STATE OF MISSOURI
Jeremiah W. (Jay) Nixon, Governor * Kip A. Stetzler, Acting Director
DEPARTMENT OF NATURAL RESOURCES
dnr.mo.gov

FINAL REMEDY DECISION

Archimica, Incorporated
2460 West Bennett Street
Springfield, Missouri
EPA ID#: MOD 095038329

INTRODUCTION

This Final Remedy Decision (FRD) is issued by the Missouri Department of Natural Resources (Department) in coordination with the U.S. Environmental Protection Agency (EPA). The purpose of the FRD is to identify the selected final remedy, present any concerns and issues raised during the public comment period, and provide responses. Formal comments were received during the public comment period; however, the selected final remedy was not changed from the proposed final remedy outlined in the Statement of Basis.

SELECTED REMEDY

The selected final remedy for the Archimica, Incorporated (Archimica) facility, located at 2460 West Bennett Street in Springfield, Missouri, Greene County, consists of the following:

1. For the contaminated groundwater and soil at the site, the final remedy consists of Alternative 3, "Enhanced Controls, Groundwater Capture and Monitoring, and DNAPL Recovery and Monitoring," as described in the approved Corrective Measures Study (CMS) Report dated January 9, 2002, with modifications. Several changes have been made in the corrective measures since the CMS Report was finalized.

The final remedy for the site addressing the groundwater and soil contamination is described below.

Implementation of Institutional Controls

Institutional controls are actions that will control land use and site access that could potentially expose humans to contaminated groundwater or soil contact, through public agencies or records. Institutional controls will not have a direct bearing on the reduction of contaminant concentrations or site restoration, but could reduce the potential for human exposure. The institutional controls will be implemented at the site by Archimica and the Department entering into an Environmental Covenant and by implementing new standard operating procedures (SOPs).

Alternative 3 of the CMS Report originally included provisions for updating deed attachments to reflect current knowledge of site conditions, including information regarding the location, nature, and extent of soil and groundwater contamination. This requirement will be replaced by the Environmental Covenant. The Missouri Environmental Covenants Act, Section 260.1000 through 260.1039, RSMo., was not anticipated at the time of the CMS. The Environmental Covenant, which will conform to the Missouri Environmental Covenant Act, will be an institutional control. The Environmental Covenant will contain all information normally contained in a deed attachment plus additional requirements. The Environmental Covenant also has enforceable measures. Archimica will submit a draft Environmental Covenant to the Department as part of a Corrective Measures Implementation (CMI) Work Plan, as required by Archimica's final Missouri Hazardous Waste Management Facility Part I Permit.

In addition to the Environmental Covenant, new SOPs will be written and implemented to formalize current maintenance activities for existing caps over contaminated areas and the floodwall. The new SOPs will also implement specific procedures for any required repairs and cover intrusive construction activities that would take into account environmental action in construction projects. Soil contamination at the Archimica facility may pose a threat to human health and the environment if conditions change. These SOPs will contain provisions for future subsurface work (excavated soil management plan) and cap maintenance over areas of contaminated soil. The Part I Permit requires the submittal of SOPs as part of an Operation, Maintenance, and Monitoring Plan.

Dense Non-Aqueous Phase Liquid (DNAPL) Recovery

New wells will be utilized to aid in potential dense non-aqueous phase liquid (DNAPL) recovery. The locations of these wells will be within the footprint of the source areas at bedrock locations where the potential for DNAPL recovery is the highest. Specific details of well location, construction, installation schedule, operation, and performance evaluation will be developed as part of the CMI Work Plan. Data from these well installations will be used to evaluate the potential for discovery and recovery of additional DNAPL under the most favorable conditions. These new wells may encounter and recover significant quantities of DNAPL, indicating that subsurface conditions are favorable to additional DNAPL recovery efforts. Alternatively, if these wells do not recover significant quantities of DNAPL, this data may be used to formally document the impracticability of further DNAPL recovery at the facility.

