SECOND FIVE-YEAR REVIEW

RALSTON SITE

CEDAR RAPIDS, IOWA

June 2011

Prepared by:
United States Environmental Protection Agency
Region 7
901 North Fifth Street
Kansas City, Kansas 66101

Approved by:

Cecilia Tapia, Director
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6/30/11
Date

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List of Abbreviations

ARARs	Applicable or relevant and appropriate requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
Cis-1,2-DCE	Cis-1,2-dichloroethene
CFR	Code of Federal Regulations
DDT	Dichlorodiphenyltrichloroethane
DVE	Dual vapor extraction
EPA	U.S. Environmental Protection Agency
ERA	Ecological Risk Assessment
IDNR	Iowa Department of Natural Resources
MCL	Maximum Contaminant Level
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and maintenance
PCB	Polychlorinated biphenyl
RAO	Remedial action objective
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RSL	Regional Screening Level
TBC	To Be Considered
TCE	Trichloroethene
VOCs	Volatile organic compounds
µg/l	Microgram per liter

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: Ralston Site		
EPA ID *(from WasteLAN)*: IAD980632491		
Region: 7	**State:** IA	**City/County:** Cedar Rapids/Linn
SITE STATUS		
NPL status: ☐ Final ☐ Deleted X Other (specify) Not on NPL, state deferral		
Remediation status (choose all that apply): ☐ Under Construction X Operating ☐ Complete		
Multiple OUs?* ☐ YES X NO	**Construction completion date:** 9 / 14 / 2000	
Has site been put into reuse? ☐ YES X NO		
REVIEW STATUS		
Lead agency: ☐ EPA X State ☐ Tribe ☐ Other Federal Agency		
Author name: Diana Engeman		
Author title: Remedial Project Manager	**Author affiliation:** U.S. EPA-Region 7	
Review period:** 1 / 5 / 2011 to 6 /30/2011		
Date(s) of site inspection: 4 /14 / 2011		
Type of review: ☐ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only X 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 On-site Construction at OU #___ ☐ Actual RA Start at OU# 01 ☐ Construction Completion X Previous Five-Year Review Report ☐Other (specify) Remedial action start		
Triggering action date *(from WasteLAN)*: 5 / 18/ 2006		
Due date *(five years after triggering action date)*: 5 /18 / 2011		

* ["OU" refers to operable unit.]
** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form, cont'd.

Issues:

It is not clearly demonstrated that the extent of contamination has been defined to the east of MW-3B or MW-9B in the Devonian aquifer.

The vapor intrusion exposure pathway has not been evaluated at the Ralston site.

The sediments and surface water of Dry Run Creek have not been sampled since prior to the ROD.

Listing on the state Registry of Hazardous Waste or Hazardous Substance Disposal Sites is not as enforceable as an environmental covenant.

Recommendations and Follow-up Actions:

Take actions, possibly including installation of monitoring wells to define the extent of groundwater contamination to the east in the Devonian aquifer.

Evaluate the potential for vapor intrusion utilizing multiple lines of evidence.

Sample sediments and surface water of Dry Run Creek and amend O&M Plan to include periodic sampling.

Implement Uniform Environmental Covenant on the site property.

Protectiveness Statement:

A protectiveness determination for the remedy at the Ralston site cannot be made until further information is obtained. Further information will be obtained by conducting a vapor intrusion study and collecting and evaluating sediment and surface water data from Dry Run Creek. It is expected that this evaluation will take approximately two years to complete, at which time a protectiveness determination may be made.

Other Comments:

None

Executive Summary

The Ralston site is located north of 228 Blairs Ferry Road, just south of Dry Run Creek, and about ½ mile east of C Avenue on the north side of Cedar Rapids, Linn County, Iowa (see Figure 1). The site was formerly used for industrial waste disposal. The disposal area occupies 1.5 acres and is enclosed with a fence with a locked gate.

From 1956 to 1958, a waste contractor disposed of industrial wastes on his property. The contractor collected these wastes from Collins Radio Company and other local businesses. Solvents and other debris were burned at the site and small containers of cyanide wastes were encapsulated in concrete and buried. In 1981, Rockwell International (now Rockwell Collins, Inc.), the successor in interest to Collins Radio Company, notified the U.S. Environmental Protection Agency of this disposal site.

In 1985, the EPA launched an investigation of the Ralston site. Rockwell Collins conducted additional investigations in the early 1990s. Soil and groundwater contamination was found at the site. Soil contamination was found primarily in the subsurface and limited to the site. Groundwater containing chlorinated solvents was found within about 300 feet around the site, extending approximately 900 feet to the south-southeast to about Blairs Ferry Road. Two private wells were found to be impacted, with one above drinking water standards. Both residences were connected to a municipal water supply.

In 1989, Rockwell Collins removed and disposed of two containers of concrete-encapsulated cyanide. No other cyanide containers were found. Other cleanup actions were completed in 1997 including: removing contaminants from shallow soils; pumping and treating groundwater; placing a cap composed of clay and soil over the disposal area; and stabilizing the bank of the adjacent Dry Run Creek. A state rule restricting new groundwater wells within a mile of the site was established in 1996.

Rockwell Collins continues to monitor the site under the oversight of the Iowa Department of Natural Resources. Groundwater is sampled annually at 19 monitoring wells and 2 private wells. Two additional private wells are sampled semiannually. The disposal area cap and creek bank stabilization are inspected semiannually and any problems identified are addressed. It is verified annually that the institutional controls remain in place and effective. Due to a change in the direction of groundwater flow in the Devonian aquifer, the extent of contamination to the east of the site is uncertain. In the other zones the extent of groundwater contamination has not expanded. The integrity of the cap and creek bank stabilization remains in good condition.

Four issues that need to be addressed have been identified during this five-year review. They are: (1) the extent of groundwater contamination has not been defined east of MW-3B and MW-9B, (2) the vapor intrusion pathway has not been evaluated, (3) sediment and surface water have not been sampled since the Record of Decision (ROD), and (4) listing on the state Registry of Hazardous Waste or Hazardous Substance Disposal Sites is not as enforceable as an environmental covenant. Recommendations for follow-up actions on these issues are as follows: (1) define the extent of contamination in the Devonian aquifer to the east, (2) evaluate the potential for vapor intrusion, (3) sample sediments and surface water of Dry Run Creek and amend the Operation and Maintenance (O&M) Plan to include periodic sampling and (4) implement a uniform environmental covenant on the site property.

A protectiveness determination for the remedy at the Ralston site cannot be made until further information is obtained. This information will be obtained by conducting a vapor intrusion study and collecting and

evaluating sediment and surface water data from Dry Run Creek. It is expected that this evaluation will take approximately two years to complete, at which time a protectiveness determination may be made.

1.0 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 Agency 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 Agency interpreted this requirement further in the NCP; 40 CFR § 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.

The EPA Region 7 has conducted a five-year review of the remedial actions implemented at the Ralston site in Linn County, Iowa. This review was conducted from January 2011 through May 2011. This report documents the results of the review.

This is the second five-year review for the site. The triggering action for this second statutory review is the completion date of the first five-year review which was May 18, 2006, as shown in the EPA's WasteLAN database. The five-year review is required because hazardous substances, pollutants or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

2.0 Site Chronology

Table 1 presents a summary of the major site events and relevant dates in the site chronology.

Table 1
Chronology of Site Events

EVENT	DATE
103(c) Notification	6/1/1981
Preliminary Assessment	10/2/1985
Preliminary Assessment 2	11/8/1988
Site Inspection	12/15/1989
Site listing on the state's Registry of Hazardous Substance or Hazardous Waste Disposal Sites filed with the Linn County Recorder	6/14/1990
EPA Administrative Order on Consent	11/27/1991
EPA Administrative Order on Consent	2/16/1993
Removal Assessment completed	8/12/1993
Engineering Evaluation/Cost Analysis completed	12/2/1993
Protective water source designation effective	11/13/1996
Removal actions completed	6/1997
Remedial Investigation/Feasibility Study reports completed	8/1998
Record of Decision signed	9/30/1999
EPA/IDNR Response Action Oversight and NPL Deferral Agreement	7/20/2000
IDNR Consent Order with Rockwell Collins	7/24/2000
Remedial Action Implementation Work Plan approved	10/10/2000
Remedial actions initiated with first semi-annual monitoring event	4/26/2001
Five-year review completed	5/18/2006

3.0 Background

3.1 Physical Characteristics

The Ralston site is located north of 228 Blairs Ferry Road, just south of Dry Run Creek, and about one-half mile east of C Avenue on the north side of Cedar Rapids, Linn County, Iowa. The site was formerly used for industrial waste disposal. The disposal area occupies 1.5 acres and is enclosed with a fence with a locked gate.

The topography of the disposal area is characterized by the steeply sloping banks of Dry Run Creek to the north and a railroad embankment to the south. Previous Superfund removal actions have modified the general site topography by raising and leveling the disposal area. A minimum of two feet of

compacted clay and two feet of topsoil were placed as a cap over the surface of the former disposal area to prevent precipitation infiltration. Terraces, drainage channels and an access road were subsequently constructed on top of the cap to prevent cap erosion and improve access.

The topography of the southern creek bank of Dry Run Creek, which forms the northern boundary of the disposal area, was also modified by removal actions implemented at the site. A total of 13,400 square feet of geomembrane liner and 17,840 square feet of cable-concrete mats was placed on the creek bank to protect the disposal area and clay cap from surface water erosion associated with the creek. Cable-concrete mats were also placed under the creek crossing to provide a resistant and stable surface upon which to cross the creek.

The geology of the site vicinity generally consists of unconsolidated Quaternary-age alluvial deposits overlying Devonian and Silurian carbonate bedrock. Unconsolidated deposits at the site near Dry Run Creek consist of a thin layer of topsoil and clayey to sandy silt overlying fine to medium sand.

Three principal aquifers are present at the site: (1) the Quaternary alluvial aquifer, (2) the Devonian aquifer and (3) the Silurian aquifer. The alluvial aquifer at the Ralston site is approximately ten feet to fifteen feet thick and consists of groundwater flow in the alluvial sands and gravel near Dry Run Creek. Under normal conditions, shallow groundwater flow from the disposal area is oriented primarily to the northeast toward the creek. North of the disposal area, shallow groundwater flow is radially southward from upland areas toward the channel of Dry Run Creek.

At a depth below the ground surface of 20 to 50 feet, Devonian-age dolomite bedrock of the Otis and Bertram formations is encountered. In the Devonian aquifer, the groundwater flow is in both the northeast and southeast directions from the site. The Silurian-age Scotch Grove formation is encountered throughout the site vicinity at a depth below the ground surface of 110 to 140 feet. Groundwater flow in the Silurian aquifer is predominantly horizontal with little or no component of vertical groundwater flow. The horizontal direction of groundwater flow is generally southward with some variation. Downward vertical gradients were measured between nested wells installed in the alluvial, Devonian, and Silurian aquifers. Near the creek channel, more pronounced vertical solution weathering in the bedrock aquifers may indicate an area of increased downward migration of contaminants.

Several private and public water supply wells exist within two miles of the site. Originally, six private wells existed within one mile of the site. Two private wells have since been abandoned and the residences were connected to the public water supply. Available well construction information indicates most of these water supply wells are greater than 150 feet deep, cased through the unconsolidated and upper bedrock deposits, and open to lower Devonian and/or Silurian rocks. The city of Marion uses two wells which tap the Silurian aquifer approximately one mile east of the Ralston site. The Cedar Rapids water supply wells are located in alluvial sand and gravel deposits. They are generally 60 to 70 feet deep and located close to the Cedar River, several miles southwest of the Ralston site.

3.2 Land and Resource Use

The disposal area is fenced and will continue to be fenced. It is accessible through a locked gate. Rockwell Collins has stated it will continue to own this property in the future and will restrict access to the disposal area to those who have a need to monitor and maintain it. There are no environmental covenants on this property. The area immediately surrounding the disposal area is zoned for residential/agricultural use.

There are commercial properties within 500 feet of the disposal area to the south. Residential developments exist north and west of the disposal area. The developments have reached the property owned by Rockwell Collins. It is possible that there will be further commercial and residential development in areas outside of the disposal area.

