 EXCEEDS DIRECT CONTACT RISK GOALS FOR RECREATIONAL OR COMMERCIAL USE. AREA IS TO BE COVERED WITH AT LEAST TWO FEET OF CLEAN FILL.

RES-1 THROUGH RES-6 EXCEED DIRECT CONTACT AND INDOOR AIR RISK GOALS FOR RESIDENTIAL LAND USE. AREAS ARE TO BE REMEDIATED THROUGH EXCAVATION AND/OR CLEAN SOIL COVER INSTALLATION TO ACHIEVE A FOUR FOOT SOIL EXPOSURE DEPTH TO ADDRESS DIRECT CONTACT RISK. AREA THAT EXCEEDS INDOOR AIR RISK WITHIN RES-1 WILL BE RESTRICTED FROM CONSTRUCTION OF HABITABLE STRUCTURES. A SUB-AREA OF RES-1 EXCEEDS INHALATION RISK GOALS AS WELL.

SHORELINE/SLOPE AREA IS BEING UNDERCUT BY WAVE ACTION AND IS ERODING. DEBRIS LITTERING THIS AREA MAY REQUIRE SPECIAL HANDLING DURING GRADING/SLOPELINE STABILIZATION.



NOTE: HAZARDS AND RISKS WERE CALCULATED FOLLOWING NCP GUIDELINES BASED ON EXISTING GRADE, AND DATA COLLECTED DURING FORMER DZANOND SHAMROCK PAINESVILLE WORKS SITE REMEDIAL INVESTIGATION (APPROVED SEPTEMBER 2008).



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THIS FIGURE WAS CREATED USING INFORMATION OBTAINED BY SECOR INTERNATIONAL, INC.

Figure 4 - Map of Operable Unit OU6, indicating areas which exceed direct contact and indoor air risks for residential/recreational/commercial use (Hull & Assocci & Assocci)

PROJECT NO.:
 DATE:
 INITIAL DATE: APRIL 2008
 4/13/08

TABLES

Table 1 - Analysis of remedial alternatives (from: Feasibility Study for Operable Unit OU6 (Hull & Associates, 2005)).

FEASIBILITY STUDY
FORMER DIAMOND SHAMROCK PAINESVILLE WORKS SITE
OPERABLE UNIT 6 - PARCEL 2C1

TABLE 4

INDIVIDUAL EVALUATION OF FINAL ALTERNATIVES

CRITERIA	ALTERNATIVE OU6-A		ALTERNATIVE OU6-B ACTIVE INDUSTRIAL		ALTERNATIVE OU6-C MIXED RECREATIONAL/RESIDENTIAL LAND USE		ALTERNATIVE OU6-D MIXED RECREATIONAL/RESIDENTIAL LAND USE	
	No Action		Land Use Restriction, Shoreline Stabilization, Access Restriction, Risk Mitigation Plan 0-2 Clean Soil Cover	Land Use Restriction, Shoreline Stabilization, Up to 4' Excavation/ On-Site Management 0-4 Clean Soil Cover Mitigation Plan	Land Use Restriction, Shoreline Stabilization, Up to 4' Excavation/ Off-Site Disposal Mitigation Plan	Land Use Restriction, Shoreline Stabilization, Up to 4' Excavation/ Off-Site Disposal Mitigation Plan	Land Use Restriction, Shoreline Stabilization, Up to 4' Excavation/ Off-Site Disposal Mitigation Plan	Risk
PERMEABLE PROTECTIVENESS								
Human Health Protection Direct Contact/Soil Ingestion	Does not meet protectiveness criteria. No significant reduction in risk. Some reduction through existing access restriction.	Meets protectiveness criteria if future access to portions of the property is restricted. Alternative effective both during and post-construction.	Meets protectiveness criteria if future usage of the property is restricted. Alternative effective post-construction; Risk Mitigation Plan to protect workers during construction.	Same as Alternative OU6-B.	Same as Alternative OU6-B.	Same as Alternative OU6-B.	Same as Alternative OU6-B.	Same as Alternative OU6-D
Groundwater Contact Environmental Protection	There is no groundwater contact risk. Meets protectiveness criteria. No reduction in risk, but no sensitive environmental receptors identified.	Same as Alternative OU6-B.	Same as Alternative OU6-B. Meets protectiveness criteria. No sensitive environmental receptors identified, but alternative would reduce risk. Erosion control measures to be implemented during shoreline stabilization to control runoff.	Same as Alternative OU6-B.	Same as Alternative OU6-B.	Same as Alternative OU6-B.	Same as Alternative OU6-B.	Same as Alternative OU6-D
COMPLIANCE WITH ARARS								
Chemical-Specific ARARS	Would not meet any ARARs since there will be no action.	Risk-based standards developed per RAGS and clean soil cover meet applicable risk standards in areas proposed for active industrial use.	Risk-based standards developed per RAGS, soil removal and clean soil cover meet applicable risk standards.	Same as Alternative OU6-A.	Same as Alternative OU6-A.	Same as Alternative OU6-A.	Same as Alternative OU6-A.	Same as Alternative OU6-D
Location-Specific ARARS	Not relevant. There are no location-specific ARARS.	Same as Alternative OU6-A.	Rezoning of property will be required.	Same as Alternative OU6-D	Same as Alternative OU6-D	Same as Alternative OU6-D	Same as Alternative OU6-D	Same as Alternative OU6-D
Action-Specific ARARS	Not applicable, since no actions would be taken.	Would meet Action-Specific ARARS for active industrial use scenario. Stormwater permitting requirements for construction activities will be met. ORC 3734.02(H) may apply - authorization could be through RD/RA Orders. Shoreline stabilization will require Corps of Engineers permit, potentially others.	Would meet Action-Specific ARARS for recreational and residential redevelopment. Stormwater permitting requirements for construction activities will be met. ORC 3734.02(H) may apply - authorization could be through RD/RA Orders. Shoreline stabilization will require Corps of Engineers permit, potentially others.	Same as Alternative OU6-D	Same as Alternative OU6-D	Same as Alternative OU6-D	Same as Alternative OU6-D	Same as Alternative OU6-D
Other Criteria & Guidance	Does not meet 10 ⁻⁵ risk goal.	Protects against direct-contact or soil ingestion at 10 ⁻⁵ carcinogenic risk goal & Target Hazard Index (1) for active industrial use.	Protects against direct-contact or soil ingestion at 10 ⁻⁵ carcinogenic risk goal & Target Hazard Index (1) for recreational and residential use.	Same as Alternative OU6-D	Same as Alternative OU6-D	Same as Alternative OU6-D	Same as Alternative OU6-D	Same as Alternative OU6-D

