FIVE-YEAR REVIEW REPORT

Second Five-Year Review Report
for
Sheller-Globe Corporation Disposal Superfund Site

Keokuk, Lee County, Iowa

June 2010

Prepared by:

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8.0

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6/30/10
(Date)

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EXECUTIVE SUMMARY

The Sheller-Globe Corporation Disposal site is located in Lee County, four miles north of the City of Keokuk, in the extreme southeast corner of Iowa. The site includes a primary disposal area and a smaller secondary disposal area. The primary disposal area is a 6.6 acre portion of the site bordered by Airport Road (340th Street) to the south, 260th Avenue to the west, and two nameless intermittent streams to the north and east. The September 1995 Record of Decision (ROD) documents the remedy that was selected by the United States Environmental Protection Agency (EPA) for the Sheller-Globe Corporation Disposal site. Cleanup activities at the primary disposal area included demolition of the house, construction of soil and vegetative covers over areas of exposed ash material, and placement of deed restrictions to prohibit residential development and the disturbance of the surface and subsurface. The secondary disposal area, also referred to as the North Hill disposal area, was subsequently determined not to be a source of contamination that required cleanup activities.

This is the second five-year review for the Sheller-Globe Corporation Disposal site. The triggering action for this statutory review is the signature date of the previous Five-Year Review report. The First Five-Year Review Report was signed on September 1, 2005. Five-year reviews are required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

This five-year review concludes that the remedy at the Sheller-Globe Corporation Disposal site is protective of human health and the environment.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: Sheller-Globe Corporation Disposal		
EPA ID *(from WasteLAN)*: IAD980630750		
Region: 7	**State:** IA	**City/County:** Lee County

SITE STATUS	
NPL status: ☐ Final X Deleted ☐ Other (specify)	
Remediation status (choose all that apply): ☐ Under Construction ☐ Operating X Complete	
Multiple OUs?* ☐ YES X NO	**Construction completion date:** 11/10/99
Has site been put into reuse? ☐ YES X NO	

REVIEW STATUS	
Lead agency: X EPA ☐ State ☐ Tribe ☐ Other Federal Agency	
Author name: James Colbert	
Author title: Remedial Project Manager	**Author affiliation:** U.S. EPA - Region 7
Review period:** 12/1/2009 to 6/30/2010	
Date of site inspection: 5/11/2010	
Type of review: X Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion	
Review number: ☐ 1 (first) X 2 (second) ☐ 3 (third) ☐ Other (specify)	
Triggering action: ☐ Actual RA Onsite Construction at OU # NA ☐ Actual RA Start at OU#____ ☐ Construction Completion X Previous Five-Year Review Report ☐ Other (specify)	
Triggering action date *(from WasteLAN)*: 9/1/2005	
Due date *(five years after triggering action date)*: 9/1/2010	

Five-Year Review Summary Form
(Continued)

Issues: There are no issues or problems that affect current protectiveness or future protectiveness of the remedy.

Recommendations and Follow-up Actions: No issues were identified that affect the protectiveness of the remedy. Therefore, specific recommendations and follow-up actions are not necessary. However, it should be noted that post-remedial action inspections will continue to be conducted to determine if maintenance activities are necessary and assess compliance with the restrictions as stated in the Environmental Protection Declaration of Restrictive Covenants. Information from future post-remedial action inspections (i.e., Spring 2012, Spring 2014, and Spring 2015) will also be used to provide information for the next five-year review.

Protectiveness Statement: The remedy at the Sheller-Globe Corporation Disposal site is protective of human health and the environment.

I. Introduction

The purpose of five-year reviews is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review Reports. In addition, Five-Year Review Reports identify issues found during the review, if any, and recommendations to address them.

The United States Environmental Protection Agency (EPA) is preparing this five-year review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121(c) and the National Contingency Plan (NCP). CERCLA § 121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The EPA interpreted this requirement further in the NCP; 40 C.F.R. § 300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

EPA Region 7 has conducted this five-year review of the remedial action implemented at the Sheller-Globe Corporation Disposal site in Keokuk, Lee County, Iowa. This report documents the results of the review.

This is the second five-year review for the Sheller-Globe Corporation Disposal site. The triggering action for this second five-year review is the signature date on the previous five-year review. The August 2005 First Five-Year Review Report was signed and approved by the EPA Region 7 Superfund Division Director on September 1, 2005. Five-year reviews are required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

II. Site Chronology

Table 1

Chronology of Site Events

Event	Date
Initial site investigation by EPA	August 1986
Final listing on National Priorities List (NPL)	October 1, 1990
Administrative Order on Consent (AOC) for Remedial Investigation/Feasibility Study (RI/FS)	October 23, 1990
RI/FS complete	February 1995
Proposed Plan available for public comment	August 1, 1995
Record of Decision (ROD) signed	September 20, 1995
Remedial Design start	September 25, 1998
Consent Decree for Remedial Design/Remedial Action (RD/RA)	March 3, 1999
RD/RA Work Plan	April 1999
Remedial Design complete	April 14, 1999
Remedial Action construction began	November 1, 1999
Remedial Action construction complete	November 10, 1999
Remedial Action Report	May 2000
Preliminary Closeout Report	September 15, 2000
Final Close Out Report	April 25, 2001
Deletion from NPL	September 24, 2001
First Five-Year Review completed	September 1, 2005

III. Background

Physical Characteristics

The Sheller-Globe Corporation Disposal site, also known as the Grimes Property site, is located in Lee County, four miles north of the City of Keokuk, in the extreme southeast corner of Iowa. The site includes a primary disposal area and a smaller secondary disposal area known as the North Hill disposal area. The primary disposal area is a 6.6 acre portion of the site bordered by Airport Road (340th Street) to the south, 260th Avenue to the west, and two nameless intermittent streams to the north and east. The North Hill disposal area is located on a small hill east of 260th Avenue approximately one-quarter of a mile north of Airport Road. A site location map depicting the North Hill disposal area and the primary disposal area is attached.

Land and Resource Use

Land use in the vicinity of the site is predominantly pasture and forest with scattered farms and residences. It is anticipated that this type of land use will continue into the future. The primary disposal area of the site is subject to an Environmental Protection Declaration of Restrictive Covenants that prohibits residential use of the property. Therefore, the primary disposal area is unoccupied and it is anticipated that the property will remain vacant in the future. The primary disposal area is a mix of grasses and trees.

