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OTHER:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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Addendum to Second Five Year Review Report, Coakley Landfill Superfund Site

A Five-Year Review addendum is generally completed for remedies where the protectiveness determination is deferred until further information is obtained. When deferring protectiveness in the Five-Year Review report, a timeframe is provided for when the information will be obtained and a protectiveness statement can be made. This document provides progress since the Five-Year Review and protectiveness determinations for the remedies where the statement was deferred in the September 21, 2006 Five-Year Review.

The second Five-Year Review report (Report) for the Coakley Landfill Superfund Site in North Hampton and Greenland, New Hampshire, was signed by Richard Cavagnero, Deputy Director of EPA New England's Office of Site Remediation and Restoration on September 21, 2006. The protectiveness statements outlined in the Report were as follows:

Operable Unit 1 – Source Control

A protectiveness determination of the source control remedy at OU1 cannot be made at this time until further information is obtained. Metals exceedences are present above ecological benchmarks in the surface water, leachate and sediment at the site. Additional monitoring data has been collected and will be analyzed to determine if adverse ecological impacts are present in these media. It is expected that the data analysis will take approximately 15 months to complete, at which time a protectiveness determination will be made, in addition, sporadic violation of off-site methane gas levels must be brought into compliance with state regulations. All human health threats at the site have been addressed through stabilization and capping of the landfill and the landfill cap is functioning as intended. Installation of fencing and warning signs and deed restrictions are preventing human exposures at the capped landfill.

Operable Unit 2 – Management of Migration

A protectiveness determination of the management of migration remedy at OU2 cannot be made at this time until further information is obtained. High levels of arsenic and manganese are present in wells at the edge of the proposed groundwater management zone (GMZ). Additional data must be collected so that a determination can be made whether elevated levels are a result of landfill impacts or from a source other than the NPL site. Dependent on these findings, the scope of the groundwater remedy may need to be modified. A protectiveness determination will be made in 15 months when all data has been evaluated. The extent of the GMZ needs to be determined and institutional controls established for all properties within the GMZ. Monitoring of the site will continue until cleanup levels for the contaminants of concern are met. It is expected to take approximately 15 years to reach cleanup levels.

Site-wide Protectiveness Determination

A site-wide protectiveness determination for the Coakley Superfund Site cannot be made at this time until further information is obtained. Metals exceedences are present above ecological benchmarks in the surface water, leachate and sediment at the site and high levels of arsenic and manganese are present in wells at the edge of the proposed groundwater management zone. Additional data has been and/or will be collected and analyzed and a protectiveness determination will be made in 15 months.

This addendum addresses the Protectiveness Statement(s) for Operable Unit 1, Operable Unit 2 and Sitewide.

Progress Since the Second Five-Year Review Completion Date

Operable Unit 1

At the time of the Report, EPA required further information on metals exceedences present above ecological benchmarks in the surface water, leachate and sediment at the site to determine if adverse ecological impacts are present in these media. In 2008, additional sampling data were collected and toxicity tests were run on sediment sample S-SED5/SED-3T-1107 (figure attached). This sample contained the highest concentrations of metals likely to be toxic of the multiple sediment samples analyzed. Toxicological and analytical protocols used followed procedures outlined in *Test Methods for Measuring the Toxicity of Sediment-Associated Contaminants with Freshwater Invertebrates (ASTM, 2007), Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates (US EPA 2000)* and *Standard methods for the Examination of Water and Wastewaster, 20th Edition (APHA 1998).* The toxicity of the sediment sample was assessed by conducting chronic survival and growth assays using the freshwater midge species, *Chironomus tentans* and the freshwater amphipod species, *Hyalella azteca.* Analysis of the data documented no ecologically significant difference in measured endpoints between the laboratory control and the site sediment sample.

In 2009 a surface water sample was collected from the same location as the sediment sample used for toxicity, and toxicity was evaluated using the freshwater water flea species, *Ceriodaphnia dubia* and the freshwater fish species *Pimephales promelas.* The results showed no effect on the survival and reproduction of water fleas, and a 30% growth inhibition of the fish, although survival was not affected in the fish. This growth inhibition is a minimal sublethal effect, partially explainable by the increased sensitivity of the fish used in the test, as shown by their higher sensitivity to the reference toxicant. The results indicate that there is no ecologically significant impact. This result, in combination with the lack of effects in the sediment toxicity test, indicates that the samples taken from this area had no significant impact. Since this area was selected as the "worst case" area, based on chemistry testing of sediment, EPA has concluded that it is likely that there are no significant ecological impacts in surface water and sediment at the Coakley Landfill Site.

In addition, sporadic violations of off-site methane gas levels needed to be brought into compliance with state regulations (Env-Hw 702.09 and 702.11) according to the Report. Subsequently, the Coakley Landfill Group (CLG) installed methane gas alarms in buildings on abutting properties in 2007 and no violations have been reported on those properties since that time. In September 2008, methane was detected in monitoring probes M-6 and M7 (see attached map) which had not had violations since 2005. The agencies will continue to require CLG perform quarterly landfill gas monitoring of landfill gas probes M-4, M-5, M-6 and M-7 and allow scaled back landfill gas monitoring at M-1 and M-2 to twice a year based on historical data and lack of any nearby structures.