FEASIBILITY STUDY
FORMER DIAMOND SHAMROCK PAINESVILLE WORKS SITE
OPERABLE UNIT 6 - PARCEL 2C1

TABLE 4

INDIVIDUAL EVALUATION OF FINAL ALTERNATIVES

	ALTERNATIVE OU6-A	ALTERNATIVE OU6-B ACTIVE INDUSTRIAL Land Use Restriction Shoreline Stabilization Access Restriction Risk Mitigation Plan 0-2 Clean Soil Cover	ALTERNATIVE OU6-C MIXED RECREATIONAL/RESIDENTIAL LAND USE Land Use Restriction Shoreline Stabilization Up to 4 Excavation/ On-Site Management 0-4 Clean Soil Cover Risk Mitigation Plan	ALTERNATIVE OU6-D MIXED RECREATIONAL/RESIDENTIAL LAND USE Land Use Restriction Shoreline Stabilization Up to 4 Excavation/ Off-Site Disposal 0-4 Clean Soil Cover Risk Mitigation Plan
CRITERIA				
LONG-TERM EFFECTIVENESS AND PERMANENCE				
Magnitude of Residual Risk Direct Contact/Soil Ingestion	Source has not been removed. Existing risk will remain.	Waste pile removal, clean soil cover and deed restrictions will eliminate or reduce direct-contact risk under an active industrial scenario. Shoreline stabilization measures, Risk Mitigation Plan and Land Use Restrictions require compliance and upkeep. Existing impacted soils will remain.	Waste pile and soil removal, clean soil cover and deed restrictions will eliminate or reduce direct-contact risk under a recreational and residential use scenario. Shoreline stabilization system, Risk Mitigation Plan and Land Use Restrictions require compliance and upkeep. Impacted soils will remain, but will be relocated and covered.	Waste pile and soil removal, off-site disposal, clean soil backfill and deed restrictions will eliminate or reduce direct-contact risk under a recreational and residential use scenario. Shoreline stabilization system, Risk Mitigation Plan and Land Use Restrictions require compliance and upkeep. Impacted soils that may remain will be covered to achieve the applicable point-of-compliance.
Groundwater Contact	Natural attenuation and dilution may decrease risk.	Same as Alternative OU6-B.	Same as Alternative OU6-B.	Same as Alternative OU6-B.
Adequacy & Reliability of Controls	No controls over remaining contamination. No reliability.	Risk Mitigation Plan will reduce risk. Clean soil cover is adequate, reliable and easily maintained. Shoreline stabilization measures will require periodic maintenance. Same as Alternative OU6-A.	Same as Alternative OU6-C.	Same as Alternative OU6-C.
Need for 5-Year Review	Review would be required to ensure adequate protection of human health and the environment is maintained.	Same as Alternative OU6-A.	Same as Alternative OU6-A.	Same as Alternative OU6-A.
REDUCTION IN TOXICITY, MOBILITY OR VOLUME				
Treatment Process Used	None.	None.	None.	None.
Amount Destroyed or Treated	None.	None.	None.	None.
Reduction of Toxicity, Mobility or Volume	None.	Waste pile removal reduces volume. Shoreline stabilization and clean soil cover reduce mobility.	Waste pile and shoreline debris removal reduce volume. Shoreline stabilization and clean soil cover reduce mobility.	Waste pile, shoreline debris and soil removal reduce volume. Shoreline stabilization and clean soil cover backfill reduce mobility of any residual materials.
Final Treatment and Quantity of Residuals Remaining After Treatment	Not applicable. No Treatment. Concentrations will remain but may decrease through natural attenuation.	Same as Alternative OU6-A. Same as Alternative OU6-A.	Same as Alternative OU6-A. Same as Alternative OU6-A.	Same as Alternative OU6-A. Same as Alternative OU6-A.
Statutory Preference for	Does not satisfy.	Same as Alternative OU6-B.	Same as Alternative OU6-B.	Same as Alternative OU6-B.

FEASIBILITY STUDY
FORMER DIAMOND SHAMROCK PAINESVILLE WORKS SITE
OPERABLE UNIT 6 - PARCEL 2C1

TABLE 4

INDIVIDUAL EVALUATION OF FINAL ALTERNATIVES

CRITERIA	ALTERNATIVE OUB-A	ALTERNATIVE OUB-B ACTIVE INDUSTRIAL	ALTERNATIVE OUB-C MIXED RECREATIONAL/RESIDENTIAL LAND USE	ALTERNATIVE OUB-D MIXED RECREATIONAL/RESIDENTIAL LAND USE
	No Action	Land Use Restriction/ Shoreline Stabilization/ Access Restriction/ Risk Mitigation Plan 0-2' Clean Soil Cover	Land Use Restriction/ Shoreline Stabilization/ Up to 4' Excavation/ On-Site Management 0-4' Clean Soil Cover/ Mitigation Plan	Land Use Restriction/ Shoreline Stabilization/ Up to 4' Excavation/ Off-Site Disposal 0-4' Clean Soil Cover/ Mitigation Plan
SHORT TERM EFFECTIVENESS				
Community Protection	Risk to community not increased.	Risk to community slightly increased due to construction traffic.	Same as Alternative OUB-C.	Same as Alternative OUB-C.
Worker Protection	No significant risk to workers.	Potential exposure during waste pile removal. No significant exposure risk during placement of clean soil cover.	Potential exposure during waste pile and soil removal. No significant exposure risk during placement of clean soil cover.	Potential exposure during waste pile and soil removal. No significant exposure risk during placement of clean soil backfill.
Environmental Impacts	Impact equivalent to existing conditions.	Potential stormwater impact during waste pile removal and cover placement activities. Potential surface water impact during shoreline stabilization. These impacts can be mitigated.	Same as Alternative OUB-C.	Same as Alternative OUB-C.
Time Until Action is Complete	Not applicable.	Waste pile removal, clean soil cover placement and shoreline stabilization within 6 to 12 months.	Waste pile and soil removal, clean soil cover and shoreline stabilization within 6 to 12 months.	Waste pile and soil removal, clean soil backfill and shoreline stabilization within 6 to 12 months.