History of Contamination

From 1948 until 1972, waste materials were hauled to the primary disposal area of the site from the former Sheller-Globe plant located in Keokuk. During the years the site was used as a disposal area, the Sheller-Globe Keokuk plant manufactured various rubber products and automobile parts. The waste material brought to the site for disposal consisted of rubber, wood, paper, plastics, and drums of various solvents and paint sludge. These wastes were brought onto the primary disposal area of the site via an access road running along the ridge of the hill. The wastes were periodically burned and then bulldozed over the hillsides from the ridge. The primary disposal area was covered with soil and graded at the conclusion of the disposal operation.

Initial Response

The Iowa Department of Water, Air, and Waste Management, now known as the Iowa Department of Natural Resources (IDNR), first inspected the disposal practices at the site as a result of complaints received following a fire at the site in 1980. Samples collected in October 1980, by the Sheller-Globe Corporation, from the on-site drinking water well (*i.e.*, the Grimes well) and other private wells in the vicinity of the site showed no evidence of contamination.

In 1986, the initial Field Investigation Team (FIT) investigation was conducted by Ecology and Environment under contract to EPA. This investigation included the collection of surface soil,

stream sediment, surface water, and groundwater samples. A follow-up investigation was conducted in 1987 and included a geophysical survey, installation of groundwater monitoring wells, and additional sampling. In March 1988, EPA conducted additional sampling to assist in the Hazard Ranking System (HRS) scoring process that resulted in the site being proposed for the National Priorities List (NPL) in May 1989 with final NPL listing effective October 1990.

Basis for Taking Action

In October 1990, EPA and Sheller-Globe Corporation entered into an Administrative Order on Consent (AOC), Docket No. VII-91-F-0003. The AOC required Sheller-Globe Corporation to conduct a Remedial Investigation/Feasibility Study (RI/FS) to determine the nature and extent of contamination at the site and evaluate alternatives to address contamination at the site. The September 1995 Record of Decision (ROD) prepared by EPA presents the remedy that was selected for the site.

The remedial investigation field activities included sampling of ash material, soil, surface water, sediment, and groundwater. Groundwater samples were collected from monitoring wells installed in the shallow glacial till deposits and monitoring wells installed in the deeper underlying Mississippian-age bedrock aquifer that consists of alternating beds of claystone and limestone. The shallow glacial till water-bearing zone and the deeper bedrock water bearing zone are separated by a shale/claystone confining unit (*i.e.*, aquitard). The thickness of the aquitard unit ranges from 40 to 45 feet in the vicinity of the site. A summary of the investigation and analytical results were provided in the July 1994 Remedial Investigation (RI) Report.

Using the data collected during the RI, as well as other data and information available for this site, EPA prepared a Baseline Risk Assessment (BLRA) that consisted of a human health evaluation and an environmental evaluation. The purpose of the BLRA is to characterize any risk posed by the site to human health and the environment. A reasonable maximum exposure (RME) scenario is developed to evaluate the risk to human health. EPA assumed that the RME for the Sheller-Globe Corporation Disposal site included future residents at the primary disposal area who consume vegetables from an on-site garden and use shallow on-site groundwater for drinking water and other household uses. Although use of shallow groundwater in the vicinity of the site is unlikely due to low yield and poor quality, this potential exposure pathway was included in the RME. Also, the confining units between the shallow and deep water bearing zones serve to limit the hydraulic communication between these zones as no evidence of contaminant migration to the deep groundwater was observed. Nevertheless, the 300-foot deep on-site drinking water well (i.e., the Grimes well) that was located in the deep bedrock aquifer has been abandoned and closed per State of Iowa approved procedures. The EPA initially included a trespasser scenario for evaluation. However, exposures were judged to be very minor to non-existent and, therefore, were not quantified in the BLRA.

Cancer risks are expressed as an upper-bound (most conservative) estimate of the additional cancers which could result from lifetime exposure to all contaminants of concern under the RME. In general, EPA considers as being acceptable those concentration levels representing an

excess lifetime cancer risk of between 10^{-4} and 10^{-6}, or lower. A cancer risk level of 10^{-4} means that one person out of ten thousand is at risk of developing cancer during a lifetime of exposure to site contaminants under the RME. A cancer risk level of 10^{-6} means that one person out of a million is at risk of developing cancer during a lifetime of exposure to site contaminants under the RME. The BLRA also included a comparison of site risks and background risks that EPA used to further characterize the risk-related need for remedial action. The ROD indicates that the cumulative carcinogenic risk associated with site-related contaminants for potential future on-site resident exposures to surface soil, subsurface soil, and to site-grown vegetables at the primary disposal area is within the acceptable 10^{-4} to 10^{-6} risk range. The ROD also indicates that the cumulative carcinogenic risk associated with site-related contaminants calculated for ingestion, dermal contact, and inhalation of shallow groundwater potentially used as a primary source of drinking and household water for a period of 30 years is 7×10^{-4}. The BLRA indicates that arsenic and beryllium are the chemicals of concern that exceed a 1×10^{-4} risk level and, therefore, contribute to the majority of the total carcinogenic risk associated with the groundwater exposure pathways. The BLRA employed a conservative approach of using "total" metals concentration data from unfiltered groundwater samples to represent the groundwater exposure concentrations instead of the "dissolved" metals concentration data from filtered samples. Also, as mentioned above, it is unlikely that shallow groundwater at the site will be used as a source of water due to low yields and poor quality. Therefore, while the cumulative carcinogenic risk associated with the use of shallow groundwater at the site slightly exceeds the EPA acceptable risk range, the ROD indicates no remedial action was determined to be necessary with regard to groundwater.

A Hazard Index (HI) is used to assess non-carcinogenic risk for the RME. An HI greater than one may be a concern with respect to non-cancer health effects and may require a remedial action. An HI of less than one indicates that adverse, non-carcinogenic effects on human health are not expected. An HI of 3 was calculated in the BLRA based on the potential for primary disposal area subsurface soils to be ingested by a future adult resident throughout a 30 year period of time. An HI of 2 was calculated in the BLRA based on the potential for primary disposal area surface soils to be ingested by a future child resident throughout a six year period of time. An HI of 2 was also calculated in the BLRA based on the potential for primary disposal area subsurface soils to be ingested by a future child resident throughout a six year period of time. The BLRA indicates that antimony in surface soil and antimony and cadmium in subsurface soils are the chemicals of concern that have hazard quotient (HQ) values that are equal to or greater than one and, therefore, contribute to the majority of the total non-carcinogenic risk associated with the soil exposure pathways. An HI of 9 was associated with the ingestion of vegetables grown at the primary disposal area for a 30 year period of time and is predominantly due to the potential uptake of cadmium from the soil. These HI values represent potentially unacceptable risks associated with exposure to soils and site-grown vegetables at the primary disposal area, thereby forming the basis for the remedial action taken at the site. The HI values for other exposure routes and exposure media were also calculated in the BLRA. The HI value calculated for exposure to site-related contaminants by a future adult resident due to ingestion of surface soil at the primary disposal site was one. The HI value calculated for exposure to site-related contaminants by a future adult resident due to dermal contact with

