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DECISION DOCUMENT

FOR THE

REMEDIATION OF

Rockwell International Corporation, On-Highway Products

Licking County, Ohio

prepared by

THE OHIO ENVIRONMENTAL PROTECTION AGENCY

November, 2002

"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.

By: Zona L Clements Date Mar 4, 03

DECLARATION

SITE NAME AND LOCATION

Rockwell International Corporation, On-Highway Products
Heath, Ohio

STATEMENT OF BASIS AND PURPOSE

This Decision Document presents the selected remedial action for the Rockwell International Corporation, On-Highway Products Site (Rockwell) in Heath, 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 vinyl chloride, cis 1,2 dichloroethene, and polychlorinated biphenyls (PCBs) due to past disposal practices at the Rockwell site, 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

- Enhanced In-situ Anaerobic Reductive Dechlorination to reduce the concentration of vinyl chloride and cis 1,2 dichloroethene in ground water;
- Soil Cover to provide a minimum of two feet of separation between the industrial fill and the land surface;
- Light Non-Aqueous Phase Liquid removal to reduce the mass and volume of PCB-laced hydrocarbon oil in the ground water;
- Monitoring to document the effectiveness of Enhanced In-Situ Anaerobic Reductive Dechlorination and the fate and transport of vinyl chloride and cis 1,2 dichloroethene in soil and ground water; and,
- Institutional/Engineering Controls to prevent contact with contaminated media during the remedial action.

STATUTORY DETERMINATIONS

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

Joseph P. Koncelik, Assistant Director

2/25/03

Date

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1.0 SITE BACKGROUND

1.1 Site Location, History and Characteristics

The Rockwell International Corporation, On-Highway Products site (Rockwell) is located at 444 Hebron Road (State Route 79) in Heath, Licking County, Ohio (Figure 1). The current owner and operator of the facility is Meritor Heavy Vehicle Systems, LLC (Meritor). The area of the site owned by Meritor is approximately 77 acres, which includes 60 acres around the main plant and a 17 acre parcel east of the plant. A residential neighborhood is located immediately north of the site, commercial properties are located to the south, and mixed agricultural, residential, and commercial properties are located to the east. The Moundbuilders State Memorial Park, an archaeological and historical site, is located west of the site, across Hebron Road. An abandoned railroad spur borders the northeastern side of the property line. The nearest significant waterway is the South Fork of the Licking River, which is located 2000 feet east of the site. A small pond, Gayth Avenue Pond, is located 600 feet east of the northern property line.

The facility was built in 1951 to manufacture heavy-duty truck axles for military vehicles. It was originally named Timken-Detroit Axle Company, Ohio Axle and Gear Division. In 1953, the facility was named Rockwell Spring and Axle Company. In 1954, the facility expanded to include the manufacture of commercial truck axles. No other major expansions have taken place since. In 1958, the facility was named Rockwell-Standard Corporation, Transmission and Axle Division. In 1967, the facility was named North American Rockwell Corporation, and in 1973 it was named Rockwell International Corporation. In 1997, the facility separated from Rockwell International Corporation and became known as Meritor Automotive, Inc., Meritor Heavy Vehicle Systems, LLC, and ArvinMeritor, Inc. The current owner and operator is Meritor Heavy Vehicle Systems, LLC, which continues to manufacture and assemble heavy-duty truck axles and axle components for military and commercial use.

The manufacturing process consists of metal operations, including heat treatment, metal working, and metal finishing. The process generates an oily wastewater, which is a by-product of quenching, machining, and lubricating processes. In the past, the wastewater contained cutting oil, solvents, paints, paint thinners, and metals. From 1951-1985, wastewater was discharged to a series of four unlined surface impoundments or lagoons (Lagoons 1, 2, 3, and 4) (see Figure 2). The lagoons acted as an oil water separator and primary disposal method for the wastewater through infiltration to ground water. The wastewater was pumped to Lagoon 1, where primary oil separation took place, and then flowed to Lagoon 2 through an underflow system. Additional oil separation occurred in Lagoon 2 before the wastewater flowed north to Lagoon 3 and Lagoon 4. The individual lagoon capacities ranged from 1.7 to 2.7 million gallons.

The facility placed industrial wastes and demolition material on the property. The waste was placed adjacent to the railroad spur and in the vicinity of the lagoons, mainly between Lagoons 3 and 4. The fill consists of oily metal grindings and filings, machinery pieces, crushed drums, wire, construction debris, ash, slag, and fabrics. The total area of the fill is approximately five acres and has an average thickness of approximately 13 feet.

In 1981, Rockwell performed an internal environmental audit, which included the installation and sampling of five ground water monitoring wells installed in the lagoon area. The sampling results indicated the presence of various chemical contaminants in ground water.

In May 1984, Rockwell obtained a Permit to Install (PTI) for a wastewater pre-treatment system that would eliminate the lagoons as the primary wastewater treatment method. In 1985, Rockwell obtained the PTI, built the pre-treatment system, and began discharging the treated wastewater to the Newark Wastewater Treatment Plant.

In 1984, after Rockwell received the PTI for the wastewater pre-treatment system, they began plans to close the lagoons. The remaining wastewater in the lagoons and a thick layer of sludge that had formed at the bottom of the lagoons needed to be removed. Ohio EPA and US EPA initially classified the bottom sludge as F006 electroplating waste. This classification required Rockwell to close the lagoons in accordance with Resource Conservation and Recovery Act (RCRA) requirements. Rockwell appealed the F006 electroplating classification to US EPA. In 1986, US EPA advised Rockwell that the electroplating definition had been revised and the lagoon sludge was <u>not</u> a listed F006 electroplating waste. Ohio EPA also removed the hazardous classification of the lagoon sludge. However, by the time of the 1986 revision, Rockwell had already submitted a RCRA closure plan to US EPA and Ohio EPA. The regulatory agencies encouraged Rockwell to close the lagoons in accordance with the closure plan but did not require it.

In 1986, Rockwell began closure of the wastewater lagoons. Rockwell pumped out approximately 11 million gallons of water, treated it, and then discharged it to the Newark Wastewater Treatment Plant. Rockwell then initiated the removal of the bottom sludge. Sampling results of the bottom sludge indicate that it contained oil and grease, phenolics, vinyl choride, methylene chloride, trans 1,2 dichloroethene, 1,2 dichloroethane, toluene, chlorobenzene, ethylbenzene, xylenes, cyanide, and several metals. Rockwell solidified the sludge with kiln dust and disposed of it at Bedford ECOL 2, a solid waste landfill in Gahanna, Ohio. Ohio EPA approved the disposal of the solidified sludge as solid waste in October 1987. The lagoons were backfilled with clean fill and graded, and the closure was completed in 1988.

In March 1986, Rockwell signed Ohio EPA Director's Findings and Orders to complete a hydrogeologic assessment of the lagoon area. The Findings and Orders were issued to satisfy RCRA requirements related to the lagoon closure. Rockwell completed the assessment in August 1986 and provided the final report to Ohio EPA in November 1986. The investigation consisted of the installation of eight new monitoring wells; the sampling of all 13 on-site monitoring wells; the completion of a geophysical survey; and the evaluation of all geologic, hydrogeologic, and geophysical data. The results of the investigation indicated the ground water was contaminated with several volatile organic compounds, heavy hydrocarbon oil, and metals; and large amounts of debris between Lagoons 3 and 4.

In January 1989, Rockwell began voluntary quarterly sampling of the 13 on-site monitoring wells at the request of Ohio EPA. On April 20, 1989, Ohio EPA completed a preliminary assessment and recommended no further federal action and gave the site a medium priority for state action. In June 1989, Ohio EPA received the first quarter ground water sampling results, and, in July 1989, Ohio EPA received the second quarter results. The first two quarterly reports indicated persistent ground water contamination of cis 1,2 dichloroethene, trans 1,2 dichloroethene, and vinyl chloride. The quarterly reports also indicated the heavy hydrocarbon oil in the ground water contained polychlorinated biphenyls (PCBs). The piezeometric surface of ground water indicated an easterly flow of contaminants toward the South Fork Licking River and residential areas.

In August 1989, Ohio EPA and Rockwell began discussions to address the ground water contamination. In April 1990, Ohio EPA sent Rockwell an invitation to negotiate an administrative order on consent (AOC) to complete a remedial investigation and feasibility study (RI/FS). In June 1990, Rockwell informed Ohio EPA that Rockwell had installed and sampled monitoring wells east of their property and discovered that the contamination had migrated in ground water several hundred feet east of its property line. On November 28, 1990, Rockwell signed the AOC with Ohio EPA to complete an RI/FS. The AOC divided the site into two operable units: (1) The Closed Lagoon Operable Unit (CLOU) and (2) the Demolition Debris Operable Unit (DDOU) (see Figure 2). The AOC defines the CLOU as the four lagoons, the industrial fill between the lagoons, and any contamination migrating from the CLOU. The DDOU is defined as the fill area adjacent to the east side of the main manufacturing building and any contamination migrating from the DDOU.

