

**EXPLANATION OF SIGNIFICANT DIFFERENCES  
FOR**

**MCKIN COMPANY SUPERFUND SITE  
GRAY, CUMBERLAND COUNTY, MAINE**



**Prepared by**

**U.S. Environmental Protection Agency  
Region 1  
BOSTON, MASSACHUSETTS**



**EXPLANATION OF SIGNIFICANT DIFFERENCES  
MCKIN COMPANY SUPERFUND SITE**

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**DECLARATION FOR  
EXPLANATION OF SIGNIFICANT DIFFERENCES  
MCKIN COMPANY SUPERFUND SITE**

**Site Name and Location**

McKin Company Superfund Site  
Gray, Cumberland County, Maine  
EPA Site ID: MED980524078

**Statement of Purpose**

This decision document sets forth the basis for the determination to issue the attached Explanation of Significant Differences (ESD) for the McKin Company Superfund Site (Site). The U.S. Environmental Protection Agency (EPA) developed this decision document after consulting with the Maine Department of Environmental Protection (MEDEP). The MEDEP's letter of concurrence is provided as Attachment A to this ESD.

**Statutory Basis for Issuance of the ESD**

Pursuant to Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. § 9617(c), and the National Contingency Plan (NCP) at 40 C.F.R. § 300.435(c)(2)(i), if EPA determines that the remedial action being undertaken at a site differs significantly from the Record of Decision (ROD) for that site, EPA shall publish an ESD and the reasons such changes are being made. According to 40 C.F.R. § 300.435(c)(2)(i), and EPA guidance (Office of Solid Waste and Emergency Response (OSWER) Directive 9200.1-23-P, July 1999), an ESD, rather than a ROD Amendment, is appropriate where the adjustments being made to the ROD are significant but do not fundamentally alter the remedy with respect to scope, performance or cost. EPA has determined that the adjustments to the 2001 Amended ROD provided in this ESD are significant but do not fundamentally alter the overall remedy for the Site with respect to scope, performance, or cost. Therefore, this ESD is being properly issued.

In accordance with Section 117(d) of CERCLA, 42 U.S.C. § 9617(d), and the NCP at 40 C.F.R. §§ 300.435(c)(2)(i)(A) and 300.825(a)(2), this ESD and its supporting documentation will be available for public review at the EPA Records Center in Boston, Massachusetts and the public information repository located at the Gray Public Library, Gray, Maine. The ESD and its supporting documentation will also be available at MEDEP's offices in Augusta, Maine. Notice of this ESD will be published in a local newspaper of general circulation.

**Background**

The Site was listed on the National Priorities List on September 1, 1983. Following a Remedial Investigation and Feasibility Study, EPA signed a ROD on July 22, 1985 selecting the cleanup remedy for the contaminated soil on the McKin property and for the contaminated groundwater.

The remedy included thermal treatment of soils, drum disposal, construction of a groundwater extraction, treatment and surface water discharge system (GETS), groundwater monitoring, and Site closure activities. The Site has two Operable Units or "OUs": OU-1 comprised of the McKin property, and OU-2 comprised of the properties beyond the McKin property where groundwater contamination has come to be located.

In the late 1980s, a group of responsible parties (the Settling Parties) completed the remedial activities related to soil on the McKin property. The Settling Parties then constructed the GETS in 1990 and operated the system until October 1995 when EPA and MEDEP agreed to a shutdown of the system while an evaluation was performed to determine whether it was technically practicable to restore groundwater. The Agencies and the Settling Parties were unable to reach a consensus regarding groundwater restoration, so in 1997 the parties entered into a mediation process. This process was expanded to include the Town of Gray, the Gray Water District, a community group funded by EPA, and other interested parties. The result was an Amended ROD (AROD) that EPA issued in 2001.

The 2001 AROD documented the modifications to the 1985 ROD for both OU-1 and OU-2:

#### OU-1 (On-Site Soil)

- Waiver of groundwater cleanup standards; and
- Institutional Controls on the McKin property.

#### OU-2 (Off-Site Groundwater)

- Waiver of groundwater cleanup standards;
- Institutional controls on properties within a defined area impacted by the groundwater contamination;
- Abandonment of residential water supply wells;
- Increased long-term monitoring with additional monitoring wells and surface water locations;
- Contingency response for surface water; and
- Actions to address contamination in the Boiling Springs area.

### **Overview of the ESD**

This ESD documents the following change to the AROD:

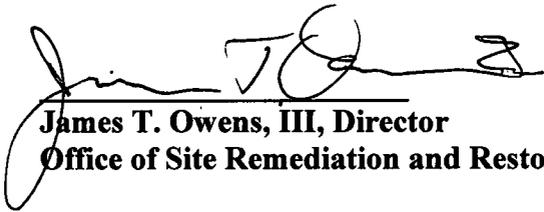
A new series of wells (designated in the AROD as the 900-series wells), originally required to provide assurance regarding the lateral extent of bedrock contamination and vertical gradient between bedrock and overburden, will not be installed. EPA, MEDEP, and Settling Parties representatives met in Spring 2009 to discuss the 900-series wells. The parties ultimately concluded that the 900-series wells were not necessary. Data suggested that the northern portion of the overburden plume was approaching drinking water standards, and the updated regression analysis indicated that the eastern portion of the overburden plume might attain these standards more quickly than originally calculated. Moreover, hydrological and water quality data indicated that the Royal River system functioned as the discharge zone for the overburden and bedrock plumes. Accordingly, because the plumes were contained by the Royal River system, the parties

concluded that the 900-series wells were not needed to delineate the lateral extent of the bedrock plume or the vertical gradient. In addition, because OU-2 covers more than 600 acres the parties concurred that data from the proposed eight 900-series wells (roughly one bedrock well per 75 acres) would not provide the high level of confidence necessary to remove restrictive covenants from individual properties or to recommend to the Town to adjust the Institutional Control Zone.

EPA and MEDEP, based on multiple lines of evidence, have determined that the remedy as selected in the 1985 ROD and modified in the AROD and with this ESD remains protective of human health and the environment. There are no substantive changes to the applicable or relevant and appropriate requirements identified in the AROD as a result of the remedy change documented in this ESD. This ESD does not fundamentally alter the overall remedy for the Site with respect to scope, performance, or cost.

**Declaration**

For the foregoing reasons and as explained herein, by my signature below, I approve the issuance of an Explanation of Significant Differences for the McKin Company Superfund Site in Gray, Maine, and the change stated therein.

  
**James T. Owens, III, Director**  
**Office of Site Remediation and Restoration**

7/3/14  
**Date**

**EXPLANATION OF SIGNIFICANT DIFFERENCES  
MCKIN COMPANY SUPERFUND SITE  
GRAY, MAINE**

**I. INTRODUCTION**

**A. Site Name and Location**

Site Name: McKin Company Superfund Site

Site Location: Gray, Cumberland County, Maine

**B. Lead Agency**

The U.S. Environmental Protection Agency (EPA) and Maine Department of Environmental Protection (MEDEP) are co-lead enforcement agencies for the McKin Company Superfund Site.

**C. Legal Authority**

This Explanation of Significant Differences (ESD) is being issued for the McKin Company Superfund Site (Site) to document changes in the remedy since the Amended Record of Decision (AROD) for the Site was issued on March 30, 2001. EPA is required to publish this ESD pursuant to Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. § 9617(c), and the National Contingency Plan (NCP) at 40 C.F.R. § 300.435(c)(2)(i).

**D. Summary of Circumstances Necessitating this Explanation of Significant Differences**

This ESD explains the difference between the remedial action being undertaken and the remedial action set forth in the AROD and the reason this change is being made.

