ATTACHMENT 40

Additional ROD Summaries

cleanup goals were established to reduce the excess lifetime cancer risk to 10^{-4} to 10^{-6}. For non-carcinogenic compounds, the goal is a Hazard Index (HI) equal to 1 or less. Individual ground water remediation standards are based on the more stringent of SDWA MCLs or non-zero MCLGs, or State background levels. If these levels cannot be met, the ROD will be amended.

INSTITUTIONAL CONTROLS: Deed, land use, and ground water use restrictions will be implemented.

KEYWORDS: Acids; Air Stripping; Background Levels; Benzene; Capping; Carcinogenic Compounds; Chromium; Clean Air Act; Clean Water Act; Direct Contact; Excavation; Ground Water; Ground Water Monitoring; Ground Water Treatment; Institutional Controls; Landfill Closure; Lead; MCLs; MCLGs; Metals; O&M; Offsite Disposal; Onsite Containment; Onsite Discharge; Onsite Disposal; Onsite Treatment; Organics; PCE; Phenols; RCRA; Safe Drinking Water Act; Soil; State Standards/Regulations; Surface Water Monitoring; TCE; VOCs; Water Quality Criteria.

LORD SHOPE LANDFILL, PA
First Remedial Action - Final
June 29, 1990

The 25-acre Lord Shope Landfill site is an inactive hazardous waste landfill in Girard Township, Erie County, northwestern Pennsylvania. The site consists of a 4-acre landfill and adjacent areas of contaminated soil, surface water and ground water. The surrounding area is primarily agricultural and residential, with two unnamed tributaries of Elk Creek bordering the site to the north and west. From the mid-1950s to 1979, industrial wastes, including spent adhesives, degreasing solvents, acids, caustics, and some drummed wastes were disposed of onsite from nearby facilities. During 1982 and 1983, responsible parties, under an agreement with the State, implemented a remedial alternative, which included removing 81 exposed drums, capping the landfill, and installing a low permeability ground water cutoff wall to reduce leachate production from the landfill and to divert ground water flow around the site. Landfill leachate has, however, resulted in VOC and inorganic ground water contamination both beneath and to the north of the landfill, with a contaminant plume migrating towards the north. Surface soil around the landfill has also been found to contain elevated levels of VOCs. The primary contaminants of concern affecting the landfill material, surrounding soil, and ground water are VOCs including benzene, PCE, and TCE; and metals including arsenic, chromium, and lead.

The selected remedial action for this site includes in-situ vapor stripping using vacuum wells to volatize and remove VOCs from the landfill material and the surrounding soil; collection and treatment of gas emissions generated by the vapor stripping process using carbon filtration; ground water pumping and treatment including pretreatment for metal removal, followed by air stripping, to halt plume migration, with final discharge of treated ground water into the nearby surface tributaries; implementation of site access restrictions and institutional controls including ground water use restrictions. The estimated present worth cost for the remedial action is $5,760,000, which includes an annual O&M cost of $420,000 for years 0-2, and $310,000 for years 3-50.

PERFORMANCE STANDARDS OR GOALS: Chemical-specific soil criteria for the landfill material and the surrounding soil were not provided, but will be determined during the remedial design and will be based on soil contaminant levels that will not significantly impact the underlying ground water. Ground water cleanup goals will meet SDWA MCLs or proposed MCLs (PMCLs), and a 10^{-4} excess cancer risk or a Hazard Index = 1. Target ground water cleanup levels include PCE 5 ug/l (PMCL), TCE 5 ug/l (MCL), benzene 5 ug/l (MCL), arsenic 20 ug/l (based on an excess cancer risk of 10^{-4}), chromium 50 ug/l (MCL), and lead 15 ug/l (risk-based calculation). Ground water goals will be revised to meet background levels in accordance with State ARARs. Air emissions from the air stripping of the ground water treatment system and the gas released from the in-situ vapor stripping process will be treated to meet State standards.

INSTITUTIONAL CONTROLS: Ground water use restrictions will be implemented to prevent permitting and construction of ground water wells in the contaminated plume area.

KEYWORDS: Air Stripping; Arsenic; Benzene; Carbon Adsorption (GAC); Carcinogenic Compounds; Chromium; Clean Air Act; Direct Contact; Ground Water; Ground Water Treatment; Institutional Controls; Lead; MCLs; Metals; O&M; Onsite Discharge; Onsite Treatment; PCE; Plume Management; RCRA; Safe Drinking Water Act; Soil; State Standards/Regulations; TCE; Treatment Technology; Vacuum Extraction; VOCs.

M.W. MANUFACTURING, PA
Second Remedial Action
June 29, 1990

The 15-acre M.W. Manufacturing site is a former copper recovery facility in Montour County, Pennsylvania, two miles north of Danville. The Pennsylvania Department of Transportation (PennDOT) maintains a storage area immediately north of the site, and farmlands and wooded lots are adjacent to the site on the west and south. Mauses Creek flows in a southerly direction past the site. Several private residences, motels, gas stations, restaurants, and a Head Start school are located just north of the Penn DOT storage area and rely on private ground water wells for drinking water. From 1966 to 1972, M.W. Manufacturing was engaged in secondary copper recovery from scrap wire, using both mechanical and chemical processes. Granular carbon wastes generated by the chemical process were dumped onsite, and spent solvents and acids were allegedly disposed of onsite. In 1972, M.W. Manufacturing filed for bankruptcy and the Philadelphia National Bank acquired the property. Warehouse 81, Inc., acquired the site in 1976 and unsuccessfully attempted to recover copper from the large waste piles of fluff material (fibrous insulation materials contaminated with metals and solvents). The initial remedial investigation revealed several areas posing potential threats to public health: the carbon waste pile, four wire-fluff waste piles, a surface impoundment, a buried lagoon, and contaminated soil, drums and storage tanks. A 1989 remedial action addressed the concerns for direct contact with, and migration of contaminants from, the carbon waste pile by excavating the carbon waste pile and incinerating the waste offsite. This second remedial action addresses the remaining principal threats at the site by treating the onsite waste and contaminated soil. A subsequent remedial action will address possible remediation of contaminated ground water and offsite soil, sediment, and surface water contamination. The primary contaminants of concern affecting the soil, debris, and lagoon water are VOCs including PCE and TCE; other organics including PCBs; and metals including lead.

The selected remedial action for this site includes excavation and onsite incineration of approximately 32,000 cubic yards of fluff waste, followed by stabilization of the lead-contaminated ash and offsite disposal of residual ash; excavation and onsite incineration of approximately 13,000 cubic yards of contaminated soil, followed by onsite stabilization, as necessary, before offsite disposal; backfilling and capping the soil (landfill closure) under the fluff waste piles; covering the soil not under the fluff piles using hybrid closure (topsoil cover and revegetation); onsite treatment of approximately 86,000 gallons of lagoon water using carbon adsorption and metal removal, followed by onsite discharge to surface water; and onsite incineration of approximately 40 cubic yards of waste contained in tanks and drums, followed by stabilization of the ash and offsite disposal; and ground water monitoring. The estimated present worth cost for this remedial action is $35,950,000, which includes an estimated annual O&M cost of $39,000 and an additional estimated $20,000 every 5 years.

PERFORMANCE STANDARDS OR GOALS: Action levels have been established for soil/waste based on a 10^{-6} cancer risk level or an HI of 1.0, where technically feasible. If soil cannot be feasibly cleaned to the 10^{-6} risk level (e.g., excessive volume of contaminated soil in one particular area onsite), cleanup will reduce the additional incremental risk to the ground water to 10^{-4} levels or to MCLs, whichever are more stringent. Chemical- specific cleanup levels for soil, fluff waste, and drummed and tanked wastes were provided for eight indicator contaminants including PCE, TCE, PCB, and lead.

INSTITUTIONAL CONTROLS: Not applicable.

KEYWORDS: Benzene; Capping; Carbon Adsorption (GAC); Carcinogenic Compounds; Clean Air Act; Clean Water Act; Closure Requirements; Debris; Dioxin; Direct Contact; Excavation; Ground Water Monitoring; Hybrid/Alternate Closure; Incineration/Thermal

Destruction; Landfill Closure; Lead; Metals; O&M; Offsite Disposal; Onsite Discharge; Onsite Treatment; Organics; PCBs; PCE; RCRA; Soil; Solidification/Stabilization; Solvents; State Standards/Regulations; Surface Water; Surface Water Treatment; TCE; Treatability Studies; Treatment Technology; VOCs.

OSBORNE LANDFILL, PA
First Remedial Action
September 28, 1990

The 15-acre Osborne Landfill site is an inactive abandoned coal strip mine in Pine Township, Mercer County, Pennsylvania. The site is in a semi-rural area with a large natural pond, woodlands, and wetlands bordering the site to the west. The shallow Clarion aquifer is present east of the strip mine highwall. The portion of the aquifer that formerly overlaid the site was excavated during stripping activities. After the mine was abandoned, the strip mine pit filled with ground water. From the late 1950s to 1978, contaminated spent foundry sand and other industrial and municipal wastes were disposed of into the pit. Other wastes including trash and drums containing solvents, wastewater, and coolants, were disposed of onsite, gradually filling the strip mine and displacing the water. The site holds an estimated 233,000 cubic yards of fill material. In 1983, Cooper Industries, an operator of the site, removed approximately 600 drums of waste and 45 cubic yards of soil from the site and installed a fence to restrict site access. EPA has divided the remedial action into five operable units. Operable Unit 2 (OU2), which addresses contaminated wetland sediment, and OU5, which addresses the contaminated Homewood aquifer will be implemented in a subsequent Record of Decision (ROD). This ROD addresses the remaining three operable units. OU1 addresses solid waste fill material including foundry sand and other onsite pond sediment, OU3 addresses leachate associated with the onsite water table, and OU4 addresses the Clarion aquifer. The primary contaminants of concern affecting the sediment and ground water are VOCs including benzene and TCE; other organics including PCBs and PAHs; and metals including arsenic, chromium, and lead.