Four private wells are still in use in the vicinity of the site. They are identified as the Finley, Thurness, Foster and Grabau wells. The Finley and Thurness wells are reported to be used for irrigation, the Grabau well for watering livestock and the Foster well as a drinking water supply. During development of the Remedial Action Implementation Work Plan the Finley and Thurness wells were identified as either being near or potentially downgradient of the site in the bedrock aquifer. It was planned for these wells to be sampled semiannually. The other two wells were identified as being within the vicinity of the site and were planned to be sampled annually. None of the contaminants of concern have been detected in any of these wells above a detection limit during the past five years.

3.3 History of Contamination

From about 1956 to 1958, the Ralston site was used by Rockwell Collins as a disposal area for wastes generated from a pilot gold-plating operation and other industrial sources. The amount of solid and liquid wastes that were disposed of at the site is not known; however, it has been estimated that 60,000 gallons of liquid waste may have been disposed of during the years of plating operation. The wastes were typically burned and spread in layers, as necessary, to accommodate additional wastes. The types of wastes disposed of at the site by Rockwell Collins included solvents, paint sludge and general industrial refuse including scrap metal, office furniture and construction and demolition debris. The Ralston disposal site was not restricted solely for Rockwell Collins' use. Other local businesses or citizens likely disposed of other solid waste at the site.

In addition to the industrial-type wastes already mentioned, the Ralston site was also used for the disposal of cyanide wastes (salts of ferrocyanide compounds) from the plating operation. The cyanide wastes were initially placed in 5-gallon containers. Two 5-gallon containers were then placed in a 55-gallon drum and encapsulated in concrete. An undetermined number of concrete-encapsulated cyanide drums were disposed of at the site. As stated previously, Rockwell Collins was able to find only two drums of concrete-encapsulated cyanide wastes during investigations at the site.

3.4 Initial Response

In December 1981, Rockwell Collins submitted a CERCLA section 103(c) notice to the EPA, which listed hazardous substances disposed of at the Ralston site as solvents, paint sludge and buried drums of concrete-encapsulated cyanide. In this notice, Rockwell Collins estimated that 60,000 gallons of liquid wastes were generated and disposed of during the years of its plating operation, and an undetermined number of concrete-encapsulated cyanide drums were buried at the site.

In May 1985, a contractor for the EPA conducted a preliminary assessment of the Ralston site. The assessment indicated that groundwater and surface water contamination may have resulted from the previous disposal activities, and a site inspection was recommended.

In 1989, Rockwell Collins removed and properly disposed of two drums of concrete-encapsulated cyanide. No other drums were located.

In November 1990, Rockwell Collins conducted an additional investigation at the site under the oversight of an EPA contractor. Six trenches were excavated and shallow soil borings were installed on a 50-foot-by-50-foot grid system for the purpose of collecting soil samples for laboratory analyses of volatile organic compounds (VOCs), including trichloroethene (TCE) and metals. The results of this investigation were reported in a document entitled, "Report for Investigation of the Ralston Site, Blairs Ferry Road, January 1991."

On December 4, 1991, Rockwell Collins and the EPA entered into an Administrative Order on Consent to conduct a Remedial Investigation and Feasibility Study (RI/FS) at the Ralston site. The goal of the RI/FS was to investigate the extent of soil and groundwater contamination at the site and to determine an appropriate remedy or remedies.

To accelerate the cleanup of the disposal area and shallow groundwater, on January 22, 1993, Rockwell Collins and the EPA entered into a second Administrative Order on Consent to conduct a removal site evaluation, engineering evaluation/cost analysis and a removal action. The removal action took place while work continued on the RI/FS.

The removal actions implemented at the Ralston site included the following:

- Capping of the former disposal area;
- Stabilizing the bank of Dry Run Creek to prevent erosion at the site;
- Installation and operation of a dual vapor extraction (DVE) and treatment system; and
- Extracting and treating alluvial (shallow) groundwater located north of Dry Run Creek.

Capping of the disposal area and stabilization of the creek bank were completed in December 1995. The DVE system began full-time operation in April 1995 and operated periodically until June 1997. At that time, it was determined that it was no longer effectively removing additional source contamination. More than 4,800 pounds of VOCs were removed and treated with the DVE and treatment system.

3.5 Basis for Taking Action

A baseline risk assessment was conducted as a part of the remedial investigation. It included a human health risk assessment and a qualitative ecological risk assessment. The human health exposure scenarios that were evaluated in the risk assessment included exposures to contaminated surface soil, groundwater, sediment and surface water. Due to the implementation of the removal actions and institutional and engineering controls, the only exposure pathways which were still considered viable at the time of the ROD involved exposure to groundwater through ingestion or inhalation of vapors during household use by a resident. In the ROD, the following contaminants were identified as contaminants of concern for groundwater: benzene; 1,1-dichlorothene; cis-1,2-dichloroethene (cis-1,1-DCE); TCE and vinyl chloride.

It was noted in the ROD that although potential ecological risks to site vegetation, the terrestrial food web and the aquatic life in Dry Run Creek were identified, the uncertainties of these risks were high due to the qualitative nature of the ecological risk assessment. However, it was also noted that implementation of the removal actions that took place at the site significantly reduced or eliminated any threat to site vegetation, the terrestrial food web or the aquatic life in Dry Run Creek.

4.0 Remedial Actions

4.1 Remedy Selection

The ROD for the Ralston site was signed on September 30, 1999. Remedial action objectives (RAOs) were developed during the feasibility study using data collected during the remedial investigation, to aid in the development and screening of remedial alternatives that were considered for the ROD. Separate RAOs were developed for soil and groundwater. The RAO for soil was the prevention or minimization of direct contact exposures (inhalation, dermal contact, ingestion, etc.) with soil having a carcinogenic risk in excess of $1x10^{-4}$ or a hazard index for noncarcinogens greater than 1. Specific soil cleanup criteria were not established for the site because the removal actions had eliminated exposure to soil which exceeded these threshold levels.

The RAO for groundwater was the prevention of ingestion of or direct contact with groundwater having a carcinogenic risk in excess of $1x10^{-4}$ and/or a hazard index for noncarcinogens greater than 1. The EPA's Maximum Contaminant Levels (MCLs) from the Safe Drinking Water Act for public water supplies were identified as applicable or relevant and appropriate requirements (ARARs) for this site. The cleanup levels for groundwater at the site were the MCLs, expressed in micrograms per liter (µg/l), which are as follows:

Contaminant	MCL, in µg/l
Benzene	5
1,1-Dichloroethene	7
Cis-1,2-Dichloroethene	70
Trichloroethene	5
Vinyl chloride	2

It was noted in the ROD that achieving MCLs in the disposal area may not be possible due to the likelihood that contaminants are present in that area as a dense nonaqueous phase liquid.

The selected remedy in the ROD included monitored natural attenuation of groundwater, institutional controls and maintenance of the disposal area cap and creek bank stabilization.

As stated in the ROD, the institutional controls implemented at the Ralston site include:

(1) Continued ownership by Rockwell Collins of the fenced area, including the disposal area. The area is zoned for residential/agricultural use. The only access to the disposal area is through a locked gate, thus restricting access by trespassers.

(2) Listing of the site on the Registry of Hazardous Waste or Hazardous Substance Disposal Sites pursuant to Iowa Administrative Code 455B.426. Pursuant to Subrule 567, Iowa Administrative Code 148.6(5), written approval of the director of the IDNR is required prior to any substantial change in the use of the listed site. In addition, written approval is also required to sell, convey or transfer title of the listed site.

(3) A 1-mile area surrounding the site has been designated as a protected source area pursuant to Rule 567 Iowa Administrative Code 53.7(455B). According to the promulgated rule, any new application for a permit to withdraw groundwater or to increase an existing permitted

withdrawal of groundwater from within the protected water source area will be restricted or denied, if necessary, to preserve public health and welfare or to minimize movement of groundwater contaminants from the Ralston Site. IDNR coordinates with the Linn County Health Department, the local well permitting authority, to enforce this institutional control.

An element of the selected remedy was monitored natural attenuation of the groundwater. Data collected at the site prior to selection of the remedy indicated that intrinsic bioremediation of the contaminants of concern was occurring in the disposal area and in areas downgradient in the alluvial, Devonian and Silurian aquifers. The data suggested that intrinsic biodegradation would occur at a predictable rate in the future and degrade TCE and associated breakdown products by 50 percent every six months to two years. Groundwater samples were to be collected from monitoring wells and private wells. These water samples were to be analyzed for VOCs as well as other parameters to determine the continued effectiveness of the bioremediation processes.

The selected remedial actions include maintenance of the cap and the creek bank. The cap and the creek bank were to be visually inspected periodically to verify the integrity and performance of the materials. The cap and the creek bank were to be regularly maintained, including mowing, revegetation and repair as needed to ensure long-term reliability.

4.2 Remedy Implementation

On July 20, 2000, the EPA and IDNR entered into an agreement entitled the Response Action Oversight and NPL Deferral Agreement for the Ralston Superfund Site, Cedar Rapids, Iowa. Pursuant to this agreement, IDNR agreed to assume responsibility for overseeing the response actions at the Ralston site and implementation of the ROD. Further, the EPA agreed to defer consideration of listing the Ralston site on the National Priorities List (NPL), and, when the response actions are complete, to no longer consider the site for the NPL unless new information suggests the existence of a significant threat to human health or the environment.

On July 24, 2000, IDNR entered into Consent Order No. 00-HC-05 with Rockwell Collins in which Rockwell Collins agreed to perform the work prescribed in the ROD under the oversight of IDNR.

Rockwell Collins prepared a Remedial Action Implementation Work Plan that was approved by IDNR on October 10, 2000. Rockwell Collins began implementation of the work plan, consisting of groundwater monitoring and site inspections, in April 2001.

During the remedial action, groundwater monitoring has been conducted in 19 monitoring wells and 4 private wells. The locations of the monitoring wells are shown in Figure 2; the locations of the private wells are shown in Figure 3. Monitoring wells in five geologic zones, both on-site and downgradient of the disposal area, have been sampled. Four wells in the alluvial aquifer have been sampled: MW-1A, MW-2A, MW-3A and MW-4A. Five wells in the Devonian bedrock aquifer have been sampled: MW-1B, MW-2B, MW-3B, MW-4B and MW-9B. The Silurian bedrock aquifer is monitored in three zones. The uppermost of the three zones is the Upper Scotch Grove formation of the Silurian aquifer and the wells in this zone are MW-1C, MW-3C and MW-4C. The next deepest zone is the Lower Scotch Grove formation of the Silurian aquifer and the wells in this zone are MW-1D, MW-3D, MW-5D, MW-7D, MW-8D and MW-9D. The deepest zone sampled is the Hopkinton formation of the Silurian aquifer and the well in this zone is MW-3E. These monitoring wells were sampled semiannually in April and October from 2001 through 2005. Beginning in April 2006 to the present, the monitoring wells have been sampled annually.

Two of the four private wells have been sampled semiannually in April and October since 2001. These are the private wells closest to the site. The other two private wells have been sampled annually in April of each year since 2001.

The disposal area cap and the creek bank stabilization were inspected and maintained quarterly from 2001 through 2005. Since 2006, this inspection and maintenance has occurred semiannually.

4.3 Systems Operation and Maintenance

The plans for long-term monitoring, operation and maintenance (O&M) of the remedial activities are documented in the Remedial Action Implementation Work Plan. The operation and maintenance activities have included:

- annual sampling of 19 monitoring wells for the COCs
- semiannual sampling of two private wells for the COCs
- annual sampling of two private wells for the COCs
- biennial sampling for natural attenuation parameters
- maintaining the fence, including gates and locks, around the disposal area
- removing deep-rooted growth that would damage the structures
- removing debris from the creek channel
- repairing any exposed geomembrane liner
- repairing slope failure or creep either around the cap or the creek bank
- repairing damage to the cap or cabled-concrete mat that could result in erosion or failure of these structures
- mowing and maintaining the vegetative cover

Maintenance activities have been reported in annual reports. Attachment A lists the annual O&M costs for the site for the past five years as provided by Rockwell Collins. These costs include all of the maintenance items listed above as well as the costs for groundwater sampling and analysis and report preparation. The estimate of O&M costs that was included in the cost of the remedy in the ROD was $32,780 per year and included all of the same elements. The O&M costs for the past five years have been very close to the estimated amount, averaging $30,175 per year.

5.0 Progress Since Last Review

The protectiveness statement in the first Five-Year Review Report for the site was as follows:

The remedy at the Ralston site is protective of human health and the environment because there is no exposure to site-related contaminants and institutional controls are in place to effectively prevent future exposures.