The Remedial Action Work Plan (Appendix A to the 2001 Amendment to the Consent Decree) required that the Settling Parties install a series of monitoring wells in the overburden and bedrock. The purpose of these wells, designated as the 900-series wells, was to monitor the lateral extent of the bedrock plume and the vertical gradient between bedrock and the overburden groundwater. In particular, data from the eight proposed 900-series wells was to be used to confirm that the plumes did not expand to areas beyond the brook and river, located within the Institutional Control Zone (ICZ). In addition, the data would be used to make determinations regarding removing restrictive covenants on individual properties as groundwater cleanup standards are met.

The Settling Parties and EPA made efforts to gain access from property owners to install and monitor the 900-series wells. These efforts, including multiple meetings and telephone calls with individual property owners, were unsuccessful. The September 2008 Fourth Five-Year Review for the Site identified the status of the 900-series wells as an issue. Therefore, EPA, MEDEP, and the Settling Parties representatives met in Spring 2009 to discuss the 900-series wells. The parties ultimately concluded that the 900-series wells were not necessary since data suggested that the northern portion of the overburden plume was approaching drinking water standards, and an updated regression analysis indicated that the eastern portion of the overburden plume might attain these standards more quickly than originally calculated. Moreover, hydrological and water quality data indicated that the Royal River system<sup>1</sup> functioned as the discharge zone for the overburden and bedrock plumes. Accordingly, because the plumes were contained by the Royal River system, the parties concluded that the 900-series wells were not needed to delineate the lateral extent of the bedrock plume or vertical gradient. In addition, because Operable Unit 2 (OU-2)<sup>2</sup> covers more than 600 acres the parties concurred that data from the proposed eight 900-series wells (roughly one bedrock well per 75 acres) would not provide the high level of confidence necessary to remove restrictive covenants from individual properties or to recommend to the Town to adjust the ICZ.

EPA and MEDEP, based on multiple lines of evidence, have determined that the remedy as selected in the 1985 ROD and modified in the AROD and with this ESD remains protective of human health and the environment. In September 2013 EPA issued the Fifth Five-Year Review for the Site which concluded that the Site remains protective of human health and the environment.

#### **E. Availability of Documents**

This ESD and supporting documentation shall become part of the Administrative Record for the Site. The ESD, supporting documentation for the ESD, and the Administrative Record are available to the public at the following locations and may be reviewed at the times listed below.

U.S. Environmental Protection Agency Records Center  
5 Post Office Square, Suite 100  
Boston, MA 02109-3912  
Telephone: (617) 918-1440

Open Monday through Thursday from 9:30 am - 3:30 pm, excluding federal holidays.

Maine Department of Environmental Protection  
28 Tyson Drive  
Augusta, Maine 04333  
Telephone: (207) 278-7843

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<sup>1</sup> Royal River system was the term used in the 1985 ROD since Collyer Brook is a tributary to the Royal River. Because groundwater from the McKin Site flows to the east to the Royal River and to the north toward Collyer Brook and ultimately discharges into both, the term is used here as well.

<sup>2</sup> Subsequent to the 1985 ROD, EPA defined the 1985 ROD designation of on-site soils and off-site groundwater as OU-1 and OU-2, respectively. This ESD changes the groundwater remedy selected in the 2001 AROD and refers to this remedy component as OU-2 groundwater.

Open Monday through Thursday from 8:30 – 11:30 am, 1:30 – 4:30 pm.

Gray Public Library  
5 Hancock Street  
Gray, Maine 04039  
Telephone: (207) 657-4110

Open Tuesday - Wednesday 10 am to 8 pm, Thursday 10 am to 6 pm, Friday 10 am to 5 pm, and Saturday 10 am to 3 pm.

## **II. SUMMARY OF SITE HISTORY, CONTAMINATION, AND SELECTED REMEDY**

### **A. Site History and Contamination**

The Site<sup>3</sup> is composed of areas impacted by contamination that was released on the McKin property. The McKin property itself comprises an area of approximately seven acres located on the west side of Mayall Road in the rural area of Gray, Maine. Properties contiguous to the McKin property include residential areas, wooded areas, and farmland. The nearest residences are immediately north and west of the McKin property; the closest home is within 100 feet from the McKin property. (See Figure 1)

The McKin facility operated from 1965 to 1977 as a tank cleaning and waste removal business for collection, and transfer station and disposal facility for waste oil and industrial process waste. Wastes were stored on the McKin property in 22 above-ground storage tanks. In 1972, the facility was expanded with the addition of an asphalt-lined lagoon and incinerator to process a large volume of oily waste from an oil spill in Hussey Sound (a shipping channel leading into Portland harbor). The incinerator operated under a permit from MEDEP until operations ceased in about 1973. Most of the oily wastes were stored in the lagoon. This lagoon reportedly leaked and discharged portions of its contents to the subsurface. Waste handling included discharge to the ground, storage in tanks or the lagoon, transport off-site, incineration, and burial on the McKin property. The facility reportedly handled an estimated 100,000 to 200,000 gallons of waste annually between 1972 and 1977.

During 1973 and 1974, local residents reported chemical odors in their well water and discoloration of their laundry. Investigations subsequently found solvents in soils on the McKin property and in groundwater both beneath the McKin property and beyond it. Volatile organic compounds (VOCs) from the facility contaminated local residential water supply wells through migrating groundwater. In 1977, the solvents were identified as trichloroethene (TCE) and 1,1,1-trichloroethane (TCA), and the Town of Gray ordered the McKin Company to cease

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<sup>3</sup> The 1985 ROD identified the McKin property as on-site and all surrounding properties with contaminated groundwater as off-site. This differs from how CERCLA defines "Site." For this ESD, "Site" will encompass both the McKin property and surrounding properties with contaminated groundwater. When a distinction is to be made between the two in this ESD, "McKin property" will be used instead of "on-site."

operations. In December 1977, 16 private water supply wells were capped and water was trucked in on an emergency basis. In 1978, residents were connected to the public water system which had by then been extended to this area of Gray.

During the summer of 1979, MEDEP removed 33,500 gallons of liquid waste from the McKin property. MEDEP entered into a cooperative agreement with EPA in June 1983 to implement initial remedial measures and conduct a Remedial Investigation/Feasibility Study (RI/FS). During 1983, MEDEP removed 169 drums of solidified sludge, 18 cubic yards of solid materials, 10,500 gallons of liquids, and the cleaned above ground tanks from the property. These activities were undertaken to remove potential sources of contamination from the McKin property.

The 1984 RI identified VOCs and heavy metals in the soils on the McKin property. The heavy metal concentrations were within the range typically found in soils. Three areas contained soil contaminants typical of oil disposal operations (e.g., constituents of petroleum). Three other areas were heavily contaminated with VOCs including TCE at 1,500 milligrams per kilogram (mg/kg, also commonly expressed as parts per million or ppm); methylene chloride at 49 mg/kg; xylenes at 21 mg/kg; 1,1,1-TCA at 4.5 mg/kg; dichlorobenzene at 9.2 mg/kg, and other contaminants.