The selected remedial action for this site is comprised of three operable units. The primary remedy for OU1 includes constructing a slurry wall barrier around the perimeter of the fill, constructing a clay cap over the fill material, ground water pumping and treatment using equalization, pH adjustment, chemical precipitation, clarification, sand filtration, and carbon adsorption, followed by injection into the onsite mine pit; offsite disposal of ground water treatment residues; ground water monitoring; and implementing institutional controls including deed restrictions. A contingency remedy for OU1 will be implemented if performance standards cannot be met during the pre-design stage of remedy implementation and includes regrading the site, excavating and placing solid waste in a RCRA Subtitle-C onsite landfill; long-term ground water monitoring; and implementing institutional controls. If the primary remedy for OU1 is implemented, no additional action, other than the primary OU3 remedy of ground water monitoring, is necessary for OU3. If the contingency remedy for OU1 is implemented, the contingency remedy for OU3 also must be implemented. The contingency remedy for OU3 includes dewatering the site during excavation; isolating the fill area from the onsite mine pools; treating the ground water using equalization, clarification, and sand filtration for solids removal, and carbon adsorption for organics removal, followed by onsite discharge; and ground water monitoring. The selected remedy for OU4 includes pumping and treatment of ground water in the Clarion Formation using air stripping, onsite air emissions treatment, onsite injection of treated ground water, and ground water monitoring. The estimated present worth cost for the primary remedies is $18,681,000 with an annual O&M cost of $904,000 for 30 years. If the contingency remedies are implemented, the estimated present worth cost is $17,811,000, which includes an annual O&M cost of $940,000 for 30 years.

PERFORMANCE STANDARDS OR GOALS: The selected source remedy will not reduce the current level of contamination in the fill area, but will maintain an average PCB concentration level of 23 mg/kg. EPA's PCB Spill Cleanup Policy for a reduced access area is met by this alternative. Ground water contaminants will be remediated to the following background levels: TCE 0.2 ug/l, benzene 0.2 ug/l, PCBs 1 ug/l, chromium 50 ug/l, lead 15 ug/l, and arsenic 22 ug/l. If any ground water contaminants exceed SDWA MCLs or MCLGs, the remedy will continue until these goals are met.

INSTITUTIONAL CONTROLS: Deed restrictions will be implemented to reduce exposure to the site. The State has required that mining within a 1/2-mile of the site be restricted.

KEYWORDS: Air Stripping; Arsenic; Background Levels; Benzene; Capping; Carbon Adsorption (GAC); Carcinogenic Compounds; Chromium; Clean Water Act; Contingency Remedy; Direct Contact; Drinking Water Contaminants; Excavation; Offsite Disposal; Ground Water; Ground Water Monitoring; Ground Water Treatment; Institutional Controls; Lead; MCLs; MCLGs; Metals; O&M; Onsite Containment; Onsite Discharge; Onsite Treatment; Organics; PAHs; PCBs; Plume Management; RCRA; Safe Drinking Water Act; Sediment; Slurry Wall; Solvents; State Standards/Regulations; TCE; Toxic Substances Control Act; VOCs.

RAYMARK, PA
First Remedial Action
September 28, 1990

The 7-acre Raymark site is an active metal manufacturing and electroplating plant in the Borough of Hatboro, Montgomery County, Pennsylvania. The site is in an industrial area and is approximately 100 feet from the nearest residence. The nearest surface water is Pennypack Creek, which flows 4,000 feet southwest of the site. As part of the rivet manufacturing process at the plant, VOCs, including 30 to 40 gallons of TCE, were used daily at the site to clean and degrease metal parts. In 1979, when EPA discovered TCE in the Hatboro public water supply wells, the Hatboro Borough Water Authority removed these wells from operation, and supplemented the water supply using an interconnection with a neighboring water company. Further EPA site investigations from 1980 to 1987 identified TCE in soil and other wells onsite and adjacent to the property and seem to indicate that contaminants from the site may have been at least a contributing source of contamination in the downgradient public water supply wells. Other chemical contaminants identified in samples from the public water supply wells, including TCA, did not seem to originate at the site, thus indicating several distinct sources for this contamination. In 1987, the site owners agreed to install ground water treatment units with air stripping towers, and, as necessary, air emission control units, at two Hatboro public supply wells to return these to routine operation. This Record of Decision (ROD) addresses contaminated drinking water and ground water, which are referred to as Operable Units 2 and 3 (OU2 & OU3), respectively. The soil/source contamination (OU1), will be addressed in a subsequent ROD. The primary contaminants of concern affecting the ground water are VOCs including TCE and PCE.

The selected remedial action for this site includes continuing the operation and maintenance of the Hatboro public supply and the existing air stripping towers at the wells and the installation of new vapor phase carbon adsorption units; completing a ground water remedial design study to determine the number, location, and construction of new extraction wells with corresponding installation and implementation; onsite pumping and treatment of ground water with air stripping and vapor phase carbon adsorption units with onsite discharge to Pennypack Creek; and implementing institutional controls. The estimated present worth cost for this remedial action is $2,700,000, which includes an annual O&M cost of $125,000.

PERFORMANCE STANDARDS OR GOALS: The ground water will be remediated until contaminant levels reach SDWA MCLs, non-zero MCLGs, or background levels, whichever are more restrictive. The residual excess cancer risk resulting from site-related contamination will be reduced to a 10^{-4} level and non-carcinogenic levels will be reduced to a Hazard Index = 1. Chemical-specific standards for ground water include TCE 5 ug/l (MCL) and PCE 5 ug/l (proposed MCL). Additional still-undefined, aquifer contamination at the site may make it technically impracticable to attain these levels, and if so, an ARAR waiver will be enacted and the ROD amended.

INSTITUTIONAL CONTROLS: Institutional controls will be implemented to restrict access to the contaminated aquifer.

KEYWORDS: Air Stripping; Background Levels; Carbon Adsorption (GAC); Carcinogenic Compounds; Clean Air Act; Clean Water Act; Direct Contact; Drinking Water Contaminants; Ground Water; Ground Water Monitoring; Ground Water Treatment; Institutional Controls;

MCLs; MCLGs; O&M; Onsite Discharge; PCE; RCRA; Safe Drinking Water Act; State Standards/Regulations; TCE; Treatment Technology; VOCs.

SAND, GRAVEL AND STONE, MD
Second Remedial Action
September 28, 1990

The 200-acre Sand, Gravel and Stone site is a former sand and gravel quarry three miles west of the town of Elkton, in Cecil County, Maryland, along a tributary to Mill Creek. Surface water in Mill Creek eventually flows to the Elk River and the Chesapeake Bay. Beginning in 1969, hazardous materials were disposed of onsite. In 1974, a pool of chemical waste burned in an onsite fire, the cause of which has yet to be determined. Subsequently, 200,000 gallons of this liquid waste were removed to an offsite landfill and the remaining drums and sludge were buried onsite in two excavated pits (eastern and western). The site has been separated into three operable units (OUs). A 1985 Record of Decision (ROD) addressed OU1, the remediation of shallow ground water contamination near the eastern excavated pit, source control (i.e., removal of buried drums), and site access restrictions. This ROD focuses on OU2, the threat posed by soil and ground water contamination migrating from the eastern portion of the site, including remediation of ground water contamination in the lower aquifers if needed, and evaluation of contaminant sources near the western excavation pit. Soil sampling analyses and geophysical studies now show that there are no unacceptable risks associated with soil in the western area of the site. A future ROD will address OU3, the contaminated soil, source control, final site closure, and post-closure operation and maintenance activities. The primary contaminants of concern affecting the ground water are VOCs including benzene, TCE, toluene and xylenes; and metals.

The selected remedial action for this site includes onsite and offsite ground water monitoring. If this monitoring data demonstrate that remediation is required, ground water may be treated either onsite, or offsite at point of use, and bottled water will be supplied to affected residences and businesses. The onsite treatment system installed as a result of the first remedial action would be expanded and modified, as necessary, to treat the ground water in the lower aquifer. Treatment measures may utilize granular activated carbon, air stripping, ion exchange, or any combination of these techniques. The estimated present worth cost of this remedial action ranges from $702,000 to $7,125,000, depending on the extent and nature of treatment required, and an annual O&M cost ranging from $102,000 to $625,900 for 30 years.

PERFORMANCE STANDARDS OR GOALS: Action levels that will trigger the implementation of onsite and/or offsite ground water treatment include concentrations of chemicals of concern in excess of MCLs, a cumulative carcinogenic risk in excess of 10^{-4}, or a non-carcinogenic Hazard Index greater than 1.0.

INSTITUTIONAL CONTROLS: Not applicable.

KEYWORDS: ACL; Air Stripping; Benzene; Carbon Adsorption (GAC); Carcinogenic Compounds; Clean Water Act; Direct Contact; Ground Water; Ground Water Monitoring; Ground Water Treatment; MCLs; MCLGs; Metals; O&M; Offsite Discharge; Offsite Treatment; Onsite Discharge; Onsite Treatment; RCRA; Safe Drinking Water Act; State Standards/Regulations; TCE; Treatment Technology; VOCs; Wetlands; Xylenes.