1.2 Summary of the Remedial Investigation

The RI, performed by Rockwell with Ohio EPA oversight, included a number of tasks to identify the nature and extent of site-related chemical contaminants. The tasks included sampling soil, surface water, industrial fill, and ground water. The data obtained from the RI were used to conduct a baseline risk assessment and to determine the need to evaluate remedial alternatives. The RI field activities began in 1991 and were completed in 1993. Ohio EPA approved the final RI Report on February 10, 1998.

This Decision Document contains a brief summary of the findings of the RI. Please refer to the RI for additional information on contaminant concentrations.

The nature and extent of contamination at the Rockwell site in each environmental medium and the contaminants attributable to the site are described in the following sections.

1.2.1 Soil Contamination

Soil samples were collected from surface soil (0-2 feet below the ground surface) and subsurface soil (2-12 feet below the ground surface). The samples were analyzed for volatile organic compounds, semi-volatile organic compounds, PCBs, pesticides, and inorganics (metals and cyanide). Table 1-1 summarizes the analytical results for soil.

Table 1-1. Summary of Soil Analytical Results

Soil Media	Organic Chemicals	Elevated Inorganics
Surface Soil (0-2 Feet)	tetrachloroethene, PCBs	arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel, sodium, cyanide, barium, silver, vanadium, zinc
Subsurface Soil (2-12 Feet)	BTEX, acetone, methylene chloride, 2-butanone, trichloroethene, cis 1,2 dichloroethene, vinyl chloride, phenanthrene and di-n-butylphthalate, PCBs	cadmium, chromium, copper, lead, zinc, cyanide

Inorganics were considered elevated if concentrations exceeded a statistical critical value as compared to background (see RI Report). In general, the highest concentrations of chemicals occur in the subsurface soil and in the industrial fill. Contaminated soil was not detected off of Rockwell's property.

In addition to the soil samples, waste fill samples were also collected from 10 trenches that were dug in the DDOU and the CLOU fill areas. Organic chemicals detected in the waste fill include BTEX (benzene, toluene, ethylbenzene, xylenes), trichloroethene, tetrachloroethene, methylene chloride, 2-butanone, acetone, and PCBs. Elevated inorganics detected include chromium, cobalt, copper, iron, manganese, nickel, arsenic, lead, sodium, zinc, barium, aluminum, cadmium, beryllium, vanadium, and cyanide.

1.2.2 Ground Water Contamination

The RI characterized the nature and extent of ground water contamination. The contaminated ground water is confined to the upper aquifer, which begins 5-10 feet below the land surface and is approximately 60 feet thick. The upper aquifer is a heterogeneous mix of glacial sand and gravel outwash deposits and clay lenses. The upper aquifer yields between 100-150 gallons per minute. At the base of the upper aquifer is a clay-till, 45-65 feet thick, that separates the upper aquifer from the lower aquifer. The clay-till is a barrier to vertical migration of the plume. The upper aquifer is contaminated with several chemical compounds. Table 1-2 summarizes the analytical results for ground water.

Table 1-2 Summary of Ground Water Analytical Results

Organic Chemicals	Elevated Inorganics
vinyl chloride, cis 1,2 dichloroethene, 4-methyl 2-pentanone, trans 1,2 dichloroethene, trichloroethene, tetrachloroethene, 1,2 dichloroethane, BTEX, and PCBs	aluminum, arsenic, barium, copper, lead, manganese, chromium, cobalt, nickel, vanadium, and zinc.

The RI defined a vinyl chloride plume and a cis 1,2 dichloroethene plume that extends east of the CLOU. The highest concentrations of vinyl chloride and cis 1,2 dichloroethene are in the ground water beneath Lagoons 1 and 2. The lateral extent of the vinyl chloride plume is approximately 1000 feet east of the property line, and the lateral extent of the cis 1,2 dichloroethene plume is appoximately 1800 feet east of the property line (see Figure 3). The vertically extent of the plume is to the base of the upper aquifer (approximately 50 feet below the top of the ground water table). The total surface area of both plumes together is approximately 34 acres. The closure of the lagoons has eliminated the primary source of contaminants; therefore, the migration of the contaminant plume has probably stagnated. The other contaminants detected in ground water are either contained on the facility's property or were detected sporadically in monitoring wells off of the property.

The RI defined the nature and extent of a hydrocarbon oil plume at the top of the ground water table (see Figure 4). The oil is a light non-aqueous phase liquid (LNAPL). The apparent thickness of the LNAPL in the well casings is 0.4-4.7 feet. The thickest LNAPL occurs in the Lagoons 1 and 2 area. The LNAPL contains PCBs, toluene, ethylbenzene, and xylenes. Analytical interferences prevented the detection of other constituents. The LNAPL has migrated southeast of Lagoon 2 and seeped out onto the land surface. The seepage is not continuous and is related to the height of the ground water table. Estimated aerial extent of LNAPL is 25,000 square feet.

1.2.3 Surface Water Contamination

The RI characterized the nature and extent of surface water and sediment contamination at the Gayth Avenue Pond and South Fork Licking River. Site-related contaminants detected in surface water include vinyl chloride (Gayth Avenue Pond) and cis 1,2 dichloroethene (South Fork Licking River). The concentrations of these contaminants are below the water quality standards (WQS) for surface water (see Ohio Administrative Code (OAC) 3745-1-34, effective February 22, 2002).

1.3 Interim or Removal Actions Taken to Date

In April 1991, Ohio EPA discovered LNAPL seepage immediately east of the railroad tracks in an adjacent farm field. Ohio EPA sampled the soil and found that it contained PCBs at a concentration of 149 mg/kg. Rockwell fenced off the area and placed booms and straw bales to prevent surface water run-off. This work was completed as an interim action under the AOC.

In May 1991, Rockwell completed an interim environmental investigation in the residential areas at Gayth Avenue and Licking View Drive. The investigation was conducted as an interim action under the AOC with Ohio EPA oversight. The objective of the investigation was to determine the need for immediate action. Rockwell sampled ground water, indoor air, basement sump water, and Gayth Avenue Pond surface water. Ground water was found to contain vinyl chloride and cis 1,2 dichloroethene in the vicinity of Gayth Avenue. Site-related contaminants were not detected in the in-door air samples or basement sump water samples. Vinyl chloride was detected in the Gayth Avenue Pond. Ohio EPA concluded that immediate actions were not required to protect the health of the residents.

In October 1993, Rockwell initiated LNAPL recovery operations on their property as an interim action under the AOC. Rockwell installed three recovery wells that were placed at locations where thick LNAPL was identified during the RI in the Lagoon 1 and 2 area (Figure 4). The wells were drilled 22-28 feet below the ground surface and were constructed with 8-inch diameter v-slot wire wrap screens and steel casings. The well screens straddle the top of the water table. LNAPL is recovered using gravity skimmers and pumped to a recovery drum located in an equipment building. The recovery operation is ongoing and has recovered approximately 7,000 gallons of LNAPL.

2.0 SUMMARY OF SITE RISKS

A baseline risk assessment was conducted by Rockwell to evaluate current and future risk to human health associated with 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.

2.1 Risks to Human Health

The objective of the baseline risk assessment is to evaluate current and potential future risks to human health associated with contaminants present at a site. There are two hazards to human health that are calculated in baseline risk assessments: (1) carcinogenic (cancer) risk and (2) hazard risks. Carcinogenic risks are the probability of an individual developing cancer over a lifetime from exposures to chemical compounds that are considered cancer causing. Hazard risks are measured as an hazard index (HI), which is a measure that describes the potential for non-cancer health damage to occur in an individual from exposure to all toxic substances. The risk assessment requires that exposure pathways for exposure be identified and the risks and hazards of each pathway be numerically estimated. Ohio EPA has established criteria to manage risks in accordance with the National Oil and Hazardous Substances Contingency Plan, 40 CFR Part 300 (NCP). The criteria are an excess cancer risk range of 1 in 1,000,000 to 1 in 10,000 and an HI score of greater than 1.

The potential human receptors and calculated human heath risks that exceed Ohio EPA's established criteria are summarized below.

- Current Employees. The exceedences are an HI score of 2.3 and an excess cancer risk of 4.2 in 100,000. The HI is mainly due to dermal contact with arsenic, chromium, nickel, manganese, and thallium in soil. The cancer risk is due to dermal contact with arsenic in soil.

- Future Industrial Workers at CLOU. The exceedences are an HI score of 2.4 and an excess cancer risk of 7.0 in 1,000,000. The HI is mainly due to dermal contact with arsenic, nickel, manganese, and thallium in soil. The cancer risk is due mainly to inhalation of vinyl chloride.