The recommendations made in the first Five-Year Review Report included:

- Continue monitoring of 16 monitoring wells. (Note: 19 wells are actually monitored at the site.)
- Continue monitoring of private wells.
- Continue conducting site inspections.
- Continue to monitor institutional control.

Over the past five years, Rockwell Collins has continued to sample the monitoring wells annually for the contaminants of concern and biennially for the natural attenuation parameters. Two of the private wells have been sampled for the contaminants of concern semiannually, while the other two private wells have been sampled annually. The site has been inspected semiannually and any problems identified have been addressed. Rockwell Collins has continued to ensure that the institutional controls remain in place. Annual reports of the activities at the site have been submitted to IDNR. IDNR continues to oversee the remedial actions at the site.

6.0 Five-Year Review Process

6.1 Administrative Components

The five-year review process was initiated on January 5, 2011, with a meeting of the team of people who would be working on the review. The team working on this five-year review includes the EPA Remedial Project Manager, Diana Engeman; IDNR Project Manager, Robert Drustrup; additional EPA technical staff; community involvement coordinators and legal staff. Representatives of Rockwell Collins and their consultant, MWH, provided information necessary to conduct this five-year review.

6.2 Community Involvement

On March 12, 2011, a public notice regarding the start of the second five-year review was published in the Cedar Rapids Gazette. A fact sheet announcing the start of the second five-year review was emailed to federal and state congressional offices on March 7, 2011, and mailed to local interested parties on March 11, 2011. Local interested parties include city and county officials, local organizations and citizens who have expressed an interest in the site. In general, the community interest in the Ralston site has been low. There have been no comments or questions provided to the EPA from the public during this five-year review.

Soon after approval of this Second Five-Year Review Report, a notice will be placed in the same newspaper announcing that the report is complete, and that it is available to the public at the Cedar Rapids Public Library in Cedar Rapids, Iowa, and the EPA Region 7 office.

6.3 Document Review

This five-year review consisted of a review of relevant documents, including the Remedial Action Implementation Work Plan and Remedial Action Activity Reports for 2006 through 2010. A complete list of documents reviewed as part of the five-year review process is included in Attachment B.

6.4 Data Review and Evaluation

Groundwater monitoring data have been collected at the Ralston site by Rockwell Collins in accordance with the Remedial Action Implementation Work Plan, Former Ralston Disposal Site, Cedar Rapids, Iowa, September 2000, as modified. Attachment C includes a compilation of these data. Figure 2 is a site map showing the location of the monitoring wells.

The A-series monitoring wells are in the unconsolidated alluvium of Dry Run Creek, with the flow direction from the disposal area predominantly to the northeast, toward the creek. Historically, the well upgradient of the disposal area, MW-1A, and the side gradient well, MW-2A, have shown significant decreases in contaminants, especially TCE and cis-1,2-DCE. These wells continue to have levels of these contaminants below MCLs and vinyl chloride is not detectable in these wells. MW-3A, which is immediately downgradient of the disposal area, continues to be very heavily contaminated with no discernable trends. MW-4A, which is further downgradient of the disposal area, is uncontaminated, with concentrations of all COCs below MCLs. Benzene was only found above detection limits in one alluvial well, MW-3A. The benzene level exceeded the MCL of 5 µg/l once, in April 2009 at 14.9 µg/l. It has been reported that previous investigations demonstrated that discharge from the alluvium to Dry Run Creek at the Ralston site causes negligible impact to the creek. However, there are no recent surface water or sediment samples to confirm that this is still the case.

Monitoring results from the next deeper B-series monitoring wells in the Devonian bedrock aquifer have shown more variability. During the past five years, the flow direction in the Devonian aquifer was predominantly to the east-northeast. This is a change in flow direction from the time the remedial investigation was conducted when the flow in the Devonian aquifer was primarily to the southeast. The reason for this change in flow direction has not been given. A decrease in the concentration of TCE has been observed in monitoring well MW-3B, which is immediately downgradient of the disposal area, along with small-to-moderate increases in the concentrations of cis-1,2-DCE. At MW-2B, which is side gradient to the disposal area, the concentrations of cis-1,2-DCE and vinyl chloride appear to be stable to decreasing after a rise noted during the previous five-year review. Contaminant levels in MW-9B, which is located about 500 feet southeast of the disposal area, have been more variable than the other Devonian wells. The concentrations of TCE, although detectable, have been below the MCL for the past five years. Concentrations of cis-1,2-DCE have varied from 19.1 to 981 µg/l. The concentration of vinyl chloride has consistently been above the MCL of 2 µg/l. MW-4B, which is side gradient to the disposal area, is uncontaminated. MW-3B is the only Devonian aquifer well with detectable levels of benzene. The levels of benzene in this well have consistently been above the MCL for the past five years.

The C- and D-series monitoring wells are completed in the Upper and Lower Scotch Grove formation of the Silurian bedrock aquifer. Flow direction in the Scotch Grove formation has varied from southeasterly to southwesterly in the past five years with southeasterly flow being most frequent. Very little contamination of the Scotch Grove Formation has been detected outside of the site itself in the upper formation, i.e., MW-1C. Contaminant levels have been fairly stable in MW-1C and MW-3C, the only two C-series wells with significant contamination, except for gradual increases of cis-1,2-DCE in MW-1C, which is indicative of

natural attenuation occurring. MW-4C is upgradient of the disposal area and is uncontaminated. Only low levels of contamination have been found in the D-series wells. The concentrations of TCE and cis-1,2-DCE found in MW-1D have exceeded their respective MCLs for the past three years. MW-3D had a concentration of 1.95 µg/l of vinyl chloride for the first time in 2010. MW-9D has exhibited stable concentrations of TCE and cis-1,2-DCE that are below the MCLs for the past five years. MW-3C is the only Scotch Grove formation well with benzene concentrations above the detection limits. The concentration of benzene in MW-3C has been around 100 µg/l for the past five years.

One monitoring well is completed in the underlying Hopkinton formation of the Silurian bedrock aquifer. This well, MW-3E, located near the disposal area, has not shown the presence of contamination.

In addition to sampling monitoring wells for the contaminants of concern, the wells are sampled biennially for the following natural attenuation parameters: nitrate as nitrogen, sulfate, total organic carbon, methane, ethene, ethane, dissolved iron and dissolved manganese. These parameters are indicators that conditions in the subsurface are favorable for intrinsic bioremediation to occur or that it has taken place. This information, as well as contaminant concentration and other hydrogeologic information, can be used to assess whether intrinsic bioremediation is occurring, and, if so, at what rate it might be expected to occur. The 2010 Annual Report includes the most recent analysis of the natural attenuation data. Twelve wells had detectable concentrations of methane, up from five wells in 2008. Three wells had detectable concentrations of ethane in 2010, consistent with the 2008 results. These data indicate that reductive dechlorination is occurring. In addition, the pH and dissolved oxygen measurements, as well as total organic carbon and electron donor data, indicate the environment is conducive to supporting biodegradation processes.

In conclusion, groundwater monitoring at the Ralston site has generally demonstrated stable or improving conditions. In the Devonian aquifer (B-series) monitoring wells, it is not clearly demonstrated that the extent of contamination has been defined to the east of MW-3B or MW-9B. Natural attenuation monitoring parameters coupled with contaminant concentration information, generally demonstrate that natural attenuation is occurring. Except for uncertainty in the Devonian aquifer, monitoring data demonstrate that the extent of contamination is expanding neither horizontally nor vertically.

The monitoring results from four private wells since April 2001 have revealed no detectable contamination associated with the Ralston site, except for occasional vinyl chloride in the Thurness well at levels below the MCL. Detectable levels of vinyl chloride have not been found in this well since October 2005. Table 4-7 from the 2010 Annual Report is a historic summary of results from the Thurness well (included as Attachment D). From 1993 through 1997, low levels of TCE and cis-1,2-DCE were found in the Thurness well. Samples from 1998 through 2010 did not reveal any detectable contamination.

Semiannual inspections of the site are conducted by Rockwell Collins personnel and include inspecting the condition of the cap and creek bank stabilization. They also ensure that the fence that restricts access to the disposal area is in good condition and that the gate is locked. The environmental contractor employed by Rockwell Collins inspects the site annually and completes a Field Inspection Sheet, which is included with each annual report. They also verify that all monitoring wells are in good condition as they are conducting the groundwater sampling. During the past five years, only minor problems such as a tree limb falling on the fence, saplings growing along the area with creek bank stabilization and repair to the bumper protecting a monitoring well have been noted and addressed.

6.5 Site Inspection

An inspection to assess the conditions of the site was conducted on April 14, 2011. Participating in the inspection were EPA Remedial Project Manager, Diana Engeman; IDNR's Greg Fuhrmann; Rockwell Collins Director of Environment, Safety and Health Operations, Tom Gentner; Rockwell Collins Manager of Facility Operations, Mike Stadtmueller; and MWH's Steve Varsa. The visit began by meeting in the Rockwell Collins' office to discuss the schedule for completion of the five-year review and potential issues and recommendations that may be included in the report. After the meeting, the group went to the disposal area to view the site and then to the location of one of the residential wells that is sampled semiannually. Everything at the site was found to be in good condition. Rockwell Collins representatives indicated that they will be installing a fence along the western edge of the property they own outside of the disposal area because the residential property owners are beginning to encroach on that property. This encroachment is not near the disposal area. The Site Inspection Report is Attachment E to this report.

7.0 Technical Assessment

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

Yes. The selected remedy in the ROD included monitored natural attenuation of groundwater, institutional controls and maintenance of the disposal area cap and creek bank stabilization.

For the past five years the groundwater has been monitored annually for the contaminants of concern and biennially for the natural attenuation parameters. In addition to the 19 monitoring wells at the site, 2 private wells have been sampled semiannually and 2 private wells have been sampled annually for the contaminants of concern.

The institutional controls were all implemented prior to the ROD. The EPA verified in March 2011 that the disposal area remains under the ownership of Rockwell Collins. It was observed during the site inspection that the disposal area is fenced, with a locked gate, limiting access by the public. The EPA also verified that the Ralston site remains on the state Registry of Hazardous Waste or Hazardous Substance Disposal Sites. In addition, the Ralston site continues to be designated by rule as a protected water source area pursuant to Subrule 567, Iowa Administrative Code 53.7(1). The state legislature has enacted amendments to the Iowa Adminstrative Code covering the state registry that will become effective on July 1, 2011. These amendments include a provision that, in the event a uniform environmental covenant is executed for a site, the contaminated portions of the property may be removed from the registry. Implementation of a uniform environmental covenant for the portion of the property owned by Rockwell Collins that comprises the site would be a more enforceable institutional control than listing it on the registry for the long term.

Rockwell Collins reports that they have queried the Linn County Health Department annually regarding permit applications for private wells within the designated protected water source area. In February 2006, the first such application was received for closed-loop heat pump wells about one-half of a mile west of the site. Due to the upgradient location and the fact that the wells would not extract water, the health department granted a permit. Ultimately, these wells were never installed. There have not been any well permit applications within the designated protected water source area since that time.

The cable/concrete mat creek bank stabilization is inspected twice a year and continues to be in excellent condition. It continues to maintain the creek bank without any signs of erosion.

The disposal area is secured behind a fence with a locked gate. The cap is in excellent condition, with no signs of erosion or ponding of water, and it has a thick grass cover.

7.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of remedy still valid?

Changes in Standards and To Be Considers (TBCs)

- *Have there been changes to risk-based cleanup levels or standards identified as ARARs in the ROD that call into question the protectiveness of the remedy?*

  The ROD only established cleanup levels for groundwater because contaminated soil from the disposal area was capped with two feet of compacted clay and two feet of soil. The groundwater cleanup goals were based on the federal MCLs. The MCLs for the contaminants of concern have not changed since the ROD was issued in September 1999.

  Exposure assumptions, toxicity data, cleanup levels and RAOs were not selected specifically to address ecological risk at the site. Although the removal action involved capping of the disposal area and stream bank stabilization, there have not been any samples collected of the surface water and sediment in Dry Run Creek to confirm whether these actions have been protective for ecological receptors in the creek. Collection and analysis of surface water and sediment samples would be necessary to make that determination.

- *Are there newly promulgated standards that call into question the protectiveness of the remedy?* No.