Contaminants were released to the subsurface at the McKin property. As a result of precipitation-driven groundwater flow, coupled with pumping of residential bedrock wells, contaminated groundwater migrated toward the regional aquifer discharge areas of the Royal River east of the McKin property and the Collyer Brook north of the McKin property. The RI identified TCE and 1,1,1-TCA at concentrations of 16,000 micrograms per liter ( $\mu\text{g/L}$ , also commonly expressed as parts per billion or ppb) and 170 ppb, respectively, as the major VOCs in the surficial overburden aquifer groundwater. Concentrations of the two contaminants were 29,000 ppb and 500 ppb, respectively, in the bedrock aquifer based on samples collected from residential wells. Concentrations of TCE and 1,1,1-TCA were below the 1 ppb detection limit in Collyer Brook and the Royal River. Both VOCs were detected at Boiling Springs (an area of groundwater seeps in the Royal River floodplain) at maximum concentrations of 44 ppb TCE and 30 ppb 1,1,1-TCA.

The risk assessment completed as part of the RI concluded that there was no significant health risk from surface water or direct contact with soils on the McKin property. Air monitoring on the property indicated no exceedances of state guidelines for ambient air. However, the contaminated soils on the property were considered a source of contaminants that impacted the overburden and bedrock aquifers, which were used as drinking water sources prior to the expansion of the public water system. The public health risk was considered a future potential risk because there were no known users of the groundwater as a drinking water supply at the time of the RI due to the availability of public water, and because it was assumed the contamination would restrict future use of the aquifer. The TCE concentrations exceeded 28 ppb, the  $10^{-5}$  lifetime risk of cancer guideline established by EPA, at most of the monitoring wells sampled. EPA's risk assessment concluded that surface water did not present an unacceptable human health or ecological risk, either currently or under a future potential

drinking water scenario. Based on these findings, action to protect human health and the environment was required.

## **B. Selected Remedy**

The 1985 ROD included components for treatment of contaminated soil and contaminated groundwater. The remedy presented in the ROD included:

- Soil aeration of soils from identified areas on the McKin property;
- Off-site disposal of approximately 16 drums;
- Soil testing in the petroleum contaminated areas;
- Construction of the Groundwater Extraction and Treatment System (GETS) and operation of this system for a period of five years to achieve groundwater performance standards of 92 ppb 1,1,1-TCA and 28 ppb TCE;
- Re-evaluation of the groundwater performance standards if the standards were not met within five years;
- Initiation of a groundwater and surface water monitoring program; and
- Building demolition, clearing debris, removing drums and other materials, and other closure activities.

Source area soil aeration was selected to actively and significantly reduce the amount of contamination that remained in soil on the McKin property. The performance standard for the remedy was a soil concentration of 0.1 mg/kg TCE, averaged over the volume of treated soils, so contamination in soil would no longer adversely affect groundwater that could be used as drinking water. The ROD specified that areas of the property contaminated with petroleum derivatives would be tested further during the remedial design to determine an appropriate remedial action.

The remedial action objective for OU-2 groundwater as stated in the 1985 ROD was to restore the aquifer to levels protective of human health and the environment within practical limits and a reasonable amount of time. Performance standards were established with the expectation that they could be achieved within the planned five-year period of operation of the OU-2 groundwater remedy. The performance standards of 92 ppb 1,1,1-TCA and 28 ppb TCE were applicable throughout the impacted area, and were established based on the protection of human health and the environment with consideration given to potential exposures and possible synergistic and additive effects. As a suspected carcinogen, the TCE standard was based on a  $10^{-5}$  lifetime cancer risk value. The 1,1,1-TCA performance standard was based on a recommended maximum concentration level of 200 ppb, adjusted to 92 ppb based on possible synergistic and additive effects with TCE.

The source control remedy was completed in 1987. During 1986, a group of Settling Parties excavated and treated VOC-impacted soil to minimize continued migration of VOCs to groundwater. Approximately 9,500 cubic yards of soils that contained solvents were excavated and treated by soil aeration between July 1986 and February 1987. These VOC-contaminated soils were excavated outward from the identified source areas until TCE concentrations met the soil excavation performance standard. Between November 1986 and April 1987, approximately

2,500 cubic yards of petroleum-contaminated soils were excavated to a 1 mg/kg polynuclear aromatic hydrocarbon and total extractable hydrocarbons performance standard and treated in the same manner. The treated soil was then stabilized using cement and replaced in the excavations. The entire property was sloped, graded, loamed, and hydroseeded.

The 1985 ROD stated that the three RAOs for the OU-2 groundwater remedy would be achieved by the design, construction and operation of the GETS to remove VOCs from the overburden aquifer and restore overburden groundwater to the established performance standards. The ROD assumed the OU-2 groundwater remedy would consist of 25 extraction wells into the surficial aquifer and upper bedrock aquifer and anticipated a five-year restoration time frame.

In 1990, EPA and MEDEP agreed to a phased approach to groundwater remediation beginning with four extraction wells and a central treatment system to address the contamination. Two extraction wells were located approximately 1,000 feet north of the McKin property on the western side of Mayall Road (prior to the intersection with Depot Road), one west of Depot Road and the fourth off of Mayall Road approximately 500 feet west of the Depot Road intersection. (See Figure 2 for the extraction well locations.) Two infiltration galleries were located in the central and northern areas of the McKin property to re-inject treated groundwater. Following an evaluation of the effectiveness of the first phase, a decision to expand the system (e.g., the next phase) to the east side of Mayall Road would be made.

Prior to the startup of the GETS, EPA issued an Explanation of Significant Differences in 1990 that changed the discharge of treated groundwater from surface water discharge to a groundwater reinjection system. The GETS operated from 1990 until 1995 when its operation was suspended to focus on the technical impracticability evaluation.

One of the four extraction wells, placed in the eastern plume, (EW-503), was designed with a projected flow of 20 gallons per minute (gpm). The well was installed in soils with a limited saturated overburden thickness that yielded only 1-2 gpm. As a result, the system was not effective in extracting VOCs migrating in the eastern plume from the McKin property to the Royal River. In addition, the expected flushing of VOCs through the use of infiltration galleries did not appear to affect the monitoring wells placed in the northern TCE plume thereby limiting the effectiveness of this action. This observation suggested that operation of the residential wells in the 1970s, historic lagoon operations, and TCE transport through bedrock fractures, contributed to the northern plume that migrated toward Collyer Brook.

The OU-2 groundwater remedy change in the 2001 AROD replaced two groundwater RAOs in the 1985 ROD with the following activities:

- Develop institutional controls to prevent exposure to contaminated groundwater;
- Monitor groundwater to show that the contaminant plume does not expand and that contaminant concentrations continue to decline due to natural processes;
- Monitor surface water to show decreases in TCE concentrations in the Royal River resulting from decreases in groundwater concentrations. A contingency response approach would be implemented if TCE exceeds the state performance standard at a specified location and date; and

- Evaluate the remedy to assess that it is protective of human health and the environment at least every five years and report findings in Five-Year Review reports.

In addition to these activities, the 2001 AROD included a technical impracticability determination. EPA determined that it was not technically practicable to restore the bedrock aquifer within a reasonable time frame and established a Technical Impracticability Zone. Horizontally, this zone encompasses the same area as the ICZ and vertically extends into the deep bedrock. See Figure 3 for the ICZ.

The four ICs identified in the 2001 AROD have been implemented. The Town of Gray adopted a groundwater ordinance for the Site on January 22, 2002. The objective of this ordinance is to prevent exposure to contaminated groundwater until federal and state drinking water standards are reached. The ordinance prohibits the extraction and use of groundwater for any purpose, with the exception of monitoring the contamination. This ordinance delineates the ICZ for which these restrictions will apply. This ICZ will remain in place as long as contamination above drinking water standards remains in the groundwater. The ordinance includes provisions for Town enforcement and stipulates penalties for any breaches of the ordinance.