- Future Industrial Workers at DDOU. The exceedences are an HI score of 3.0 and an excess cancer risk of 5.3 in 100,000. The HI is due to dermal contact with arsenic, manganese, and nickel in soil. The excess cancer risk is due to inhalation of benzene.

- Future Construction and Remediation Workers at CLOU. The exceedences are an HI of 110 and an excess cancer risk of 1.8 in 100,000. The HI is due mainly to dermal contact with cadmium, manganese, PCBs, and vinyl chloride in soil and manganese, PCBs, and vinyl chloride in ground water. The excess cancer risk is due mainly to dermal contact with vinyl chloride, PCBs, and manganese in ground water.

- Future Construction and Remediation Worker at DDOU. The exceedences are an HI of 36 and an excess cancer risk of 3.2 in 100,000. The HI is due mainly to dermal contact with PCBs and vinyl chloride in ground water. The excess cancer risk is mainly due to dermal contact with beryllium in soil and PCBs, vinyl chloride, and 1,2 dichloroethane in ground water.

- Current Residents within Ground Water Plume. The exceedences are an HI of 3,900 and an excess cancer risk of 2.3 in 100. The HI is due mainly to ingestion of vinyl chloride and cis 1,2 dichloroethene in ground water. The excess cancer risk is due mainly to ingestion of vinyl chloride in ground water, if ground water were used as a source of potable water.

- Current Residents North of the Facility. The exceedence is an HI of 7.6. The HI is due mainly to the theoretical inhalation of benzene and total xylene vapors as predicted by a mathematical model of the vaporization and inhalation process.

- Future Residents at CLOU. The exceedences are an HI of 1,400 and an excess cancer risk of 9.2 in 1000. The HI is due mainly to dermal contact and ingestion of contaminants in soil and ground water. The excess cancer risk is due mainly to dermal contact and ingestion of several contaminants in soil and ground water.

- Future Residents at DDOU. The exceedences are an HI of 830 and an excess cancer risk of 1.1 in 100. The HI is due mainly to dermal contact and ingestion of contaminants in ground water. The excess cancer risk is due mainly to dermal contact and ingestion of contaminants in ground water.

2.2 Risks to Ecological Receptors

A Phase I screening ecological assessment was completed during the RI to evaluate the impacts to nearby ecosystems. Four ecosystems were identified as areas of interest: (1) LNAPL seep area; (2) Gayth Avenue Pond; (3) South Fork Licking River; and (4) eastern third of Rockwell's property (see Figures 1 and 2). Based on a qualitative analysis of the contaminants effects on these ecosystems, they are not being adversely affected. A more extensive Phase II ecological assessment was not conducted for this reason.

3.0 FEASIBILITY STUDY

A Feasibility Study (FS) was conducted by Rockwell, with oversight by Ohio EPA, to define and analyze appropriate remediation alternatives. Ohio EPA approved the final FS on March 8, 2002. The FS identified remedial action objectives, general remedial actions for those objectives, and evaluated potential remediation technologies. The FS included the results of a treatability study of in-situ anaerobic reductive dechlorination, a potential ground water remediation technology. The treatability study began in 1995 and ended in 2000. The RI and FS were the basis for the selection of Ohio EPA's preferred alternative.

4.0 REMEDIAL ACTION OBJECTIVES

As part of the RI/FS process, remedial action objectives (RAOs) were developed in accordance with the 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 intent of the RAOs is to set 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-related 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 an HI of 1.0 and a range of potential exposed receptors, i.e. ingestion of ground water, inhalation of vapors, and skin contact with soil and ground water.

Carcinogenic risks are estimated as the unitless probability of an individual developing cancer over a lifetime as the result of exposure to the potential carcinogens related to the site. Note that for any individual in the exposed population, this risk is in excess of the risk imparted to that individual by factors not related to the site (see Section 8.0 of the RI report for further discussion of site-specific risks).

The RAOs were developed to ensure that remedial actions reduce the projected risk to humans to acceptable levels. The USEPA, through the NCP, defines acceptable RAOs for known or suspected carcinogens to be concentration levels that represent an upper bound excess lifetime cancer risk, above that of the background, 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.

Likewise, noncarcinogenic risks are also to be reduced to an acceptable level (HI less than 1). The HI is the sum of the Hazard Quotient (HQ) scores, which is the risk from a single contaminant. In a similar manner, important ecological resources (e.g. waters of the state or endangered species) will also be protected. Exposure pathways that will be addressed at the site are potential human exposure to contaminated ground water, contaminated soil, and industrial fill.

Based on the results of the RI and information provided in the FS, Ohio EPA prepared the *Preferred Plan for the Remediation of the Rockwell International Corporation Site* (Preferred Plan) in August 2002. In the Preferred Plan, Ohio EPA established RAOs for this site, which are listed below.

1. Prevent exposure to soil, waste, and ground water so that current and future worker exposures to 95% of the upper confidence limit on the mean concentrations of contaminants are within the cumulative target risk range of 1 in 1,000,000 to 1 in 10,000 for individual carcinogens and an HQ of less than 1.0 for individual non-carcinogens.

2. Prevent exposure to contaminated ground water, soil and waste so that current and potential future resident exposures to 95% of the upper confidence limit on the mean concentrations of contaminants are within the cumulative target risk range of 1 in 1,000,000 to 1 in 10,000 for individual carcinogens and an HQ of less than 1.0 for individual non-carcinogens.

3. Ensure that the leaching of contaminants from the DDOU, CLOU, soil, or any other sources and source areas, do not exceed maximum contamination levels (MCLs) in ground water.

4. Remove LNAPL to the extent practicable and ensure that it is not an unacceptable source of contaminants to ground water.

5. Restore the ground water to the MCLs listed in OAC 3745-81-12.

7. Prevent the use of contaminated ground water and ensure protection of human health from exposures to contaminants in ground water until MCLs are met.

8. Ensure that contaminants in ground water do not migrate to unaffected areas in detectable concentrations.

5.0 SUMMARY OF REMEDIAL ALTERNATIVES

Ohio EPA formulated and considered a total of four alternatives in the Preferred Plan. A brief description of the major features of each of the alternatives follows. More detailed information about these alternatives can be found in the Preferred Plan and the FS.

5.1 No Action Alternative

The no action alternative is a baseline against which the other alternatives are compared. This alternative assumes that no active remediation will be implemented to achieve the RAOs. It relies on undocumented natural attenuation processes and existing controls and restrictions to reduce the risk. Access to the CLOU and DDOU is currently controlled by a perimeter fence and 24-hour security. This alternative assumes that these measures would not continue in the foreseeable future. There are no reliable existing controls to prevent future residential development on the property or to prevent the use of contaminated ground water.

5.2 In-situ Anaerobic Reductive Dechlorination, Soil Cover, LNAPL Removal, Monitoring, and Institutional/Engineering Controls

Enhanced in-situ anaerobic reductive dechlorination is an active bioremediation process that utilizes naturally occurring anaerobic bacteria to actively degrade chlorinated chemical compounds in the ground water to ethene/ethane, which are non-toxic. The enhancement of anaerobic reductive dechlorination is accomplished by creating favorable conditions for the proliferation of anaerobic bacteria that exist in the ground water.

LNAPL would be removed through the use of a skimming device that will be placed in recovery wells. The LNAPL would drain by gravity into a storage reservoir, and a pneumatic pump would pump it to a storage tank at the surface. When the storage tank is full, the LNAPL would be disposed of in accordance with applicable regulations.

Clean soil would be placed over the DDOU and CLOU fill to provide at least two feet of separation between the contaminated media and the land surface.

The monitoring plan would document the effectiveness of enhanced in-situ reductive dechlorination and the fate and transport of contaminants in soil and ground water. This would be accomplished by gathering historical data, hydrogeologic data, geochemical data, and microbiological data.

Institutional and engineering controls may consist of land-use restrictions, fences, security, and personal protective equipment to protect human health during remediation.

5.3 Ground Water Extraction/Treatment, Soil Cover, LNAPL Removal Monitoring, and Institutional/Engineering Controls

Ground water extraction and treatment relies on the mechanical extraction of contaminated ground water and the physical removal of volatile organic compounds. The volatile organic compounds in the ground water would be "stripped" out of the water and discharged to the air. The treated ground water would then be discharged to the South Fork Licking River. The other components of this alternative are the same as described in Section 5.2.

5.4 Zero-Valent Iron Reactive Wall, Soil Cover, LNAPL Removal, Monitoring, and Institutional/Engineering Controls

The zero valent iron reactive wall relies on the transport of the chlorinated hydrocarbons in ground water through a wall that contains granulated zero valent iron (Fe^0). The wall would be placed as a continuous trench perpendicular to the plume and immediately east of the CLOU on the east side of the railroad tracks. Chlorinated hydrocarbons chemically react with the Fe^0 as they pass through the wall and are reduced (dechlorinated) to form ethene, which is not hazardous.