- *Have TBCs used in selecting cleanup levels at the site changed in ways 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 the site. The change in potential future land use known at this time is the property known as the Bauer residence which has been put up for sale by the property owner for commercial use. A sale is currently pending but has not been completed. This property is located approximately 500 feet south of the disposal area.

- *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?*

  As discussed below under Question C, subsurface vapor intrusion has been identified as an additional potential exposure pathway which was not evaluated in the past at this site. In addition, the human health risk assessment did not account for dermal contact with contaminated

groundwater by current and future residential receptors. However, inclusion of this pathway would not affect the protectiveness of the remedy because no individuals are using contaminated groundwater and installation of new wells is protected within one mile of the source area.

- *Are there newly identified contaminants or contaminant sources?*

  The available data do not demonstrate new contaminants or contaminant sources.

- *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)?* There are no known unanticipated toxic byproducts.

- *Have physical site conditions (e.g., changes in anticipated direction or rate of groundwater flow) or the understanding of these conditions (e.g., changes in anticipated direction or rate of groundwater flow) changed in a way that could affect the protectiveness of the remedy?*

  The flow direction in the Devonian aquifer has changed since the investigations conducted prior to the ROD. It is no longer clear that the extent of contamination in this aquifer is fully defined.

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?*

  Numerous toxicity values have changed since the baseline human health risk assessment was completed in October 1994. These changes have no impact on the remedy for soil because direct contact has been eliminated through a clay and soil cap. In terms of groundwater, no one is currently using the contaminated groundwater as a domestic source and the remedy prevents future exposure because a one-mile area surrounding the site has been designated as a protected source area pursuant to Iowa Administrative Code 567-53.7(455B), and any new wells in the designated area must be approved by state authorities. Thus, these changes do not impact the protectiveness of the remedy for soil and groundwater.

  The exposure point concentrations for sediment and surface water from the human health risk assessment were compared to the most recent Regional Screening Levels (RSLs) for residential soil and tap water, because the RSLs generally contain the latest toxicity values (http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm). This comparison is a health-protective approach because the residential soil and tap water RSLs are based on residential exposures which are much greater than the recreational user scenario evaluated in the site-specific risk assessment. This comparison indicates that none of the compounds detected in Dry Run Creek pose a significant risk to human health and any changes to toxicity values do not affect the protectiveness of the remedy for sediment and surface water.

  It is unknown whether any contaminants related to the site are currently in the sediments or surface water of Dry Run Creek as there have not been any samples collected since prior to the ROD. However, it was recognized that the alluvial aquifer was in communication with Dry Run Creek at times. Confirmation samples of the sediment and surface water could verify that the remedy chosen is protective of Dry Run Creek. These confirmation samples should be analyzed for the VOC contaminants of concerns as well as total polychlorinated biphenyls (PCBs), PCB

Arochlor 1260, dichlorodiphenyltrichloroethane (DDT), metals and cyanides. PCBs and DDT were never sampled for in the sediment but were found in soil samples from the disposal area. If they are present in the sediments of Dry Run Creek they may pose an ecological risk due to their potential to biomagnify through the food chain.

- *Have other contaminant characteristics changed in a way that could affect protectiveness of the remedy?*

  There are no other known changes to contaminant characteristics that could impact the protectiveness of the remedy.

Changes in Risk Assessment Methods

- *Have standardized risk assessment methodologies changed in a way that could affect the protectiveness of the remedy?*

  The overall approach for conducting the human health risk assessment is comparable to current risk assessment practice in Region 7. As mentioned previously, currently methodology quantifies dermal contact with contaminated water while showering and bathing, which was not done in this human health risk assessment. Also, the EPA has more recent guidance on quantifying exposure for both the dermal and inhalation routes of exposure. Furthermore, a few exposure parameters used in the human health risk assessment for this site are different than values currently used (i.e., skin surface area, inhalation rate). Overall, these changes do not have a significant impact on the conclusions of the risk assessment, nor do they affect the protectiveness of the remedy.

  The 1994 Ecological Risk Assessment (ERA) for the site was adequate. However, in 1997, the EPA published Interim Final Ecological Risk Assessment Guidance for Superfund. Although the ERA for the site was referred to as a baseline risk assessment, it was actually a screening level ERA (refer to steps 1, 2 and 3 of the 1997 ERA guidance). A screening level risk assessment was the appropriate action to take at the Ralston site. The ERA is still considered adequate because it contained all three steps in the 1997 guidance. Confirmed ecological risks and potential ecological risks were found at the site via the assessment that was performed. The next step in conducting an ERA, as described in the 1997 ERA guidance, would be to conduct a baseline ERA, bringing unknown and known COCs forward and performing a more in-depth ERA. Rather than going through this process at the Ralston site, the creek bank was stabilized with a geomembrane underneath, a creek crossing was installed and the disposal area was capped. Action levels were not developed for creek sediment or surface water, nor were any confirmation samples collected. Ongoing monitoring of the creek has not occured to demonstrate that, due to the actions taken, the sediment and surface water do not pose a risk to aquatic organisms. Collection of sediment and surface water samples would need to be collected, analyzed and compared to appropriate ecological screening levels to make that determination.

Evaluation of Remedial Action Objectives

Separate RAOs were developed for soil and groundwater. The RAO for soil was the prevention or minimization of direct contact exposures (inhalation, dermal contact, ingestion, etc.) with soil having a carcinogenic risk in excess of $1x10^{-4}$ or a hazard index for noncarcinogens greater than 1. The contaminated soil in the disposal area was capped and the area was fenced as part of a removal action. The bank of Dry Run Creek was stabilized as part of that action. The remedy in the ROD includes on-going maintenance of the cap, creek bank stabilization and the fence to prevent direct contact exposure to contaminated soil. The remedy is achieving this RAO.

The RAO for groundwater was the prevention of ingestion of or direct contact with groundwater having a carcinogenic risk in excess of $1x10^{-4}$ and/or a hazard index for noncarcinogens greater than 1. The implementation of the protected source area for groundwater in a 1-mile radius around the site prevents any changes to use of the groundwater in the vicinity of the site without an opportunity for regulators to determine whether anyone could be exposed. There are only four wells in the vicinity of the site that are known to be used for any purpose. These four wells are sampled regularly and there are no elevated levels of any of the contaminants of concern in these wells. At the time this RAO was developed, exposure to groundwater contamination through inhalation was only evaluated for showering or cooking. Vapor intrusion from the groundwater plume was not specifically considered during development of the groundwater RAO, although it is an inhalation exposure.

7.3 Question C: Has other information come to light that could call into question the effectiveness of the remedy?

In 2008, the Cedar Rapids area sustained significant flooding. Rockwell Collins reported that Dry Run Creek and the disposal area were not significantly impacted by this event.

The vapor intrusion pathway was not considered in the original remedial investigation or in the baseline risk assessment. The sampling results indicate that VOC-contaminated groundwater may underlie or be adjacent to buildings located south of the site on property not owned by Rockwell Collins. In May 2010, vinyl chloride and cis-1,2-DCE were detected in MW-9B at 17.8 and 205 µg/l, respectively. The vapor intrusion pathway should be fully evaluated using a multiple-lines-of-evidence approach, which may include the collection of additional environmental samples (e.g., soil gas, subslab gas, indoor air). Due to a lack of information, it is not possible to determine whether the remedy is protective for the vapor intrusion pathway.

Control of future uses of the disposal area are primarily the result of Rockwell Collins' commitment to ongoing ownership of the property and the notification to any future owner of the need to obtain written approval of the director of IDNR prior to any substantial change in the use of the property since it is listed on the state's Registry of Hazardous Waste or Hazardous Substance Disposal Sites. Placing an environmental covenant on the deed for this property consistent with the Uniform Environmental Covenants Act would provide a more permanent and enforceable means of imposing limitations on future use of the property.

7.4 Summary of Technical Assessment

The selected remedy in the ROD included monitored natural attenuation of groundwater, institutional controls and maintenance of the disposal area cap and creek bank stabilization. The disposal area cap and the creek bank stabilization that are to be maintained were implemented as part of a previous non-time-critical removal action.

Since implementation of the remedial action at the Ralston site, groundwater has been monitored in 19 monitoring wells, both on- and off-site. Initially, these wells were sampled semiannually for the contaminants of concern. For the past five years, they have been sampled annually. There are four A-series wells in the unconsolidated alluvium of Dry Run Creek. Two of these wells have experienced some of the most significant decreases in contamination at the site and the furthest downgradient well is no longer contaminated. The one A-series well located immediately downgradient of the disposal area continues to be heavily contaminated.

The next deepest monitoring wells are the five B-series wells in the Devonian bedrock aquifer. As described previously in this report, in some of these wells, concentrations of TCE have decreased, while the concentrations of cis-1,2-DCE and vinyl chloride have increased. These changes may be indicative of intrinsic bioremediation occurring, resulting in the reductive dechlorination of TCE to cis-1,2-DCE to vinyl chloride to ethene. Due to a change in groundwater flow direction in the Devonian aquifer since the remedial investigation was conducted from predominantly southeast to north northeast, it is not clearly demonstrated that the extent of contamination has been defined to the east of MW-3B or MW-9B in the Devonian aquifer.

There are a total of ten monitoring wells in three zones of the deeper Silurian bedrock aquifer. There are three C-series wells in the Upper Scotch Grove formation, six D-series wells in the Lower Scotch Grove formation and one well in the Hopkinton formation of the Silurian aquifer. The two C-series wells nearest the disposal area have had fairly steady levels of contamination for the past five years. The D-level wells have only exhibited low levels of contamination. The E-series well is uncontaminated.

In addition to sampling monitoring wells for the contaminants of concern, the wells are sampled biennially for several parameters which are indicators that conditions in the subsurface are favorable for intrinsic bioremediation to occur or that it has taken place. It has been demonstrated that natural attenuation is occurring at the Ralston site although it has not clearly described in annual reports how these data are used to reach that conclusion.

Groundwater monitoring at the Ralston site has generally demonstrated stable or improving conditions and, except for uncertainty in the B-series Devonian aquifer wells to the east, monitoring data demonstrate that the extent of contamination is expanding neither horizontally nor vertically.

Monitoring of four private wells since April 2001 has revealed no detectable contamination associated with the Ralston site, except for occasional vinyl chloride in the Thurness well at levels below the MCL.

The vapor intrusion exposure pathway has not been evaluated at the Ralston site. Since groundwater sampling results indicate that VOC-contaminated groundwater may underlie or be adjacent to buildings located south of the site, this pathway should be fully evaluated using a multiple-lines-of-evidence approach. Due to a lack of information, it is not possible to determine whether the remedy is protective for this pathway.

The sediments and surface water of Dry Run Creek have not been sampled since prior to the ROD. Therefore, it is not possible to determine whether there has been an impact to the creek from the site since implementation of the remedy. Periodic confirmation sampling of sediments and surface water for VOCs, PCBs, DDT, metals and cyanides would provide information needed to determine whether there has been any movement of contaminants from the disposal area into the creek.

For the past five years, semiannual inspections of the site were conducted by Rockwell Collins' personnel. They inspect the condition of the cap and creek bank stabilization, ensure that the fence, gates and locks are in good condition and verify that all monitoring wells are in good condition. During the past five years, only minor problems have been identified and addressed.

Three institutional controls have been identified for the Ralston site: continued ownership of the property by Rockwell Collins, listing of the site on the state's Registry of Hazardous Waste or Hazardous Substance Disposal Sites and designation of a 1-mile area surrounding the site as a protected source area for groundwater. Rockwell Collins has verified that they own the property surrounding the site, that the site continues to be listed on the state registry and that they check with the county health department annually regarding requests for well permits with the protected source area. During the past five years, a request for installation of nonpumping wells was approved, but it was later decided that the wells were not needed. It is recommended that Rockwell Collins place an environmental covenant on the deed for this property, consistent with the Uniform Environmental Covenants Act, which would provide a more permanent and enforceable means of imposing limitations on future use of the property than the current listing on the state registry.

8.0 Issues

Table 2

Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
It is not clearly demonstrated that the extent of contamination has been defined to the east of MW-3B or MW-9B in the Devonian aquifer.	N	Y
The vapor intrusion exposure pathway has not been evaluated at the Ralston site.	*	*
The sediments and surface water of Dry Run Creek have not been sampled since prior to the ROD.	*	*
Listing on the state Registry of Hazardous Waste or Hazardous Substance Disposal Sites is not as enforceable as an environmental covenant.	N	Y

*Protectiveness determination deferred.