Enhanced DNAPL Monitoring

The final remedy will include quarterly inspections for recoverable amounts of DNAPL in all known DNAPL-containing wells, in addition to those in which dedicated pumping equipment has or will be installed. This approach enhances the existing DNAPL monitoring program by adding nine existing wells historically known to contain DNAPL, as well as the four new wells to the group of potential DNAPL recovery wells. Archimica is currently required to have permanent pumping systems for recovery in limited "designated DNAPL recovery wells" as part of their interim measures. Interim measures are required by the 3008(h) Corrective Action Order on Consent (Consent Order) entered into by EPA and Syntex Agribusiness, Incorporated (now Archimica, Incorporated) in May 1989. With the monitoring approach, manpower efforts can be focused on recovering DNAPL wherever it might occur in recoverable amounts in addition to the planned DNAPL recovery wells. Furthermore, enhanced monitoring facilitates evaluation of changes (if any) in DNAPL entry into well boreholes which may result from varying the location of groundwater pumping wells and flexible operation of the groundwater pumping system. Specific details of the enhanced DNAPL monitoring system will be developed as part of the CMI Work Plan.

Enhanced Groundwater Recovery

The enhanced groundwater containment system will include an enhanced groundwater pumping network. The CMS Report originally discussed a new groundwater treatment system. However, the groundwater treatment air stripper was replaced in 2000 and must continue to be in compliance with air and water discharge permits. The enhancement of the groundwater network will be designed to improve control and containment of contaminated groundwater and operational flexibility and effectiveness of the network.

The groundwater pumping system will continue to utilize three existing pumping wells. In addition, three existing monitoring wells will be converted into pumping wells, one previously discontinued pumping well will be reactivated, and their performance will be evaluated for effectiveness as pumping wells. Archimica may use these wells or others and may pump them at rates and for durations that optimize capture. Optimum capture will meet the minimum drawdown criteria while minimizing aquifer withdrawals and water drawn from Jordan Creek. New groundwater extraction pumps and overhead piping systems will be installed, as needed. Specific details of the enhanced groundwater recovery system will be presented in the CMI Work Plan.

The pumping well network must maintain hydraulic capture sufficient to minimize discharge to Jordan Creek. If monitoring indicates the need for additional pumping wells to meet these groundwater containment standards, these wells must be installed. Hydraulic capture of groundwater should be demonstrated by comparing on-site groundwater levels with Jordan Creek surface water levels.

Archimica performed a pilot study to optimize the groundwater pumping system and to ensure groundwater containment via performance standards. Archimica submitted a *Proposed Pilot Study Work Plan for Hydraulic Testing for Control and Compliance* August 7, 2006. The

Department and EPA approved the Pilot Study Work Plan September 15, 2006. Based on this pilot study, Archimica presented a preliminary groundwater containment drawdown standard to the Department February 18, 2010. This performance standard sets the depth of drawdown in the on-site groundwater to be at least 0.25 foot below Jordan Creek levels. Archimica must maintain this drawdown standard based on a comparison of monthly rolling averages. If this groundwater containment standard cannot be maintained, Archimica must notify the Department within two weeks to discuss possible remedies for the situation.

The Part I Permit requires the continuation of the pilot study. Archimica will update and submit the 2006 Pilot Study Work Plan to the Department for approval, pursuant to the Part I Permit, and pilot testing will be conducted per a schedule established in the approved, updated Pilot Study Work Plan. Upon completion of the Pilot Study Work Plan activities, Archimica will submit a Pilot Study Report to the Department. The Pilot Study Report will specify recommended changes to groundwater containment standards and procedures.

The goal of enhanced groundwater recovery is to establish a new pumping network with the primary function of achieving containment of contaminated groundwater, while allowing flexibility of pumping operations for maintenance and operational needs.

Enhanced Monitoring Activities

The enhanced monitoring program involves chemical monitoring of groundwater quality, visual and recovery monitoring for DNAPL stability, and monitoring of nearby creeks to verify no contaminated groundwater aqueous phase liquid (APL) discharge. The program will use chemical monitoring via groundwater sampling to determine groundwater quality and to detect changes in APL concentrations, which may indicate changes in: 1) groundwater containment, 2) DNAPL movement, or 3) DNAPL dissolution into groundwater. In addition, the program will use recovery monitoring to record amounts and track rates of DNAPL recovery from the subsurface to evaluate changes in DNAPL recovery rates. Finally, the program will use chemical monitoring via creek water sampling to determine the absence of detectable facility-specific contaminants in creeks. Specific details of the enhanced monitoring program will be developed as part of the CMI Work Plan and the Operation, Maintenance, and Monitoring Plan.