surface soil at the primary disposal site was less than one. HI values were also calculated for exposure to shallow groundwater from the primary disposal area by an adult resident if used as a primary source of drinking and household water for a 30 year period of time and a child resident for a six year period of time. An HI of one was calculated in the BLRA for a future adult resident due to dermal contact with shallow groundwater potentially used for household purposes. An HI of 2 was calculated in the BLRA for a future child resident due to dermal contact with shallow groundwater potentially used for household purposes. The HI values were less than one for both the child exposure scenario and adult exposure scenario due to inhalation of vapors from shallow groundwater potentially used for household purposes. The HI values in the BLRA were greater than one for both the child exposure scenario and adult exposure scenario for the ingestion of shallow groundwater potentially used for household purposes. The BLRA indicates that antimony, arsenic, manganese, and vanadium in shallow groundwater are the chemicals of concern that have hazard quotient (HQ) values greater than one and, therefore, contribute to the majority of the total non-carcinogenic risk associated with the groundwater exposure pathways. The BLRA also included a comparison of site risks and background risks that EPA used to further characterize the risk-related need for remedial action. This comparison of risks was evidently used to support the language in the ROD that states, "The cumulative chronic and subchronic HI values calculated for the ingestion, dermal contact, and inhalation of shallow groundwater potentially used as a primary source of drinking and household water, are at or below one, indicating no unacceptable non-carcinogenic risks". As previously stated, the ROD indicates no remedial action was determined to be necessary with regard to groundwater.

Using the Uptake Biokinetic (UBK) model, calculations in the BLRA also indicated that unacceptable risk to a future child resident may result from exposure to lead in surface soils and subsurface soils in the primary disposal area.

The environmental evaluation component of the BLRA assessed the environmental impact of the releases of hazardous substances from the site. The ROD concluded that these releases did not appear to present a significant threat to the environment.

In summary, the EPA determined that a response action was necessary for the primary disposal area to address the potentially unacceptable risks to future residents that may result from the ingestion of soil/waste material or site-grown vegetables. The EPA determined that a response action was not necessary with regard to surface water, sediment, and ground water associated with the primary disposal area. The EPA also determined that a response action was not necessary for the North Hill disposal area. To address the findings of the RI and BLRA, the February 1995 Feasibility Study (FS) Report evaluated remedial alternatives and provided the basis for EPA's preferred alternative as presented in the July 1995 Proposed Plan. The RI Report, FS Report, and Proposed Plan were made available for public comment from August 1, 1995, to August 31, 1995. The September 1995 Record of Decision (ROD) documents the remedial alternative selected by EPA to address the potential exposure to soils and ash material at the site.

IV. Remedial Actions

Remedy Selection

The Record of Decision (ROD) for the Sheller-Globe Corporation Disposal site was signed on September 20, 1995. Based on the findings of the RI and the BLRA, a remedial action objective (RAO) for this site was established to aid in the development and screening of remedial alternatives in the FS Report. The RAO for this site, as stated in the February 1995 FS Report, is to control future use of the property to minimize potential for exposures.

The selected remedy described in the September 1995 ROD addressed the threat posed by the contaminants within the primary disposal area of the site and required the following actions:

- Record restrictive covenants/deed restrictions with the Lee County Recorder's office to prohibit the disturbance of the surface or subsurface of the property and limit land use to nonresidential.
- Demolish the house and shed located onsite to prevent it from being used.
- Remove all drums exposed at the ground surface (the drums were determined to be empty or filled with nonhazardous material, crushed, and placed in basement of house prior to backfilling operation).
- Construct a soil and vegetation cover over the exposed ash and over the basement of the house.
- Inspect and maintain the soil covers.

Remedy Implementation

A Consent Decree, Civil Action No. 8-98-CV-90150, was negotiated and executed by the United Technologies Automotive Systems, Inc., Miriam and David B. Grimes (the property owners), and the United States of America. United Technologies Automotive Systems, Inc. (UTAS) was formerly known as the Sheller-Globe Corporation and is now known as United Technologies Corporation (UTC). The Consent Decree was lodged with the U.S. District Court for the Southern District of Iowa on September 25, 1998, and subsequently entered by the Court on March 3, 1999. The remedial action was conducted in accordance with the April 1999 Remedial Design/Remedial Action (RD/RA) Work Plan by UTAS, Inc. and their technical contractors (URS Corporation and WRS Infrastructure and Environment). The remedial action is documented in the May 2000 Remedial Action (RA) Report. The RA Report was approved by EPA on September 25, 2000.

The field work associated with the remedial action was conducted between November 1, 1999, and November 11, 1999. A backhoe was used to demolish the house and the shed. The backhoe

was also used to hammer and thoroughly break up the basement slab prior to placing the debris from the house and shed in the basement area. The drums that were scattered around the primary disposal area were collected and subsequently crushed and also placed in the basement area. The RI Report and the FS Report indicated that there were approximately 86 drums that were either empty or contained non-hazardous solid materials (e.g., soil, sticks, rusty metals, etc.). The actual number of surface and partially buried drums that were collected during the remedial action totaled 167. An initial layer of clay was placed over the debris prior to placement of a non-woven geotechnical filter fabric over the limits of the house. Three 8-inch thick lifts of clay were placed over the filter fabric and then a 12-inch layer of topsoil was spread over the clay. Each lift of clay and topsoil were compacted and sloped to specifications. The four areas of exposed ash that were identified during the RI/FS were also covered with at least one foot of topsoil. The house area, the shed area, the four ash areas (i.e., Area P, Area R, Area U, and Area V), and drum divots were seeded and erosion control mats were spread and staked over the completed soil areas.

EPA conducted a pre-certification inspection on November 8, 1999. In an April 21, 2000, letter to UTC, the EPA indicated that the RA Report adequately demonstrated completion of the outstanding items noted during the pre-certification inspection and that the remedial action had been performed in accordance with the Consent Decree and RD/RA Work Plan. The signed Statement of Completion was submitted by UTC with the final RA Report on May 22, 2000. The RA Report was subsequently approved by EPA on September 25, 2000.