9.0 Recommendations and Follow-up Actions

Implementation of the following recommendations is necessary to address the issues identified in this five-year review. The recommendations will be implemented by Rockwell Collins with IDNR as the lead oversight agency and the EPA Region 7 as the support agency.

Table 3

Issue	Recommendations and Follow-up Actions	Party Responsible	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
				Current	Future
It is not clearly demonstrated that the extent of contamination has been defined to the east of MW-3B or MW-9B in the Devonian aquifer.	Take actions, possibly including installation of monitoring wells to define the extent of groundwater contamination to the east in the Devonian aquifer.	Rockwell Collins/ IDNR	6/30/2013	N	Y
The vapor intrusion exposure pathway has not been evaluated at the Ralston site.	Evaluate potential for vapor intrusion utilizing multiple lines of evidence.	Rockwell Collins/ IDNR	6/30/2013	*	*
The sediments and surface water of Dry Run Creek have not been sampled since prior to the ROD.	Sample sediments and surface water of Dry Run Creek and amend O&M Plan to include periodic sampling.	Rockwell Collins/ IDNR	6/30/2012	*	*
Listing on the state Registry of Hazardous Waste or Hazardous Substance Disposal Sites is not as enforceable as an environmental covenant.	Implement Uniform Environmental Covenant on the site property.	Rockwell Collins/ IDNR/EPA	6/30/2012	N	Y

*Protectiveness determination deferred.

10.0 Protectiveness Statement

A protectiveness determination for the remedy at the Ralston site cannot be made until further information is obtained. This information will be obtained by conducting a vapor intrusion study and collecting and evaluating sediment and surface water data from Dry Run Creek. It is expected that this evaluation will take approximately two years to complete, at which time a protectiveness determination may be made.

11.0 Next Five-Year Review

The next five-year review for the Ralston site will be required in June 2016.

FIGURES

FIGURE 1
SITE LOCATION MAP

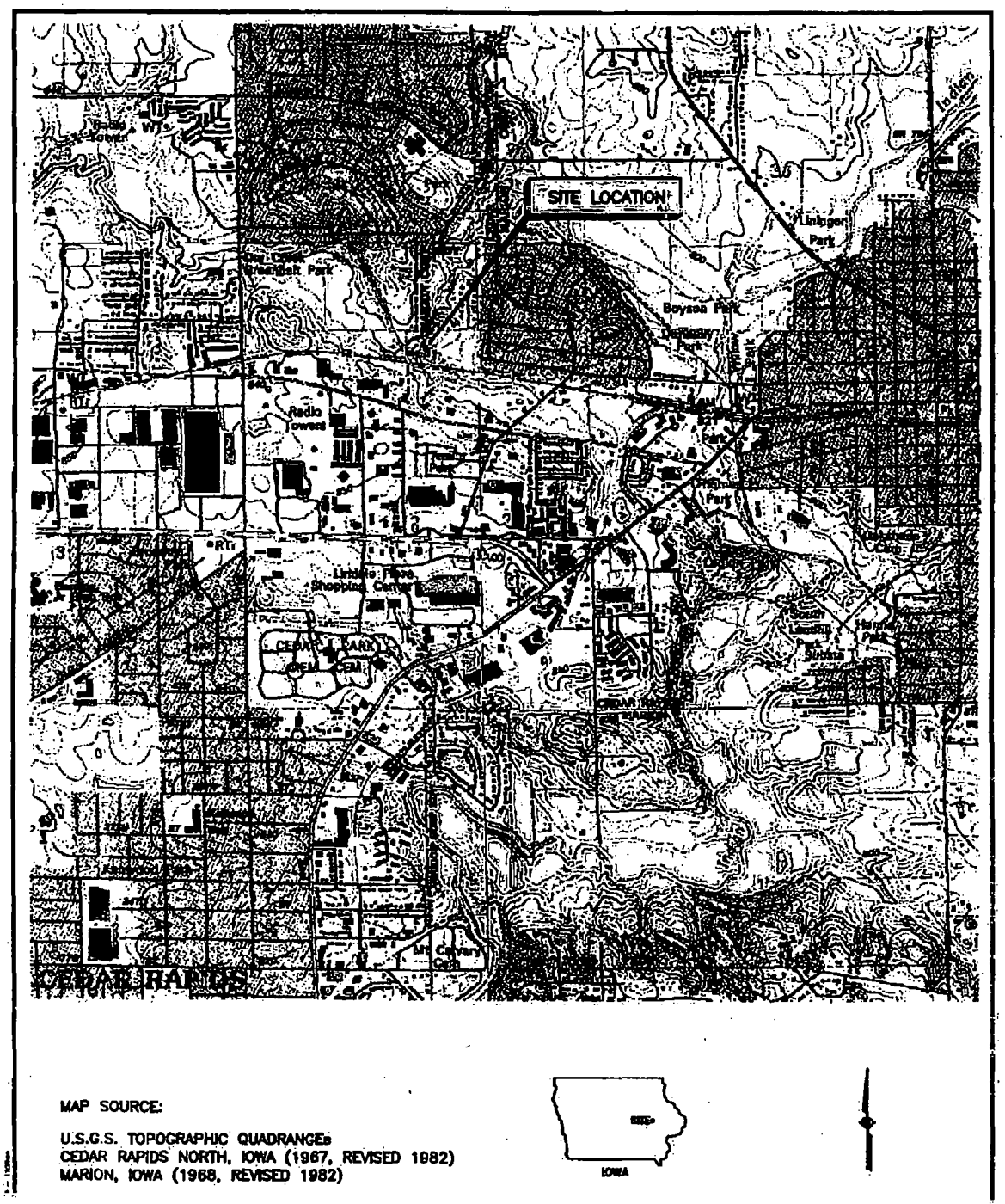


FIGURE 2
SITE LAYOUT AND OWNERSHIP

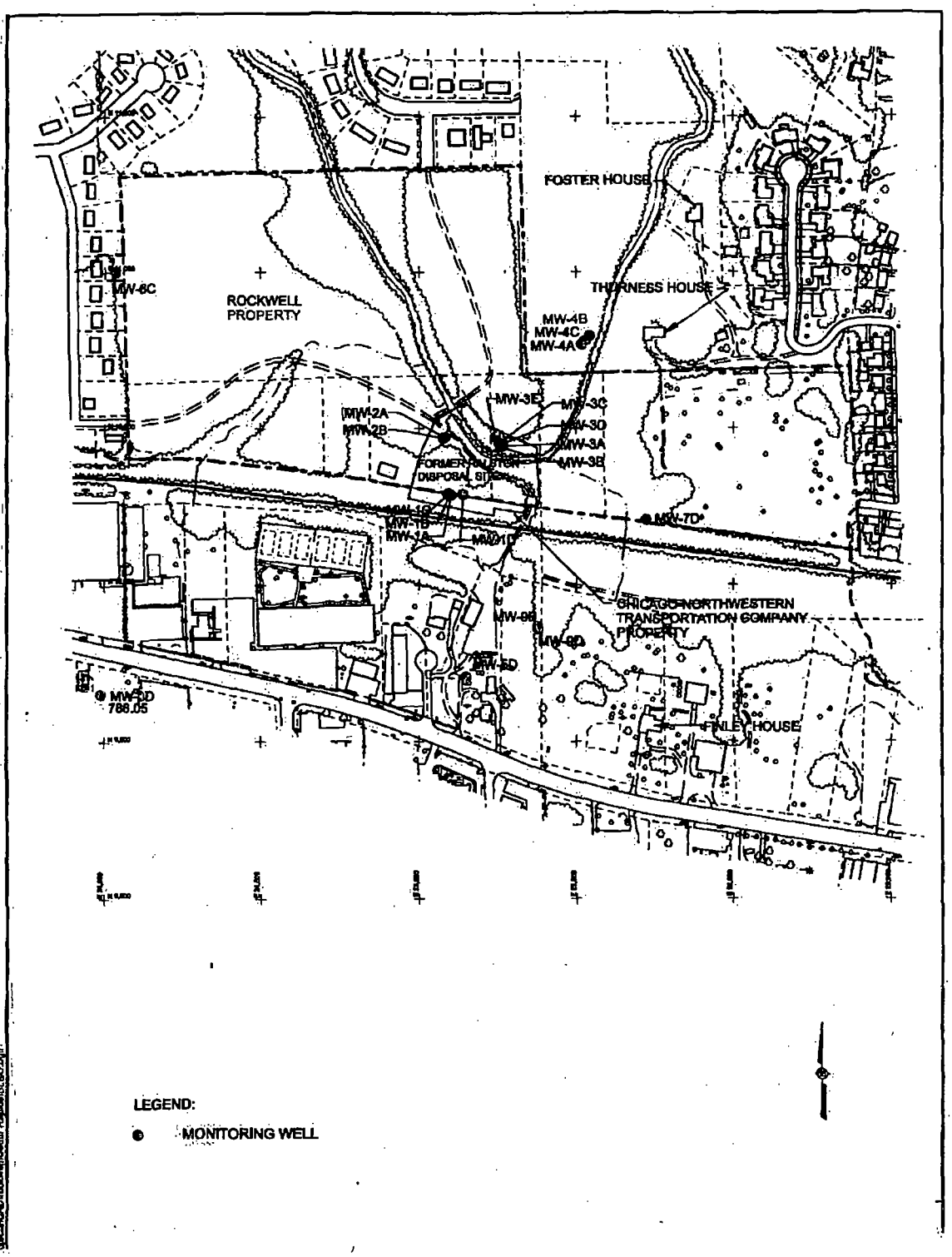
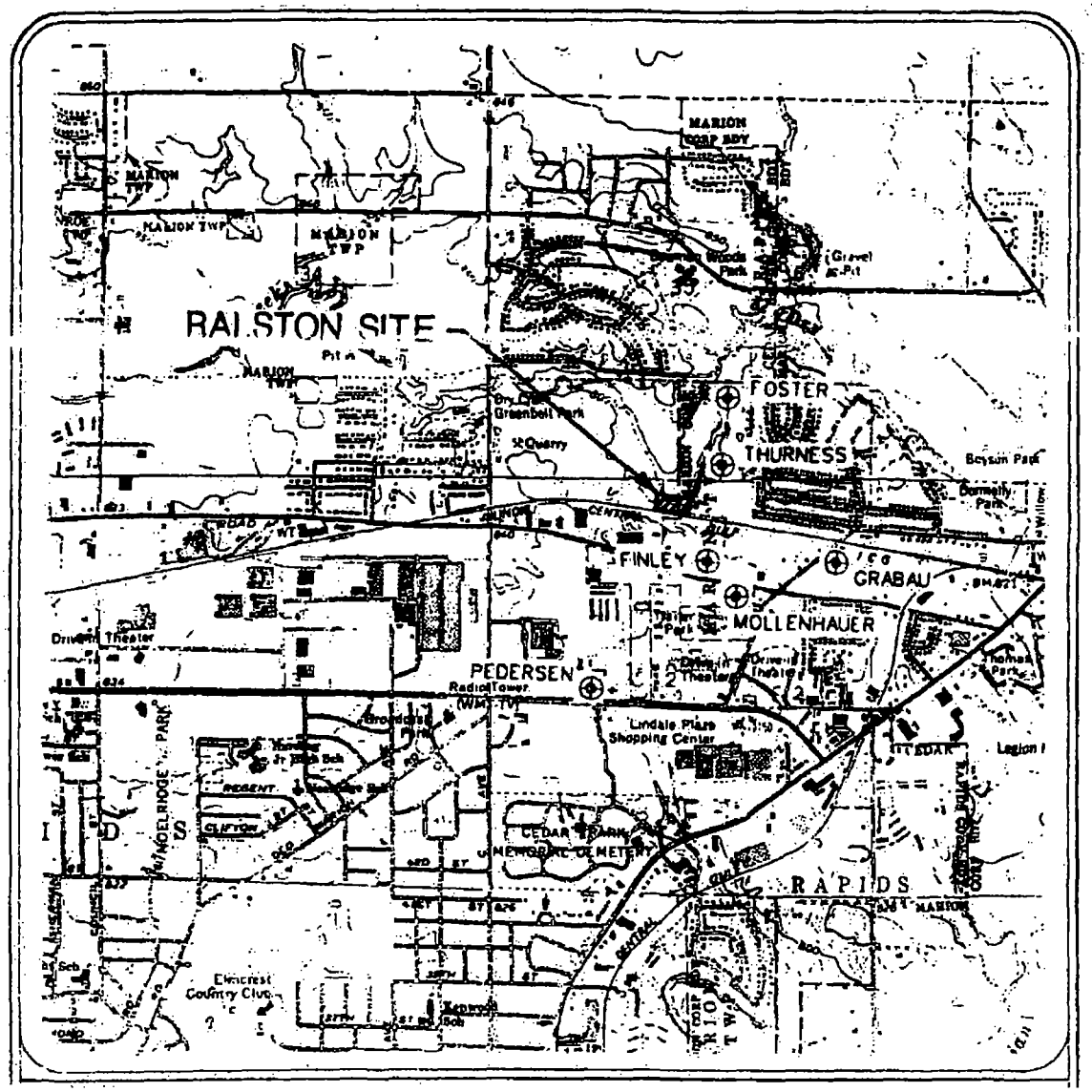


