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DECISION DOCUMENT FOR THE REMEDIATION OF

FORMER TURCO-PUREX FACILITY
MARION COUNTY, OHIO

prepared by

THE OHIO ENVIRONMENTAL PROTECTION AGENCY

January 14, 2004

I certify this to be a true and accurate copy of the official documents filed in the records of the Ohio Environmental Protection Agency.
By [illegible] Date 1/15/04

DECLARATION

SITE NAME AND LOCATION

FORMER TURCO-PUREX FACILITY
MARION COUNTY, OHIO

STATEMENT OF BASIS AND PURPOSE

This Decision Document presents the selected remedial action for the Former Turco-Purex Facility in Marion, 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 chemicals and compounds associated with the historic operations at the facility were identified through surface and subsurface soil sample analyses which includes acetone, cis-1,2-dichloroethene (DCE), tetrachloroethene (PCE), toluene, vinyl chloride, arsenic and lead. Arsenic and lead were eliminated from consideration due to the fact that on-site concentrations do not vary significantly from the corresponding off-site sample concentrations. Ground water contamination at this site is limited to perchloroethylene. Petroleum hydrocarbon contamination of undetermined origin was discovered in Monitoring Well # 8 on June 13, 1997. The contamination appears to be discrete and limited to ground water within Monitoring Well # 8.

DESCRIPTION OF THE SELECTED REMEDY

Ohio EPA's proposed remedy for the Site includes:

- **Institutional controls** - Consists of a shallow ground water use restriction which would prohibit the withdrawal of shallow ground water for potable use at the Site, and an industrial use restriction which would limit the use of the Site to industrial purposes only.

- **Engineering *controls***- Consists of physical controls, such as restrictive fencing, to minimize access to the Site.

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 at the site and the effectiveness of the remedy will be reviewed regularly.

Christopher Jones, Director

1-14-04
Date

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DECISION SUMMARY

FORMER TURCO-PUREX FACILITY
MARION COUNTY, OHIO

1.0 SITE BACKGROUND

1.1 Site History

The Site is located in Marion County, at State Route 95 West, in Marion, Ohio (Site Location Map, Figure 1-1). The Facility is currently an inactive former chemical blending facility situated on a 28-acre parcel of land between the Little Scioto River and Rock Swale Ditch. The Site was used for industrial purposes between 1963 and 1998, when operations ceased. The facility is currently empty and placed on the market for sale.

The Site was privately owned and used for agricultural purposes prior to being acquired by Great Lakes Carbon Corporation in 1963. Great Lakes Carbon owned and operated the Facility from May 10, 1963, to December 20, 1979, for the manufacturing, warehousing, and distribution of charcoal briquettes. Turco-Purex conducted manufacturing operations at the Facility from December 1979, to April 1983. While in operation, Turco-Purex produced a variety of specialty products through chemical blending which included paint strippers, decarbonizers, solvents, metal brighteners, industrial grade floor waxes, disinfectants, cleaners, etc. The Pennwalt Corporation purchased Turco-Purex in 1985. Pennwalt became Elf Atochem North America, Inc. (Atochem, a predecessor of ATOFINA) in 1989, and in April 1993, Atochem sold the Site to IVAX Industries, Inc. (IVAX). IVAX operated the Facility until 1998, at which time they ceased operations. IVAX currently owns the Facility.

Approximately 25% of the property is occupied by buildings, paved roads and parking areas. The remaining 75% consists of open fields with substantial vegetative cover. The former manufacturing portion of the Facility is restricted to the southwest quadrant of the property. Charcoal processing and storage formerly occurred in the inactive northwest quadrant of the property. Coal storage, associated with the past operations, occurred in the northeast portion of the property, which is also currently inactive. The southeast quadrant contains a truck parking area and a grass field, which has reportedly never been utilized for manufacturing activities.

While in operation, the facility conducted chemical blending and manufacturing of paint strippers, decarbonizers, solvents, metal brighteners, industrial grade floor waxes, disinfectants, cleaners, etc. The chemicals and compounds associated with these operations, and identified through surface and subsurface soil sample analyses, include acetone, cis-1,2-dichloroethene (DCE), tetrachloroethene (PCE), toluene, vinyl chloride, arsenic and lead. Arsenic and lead were eliminated from consideration due to the fact that on-site concentrations do not vary significantly from the corresponding off-site sample concentrations. Ground water contamination at this site is limited to PCE.