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 the NCP:

1. Overall protection of human health and the environment - Alternatives shall be assessed 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 by eliminating, reducing, or controlling exposures to levels established during development of remediation goals

2. Compliance with all State, Federal and Local laws and regulations - Addresses whether or not a remedy will meet all of the applicable State, Federal and Local environmental requirements;

3. Long-term effectiveness and permanence - Refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once pollution has been abated and clean-up goals 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 - The degree to which alternatives employ recycling or treatment that reduces toxicity, mobility, or volume shall be assessed, including how treatment is used to address the principal threats posed by the site;

5. Short-term effectiveness - The short-term impacts of alternatives shall be assessed considering 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 - The ease or difficulty of implementing the alternatives shall be assessed by considering the following factors as appropriate: (1) Technical feasibility, including 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); (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 - The types of costs that shall be assessed include the following: (1) Capital costs, including both direct and indirect costs; (2) Annual operation and maintenance (O&M) costs; and (3) Net present value of capital and O&M costs; and,

8. Community acceptance - This assessment includes determining which components of the remedial alternatives that interested persons in the community support, have reservations about, or oppose. The comment period on the Preferred Plan ended October 25, 2002 . See Section 6.2.8.

The first two are threshold criteria required for acceptance of an alternative as both accomplishing the goal of health and environmental protection and complying with the law. The next five are the balancing criteria that were used to select the alternative identified in the Preferred Plan. The cost estimates were based on information provided by the FS. Those estimates include only the direct costs of implementing the selected remedy at the site and do not include other costs, such as damage to the environment or human health associated with any alternative. 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 examines 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. Seven chemical exposure routes have been identified: vapors, soil particulates, dermal contact with soil, dermal contact with surface water, soil ingestion, ground water ingestion, and dermal contact with ground water. The normal criteria for acceptability of risk represent an upperbound excess lifetime cancer risk to an individual between 1 in 10,000 and 1 in 1,000,000 and the total noncarcinogenic adverse health effects are estimated using an HI score of less than 1.0. The residual risks that are anticipated to remain after the completion of each of the remedial alternatives are summarized in Table 6-1.

Table 6-1 Anticipated Residual Risks

Alternative	Description	Residual Risk	
		Cancer	HI
Alternative 1	No Action	No Change	No Change
Alternative 2	Enhanced In-Situ Reductive Dechlorination, Soil Cover, LNAPL Removal, Monitoring, Institutional/Engineering Controls	3.5 in 100,000	0.7
Alternative 3	Ground Water Extraction/Treatment, Soil Cover, LNAPL Removal, Monitoring, Institutional/Engineering Controls	7.4 in 1,000	3
Alternative 4	Zero-Valent Iron Reactive Wall, Soil Cover, LNAPL Removal, Monitoring, Institutional/Engineering Controls	Unknown	Unknown

Assumptions and Notes:
No Change means the residual risk will be approximately the same as the current risk for the next 20 years.
Alternative 2: assumes the achievement of MCL for vinyl chloride/1,2 DCE in ground water within 20 years
Alternative 3: assumes 50%reduction of vinyl chloride/1,2 DCE in ground water within 20 years
Alternative 4: relies on undocumented natural attenuation processes for contaminated ground water downgradient from wall
Alternatives 2,3,4: assumes the common components will be effective in reducing risk to acceptable levels.

Based on Ohio EPA's assessment of the information in the FS, only Alternative 2 is anticipated to reduce the human health risk to acceptable levels within 20 years. Alternative 3 has the potential to reduce the risk to acceptable levels within 50 years. Alternative 4 may require several hundred years to reduce the concentration of vinyl chloride to acceptable levels (based on general fate and transport properties of vinyl chloride in subsurface environments).

6.2.2 Compliance with Applicable Requirements

Alternative 1, No Action, does not comply with applicable requirements pertaining to the release of pollutants, hazardous wastes, and hazardous substances into the environment. Alternative 1 does not comply with Ohio Revised Code (ORC) Section 6111.04; and, does not comply with OAC Chapters 3745-81 and 3745-82.

Alternatives 2, 3, and 4 all comply with applicable requirements. Alternative 2 would require an underground injection control (UIC) permit or waiver. The requirements are set forth in OAC 3745-34-06 through 3745-34-09 (Ohio UIC rules). The waiver would allow the injection of nutrients and electron donor substances, which would facilitate the reductive dechlorination process.

6.2.3 Long-Term Effectiveness and Permanence

Alternative 1: This alternative is not considered effective in the long-term. The sources of ground water contamination will remain and no attempts will be made to monitor or reduce concentrations of the contaminants. The potential risk due to exposure to contaminants in ground water will not be reduced and will remain indefinitely. Existing controls and alternative water supply are not a reliable means to ensure effectiveness in the long-term.

Alternative 2: This alternative has the potential to permanently reduce the concentration of contaminants in the ground water to MCLs. Treatability study data indicates this alternative reduced the concentration of vinyl chloride by 90% in the treated area. The predicted time-frame to remediate the ground water is 10 years with periodic re-application as required to maintain MCLs.

Alternative 3: This alternative would reduce the concentrations of contaminants and prevent downgradient migration, but it is unlikely that this alternative could achieve MCLs in ground water in a reasonable time-frame. This is due to the heterogeneous characteristics of the upper aquifer and the general inability of this technology to mechanically remove contaminants from aquifer pore spaces. To ensure long-term effectiveness modifications may be needed during implementation to reduce vinyl chloride and cis 1,2 dichloroethene to MCLs.

Alternative 4: This alternative would have a high degree of long-term effectiveness as a barrier to continued downgradient migration of contaminants. The overall long-term effectiveness of this alternative is uncertain because it relies on unproven natural attenuation processes to achieve RAOs away from the wall. Therefore, this alternative is not expected to be able to reduce the concentration of vinyl chloride and cis 1,2 dichloroethene to MCLs in a reasonable time frame.

6.2.4 Reduction of Toxicity, Mobility or Volume Through Treatment

Alternative 1: This alternative would not reduce the toxicity, mobility, or volume through treatment. No active treatment process would be implemented.

Alternative 2: This alternative would reduce the toxicity and volume through treatment. In-situ anaerobic dechlorination would reduce the toxicity of contaminants in the ground water. LNAPL recovery would reduce the volume. The soil cover and institutional/engineering controls will not reduce toxicity, mobility, or volume of contaminants through treatment.

Alternative 3: This alternative would reduce the mobility and volume of contaminants in ground water through treatment. Ground water extraction and treatment would reduce the mobility and volume of contaminants. The contaminants would be transferred to the air in the treatment system. The common components are the same as described for Alternative 2.

Alternative 4: This alternative would reduce toxicity and mobility of contaminants in ground water through treatment. The wall would act as a barrier to downgradient migration of contaminants. The common components are the same as described for Alternative 2.

6.2.5 Short-Term Effectiveness

Alternative 1: This alternative would not add any additional risk to community and workers. This alternative would result in continued migration of the ground water plume.

Alternative 2: This alternative would add temporary risk to workers during construction of the anaerobic dechlorination system, LNAPL recovery system, monitoring wells, and soil cover. Construction in residential areas could potentially add risk to the community. Alternative 2 would be implemented in phases and is anticipated to take at least 10 years to complete. Personal protective equipment, institutional/engineering controls, and health and safety protocols would reduce the risk during remediation.

Alternative 3: This alternative would require the placement of extraction wells and an air stripper in residential areas. This could potentially add some risk to the community. Contaminants would be stripped from ground water and released into the air, so continuous air monitoring may be necessary. The construction of the ground water extraction/treatment system would add some risk to workers. The system may take one year to construct and test and would be in operation for 20 years or more. Personal protective equipment, institutional/engineering controls, and health and safety protocols would reduce the risk during construction and remediation.

Alternative 4: This alternative would add some risk to remediation workers during construction of the reactive wall. Remediation workers would need personal protective equipment and health and safety monitoring. Construction would take one year to complete. Maintenance and monitoring would continue for several years.

6.2.6 Implementability

Alternative 1: No approvals would be necessary and nothing would be required to implement this alternative.

Alternative 2: Technically, this alternative should be feasible to construct, but the anaerobic reductive dechlorination system would require continuous maintenance and monitoring. The ability to implement this alternative site-wide is uncertain. Administratively, the re-injection of contaminated ground water would require a UIC permit or waver (OAC 3745-34-06 through 3745-34-09). A waiver was granted for the pilot-scale study, which may be continued for the full-scale system.

Alternative 3: This alternative should be feasible to construct and maintain. Iron fouling of the air stripper and extraction wells over the long-term may be problematic. This is a high maintenance technology. Administratively, this alternative requires coordination between Ohio EPA's Division of Air Pollution Control and Division of Surface Water. Services and materials are readily available.