The second institutional control selected were restrictive covenants for nineteen sub-dividable properties. The restrictive covenants were included to prevent the use of groundwater on these properties and alleviate the concern that future development and installation of wells could possibly alter the boundaries of the contaminant plume. These covenants were recorded in June 2003 at the Cumberland County Registry of Deeds.

The third institutional control selected was the establishment of two conservation easements to protect areas of open space with frontage along Collyer Brook and the Royal River. These easements were recorded in January 2002.

Finally, the Settling Parties were also required to make a good faith effort to procure a restrictive covenant for the McKin property. This final institutional control was obtained with the recording of an environmental covenant on the McKin property deed on September 27, 2013.

In addition to these institutional controls, two separate agreements were reached between the Settling Parties and the Town of Gray and the Gray Water District. The Settling Parties agreed to provide funds to the Gray Water District for development of a new water supply well and for water mains to connect the new well to the existing distribution system. Per a Memorandum of Understanding signed by the Settling Parties, EPA, MEDEP, Gray Water District, and the Town of Gray, payment by the Settling Parties for the institutional controls and agreements were made on or around January 1, 2002.

The Settling Parties continue to conduct routine groundwater and surface water monitoring in accordance with the 2001 Long-Term Monitoring Plan. At the time of the 2008 FYR, 18 monitoring wells and four surface water points were monitored for site-related contaminants. At the time of the 2013 FYR, due to a decrease in groundwater contamination within the ICZ, nine monitoring wells and one surface water point were being monitored. Springs and seeps have achieved drinking water standards and are no longer monitored. (See Figure 3 for the monitoring

locations and Figure 4 for the groundwater plume.)

At the time of the 2008 FYR, six VOCs were consistently detected in the groundwater: PCE, TCE, 1,1,1-TCA, cis-1,2-dichloroethene, 1,1-dichloroethene, and 1,1-dichloroethane. The last three VOCs are daughter compounds or breakdown products created as PCE, TCE, and 1,1,1-TCA degrade. Of these six, TCE and 1,1-DCE exceeded Maine MEGs and Federal MCLs with TCE overwhelmingly being the most widespread and having the highest concentrations. Since the 2008 FYR, only TCE has exceeded its MEG and MCL. The minimal concentrations of daughter compounds indicate that little degradation of TCE is occurring.

Contamination concentrations throughout the eastern plume (discharging in the Royal River) since the 2008 FYR continue to show an overall decreasing trend though not at the rate observed during the 2003-2008 period. Concentrations in the northern plume also continue to decrease and as documented in the 2002 FYR, attenuate to non-detect in the overburden prior to Collyer Brook.

In September 2013 the Settling Parties submitted updated regression analyses on TCE concentrations used to project the likely year when drinking water standards will be reached. The analysis added sampling results from 2008-2013 to the regression analysis first conducted in 1999. The  $R^2$  values for the regression analysis are statistical measurements of the “goodness-of-fit” of the regression to the actual data points. As noted in the 2008 FYR, the  $R^2$  values for the 2007 analysis were higher than the 1999 analysis indicating greater confidence in the projected estimates for attaining drinking water standards. Similarly, the 2013 analysis indicated the  $R^2$  values continue to improve and thus further refined the projected timeframe for attaining the TCE drinking water standard. The 2013 analysis indicated that the TCE drinking water standard will be attained throughout the overburden aquifer around 2033.

Surface water in the Royal River, a State of Maine Class B surface water body, has met the TCE drinking water standard since the 2008 FYR. TCE has never been detected at the laboratory detection limit (typically 0.5 ppb and the drinking water standard is 5 ppb) in Collyer Brook, a State of Maine Class A surface water body.

### **III. DESCRIPTION OF AND BASIS FOR SIGNIFICANT DIFFERENCES**

#### **A. Description of Significant Difference**

The phased implementation of the 1985 ROD remedy consisted of four extraction wells installed in the overburden and upper five feet of the bedrock. A conceptual site model was developed using GETS data, geophysical data, water level and water quality data collected from the monitoring well and surface water network, geological data obtained from the many borings, and computer modeling. As additional data was collected, the conceptual site model was refined which led to the 2001 AROD. There was also concurrence among the Agencies, the Settling Parties, and the community group’s technical consultant regarding the extent of the overburden plume. Although there was no data from the deep bedrock, but based on the hydrology and geology, the parties inferred the location of the bedrock plume generally mirrored the location of

the overburden plume. Based on this understanding, an ICZ was proposed that included the known overburden plume and land beyond the plume where a water supply well might possibly draw in contaminated water.

The proposed ICZ generated much discussion amongst all parties concerning the lifespan of the ICZ and the restrictive covenants that were to be placed on the nineteen individual properties. Consequently, the technical representatives of the Agencies, Settling Parties, and community group identified eight locations to install monitoring wells into the overburden and deep bedrock. The purpose of the 900-series wells was to monitor the positions of the plumes and potential for lateral expansion and the vertical gradient between bedrock and overburden. In particular, data from the 900-series wells was to be used to confirm that the plumes did not expand to areas beyond the ICZ. In addition, the data would be used to make determinations regarding removing restrictive covenants on individual properties as groundwater cleanup standards were met.

Following the signing of the March 2001 AROD and signing of the December 2001 Amendment to the Consent Decree, representatives from EPA and the Settling Parties met with property owners to discuss the specific locations for the proposed 900-series wells and to gain access for their installation and subsequent monitoring. These meetings continued into early 2005 but ultimately were not successful in obtaining access. Following the 2008 Five-Year Review that identified the 900-series wells as an issue to be resolved, the technical representatives of EPA, MEDEP, and the Settling Parties met to review the updated Site data and consider options regarding the 900-series wells. The technical staff concurred that the 900-series were not essential to maintain the protectiveness of the remedy, and, at a spacing of one location per 75 acres, they would not be sufficient to recommend changes to the overlapping institutional controls. Therefore, EPA recommended issuing this ESD to remove installation of the 900-series wells from the 2001 AROD remedy.

## **B. Basis for the ESD**

The release of contaminants from the McKin property was discovered when contaminants were detected in residential bedrock wells downgradient of the property. Following the emergency supply of potable drinking water, the public water system was expanded into the affected area. The 1984 RI focused on contamination in the McKin property soils and groundwater in the overburden and shallow bedrock (bedrock monitoring wells were installed in the upper 10-25 feet of the bedrock whereas the contaminated residential bedrock wells were installed 30 to 460 feet into the bedrock).

The 1985 ROD set as a remedial action objective the restoration of the OU-2 aquifer, within a reasonable time and practical limits. This restoration goal was to be accomplished by extracting groundwater from the overburden aquifer and in the uppermost portion of bedrock, with the expectation that the groundwater extraction system would reduce flow of contaminated groundwater to the bedrock aquifer and treat a substantial portion of the bedrock aquifer. However, systematic recovery of contaminated groundwater from the fractured bedrock to clean the bedrock aquifer in a comprehensive manner was screened out in the 1985 FS as technically infeasible. Consequently, further investigation of the deep bedrock was not performed. Indirect evidence, such as the upward groundwater gradient data from bedrock to overburden, the

presence of TCE at an exploratory overburden well near the confluence of the Royal River and Collyer Brook without any other detections in this area of overburden, as well as mass flux calculations, combined with the direct overburden and shallow bedrock data, provided sufficient evidence to view the contaminant concentrations and location of the bedrock plume as generally the same as the concentrations and location of the overburden plume.

In addition to the above, the following lines of evidence support the conclusion that data from the 900-series wells is not necessary to maintain the protectiveness of the remedy selected in the 2001 AROD.