FIGURE 3
LOCATION OF PRIVATE WELLS



Attachments

ATTACHMENT A
O&M COSTS

2006-2010 Operation and Maintenance Costs
Former Ralston Disposal Site - Cedar Rapids, Iowa

Item	2006	2007	2008	2009	2010
1 - Monitoring	$20,950	$16,950	$21,250	$17,700	$22,650
2 - Equipment Repair/Replacement*	$0	$0	$3,374	$350	$0
3 - Cap Maintenance (mowing, fence/gate repair, reseeding)	$1,000	$3,100	$6,100	$3,400	$3,600
4 - Reporting	$6,150	$5,950	$6,150	$6,050	$6,150
TOTAL	$28,100	$26,000	$36,874	$27,500	$32,400

Notes
* 2008: replacement of MW-8D completion, and MW-1 nest and DPE vault repairs; 2009: resurvey MW-8D completion.

Attachment B
Site Documents Reviewed

2006 Annual Remedial Action Activity Report, Former Ralston Disposal Site, MWH, January 2007.

2007 Annual Remedial Action Activity Report, Former Ralston Disposal Site, MWH, December 2007.

2008 Annual Remedial Action Activity Report, Former Ralston Disposal Site, MWH, February 2009.

2009 Annual Remedial Action Activity Report, Former Ralston Disposal Site, MWH, February 2010.

2010 Annual Remedial Action Activity Report, Former Ralston Disposal Site, MWH, March 2011.

Feasibility Study Report, Former Ralston Disposal Site, Cedar Rapids, Iowa, Montgomery Watson, August 1998.

Final Baseline Risk Assessment for the Ralston Disposal Site, Cedar Rapids, Iowa, CDM Federal Programs Corporation, October 21, 1994.

First Superfund Five-Year Review, Ralston Site, Cedar Rapids, Iowa, IDNR, May 18, 2006.

Letter to Robert Drustrup, IDNR, Re: Baseline Groundwater Sampling Event-Metals Results, MWH, July 6, 2001.

Memorandum: Comments on Ralston 5 Year Review, EPA, March, 24, 2011.

Memorandum: Five-Year Review Technical Assessment, Former Ralston Site, Cedar Rapids, Iowa, EPA, March 29, 2011.

Record of Decision, Ralston Site, Cedar Rapids, Iowa, EPA, September 1999.

Remedial Action Implementation Work Plan, Former Ralston Disposal Site, Cedar Rapids, Iowa, Montgomery Watson, September 2000.

Remedial Investigation Report, Former Ralston Disposal Site, Cedar Rapids, Iowa, Montgomery Watson, September 1997.

ATTACHMENT C
GROUNDWATER MONITORING DATA

TABLE 4-4

HISTORICAL GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS
(Results in µg/L)
ROCKWELL COLLINS, INC., FORMER RALSTON DISPOSAL SITE - CEDAR RAPIDS, IOWA

Well No.	Sample Date	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	Vinyl Chloride	Benzene	Other VOC Detections
MW-1A	07-92	5	180	170	2	1, J	<2	<2	
	02-93	2, J	120	190	2, J	<10	<10	<10	
	12-93	-	-	-	-	-	-	-	
	08-94	-	-	-	-	-	-	-	
	12-94	1.9	87.5	144	1.8	<1	<2	<1	
	06-95	1.3	16.8	11	<1	<1	<2	<1	
	09-95	2.0	34.7	42.8	<1	<1	<2	<1	
	12-95	2.3	56.7	84.4	1.7	<1	<2	<1	
	03-96	1.8	70.8	128	2.7	<1	<2	<1	
	06-96	2.3	28.4	15.1	<1	<1	<2	<1	
	09-96	2.6	33.9	20.4	<1	<1	<2	<1	
	04-01	1.0	7.4	2.1	<1.0	<2.0	<1.0	<0.5	
	10-01	1.3	12.1	4.3	<1.0	<2.0	<1.0	<0.5	
	05-02	1.1	10.1	5.1	<1.0	<2.0	<1.0	<0.5	
	10-02	1.2	9.3	5.4	<1.0	<2.0	<1.0	<0.5	
	04-03	2.3	29.3	10.3	<1.0	<2.0	<1.0	<0.5	
	10-03	2.13	20.3	7.13	<1.0	<2.0	<1.0	<0.5	
	04-04	1.06	9.11	3.13	<1.0	<2.0	<1.0	<0.5	
	10-04	1.07	11.2	3.87	<1.0	<2.0	<1.0	<0.5	
	04-05	1.10	10.0	2.80	<1.0	<2.0	<1.0	<0.5	
	10-05	2.13	19.6	6.06	<1.0	<2.0	<1.0	<0.5	
	04-06	1.20	11.0	4.71	<1.0	<2.0	<1.0	<0.5	
	04-07	1.59	17.2	20.5	<1.0	<2.0	1.75	<0.5	
	04-08	1.33	8.20	3.71	<1.0	<2.0	<1.0	<0.500	
	04-09	1.17	4.54	1.08	<1.0	<2.0	<1.0	<0.500	
	05-10*	<1.00/<1.00	2.34/2.15	<1.00/<1.00	<1.00 C/<1.00	<2.00/<10.0	<1.00<1.00	<0.500/<0.500	
MW-1B	07-92	7	250	860	9	2	7	1	
	02-93	<100	230	1,400	12, J	<100	<100	<100	
	12-93	-	-	-	-	-	-	-	
	08-94	2	60	380	3	3	<20	<2	
	12-94	5.5	115	703	5.2	1.4	<2	<1	
	06-95	3.0	27.7	35.1	<1	<1	<2	<1	
	09-95	5.1	55.4	110	1.0	<1	<2	<1	
	12-95	6.5	81.4	175	2.4	<1	<2	<1	
	03-96	4.0	47.4	46.5	<2	<2	<2	<2	
	03-96	4.0	47.4	46.5	<2	<2	<2	<2	
	06-96	4.3	41.1	23.4	<1	<1	<2	<1	
	09-96	5.8	56.8	40.9	<1	<1	<2	<1	
	04-01	1.7	11.9	6.2	<1.0	<2.0	<1.0	<0.5	

TABLE 4-4 (CONTINUED)

HISTORICAL GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS
(Results in µg/L)
ROCKWELL COLLINS, INC., FORMER RALSTON DISPOSAL SITE - CEDAR RAPIDS, IOWA

Well No.	Sample Date	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	Vinyl Chloride	Benzene	Other VOC Detections
MW-1B (Continued)	10-01	2.0	20.3	25.7	<1.0	<2.0	<1.0	<0.5	
	05-02	3.7	35.4	53.9	<1.0	<2.0	<1.0	<0.5	
	10-02	2.6	21.6	21.4	<1.0	<2.0	<1.0	<0.5	
	04-03	5.2	67.2	56.7	<1.0	<2.0	<1.0	<0.5	
	10-03	4.98	49.0	46.7	<1.0	<2.0	<1.0	<0.5	
	04-04	1.93	15.8	12.0	<1.0	<2.0	<1.0	<0.5	
	10-04	3.71	34.7	34.2	<1.0	<2.0	<1.0	<0.5	
	04-05	3.45	34.1	47.9	<1.0	<2.0	<1.0	<0.5	
	10-05	5.25	48.4	56.9	<1.0	<2.0	<1.0	<0.5	
	04-06*	5.22/5.46	47.8/51.5	74.4/78.8	<1.0/<1.0	<2.0/<2.0	<1.0/<1.0	<0.5/<0.5	
	04-07	3.30	28.2	72.0, M1	<1.0	<2.0	<1.0	<0.5	
	04-08*	2.10/2.27	12.4/12.1	32.1/32.2	<1.0/<1.0	<2.0/<2.0	<1.0/<1.0	<0.500/<0.500	
	04-09	3.08	15.2	18.3	<1.0	<2.0	<1.0	<0.5	
	05-10	1.10	5.92	1.70	<1.00 C	<2.00	<1.00	<0.500	
MW-1C	07-92	0.6, J	65	43	0.5	2	<4	<4	
	02-93	<10	45	120	1	2	4, J	140	
	12-93	-	-	-	-	-	-	-	
	08-94	0.4, J	74	160	1	2	<10	16	
	12-94	-	66.9	181	1.2	2.3	<2	10.7	
	06-95	<1	58.1	157	<1	2.5	<2	47.1	
	09-95	<1	85.4	229	<1	4.0	<2	1	
	12-95	<1	85.4	223	2.4	4.8	<2	1.1	
	03-96	<2	63.9	174	<2	2.6	<2	<2	
	06-96	<1	55.5	150	1.3	2.5	<2	<1	
	09-96	<1	59	160	1.6	2.7	<2	1.8	
	04-01	<1.0	67.5	248	9.4	3.5	<1.0	1.4	
	10-01	<1.0	62.7	261	1.7	3.2	<1.0	0.7	
	05-02	<1.0	65.6	249	1.9	3.7	<1.0	<0.5	
	10-02	<1.0	62.7	230	1.7	3.2	<1.0	0.7	
	04-03*	<1.0/<1.0	74.7/74.1	320/327	2.8/2.7	4.1/4.1	<1.0/<1.0	<0.5/<0.5	
	10-03	<1.0	66.0	287	2.19	4.05	<1.0	<0.5	
	04-04*	<1.0/<1.0	62.5/63.2	292/280	2.45/2.19	3.85/3.57	<1.00/<1.00	1.07/1.09	
	10-04	<1.0	65.2	307	2.33	4.30	<1.0	<0.5	
	04-05	<1.0	59.4	269	1.75	3.60	<1.0	<0.5	
	10-05*	<1.0/<2	62.2/63	332/290**	3.03/290**	4.38/5	1.24/<2	<0.5/<2	
	04-06	<1.0	59.4	271	2.18	3.62	<1.00	<0.5	
	04-07	<1.0	53.2	299	3.32	3.48	<1.00	<0.5	
	04-08	<1.0	50.5	299	2.35	3.84	<1.0	<0.500	
	04-09	<1.0	49.4	232	1.54	3.19	<1.0	<0.5	
	05-10	<1.00	52.4	295	3.04	3.19	<1.00	<0.500	

TABLE 4-4 (CONTINUED)

HISTORICAL GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS
(Results in µg/L)
ROCKWELL COLLINS, INC., FORMER RALSTON DISPOSAL SITE - CEDAR RAPIDS, IOWA