TYSON DUMP #1, PA
Third Remedial Action
September 28, 1990

The 4-acre Tyson Dump #1 site is an abandoned septic and chemical waste disposal area in Upper Merion Township, Montgomery County, Pennsylvania. The site consists of a series of abandoned unlined lagoons in a former sandstone quarry, and is bordered by unnamed tributaries to the Schuylkill River on the east and west, and a railroad switching yard to the north. Beyond the railroad yard is a floodplain/wetlands area and the Schuylkill River, which flows southeast toward Philadelphia. The river is the main source of drinking water in the area. Barbadoes Island lies in the center of the river in the site vicinity and is used as an electrical substation. From 1960 until 1973, the privately owned site was used for the disposal of liquid septic tank wastes, sludge, and chemical wastes that were hauled onsite in bulk tank trucks. In 1973, the

PERFORMANCE STANDARDS OR GOALS: Contaminants of concern in the ground water will be reduced to meet current and proposed Maximum Contaminant Levels (MCLs) including PCE 5 ug/l (proposed MCL), TCE 5 ug/l (MCL), and benzene 5 ug/l (MCL); thereby reducing cumulative residual carcinogenic risk due to ingestion to 10^{-6}.

INSTITUTIONAL CONTROLS: Not applicable.

KEYWORDS: Benzene; Carbon Adsorption (GAC); Carcinogenic Compounds; Clean Air Act; Clean Water Act; Direct Contact; Drinking Water Contaminants; Ground Water; Ground Water Monitoring; Ground Water Treatment; MCLs; MCLGs; O&M; Onsite Discharge; Onsite Treatment; PCE; Plume Management; Safe Drinking Water Act; TCE; Treatability Studies; VOCs; Water Quality Criteria.

MASTER DISPOSAL SERVICE
LANDFILL, WI
First Remedial Action
September 26, 1990

The 26-acre Master Disposal Service Landfill site is an inactive industrial landfill in the Town of Brookfield, Waukesha County, Wisconsin. The site lies within the marshy floodplain of the Fox River and is partially surrounded by wetlands and drainage channels. The site overlies a surficial sand/gravel and dolomite aquifer system, which has been contaminated by onsite disposal activities. Onsite disposal of mainly industrial foundry sands and slags occurred between 1967 and 1982. Onsite disposal of hazardous wastes including inks, sludge, and solvents was also observed during this period. The site was partially closed in 1982, but controlled burning of wood waste continued until 1985, when the site was permanently closed. Investigations completed in 1990 identified negative impacts on surface water and ground water from the landfill sources. This Record of Decision (ROD) addresses source control as a final remedy and management of migration of ground water as an interim remedy. A subsequent ROD will address the final restoration of the surficial aquifer system. The primary contaminants of concern affecting the soil, debris, and ground water are VOCs including benzene, TCE, toluene, and xylenes; and metals including arsenic, chromium, and lead.

The selected remedial action for this site includes capping the landfill with a clay/soil cap and soil cover; installing an active landfill gas venting system; pumping and treatment of ground water in the surficial aquifer system using filtration and either air stripping, carbon adsorption, ion exchange or chemical treatment, based on the results of treatability studies; discharging the treated water onsite to surface water; restoring or mitigating any wetlands impacted by this remedial action; conducting long term surface water and ground water monitoring; and implementing institutional controls including deed, land use, and ground water use restrictions, and site access restrictions such as fencing. The estimated present worth cost for this remedial action ranges from $4,632,000 to $5,016,000, which includes an annual O&M cost ranging from $142,730 to $164,130 for 30 years, depending upon the selected ground water treatment.

PERFORMANCE STANDARDS OR GOALS: Effluent discharge limitations for treated ground water were calculated from State discharge statutes, and specify weekly averages for metal contaminants and monthly averages for VOCs, as well as maximum concentration levels. Chemical-specific goals include benzene 8.5 lbs/day, TCE 22 lbs/day, toluene (daily concentration level) 17 mg/l, arsenic 0.045 lbs/day, chromium (total) 0.034 lbs/day, and lead 0.0096 lbs/day.

INSTITUTIONAL CONTROLS: Deed, land use, and ground water use restrictions will be implemented at the site.

KEYWORDS: Air Stripping; Arsenic; Benzene; Capping; Carbon Adsorption (GAC); Carcinogenic Compounds; Chromium; Clean Water Act; Debris; Direct Contact; Floodplain; Ground Water; Ground Water Monitoring; Ground Water Treatment; Institutional Controls; Interim Remedy; Lead; Metals; O&M; Offsite Disposal; Onsite Containment; Onsite Discharge; Onsite Disposal; Onsite Treatment; Plume Management; RCRA; Soil; Solvents; State Standards/Regulations; Surface Water Monitoring; TCE; Toluene; Treatability Studies; VOCs; Venting; Water Quality Criteria; Wetlands; Xylenes.

METAMORA LANDFILL, MI
Second Remedial Action
September 28, 1990

The 160-acre Metamora Landfill site is an inactive, privately owned landfill in Metamora Township, Lapeer County, Michigan. Both wetland and woodland areas are present onsite. The site is underlain by a shallow glacial deposit aquifer, a lower sand and gravel unit ("the intermediate aquifer"), and the Marshall Sandstone bedrock aquifer. Landfill operations began in 1955 as an open dump, and the facility was upgraded in 1969. Industrial and municipal wastes, including approximately 35,000 drums, were accepted until the landfill closed in 1980. In 1981, the State sampled seven drums and identified several hazardous materials. A 1986 Record of Decision (ROD) for Operable Unit 1 (OU1) called for the excavation and disposal of the waste drums offsite at a RCRA incinerator. This ROD addresses ground water contamination of the shallow aquifer, as well as the generation of leachate at the landfill (OU2). A third ROD will address onsite contaminated subsurface soil (OU3). The primary contaminants of concern in the landfill affecting debris and ground water are VOCs including benzene, PCE, TCE, and xylenes; and metals including arsenic and barium.

The selected remedial action for this site includes pumping and treatment of ground water using precipitation/flocculation to remove inorganic contaminants, followed by air stripping and carbon adsorption to remove organics, and reinjection of treated water into the shallow aquifer; offsite treatment and disposal of secondary waste streams including flocculation sludge and spent carbon; capping the landfill area using a multi-layer clay cap as required by the State, and collection and flaring of landfill gases; monitoring ground water; implementing institutional controls such as deed and ground water use restrictions, and site access restrictions such as fencing. The estimated present worth cost for this remedial action is $19,354,050, which includes an annual O&M cost of $856,944 for 20 years.

PERFORMANCE STANDARDS OR GOALS: Chemical-specific cleanup goals for ground water are based on Michigan Act 307 rules as well as MCLs and include benzene 1.0 ug/l (State), PCE 0.7 ug/l (State), TCE 3.0 ug/l (State), xylenes 20 ug/l (State), and for arsenic the more stringent of 0.02 ug/l (State) or background.

INSTITUTIONAL CONTROLS: Deed and ground water use restrictions will be implemented at the site.

KEYWORDS: Air Stripping; Arsenic; Background Levels; Benzene; Capping; Carbon Adsorption (GAC); Carcinogenic Compounds; Clean Air Act; Closure Requirements; Debris; Direct Contact; Drinking Water Contaminants; Ground Water; Ground Water Monitoring; Ground Water Treatment; Institutional Controls; Landfill Closure; Leachability Tests; MCLGs; MCLs; Metals; O&M; Offsite Disposal; Offsite Treatment; Onsite Containment; Onsite Discharge; Onsite Treatment; PCE; RCRA; Safe Drinking Water Act; State Standards/Regulations; TCE; Treatability Studies; Venting; VOCs; Wetlands; Xylenes.

MOSS-AMERICAN KERR-MCGEE OIL, WI
First Remedial Action - Final
September 27, 1990

The 88-acre Moss-American Kerr-McGee Oil site, a former wood preserving facility is in Milwaukee County, Wisconsin. Part of the facility lies within the 100-year floodplain of the Little Menomonee River, which flows through the site. A section of the site is wooded, and wetlands are located near the river onsite and downstream. A 23-acre portion of the site is presently used as a railroad loading and storage facility for automobiles, and the remainder of the site is an undeveloped parkland. An unconfined shallow aquifer underlies the site. Beginning in 1921, onsite operations consisted of wood preserving of railroad ties, poles, and fence posts with a mixture of creosote, which is high in PAHs, and No. 6 fuel oil. The facility changed names and ownership several times until it ceased operations in 1976. Wastes were discharged to onsite settling ponds until 1971, when wastewater was discharged into the sanitary sewer system. In 1971, several people received chemical burns attributed to creosote while wading three miles downstream of the site. This led to a State order requiring cleanup of onsite settling ponds by the site owner and operator. In 1973, EPA dredged 5,000 feet of the river directly downstream of the site. During 1977 to 1978, 450 cubic yards

[redacted] soil were removed during the dismantling of the facility. Studies conducted before 1980 indicated that extensive creosote contamination was present in the soil and ground water onsite as well as in the sediment of the Little Menomonee River. This Record of Decision (ROD) provides a final remedy and addresses source and ground water remediation. The primary contaminants of concern affecting the soil, sediment, and ground water are VOCs including benzene, toluene, and xylenes; and other organics including PAHs.

The selected remedial action for this site includes rerouting 5 miles of the river channel onsite parallel to the existing channel, followed by excavating highly contaminated sediment from the old channel; mitigating wetland areas; treating 5,200 cubic yards of river sediment and 80,000 cubic yards of contaminated onsite soil using onsite soil washing and bioslurry technologies; separation and dewatering of residues followed by redeposition onsite; covering treated material with 2 feet of clean soil and 6 inches of topsoil, followed by revegetation; recycling or treating slurry water onsite before discharge to a publicly owned treatment works (POTW) or the river; constructing a synthetic geomembrane barrier to prevent movement of contaminated ground water into the river; collecting ground water using a drain and interceptor system, followed by treatment using an oil/water separator and granular activated carbon, with discharge of treated water to a POTW or to the river; removing pure-phase liquid wastes for offsite incineration; and ground water monitoring. The estimated present worth cost for this remedial action is $26,000,000, which includes an annual O&M cost of $130,000 for 10 years.