Petroleum hydrocarbon contamination of undetermined origin was discovered in Monitoring Well # 8 on June 13, 1997. The contamination appears to be discrete and limited to ground water within Monitoring Well # 8.

1.2 Summary of the Remedial Investigation

The Remedial Investigation was conducted by ATOFINA Chemicals, Inc. (ATOFINA) under the requirements of a November 1, 1993 Administrative Order on Consent (AOC). The Remedial Investigation included a number of tasks to identify the nature and extent of site-related chemical contaminants. The investigation was conducted with oversight by Ohio EPA and was approved on August 1, 1996. The tasks included sampling of soil and ground water. The data obtained from the investigation were used to conduct a baseline risk assessment and to determine the need to evaluate remedial alternatives. This Decision Document contains a brief summary of the findings of the Remedial Investigation and Feasibility Study. Please refer to the Remedial Investigation Report (RI) and Feasibility Study Report for additional information on contaminant concentrations.

The nature and extent of contamination at the Former Turco-Purex facility in each environmental medium and the contaminants of concern attributable to the Site as summarized in the RI Report (McLaren/Hart, January 20, 1995), are described below:

- Soil in the Former Charcoal Processing Area has not been substantially impacted by facility operations;
- VOCs exceeding background concentrations are present in surface and subsurface soil samples collected adjacent to and beneath the Tank Farm Area. However, there is no complete pathway for human exposure to these compounds;
- Although impacted sediments are present in the off-site Rock Swale Ditch, the source of the impacts is not related to the Facility's drainage ditches nor the retention pond;
- VOCs (vinyl chloride and cis-1,2-dichloroethene) are present in monitoring wells installed on-site in the overburden water-bearing unit near the Tank Farm;
- Temporary well-point samples indicate that organic compounds in overburden ground water are confined to the vicinity of the Tank Farm Area. Chemical data from monitoring wells confirm the findings of the temporary well-point samples;
- VOCs have not been detected in monitoring wells installed at the Facility boundary along the general downgradient direction of overburden ground water flow. In addition, VOCs have not been detected in monitoring wells installed in the upgradient and cross-gradient direction of overburden ground water flow;
- Ground water modeling results predict that the vinyl chloride and cis-1,2 dichloroethene will not exceed drinking water standards at the downgradient Facility boundary due to natural attenuation/degradation in the shallow water-bearing zone;
- VOCs have not been detected in the bedrock water-bearing unit;

- The overburden and bedrock water-bearing units are not in hydraulic communication in the area of the Tank Farm;

- Public water supplies in Marion County are obtained primarily from the Little Scioto River. The surface intake for the Little Scioto River is upstream of the Facility; and,

- Municipal supply wells located approximately 1 mile from the Facility are completed in the bedrock aquifer approximately 200 feet deep and are cased to 100 feet. Overburden ground water is not used as a municipal supply source.

1.2.1 Soil Contamination

The chemicals and compounds associated with these operations, and identified through surface and subsurface soil sample analyses, include acetone, cis-1,2-dichloroethene (DCE), tetrachloroethene (PCE), toluene, vinyl chloride, arsenic and lead. Arsenic and lead were eliminated from consideration due to the fact that on-site concentrations do not vary significantly from the corresponding off-site sample concentrations. VOCs exceeding background concentrations are present in surface and subsurface soil samples collected adjacent to and beneath the Tank Farm Area. However, there is no complete pathway for human exposure to these compounds.

1.2.2 Ground Water Contamination

Ground water contamination at this site is limited to PCE. Petroleum hydrocarbon contamination of undetermined origin was discovered in Monitoring Well # 8 on June 13, 1997. The contamination appears to be discrete and limited to ground water within Monitoring Well # 8. Temporary well-point samples indicate that organic compounds in overburden ground water are confined to the vicinity of the Tank Farm Area. Chemical data from monitoring wells confirm the findings of the temporary well-point samples. VOCs have not been detected in monitoring wells installed at the Facility boundary along the general downgradient direction of overburden ground water flow. In addition, VOCs have not been detected in monitoring wells installed in the upgradient and cross-gradient direction of overburden ground water flow.

Ground water modeling results predict that the vinyl chloride and cis-1,2 dichloroethene will not exceed drinking water standards at the downgradient Facility boundary due to natural attenuation/degradation in the shallow water-bearing zone. VOCs have not been detected in the bedrock water-bearing unit.