**FEASIBILITY STUDY
FORMER DIAMOND SHAMROCK PAINESVILLE WORKS SITE
OPERABLE UNIT 6 - PARCEL 2C1**

TABLE 4

INDIVIDUAL EVALUATION OF FINAL ALTERNATIVES

CRITERIA	ALTERNATIVE OU6-A No Action	ALTERNATIVE OU6-B ACTIVE INDUSTRIAL Land Use Restriction Shoreline Stabilization Access Restriction Risk Mitigation Plan 0-2 Clean Soil Cover	ALTERNATIVE OU6-C MIXED RECREATIONAL/RESIDENTIAL LAND USE Land Use Restriction Shoreline Stabilization Up to 4' Excavation/ Off-Site Disposal 0-4 Clean Soil Cover Mitigation Plan	ALTERNATIVE OU6-D MIXED RECREATIONAL/RESIDENTIAL LAND USE Land Use Restriction Shoreline Stabilization Up to 4' Excavation/ Off-Site Disposal 0-4 Clean Soil Cover Mitigation Plan
IMPLEMENTABILITY				
Ability to Construct and Operate	No construction or operation.	Shoreline stabilization system warrants additional study and design. Would require significant materials handling for shoreline stabilization system, including excavation and imported fill. Additional handling of waste pile materials and cover soils.	Shoreline stabilization system warrants additional study and design. Would require significant materials handling for shoreline stabilization system, including excavation and imported fill. Additional handling of waste pile materials, excavated soils and backfill materials.	Same as Alternative OU6-D.
Ease of Doing More Action if Needed	If monitoring indicates action is necessary, may need to go through FS process again.	Simple to repair shoreline stabilization or extend cover soil system. Simple to extend cover soil system.	Same as Alternative OU6-C.	Same as Alternative OU6-C.
Ability to Monitor Effectiveness	No monitoring.	Simple to visually monitor shoreline stabilization and cover systems. No groundwater monitoring proposed.	Same as Alternative OU6-C.	Same as Alternative OU6-C.
Ability to Obtain Approvals and Coordinate with Other Agencies	No approval necessary.	Same as Alternative OU6-B.	Same as Alternative OU6-B. Excavation and on-site management of impacted soils will require agency approval	Same as Alternative OU6-D.
Availability of Services and Availability of Equipment, Specialists and Materials	Not applicable. Not applicable.	Same as Alternative OU6-B. Equipment, fill and borrow sources readily available. No specialist requirements.	Same as Alternative OU6-B. Equipment, fill sources and shoreline stabilization materials readily available. Specialty contractor may be warranted for aspects of shoreline stabilization.	Same as Alternative OU6-B. Equipment, fill sources and shoreline stabilization materials readily available. Specialty contractor may be warranted for aspects of shoreline stabilization.
COST				
Capital Cost Estimates ^a	\$0	\$5,656,000	\$8,986,000	\$17,057,000
Annual O&M Cost - Years 1-30 ^c	\$0	\$484,000	\$497,000	\$497,000
Total Present Value	\$0	\$6,140,000	\$9,483,000	\$17,554,000

Notes: Percentages used to develop costs for this section are based on the accepted percentages found in the U.S. EPA Guide to Developing and Documenting Cost Estimates During the Feasibility Study (EPA 540-R-00-002, July 2000).

- a. Refer to Tables E-1 through E-3 in Appendix E for a more detailed breakdown of cost, including a -30/+50% range per CERCLA cost estimating guidance.
- b. Alternatives OU6-D and OU6-E include 2 feet of clean soil cover or backfill in areas exceeding 10-5 direct-contact, cumulative risk goals for recreational use and 4 feet of soil in areas exceeding risk goals for residential use to achieve the applicable point-of-compliance.
- c. Long-term O&M costs may include landscaping activities, such as periodic mowing of vegetation, annual updating of the Risk Mitigation Plan, and repairs to the shoreline stabilization system.
- d.

APPENDICES

Appendix A

Input parameters and assumptions for post-remedy (confirmatory)
risk assessment for Operable Unit OU6.

(Copied and/or modified from FS Report for Operable Unit OU2 (Hull, 2004))

POST-REMEDY RISK ASSESSMENT INPUTS / ASSUMPTIONS

TABLE 1

BASELINE INDUSTRIAL WORKER SCENARIO: EXPOSURE FACTOR VALUES FOR HUMAN HEALTH RISK ASSESSMENT FOR SOIL DATA

(from FS Report for Operable Unit OU2 - Appendix A - Table 3-3 (Hull, 2004))

Exposure Factor	Industrial Worker	
BW - Body Weight (kg)	70	a
ATc - Averaging Time Carcinogenic (days)	25,550	a
ATn - Averaging Time Non-Carcinogenic (days)	9,125	a
ED - Exposure Duration (years)	25	a
EF - Exposure Frequency (days/year)	250	a
IR - Ingestion Rate Soil (mg/day)	100	b
InhR - Inhalation Rate (m ³ /hour)	1.6	c
AF - Soil to Skin Adherence Factor (mg/cm ²)	0.2	d
SA - Surface Area of Exposed Skin (cm ²)	3,300	d
ET - Exposure Time (hr/day)	8	e
PEF-Particulate Emission Factor (m ³ /kg)	6.26E+08	f

- a Risk Assessment Guidance for Superfund, Part B - Development of Risk-Based Preliminary Remediation Goals U.S. EPA, 1991.
- b Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, USEPA, 2002.
- c Exposure Factors Handbook value for adults involved in moderate activities, U.S. EPA, 1997.
- d Risk Assessment Guidance for Superfund, Part E Supplemental Guidance for Dermal Risk Assessment, U.S. EPA, 2004.
- e Professional judgement based on an average work day.
- f Site-specific based on USEPA's Soil Screening Guidance Calculation for a 30-acre Site in Cleveland

POST-REMEDY RISK ASSESSMENT INPUTS / ASSUMPTIONS

TABLE 2

BASELINE CONSTRUCTION WORKER SCENARIO: EXPOSURE FACTOR VALUES FOR HUMAN HEALTH RISK ASSESSMENT FOR SOIL DATA

(from FS Report for Operable Unit OU2 - Appendix A - Table 3-10 (Hull, 2004))

Exposure Factor	Construction/Excavation Worker	
BW - Body Weight (kg)	70	a
ATc - Averaging Time Carcinogenic (days)	25,550	a
ATn - Averaging Time Non-Carcinogenic (days)	365	a
ED - Exposure Duration (years)	1	a
EF - Exposure Frequency (days/year)	250	a
IR - Ingestion Rate Soil (mg/day)	330	a
InhR - Inhalation Rate (m ³ /hour)	2.5	a
AF - Soil to Skin Adherence Factor (mg/cm ²)	0.7	b
SA - Surface Area of Exposed Skin (cm ²)	3,300	b
ET - Exposure Time (hr/day)	8	c
PEF - Particulate Emission Factor (m ³ /kg)	6.26E+08	d

- a Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, USEPA 2002.
- b Risk Assessment Guidance for Superfund, Part E Supplemental Guidance for Dermal Risk Assessment, U.S. EPA, 2004.
- c Professional judgement based on an average workday.
- d Site-specific based on USEPA's Soil Screening Guidance Calculation for a 30-acre site in Cleveland.