PERFORMANCE STANDARDS OR GOALS: Goals are designed to reduce the excess lifetime cancer risk for carcinogens to 10^{-4} or less. For non-carcinogens, cleanup levels will reduce the Hazard Index (HI) to 1 or less. Chemical-specific goals for ground water include benzene 0.067 ug/l [State Preventive Action Level (PAL)], toluene 68.6 ug/l (State PAL), and xylenes 124.0 ug/l (State PAL). The chemical-specific goal for soil and sediment is PAHs (carcinogenic) 6.1 mg/kg (State).

INSTITUTIONAL CONTROLS: Deed restrictions will be implemented to prevent onsite development.

KEYWORDS: ARAR Waiver; Benzene; Biodegradation/Land Application; Carbon Adsorption (GAC); Carcinogenic Compounds; Direct Contact; Excavation; Filling; Floodplain; Ground Water; Ground Water Monitoring; Ground Water Treatment; Incineration/Thermal Destruction; Institutional Controls; O&M; Offsite Discharge; Offsite Treatment; Onsite Containment; Onsite Disposal; Onsite Treatment; Organics; PAHs; Publicly Owned Treatment Works (POTW); RCRA; Sediment; Soil; Soil Washing/Flushing; State Standards/Regulations; Toluene; Treatability Studies; Treatment Technology; Wetlands; Xylenes.

NATIONAL PRESTO INDUSTRIES, WI
First Remedial Action
August 1, 1990

The 325-acre National Presto Industries site is a former munitions and metal-working facility in Eau Claire, Chippewa County, Wisconsin, adjacent to the town of Hallie. From 1942 until 1945, the site was government-owned, contractor-operated, and produced gunpowder and small arms. From 1945 to 1980, the site was owned by National Presto Industries (NPI). Initial operations were for the manufacture of cookware and consumer products, which generated waste streams consisting of metals, oils, grease, and spent solvents. Also, beginning in 1951, artillery shell fuses, aircraft parts, and metal projectiles were produced by NPI under a military contract. Early waste-handling practices included the use of dry wells and seepage pits with overflow from the pits pumped to a series of lagoons, used as settling and percolation ponds. A major waste steam generated from the defense-related activities was a spent forge compound, comprised of mineral oil, graphite, VOCs, and asphalt, which accounts for much of the sludge in the bottom of one of the settling ponds. From 1966 to 1969, the spent forge compound was also landfilled onsite. Subsequently, the spent forge compound was recycled as part of the manufacturing process. Based on their investigations, EPA required National Presto Industries to provide bottled water to an area in Hallie, where private wells are contaminated or threatened by contamination from confirmed onsite sources. This Record of Decision (ROD) provides for a permanent alternate water supply to address the principal threat posed by the ground water contamination at the site.

which includes an annual O&M cost of $90,569. The present worth costs associated with each of the four OUs are $490,302 (OU1); $258,667 (OU2); $1,831,805 (OU3), which includes an annual O&M cost of $90,569; and $4,995,422 (OU4).

PERFORMANCE STANDARDS OR GOALS: The lagoon soil excavation levels for the OEC site OU1 will attain background levels consistent with State and Federal (RCRA) clean closure levels; excavation of OU2 soil will attain a 10^{-6} cumulative carcinogenic risk and a cumulative HI<1 for noncarcinogens. Ground water treatment (OU3) will attain Federal and State ground water cleanup standards and are based on State preventative action limits (PALs). Chemical-specific ground water goals include chromium 5.0 ug/l (PAL); and TCE 0.18 (PAL). Cleanup levels for Davy Creek and adjacent wetlands have not been determined.

INSTITUTIONAL CONTROLS: Not applicable.

KEYWORDS: Air Stripping; Benzene; Carbon Adsorption (GAC); Carcinogenic Compounds; Chromium; Clean Closure; Clean Water Act; Debris; Direct Contact; Drinking Water Contamination; Excavation; Filling; Ground Water; Ground Water Monitoring; Ground Water Treatment; Hybrid/Alternate Closure; Interim Remedy; MCLs; MCLGs; Metals; O&M; Offsite Disposal; Onsite Discharge; Onsite Treatment; Organics; Plume Management; RCRA; Safe Drinking Water Act; Sediment; Sludge; Soil; Solvents; State Permit; State Standards/Regulations; Surface Water; Surface Water Monitoring; Surface Water Treatment; TCE; Toluene; Treatability Studies; VOCs; Water Quality Criteria; Wetlands; Xylenes.

ONALASKA MUNICIPAL LANDFILL, WI
First Remedial Action - Final
August 14, 1990

The 11-acre Onalaska Municipal Landfill site includes a 7-acre landfill owned by the Township of Onalaska, which is located in central-western Wisconsin. The Black River and its associated wetlands are 400 feet west of the site and lie within a wildlife and fish refuge. The site was operated as a sand and gravel quarry until the late 1960s, when it was converted and used as a municipal landfill until 1980. Although the site was primarily used for the disposal of municipal wastes, solvent wastes were also disposed of onsite until 1976. Approximately 320,000 gallons of liquid solvent waste and approximately 1,000 drums of solvent waste were either burned with other trash onsite or poured directly into holes for burial in the southwestern portion of the landfill. The Township capped the landfill in 1982, but subsequent onsite investigations revealed ground water contamination within and around the site. Ground water flows beneath the landfill, where it comes into contact with solvents leaking from the solvent disposal area. The ground water flows in a southwesterly direction and a ground water contaminant plume has migrated from the southwestern edge of the landfill and appears to be discharging into the wetlands. This Record of Decision addresses two operable units, the ground water plume and the contaminated soil adjacent to the southwestern portion of the landfill, which is a major source of ground water contamination. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene, TCE, toluene, and xylenes; other organics including PAHs; and metals including arsenic and lead.

The selected remedial action for this site includes in-situ bioremediation of the solvent-contaminated soil and, if feasible, a portion of the landfill debris; pumping and treatment of the ground water plume using aeration, clarification, and filtration, followed by discharge of the treated ground water into the Black River and onsite disposal of the sludge generated during the treatment process; reconstruction of the landfill cap and installation of a passive methane gas venting system to control the gas buildup under the cap; ground water monitoring; and implementation of institutional controls including deed restrictions limiting ground water and surface water use. The estimated present worth cost for this remedial action is $8,000,000, which includes an annual O&M cost of $164,000 for 30 years.

PERFORMANCE STANDARDS OR GOALS: Chemical-specific soil cleanup standards were not provided but will be established once the reduction rate for bioremediation has been determined during the pilot-scale test. Currently, the estimated cleanup goal is an 80-95% reduction of the organic contaminant mass in the soil. Ground water at the landfill waste boundary will meet SDWA MCLs or

non-zero MCLGs. Chemical-specific cleanup standards for the ground water beyond the site boundary are based on State cleanup levels and include benzene 0.067 ug/l, toluene 68.6 ug/l, xylenes 124 ug/l TCE 0.18 ug/l, arsenic 5 ug/l, and lead 5 ug/l. The reconstructed cap is projected to reduce the rate of precipitation infiltration by 80%, thereby minimizing contaminant migration toward the ground water.

INSTITUTIONAL CONTROLS: Deed restrictions limiting surface and ground water use at the site will be implemented.

KEYWORDS: Aeration; Arsenic; Benzene; Biodegradation; Capping; Carcinogenic Compounds; Clean Water Act; Ground Water; Ground Water Monitoring; Ground Water Treatment; Institutional Controls; Lead; MCLs; MCLGs; Metal; O&M; Offsite Disposal; Onsite Discharge; Onsite Treatment; Organics; PAHs; Plume Management; RCRA; Safe Drinking Water Act; Soil; Solvents; State Standards/Regulations; TCE; Toluene; Treatability Studies; Treatment Technology; Venting; VOCs; Wetlands; Xylenes.

OTT/STORY/CORDOVA CHEMICAL, MI
Second Remedial Action
September 29, 1990

The Ott/Story/Cordova Chemical site is a former specialty chemical manufacturing facility in Dalton Township, Muskegon County, Michigan. The site is at the headwaters of a small, unnamed tributary of Little Bear Creek, which flows southeast of the site approximately one-half mile away to Muskegon River, three miles to the south. The site operated from 1957 to 1985 under a series of owners. Chemical products manufactured onsite included intermediate items used in manufacturing pharmaceuticals, dyestuffs, agricultural chemicals, diisocyanates, and herbicides. For at least ten years, production vessel clean-out wastes and wastewaters were discharged to onsite unlined lagoons and allowed to dissipate into soil. In subsequent years, wastes were also drummed and stored onsite. In the early 1960s, the State noted signs of water and soil contamination. Site owners attempted to manage the ground water contaminant plumes emanating from the site, but the effectiveness of these measures was uncertain. In 1977, the State negotiated with a new site owner to remove several thousand drums, thousands of cubic yards of lagoon sludge, and to destroy or to neutralize phosgene gas left onsite. In 1982, an alternate water supply was undertaken and financed in part by the State and a former owner. A Record of Decision (ROD), signed in 1989 and reaffirmed in 1990 after additional public comment, addressed Operable Unit 1 (OU1), the contamination of the nearby Little Bear Creek system. This ROD addresses aquifer restoration. A subsequent ROD will address remaining threats posed by the contaminated soil areas at the site. The primary contaminants of concern affecting the ground water are VOCs including benzene, 1,2 dichloroethane, PCE, TCE, toluene, vinyl chloride, and xylenes; other organics including pesticides; and metals including arsenic.