1.2.3 Surface Water Contamination

Although impacted sediments are present in the off-site Rock Swale Ditch, the source of the impacts is not related to the Facility's drainage ditches nor the retention pond. Public water supplies in Marion County are obtained primarily from the Little Scioto River. The surface intake for the Little Scioto River is upstream of the Facility.

2.0 SUMMARY OF SITE RISKS

A baseline risk assessment was conducted to evaluate current and future risks to human health and ecological receptors associated with contaminants present at the Site. The results demonstrated that the existing concentration of contaminants in environmental media pose no risks to human and ecological receptors at a level sufficient to trigger the need for remedial actions.

2.1 Risks to Human Health

The relevant portions of the human health risk assessment are represented by two remedial action objectives for protection of human health from contaminants at a site; “carcinogenic risk” and “non-carcinogenic risk.” The risk assessment identifies a number of potential on-Site and off-Site receptors to the on-Site soil and subjects these receptors to a screening process to identify those likely to be the most exposed to contaminants from the Site. This screening identifies the following receptors as those likely to have the highest exposures:

- Future on-Site excavation workers potentially exposed to subsurface soil through incidental ingestion, dermal contact and inhalation of dust or volatilized constituents; and

- Future on-Site industrial workers potentially exposed to surface soil through incidental ingestion, dermal contact and inhalation of dust or volatilized constituents.

These receptors were subjected to quantitative evaluation. Intake equations consistent with Ohio EPA and USEPA guidance were used to estimate exposure to the receptors for each route of potential exposure evaluated.

Constituents of interest (COIs) in the surface and subsurface soils were used to evaluate the exposure medium potentially encountered by the hypothetical future construction worker. The COIs included: cis 1,2-dichloroethene, toluene, vinyl chloride, 2-methylnaphthalene, phenanthrene, arsenic, and lead. The receptor populations evaluated in the risk assessment included plausible occupational exposures to the current site employee and a hypothetical future construction worker. Potential exposures to COIs identified in surface and subsurface soils were evaluated for vapor inhalation, dermal contact and incidental ingestion pathways. The exposure point concentrations estimated for the average and upper bound Reasonable Maximum Exposure (RME) individuals were represented by the mean and 95% UCL of the mean soil concentrations, respectively.

The cumulative hazard indices developed for current and future occupational exposure scenarios were less than 1 for both the average (50th percentile) and RME (95th percentile) individuals. A hazard index of less than or equal to 1 indicates that COIs are present at concentrations which do not pose an unacceptable carcinogenic health risk.

Similarly, carcinogenic health risks were added across each of the exposure pathways and yielded cumulative risks that were either less than the low-end target risk of 1×10^{-6} or within USEPA's acceptable risk range of 1×10^{-6} to 1×10^{-4} as identified in the Code of Federal Regulations, 40 CFR 300.430 (e)(2)(i)(A)(*2*). The cumulative carcinogenic risk potential associated with the average or upper bound exposure point concentrations developed for the current site employee were both less than the target risk level of 10^{-6}, as was the average cumulative risk for the hypothetical future construction worker. The upper bound risk for the

construction worker (RME) was the only risk estimate which marginally exceeded the benchmark of 10^{-6} at a cumulative risk estimate of 1.11×10^{-6}. This estimate is not significantly greater than the low-end target risk of 1×10^{-6} to warrant additional investigation or remedial efforts and falls well within USEPA's acceptable risk range of 1×10^{-6} to 1×10^{-4} identified in the Code of Federal Regulations, 40 CFR 300.430 (e)(2)(i)(A)(*2*).

Based on the results of the BRA, conducted using USEPA and Ohio EPA guidance on the role of risk assessment in remedy selection, the BRA concluded that remedial action was not warranted at the former Turco-Purex facility. The BRA was submitted and approved prior to the identification of free product in monitoring well MW-08, which is driving the institutional control remedy.

The report found that, using the reasonable "worst-case" exposure assumptions for current and likely future receptors, site-related non-carcinogenic and carcinogenic compounds were not likely to pose a significant threat to human health. According to USEPA guidance (USEPA, 1991c issued by the Office of Solid Waste and Emergency Response (OSWER) Directive 9355.0-30), when the cumulative carcinogenic site risk to an individual, based on both current and potential future use, is less than 10^{-4}, and the noncarcinogenic hazard index is less than 1, remedial action is generally not warranted. Similarly, according to (Ohio Administrative Code Rule 3745-300-08 (B)(1)(e), the excess carcinogenic risk associated with a property must be less than 1×10^{-5} and the noncarcinogenic hazard index must be less than 1.