In September 2007 EPA issued an Explanation of Significant Differences for OU1 that revised the landfill monitoring standard for arsenic, based on the Safe Drinking Water Act Maximum Contaminant Level (MCL), from 0.05 mg/l to 0.010 mg/l.[1] EPA also added a landfill monitoring standard for manganese, based on an EPA Health Advisory, of 0.3 mg/l. EPA also added landfill monitoring standards for a new contaminant, tetrahydrofuran, based on the New Hampshire Ambient Groundwater Quality Standard (NH AGQS) (Env-OR 603.03, Table 600.1) of 0.154 mg/l.

The ESD also updated Applicable or Relevant and Appropriate standards (ARARs) cited in the 1990 ROD both to include revised State regulatory standards and to identify additional standards that were not specifically identified in the 1990 ROD. None of the revisions significantly changed the scope or protectiveness of the remedy.

Based on the above findings, the Protectiveness Statement for Operable Unit 1 is hereby revised as follows:

> The remedy at Operable Unit 1 is protective of human health and the environment. However, the landfill gas monitoring program will remain in place, as will a reduced surface water and sediment monitoring effort to ensure that the currently non-toxic concentrations are not increasing significantly. Groundwater monitoring to determine compliance with the revised groundwater monitoring standards for the landfill will be conducted as a component of OU2. A plan for future monitoring will be developed by the agencies and CLG as appropriate for the next five year review.

Operable Unit 2

At the time of the Report, institutional controls were not in place; arsenic and manganese concentrations were present above the interim groundwater cleanup levels identified in the OU2 Record of Decision (ROD) in wells at the boundary of the proposed GMZ; and there was uncertainty whether or not these levels were landfill related. Since the Report, the CLG has provided two lines of evidence (i.e., current groundwater flow contours and historical VOC concentrations below detection limits) which help support their theory that the levels of arsenic and manganese at some locations were not landfill related. Also, in consultation with EPA and

[1] The MCL for arsenic was changed from 0.05 mg/l to 0.010 mg/l as stated above in two ESDs reissued in 2009. The ESDs, originally issued in 2007, incorrectly cited the MCL for arsenic as 0.10 mg/l.

New Hampshire DES (NHDES), the CLG have included additional properties within the GMZ to ensure an appropriate boundary surrounding the GMZ.

The CLG also put institutional controls in place by obtaining an approved groundwater management permit from NHDES and within this permit, finalizing the abovementioned GMZ (see attached figure). Deed notices were placed on all affected properties within the GMZ and the notices were recorded at the Rockingham County Registry of Deeds in June 2008. The CLG is required to annually notify residents at all affected properties. Annual monitoring at the site will continue until the interim groundwater cleanup levels for all contaminants of concern, as required under the OU2 ROD are met.

In September 2007 EPA issued an Explanation of Significant Differences for OU2 that revised the groundwater remediation standard for arsenic, based on the Safe Drinking Water Act Maximum Contaminant Level (MCL), from 0.05 mg/l to 0.010 mg/l.[2] EPA also added a groundwater remediation standard for manganese, based on an EPA Health Advisory, of 0.3 mg/l.

The ESD also updated Applicable or Relevant and Appropriate standards (ARARs) cited in the 1990 ROD both to include revised State regulatory standards and to identify additional standards that were not specifically identified in the 1990 ROD. None of the revisions significantly changed the scope or protectiveness of the remedy.

Based on the above findings, the Protectiveness Statement for Operable Unit 2 is hereby revised as follows:

> The remedy at Operable Unit 2 is protective of human health and the environment in the short-term. Long-term protectiveness will be achieved when interim groundwater cleanup levels for all contaminants of concern are met.

Site-wide Protectiveness Determination

Based on these findings, the Site-wide Protectiveness Statement is hereby revised as follows:

> The remedy at the Coakley Landfill Superfund Site is protective of human health and the environment in the short-term. Long-term protectiveness has been achieved already in OU1 based on the maintenance of the landfill cap, long-term monitoring, and use restrictions. Long-term protectiveness will be achieved in OU2 when interim groundwater cleanup levels for all contaminants of concern are met and restrictions on the use of groundwater within OU2 can be removed.

[2]. The MCL for arsenic was changed from 0.05 mg/l to 0.010 mg/l as stated above in two ESDs reissued in 2009. The ESDs, originally issued in 2007, incorrectly cited the MCL for arsenic as 0.10 mg/l.

Issues and Recommendations

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Methane Gas	Continue methane gas monitoring program.	CLG	USEPA and NHDES	Quarterly (M-4-M-7) Bi-annually (M-1 & M-2)	N	Y
Sediment, Surface Water and Leachate Sampling Plan	Perform chemistry testing to ensure that the currently non-toxic concentrations do not show an upward trend .	CLG	USEPA and NHDES	September 2011 (conduct at each 5 year review milestone)	N	Y

Next Five Year Review

The next five-year review will be completed on September 21, 2011, five years after the signature of the last five-year review report.

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

July 29, 2009
Date