The selected remedial action for this site includes installing and operating extraction wells in a phased approach to restore the aquifer and prevent degradation of useable ground water downgradient of the plume; pumping and treatment of ground water in the shallow and deeper zones of the aquifer system using physical-chemical treatment including UV-oxidation, air stripping, biological treatment such as activated sludge, and/or filtration/adsorption such as granular activated carbon as determined in the design phase; discharging the treated effluent in the nearby stream; installing a ground water monitoring system to demonstrate the effectiveness of restoration; and implementing institutional controls, such as deed restrictions to limit ground water use. The estimated present worth cost for this remedial action is $26,000,000, which includes an annual O&M cost of $1,400,000.

PERFORMANCE STANDARDS OR GOALS: Ground water cleanup goals include benzene 1 ug/l (10^{-6} cancer risk level), toluene 40 ug/l (State standard), TCE 3 ug/l (10^{-6} cancer risk level), and xylenes 20 ug/l (State standard). Effluents must meet limitations for stream discharge as administered by the State.

INSTITUTIONAL CONTROLS: Deed restrictions or other controls will be implemented to limit current and future uses of ground water at and downgradient of the facility.

KEYWORDS: Air Stripping; Arsenic; Benzene; Carbon Adsorption (GAC); Carcinogenic Compounds; Clean Air Act; Clean Water Act; Direct Contact; Floodplain; Ground Water; Ground Water Monitoring; Ground Water Treatment; Institutional Controls; MCLs; Metals; O&M; Offsite Discharge; Organics; PCE; Pesticides; Plume Management; RCRA; Safe Drinking Water Act; State Standards/Regulations; TCE; Toluene; VOCs; Wetlands; Xylenes.

PRISTINE, OH

First Remedial Action (Amendment) - Final
March 30, 1990

The 2-acre Pristine site is in Reading, Hamilton County, Ohio. The site is bordered by industrial and residential areas, including a trailer park three hundred feet northeast of the site. Eight municipal supply wells serving the citizens of Reading are located approximately 300 feet northwest of the site. Prior to 1974, this site was used for the manufacture of sulfuric acid. Subsequently, Pristine began liquid waste disposal operations at the site, and in 1977, obtained a permit to operate an onsite liquid waste incinerator. An onsite concrete lined pit (the magic pit) was used to store and treat hazardous materials during liquid waste disposal operations. In 1979, State investigations identified as many as 8,000 to 10,000 drums and several thousand gallons of liquid wastes onsite. Types of waste included acids, solvents, pesticides, and PCBs. Over 90 hazardous compounds were detected onsite in the soil, ground water, surface water, sediment, and debris as a result of past disposal activities. In 1981, the State ordered all onsite disposal operations to cease. From 1980 to 1983, EPA and Pristine removed onsite wastes including paint and solvent sludge, solvents, pesticides, organics, PCB-contaminated soil, and incinerator ash. During 1984, the PRPs removed contaminated soil and waste as a means to address the immediate site hazards. A 1987 Record of Decision (ROD) documents the selection of in-situ vitrification of the upper 12 feet of soil across the site. This ROD amends the soil component remedy of the 1987 ROD from in-situ vitrification to incineration and soil vapor extraction. The primary contaminants of concern affecting the soil, sediment, debris, and ground water are VOCs including benzene, PCE, TCE, and xylenes; other organics including dioxin and pesticides such as DDT; metals including lead, chromium, and arsenic; and other inorganics.

The selected amended remedial action for this site includes excavating and incinerating the top one foot of contaminated soil from across the site (a total of 3,598 cubic yards) and 1,799 cubic yards of contaminated soil to a depth of four feet in areas that contain semi-volatile organic compounds and pesticides in excess of performance goals; incinerating 600 cubic yards of contaminated sediment and 1,125 cubic yards of contaminated soil surrounding the magic pit; testing the residual ash and placing the ash onsite if it meets standards for delisting; performing in-situ soil vapor extraction with an off-gas control system to extract VOCs from onsite soil to a depth of 12 feet; dewatering the upper aquifer, and onsite treatment of the extracted ground water using carbon adsorption; capping the soil with a RCRA multi-layer cap; pumping and treatment of ground water from the lower and upper aquifer and lower outwash lens of the upper aquifer using air stripping and carbon adsorption; decontaminating and demolishing all onsite structures and disposing of the debris offsite; monitoring ground water; and implementing institutional controls including deed restrictions, and site access restrictions such as fencing. The estimated present worth cost for this remedial action is $13,500,000, which includes an O&M cost of $6,000,000.

PERFORMANCE STANDARDS OR GOALS: Chemical-specific goals for soil/sediment were based on a cumulative 10^{-6} incremental lifetime cancer risk of eleven indicator compounds including aldrin 15 ug/kg, benzene 116 ug/kg, chloroform 2,043 mg/kg, DDT 487 ug/kg, 1,2-DCA 19 ug/kg, 1,1-DCE 285 ug/kg, dieldrin 6 ug/kg, PAHs 14 ug/kg, dioxin 0 ug/kg, PCE 3,244 ug/kg, and TCE 175 ug/kg.

INSTITUTIONAL CONTROLS: Deed restrictions will be implemented at the site.

KEYWORDS: Air Stripping; Arsenic; Benzene; Capping; Carbon Adsorption (GAC); Carcinogenic Compounds; Chromium; Clean Water Act; Debris; Decontamination; Dioxin; Direct Contact; Drinking Water Contaminants; Excavation; Ground Water; Ground Water Monitoring; Ground Water Treatment; Incineration/Thermal Destruction; Inorganics;

sand and gravel aquifer and a deeper fractured dolomite and sandstone aquifer, both hydraulically connected and current sources of drinking water. Three of the subsites were occupied by tenants between approximately 1968 and 1985. All three subsites were involved with the storage and/or reconditioning of electrical equipment and contain PCB-contaminated soil and debris from spills or disposal of PCB oil. One subsite was also involved with reclamation of copper wire. The fourth subsite was used by the University as a burn pit for waste chemicals. From 1968 to 1974, it is estimated that 90,000 gallons of laboratory chemicals, solvents, corrosives, salts, heavy metals, organics, and inorganics were disposed of in the burn pit, which was ultimately capped in 1980. In 1984, ground water sampling identified the burn pit as a source of contamination. In 1986, the University submitted plans for an alternate water supply for affected residents. This action has been updated and is addressed in this Record of Decision (ROD). This ROD also addresses ground water treatment in the burn pit area and treatment and consolidation of contaminated soil and debris in the remaining three subsites. The primary contaminants of concern affecting the soil, debris, and ground water are VOCs including chloroform; other organics including PCBs; and metals such as lead.

The selected remedial action for this site includes excavating 2,620 cubic yards of soil containing greater than 1,000 mg/kg of lead and transporting the soil to an offsite RCRA landfill for disposal; excavating 160 cubic yards of concrete debris and 6,309 cubic yards of soil with greater than 25 mg/kg of PCBs, followed by onsite thermal desorption and fume incineration; consolidating 14,809 cubic yards of soil with 10-25 mg/kg of PCBs and limiting access with man-made barriers; backfilling excavations with treated soil and grading and revegetating the area; pumping and treating contaminated ground water using a packed tower air stripper, followed by onsite discharge to an infiltration supply pond; and ground water monitoring. Outside of the selected remedy, the University of Minnesota is constructing two supply wells upgradient of the contaminant plume and supplying 27 affected residents with this alternate water supply. The combined estimated capital cost for both remedies is $8,308,686. There are no O&M costs associated with the soil remedy. The estimated annual O&M cost for the ground water remedy is $8,695 for 20 years.

PERFORMANCE STANDARDS OR GOALS: Cleanup levels for carcinogenic compounds are meant to reduce the excess lifetime cancer risk to 10^{-4} to 10^{-7}. Specific soil cleanup goals include PCBs 25 mg/kg (TSCA PCB "Spill Cleanup Policy") and lead 1,000 mg/kg (EP Toxicity Leach Testing). Specific ground water cleanup goals for VOCs were also provided.

INSTITUTIONAL CONTROLS: Not applicable.

KEYWORDS: Air Stripping; Carcinogenic Compounds; Clean Air Act; Debris; Direct Contact; Drinking Water Contaminants; Excavation; Ground Water; Ground Water Monitoring; Ground Water Treatment; Incineration/Thermal Destruction; Leachability Tests; Lead; MCLs; MCLGs; Metals; O&M; Offsite Disposal; Onsite Discharge; Onsite Disposal; Onsite Treatment; Organics; PCBs; RCRA; Safe Drinking Water Act; Soil; State Standards/Regulations; Toxic Substances Control Act; Treatment Technology; VOCs.