TABLE 3

BASELINE CONSTRUCTION WORKER SCENARIO: EXPOSURE FACTOR VALUES FOR GROUNDWATER
 (from FS Report for Operable Unit OU2 - Appendix A - Table 3-16 (Hull, 2004))

Exposure Factor	Construction Worker
BW - Body Weight (kg)	70
ATc - Averaging Time Carcinogenic (days)	25,550
ATn - Averaging Time Non-Carcinogenic (days)	365
ED - Exposure Duration (years)	1
EF - Exposure Frequency (days/yr)	250
IRgw - Ingestion Rate Groundwater (L/event)	0.01
AF - Soil to Skin Adherence Factor (mg/cm ²)	0.7
SA - Surface Area of Exposed Skin (cm ² /day)	3,300
ET - Exposure Time to Groundwater (hr/day)	2

References:

- a Draft Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, USEPA 2001.
- b Risk Assessment Guidance for Superfund, Part E Supplemental Guidance for Dermal Risk Assessment, Interim, U.S. EPA, 20
- c Site-specific estimated extrapolated from Residential Scenario for Risk Assessment Guidance for Superfund, U.S. EPA, 1989.

POST-REMEDY RISK ASSESSMENT INPUTS / ASSUMPTIONS

TABLE 4

BASELINE ADULT RESIDENTIAL SCENARIO: EXPOSURE FACTOR VALUES FOR HUMAN HEALTH RISK ASSESSMENT FOR SOIL DATA

(from FS Report for Operable Unit OU2 - Appendix A - Table 3-20 (Hull, 2004))

Exposure Factor	Adult Resident	
BW - Body Weight (kg)	70	a
ATc - Averaging Time Carcinogenic (days)	25,550	a
ATn - Averaging Time Non-Carcinogenic (days)	8,760	a
ED - Exposure Duration (years)	24	a
EF - Exposure Frequency (days/year)	350	a
IR - Ingestion Rate Soil (mg/day)	100	a
InhR - Inhalation Rate (m ³ /hour)	1	b
AF - Soil to Skin Adherence Factor (mg/cm ²)	0.07	c
SA - Surface Area of Exposed Skin (cm ²)	5,700	c
ET - Exposure Time (hr/day)	24	d
PEF-Particulate Emission Factor (m ³ /kg)	1.21E+09	e

- a Risk Assessment Guidance for Superfund, Part B - Development of Risk-Based Preliminary Remediation Goals U.S. EPA, 1991.
- b USEPA Exposure Factor's Handbook, 1997.
- c Risk Assessment Guidance for Superfund, Part E Supplemental Guidance for Dermal Risk Assessment, U.S. EPA, 2004.
- d Resident assumed to spend all 24 hours per day at home.
- e Site-specific based on USEPA's Soil Screening Guidance Calculation for a 0.5-acre site in Cleveland

POST-REMEDY RISK ASSESSMENT INPUTS / ASSUMPTIONS

TABLE 5

BASELINE CHILD RESIDENTIAL SCENARIO: EXPOSURE FACTOR VALUES FOR HUMAN HEALTH RISK ASSESSMENT FOR SOIL DATA

(from FS Report for Operable Unit OU2 - Appendix A - Table 3-26 (Hull, 2004))

Exposure Factor	Child Resident	
BW - Body Weight (kg)	15	a
ATc - Averaging Time Carcinogenic (days)	25,550	a
ATn - Averaging Time Non-Carcinogenic (days)	2,190	a
ED - Exposure Duration (years)	6	a
EF- Exposure Frequency (days/year)	350	a
IR - Ingestion Rate Soil (mg/day)	200	a
InhR - Inhalation Rate (m ³ /hour)	1	b
AF - Soil to Skin Adherence Factor (mg/cm ²)	0.2	c
SA - Surface Area of Exposed Skin (cm ²)	2,800	c
ET - Exposure Time (hr/day)	24	d
PEF-Particulate Emission Factor (m ³ /kg)	1.21E+09	e

- a Risk Assessment Guidance for Superfund, Part B - Development of Risk-Based Preliminary Remediation Goals U.S. EPA, 1991.
- b USEPA Exposure Factor's Handbook, 1997.
- c Risk Assessment Guidance for Superfund, Part E Supplemental Guidance for Dermal Risk Assessment, U.S. EPA, 2004.
- d Resident assumed to spend all 24 hours per day at home.
- e Site-specific based on USEPA's Soil Screening Guidance Calculation for a 0.5-acre site in Cleveland

POST-REMEDY RISK ASSESSMENT INPUTS / ASSUMPTIONS

TABLE 6

BASELINE ADULT RECREATOR SCENARIO: EXPOSURE FACTOR VALUES FOR HUMAN HEALTH RISK ASSESSMENT FOR SOIL DATA

(from FS Report for Operable Unit OU2 - Appendix A - Table 3-33 (Hull, 2004))

Exposure Factor	Adult Recreator	
BW - Body Weight (kg)	70	a
ATc - Averaging Time Carcinogenic (days)	25,550	a
ATn - Averaging Time Non-Carcinogenic (days)	8,760	a
ED - Exposure Duration (years)	24	b
EF- Exposure Frequency (days/year)	175	c
IR - Ingestion Rate Soil (mg/day)	100	d
InhR - Inhalation Rate (m ³ /hour)	1	b
AF - Soil to Skin Adherence Factor (mg/cm ²)	0.07	c
SA - Surface Area of Exposed Skin (cm ²)	5,700	d
ET - Exposure Time (hr/day)	4	c
PEF-Particulate Emission Factor (m ³ /kg)	6.26E+08	e

- a Risk Assessment Guidance for Superfund, U.S. EPA, 1989.
- b USEPA Exposure Factors Handbook, 1997a.
- c Site-specific based on activity and climate patterns of Ohio.
- d Risk Assessment Guidance for Superfund, Part E, Supplemental Guidance for Dermal Risk Assessment, USEPA 2004.
- e Site-specific based on USEPA's Soil Screening Guidance Calculation for a 30-acre site in Cleveland

POST-REMEDY RISK ASSESSMENT INPUTS / ASSUMPTIONS

TABLE 7

BASELINE CHILD RECREATOR SCENARIO: EXPOSURE FACTOR VALUES FOR HUMAN HEALTH RISK ASSESSMENT FOR SOIL DATA

(from FS Report for Operable Unit OU2 - Appendix A - Table 3-39 (Hull, 2004))