Contaminant Properties - Liquid waste released at the facility contaminated the soils beneath the McKin property and migrated through the unsaturated soils to the overburden groundwater. Based on contaminant concentrations measured in the excavated soils, it is believed that the waste migrated to the water table as a free-phase, dense, non-aqueous phase liquid (DNAPL). Once in the groundwater the DNAPL continued to spread until it became bound up by the finer grained silts in the overburden soil or in fractures in the bedrock, and it no longer flowed as a liquid under the normal hydraulic gradients present at the Site. At this point, the liquid waste is termed residual DNAPL, and it continues to act as a long-term source of VOCs by slowly dissolving into the ambient groundwater.

The release of contaminants ceased with the closure of the facility in 1977. Contamination was detected in the Royal River twelve years later in 1989. As explained below, the Royal River discharge zone represents the maximum extent of the contaminant plume. Contaminant concentrations in OU-2 groundwater peaked in the late 1990s and have been declining since then. With no further releases, the overburden groundwater has met federal and state drinking water standards in portions of OU-2, and the rest of the overburden groundwater is expected to attain the standards within the next thirty years.

Site geology - The overburden materials present at the Site include fine-grained glaciomarine deposits, coarse-grained glaciomarine deposits, flood plain alluvium, and glacial till. Permeability varies with these deposits, creating preferential pathways for groundwater and dissolved contaminants to flow from the McKin property. The preponderance of fine-grained and coarse-grained deposits with minimal total organic carbon contributes to the almost complete absence of daughter products of TCE.

The overburden materials are underlain by granitic bedrock. The bedrock surface lies at depths of 50 to 100 feet beneath the eastern edge of the glaciomarine delta and slopes eastward toward the Royal River to a depth of nearly 200 feet beneath the overburden materials. A bedrock high has been mapped near the intersection of Mayall and Depot Road that essentially bifurcates flow in the overburden.

Two bedrock troughs have been identified from geophysical data. One trough trends in a southeasterly direction from the junction of Mayall and Depot Roads towards the Royal River; and the other trough, located just west of the Royal River, trends in a southerly direction. The bedrock troughs are expected to have higher transmissivity due to the increased thickness of the saturated overburden materials and enhanced bedrock fracturing.

Site hydrology – Groundwater is recharged by infiltration of precipitation and by leakage from overlying clay deposits upgradient from the McKin property. The direction of groundwater flow from the McKin property is generally from west to east toward the Royal River and to a lesser extent south to north toward Collyer Brook. The flow is driven by the fact that the McKin property is approximately 200 feet higher than the Royal River and Collyer Brook.

This groundwater flow from the McKin property is opposed by groundwater flow from east to west toward the Royal River and north to south toward Collyer Brook from the opposite sides of the Royal River and Collyer Brook. The Royal River system forms the downgradient boundary of the regional aquifer system. In this area, upward hydraulic gradients are present where groundwater flow from both the east and west sides of the Royal River converges.

Paired monitoring wells installed in the overburden and the underlying shallow bedrock indicate downward hydraulic gradients from the overburden into the bedrock at the higher topographic elevations at the McKin property. At the lower elevations of the Site, vertical gradients are upward from the bedrock into the overburden. These gradients provide the driving force to transport groundwater and VOCs away from the McKin property downward into the coarse-grained glaciomarine deposits and bedrock and then back up into the overburden in the southerly trending bedrock trough and flood plain of the Royal River. The vertical upward gradients along the Royal River and the presence of contaminants in the Royal River that are the same as those in the groundwater plume indicate groundwater from the Site discharges to the Royal River.

Water Quality Data – As detailed above in Section II.B., TCE concentrations continue to decrease across the Site. The summary table and regression tables from the 2103 FYR are repeated below

**TCE Concentrations Since the 2008 Five-Year Review**

		TCE Concentrations 2008 -2013 (in µg/L)										
Monitoring Location	Well Type	Sampling Frequency <sup>1</sup>	2008 Sept	2009 June Dec		2010 Apr Sept		2011 Apr Sept		2012 Apr Sept		2013 Apr
Eastern Plume												
B-1A	BR	Semi-annual	7					61 <sup>2</sup> 68	27	56	40	68
MW-206A	BR	Semi-annual	500/ 390 <sup>3</sup>	300	410	450/ 360	210	340	330	240	310	210
B-4A	OB	Every 3 yrs						31/ 41				
MW-801B	OB	Every 3 yrs	2	1						9.7	1.6	1U
MW-802B	OB	Every 3 yrs	11					1	3	5.6	4.1	4.3
MW-803C	OB	Semi-annual	94	58	87/ 82	52	54/ 50	38	23/ 22	31/ 29	33/ 32	22
B-102	OB	Semi-annual	9/1	16/ 54	0.5U	10/ 0.7	0.5U	43/ 38	0.8/ 3	1U	1U	1U/ 2.9
B-103	BR	Semi-annual						81	54	120	110	58
Northern Plume												
MW-202A	BR	Semi-annual								3.7	4	3.2
Surface Water												
SW-201		Semi-annual	0.8/1	0.5U	NA <sup>4</sup>	0.5U	2	0.3 J	0.4J	1U	1U	1U

Notes: Monitoring locations are ordered by distance from the McKin Site

BR/OB: Bedrock/Overburden

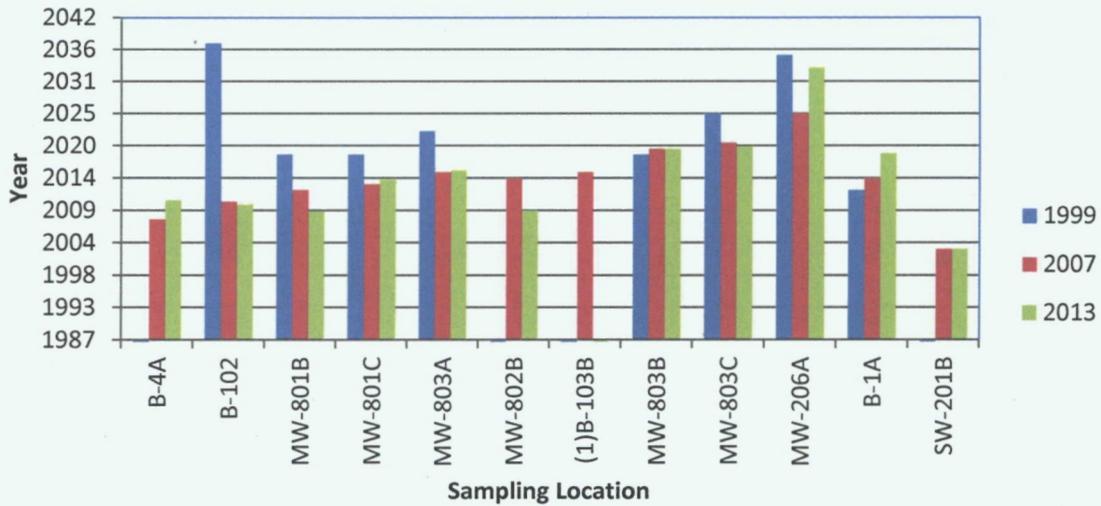
<sup>1</sup> Sampling Frequency according to the approved 2001 Long Term Monitoring Plan, but modified based on results