Well No.	Sample Date	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	Vinyl Chloride	Benzene	Other VOC Detections
MW-1D	07-92	-	-	-	-	-	-	-	
	02-93	<4	29	61	0.7, J	0.9, J	2, J	<4	
	12-93	0.5, J	35	130	2	1, J	<2	0.3, J	
	06-94	0.2, J	31	90	1	0.8, J	0.4	<2	
	12-94	<1	13.2	28.1	<1	<1	<1	<1	
	06-95	<1	21.9	47.9	<1	<1	<2	<1	
	09-95	<1	14.8	36.9	<1	<1	<2	<1	
	12-95	<1	8.3	18.4	<1	<1	<2	<1	
	03-96	<1	5.7	8.3	<1	<1	<2	<1	
	06-96	<1	3.6	7.0	<1	<1	<2	<1	
	09-96	<1	7.2	14.5	<1	<1	<2	<1	
	04-01	<1.0	9.4	30.6	<1.0	<2.0	<1.0	<0.5	
	10-01	<1.0	10.0	42.5	<1.0	<2.0	<1.0	<0.5	
	05-02	<1.0	3.6	9.2	<1.0	<2.0	<1.0	<0.5	
	10-02	<1.0	10.9	41.3	<1.0	<2.0	<1.0	<0.5	
	04-03	<1.0	2.6	7.2	<1.0	<2.0	<1.0	<0.5	
	10-03	<1.0	3.60	11.7	<1.0	<2.0	<1.0	<0.5	
	04-04	<1.0	11.1	63.4	<1.0	<2.0	<1.0	<0.5	
	10-04	<1.0	11.7	52.3	<1.0	<2.0	<1.0	<0.5	
	04-05*	<1.0/<1.0	3.83/3.72	13.0/13.2	<1.0/<1.0	<2.0/<2.0	<1.0/<1.0	<0.5/<0.5	
	10-05*	<1.0/<2	1.78/<2	4.94/6**	<1.0/6**	<2.0/<2	<1.0/<2	<0.5/<2	
	04-06	<1.0	<1.0	1.80	<1.0	<2.0	<1.0	<0.5	
	04-07	<1.0	3.76	21.2	<1.0	<2.0	<1.0	<0.5	
	04-08	<1.0	17.3	108, M1	<1.0	<2.0	<1.0	<0.500	
	04-09	<1.0	17.4	64.9	<1.0	<2.0	<1.0	<0.5	
	05-10	<1.00	15.3	55.4	<1.00 C	<2.00	<2.00	<0.500	
MW-2A	07-92	<10	37	110	2, J	1, J	7, J	<10	
	02-93	2, J	36	88	1, J	<10	5, J	<10	
	12-93	-	-	-	-	-	-	-	
	06-94	-	-	-	-	-	-	-	
	12-94	<1	15.2	41.1	<1	<1	<2	<1	
	06-95	<1	14.8	52.7	<1	<1	3.0	<1	
	09-95	<1	29.8	132	<1	<1	4.9	<1	
	12-95	<1	24.2	65.5	<1	<1	<2	<1	
	03-96	<1	19.6	40.8	<1	<1	<2	<1	
	06-96	<1	17.4	33.0	<1	<1	<2	<1	
	09-96	<1	31.9	109	1.4	<1	2.9	<1	
	04-01	<1.0	1.5	1.8	<1.0	<2.0	<1.0	<0.5	

TABLE 4-4 (CONTINUED)

HISTORICAL GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS
(Results in µg/L)
ROCKWELL COLLINS, INC., FORMER RALSTON DISPOSAL SITE - CEDAR RAPIDS, IOWA

Well No.	Sample Date	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	Vinyl Chloride	Benzene	Other VOC Detections
MW-2A (Continued)	10-01	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	05-02	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-02	<1.0	6	18	<1.0	<2.0	<1.0	<0.5	
	04-03	<1.0	5.8	3.7	<1.0	<2.0	<1.0	<0.5	
	10-03	<1.0	2.52	7.25	<1.0	<2.0	<1.0	<0.5	
	04-04	<1.0	1.26	2.88	<1.0	<2.0	<1.0	<0.5	
	10-04	<1.0	3.41	12.4	<1.0	<2.0	<1.0	<0.5	
	04-05	<1.0	1.29	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-05	<1.0	5.35	28.6	<1.0	<2.0	<1.0	<0.5	
	04-06	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-07*	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<2.0/<2.0	<1.0/<1.0	<0.5/<0.5	
	04-08	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.500	
	04-09	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	05-10*	<1.00/<1.00	<1.00/<1.00	<1.00/<1.00	<1.00 C/<1.00 C	<2.00/<2.00	<1.00/<1.00	<0.500/<0.500	
MW-2B	07-92	<1	<1	<1	<1	<1	420	<1	
	02-93	<1	<1	<1	<1	<1	620	<1	
	12-93	<1	<1	<1	<1	<1	-	<1	
	06-94	<1	<1	<1	<1	<1	200	<1	
	12-94	<1	<1	<1	<1	<1	362	<1	
	06-95	<1	<1	<1	<1	<1	179	<1	
	09-95	<1	<1	<1	<1	<1	290	<1	
	12-95	<1	<1	<1	<1	<1	769	<1	
	03-96	<1	<1	1.2	<1	<1	939	<1	
	06-96	<1	<1	1.1	<1	<1	786	<1	
	09-96	<1	<1	<1	<1	<1	572	<1	
	04-01	<1.0	<1.0	2.0	<1.0	<2.0	625	<0.5	
	10-01	<1.0	12.1	3.0	<1.0	<2.0	559	<0.5	1.2[a]
	05-02	<1.0	<1.0	5.0	<1.0	<2.0	1,480	<0.5	
	10-02	<1.0	<1.0	2	<1.0	<2.0	461	<0.5	
	04-03*	<1.0/<1.0	<1.0/<1.0	7.7/7.8	<1.0/<1.0	<2.0/<2.0	1,000/991	<0.5/<0.5	6.3[b]
	10-03	<1.0	<1.0	6.46	<1.0	<2.0	886	<0.5	4.87[b]
	04-04	<1.0	<1.0	5.00	<1.0	<2.0	601	<0.5	0.31[c]
	10-04*	<1.0/<1.0	<1.0/<1.0	5.53/5.32	<1.0/<1.0	<2.0/<2.0	633/523	<0.5/<0.5	
	04-05	<1.0	<1.0	5.24	<1.0	<2.0	971	<0.5	
	10-05	<1.0/<1.0	<1.0/<1.0	8.58/1.05	<1.0/<1.0	<2.0/<2.00	1,010/1,030	<0.5/<0.5	
	04-06	<1.0	<1.0	9.36	<1.0	<2.0	906	<0.5	
	04-07	<1.0	<1.0	5.30	<1.0	<2.0	662	<0.5	
	04-08	<1.0	<1.0	3.49	<1.0	<2.0	474	<0.500	
	04-09	<10.0	<10.0	<10.0	<10.0	<20.0	298	<5.0	
	05-10	<5.00	<5.00	<5.00	<5.00	<50.0	413	<2.50	

TABLE 4-4 (CONTINUED)

HISTORICAL GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS
(Results in µg/L)
ROCKWELL COLLINS, INC., FORMER RALSTON DISPOSAL SITE - CEDAR RAPIDS, IOWA

Well No.	Sample Date	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	Vinyl Chloride	Benzene	Other VOC Detections
MW-3A	07-92	6, J	3,900	11,000	32, J	260	1,500	7, J	
	02-93	<2,500	4,300	33,000	<2,500	440, J	8,900	<2,500	
	12-93	-	-	-	-	-	-	-	
	08-94	-	-	-	-	-	-	-	
	12-94	1.2	1,670	15,000	69.2	22.5	2,420	5.8	
	06-95	-	-	-	-	-	-	-	
	09-95	-	-	-	-	-	-	-	
	12-95	<5	883	7,760	41.2	95.2	1,330	<5	
	03-96	<50	1,180	6,190	<50	87.0	872	<50	
	07-96	<10	5,000	32,300	60.3	400.0	2,320	<10	
	09-96	<10	302	7,100	42.7	83.6	814	2	
	04-01	2.0	4,460	28,300	1,780	390	1,160	4.5	3.3[a]
	10-01	<1.0	561	15,100	<1.0	<2.0	<1.0	3.0	
	05-02*	<1.0/<500	1,690/2,200	23,500/21,000	75.0	167/<500	969/1,400	3.2/<500	7.4[a], 2.6[e]
	10-02	<1.0	475	18,500	88.3	211	1,230	3.6	3.9[a], 8.8[e]
	04-03	<1.0	70.6	14,800	168	<100	927	<0.5	5.3[a], 1.8[e], 1.1[f]
	10-03	<1.0	173	7,080	64.7	52.2	472	1.79	3.96[a]
	04-04	1.30	3,580	22,800	246	298	966	4.42	3.62[a], 8.33[e]
	10-04	<1.0	198	8,120	58.6	78.5	640	1.78	1.08[e]
	04-05	<1.0	125	6,720	44.0	44.2	518	0.96	2.81[a]
	10-05*	<1.0/<100	264/220	5,910/6,700**	65.3/6,700**	42.9/<100	472/420	1.21/<100	3.20[a]
	04-06	<1.0	19.2	3,860	15.1	26.0	298	<0.5	2.44[a]
	04-07	<1.0	1,520	20,400	261	164	898	2.48	4.04[a]
	04-08	<1.0	2,390	23,200	59.1	222	739	3.01	4.19[a]
	04-09*	<5.0/<1.0	3,090/2,990	22,600/20,400	28.7/111	118/228	856/807	14.9/3.23	
	05-10	<100	6,140	30,800	<100	321	1,100	<50.0	
MW-3B	07-92	0.8, J	2,200	4,600	14	240	2,100	25	
	02-93	<500	1,200	4,800	<500	200, J	1,800	62, J	
	12-93	-	-	-	-	-	-	-	
	08-94	<2	580	2,400	12	140	1,800	13	
	12-94	<1	493	3,200	17.3	134	1,480	12.1	
	06-95	<1	410	2,630	21.9	117	1,560	9.6	
	09-95	<1	331	3,040	28.2	121	1,850	9.1	
	12-95	<1	337	3,100	26.9	141	1,890	10.6	
	03-96	<20	422	2,930	<20	102	1,480	<20	
	07-96	<1	562	3,340	9.0	117	1,300	9.8	
	04-01	<1.0	442	4,320	45.0	143	1,450	9.9	
	10-01	1.3	269	3,900	<1.0	<2.0	<1.0	10.2	
	05-02	<1.0/<100	257/350	3,060/3,900	24.8	110/150	1,270/1,900	9.9/<100	

TABLE 4-4 (CONTINUED)

HISTORICAL GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS
(Results in µg/L)
ROCKWELL COLLINS, INC., FORMER RALSTON DISPOSAL SITE - CEDAR RAPIDS, IOWA

Well No.	Sample Date	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	Vinyl Chloride	Benzene	Other VOC Detections
MW-3B (Continued)	10-02	<1.0	375	4,910	17.6	158	1,700	16.8	
	04-03	<1.0	348	5,880	75.1	157	2,490	16.8	
	10-03	<1.0	247	5,790	91.4	153	2,180	16.9	
	04-04	<1.0	332	5,050	46.1	142	1,830	14.1	
	10-04	<1.0	224	4,760	22.8	124	1,990	15.8	0.41[e]
	04-05	<1.0	223	4,700	18.7	109	2,070	12.3	
	10-05	<1.0	145	6,100	103	133	2,820	14.9	
	04-06	<1.0	344	6,100	26.0	193	1,980	19.0	
	04-07	<1.0	324	6,410	142	132	1,810	14.7	
	04-08	<1.0	320	5,490	14.7	142	1,770	15.0	
	04-09	<10.0	256	5,380	28.7	118	1,850	14.9	
	05-10	<20.0	275	6,640	<20.0	<200	2,510	17.2	
MW-3C	07-92	-	-	-	-	-	-	-	
	02-93	<2	0.7, J	8	<2	6, J	3	<2	
	12-93	-	-	-	-	-	-	-	
	08-94	<2	0.2, J	38,000	5	200, J	9,000	<2	
	12-94	<1	1.0	73,200	76.5	328	8,290	246	
	06-95	-	-	-	-	-	-	-	
	09-95	<1	1.2	204	2.1	2.6	202	<1	
	12-95	-	-	-	-	-	-	-	
	03-96	-	-	-	-	-	-	-	
	07-96	-	-	-	-	-	-	-	
	09-96	-	-	-	-	-	-	-	
	05-01	<1.0	<1.0	15,000	286	108	9,730	54.4	22.6[f], 3.4[e], 23.0[d], 3.4[d]
	10-01	<1.0	<1.0	37,200	119	242	6,950	79	
	05-02	<1.0	1.1	38,300	303	314	7,620	100	3.4[e], 66.4[f]
	10-02	<1.0	2.4	36,000	164	366	6,200	103	3[a], 3[d], 55.3[f]
	04-03	<1.0	1.0	40,100	429	430	7,360	113	1.5[e], 2.9[e], 54.4[f]
	04-04	<1.0	2.40	45,100	427	407	8,160	117	2.83[e], 1.92[g], 55.7[f]
	04-05	<1.0	1.00	46,700	201	352	9,430	119	2.52[e], 73.5
	10-05	<1.0	1.35	40,500	<100	347	7,100	120	2.89[e], 2.64[g], 62.8
	04-06	<1.0	1.12	41,800	396	451	7,610	137	1.63[e], 5.17[e], 73.8[f], 3.34[g]