Exposure Factor	Child Recreator	
BW - Body Weight (kg)	15	a
ATc - Averaging Time Carcinogenic (days)	25,550	a
ATn - Averaging Time Non-Carcinogenic (days)	2,190	a
ED - Exposure Duration (years)	6	b
EF - Exposure Frequency (days/year)	175	c
IR - Ingestion Rate Soil (mg/day)	200	d
InhR - Inhalation Rate (m ³ /hour)	0.66	b
AF - Soil to Skin Adherence Factor (mg/cm ²)	0.2	c
SA - Surface Area of Exposed Skin (cm ²)	2,800	d
ET - Exposure Time (hr/day)	4	c
PEF-Particulate Emission Factor (m ³ /kg)	6.26E+08	e

- a Risk Assessment Guidance for Superfund, U.S. EPA, 1989.
- b USEPA Exposure Factors Handbook, 1997a.
- c Site-specific based on activity and climate patterns of Ohio.
- d Risk Assessment Guidance for Superfund, Part E Supplemental Guidance for Dermal Risk Assessment, U.S. EPA, 2004.
- e Site-specific based on USEPA's Soil Screening Guidance Calculation for a 30-acre site in Cleveland

POST-REMEDY RISK ASSESSMENT INPUTS/ASSUMPTIONS

TABLE 8

SUMMATION OF LAKE ERIE^a AND GRAND RIVER RESIDENT OR RECREATOR RISKS
 (modified from FS Report for Operable Unit OU2 - Appendix A - Table 5-14 (Hull, 2004))

Receptor b	Non-Cancer Hazard	Cancer Risk
Adult Grand River Recreator / Resident	0.1	4.3×10^{-6}
Child Grand River Recreator / Resident	0.5	7.5×10^{-6}

- a. Risks from Lake Erie media were qualitatively assessed as part of the Lake Erie and Grand River Baseline Human Health Risk Assessment (Hull 2003)
- b. Adult fisher and child recreator risks calculated in the Phase II RI Appendix S-1 - Lake Erie and Grand River Baseline Human Health Risk Assessment (Hull, 2003).

RESPONSIVENESS SUMMARY

for OU2 and OU6 of the Diamond Shamrock Painesville Works
Lake County, Ohio

Please note that this responsiveness summary contains comments pertaining to both OU2 and OU6 of the Diamond Shamrock Painesville Works. The public hearings for the preferred plans for both OUs were held simultaneously on July 7, 2005 and many of the letters received during the public comment period referred to both OU2 and OU6. Therefore, Ohio EPA has selected to present the Agency's responses to the preferred plans for OU2 and OU6 in a single responsiveness summary.

Comments from Lake County General Health District

- (1) *In the above referenced documents (Feasibility Studies for OU2 and OU6, Ohio EPA comments on the Feasibility Studies for OU2 and OU6, and the Preferred Plans for OU2 and OU6) under either end use, there are references to the construction of buildings to be slab on grade. Generally, construction of a house or commercial building constructed on a slab requires the construction of footings below frost to provide the stability of the slab and keep it from moving with freeze and thaw. Installation of the footings could be well below the 2 or 4 foot point of compliance considering the compliance will be achieved by the placement of clean soil on top of the contaminated soil. Installation of the underground utilities such as water and sewer lines will also be below the 2 or 4 foot point of compliance. Both the piping and bedding materials typical for the installation of utilities can act as a conduit creating a pathway for the migration of contamination to other areas of the site or potentially off site. With this in mind, please consider the following questions/concerns:*
- (a) *Will the risk management plan address the risk to the construction workers working below the points of compliance?*
 - (b) *Will Ohio EPA monitor the construction activities (buildings, utilities) to ensure that the risk management plan is followed?*
 - (c) *Does a risk management plan require notification of all construction workers and builders regarding risks and precautions?*
 - (d) *What plan will address the potential for the migration of contaminants on and off the site? Does Ohio EPA review and approved the plan? If so, does Ohio EPA require monitoring of the activities and sampling during construction and in the future?*
 - (e) *If the contamination were to migrate on or off site, (such as the chromium has in the sewer trench along Fairport Nursery Rd.) who will be responsible to*

correct the problem? Does Ohio EPA have the enforcement authority to ensure that a responsible entity corrects the problem?

Ohio EPA Response:

- (a) The risk management plan (RMP) that will be established for the OU will require that precautions be taken by workers to minimize potential exposure to contaminants which remain below the required 2 or 4 foot point of compliance (POC). In addition, the RMP will specify how potentially contaminated material must be handled and appropriately disposed during construction activities, in order to protect current and future occupants of the OU.
- (b) It is the responsibility of the current property owner and developer to ensure that the RMP is followed by workers. To the extent that these activities occur while other remedial activities are being performed on the Diamond Shamrock Painesville Works, Ohio EPA may be checking on the progress of development activities. If concerns regarding failure to follow the RMP are brought to the Agency's attention by citizens, political entities or others, Ohio EPA will immediately respond to make sure that current property owner and developer are meeting the requirements of the RMP. The RMP requires that Ohio EPA be notified 15 days in advance of any work which will involve excavation activities within either OU.
- (c) Yes, the RMP requires that all construction worker and builders be notified of the potential risks posed and appropriate methods that must be in place to manage potential exposure to both site workers, recreators and residents.
- (d) The property owner and developer are responsible for insuring that migration of contaminants does not occur due to redevelopment activities on the OU. If plans are part of required remedial activities at the OU, they will be reviewed and approved by Ohio EPA. If the activities are performed outside the scope of remedial activities, those activities must be performed in compliance with applicable statutes and regulations. Should the Agency be made aware of any potential violations of the RMP or any violation of Ohio's environmental statutes or regulations, the Agency will immediately respond.
- (e) See response (d), above.

Yes, Ohio EPA has the authority to enforce Ohio's environmental statutes and regulations, including those regarding contaminant migration.

- (2) *The documents referenced above restrict the use of ground water for potable uses clearly indicating that it is contaminated. Are there other uses that should be restricted such as for irrigation, process water, etc.?*

Ohio EPA Response: In order to eliminate the potential for recontamination of clean

soils within the OU, the use of groundwater from the Site for potable and non-potable use, except for ground water monitoring and treatment, will be restricted. This requirement will be addressed in the decision documents.

- (3) *On Page 30 of the Feasibility Study for OU6, there is a statement referring to the maintenance of the Lake Erie shoreline that reads “periodic repair to the shoreline protection system is also anticipated.” What does this mean? Obviously there will be a need to maintain the shoreline protection. Who will be responsible/required to ensure that it is maintained?*

Ohio EPA Response: Ohio EPA will require that the shoreline protection system design be in compliance with applicable statutes and regulations and that all applicable permits, licenses and authorizations be obtained. Ohio EPA will not approve moving forward with construction until all the aforementioned requirements have been satisfied. U.S. Army Corps of Engineers and ODNR maintenance requirements will also be included within the Operation and Maintenance Plan (O&M Plan) established for the shoreline protection system. The property owner and developer are responsible for these activities.