For the reasonable maximum exposure potential receptor, the cumulative site cancer risk was 1.1×10^{-6} and the non-carcinogenic hazard index was 0.6, both of which are less than USEPA and Ohio EPA acceptable cumulative risk levels. Because these estimates of risk were generated using reasonable "worst-case" assumptions, the actual potential risk to humans may be much lower, possibly even zero. Based on the results of the assessment, and USEPA and Ohio EPA guidance on the role of risk assessment in remedy selection, the BRA Report concluded that remedial action was not warranted at the former Turco-Purex Facility. The BRA was submitted and approved prior to the identification of free product in monitoring well MW-08, which is driving the institutional control remedy.

2.2 Fate And Transport Modeling

Fate and transport modeling was conducted as part of the RI, using the MYGRT Computer model (Tetra Tech, 1989) to simulate the migration characteristics of the dissolved organic compounds, vinyl chloride and cis-1,2-dichloroethene (cis-1,2-DCE) detected in overburden ground water samples from wells MW-5 and MW-8.

This was done in order to evaluate the overburden ground water as a potential exposure pathway to any human or environmental receptors. MYGRT is a 2-dimensional analytic code for predicting the downgradient concentration distribution of organic and inorganic compounds in porous media. The modeling was undertaken to determine the theoretical downgradient concentration distribution of the compounds within the overburden water-bearing unit relative to the property boundary. Conservative input parameter values were used in the model to simulate a worst-case scenario, while reproducing field observations where possible.

Each compound was modeled over the distance from MW-5 (monitoring point adjacent to TFA) to the downgradient property boundary (approximately 180 meters). The highest concentrations ever expected to reach the downgradient property boundary at equilibrium were calculated. These concentrations were calculated to be 0.236 PPB for vinyl chloride (MCL = 2.0 PPB) and 0.00193 PPB for cis-1,2-Dichloroethene (MCL = 70 PPB). Analytical results

generated from the temporary well-point sampling events, and from wells MW-9 and MW-10 support the model findings and are consistent with the model output, suggesting satisfactory model calibration. The results of the modeling exercise indicated that vinyl chloride and cis-1,2-dichloroethene would intrinsically degrade to below USEPA primary drinking water standards, prior to reaching the facility boundary.

2.3 Ohio EPA Vapor Intrusion Modeling

In response to the discovery of free product in monitoring well MW-8, Ohio EPA conducted an additional analysis of potential exposure via the ground water pathway. This additional analysis was beyond those analyses performed in accordance with the approved BRA workplan and documented in the BRA report.

Ohio EPA performed a modeling exercise to assess potential worker exposure to vinyl chloride vapors in air inside the main manufacturing building at the facility. The analysis was performed using USEPA's model for tier 2 vapor intrusion from groundwater, OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway [Federal Register: November 29, 2002 (Volume 67, Number 230)].

Ohio EPA constructed the model by assuming that vinyl chloride was present in ground water beneath the entire footprint of the main manufacturing building (modeled as approximately 133,000 square feet) at a concentration of 38,000 ug/l. This assumption is conservative; see Ohio EPA memorandum, dated March 1, 2000.

First and foremost, field data generated to date indicate that vinyl chloride in ground water does not extend beneath any portion of the main building at a concentration above the detection limit (10 ug/l). Vinyl chloride impacts are limited to the immediate vicinity of the tank farm area, located approximately 100 feet east-northeast of the main manufacturing building.

Further, ground water flow in the shallow water-bearing zone is toward the northwest. As such, the majority of the main manufacturing building is located cross-gradient to the tank farm area. Based on ground water contour maps presented in the RI Report, only the extreme northern portion of the building is located downgradient of the tank farm area with respect to ground water flow. At most, 9,600 square feet of the building footprint is located downgradient of the tank farm area. As such, less than 10% of the building is in an area susceptible to vinyl chloride vapors, provided the impacts migrated a substantial distance downgradient relative to the current distribution.