<sup>2</sup> This sample was collected in January 2011

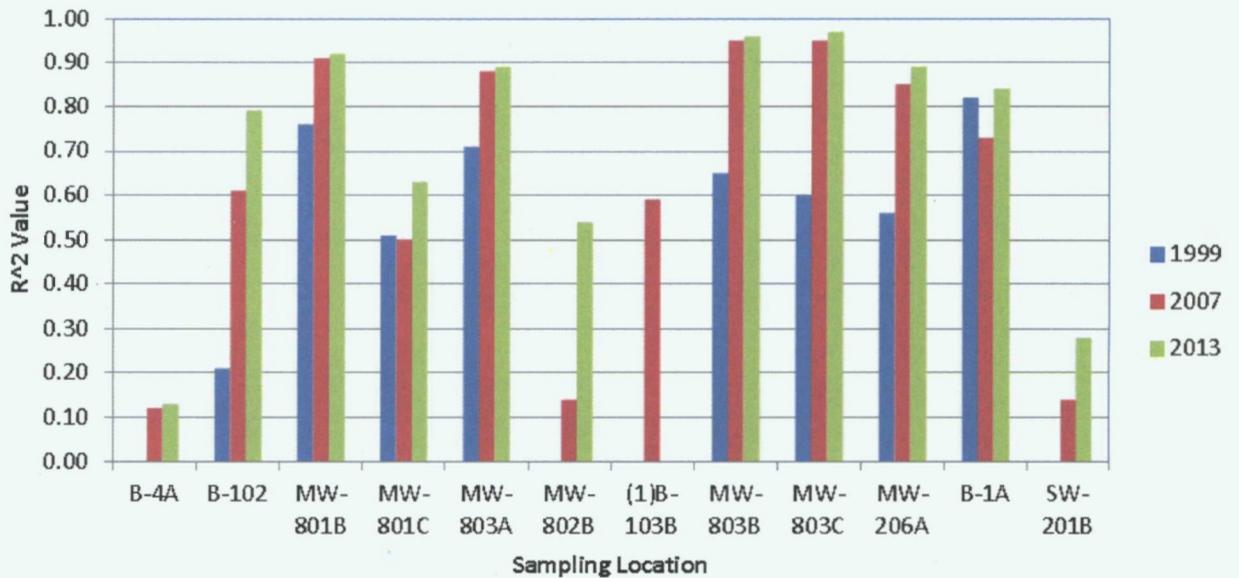
<sup>3</sup> Duplicate sample represented by /

<sup>4</sup> Sampling location not accessible (ice on river)

## Projected Year of TCE Clean-up Goal Attainment



## Comparison of R<sup>2</sup> Values for TCE Regressions



These R<sup>2</sup> values are statistical measurements of the “goodness-of-fit” of the TCE regression analyses to the actual data points (the range for R<sup>2</sup> is from 0.0 to 1.0 and the closer to 1.0, the greater the confidence in the “goodness-to-fit” and the accompanying projected estimates of attaining the drinking water standards).

Other Lines of Evidence – In 1998, an exploratory overburden well for the Gray Water District was installed north of the confluence of Collyer Brook and the Royal River. The well screen was placed above the bedrock surface. Low levels of TCE were detected in initial sampling of the well. Therefore a follow-up investigation of the overburden through micro-wells was performed on properties west of this area and upstream along the northern bank of Collyer Brook up to Merrill Road. No VOCs were detected in these micro-wells. The parties concluded that the TCE in the overburden north of Collyer Brook, with attenuation of the northern overburden plume a half mile south of Collyer Brook, was a result of bedrock transport from the McKin property and subsequent upward discharge from the bedrock to the overburden. This conclusion is consistent with the conceptual site model of flow up and into the Royal River.

In response to TCE data from this exploratory well, MEDEP and EPA collected water samples from residential bedrock wells located outside of the ICZ. Samples were collected on Mountain Road north of Collyer Brook, and Depot Road, George Perley Road, Town Farm Road, and Davis Williams Road all east of the Royal River. All of these locations are located topographically uphill from the groundwater discharge zones (Collyer Brook and the Royal River) such that groundwater flow from these locations would be toward the discharge zones (and by extension, toward the McKin property). No VOCs were detected in any of these wells consistent with the conceptual site model. (See Figure 5 for location of these residential properties.)

Since the 2001 entry of the Amendment to the Consent Decree, the Gray Water District has extended its public water service to the first two homes on Depot Road east of the Royal River, thus further reducing the possibility of a water supply well pulling contamination beyond its current location.

#### **IV. MEDEP COMMENTS**

The State of Maine has participated with EPA in reviewing the modification to the remedy which is described herein and concurs with the approach adopted by EPA. MEDEP's concurrence letter is Attachment A.

#### **V. STATUTORY DETERMINATION**

In accordance with Section 121 of CERCLA, EPA believes that the remedy remains protective of human health and the environment, complies with all Federal and State requirements that are applicable or relevant and appropriate to this remedial action, and is cost-effective. EPA has determined that the adjustments to the ROD provided in this ESD are significant but do not fundamentally alter the overall remedy for the Site with respect to scope, performance, or cost. Therefore, this ESD is being properly issued.

#### **VI. PUBLIC INFORMATION**

In accordance with Section 117(d) of CERCLA and Section 300.825(a) of the NCP, this ESD

and the Administrative Record are available for public review at the locations and times listed in Section 1 above as well as on the internet at [www.epa.gov/region1/superfund](http://www.epa.gov/region1/superfund). Notice of the release of the ESD will be published in the Portland Press Herald.

**EXPLANATION OF SIGNIFICANT DIFFERENCES  
FOR  
MCKIN COMPANY SUPERFUND SITE**

**ATTACHMENT A  
STATE CONCURRENCE LETTER**



STATE OF MAINE  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PAUL R. LEPAGE  
GOVERNOR

PATRICIA W. AND  
COMMISSIONER

June 26, 2014

Mr. James T. Owens, III, Director  
Office of Site Remediation and Restoration  
EPA New England  
5 Post Office Square  
Suite 100, mailcode: OSRR07-5  
Boston, MA 02109-3912

Re: McKin Company Superfund Site, Explanation of Significant Difference

Dear Mr. Owens:

Thank you for the opportunity to review the Explanation of Significant Difference (ESD) for the McKin Co. Superfund Site in Gray, Maine that was submitted to the the Maine Department of Environmental Protection (MEDEP) on June 26, 2014. The MEDEP concurs with the ESD, which in summary will modify the remedy to no longer require the installation and monitoring of the "900-series wells" that were specified in the 2001 Amendment to the Record of Decision. Specifically, the language contained in Section IV of the ESD regarding MEDEP's concurrence is acceptable as written.

The MEDEP looks forward to a continuation of our collaborative working relationship with EPA on this and the other CERCLA sites in Maine. If you have any questions, do not hesitate to call me at (207) 446-4366.

Sincerely,

David Wright, Director  
Division of Remediation  
Bureau of Remediation and Waste Management

cc: Terrence Connelly, EPA  
Michael Jasinski, EPA  
Rebecca Hewett, DEP

AUGUSTA  
17 STATE HOUSE STATION  
AUGUSTA, MAINE 04333-0017  
(207) 287-2581 FAX: (207) 287-7826  
RAY BLISS / PERSPECTIVE, S.L.