- (4) *In Ohio EPA comments on the Feasibility Study for OU2 there is a comment regarding Appendix A, Executive Summary, page xii regarding an elevated lead sample found. The document states that the lead exposure point concentrations in surface soil at OU2 do not pose an unacceptable health hazard with one exception and that frequent exposures at that one localized area may pose an unacceptable health hazard to a child or adult resident. What actions will be implemented to **prevent** this unacceptable exposure/risk?*

Ohio EPA Response: The area within OU2 that exceeds the direct contact hazard for lead will be covered with a minimum of 4 feet of clean soils and this applicable point of compliance (POC) will be maintained through an O&M Plan.

- (5) *Both Feasibility Study documents state that there are no environmental operation and maintenance costs associated with maintaining a point of compliance under either scenario because the clean back fill will be applied to areas of relatively flat land surface and are not subject to erosion. Placing four feet of soil on a flat area changes the topography and therefore the piles can erode, especially over time during droughty conditions where grass cover dies and heavy rain events follow. To state that no costs are associated indicates that no maintenance is planned or needed of these critical soil piles. The clean soil piles are all that will separate people from the risks associated with the contaminated soils below. This is not acceptable and Ohio EPA should require maintenance of the soils barriers creating the critical point of compliance.*

Ohio EPA Response: Through the Environmental Covenant and the O&M Agreement, the responsible party will be required to maintain a 2 foot POC in

recreational areas and a 4 foot POC in residential areas. Ohio EPA will insure that the applicable POCs are maintained during reviews, as required under the O&M Agreement.

- (6) *The Feasibility Study for OU2 indicates that carcinogenic chemicals were eliminated by the Detection Frequency Screen and by the U.S. EPA Region 9 PRG Screen. In these discussions the following statements are made in both sections: "Uncertainty associated with the elimination of known, probable and possible human carcinogens by the detection frequency screen may result in an underestimation of potential health risks." "Uncertainty associated with the elimination of known, probably and possible human carcinogens by the U.S. EPA Region 9 PRG Screen may result in an underestimation of potential health risks." Please explain how this issue is being addressed. Will these statements appear in the environmental covenants or deed restrictions so that prospective industries or residents will be advised of these potential risks?*

Ohio EPA Response: The language referred to in this comment is commonly included in risk assessments approved by Ohio EPA. It brings awareness to the fact that risk assessment is not an exact science and that data that is utilized in performance of a risk assessment may, at times, be derived from a very limited amount of research. Ohio EPA has made every effort to insure that the remedial standards set for the chemicals of concern at the Diamond Shamrock Painesville Works, including OU2 and OU6, are protective of human health and the environment. This does not guarantee, however, that future research will not determine that the risk levels currently in place at the Site are either over-protective or under-protective. An Environmental Covenant will be put into place for each of the OUs which will contain information regarding Site contamination and will also refer the reader back to the remedial investigations and feasibility studies that have been conducted on the Diamond Shamrock Painesville Works. It will be the responsibility of the prospective industries or residents to review the Environmental Covenant and supporting documentation thoroughly.

- (7) *Enclosed please find a copy of a map "Diamond Alkali Company – Map of Present & Proposed Brine Wells." The map is originally dated 1944 and the most recent entry is dated 1967. The map denotes brine solution mining wells that were active, abandoned and abandoned & plugged at that point in time. The Lake County General Health District has acquired other maps as well that denote brine solution wells and gas wells on the other portions of the Diamond Property located in Painesville City on Jackson St. as well. We acquired these maps from Ohio Department of Natural Resources, Division of Mineral Resource Management and Tierra Solutions. These maps were obtained with concerns of a housing development planned for the Jackson St. property. It is our understanding from the information obtained for ODNR, that many of the older brine solution mining wells on the Fairport Nursery property were abandoned and plugged under the rules and technologies available at the time and that those wells could pose leakage issues in the*

future. That has already been evidenced by previously plugged wells on the south side of Fairport Nursery Road that had to be resealed a few years back. The issue of subsidence of brine solution mining caverns has also been raised by ODNR through our discussions with Tom Tomastik. Based on the locations of the wells the question of responsibility for repairing old sealed wells should they become a problem must be addressed for these operable units as well as all the others. ODNR has advised that buildings/homes should not be constructed over abandoned, plugged brine solution wells or gas/oil wells. Please do the necessary research and address these concerns.

Ohio EPA Response: Ohio EPA is aware of the presence of old brine solution mining and gas production wells across the Diamond Shamrock Painesville Works. A copy of the map which was attached to the Lake County General Health District comments will be included as an attachment to the Decision Document, so that the information is readily available to anyone wishing to develop the Site. Please be aware that the ultimate responsibility for siting a new home or business will be with the zoning department for the local community (City of Painesville, Painesville Township or the Village of Fairport). These entities will be made aware of this map as well.

Comments from Engineering Management Inc. (on behalf of Scepter Management Corporation)

(these comments specifically refer to OU6)

- (1) *Shoreline protection acts to prevent or minimize shore line erosion resulting from wave/current action. Shoreline protection has been constructed elsewhere along the Lake Erie shoreline and is typically designated to protect real estate value. While we acknowledge that in this instance there is an environmental benefit to shoreline protection, the FS and Decision Document should acknowledge the significant real estate protection value (i.e. non-environmental) of the shoreline protection component of the remedies.*

Ohio EPA Response: Ohio EPA included shoreline protection within the preferred plan in order to protect Lake Erie from contamination due to erosion of impacted soils from OU6. Consideration of property values was not part of that decision process.

- (2) *Shoreline protection accounts for approximately 74% (\$4.6 million including contingency) of the \$6.1 million estimated cost for the Active Industrial remedy and approximately 48% of the \$9.5 million estimated cost for the Residential/Recreational remedy. While shoreline protection is the single largest component of the remedies, the FS and Preferred Plan have surprisingly little detail on where the shoreline protection would be constructed, what it will be comprised of and how it will be incorporated into the existing shoreline protection features.*

Without sufficient detail it is impossible to comment of the efficacy of the proposed approach or the accuracy of the estimated cost.

Ohio EPA Response: See response to (1), above. As previously stated, Ohio EPA will require that the shoreline protection system design will comply with applicable statutes and regulations and that all applicable permits, licenses and authorizations will be obtained. Ohio EPA will not approve moving forward with construction until all the aforementioned requirements have been satisfied. U.S. Army Corps of Engineers and ODNR maintenance requirements will also be included within the Operation and Maintenance Plan established for the shoreline protection system.