Alternative 4: This alternative should be feasible to construct. The principal difficulty would be the contruction of the iron reactive wall, which would need to extend about 30 feet below the ground water table. Dewatering the trench would be necessary, and the water would need to be treated before disposal. Additional hydrogeologic and geochemical studies would be required to evaluate reaction rates and determine thickness. There would be little or no maintenance. Administratively, there are no coordination issues. Services and materials are readily available.

6.2.7 Cost

The capital costs, operation and maintentance costs, net present worth costs, and net present value costs of each alternative are summarized in the table below.

Table 6-2 Costs of Remedial Alternatives Evaluated

Alternative	Cost			
	Capital	O&M	Net Present Worth	Net Present Value
Alternative 1	0	0	0	**0**
Alternative 2	1,611,911	258,600	1,615,244	**3,227,166**
Alternative 3	2,658,605	506,280	5,704,973	**8,363,588**
Alternative 4	6,934,905	181,560	1,472,459	**8,593,160**

6.2.8 Community Involvement and Acceptance

The local community has been kept informed of the activities at the Rockwell site during the RI/FS process. Ohio EPA formally met with local residents and government officials on April 23, 1991 and on August 14, 1991. Ohio EPA has made the administrative record available for public review at the Newark Public Library and at Ohio EPA's Central District Office. An up-to-date site summary was available on Ohio EPA's world wide web page at:

http://www.epa.state.oh.us/dist/cdo/sitepagesummaries/rockwell.htm

The final evaluation criteria is community acceptance of the Preferred Plan. Ohio EPA offered the Preferred Plan to the public for comment on September 25, 2002 and held a public meeting and hearing at the Heath Municipal Building on October 2, 2002. The public comment period ended on October 25, 2002. Ohio EPA received comments from Meritor HVS (Attachment A). No other comments were received. Based on the community response, Ohio EPA determined that the Preferred Plan is acceptable to the local community.

7.0 SELECTED REMEDIAL ALTERNATIVE

The selected remedial alternative is Alternative 2, In-situ Anaerobic Reductive Dechlorination, Soil Cover, LNAPL Removal, Monitoring, and Institutional/Engineering Controls. This alternative best satisfies the selection criteria because it offers the greatest degree of protection of human health and the environment; it is the most effective in the long-term; has the greatest potential to reduce the contaminant concentrations in the ground water to meet the RAOs in the shortest time-frame; and, is the most cost-effective alternative. In-situ anaerobic reductive dechlorination will be implemented in phases. The other components will be implemented concurrently with the construction of the first phase of the enhanced in-situ reductive dechlorination system.

In order to ensure the selected alternative is properly implemented and maintained, Ohio EPA identified performance standards for each component of the selected alternative. Performance standards are applicable standards and criteria for the remedial design, remedial action, and operation and maintenance of the selected remedy. The performance standards specifically address the remedial actions or circumstances for each component of the selected remedy. The selected remedy is expected to achieve these standards; if it does not, then Ohio EPA will consider the implementation of additional work, remedy modifications, or contingent remedies. The following sections describe each component of the selected remedy and list the performance standards.

7.1 Enhanced In-Situ Anaerobic Reductive Dechlorination

Enhanced in-situ anaerobic reductive dechlorination will be implemented to reduce the concentrations of cis 1,2 dichloroethene, vinyl chloride, and other chlorinated contaminants in the ground water. The technology accomplishes this by creating favorable conditions for the proliferation of anaerobic bacteria that exist in the ground water. Some of these anaerobic bacteria have the ability to "dechlorinate" chlorinated ethenes and ultimately convert them to ethene, which is not toxic. The bacteria accomplish this by utilizing the chlorinated ethenes as secondary terminal electron acceptors in their energy transformation process.

The technology consists of injecting excess electron donor and nutrients to the ground water. The electron donor is a carbon source and can be a variety of substances. The specific electron donor will be determined during the remedial design. The excess electron donor expedites the exhaustion of naturally occurring electron acceptors. Once the natural electron acceptors are depleted, the bacteria discharge electrons to other available electron acceptors, which include chlorinated ethenes. When the chlorinated ethenes are used as electron acceptors, they lose chlorine atoms and gain hydrogen atoms. The common industrial solvents, tetrachloroethene and trichloroethene, can degrade in this manner to cis dichloroethenes and vinyl chloride. The accumulation of vinyl chloride and cis 1,2 dichlorothene in the ground water at the Rockwell site is an indication that this process has occurred naturally in the former lagoons and ground water. The implementation of enhanced in-situ anaerobic reductive dechlorination is intended to speed up the natural degradation process.

The FS states that the enhanced in-situ anaerobic dechlorination system will be implemented in phases. The system will initially consist of a series of injection wells placed at the western boundary of the ground water plume. Ground water will be amended with an electron donor and other nutrients through the injection wells. Monitoring wells will be placed downgradient of the injection wells to monitor electron donor distribution and the effectiveness of biodegradation. The first phase will be the treatment of the Lagoon 1 and 2 area. When adequate treatment is provided in that area, then the second phase will be the treatment of the Lagoon 3 area. Additional phases will be implemented until the applicable RAOs are met.

7.1.1 Performance Standards for Enhanced In-Situ Anaerobic Reductive Dechlorination

The objective of the enhanced in-situ anaerobic reductive dechlorination system is to reduce the chlorinated contaminants in ground water to their respective MCLs (RAO Number 5). Ohio EPA identified the following performance standards for in-situ anaerobic reductive dechlorination:

- After all phases of treatment are completed, the chlorinated contaminants in ground water must meet MCLs for at least five consecutive years of bi-annual monitoring. Achievement of MCLs will result in acceptable risks from water use.
- The operation of the system and its effectiveness will be monitored to ensure compliance with remediation time-frames and to ensure that the biodegradation of the contaminants is occurring at an acceptable rate.
- System components will be properly installed, inspected and maintained.
- Ground water samples will be properly collected and analyzed for indicator parameters and contaminants.

The construction of each phase of the reductive dechlorination system will be monitored to ensure compliance with the approved design.

7.2 Soil Cover

The objective of the soil cover is to provide adequate separation between the industrial waste fill and the land surface. The soil cover will therefore be placed over the fill at the DDOU and CLOU fill area.

7.2.1 Performance Standards for the Soil Cover

The cover is intended to provide separation between the contaminated media and the ground surface. This will prevent incidental exposures to contaminants, reduce vapor emissions, and reduce water infiltration (RAO Numbers 1, 2, and 3). These RAOs require worker and resident exposures to be within the acceptable risk range and require the prevention of contaminants leaching to ground water from the soil and waste. The cover will meet the following specifications:

- The soil used for the cover will be classified as "clay" under the USDA textural classification chart.
- The soil used as cover will have a maximum field permeability of 1×10^{-5} centimeter per second.
- The soil cover will be a minimum of 2 feet thick.
- The soil cover will have sufficient slope to prevent ponding.
- A six-inch top soil layer will be placed over the soil cover to support vegetation.
- Vegetation will consist of grass and be sufficiently lush to minimize erosion.
- The soil cover will be required to pass a post-construction Ohio EPA inspection and annual inspections thereafter.
- Restrict property use to prevent destruction of the soil cover.

7.3 LNAPL Removal

LNAPL will be removed from the upper aquifer through the expansion of the existing LNAPL recovery system. The recovery wells will be at least 2 inches in diameter and screened across the top of the water table. A skimming device will be placed in each well. The exact number and locations of the additional recovery wells and the type of skimmer and pump that will be used will be determined during the remedial design. The skimming device, which contains a storage reservoir, will be placed in the recovery well at the interface between ground water and LNAPL. The LNAPL will drain by gravity into the storage reservoir. A pneumatic pump will be used to pump LNAPL from the storage reservoir to a storage tank at the surface. The LNAPL will then be disposed of in accordance with applicable regulations. Multiple wells may be combined into a single recovery system with common controls and storage tanks.

The LNAPL recovery system will proceed in two phases. The first phase is the installation of the recovery wells. The conceptual layout in the FS predicts that 11 new wells will be installed for a total of 14 recovery wells. The skimmer and pump systems will be pilot tested, and the ability of each well to recover oil will be evaluated during the first phase. The second phase includes the installation of the recovery equipment, piping, and control equipment.

7.3.1 Performance Standards for LNAPL Removal

The objective for LNAPL removal is to remove all recoverable LNAPL to the extent practicable (RAO Number 4). Ohio EPA identified the following performance standards for the removal of LNAPL.

- The LNAPL will be considered removed upon a demonstration that it is no longer causing ground water to exceed MCL's off of the property and thus meeting risk goals.
- Documentation will be required that indicates all recoverable LNAPL has been removed.
- System components will be properly installed, inspected and maintained
- The operation of the system and its effectiveness will be monitored.