Despite the overly conservative assumptions upon which it was based, the vapor intrusion modeling indicated that indoor air quality would not represent an unacceptable risk to human health. The incremental carcinogenic risk from vapor intrusion was calculated to be 9.5×10^{-5}. This risk value falls within USEPA's acceptable risk range of 1×10^{-6} to 1×10^{-4}.

Citing the uncertainty of the model, Ohio EPA collected an additional ground water sample from monitoring well MW-8 after completing the vapor intrusion modeling to confirm intrinsic degradation of contamination at that location. A sample was collected on April 20, 2000 and analyzed for VOCs. Vinyl chloride was reported in that sample at a concentration of 13,000 ug/l. This concentration is substantially less than 38,000 ug/l used in the vapor intrusion model (based on data for a sample collected on March 26, 1998).

On the basis of these data, by letter dated March 19, 2001, Ohio EPA concluded that these samples "confirmed a downward trend in contaminant concentrations and that downgradient

migration of significant levels of contamination would not likely occur under the existing structure."

2.4 Risks to Ecological Receptors

Because the site is fenced and located in an urban area, large terrestrial receptors (e.g., Deer) are not expected to be present on-Site. The Site is unlikely to provide a suitable habitat for small terrestrial species. As a result, potential exposure pathways to terrestrial ecological receptors are considered incomplete and therefore not a risk.

3.0 FEASIBILITY STUDY

A Feasibility Study was conducted by ATOFINA Chemicals, Inc., in order to define and analyze appropriate remedial alternatives. That study, which was conducted with oversight by Ohio EPA, was approved on April 12, 2002. The Remedial Investigation and Feasibility Study are the basis for the selection of Ohio EPA's preferred remedial alternative.

4.0 REMEDIAL ACTION OBJECTIVES

As part of the remedial investigation/feasibility study (RI/FS) process, remedial action objectives (RAOs) 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 mitigate the potential adverse effects of site contaminants present in environmental media. For environmental media, remediation levels were developed for a range of potential residual carcinogenic risk levels (*i.e.*, 1 in 100,000, 1 in 1,000,000, etc.) and using a non-carcinogenic hazard quotient (or index) of 1 and a range of potential exposed receptors, *i.e.*,

- (1) Future on-Site excavation workers potentially exposed to subsurface soil through incidental ingestion, dermal contact and inhalation of dust or volatilized constituents; and

- (2) Future on-Site industrial workers potentially exposed to surface soil through incidental ingestion, dermal contact and inhalation of dust or volatilized constituents.

These carcinogenic risk levels refer to the increased likelihood that someone exposed to the chemical releases from the site would develop cancer during his or her lifetime as compared with a person not exposed to the site. For example, a 1 in 10,000 risk level means that if 10,000 people were chronically exposed to the carcinogens at the site, there is a probability of one additional case of cancer. Note that these risks refer only to the incremental risks created by exposures from the site. They do not include the risks of cancer from other non-site related factors to which people may be exposed. Non-carcinogenic hazards are generally expressed in terms of a hazard quotient or index, which combines the concentration of chemical

exposures with the toxicity of the chemicals (quotient refers to the effects of an individual chemical whereas index refers to the combined effects of all chemicals). A hazard index of one (1) represents the maximum exposure at which no harmful effects are expected.

The RAOs were developed to ensure that remedial actions reduce the projected risk to humans to acceptable levels. USEPA through the NCP defines acceptable remediation goals for known or suspected carcinogens to be concentration levels that represent an upper bound excess (i.e., above background) lifetime cancer risk to an individual between 1 in 10,000 and 1 in 1,000,000**,** using information on the relationship between dose and response**,** with the 1 in 1,000,000 risk level as the point of departure (i.e., the level of risk at which further remedial action is considered unnecessary). Likewise, noncarcinogenic risks are also to be reduced to an acceptable level, which corresponds to a hazard index of 1.0, at which harmful effects are generally not observed in exposed persons. In a similar manner, important ecological resources (e.g. waters of the state or endangered species) will also be protected.

The RAOs developed for the Site are detailed below:

- Prevent, to the extent practicable, the ingestion of shallow overburden ground water exceeding the MCLs, Ohio EPA ground water quality standards, or in the absence of such standards, the more stringent of an excess cancer risk of 1×10^{-6} for each compound or a hazard index of less than 1 for each noncarcinogenic compound by any individual who may use the shallow overburden ground water within an area of the Site.