Remediation Goals for the Selected Remedy

The corrective action goal for groundwater at the site is the protection of human health and the environment. To achieve this goal, the corrective action objective is to prevent contaminants of concern (COCs) in groundwater from reaching potential receptors above acceptable risk levels. The following compounds were identified as COCs in Archimica's CMS Report: benzene, chloroform, 1,2-dichloroethane, methylene chloride (dichloromethane), ethylbenzene, 2,3,7,8-tetrachlorodibenzo-p-dioxin, toluene, and xylenes.

Contaminant concentrations in many monitoring wells at the facility exceed the groundwater protection standards (GPS) shown in Table 1 below. These standards are set at the Maximum Contaminant Levels (MCLs) established by EPA, the current Missouri Water Quality Standards for drinking water, or EPA Region VI Regional Screening Levels, as appropriate. MCLs are

federal drinking water standards developed under the Safe Drinking Water Act. The federal drinking water standards are published in 40 CFR Part 141 Subpart G. The MCLs for these chemical compounds are similar to those established under Missouri's Public Drinking Water Regulations at 10 CSR 60-4 for drinking water as well as Missouri's Water Quality Standards for Protection of Groundwater and Drinking Water Supply found at 10 CSR 20-7. Three additional contaminants have been found at Archimica above regulatory standards since the time of the final CMS Report and have been added to the list of COCs, shown in Table 1 below.

Table 1
Groundwater Protection Standards (mg/L)

Contaminant of Concern (COC)	Groundwater Protection Standards (GPS)
Benzene	0.005
Chloroform	0.0057*
1,1-Dichloroethane[1]	2.4**
1,2-Dichloroethane	0.005
Ethylbenzene	0.7
Methylene Chloride	0.0047*
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.000000013*
Toluene	1
Trichloroethene[1]	5
Vinyl Chloride[1]	2
Xylenes	10

mg/L: milligrams per liter
Source: MCLs established by EPA, Missouri Water Quality Standards for Drinking Water, or EPA Region VI Regional Screening Levels, May 2009.

* Limits derived from Missouri Water Quality Standards (10 CSR 20-7.031), September 2009. These limits differ from the values presented in the CMS Report.
** Limit derived from EPA Region VI Regional Screening Levels, May 2010.
[1] These COCs differ from those presented in the CMS Report.

The GPS must be achieved at a location called the point of compliance (POC). The purpose of the POC is to establish a boundary at and beyond which corrective action must be taken to address COCs in groundwater that exceed specified standards. The POC for the Archimica facility is established as the perimeter encompassing the four solid waste management units serving as the original source of groundwater contamination, specifically the main trunks of the former chemical sewer lines, the former surface impoundment, the brick-lined settling pit of the original wastewater treatment system, and the Building S-14 plumbing (in the Solvent Recovery Area). The presence of DNAPL, an on-going source of COCs, within an area larger than the POC has resulted in groundwater contamination beyond the POC boundary. The point of compliance is defined by the following wells:

Table 2
Point of Compliance Wells

Hydrogeologic Zone	Point of Compliance Wells
Alluvial	ITA3
WB1	ITO2, ITO4, RFI-7B1
UB1	ITD3, ITD5
UB1/B2	SXD3, 5-Core
B2	RFI-6B2

Since the area of DNAPL and associated APL is substantially larger than the POC, EPA and the Department believe that the GPS beyond the POC will, in spite of clean-up efforts, be exceeded for an extended period of time. Therefore, the existing groundwater contamination must be contained and the groundwater quality outside the POC must be monitored to verify that the contamination is not expanding into uncontaminated groundwater areas, the creeks, or potential off-site receptors. Monitoring wells for this purpose, called perimeter wells, are currently sampled at the facility semi-annually. In addition, the creeks are sampled as part of a surface water monitoring program. The Part I Permit requires the continued sampling of perimeter wells and the creeks.