7.4 Monitoring

A comprehensive monitoring plan, which includes a fate and transport study, will be developed and implemented. The monitoring plan will document the effectiveness of enhanced in-situ reductive dechlorination as well as the fate and transport of contaminants in soil and ground water. This will be accomplished by gathering historical data, hydrogeologic data, geochemical data, and microbiological data. Specifically, the monitoring program will establish the following:

- the rate of contaminant reduction in the ground water and remediation time-frame;
- whether the ground water plume is expanding, contracting, or in a steady state;
- the percolation rate of contaminants to ground water from source areas;
- the degradation rate of contaminants in soil, waste, and in the vadose zone;
- fate and transport mechanisms; and,
- attainment of RAOs.

7.4.1 Performance Standards for Monitoring

The objective of the monitoring program is to ensure compliance with RAO Numbers 3, 5, and 8. The monitoring program will ensure that soil and waste are not continuing sources of contaminants to ground water; that the enhanced anaerobic reductive dechlorination is effective in reducing contaminant concentrations in ground water; and that the contaminants are not migrating to unaffected areas. Ohio EPA identified the following performance standards for the monitoring program:

- The components of the monitoring program will be implemented in accordance with the Ohio EPA approved remedial design.
- Soil and ground water samples will be properly collected and analyzed by an approved laboratory.
- Field measurements will be made in accordance with established protocols and the approved remedial design.
- Performance monitoring will continue for five consecutive years after RAOs have been achieved.

7.5 Institutional and Engineering Controls

Institutional and engineering controls consist of land-use restrictions, fences, security, and personal protective equipment as required. Land-use restrictions may include deed restrictions, local ordinances, and building permit restrictions as required.

7.5.1 Performance Standards for Institutional/Engineering Controls

The objective of the institutional and engineering controls is to prevent exposure to soil, waste, and ground water during remediation (RAO Numbers 1, 2, and 7). Ohio EPA has identified the following performance standards for institutional/engineering controls:

- All controls must remain in place until all RAOs are met.
- The controls must restrict the use of ground water in all affected areas of the Meritor HVS property through appropriate deed restrictions recorded with the Licking County Recorder. Meritor HVS will endeavor to obtain voluntary use restrictions and/or an ordinance restricting ground water use in affected off-property areas.
- Meritor HVS must restrict excavations or digging at the CLOU and DDOU through appropriate deed restrictions recorded with the Licking County Recorder.
- Meritor HVS must provide proper personal protective equipment and follow proper

health and safety protocols if workers excavate or dig at the CLOU and DDOU through a plan to be approved by Ohio EPA.

- Meritor HVS must maintain the integrity of the soil cover by complying with an operation and maintenance plan to be approved by Ohio EPA.
- Institutional and engineering controls must be monitored by Meritor HVS to ensure protection of public health and safety and the environment until RAOs are achieved.

8.0 Contingent Remedy Process

Contingent remedies may be employed if the selected remedy cannot be implemented as designed, fails to perform as anticipated, or, there is a change in the conditions at the site. A contingent remedy may specify a different technology or may be a modification of the preferred remedy. The general process by which the selected remedy may be modified or changed is as follows:

- evaluate which condition triggered the performance standard;
- evaluate the need for and/or extent to which the selected remedy may be modified or changed to address the triggering condition, and the time frame for an appropriate response action;
- implement the selected remedy modification or change; and
- document the modifications or changes that were made to the selected remedy.

Potential contingent technologies will be identified and screened according to implementability, effectiveness, and cost. Ohio EPA will compare the technologies and select the most cost effective technology that will achieve the required performance standards. Ohio EPA may review and change the performance standards if it is determined that the standards are not technically feasible.

9.0 GLOSSARY

AOC	Administrative Order on Consent: legal agreement for the RI/FS.
Aquifer	An underground geological formation capable of holding and yielding water.
Baseline Risk Assessment	An evaluation of the risks to humans and the environment posed by a site.
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes. These chemicals are associated with petroleum hydrocarbons.
Carcinogen	A chemical that causes cancer.
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act. A federal law that governs cleanup of hazardous materials sites under the Superfund Program.
Cis 1,2 Dichloroethene	A general solvent. At the Rockwell site, cis 1,2 DCE is a break-down product of the chlorinated solvents trichloroethene and tetrachloroethene
CLOU	Closed Lagoon Operable Unit
DDOU	Demolition Debris Operable Unit
Decision Document	A statement issued by the Ohio Environmental Protection Agency identifying the Director's selected remedy for a site and the reasons for its selection.
Ecological Receptor	Animals or plant life exposed to chemicals released at a site.
Exposure Pathway	Route by which a chemical is transported from the site to a human or ecological receptor.
FS	Feasibility Study. A study conducted by Rockwell 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.
HI	Hazard Index: sum of hazard quotients (HQs).
HQ	Hazard Quotient: measure of toxicity risk due to a single chemical.
Human Receptor	A person exposed to chemicals released at a site.
LNAPL	Light Non-Aqueous Phase Liquid: liquid lighter than water that does not readily dissolve in water.
MCLs	Maximum Contaminant Level: drinking water criteria established under the Safe Drinking Water Act and Ohio Administrative Code (OAC) 3745-81-

12.

NCP	National Contingency Plan. A framework for investigation and remediation of hazardous substance contamination at sites as specified in CERCLA.
O&M	Operation and Maintenance. Those 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.
PCBs	Polychlorinated biphenyls. A class of chemicals. PCBs are an oily substance that were used in cutting oil at the Rockwell site. PCB production was discontinued in 1976 due to their persistence and toxicity.
Preferred Plan	The plan chosen by the 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.
RAOs	Remedial Action Objectives. Specific goals of the remedy for reducing risks posed by the site.
RI	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.
Tetrachloroethene	A common industrial solvent and cleaner.
Trichloroethene	A common industrial solvent and cleaner.
Vinyl Chloride	A common chemical used in making plastics. At the Rockwell site, vinyl chloride is a break-down product of trichloroethene and tetrachloroethene.
Water Quality Criteria	Chemical and thermal standards that define whether a body of surface water is unacceptably contaminated. These standards are intended to ensure that a body of water is safe for fishing, swimming and as a drinking water source.
Water Quality Standards	Water Quality Standards: surface water criteria defined in Ohio Administrative Code Chapter 3745-1, effective February 22, 2002.

ATTACHMENT A

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OCT 25 2002
OHIO EPA/CDO

October 25, 2002

Mr. Fred Myers
Division of Emergency and Remedial Response
Central District Office
Ohio EPA
1232 Alum Creek Drive
Columbus, Ohio 43207-3417

Re: Comments on the Preferred Plan for the Rockwell International Site Ohio ID: 145-1138, Licking County

Dear Mr. Myers:

On behalf of Meritor Heavy Vehicle Systems, LLC (Meritor HVS), Metcalf and Eddy submits these comments on the Preferred Plan for the Rockwell International Site in Heath, Ohio. We understand the public comment period runs through October 25, 2002 and appreciate the opportunity to participate. Please place this letter in the record of public comments.

Meritor HVS agrees with Ohio EPA's selected remedies outlined in the Preferred Plan that were developed in response to the approved Human Health Risk Assessment (HHRA) and Feasibility Study (FS). The following general comments were prepared to help ensure consistency between the remedies outlined in the Preferred Plan and those presented in the FS.

1. The preferred plan correctly refers to the site as the "Rockwell International Corporation, On Highway Products Site", but the name of the current owner and operator of the site is "Meritor Heavy Vehicle Systems, LLC".

2. The HHRA presented all human health risks and divided the risks based on current risks, or future hypothetical risks. The text of the HHRA also discussed whether the risks were likely or unlikely to occur in the future. For example, the construction of residential dwellings on the DDOU (directly beside the factory) and use of shallow groundwater at these residences was considered a future hypothetical risk that was not very likely to occur. Meritor HVS thinks that the Preferred Plan would benefit from using the same distinctions in presenting the human health risks so that the public can distinguish between current, probable risks and those risks that are hypothetical and will likely never occur (see attached Table 4-2).

3. Meritor HVS plans to utilize the "Enhanced In-Situ Reductive Dechlorination" technology until the MCL's are met at the site boundary and in areas off of the Meritor HVS property. Groundwater monitoring at the property boundary and in areas off of the Meritor HVS property will insure that the risks to the public have been remediated and are controlled in the future.

4. Execution of the elements of the Preferred Plan will occur as soon as practical. The time frame for completing each of the remedial actions will be negotiated and specified in the future modifications to the Amended Final Findings and Order.