- Maintain shallow overburden ground water quality at the points of compliance at concentrations below MCLs, Ohio EPA ground water quality standards, or in the~~ir~~ absence of such standards, the more stringent of an excess cancer risk of 1×10^{-6} for each compound or a hazard index of less than 1 for each non-carcinogenic compound.

- Prevent, to the extent practicable, the ingestion of Site soils exceeding the Ohio EPA generic direct-contact soil standards, or in the absence of such standards, the more stringent of an excess cancer risk of 1×10^{-6} for each compound or a hazard index of less than 1 for each non-carcinogenic compound by any individual who may come in contact with or ingest Site soils.

- The soil objectives have been met with no need for remediation since the soil at the Site does not exceed the Ohio EPA generic direct-contact soil standards as specified in Rule 3745-300-08 (B)(3) of the Ohio Administrative Code.

5.0 SUMMARY OF REMEDIAL ALTERNATIVES

A total of two (2) 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.

5.1 No Further Action

The No Further Action option must be considered in the remedial action evaluation as required by the NCP. This evaluation must address the public health, environmental and financial consequences of not implementing any action at the Site. No Further Action is not a category of technologies but a group of activities which can be used to assess the status of the Site without performing any removal, remediation or containment activities on the Site.

5.2 Institutional Controls

Institutional controls may be used to manage and/or restrict certain uses of the Site or to ensure that any future activities at the Site are conducted in an approved manner in accordance with the intent of the comprehensive remedial action. Institutional Controls may include: access restrictions; restricted ground water use and access to public water supply; and, implementation of local health ordinances, local zoning ordinances and/or deed restrictions.

The institutional controls to be implemented under this remedial alternative consist of deed restrictions to: 1) limit future Site uses to industrial purposes; and 2) prohibit the use of Site overburden ground water for potable purposes. Engineering controls will be implemented as part of this alternative to limit site access through the existing facility fence.

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 they will meet all of the applicable or relevant and appropriate requirements under State and Federal environmental laws;

3. Long-term effectiveness and permanence - Remedial alternatives shall be evaluated to determine their ability 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 uncertainties associated with the construction and operation of a technology, the reliability of the technology, the 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 be evaluated based on 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 used to select the remedial alternative~~s~~ identified in the Preferred Plan. Evaluation Criteria 8, community acceptance, is customarily based, in part, on written responses received during the public comment period and statements offered at the public meeting.

6.2 Analyses of Evaluation Criteria

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

ALTERNATIVE 1: NO FURTHER ACTION

The No Further Action alternative is included for consideration in accordance with the requirements of the NCP. No further action would take place with respect to Site soils and ground water under this remedial alternative.

ALTERNATIVE 2: INSTITUTIONAL CONTROLS

Alternative 2 consists of the implementation of institutional and engineering controls. Institutional controls include a deed restriction to preclude use of the overburden ground water for potable purposes and a deed restriction to limit Site use to industrial purposes. Engineering controls consists of physical controls, such as restrictive fencing, to minimize access to the Site.

6.2.1 Overall Protection of Human Health and the Environment

The assessment of carcinogenic risks and non-carcinogenic hazards to human receptors requires that exposure pathways be identified and the risks and hazards of each pathway be numerically estimated. The risk assessment identifies a number of potential on-Site and off-Site receptors to the on-Site soil and subjects these receptors to a screening process to identify those likely to be the most exposed to contaminants from the Site. Receptors include future on-Site excavation workers potentially exposed to subsurface soil through incidental ingestion, dermal contact and inhalation of dust or volatilized constituents; and future on-Site industrial workers potentially exposed to surface soil through incidental ingestion, dermal contact and inhalation of dust or volatilized constituents. The normal criteria for acceptability of risk represent an upperbound excess lifetime cancer risk to an individual of between 1 in 10,000 and 1 in 1,000,000. The total noncarcinogenic adverse health affects should result in a hazard index of less than 1.0.

The Site is unlikely to provide a suitable habitat for small terrestrial species. As a result, potential exposure pathways to terrestrial ecological receptors are considered incomplete and therefore not a risk.

6.2.2 Compliance with ARARs

ALTERNATIVE 1: NO FURTHER ACTION*:*

The No Further Action alternative meets the ARARs associated with soils present at the Facility since the property-specific BRA determined that the cancer risk is less than 1×10^{-6} and the hazard index is less than 1. In addition, concentrations of VOCS present in the soils at the Facility do not exceed Ohio EPA Generic Direct-Contact soil standards for either residential or industrial use scenarios as specified in Rule 3745-300-08 (B)(3) of the Ohio Administrative Code.