Land use restrictions are also a component of the remedy described in the ROD. In accordance with the Consent Decree, the property shall not be used for residential purposes and there shall be no disturbance of the surface or subsurface of the land. The Environmental Protection Declaration of Restrictive Covenants describes the land-use restrictions associated with the property and sets forth the procedures to enforce said restrictions. The Environmental Protection Declaration of Restrictive Covenants specifically includes a restriction on drilling that serves to effectively control the installation of any future water wells. Therefore, in addition to addressing the potential for exposure to soil and ash material, the Environmental Protection Declaration of Restrictive Covenants also addresses the potential for human exposure to groundwater from beneath the primary disposal area. On September 12, 2000 the Environmental Protection Declaration of Restrictive Covenants was recorded at the Recorder's Office of Lee County, State of Iowa.

In September 1989, the Sheller-Globe Corporation Disposal site (referred to as the Grimes Property site) was listed on the state of Iowa's Registry of Confirmed Hazardous Waste or Hazardous Substance Disposal Sites. Inclusion on this registry provides that written approval of the Director of the Iowa Department of Natural Resources is necessary prior to substantially changing the manner in which the site is used or selling, conveying, or transferring title of the site.

The site achieved construction completion status when the Preliminary Close Out Report was signed on September 15, 2000, indicating that all of the construction activities for the site had

been completed. The Final Close Out Report was signed on April 25, 2001, indicating that all response activities for the site had been completed. The Sheller-Globe Corporation Disposal site was deleted from the NPL on September 24, 2001.

Inspections and Maintenance

The April 1999 RD/RA Work Plan contained an Inspection and Maintenance Plan that requires: 1) routine inspections and, if necessary, maintenance of the soil and vegetative covers and 2) documentation of property conditions and land-use to assess compliance with the restrictions as stated in the Environmental Protection Declaration of Restrictive Covenants.

Routine field inspections by UTC's technical contractor, URS Corporation, have been conducted to assure the integrity of the soil and vegetative covers and describe site conditions. A total of eleven post-remedial action inspections have been completed since the construction of the remedy. The inspections were conducted in April 2000, September 2000, April 2001, September 2001, April 2002, October 2002, September 2003, September 2004, September 2006, September 2008, and May 2010. All of the inspections have been documented in corresponding reports that include an inspection form, photographs of the site, and a description of site conditions at the time of the inspection. In April 2000, the recommended maintenance actions included additional seeding and placement of erosion control material in limited areas. These tasks were completed in June 2000. All subsequent inspections have indicated that the soil and vegetative cover were in satisfactory condition and, therefore, repair and maintenance activities were not necessary. These inspections have verified the continuing development and integrity of the soil and vegetative covers that were constructed during the remedial action. These inspections have also verified compliance with the restrictions in the Environmental Protection Declaration of Restrictive Covenants (i.e., the property is not being used for residential purposes and the land surface of the property has not been disturbed).

V. Progress Since the Last Five-Year Review

The protectiveness statement in the September 2005 Five-Year Review Report stated that "the remedy at the Sheller-Globe Corporation Disposal site is protective of human health and the environment." The September 2005 Five-Year Review Report also identified three issues that could affect the future protectiveness of the remedy. The recommendations and status of the follow-up actions that were used to address the three issues from the first five-year review are discussed below.

Issue #1: To determine if any issues or problems may arise in the future will require routine site inspections, as provided for in the Inspection and Maintenance Plan.

Recommendations and Follow-up Actions: The first five-year review recommended continuing post-remedial action inspections pursuant to the Inspection and Maintenance Plan. Post-remedial action inspections were conducted by UTC's technical contractor, URS Corporation, in

September 2006, September 2008, and May 2010. These inspections have provided information that has been used to conduct this second five-year review.

Issue #2: The Lee County Engineers Office indicated that a proposed road construction project near the site may occur in 2006.

Recommendations and Follow-up Actions: The first five-year review recommended that EPA and the county continue to communicate regarding the status of the proposed road construction project. Lee County has completed the Airport Road Reconstruction Project near the intersection of Airport Road (340th Street) and 260th Avenue. The major construction activities were conducted by Lee County in 2006 and follow-up seeding activities were conducted in 2007 and 2008.

Issue #3: The property owners sold and conveyed a portion of the site in an Easement for Public Highway to Lee County for road purposes and for use as a Public Highway. However, the Easement for Public Highway did not include the notice language that is required when conveying any interest in any portion of the property that is subject to the Environmental Protection Declaration of Restrictive Covenants.

Recommendations and Follow-up Actions: The first five-year review recommended informing the property owners that future transactions must meet the requirements cited in Paragraph 9 of the Environmental Protection Declaration of Restrictive Covenants. An EPA letter dated June 19, 2006 was sent to the Grimes as a reminder of the actions that need to be taken when they grant, sell or convey any of the property subject to the restrictive covenants. A similar letter, also dated June 19, 2006, was sent to Lee County.

VI. Five-Year Review Process

Administrative Component

Since completion of the first five-year review in 2005, three post-remedial action inspections have been conducted (i.e., the September 2006 inspection, the September 2008 inspection, and the May 2010 inspection) by UTC's technical contractor, URS Corporation. The information provided in the corresponding inspection reports was designed to assist in the five-year review process. As part of the five-year review process, EPA conducted a site visit on May 11, 2010. The site visit was scheduled to coincide with the post-remedial action inspection that was conducted by URS Corporation on the same date.

The second five-year review for the Sheller-Globe Corporation Disposal Site was conducted by the following EPA Region 7 team members: Jim Colbert, Remedial Project Manager (RPM); Venessa Madden, ecologist; Mike Beringer, toxicologist; Fritz Hirter, Community Involvement Coordinator; and Gerhardt Braeckel, EPA Regional Counsel. Robert Drustrup of Iowa DNR also assisted in the review.

Community Involvement

In a December 1, 2009 letter, the EPA notified UTC that the second five-year review would be conducted during 2010. The property owners were also notified. In April 2010, a notice stating that the five-year review process was underway was placed in the local Keokuk newspaper (i.e., the Daily Gate City). A notice will be placed in the same newspaper when the second five-year review is complete. An April 2010 information sheet, or Fact Sheet, was sent to all entities on the site mailing list inviting the recipients to submit any comments to EPA. Upon completion, the Second Five-Year Review Report will be available for public review at the Keokuk Public Library and the EPA Region 7 office.