- (3) *The FS cost estimate for shoreline protection is not supported or justified by the FS or Preferred Plan. Appendix E of the FS identifies a “JJR Opinion of Estimated Costs, February 11, 2005” as the source of support for the shoreline protection cost estimate. However, this document is not included in the FS. We have requested this document from Ohio EPA and were told that Ohio EPA does not have the document. Relying on an “Opinion of Estimated Cost” document that is not included in the administrative record to support such a significant component of the FS cost estimate does not, in our experience, meet the cost documentation standard of practice for FS Reports. Without reasonably detailed support it is impossible to comment on the accuracy of the cost estimate. Given the lack of technical detail for the shoreline protection component of the remedy it is quite possible that the cost estimate reflects a high degree of uncertainty and is inflated. However, without sufficient detail and support we cannot evaluate this possibility...We request that the missing cost documentation identified in this letter be secured and provided for public comment.*

Ohio EPA Response: See response to Comment (2), above.

- (4) *The cost estimates for each of the remedial alternatives shown in Appendix E, Tables E-1 through E-3 include costs for demolition and asbestos abatement. The line items in the tables refer to a “Sevenson Environmental Bid” as the basis of the estimate. However this document is not included in the FS. We requested this document from Ohio EPA and were told that Ohio EPA does not have the document. Without reasonably detailed support it is impossible to comment on the accuracy of the cost estimate...We request that the missing cost documentation identified in this letter be secured and provided for public comment.*

Ohio EPA Response: Similarly to the response provided to Comment (2), above, asbestos removal must be performed in compliance with applicable statutes and regulations.

Comments from Frank Lichtkopler, Ohio Sea Grant College Program, Ohio State University Extension

- (1) *At the public hearing of July 7, 2005, I mentioned the concern with potential*

subsidence issues from some of the salt solution wells that may be located on the Diamond Shamrock property.

Enclosed with this note is a copy of the Geotechnical Red Flag Summary Report regarding the subsurface investigations of the salt solution wells in Painesville, Mentor, Fairport and Painesville Township prepared for the anticipated reconstruction of State Route 2.

Information on the location of the 37 Main Plant wells will be important in the preferred plans for development of OU2 and OU6 as it is recommended that buildings not be constructed over an abandoned wellhead. Subsidence over the abandoned solution wells is a primary geotechnical concern that must be addressed to avoid future problems.

Ohio EPA Response: Ohio EPA will provide a copy of the information provided by Mr. Lichtkoppler to both the Painesville PRP Group and the Site developer so that the information can be included in redevelopment plans for the Site. Local authorities will be made aware of the information, as well.

- (2) *Citizens, I think are looking forward to seeing something besides a wasteland up there. I think it has lots of possibilities for potential good for the community and the citizens out there. We just need to be sure that the environmental regulations are fulfilled and that we have quality assurance and quality control on any of these projects that are going on and we hope that you have the resources to do that and the budget cuts in the state and stuff won't impact you folks.*

We encourage – not knowing as much as we ought to know about this property – a bond or revenue stream for the operation or maintenance is encouraged, to continue this monitoring over a long number of years.

In general, I think it is a good idea personally, as a citizen, that we try and redevelop some of these brownfields for additional uses.

The coastal property, there is no more being made, is all that we have, and if we can put it to better use than an empty field with a fence around it, we encourage – I personally encourage that to be done, as long as it is safe and reliable and that the folks who ultimately live there, work there, play there, fully recognize any of the risks that might be involved and what has gone on there, so that they make a fully-informed decision in purchasing, recreating, using those kinds of properties.

Ohio EPA Response: Ohio EPA will be requesting financial assurance under a future remedial design/remedial action order, to insure that the remedy and long-term monitoring are completed to the Agency's satisfaction.

An Environmental Covenant will be placed on each of the OUs which will, in part, notify anyone purchasing the property of environmental issues associated with the Site. The O&M Plan and RMP will require notification to prospective property

owners and Site workers of requirements that must be followed due to restrictions put in place for the Site.

Comments from Art Wolfe, Citizen

I am concerned about possible contamination of the coke oven site by Uranium-238 and similar radioactive elements. The reason is that coal normally contains traces of these radioactive contaminants, and these contaminants may have been concentrated on this site during normal coking operations...Apparently a "fly-over" did not detect an above-average amount of radioactivity, however it would not be sufficiently sensitive to detect possibly harmful amount of radioactive contaminants in ground water or soil. It seems that a "fly-over" would be detecting mainly gamma radiation because of its long path length and high energy. However some contaminants could be primarily alpha and beta emitters that would not be detected by a fly-over. It might be desirable to analyze samples of ground water and of soil, specifically for the presence of such alpha and beta radioactivity...

Ohio EPA's Response: The "fly over" which was performed under the U.S. Department of Energy in 1988 was designed to detect low-level gamma radiation and would have been sufficiently sensitive to located gamma radiation in soils across the Diamond Shamrock Painesville Works , as well as in surrounding areas, that could pose a potential risk to human health.

A literature search of scientific journals and other reference material, performed by Ohio EPA, indicates that the amount of radiation released from coal combustion operations is similar to background and does not pose a significant environmental/human health threat. This information when combined with the results of the 1988 "fly over" and the remedial activities selected for OU6, leave Ohio EPA with confidence that radiation sampling is not warranted due to coal combustion activities (coking operations) at this site.

Comments from Russell M. Bimber, Citizen

- (1) *As you know, the 2/25/95 Draft of the Director's Final Findings and Orders mentioned the presence of buried tankcars and hundreds of 55 gallon drums in the "One Acre Landfill"...Now I contend that the current plan for remediation of OU6 is based on a DFFO which greatly underestimates the hazards of the materials buried in the adjacent landfill. I say those materials may still include over 100,000 gallons of chlorinated solvents in large tanks, and their hazards should preclude allowing any buildings for human occupancy in at least the eastern 500 feet of OU6. The contents of the landfill should become part of the discussion of OU6.*

Ohio EPA's Response: Remediation of the One Acre Landfill (OU10) and related groundwater (OU 1N-Lake) will be addressed under a separate preferred plan, which will be issued by Ohio EPA. A remedy will be proposed which will include monitoring to insure that contaminants do not migrate from the One Acre Landfill property onto OU6.