However, with respect to the ground water, this alternative would require the overburden ground water to be restored to the unrestricted potable standards. A restoration or restriction of Site overburden ground water is not a component of the No Further Action alternative. Therefore, this alternative does not comply with the requirements of OAC 3745-300-10 (F)(6).

ALTERNATIVE 2: INSTITUTIONAL CONTROLS

Alternative 2 consists of the implementation of institutional controls. Institutional controls include a deed restriction to preclude use of the overburden ground water for potable purposes and a deed restriction to limit Site use to industrial purposes. This alternative will also include physical controls, such as restrictive fencing, to minimize access to the Site.

Alternative 2 will result in levels of VOCS in the overburden ground water below the target cleanup goals at the point of compliance (downgradient edge of property). As such, this alternative meets the ARARs due to implementation of the institutional controls, based on available ground water data and computer modeling.

Applicable soil and ground water ARARs are met through implementation of this Alternative since the BRA determined that the existing soil concentrations, under an industrial use scenario, do not pose an excess cancer risk of more than 1×10^{-6} and the noncarcinogenic hazard index is less than 1. In addition, the soil concentrations at the Facility do not exceed the OEPA Direct-Contact Soil Standards for both residential and industrial use scenarios as specified in Rule 3745-300-08 (B)(3) of the Ohio Administrative Code. Therefore, a no further soil remediation alternative meets applicable standards.

Similarly, the overburden ground water under the Site is not and will not be used for potable purposes. Further, ground water modeling indicates that the levels of COIs at the downgradient property boundary have not historically and will not in the future reach levels exceeding USEPA drinking water standards and OEPA ground water unrestricted potable use standards.

Pursuant to OAC 3745-300-10 (F) (6) (a) (i) Class B ground water which exceeds the unrestricted potable use standards shall provide institutional controls to ensure the prevention of human exposure to ground water and to ensure protection of ecological resources on and off the property. Remedial Alternative 2 complies with this regulatory requirement.

6.2.3 Long-Term Effectiveness and Permanence

In support of the evaluation of the effectiveness of the Institutional Controls alternative, a ground water contaminant transport model has been constructed to reflect the hydraulics of the Site model. The modeling of Site conditions indicates that, under Alternative 2, the spread of organic compounds in the overburden ground water to off-site properties will not occur.

6.2.4 Reduction of Toxicity, Mobility or Volume Through Treatment

Intrinsic degradation is occurring at the Site and will provide continued reduction in toxicity, mobility and volume of COIs present in the overburden ground water. Ohio EPA collected additional ground water samples from monitoring well MW-8 after completing the vapor intrusion modeling to confirm intrinsic degradation of contamination at that location. A sample was collected on April 20, 2000 and analyzed for VOCSs. Vinyl chloride was reported in that sample at a concentration of 13,000 ug/l. This concentration is substantially less than 38,000 ug/l used in the vapor intrusion model (based on data for a sample collected on March 26, 1998).
On the basis of these data, by letter dated March 19, 2001, Ohio EPA concluded that these samples “confirmed a downward trend in contaminant concentrations and that downgradient

migration of significant levels of contamination would not likely occur under the existing structure." Based on the results of the fate and transport modeling and the RI data, intrinsic degradation are expected to continue reducing the concentration of COIs to below ARARs at the property boundary.

6.2.5 Short-Term Effectiveness

The institutional controls to be imposed under this alternative, including restricted Site access, will provide short-term effectiveness.

6.2.6 Implementability

This alternative is technically feasible and readily implementable. Potential administrative constraints associated with institutional controls and federal, state, and local requirements are anticipated to be limited and should not impede implementation.

6.2.7 Cost

The one-time "capital" costs associated with Alternative 2 include the costs associated with preparing and filing an overburden ground water use restriction, and an industrial land use restriction.

6.2.8 Community Acceptance

Ohio EPA did not receive any comments from any interested parties during the public comment period or at the public meeting held in the Marion Public Library on September 23, 2003. Therefore, there is no Responsiveness Summary included in this document.

7.0 SELECTED REMEDIAL ALTERNATIVE

The selected remedial alternative is Alternative # 2. The selection process is based on CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), the regulations contained in the NCP, and on applicable or relevant and appropriate Ohio statutory provisions or regulations.