WAYNE WASTE OIL, IN
First Remedial Action - Final
March 30, 1990

The 30-acre Wayne Waste Oil site is a former oil reclamation operation and municipal landfill in Columbia City, Indiana. The site lies within the Blue River floodplain, and a wetlands area is located onsite. The site overlies a contaminated unconsolidated surficial aquifer. From 1953 to 1970, part of the site was operated as a municipal landfill. From 1975 to 1982, waste oil reclamation activities, which included the storage and handling of hazardous wastes were conducted onsite. Site features include an incinerator, onsite disposal pits, buried drums, vacant office buildings, and several above-ground and underground storage tanks, which contain hazardous material. From 1979 to 1980, an estimated 250,000 gallons of hazardous waste were illegally dumped onsite and allowed to percolate into the soil. In addition the current landfill cap is not adequate to prevent exposure of buried landfill material. Removal actions by potentially responsible parties (PRPs) in 1986 and 1988 resulted in remediation of several onsite disposal pits, and the removal and offsite disposal of 340 buried drums, the contents of 23 storage tanks, over

12,900 tons of contaminated soil from the onsite pits, and implementation of site access restrictions. Site investigations by the PRP under a Consent Order from 1988 to 1989, characterized the location and extent of remaining contaminated media, and quantified the chemical contaminants at the site. The primary contaminants of concern affecting the soil, debris, and ground water are VOCs including benzene, PCE, TCE, toluene, and xylenes; other organics including PAHs and phenols; and metals including arsenic, chromium, and lead.

The selected remedial action for this site includes treating VOC-contaminated soil using vapor extraction; treating metals-contaminated soil using soil washing or solidification/stabilization; delineating the area of the municipal landfill; capping the landfill and constructing a landfill venting system if necessary; covering PAH-contaminated soil or consolidating the soil under the landfill cap; treating and disposing of the contents of storage tanks offsite, steam cleaning, and removing the storage tanks offsite; dismantling the incinerator and disposing of the debris offsite or within the onsite municipal landfill; pumping and treatment of ground water onsite using air stripping, or discharging the ground water offsite to a publicly owned treatment works (POTW); monitoring air, ground water, and surface water; and implementing institutional controls including deed, land use, and ground water use restrictions, and site access restrictions such as fencing. The estimated present worth cost for this remedial action is $5,582,499, which includes an annual O&M cost of $291,000 for 15 years.

PERFORMANCE STANDARDS OR GOALS: Cleanup levels for soil will be calculated using a contaminant leaching model. Chemical-specific cleanup levels for ground water are based on Federal MCLs and non-zero MCLGs including benzene 5 ug/l (MCL), PCE 5 ug/l (MCL), TCE 5 ug/l (MCL), toluene 2,000 ug/l (MCL), xylenes 10,000 ug/l (proposed MCL), and arsenic 50 ug/l (MCL).

INSTITUTIONAL CONTROLS: Deed, ground water, and land use restrictions will be implemented onsite.

KEYWORDS: Air Monitoring; Air Stripping; Arsenic; Benzene; Capping; Carcinogenic Compounds; Chromium; Clean Air Act; Clean Water Act; Debris; Direct Contact; Drinking Water Contaminants; Floodplain; Ground Water; Ground Water Monitoring; Ground Water Treatment; Institutional Controls; Landfill Closure; Leachability Tests; Lead; MCLGs; MCLs; Metals; O&M; Offsite Discharge; Offsite Disposal; Offsite Treatment; Onsite Containment; Onsite Discharge; Onsite Disposal; Onsite Treatment; Organics; PAHs; PCBs; PCE; Pesticides; Phenols; Publicly Owned Treatment Works (POTW); RCRA; Safe Drinking Water Act; Soil Washing/Flushing; Soil; Solidification/Stabilization; State Standards/Regulations; Surface Water Monitoring; TCE; Toluene; Toxic Substances Control Act; Treatability Studies; Treatment Technology; Vacuum Extraction; Venting; VOCs; Wetlands; Xylenes.

WHEELER PIT, WI

First Remedial Action - Final
September 28, 1990

The 3.4-acre Wheeler Pit site is a former industrial waste disposal pit in LaPrairie Township, approximately 1-1/2 miles from Janesville, Wisconsin. The soil beneath the site is generally sand and gravel, and the uppermost aquifer, also composed of sand and gravel, serves as a major source of drinking water for the Janesville area. From 1900 to the 1970s, the site was used as a sand and gravel pit by a railroad company, which may also have used the pit for refuse disposal. In 1956, General Motors Corporation (GMC) leased 3.82 acres of the pit, and from 1956 to 1960, disposed of general refuse onsite. From 1960 to 1974, GMC disposed of an estimated 22.3 million gallons of industrial wastes, including paint spray booth sludge, residue from part hanger stripping systems, clarifier sludge, and powerhouse coal ash. In 1974, the State required closure of the disposal area along with ground water monitoring. Onsite elevated levels of several contaminants, including TCE and chromium, were detected in the ground water after the site was closed. This Record of Decision (ROD) addresses control of the source area, as well as monitoring of ground water. Natural attenuation will be relied upon to remediate the ground water. The primary contaminants of concern affecting the waste, soil, and/or ground water are VOCs including benzene, toluene and xylenes; other organics including PAHs; and metals including arsenic, lead, and chromium.

The selected remedial action for this site includes consolidating waste and contaminated soil from adjacent property into the original onsite disposal area; removing trees from the area to provide a regular surface for the cap; capping the landfill with a solid waste cap to comply with State requirements; installing a gas venting system in the cap, if necessary, to release gas generated during tree root decomposition; monitoring of ground water and private wells, and evaluating results to determine the need for any additional remedial action; implementing institutional controls to limit land and ground water use, and site access restrictions including fencing. The estimated present worth cost for this remedial action is $2,940,000, which includes an annual O&M cost of $137,300 per year for 30 years. Costs associated with the gas venting system are not included.

PERFORMANCE STANDARDS OR GOALS: Cleanup levels identified for ground water are based on State Preventive Action Limits and include arsenic 5.0 ug/l and chromium 5.0 ug/l. No cleanup levels have been determined for soil or onsite wastes, as these will be permanently contained onsite.

INSTITUTIONAL CONTROLS: Institutional controls including deed restrictions, will be implemented to limit land and ground water use at the site.

KEYWORDS: Arsenic; Benzene; Capping; Chromium; Debris: Direct Contact; Ground Water; Ground Water Monitoring; Institutional Controls; Metals; O&M; Onsite Containment; Organics; Sludge; Soil; State Standards/Regulations; Toluene; Venting; VOCs; Xylenes.

Onsite Treatment; Organics; PCBs; Soil; Toxic Substances Control Act; Treatability Studies; Treatment Technology.

TEXARKANA WOOD PRESERVING, TX
First Remedial Action
September 25, 1990

The 25-acre Texarkana Wood Preserving site is a former wood treating facility in Bowie County, Texas, within the Days Creek 100-year floodplain. Surrounding land use is industrial, residential, and agricultural. Since the early 1900s, several lumber-related businesses have operated at the site, with documented creosote-based wood treating operations starting in 1954. By 1971, Texarkana was also using creosote and pentachlorophenol for wood preserving. State investigations of the site between 1968 and 1984 showed Texarkana to be negligent or delinquent in fulfilling various permit requirements. Fund-lead removal actions from 1986 to 1988 included implementation of site access restrictions, and construction of a berm around, and pumping down the creosote-contaminated onsite processing ponds to prevent runoff and overflow. This Record of Decision (ROD) addresses onsite contaminated soil near the processing ponds and contaminated ground water in a shallow aquifer. Remediation of ground water in a deeper aquifer will be addressed in a subsequent ROD. The primary contaminants of concern affecting the soil, sediment, sludge, and ground water are organics including dioxin, PAHs, pesticides, such as dioxin, and phenols.

The selected remedial action for this site includes excavating approximately 77,000 cubic yards of contaminated soil (includes any affected sediment and sludge), followed by onsite treatment using incineration, leachability testing of residual ash, and onsite backfilling of ash with the installation of a soil cover and revegetation; pumping and treatment of approximately 16 million gallons of contaminated ground water from the shallow aquifer using carbon adsorption, with onsite or offsite regeneration or offsite disposal of the spent carbon, pretreatment using ferric hydroxide precipitation and flocculation, followed by clarification and filtration as needed, and reinjecting the treated water onsite into the shallow aquifer; and implementing institutional controls, including deed restrictions to limit land use. The estimated present worth cost for this remedial action is $47,500,000, which includes a total O&M cost of $1,060,000.

PERFORMANCE STANDARDS OR GOALS: Soil remediation will reduce the excess cancer risk to below 10^{-6}. Ground water will be restored to its beneficial use as drinking water. Chemical-specific goals for soil include carcinogenic PAHs 3 mg/kg, total PAHs 2450 mg/kg, dioxin 20 ug/kg, and pentachlorophenol 150 mg/kg. Chemical-specific goals for ground water include carcinogenic PAHs 10 ug/l (detection limit), dioxin 0.001 mg/l (Proposed MCL). CWA requirements for PAHs and dioxin in ground water are lower than the above values, but ground water will be remediated to below detection limits as indicated.

INSTITUTIONAL CONTROLS: Deed restrictions will be implemented to restrict future site land use. Water use restrictions cannot be enforced in Texas, however.

KEYWORDS: Air Monitoring; Carbon Adsorption (GAC); Carcinogenic Compounds; Clean Closure; Clean Water Act; Closure Requirements; Dioxin; Direct Contact; Excavation; Floodplain; Ground Water; Ground Water Monitoring; Ground Water Treatment; Incineration/Thermal Destruction; Institutional Controls; Leachability Tests; MCLs; O&M; Offsite Disposal; Onsite Discharge; Onsite Disposal; Onsite Treatment; Organics; PAHs; Pesticides; Phenols; RCRA; Safe Drinking Water Act; Sediment; Sludge; Soil; Treatability Studies; Treatment Technology.