As discussed above, Meritor HVS agrees with Ohio EPA's selected remedies for this Site. Meritor HVS has provided the above general comments to help ensure that the Preferred Plan parallels the presentations provided in the approved HHRA and FS. Thank you for your consideration of these comments. Meritor HVS would be glad to discuss these comments at a meeting with the Agency as appropriate.

Respectfully,
METCALF & EDDY OF OHIO, INC.

Ihsan Al-Fayyomi
Sr. Project Manager

attachment

cc: Linda Furlough
James Haff
David Nash

ATTACHMENT

Table 4-2A Summary of Current Human Health Risks

Population	Hazard Index	Cancer Risk
Current Employee	2.33	4.2 in100,000
CLOU Construction Worker	110	1.8 in100,000
DDOU Construction Worker	36	3.2 in 100,000
North Side Residents	7.6	3 in 10,000,000

Table 4-2B Summary of Future Hypothetical Human Health Risks

Population	Hazard Index	Cancer Risk
CLOU Industrial Worker	2.4	7 in 1,000,000
DDOU Industrial Worker	3	5.3 in 100,000
Eastside Resident Groundwater Use	3900	2.3 in 100
DDOU Residential	830	1.1 in 100
CLOU Residential	1400	9.2 in 1000

FIGURES

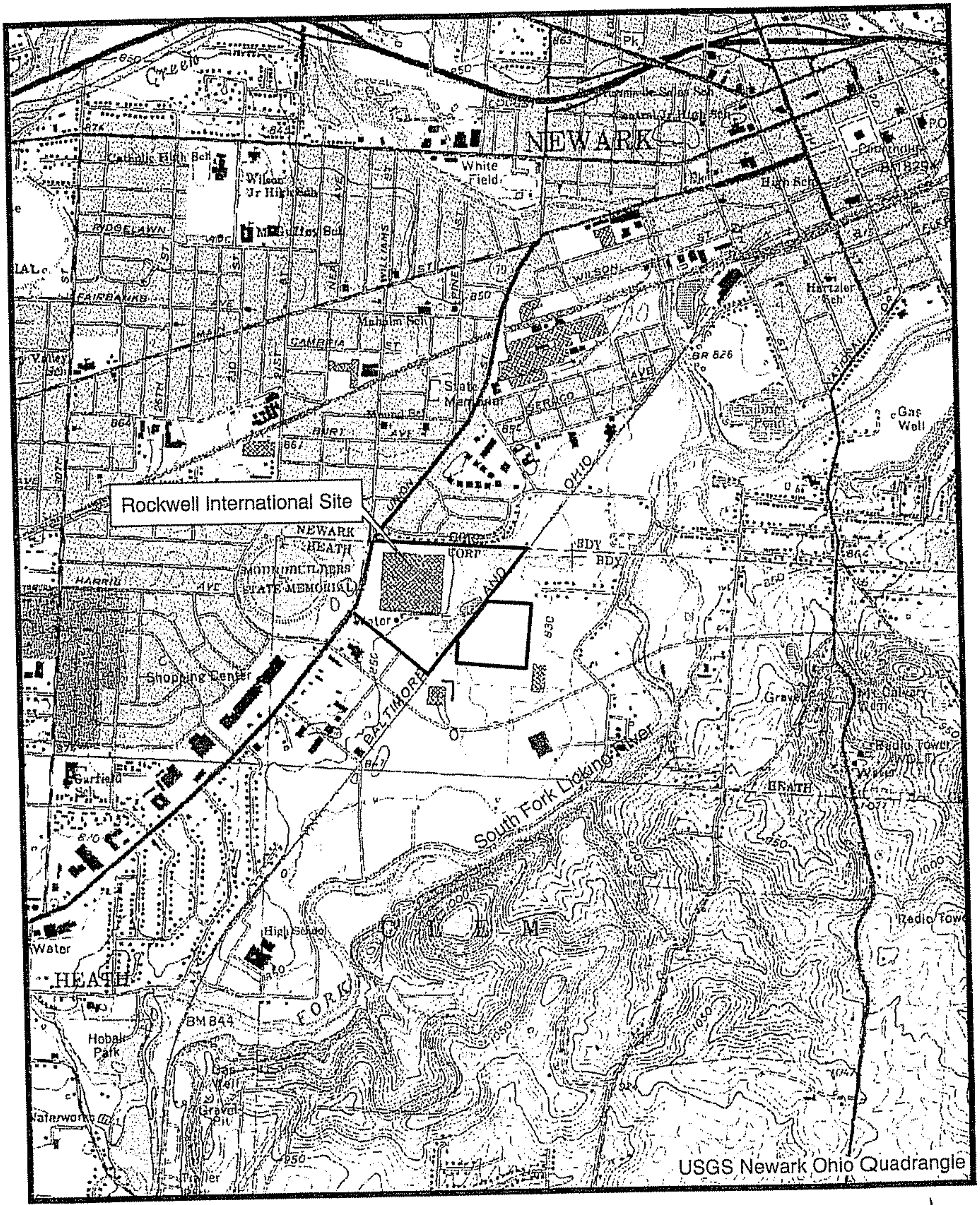
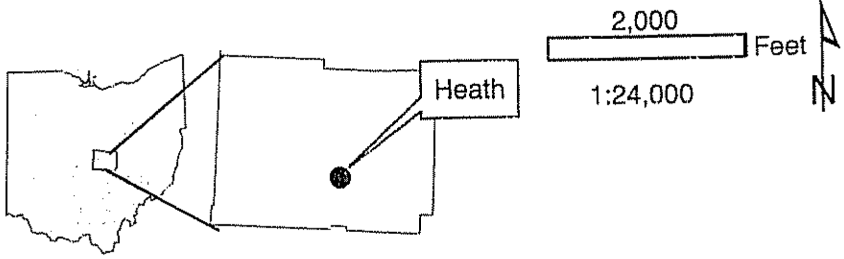


Figure 1
Site Location
Rockwell International Site
Heath, Ohio
Licking County



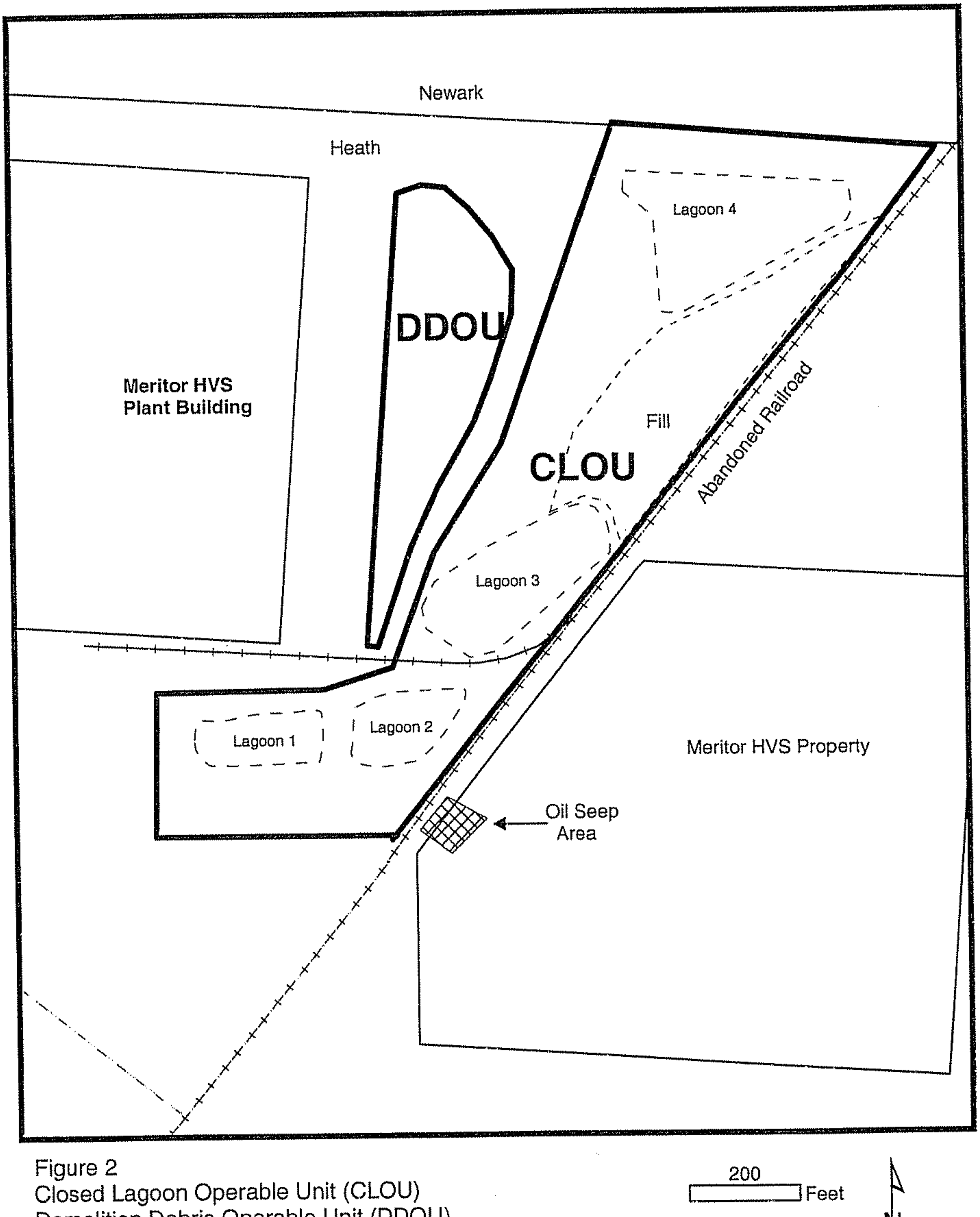


Figure 2
Closed Lagoon Operable Unit (CLOU)
Demolition Debris Operable Unit (DDOU)
Rockwell International Site
Heath, Ohio