Primarily, remedial actions are required to provide overall protection of public health and the environment and compliance with Federal and State ARARs. Additionally, a selected remedial action must be cost-effective and utilize innovative technologies to the maximum extent practicable. Based on these factors, Alternative 2 (Institutional Controls) is the alternative that satisfies the statutory and regulatory requirements applicable to the Site.

Alternative 2 consists of the implementation of institutional controls. Institutional controls include a deed restriction to preclude use of the overburden ground water for potable purposes and a deed restriction to limit Site use to industrial purposes. This alternative will also include physical controls, such as restrictive fencing, to minimize access to the Site.

Applicable soil and ground water ARARs are met through implementation of this Alternative

since the conclusions in the BRA indicated that the existing soil concentrations, under an industrial use scenario, do not pose an excess cancer risk of more than 1×10^{-6} and the noncarcinogenic hazard index is less than 1. In addition, the soil concentrations at the Facility do not exceed the OEPA Direct-Contact Soil Standards for both residential and industrial use scenarios as specified in Rule 3745-300-08 (B)(3) of the Ohio Administrative Code. Alternative 2, in requiring a deed restriction limiting the property to industrial usage, allows the no further soil remediation scenario to meet the applicable standards.

Similarly, the overburden ground water under the Site is not and will not be used for potable purposes, due to the deed restriction prohibiting the use of overburden ground water for potable usage. Further, ground water modeling indicates that the levels of COIs at the downgradient property boundary have not historically and will not in the future reach levels exceeding USEPA drinking water standards and OEPA ground water unrestricted potable use standards.

Pursuant to OAC 3745-300-10 (F) (6) (a) (i) Class B ground water which exceeds the unrestricted potable use standards shall provide institutional controls to ensure the prevention of human exposure to ground water and to ensure protection of ecological resources on and off the property. Remedial Alternative 2 complies with this regulatory requirement.

Performance Standards

- Record a deed restriction with the Marion County recorder, prohibiting the use of overburden ground water under the Site for potable purposes. The performance standard shall be achieved upon the recording of the deed restriction and its continued enforcement.

- Record a deed restriction with the Marion County recorder, restricting the Site to industrial usage only. The performance standard shall be achieved upon recording the deed restriction and its continued enforcement.

- Establish and maintain an engineering control (i.e., restrictive fencing) to limit access to the Site. The performance standard shall be achieved upon construction of the restrictive fencing and its continued maintenance.

8.0 GLOSSARY

Aquifer -	An underground geological formation capable of holding and yielding water.
ARARs -	Applicable or relevant and appropriate requirements. Those statutory provisions or rules that strictly apply to remedial activities at the site, or that 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.
EE/CA -	Engineering Evaluation/Cost Assessment. A report issued under the U.S. EPA's Superfund Accelerated Cleanup Model that evaluates remedies for a site and estimates their costs. EE/CA's are generally shorter and include fewer alternatives than Feasibility Studies.
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.
Hazardous Waste -	A waste product, listed or defined by the RCRA, which may cause harm to humans or the environment.
Human Receptor -	A person exposed to chemicals released from a site.
Leachate -	Water contaminated by contact with wastes.
LOE Contractor -	Level of Effort Contractor. A person or organization retained by Ohio EPA to assist in the investigation, evaluation or remediation of a site.
NCP -	National Contingency Plan. A framework for remediation of hazardous materials sites 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.
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.
PCE -	Perchloroethylene. A common industrial solvent and cleaner, often used for dry cleaning.
Preferred Plan -	The plan chosen by Ohio EPA to remediate the site in a manner that best satisfies the evaluation criteria.
RCRA -	Resource Conservation and Recovery Act. A federal law that regulates the handling of hazardous wastes.
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.
TCE -	Trichloroethylene. A common industrial solvent and cleaner.
Water Quality Criteria -	Chemical and thermal standards that define whether a body of surface water is unacceptably contaminated. These standards ensure that a body of water is safe for fishing, swimming and as a drinking water source.

RESPONSIVENESS SUMMARY
FORMER TURCO-PUREX FACILITY
MARION COUNTY, OHIO

Ohio EPA did not receive any comments from any of the interested parties during the public comment period or at the public meeting held in the Marion Public Library on September 23, 2003. Therefore, there is no Responsiveness Summary included in this document.