COSTS

The Part I Permit requires Archimica to submit an updated, detailed, written cost estimate in current dollars. The cost estimate will include the cost of hiring a third party to perform the corrective action activities required by the Part I Permit, including costs associated with the FSI. The cost estimate will include costs for constructing the final remedy and providing long-term maintenance and monitoring at the facility for the duration of the compliance period. The compliance period for corrective action is 30 years, based on the requirements of 40 CFR 264.96. If one or more of the GPS maximum concentration limits are being exceeded at the end of the compliance period at or beyond the POC, the corrective action program will continue until the limits are met. Then, monitoring must continue and show that the GPS maximum concentration limits have not been exceeded at or beyond the POC for three consecutive years.

Once the revised cost estimate has been reviewed and approved by the Department, Archimica will be required to provide financial assurance for the final remedy in accordance with the requirements of the Part I Permit. In addition, Archimica will adjust the corrective action cost estimate annually for inflation until all corrective action activities required by the Part I Permit are complete.

EVALUATION OF THE FINAL REMEDY

A complete evaluation of the final remedy is available in the Statement of Basis, dated August 10, 2010. In the Statement of Basis, the Department and EPA evaluated the selected final remedy using four threshold criteria: 1) protection of human health and the environment; 2) attainment of media clean-up standards; 3) controlling the sources of releases to reduce or eliminate further releases that may pose a threat to human health and the environment; and 4) compliance with applicable standards for management of waste. The selected final remedy

was also evaluated using the following five balancing criteria: 1) long-term reliability and effectiveness; 2) reduction of toxicity, mobility, and volume of wastes; 3) short-term effectiveness (includes consideration for protection of community, workers, environmental impacts, and time for achievement of objectives); 4) implementability; and 5) cost.

The evaluation found that the selected remedy meets the four threshold criteria and is supported by all five balancing factors. Chemical contamination is present in the groundwater, soil, bedrock, and materials overlying bedrock at Archimica. Residual DNAPL is present in unconsolidated material overlying the bedrock, residual DNAPL is present in bedrock, and dissolved DNAPL chemicals are present in alluvial and bedrock groundwater. The Resource Conservation and Recovery Act Facility Investigation (RFI) Report, dated June 14, 1996, determined that the APL plume is contained and controlled by the groundwater pumping system and that the DNAPL is controlled by virtue of the nature of the DNAPL residual saturation and by containment within pore spaces where it exists. On the basis of this evaluation and state and community acceptance of the remedy, enhanced groundwater capture, institutional controls, and DNAPL recovery and monitoring were selected as the final remedy for the groundwater and soil contamination at the Archimica facility located at 2460 West Bennett Street in Springfield, Missouri.

PUBLIC PARTICIPATION ACTIVITIES

The public was invited to review and offer written comments on the proposed final remedy during a 45-day public comment period. The public comment period began August 10, 2010, and ended September 24, 2010. The public was notified of the availability of the proposed final remedy for review through a newspaper legal notice, facility mailing list, and radio announcement. Neither the Department nor EPA received a request for a public meeting or public hearing. Formal comments were submitted during the public comment period; however, no changes were made to the selected final remedy.

COMMENTS RAISED AND DEPARTMENT'S RESPONSES

Comment #1 (Statement of Basis):

*P. 3, bottom of the first full paragraph, definition of the hydrogeologic zones: The "lower Elsey bedrock (E)" is technically the "lower **Burlington**/Elsey bedrock (E)" zone.*

Response #1:

The facility's comment is correct; however, no change was made to the FRD, as the referenced language is not included in the final document.

Comment #2 (Statement of Basis):

*P. 7, second-to-last paragraph, need for new pumping wells: it appears the word "needed" was omitted from the correction made to this statement. The statement should read: "Additional pumping wells are **needed** to adequately contain…".*

Response #2:

The facility's comment is correct; however no change was made to the FRD, as the referenced language is not included in the final document.

DECLARATIONS

Based on the administrative record compiled for this corrective action, I have determined that the selected final remedy to be ordered at this site is appropriate and will be protective of human health and the environment.

[Original signed by David J. Lamb]

September 30, 2010
Date

David J. Lamb, Director
HAZARDOUS WASTE PROGRAM