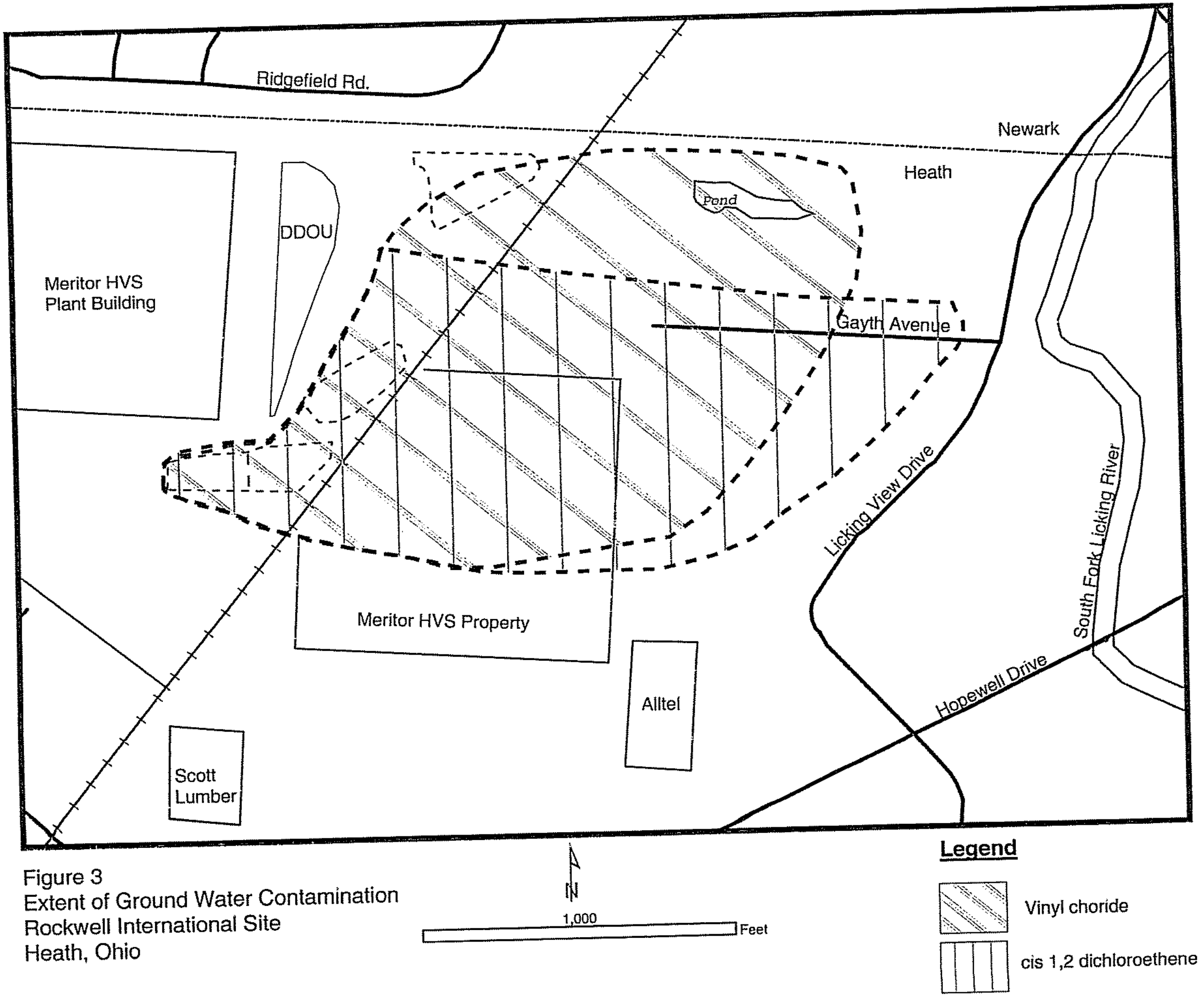


Figure 3
Extent of Ground Water Contamination
Rockwell International Site
Heath, Ohio

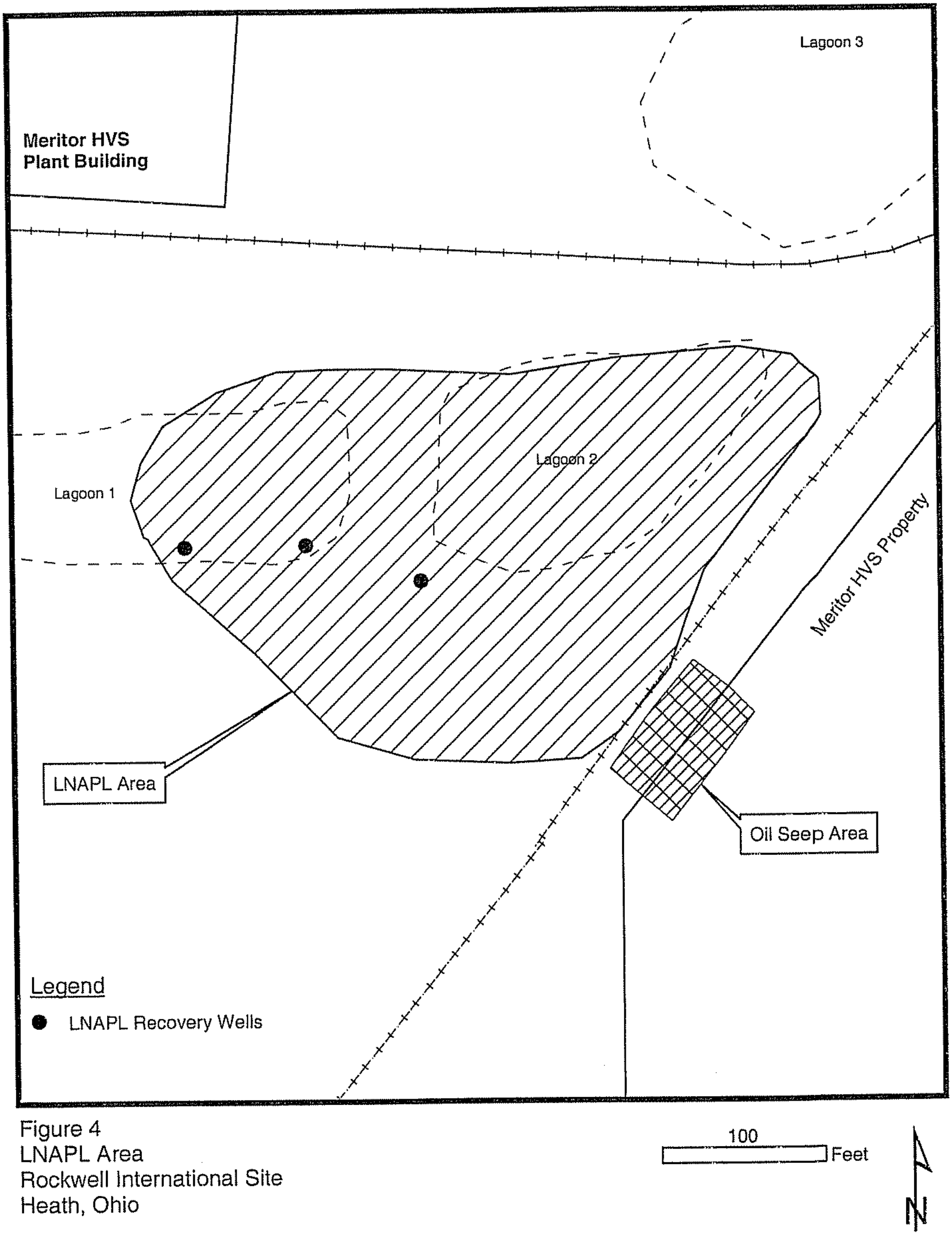


Figure 4
LNAPL Area
Rockwell International Site
Heath, Ohio