Document Review

The five-year review consisted of a review of relevant documents, including:

- Baseline Risk Assessment - Human Health Evaluation, June 1994
- Baseline Risk Assessment – Environmental Evaluation, June 1994
- Remedial Investigation Report, July 1994
- Feasibility Study Report, February 1995
- Record of Decision, September 1995
- Consent Decree (Civil Action No. 8-98-CV-90150)
- Environmental Protection Declaration of Restrictive Covenants
- Inspection and Maintenance Plan, April 1999 (Appendix D of RD/RA Work Plan)
- Remedial Action Report, May 2000
- Preliminary Close Out Report, September 2000
- Final Close Out Report, April 2001
- First Five-Year Review Report, August 2005
- Post-Remedial Action Inspection Reports, including the reports dated September 2006, September 2008, and May 2010.

Data Review

Post-Remedial Action Inspection Reports

The April 1999 RD/RA Work Plan contained an Inspection and Maintenance Plan that requires: 1) routine inspections and, if necessary, maintenance of the soil and vegetative covers and 2) documentation of property conditions and land-use to assess compliance with the restrictions as stated in the Environmental Protection Declaration of Restrictive Covenants. Routine field inspections by UTC's technical contractor, URS Corporation, have been conducted to assure the integrity of the soil and vegetative covers and describe site conditions. All of the inspections have been documented in corresponding reports that include an inspection form, photographs of the site, and a description of site conditions at the time of the inspection. In a December 6, 2004 letter to EPA, and in accordance with Section Four of the Inspection and Maintenance Plan, UTC

petitioned the EPA to reduce the frequency of inspection activities during the second five year time-frame to once every 2-1/2 years. The EPA agreed that reducing the frequency of inspections was warranted, however, rather than the two inspections proposed by UTC over the five year period EPA required a total of three site inspections. Pertinent findings of each of the three site inspections conducted since the first five-year review are summarized below.

- September 19, 2006 -

  Vegetative and soil covers - The vegetation over the ash areas, the house area, and the shed area is thick and continuous over the covered areas. The inspection indicated 100% vegetative cover in the house area and three of the four ash area (Area R, Area U, and Area V). The inspection indicated some bare patches and approximately 90% vegetative cover in the shed area and the other ash area (Area P). No action regarding vegetation on the covered areas is needed. The erosion control mats placed over the soils in the ash areas, house area, shed area, and the mats placed in June 2000, are intact and functioning as intended. No visible erosion was observed over the covered areas; consequently no action regarding soil covers is needed.

  Land-use - No indications of any filling, cutting, or dumping at the site. Some tire tracks, as evidenced by trampled weeds, were observed Property is vacant.

- September 15, 2008 -

  Vegetative and soil covers - The vegetation over the ash areas, the house area, and the shed area is thick and continuous over the covered areas. The inspection indicated 100% vegetative cover in the house area and the four ash areas (Area P, Area R, Area U, and Area V). The inspection indicated some bare patches and approximately 90% vegetative cover in the shed area. No action regarding vegetation on the covered areas is needed. The erosion control mats placed over the soils in the ash areas, house area, shed area, and the mats placed in June 2000, are intact and functioning as intended. No visible erosion was observed over the covered areas; consequently no action regarding soil covers is needed.

  Land-use - No indications of any filling, cutting, or dumping at the site. Evidence of deer crossings at location of former shed. Property is vacant.

- May 11, 2010 -

  Vegetative and soil covers - The vegetation over the ash areas, the house area, and the shed area is thick and continuous over the covered areas. The inspection indicated 100% vegetative cover in the house area and the four ash areas (Area P, Area R, Area U, and Area V). The inspection indicated approximately 90% vegetative cover in the shed area. No action regarding vegetation on the covered

areas is needed. The erosion control mats placed over the soils in the ash areas, house area, shed area, and the mats placed in June 2000, are intact and functioning as intended. No visible erosion was observed over the covered areas; consequently no action regarding soil covers is needed.

Land-use - No indications of any filling, cutting, or dumping at the site. Two animal burrows were observed on the eastern hillside, away from areas where soil and vegetative covers were placed during the remedial action activities. Property is vacant.

Five-Year Review Site Inspection

As part of the five-year review process, the EPA RPM conducted a site visit on May 11, 2010. The site visit was scheduled to coincide with the post-remedial action inspection that was conducted by URS Corporation on the same date (see previous section for a summary of the URS Corporation post-remedial action inspection report). The vegetation was observed to be healthy and continuous over the house area, shed area, Area U, Area P, Area V, and Area R. In a small area located immediately south of the shed area and west of area V, the vegetation was adequate but not as thick and continuous as that observed in the areas where the soil and vegetative covers were constructed as part of the remedial action activities. Vegetation (i.e., both groundcover and trees) appears healthy throughout the primary disposal area. Vegetation also appears healthy throughout the North Hill disposal area. Occasional pieces of rubber from the original disposal of debris were observed in both areas.

The Five-Year Review Site Inspection Checklist is attached.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision document?

Yes. The remedy is functioning as intended by the ROD. The preliminary remedial goal, as stated in the ROD, was to prevent unacceptable risks to human health and the environment from occurring due to the presence of site-related contaminants. Demolition of the house and shed, collection and placement of empty drums in basement of house prior to backfilling operation, construction of soil and vegetative covers, and implementation of land-use restrictions were used to accomplish the preliminary remedial goal. Inspections have verified the continuing development and integrity of the soil and vegetative covers that were constructed during the remedial action. These inspections have also verified compliance with the land-use restrictions defined in the Environmental Protection Declaration of Restrictive Covenants (i.e., the property remains vacant and the land surface of the property has not been disturbed).

In September 1989, the Sheller-Globe Corporation Disposal site (referred to as the Grimes Property site) was listed on the state of Iowa's Registry of Confirmed Hazardous Waste or

Hazardous Substance Disposal Sites. The site was originally classified as "significant threat to the environment - action required". In 2001 the site was reclassified as "properly closed - requires continued management". As of 2010, the site continues to be listed on the registry. Therefore, written approval of the Director of the Iowa Department of Natural Resources is necessary prior to substantially changing the manner in which the site is used or selling, conveying, or transferring title of the site.

Land use restrictions are a component of the remedy described in the ROD. In accordance with the Consent Decree, the property shall not be used for residential purposes and there shall be no disturbance of the surface or subsurface of the land. The Environmental Protection Declaration of Restrictive Covenants describes the land-use restrictions associated with the property and sets forth the procedures to enforce said restrictions. On September 12, 2000 this document was recorded at the Recorder's Office of Lee County, State of Iowa. As part of the second five-year review for the Sheller-Globe Corporation Disposal site, the Lee County, Iowa Recorders Office in Keokuk was contacted on April 20, 2010 to verify that the Environmental Protection Declaration of Restrictive Covenants that was originally filed on September 12, 2000 is still available/viewable as part of the real estate title records. The Lee County Deputy Recorder confirmed that the Environmental Protection Declaration of Restrictive Covenants was part of the real estate title records.