BANGOR  
100 HERRIN ROAD, SUITE 4  
BANGOR, MAINE 04401  
(207) 941-4371 FAX: (207) 941-4384

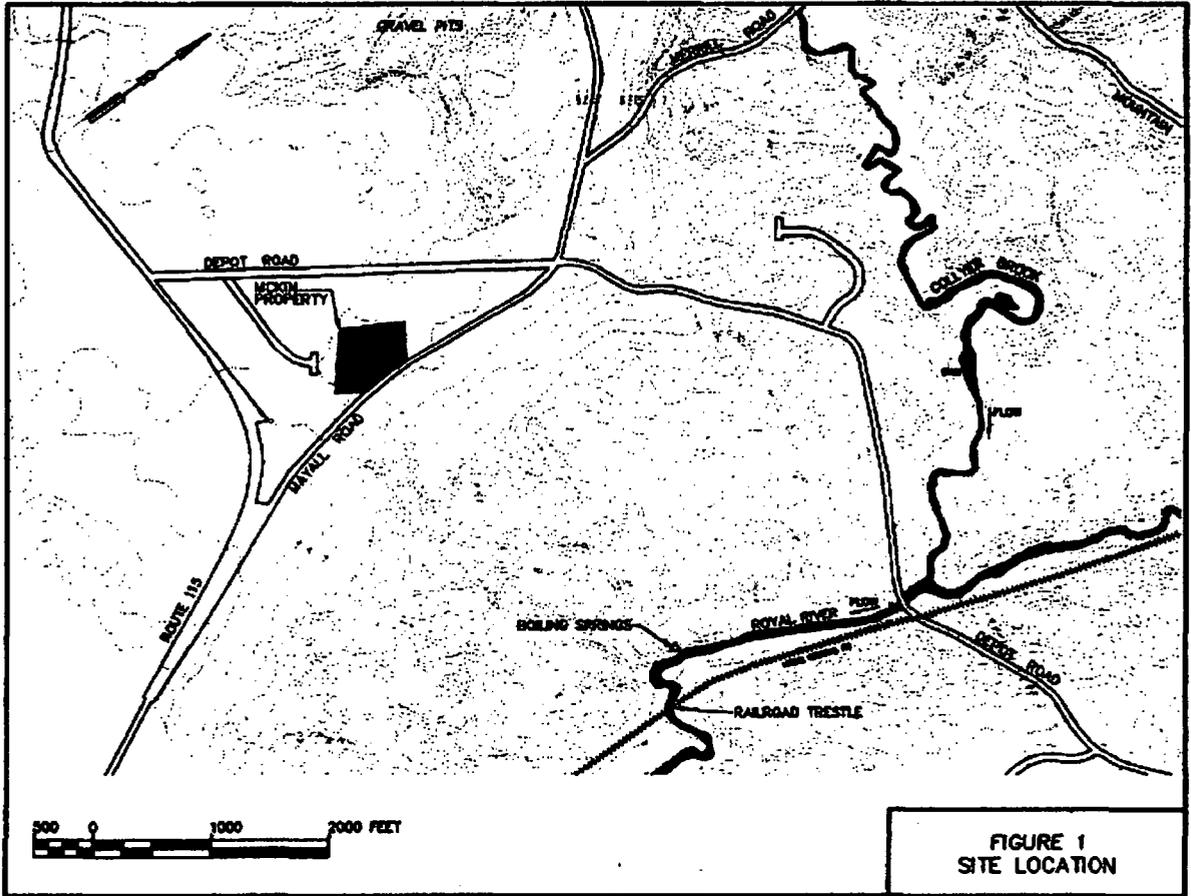
PORTLAND  
512 CANON STREET  
PORTLAND, MAINE 04103  
(207) 822-6500 FAX: (207) 822-9332

FRESHFIELD  
1225 GENERAL DRIVE, SNEYWAY PARK  
FRESHFIELD, MAINE 04032-0609-2004  
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web site: www.maine.gov/dep