TINKER AFB
(SOLDIER CREEK/BLDG 3001), OK
First Remedial Action
August 16, 1990

The 220-acre Tinker AFB (Soldier Creek/Building 3001) site, which includes an active military facility and the adjacent Soldier Creek, is in Oklahoma City, Oklahoma. Surrounding land use is urban residential. Underlying the site is a

surficial perched aquifer and a sole-source aquifer for the region. The Building 3001 (B3001) facility is used as an aircraft overhaul and modification complex for jet engine service, repair, and upgrades. From the 1940s to the 1970s, organic solvents were used to degrease metal parts in subsurface pits. Ground water contamination has occurred onsite as a result of seepage from these pits, direct discharge of solvents to storm drains, spills, and faulty drainage system connections. A North Tank Area contains several active and abandoned underground waste oil and fuel tanks. Contamination in this area has resulted from leaking tanks and fuel spills directly onto the ground. In addition, there is onsite VOC contamination, which may be the result of leaking utility lines in the area. Investigations by the Air Force from 1982 to 1989 documented ground water contamination under the B3001 complex; the potential threat of further contamination from Pit Q-51, one of the former degreasing pits; and that underground storage tanks in the North Tank Area were leaking. In 1985 in response to the detection of onsite contamination, the Air Force removed an abandoned 13,000 gallon gasoline tank from the North Tank Area, closed three contaminated production wells, and cleaned all of the onsite degreasing pits with the exception of Pit Q-51, which contains approximately 45 gallons of contaminated liquid waste. This Record of Decision (ROD) addresses remediation of onsite ground water, along with remedial actions relating to Pit Q-51 and the North Tank Area. A subsequent ROD will address contamination associated with Soldier Creek. The primary contaminants of concern affecting the soil, debris, and ground water are VOCs including benzene, PCE, TCE, toluene, and xylenes; other organics including phenols; and metals including chromium and lead.

The selected remedial action for this site includes ground water pumping and onsite treatment using air stripping to remove VOCs, precipitation to remove metals, and fine filtration to remove any remaining organics and metals; using the treated water in onsite industrial processes; disposing of any residuals from the treatment processes offsite; recovering 6,000 to 12,000 gallons of hydrocarbons floating above the ground water table by using a dual fluid production system, followed by offsite disposal of the hydrocarbons; removing approximately 45 gallons of liquid waste from Pit Q-51, and placing the liquid waste into 55-gallon drums; steam cleaning, backfilling and covering the pit with a concrete slab; storing the drums temporarily onsite; disposing of waste and wash water from the steam cleaning process offsite; removing and disposing of a 750-gallon waste tank, and properly abandoning, demolishing and backfilling the onsite 235,000-gallon fuel oil tank at the North Tank Area; treating the contaminated soil from the North Tank Area using vapor extraction, with destruction of vapors in a thermal combustor; and ground water monitoring. The estimated present worth cost for this remedial action is $13,198,308. O&M costs were not provided.

PERFORMANCE STANDARDS OR GOALS: Soil remediation goals include a 99% removal of organic contaminants at the North Tank Area. Chemical-specific ground water cleanup goals include benzene 5 ug/l (MCL), PCE 5 ug/l (MCL), TCE 5 ug/l (MCL), chromium 50 ug/l (MCL), and lead 50 ug/l (MCL).

INSTITUTIONAL CONTROLS: Not applicable.

KEYWORDS: Air Stripping; Benzene; Carcinogenic Compounds; Chromium; Clean Air Act; Clean Water Act; Debris; Direct Contact; Drinking Water Contaminants; Ground Water; Ground Water Monitoring; Ground Water Treatment; Incineration/Thermal Destruction; Lead; MCLs; Metals; O&M; Offsite Disposal; Onsite Containment; Onsite Discharge; Onsite Treatment; Organics; PCE; Phenols; Plume Management; RCRA; Safe Drinking Water Act; Soil; Sole-Source Aquifer; Solvents; State Standards/Regulations; TCE; Temporary Storage; Toluene; Treatment Technology; Vacuum Extraction; VOCs; Xylenes.

FAIRFIELD COAL GASIFICATION PLANT, IA

First Remedial Action - Final
September 21, 1990

The 1.3-acre Fairfield Coal Gasification Plant is a former coal gas generator plant in the town of Fairfield, Jefferson County, Iowa. Since 1917, the site has been owned by the local power company. From 1878 to 1950, gas was generated from coal as an energy source using various processes, each producing an array of by-products that were either sold or disposed of onsite. Since 1937, coal tar and ammonium liquor wastes were disposed of onsite. In 1986, site investigations by the power company found evidence of surface contamination and contamination in the underlying ground water as a result of leaching from buried coal tar wastes. The source of contamination was determined to be the sediment and soil associated with a relief gas holder, a gas holder pit area, and a tar separator. The primary contaminants of concern affecting the soil, sediment, and ground water are VOCs including benzene, toluene, and xylenes; other organics including PAHs; and metals including arsenic, chromium, and lead.

The selected remedial action for the site includes excavating 3,800 cubic yards of PAH-contaminated coal tar waste, soil, and sediment from the source areas and an additional undetermined quantity of soil from these site areas after separating and decontaminating larger items, followed by offsite treatment using incineration; pumping and treatment of an estimated 1,577,000 gallons of contaminated ground water using filtration, polymer injection, and settling out of the sludge wastes, followed by treatment of the supernatant using carbon adsorption with offsite discharge to a publicly owned treatment works (POTW) or onsite use of the treated water in a nutrient addition treatment process; disposing of the settled sludge in accordance with approved disposal methods; treating the coal gas migration areas by enhanced bioremediation if a pilot study proves successful; and implementing institutional controls, including ground water and land use restrictions, and site access restrictions, such as fencing. The estimated present worth cost for this remedial action is $5,815,000, which includes an estimated O&M cost of $4,762,000 for 30 years.

PERFORMANCE STANDARDS OR GOALS: Ground water will be treated to reduce the levels of contaminants to levels acceptable to the State, including benzene 1 ug/l (10^{-6} cancer risk level), toluene 2,000 ug/l (lifetime health advisory), and xylenes 10,000 ug/l (lifetime health advisory). Ground water will be treated to best available detection levels. If the ground water remediation levels can not be attained, alternate concentration levels may be established or a chemical-specific ARAR waiver may be invoked in an amended ROD. Cleanup levels for soil are based on risk assessment and include total PAHs 500 ug/kg, carcinogenic PAHs 100 ug/kg, and benzene 241 ug/kg.

INSTITUTIONAL CONTROLS: Ground water and land use restrictions will be implemented to prevent direct contact with contaminants.

KEYWORDS: Arsenic; Benzene; Biodegradation/Land Application; Carbon Adsorption (GAC); Carcinogenic Compounds; Chromium; Clean Air Act; Decontamination; Direct Contact; Excavation; Ground Water; Ground Water Monitoring; Ground Water Treatment; Incineration/Thermal Destruction; Institutional Controls; Lead; Metals; O&M; Offsite Discharge; Offsite Disposal; Offsite Treatment; Onsite Discharge; Onsite Treatment; Organics; PAHs; Plume Management; Publicly Owned Treatment Works (POTW); RCRA; Sediment; Soil; State Standards/Regulations; Toluene; Treatability Studies; Treatment Technology; VOCs; Xylenes.

PERFORMANCE STANDARDS OR GOALS: Cleanup levels are based on the more stringent of either SDWA MCLs or State regulations. These levels will reduce lifetime cancer risks to between 10^{-4} and 10^{-6} for carcinogenic compounds, and the Hazard Index (HI) to less than 1 for non-carcinogens. Chemical-specific ground water cleanup goals include PCE 5 ug/l (proposed MCL), chromium 0.05 mg/l (MCL), and lead 0.05 mg/l (MCL). Specific cleanup levels for soil were not provided.

INSTITUTIONAL CONTROLS: Ground water use restrictions will be implemented to prohibit drinking water well construction within the contaminant plume.

KEYWORDS: Carbon Adsorption (GAC); Carcinogenic Compounds; Chromium; Clean Water Act; Direct Contact; Floodplain; Ground Water; Ground Water Monitoring; Ground Water Treatment; Institutional Controls; Lead; MCLs; Metals; O&M; Offsite Disposal; Onsite Discharge; Onsite Treatment; PCE; RCRA; Safe Drinking Water Act; Soil; State Standards/Regulations; Treatability Studies; Treatment Technology; Vacuum Extraction; VOCs; Wetlands.

MIDWEST MANUFACTURING/ NORTH FARM, IA
First Remedial Action - Final
September 27, 1990

The 8-acre Midwest Manufacturing/North Farm site is located on a manufacturing site owned and operated by Smith-Jones Inc. in Kellog, Iowa. Land use in the area is primarily industrial. From 1973 to 1981, Smith-Jones engaged in electroplating and painting operations of manufactured products, which involved the use of TCE to clean the product before it was coated with the metal. In 1977, the State required treatment of the wastewaters to precipitate metals. The solid residuals were stored in an above-ground tank, then transferred periodically to an unlined disposal cell onsite. Site inspections in the early 1980s, by EPA revealed elevated heavy metal concentrations in the 170 cubic yard waste disposal cell, the surrounding soil, as well as a 7,200 cubic foot waste metals pile and a borrow pit area. Ground water sampling revealed contamination of the alluvial aquifer underlying the site. This ROD addresses both source control and ground water remediation at the site. The primary contaminants of concern affecting the soil/waste and ground water are VOCs, including PCE, TCE, toluene, and xylenes; and metals, including chromium and lead.

The selected remedial action for this site includes installing a low permeability cap over the waste disposal cell in accordance with RCRA landfill closure requirements; treating ground water using air stripping, and possible treatment of vapor/air mixture using carbon adsorption, and filtering water to remove inorganics, if needed; discharging the treated water onsite to the Skunk River or offsite to a publicly owned treatment works (POTW); implementing institutional controls including deed and ground water use restrictions; and ground water monitoring for 30 years. The estimated capital cost for this remedial action is $288,419, which includes a total O&M cost of $200,425 for 25 to 30 years.