Question B – Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Yes. See sections below for additional explanation.

Changes in Standards and TBCs

Have there been changes to risk-based cleanup levels or standards identified as Applicable or Relevant and Appropriate Requirements (ARARs) in the Record of Decision (ROD) that call into question the protectiveness of the remedy? No. The selected remedy included demolition of the house, construction of soil and vegetative covers over areas of exposed ash material, and placement of deed restrictions to prohibit residential development and the disturbance of the surface and subsurface. The selected remedy did not establish numeric cleanup levels for any media (i.e., risk-based cleanup levels or standards were not derived). Chemical-specific ARARs were not cited in the ROD because the selected remedy did not contain numeric cleanup levels.

Are there newly promulgated standards that call into question the protectiveness of the remedy? There are no new standards that call into question the protectiveness of the remedy at this site.

Have TBCs used in selecting cleanup levels at the site changed in way that could affect the protectiveness of the remedy? TBCs were not used in selecting cleanup levels for this site.

Changes in Exposure Pathways

Has land use or expected land use on or near the site changed (e.g., industrial to residential, commercial to residential)? Land use has not changed at or near the site and potential future land use changes are not anticipated.

Have any human health or ecological routes of exposure or receptors changed or been newly identified (e.g., dermal contact where none previously existed, new populations or species identified on site or near the site) that could affect the protectiveness of the remedy? New routes of exposure or receptors for the Sheller-Globe Disposal site have not been identified. There have been no changes in site conditions or exposure pathways that could result in increased exposure beyond that evaluated in the BLRA as the reasonable maximum exposure (RME) scenario (i.e., assumed that future on-site residents would contact surface and subsurface soils, consume vegetables from an on-site garden, and use shallow on-site groundwater for drinking water and other household uses). In fact, the demolition of the house and implementation of the land-use restrictions has decreased the likelihood that a future residential exposure scenario will occur. The soil and vegetative covers that were constructed minimize the potential for future exposure to soils. The post-remedial action inspections have confirmed that the terms of the Environmental Protection Declaration of Restrictive Covenants are being met, that the soil and vegetative covers are competent, and that conditions at the site have not changed since completion of the remedial action.

Are there newly identified contaminants or contaminant sources? No new contaminants or sources have been identified. No additional environmental data has been collected since the site was remediated in November 1999 because the post-remedial action inspections have confirmed that the terms of the Environmental Protection Declaration of Restrictive Covenants are being met, that the soil and vegetative covers are competent, and that conditions at the site have not changed since completion of the remedial action.

Are there unanticipated toxic byproducts of the remedy not previously addressed by the decision documents (e.g., byproducts not evaluated at the time of remedy selection)? No unanticipated toxic byproducts have been identified.

Have physical site conditions or the understanding of these conditions changed in a way that could affect the protectiveness of the remedy? The selected remedy included demolition of the house, construction of soil and vegetative covers over areas of exposed ash material, and placement of deed restrictions to prohibit residential development and the disturbance of the surface and subsurface. The post-remedial action site inspections have confirmed that the remediated areas are thoroughly vegetated and terms of the Environmental Protection Declaration of Restrictive Covenants are being met.

Changes in Toxicity and Other Contaminant Characteristics

Have toxicity factors for contaminants of concern at the site changed in a way that could affect the protectiveness of the remedy? Several non-carcinogenic and carcinogenic toxicity values have been revised since the ROD was signed in 1995. However, the changes in toxicity values do not significantly change the results of the human health risk assessment and thus, do not impact the protectiveness of the remedy for soil or groundwater.

Have other contaminant characteristics changed in a way that could affect protectiveness of the remedy? No other changes to contaminant characteristics that could impact the protectiveness of the remedy have been identified.

Changes in Risk Assessment Methods

Have standardized risk assessment methodologies changed in a way that could affect the protectiveness of the remedy? Overall, the human health risk assessment was conducted in similar manner as compared to current risk assessments. Some exposure parameters are different than those currently used (e.g., skin surface area, soil adherence factor, inhalation rates), but they do not have a significant impact on the conclusions of the risk assessment and do not affect the protectiveness of the remedy.

Evaluation of the Remedial Action Objectives (RAOs)

Are the RAOs used at the time of the remedy selection still valid? Yes. The RAO for this site, as stated in the February 1995 FS Report, is to control future use of the property to minimize potential for exposures. Demolition of the house and shed, collection and placement of empty drums in basement of house prior to backfilling operation, construction of soil and vegetative covers, and implementation of land use restrictions were used to accomplish the RAO. The post-remedial action inspections have confirmed that the land-use restrictions cited in the Environmental Protection Declaration of Restrictive Covenants are being met, that the soil and vegetative covers are competent, and that conditions at the site have not changed since completion of the remedial action.

Question C – Has any other information come to light that could call into question the protectiveness of the remedy?

No additional information has come to light which could affect the protectiveness of the remedy.

As part of this five-year review, ecological risks were further evaluated. Ecological risks at the site were originally addressed in the environmental evaluation component of the BLRA, which recommended that potential risks due to zinc be further evaluated. However, ecological concerns were not the primary focus at the site, and the remedial action was based on a residential (human health) exposure scenario. In fact, zinc was not even a risk driver for human health, since the risk-based screening level for zinc is higher than any ecological screening benchmarks.

The original environmental evaluation for the site used conservative or health-protective exposure assumptions to characterize risk to plants and soil invertebrates. As part of this five-year review, risk to higher trophic level birds and mammals due to zinc exposure was modeled using the available data. The areas in the primary disposal area that have been covered should no longer present an ecological risk. Therefore, only the North Hill Disposal area and the areas in the primary disposal area that were not covered are included in this evaluation.