**EXPLANATION OF SIGNIFICANT DIFFERENCES  
FOR  
MCKIN COMPANY SUPERFUND SITE**

**ATTACHMENT B  
SITE FIGURES**



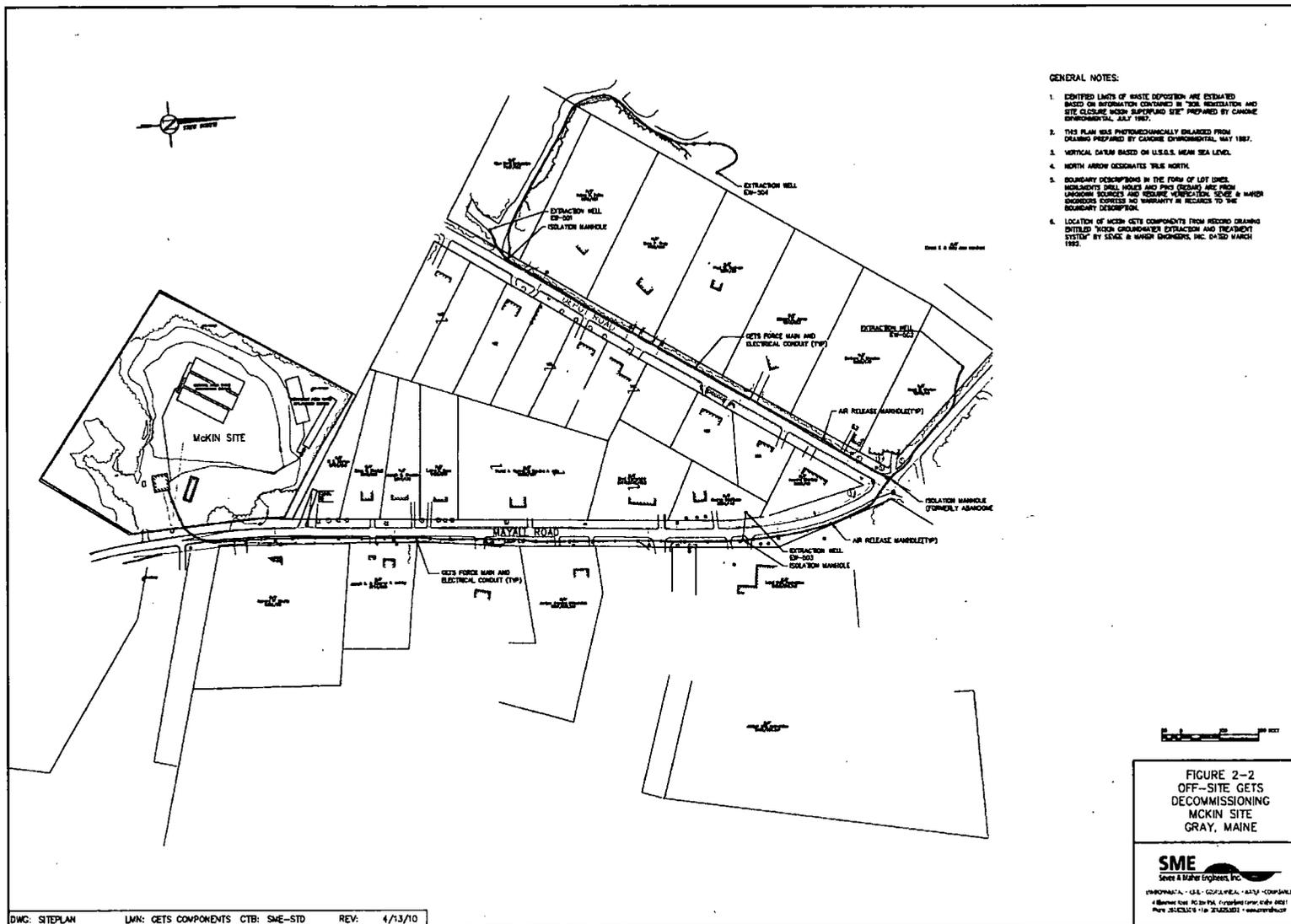


Figure 2. Extraction Well Locations

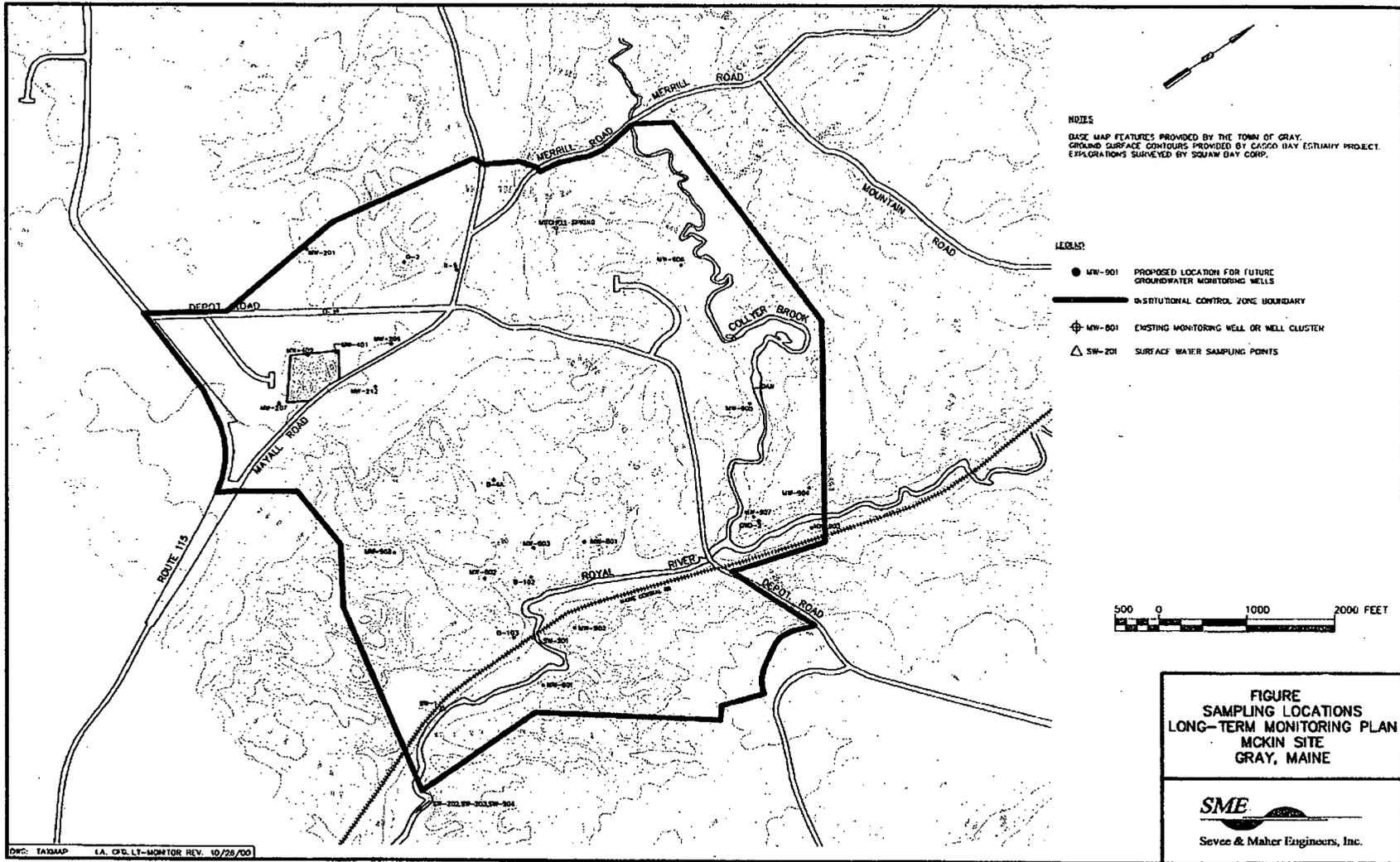


Figure 3. Sampling Locations

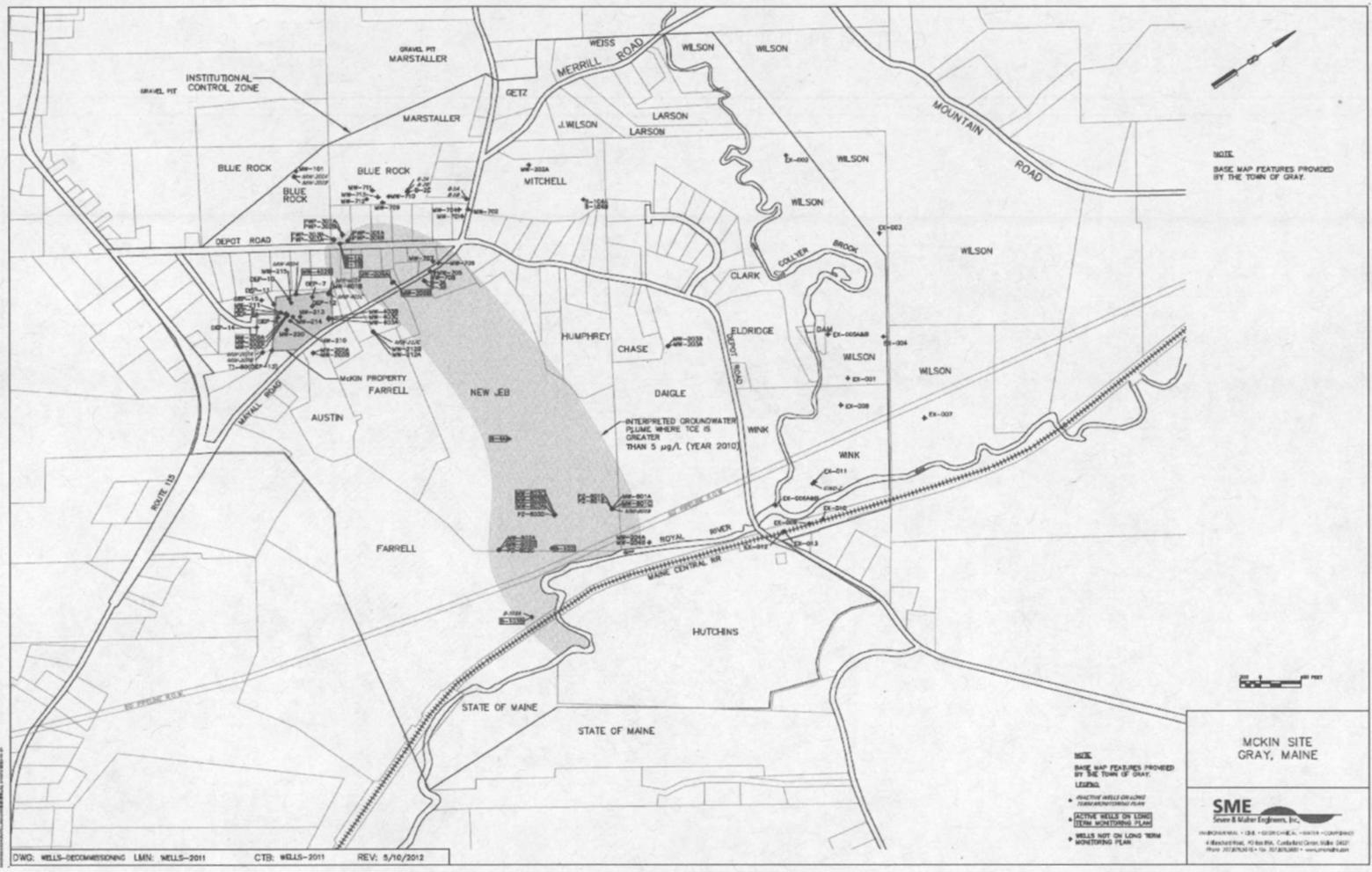


Figure 4. Groundwater Plume