PERFORMANCE STANDARDS OR GOALS: Ground water contamination at the site will be reduced to meet Iowa Anti-Degradation Requirements.

INSTITUTIONAL CONTROLS: Deed and ground water use restrictions will be implemented until remediation is completed.

KEYWORDS: Air Stripping; Arsenic; Capping; Carbon Adsorption (GAC); Carcinogenic Compounds; Chromium; Clean Water Act; Direct Contact; Ground Water; Ground Water Monitoring; Ground Water Treatment; Institutional Controls; Landfill Closure; Leachability Tests; Lead; MCLGs; MCLs; Metals; O&M; Offsite Discharge; Onsite Containment; Onsite Discharge; Onsite Treatment; PCE; Publicly Owned Treatment Works (POTW); RCRA; Safe Drinking Water Act; Soil; State Standards/Regulations; TCE; Toluene; VOCs; Xylenes.

MISSOURI ELECTRIC WORKS, MO
First Remedial Action - Final
September 28, 1990

The 6.4-acre Missouri Electric Works (MEW) site is an electrical equipment sales, service, and remanufacturing operation in Cape Girardeau, Missouri. Intermittent onsite runoff channels flow into Cape LaCroix Creek located 0.7 miles east of the site, which enters the Mississippi River, 1.1 miles to the southeast. A wetland area is located 700 feet south of the site. Since 1953, MEW has recycled materials from old electrical equipment, including the reuse of filtered transformer oil. More than 16,000 transformers have been repaired or scrapped, and approximately 28,000 gallons of transformer oil received onsite were never recycled. The MEW property, as well as adjacent properties, have been contaminated with PCBs as the result of inadequate storage and handling of transformers and PCB-contaminated transformer oils. In addition, spills and disposal of industrial spent solvents occurred onsite affecting ground water underlying the site. In 1984, preliminary State and EPA investigations found leaking drums of transformer oil onsite and PCB levels in soil of up to 21,000 mg/kg. Based on this, in 1984, the State required removal of approximately 5,000 gallons of drummed waste oil. EPA conducted investigations from 1985 to 1987 that revealed onsite PCB contamination in the soil at levels of up to 58,000 mg/kg. Offsite migration of PCBs also was detected during these investigations. In 1988, the EPA required MEW to notify the public of site contamination, limit exposure to employees and the public, and minimize movement of PCB-contaminated soil offsite from runoff and erosion. In 1989, barriers were installed across runoff channels to intercept contaminated runoff. This Record of Decision (ROD) addresses both contaminated soil and sediment removal, as well as the treatment of affected ground water. The primary contaminants of concern affecting the soil, sediment, and ground water are VOCs including benzene, PCE, and TCE; and organics including PCBs.

The selected remedial action for this site includes excavating PCB-contaminated soil and sediment and treating these by incineration onsite; placing exhaust gases through flue-gas coolers and particulate removal systems; removing acid gases in-situ; backfilling with residual materials, based on leachability test results; constructing a soil cover over the site; pumping and treatment of ground water with filtration and treatment via air stripping with subsequent carbon adsorption; discharging the treated water offsite to a surface drainage ditch between the site and the wetlands or to a publicly owned treatment works (POTW). The estimated present worth cost for this remedial action is $9,130,000, which included an estimated annual O&M cost of $64,010 for 15 years.

PERFORMANCE STANDARDS OR GOALS: Contaminant levels for soil and sediment after treatment will represent an excess upper bound lifetime cancer risk of 2×10^{-5}. Cleanup levels for ground water will be 10^{-5} and cleanup levels will meet the TSCA PCB Spill Cleanup Policy, State water quality standards and Federal MCLs for VOCs. Chemical-specific goals include TCE 5 ug/l (MCL) for ground water, PCB 10 mg/kg (TSCA) for soil to a depth of 4 feet, and PCB 100 mg/kg (TSCA) for soil below a 4-foot depth.

INSTITUTIONAL CONTROLS: Deed and/or land use restrictions will be implemented to limit the site to industrial or commercial use.

KEYWORDS: Air; Air Monitoring; Air Stripping; Benzene; Carbon Adsorption (GAC); Carcinogenic Compounds; Direct Contact; Excavation; Ground Water; Ground Water Treatment; Incineration/Thermal Destruction; Institutional Controls; Leachability Tests; MCLGs; MCLs; O&M; Offsite Discharge; Onsite Disposal; Onsite Treatment; Organics; PCBs; PCE; Public Exposure; Publicly Owned Treatment Works (POTW); Safe Drinking Water Act; Sediment; Soil; State Standards/Regulations; TCE; Toxic Substances Control Act; Treatability Studies; Treatment Technology; VOCs; Wetlands.

ground water, and the third ROD in 1987, specified installation of a ground water extraction system in the lower canyon area (Zone 3), as well as surface channels to direct surface water runoff. This fourth ROD addresses the contaminated ground water in Zone 1 (an interim measure) and in Zone 4, and proposes treatability studies to remediate the source material in Zone 1. A future ROD will specify the source treatment methods as well as a remedy for any remaining ground water contamination in Zone 1. The primary contaminants of concern affecting the ground water include VOCs such as TCE.

The selected remedial action for this site includes dewatering the bedrock in the original disposal area (Zone 1), followed by ground water treatment at the existing pretreatment plant, and offsite discharge to a publicly owned treatment works (POTW) facility; ground water pumping and treatment using air stripping or granular activated carbon, and reverse osmosis in Zone 4, followed by onsite reinjection or disposal in an industrial sewer; conducting field tests on reinjection of treated ground water into Zones 2 and 3; and performing treatability tests on soil vapor extraction at Zone 1. The estimated present worth cost of this remedial action is $115,000,000, which includes unspecified O&M costs.

PERFORMANCE STANDARDS OR GOALS: No remediation goals have been determined in this ROD for Zone 1 ground water contamination, because this is an interim measure. Chemical-specific goals for ground water in Zone 4 include TCE 5.0 ug/l (SDWA MCLs).

INSTITUTIONAL CONTROLS: Not applicable.

KEYWORDS: Air Stripping; Carbon Adsorption (GAC); Clean Air Act; Clean Water Act; Direct Contact; Drinking Water Contaminants; Ground Water; Ground Water Treatment; MCLs; O&M; Offsite Discharge; Onsite Discharge; Onsite Treatment; Plume Management; Publicly Owned Treatment Works (POTW); Safe Drinking Water Act; State Standards/Regulations; TCE; Treatability Studies; Treatment Technology; VOCs.

WATKINS-JOHNSON (STEWART DIVISION), CA
First Remedial Action - Final
June 29, 1990

The Watkins-Johnson site is an active research and development, manufacturing, and industrial complex in Santa Cruz County, five miles north of Santa Cruz, California. The Watkins-Johnson Company has owned and operated the complex since 1963, conducting such activities as: metal machining, degreasing, metal plating, and photo laboratory activities. During these activities, a variety of organics, inorganics, and metals were used. In 1984, Regional authorities found TCE and TCA in the Watkins-Johnson wastewater disposal system. Further investigations revealed soil contamination at the site and ground water contamination in the Santa Margarita aquifer underlying the site. The aquifer has been designated a sole-source aquifer used for drinking water, and is comprised of a perched zone and a regional zone. In addition, the aquifer is easily accessible for drinking water supplies and for contamination from the ground surface. The primary contaminants of concern affecting the soil and ground water are VOCs including PCE and TCE; and metals including silver.

The selected remedial action for this site includes soil vapor (vacuum) extraction with pretreatment of extracted vapors using granular activated carbon (GAC) prior to ambient discharge; capping and grading contaminated soil areas to minimize the potential for mobilization of soil contaminants to the ground water; installing infiltration leachfields to prevent offsite migration of ground water contaminants in the perched zone; installing gravity drains to transfer the contaminated ground water from the perched zone to the regional aquifer zone for subsequent extraction; ground water pumping and onsite treatment to remove contamination from both the perched and regional zones using GAC adsorption with offsite regeneration of spent carbon; discharging the treated water onsite for industrial and consumptive use and to recharge the perched zone or offsite to surface water; and ground water monitoring. The estimated present worth cost for this remedial action is $2,156,243, which includes an estimated annual O&M cost of $167,820.

PERFORMANCE STANDARDS OR GOALS: Ground water treatment standards for both the perched and regional zones were based on chemical-specific SDWA MCLGs or the more stringent of SDWA MCLs or MCLGs and State MCLs, thereby achieving a residual risk of 10^{-4} to 10^{-6}. Chemical-specific goals for ground water include PCE 0.005 mg/l (PMCL) and TCE 0.005 mg/l (MCL). Soil remediation will ensure that soil no longer poses a threat to the ground water; however, no chemical-specific goals have been set for the soil.

INSTITUTIONAL CONTROLS: Institutional controls will be developed and implemented during the remedial design/remedial action.

KEYWORDS: Capping; Carbon Adsorption (GAC); Carcinogenic Compounds; Direct Contact; Drinking Water Contaminants; Inorganics; Ground Water; Ground Water Monitoring; Ground Water Treatment; Institutional Controls; MCLs; MCLGs; Metals; O&M; Offsite Discharge; Onsite Containment; Onsite Discharge; Onsite Treatment; PCE; Plume Management; Safe Drinking Water Act; Soil; Sole-Source Aquifer; Solvents; State Standards/Regulations; TCE; Treatability Studies; Treatment Technology; Vacuum Extraction; VOCs.