Unlike most contaminants, zinc is an essential nutrient until it reaches levels where it begins to interfere with the metabolism of other nutrients in the body. Chronic zinc toxicity in wildlife is difficult to evaluate because zinc in itself, is essentially non-toxic. The primary effect of chronic excessive zinc exposure is insufficient copper absorption in tissues. This in turn impacts the overall health of the organism (anemia, ataxia, immune function, etc.), which leads to effects on growth, reproduction and survival. Therefore, rather than basing risk calculations on no-effect level toxicity data, an approach that relied on maximum tolerable levels for birds and mammals was used. The maximum tolerable level likely represents a point at which the first outward signs of zinc toxicosis become apparent. Four ecological receptors that are likely to inhabit the site include a shrew, a fox, a red-tailed hawk, and a robin. A maximum tolerable level of 1,000 mg/kg-bw/day was used for both birds and mammals based on poultry, swine and cattle studies (National Research Council, 2005). The average daily dose for each of the four receptors was calculated and compared to this maximum tolerable level to calculate a hazard quotient. None of the bird and mammal species modeled had hazard quotients exceeding one, based on average zinc concentrations that remain at the site. However, the most sensitive species, the robin, may be affected at concentrations approaching 6,000 mg/kg in soil. There may still be "hotspots" with zinc soil concentrations that are equal to greater than 6,000 mg/kg.

With regard to plant toxicity, most sources indicate that phytotoxicity and decreased floristic quality are evident at concentrations above 500 mg/kg. However, soil pH and the form of zinc in the soil can greatly influence bioavailability and toxicity. Plant tolerance to excessive zinc also varies significantly by species. Some species tend to be hyperaccumulators (red clover, sunflower, mustard species), whereas others (oak and maple seedlings) cannot grow in soil with zinc levels above 100 mg/kg. Signs of zinc toxicity include inward rolled leaves, yellow stems, and damaged roots.

During the recent May 11, 2010 five-year review site inspection, both the primary disposal area and North Hill disposal area were inspected. Based on visual observations and photographs taken at these areas, phytotoxicity and decreased floristic quality were not observed. Numerous tree species are growing on the site, including oaks, and groundcover appeared healthy.

Technical Assessment Summary

The remedy is functioning as intended by the ROD based on the information reviewed during this five-year review. The Remedial Action has been completed to address the risks associated with the RME scenario. The main components of the selected remedy as described in the

September 1995 ROD included: 1) restrictive covenants/deed restrictions that prohibit the disturbance of the surface or subsurface of the property and limit land use to nonresidential; 2) soil and vegetative covers over areas of exposed ash material; and 3) demolition of the house and shed located onsite to prevent future use.

The Environmental Protection Declaration of Restrictive Covenants describes the land-use restrictions associated with the property and sets forth the procedures to enforce said restrictions. On September 12, 2000 this document was recorded at the Recorder's Office of Lee County, State of Iowa. As part of the second five-year review for the Sheller-Globe Corporation Disposal site, the Lee County, Iowa Recorders Office in Keokuk was contacted on April 20, 2010 to verify that the Environmental Protection Declaration of Restrictive Covenants that was originally filed on September 12, 2000 is still available/viewable as part of the real estate title records. The Lee County Deputy Recorder confirmed that the Environmental Protection Declaration of Restrictive Covenants was part of the real estate title records.

The post-remedial action inspections have confirmed that the terms of the Environmental Protection Declaration of Restrictive Covenants are being met, that the soil and vegetative covers are competent, and that the land remains vacant. The Inspection and Maintenance Plan (Appendix D to the April 1999 RD/RA Work Plan) requires UTC to provide: 1) routine inspections and, if necessary, maintenance of the soil and vegetative covers and 2) documentation of property conditions and land-use. UTC will continue to conduct post-remedial action inspections in accordance with the following schedule: Spring 2012, Spring 2014, and Spring 2015. UTC requested that future post-remedial action inspections be conducted in spring to coincide with other projects that their technical contractor is working on in the area. Information from post-remedial action inspections is used to determine if maintenance activities are necessary and assess compliance with the restrictions as stated in the Environmental Protection Declaration of Restrictive Covenants. Information from future post-remedial action inspections will also be used to provide information for the next five-year review.

VIII. Issues

There are no issues or problems that affect current protectiveness or future protectiveness of the remedy.

IX. Recommendations and Follow-up Actions

No issues were identified that affect the protectiveness of the remedy. Therefore, specific recommendations and follow-up actions are not necessary. However, it should be noted that UTC will continue to conduct post-remedial action inspections to determine if maintenance activities are necessary and assess compliance with the restrictions as stated in the Environmental Protection Declaration of Restrictive Covenants. Information from future post-remedial action inspections (i.e., Spring 2012, Spring 2014, and Spring 2015) will also be used to provide

information for the next five-year review.