- (2) *The Painesville PRP Group presented “An Executive Summary of Key Issues Relating to the Painesville Works Site” (I assume) to EPA in April 1995, but it lacks any useful documentation...If the PRP Group gave Ohio EPA any documents to support this “Executive Summary,” I’d like an appointment to examine them in the Northeast District Office. Are there any such document?*

Ohio EPA’s Response: The Agency does not recall any documents being specifically submitted to the Agency in support of the “Executive Summary” prepared by the Painesville PRP Group. However, if the documentation does exist, it would be part of the Diamond Shamrock Painesville Works public files, which are located in Ohio EPA’s Northeast District Office. You may schedule a file review by contacting Ms. Lily Aaron, at (330) 963-1168.

- (3) *Any fenced “exclusion zones” such as the fenced four acres around the One Acre Landfill, and possibly one around the carcinogenic coal tar residues from the former Coke Plant, should have their property lines extended, along groundwater flow lines, down to the waterline of Lake Erie, to allow for repeated improvements to their erosion barriers.*

Ohio EPA Response: As previously stated, issues concerning the One Acre Landfill will be addressed under the preferred plan for OU10. The design and location of the shoreline protection barriers for OU6 will be approved and permitted by the U.S. Army Corps of Engineers and Ohio Department of Natural Resources. The approved design specifications will be incorporated into the requirements under the RD/RA Order. Operation and Maintenance Agreements for both OU6 and OU10 will include the maintenance requirements of both the U.S. Army Corps of Engineers and Ohio Department of Natural Resources.

Comments from Roger H. Stanley, Citizen

I do have some concern about the EPA plan for the Diamond Shamrock Property, unit 6 (OU6). In discussing clean-up plans with Russ Bimber, a former chemist at Diamond Alkali, I can’t help but share his concerns...Though I do not know the details myself, I trust his expertise and good intention...Please give due consideration to any information that he has given you in the past, or may have submitted for the public meeting scheduled for 7/7/05 in Painesville Township.

Ohio EPA Response: All of the comments which are provided to Ohio EPA, both during the public comment period for the preferred plans for OU2 and OU6, as well as at any other time during the remedial investigation process, have been taken into consideration by the Agency. Comments raised by Mr. Bimber, during the public comment period for OU2 and OU6 have been addressed above.

Comments from Anders “Dan” Fjeldstad, Citizen

First off, anytime the EPA cleans up an old industrial site laden with a number of different

toxic chemicals is something we can all applaud, as long as it is done properly and the toxic waste is dispose of appropriately. Though, as a taxpayer, I would feel better if those who made the mess paid for its cleanup. But, it is still good that it is finally going to be cleaned up.

Secondly, I'm no expert on how to clean up a site like this will all the various toxics scattered here and there OR whether 2 or 4 feet of clean dirt on top is enough OR whether someone's periodic monitoring of the earth, air, and water can be done "forever."

But I do think that the idea that a piece of ground that was once considered for Superfund status (and dropped more for political and financial reasons than for safety reasons) should ever be used as a residential area is "crazy!" This, to me, sounds more like a long term "experiment" with the health of the people who would live there. The notion that you could keep small kids and their pets from playing in the yard "forever" is ludicrous. The notion that you could keep any leftover toxics below four feet disregards the constant turnover of the topsoil by rodents, insects, earthworms and even plants. Sometime in the future and somewhere on this property something toxic will arrive at the surface. That's just the way nature works. The notion that your constant and vigilant monitoring will find IT before some small dog or child will seems to me to be unreasonable. So please reconsider any use of an old industrial site like these as a "residential area!"

As for your plans for either OU2 or OU6 as a new industrial or even commercial site, I would much prefer the former but could live with the latter.

Ohio EPA's Response: The environmental covenants, risk management plans (RMP) and the O&M Plans that will be developed for OU2 and OU6 provide a means for monitoring activities on the properties in order to limit the possibility of exposure to both human and ecological receptors to contaminants which remain below the required point of compliance. The remedies which have been proposed in the preferred plans for OU2 and OU6 were formulated utilizing standard risk assessment methodologies with conservative assumptions. Ohio EPA believes that the remedies which will be implemented for these properties will provide protection to both human health and the environment.

Comments from Ruth DeGraff, Citizen

Our already contaminated area of Lake County has done enough damage to human health. My blood tests already show high amount of many of the contaminants listed in the News Herald article written about the project in the 7/5/05 edition. I suffer from a dreaded disease possibly enhanced by a very polluted environment. (Chemical plants, Perry Nuclear Plant, local industry, and winds blowing east from the Cleveland area.)

We cannot afford to possibly contaminate Lake Erie because of accidental or improper dumping. The prevailing winds also play a huge role as soil is being dumped or moved. Life and health are more precious than monetary benefits.

We cannot afford to take a chance.

Ohio EPA's Response: Based on the information available, the remedy which has been selected within this Decision Document is protective of both human health and the environment.

Comments from Ken, Citizen

in regards to OU2 and OU6, diamond shamrock developed the atom bombs that were dropped on japan to end the war at this site, true nothing was mass produced here but plenty of things (uranium ect were brought in here for the research and developement, phillips metals aka aluminum smelting aka cousins wasn't allowed to sell because of the chromium contamination. I was in a hole we dug that was 4 to 5 feet deep and about 8x8 ft square just on the north side of what was dartron, the walls of the hole were leaching something a color of dark green it was oozing out of the ground it burned our lungs to breath, the smell was something like a strong varnish type of thing tho it wasn't varnish but something kinda pungent, vaporise most definatley a chemical of some sort. we had to take turns in making our repairs because we could not be in that hole for too long at a time. i'm sure you do understand that when ground is dug to make a ditch after its backfilled its loose and crubley almost forever after, and that ground watter and other things can move along that path with less resistance. these sites are a chemical landfill is all, by your own admission no basements or crawls, protective wear for construction people to put living quarters here is rediculous. my best thought for this area would be dirt bike and atv trails in the summer snowmobiles in the winter a golf course for sure. I wouldn't want to livethere knowing what I know and seeing it as it really appears. to bad this is between a river and our lake. and just for the record I don't like the green people not the epa, i'm not an enviromentalist, or a tree hugger, i'm against the peta people too. I don't buy into the global warming thing either, not worried about the ozone layer for sure. i'm sure glad I leave all these important decisions up to smart people tho. hope you all enjoy the view of our wonderful lake p.s. how bout some street names like cancer drive or poison parkway or chemical lane lol seriously tho thanks for the opportunity to comment

Ohio EPA's Response: The area located on the north side of the former Dartron facility is not within the boundaries of either OU2 or OU6, however that portion of the Diamond Shamrock Painesville Works (OU3 and OU18) was thoroughly investigated during Phase II RI activities. No evidence of disposal was found. Based on the information available, the remedies which have been selected OU2 and OU6 are protective of both human health and the environment.