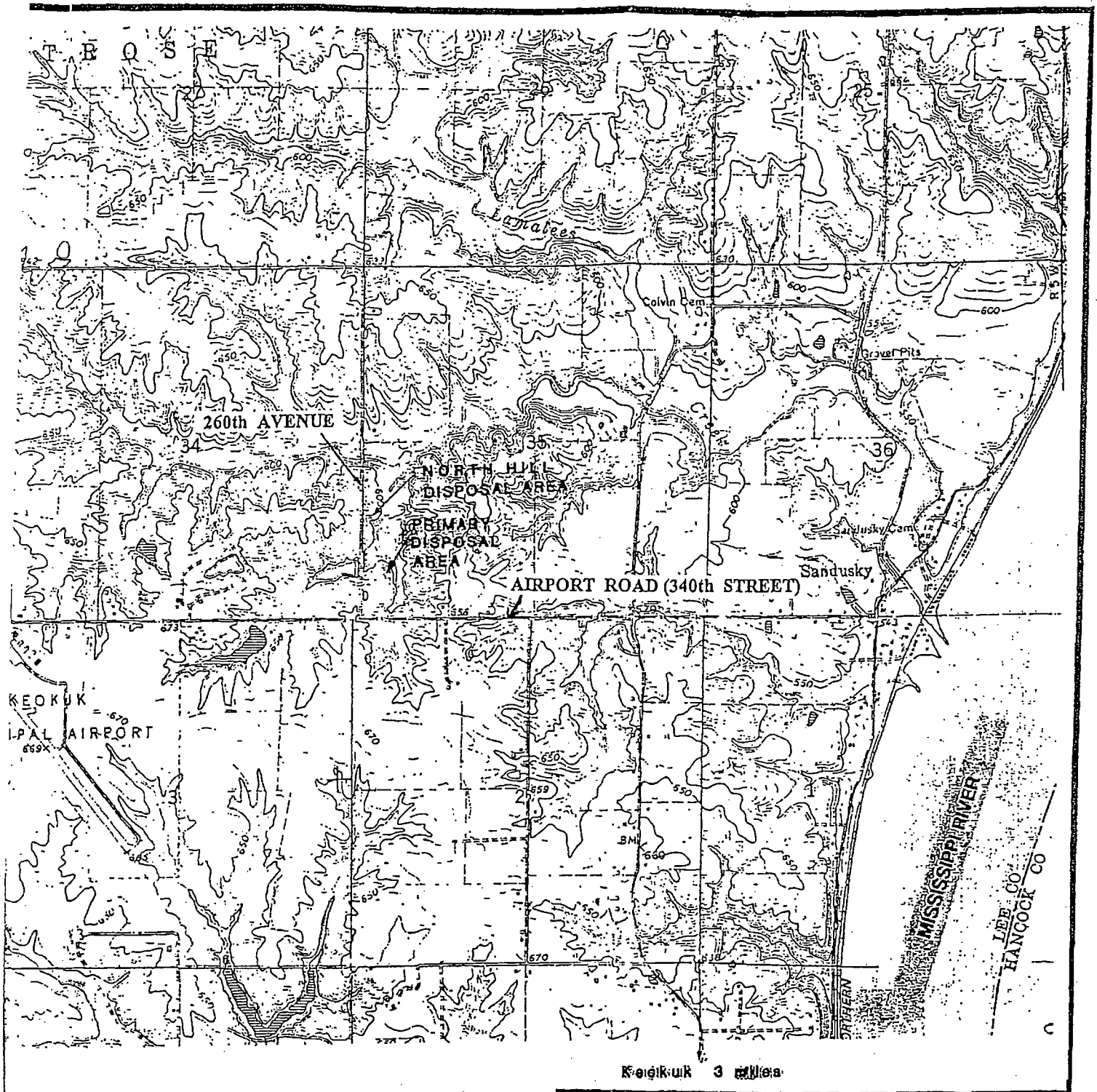
X. Protectiveness Statement

The remedy at the Sheller-Globe Corporation Disposal site is protective of human health and the environment.

XI. Next Review

The next five-year review for the Sheller-Globe Corporation Disposal site is required by June 2015, five years from the date of this review.

ATTACHMENT 1



SITE LOCATION MAP
for the
North Hill Disposal Area and the Primary Disposal Area
of the
SHELLER-GLOBE CORPORATION DISPOSAL SITE
near
KEOKUK, IOWA

Five-Year Review Site Inspection Checklist

SITE INFORMATION	
Site name: Sheller-Globe Corporation Disposal Site	Date of inspection: 5-11-10
Location and Region: near Keokuk, Iowa – EPA Region 7	EPA ID: IAD980630750
Agency, office, or company leading the five-year review: U.S. EPA	Weather/temperature: Cloudy. Temperature in the 60s.

Remedy Includes: (Check all that apply)

☐ Landfill cover/containment
☐ Access controls
X Institutional controls
☐ Groundwater pump and treatment
☐ Surface water collection and treatment
☐ Monitored natural attenuation
☐ Groundwater containment
☐ Vertical barrier walls
X Other – Soil and vegetation covers were constructed over specific areas of site; periodic inspection/maintenance of the covered areas is required as part of the April 1999 Inspection and Maintenance Plan (Appendix D of the April 1999 RD/RA Work Plan).

INSTITUTIONAL CONTROLS X Applicable ☐ N/A

Institutional Controls (ICs)

Implementation and enforcement

Site conditions imply ICs not properly implemented	☐ Yes	X No	☐ N/A
Site conditions imply ICs not being fully enforced	☐ Yes	X No	☐ N/A

Type of monitoring – Post-Remedial Action inspections conducted by the technical contractor (i.e., URS Corporation) for the responsible party (i.e., United Technologies Corporation).

Frequency - Post-Remedial Action inspections currently being conducted three times during a five-year review period (i.e., approximately every 1.5 to 2 years)

Reporting is up-to-date	X Yes	☐ No	☐ N/A
Reports are reviewed by the lead agency	X Yes	☐ No	☐ N/A
Specific requirements in deed or decision documents have been met	X Yes	☐ No	☐ N/A

Adequacy X ICs are adequate ☐ ICs are inadequate ☐ N/A

Remarks - Post-Remedial Action inspections conducted by URS Corporation (September 2006, September 2008, and May 2010) and the Five-Year Review inspection conducted by EPA (May 2010) have demonstrated that the land-use restrictions in the Environmental Protection Declaration of Restrictive Covenants (i.e., the property shall not be used for residential purposes and there shall be no disturbance of the surface or subsurface of the property) are being met.

General Remarks

Vandalism/trespassing - No signs of vandalism or trespassing are evident.

Land use changes on site - The site remains vacant.

Land use changes off site - Land use in the vicinity of the site continues to be predominantly pasture and forest with scattered farms and residences.

SOIL and VEGETATION COVERS X Applicable ☐ N/A

Soil Covers – No visible erosion in the areas of the primary disposal area where soil covers were placed during the 1999 remedial action field activities (i.e., four ash areas, former house area, and former shed area). No action regarding the soil covers is needed at this time.

Vegetation Covers – The soil cover areas were seeded as part of the 1999 remedial action field activities. Vegetation is thick, healthy, and continuous (i.e., approximately 100% coverage) in the four ash areas and the former house area. The vegetation in the former shed area is adequate (i.e. approximately 90% coverage) but not as thick as the vegetation in the other areas. No action regarding vegetation in these areas is needed at this time.

OVERALL OBSERVATIONS

Implementation of the Remedy

The remedial action objective (RAO) for the site is to control future use of the property to minimize potential for exposures. Demolition of the house and shed, construction of soil and vegetative covers, and implementation of land use restrictions were used to accomplish the RAO. The post-remedial action inspections have confirmed that that the land-use restrictions cited in the Environmental Protection Declaration of Restrictive Covenants are being met, that the soil and vegetative covers are competent, and that conditions at the site have not changed since the completion of the remedial action.

Adequacy of O&M

Operation and maintenance (O&M) activities for the site consists of the post-remedial action inspections, and if necessary, maintenance of the soil and vegetative covers. The post-remedial action inspections have verified the continuing development and integrity of the soil and vegetative covers. These inspections have also confirmed that the land-use restrictions cited in the Environmental Protection Declaration of Restrictive Covenants are being met. The responsible party, UTC, will continue to conduct post-remedial action inspections to document site conditions and determine if maintenance activities are necessary.

Opportunities for Optimization

UTC requested that future post-remedial action inspections be conducted in spring to coincide with other projects that UTC's technical contractor is working on in the area. Future post-remedial action inspections are scheduled for Spring 2012, Spring 2014, and Spring 2015.