TABLE 4-4 (CONTINUED)

HISTORICAL GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS
(Results in µg/L)
ROCKWELL COLLINS, INC., FORMER RALSTON DISPOSAL SITE - CEDAR RAPIDS, IOWA

Well No.	Sample Date	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	Vinyl Chloride	Benzene	Other VOC Detections
MW-3C	04-07	<1.0	1.26	49,300	878	346	8,000	121	75.0[f], 1.94[g]
(Continued)	04-08	<1.0	<20.0	40,200	111	381	8,050	121	1.07[h], 76.7[i]
	04-09	<100	<100	28,400	<100	236	6,520	91.0	
	05-10	<200	<200	35,600	<200	<2,000	9,640	<100	
MW-3D	07-92	-	-	-	-	-	-	-	
	02-93	<50	58	500	<50	6, J	110	5, J	
	12-93	<2	7	33	0.4, J	0.4, J	2	<2	
	08-94	<2	3	15	0.4, J	0.4, J	7	<2	
	12-94	<1	2.2	11	<1	<1	2.6	<1	
	06-95	<1	2.1	6.4	<1	<1	<2	<1	
	09-95	<1	1.2	8.1	<1	<1	3.2	<1	
	12-95	<1	1.2	4.9	<1	<1	<2	<1	
	03-96	<1	1.1	3.2	<1	<1	<2	<1	
	07-96	<1	<1	<1	<1	<1	<2	<1	
	09-96	<1	<1	2.3	<1	<1	<2	<1	
	04-01	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-01	<1.0	<1.0	2.0	<1.0	<2.0	1.2	<0.5	
	05-02	<1.0	<1.0	1.2	<1.0	<2.0	<1.0	<0.5	
	10-02	<1.0	<1.0	1.2	<1.0	<2.0	<1.0	<0.5	
	04-03	<1.0	<1.0	1.13	<1.0	<2.0	<1.00	<0.5	
	10-03*	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<2.0/<2.0	<1.0/<1.0	<0.5/<0.5	
	04-04*	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<2.0/<2.0	<1.0/<1.0	<0.5/<0.5	
	10-04	<1.0	<1.0	1.20	<1.0	<2.0	<1.0	<0.5	
	04-05*	<1.0/<1.0	<1.0/<1.0	1.31/1.59	<1.0/<1.0	<2.0/<2.0	<1.0/<1.0	<0.5/<0.5	
	10-05	<1.0/<1.0	<1.0/<1.0	<1.0/1.05	<1.0/<1.0	<2.0/<2.0	<1.00/<1.0	<0.5/<0.5	
	04-06*	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<2.0/<2.0	<1.0/<1.0	<0.5/<0.5	
	04-07	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-08	<1.0	<1.0	1.11	<1.0	<2.0	<1.0	<0.500	
	04-09	<1.00	<1.00	1.64	<1.0	<2.0	<1.0	<0.500	
	05-10	<1.00	1.02	5.05	<1.00	<10.0 Mla	1.95	<0.500	
MW-3E	12-93	<2	0.2, J	1, J	<2	<2	<2	<2	
	08-94	<2	<2	<2	<2	<2	<2	<2	
	12-94	<1	<1	<1	<1	<1	<2	<1	
	06-95	<1	<1	<1	<1	<1	<2	<1	
	09-95	<1	<1	<1	<1	<1	<2	<1	
	12-95	<1	<1	<1	<1	<1	<2	<1	
	03-96	<1	<1	<1	<1	<1	<2	<1	

TABLE 4-4 (CONTINUED)

HISTORICAL GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS
(Results in µg/L)
ROCKWELL COLLINS, INC., FORMER RALSTON DISPOSAL SITE - CEDAR RAPIDS, IOWA

Well No.	Sample Date	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	Vinyl Chloride	Benzene	Other VOC Detections
MW-3E	07-96	<1	<1	<1	<1	<1	<2	<1	
(Continued)	09-96	<1	<1	<1	<1	<1	<2	<1	
	04-01	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	1.1[a]
	10-01	<1.0	<1.0	1.9	<1.0	<2.0	<1.0	<0.5	
	05-02	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-02	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<1	
	04-03	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	1.04[a]
	10-03	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-04	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-04*	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<2.0/<2.0	<1.0/<1.0	<0.5/<0.5	
	04-05	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-05	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-06	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-07	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-08	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.500	
	04-09	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.500	
	05-10	<1.00	<1.00	<1.00	<5.00	<10.0	<1.00	<0.500	
MW-4A	07-92	-	-	-	-	-	-	-	
	02-93	<2	<2	2	<2	<2	1, J	<2	
	12-93	-	-	-	-	-	-	-	
	08-94	-	-	-	-	-	-	-	
	12-94	<1	<1	1.4	<1	<1	<2	<1	
	06-95	<1	<1	<1	<1	<1	<2	<1	
	09-95	<1	<1	3.2	<1	<1	<2	<1	
	12-95	<1	<1	3.7	<1	<1	2.2	<1	
	03-96	<1	<1	<1	<1	<1	<2	<1	
	07-96	<1	<1	1.2	<1	<1	<2	<1	
	09-96	<1	<1	2.4	<1	<1	<2	<1	
	04-01	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-01	<1.0	<1.0	3.0	<1.0	<2.0	2.4	<0.5	
	05-02	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-02	<1.0	<1.0	2.8	<1.0	<2.0	2.2	<0.5	
	04-03	<1.0	<1.0	1.2	<1.0	<2.0	<1.0	<0.5	
	10-03	<1.0	<1.0	3.27	<1.0	<2.0	1.93	<0.5	
	04-04	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-04	<1.0	<1.0	3.43	<1.0	<2.0	1.64	<0.5	
	04-05	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-05	<1.0	<1.0	2.35	<1.0	<2.0	1.63	<0.5	
	04-06	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<0.5	

TABLE 4-4 (CONTINUED)

HISTORICAL GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS
(Results in µg/L)
ROCKWELL COLLINS, INC., FORMER RALSTON DISPOSAL SITE - CEDAR RAPIDS, IOWA

Well No.	Sample Date	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	Vinyl Chloride	Benzene	Other VOC Detections
MW-4A (Continued)	04-07	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-08	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-09	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.500	
	05-10	<1.00	<1.00	<1.00	<1.00	<10.0	<1.0	<0.500	
MW-4B	07-92	-	-	-	-	-	-	-	
	02-93	<2	<2	0.3, J	<2	<2	0.7, J	<2	
	12-93	-	-	-	-	-	-	-	
	08-94	<2	<2	<2	<2	<2	<2	<2	
	12-94	<1	<1	<1	<1	<1	<2	<1	
	06-95	<1	<1	<1	<1	<1	<2	<1	
	09-95	<1	<1	<1	<1	<1	<2	<1	
	12-95	<1	<1	<1	<1	<1	<2	<1	
	03-96	<1	<1	<1	<1	<1	<2	<1	
	07-96	<1	<1	<1	<1	<1	<2	<1	
	09-96	<1	<1	<1	<1	<1	<2	<1	
	04-01	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-01	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	05-02	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-02	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-03	<1.0	<1.0	<1.0	<1.0	<2.0	2.5	<0.5	
	10-03	<1.0	<1.0	<1.0	<1.0	<2.0	1.21	<0.5	
	04-04	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-04	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-05	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-05	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-06	<1.0	<1.0	<1.0	<1.0	<2.0	1.50	<0.5	
	04-07	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-08	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-09	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.500	
	05-10	<1.0	<1.00	<1.00	<1.00	<10.0	<1.00	<0.500	
MW-4C	07-92	-	-	-	-	-	-	-	
	02-93	<2	0.6, J	1, J	<2	<2	<2	<2	
	12-93	<2	0.4, J	1, J	<2	<2	<2	<2	
	08-94	<2	0.4, J	1, J	<2	<2	<2	<2	
	12-94	<1	<1	<1	<1	<1	<2	<1	
	06-95	<1	<1	<1	<1	<1	<1	<1	
	09-95	<1	<1	<1	<1	<1	<1	<1	
	12-95	<1	<1	<1	<1	<1	<2	<1	

TABLE 4-4 (CONTINUED)

HISTORICAL GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS
(Results in µg/L)
ROCKWELL COLLINS, INC., FORMER RALSTON DISPOSAL SITE - CEDAR RAPIDS, IOWA

Well No.	Sample Date	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	Vinyl Chloride	Benzene	Other VOC Detections
MW-4C (Continued)	03-96	<1	<1	<1	<1	<1	<2	<1	
	07-96	<1	<1	<1	<1	<1	<2	<1	
	09-96	<1	<1	<1	<1	<1	<2	<1	
	04-01	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-01	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	05-02	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-02	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	2[a]
	04-03	<1.0	<1.0	1.1	<1.0	<2.0	<1.0	<0.5	
	10-03	<1.0	<1.0	1.02	<1.0	<2.0	<1.0	<0.5	
	04-04	<1.0	<1.0	1.48	<1.0	<2.0	<1.0	<0.5	
	10-04	<1.0	<1.0	1.85	<1.0	<2.0	<1.0	<0.5	
	04-05	<1.0	<1.0	1.36	<1.0	<2.0	<1.0	<0.5	
	10-05	<1.0	<1.0	1.28	<1.0	<2.0	<1.0	<0.5	
	04-06	<1.0	<1.0	1.70	<1.0	<2.0	<1.0	<0.5	
	04-07	<1.0	<1.0	1.11	<1.0	<2.0	<1.0	<0.5	
	04-08	<1.0	<1.0	1.00	<1.0	<2.0	<1.0	<0.500	
	04-09	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.500	
	05-10	<1.00	<1.00	<1.00	<1.00	<10.0	<1.00	<0.500	
MW-5D	12-93	<2	<2	<2	<2	<2	<2	<2	
	08-94	<2	<2	<2	<2	<2	<2	<2	
	12-94	<1	<1	<1	<1	<1	<2	<1	
	06-95	<1	<1	<1	<1	<1	<1	<1	
	09-95	<1	<1	<1	<1	<1	<1	<1	
	12-95	<1	<1	<1	<1	<1	<2	<1	
	03-96	<1	<1	<1	<1	<1	<2	<1	
	07-96	<1	<1	<1	<1	<1	<2	<1	
	09-96	<1	<1	<1	<1	<1	<2	<1	
	04-01	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-01	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-02	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-02	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-03	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-03	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-04	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-04	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-05	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-05	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-06	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-07	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	

TABLE 4-4

HISTORICAL GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS
(Results in µg/L)
ROCKWELL COLLINS, INC., FORMER RALSTON DISPOSAL SITE - CEDAR RAPIDS, IOWA

Well No.	Sample Date	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	Vinyl Chloride	Benzene	Other VOC Detections
MW-1A	07-92	5	180	170	2	1, J	<2	<2	
	02-93	2, J	120	190	2, J	<10	<10	<10	
	12-93	-	-	-	-	-	-	-	
	08-94	-	-	-	-	-	-	-	
	12-94	1.9	87.5	144	1.8	<1	<2	<1	
	06-95	1.3	16.8	11	<1	<1	<2	<1	
	09-95	2.0	34.7	42.6	<1	<1	<2	<1	
	12-95	2.3	56.7	84.4	1.7	<1	<2	<1	
	03-96	1.8	70.8	128	2.7	<1	<2	<1	
	06-96	2.3	28.4	15.1	<1	<1	<2	<1	
	09-96	2.6	33.9	20.4	<1	<1	<2	<1	
	04-01	1.0	7.4	2.1	<1.0	<2.0	<1.0	<0.5	
	10-01	1.3	12.1	4.3	<1.0	<2.0	<1.0	<0.5	
	05-02	1.1	10.1	5.1	<1.0	<2.0	<1.0	<0.5	
	10-02	1.2	9.3	5.4	<1.0	<2.0	<1.0	<0.5	
	04-03	2.3	29.3	10.3	<1.0	<2.0	<1.0	<0.5	
	10-03	2.13	20.3	7.13	<1.0	<2.0	<1.0	<0.5	
	04-04	1.06	9.11	3.13	<1.0	<2.0	<1.0	<0.5	
	10-04	1.07	11.2	3.87	<1.0	<2.0	<1.0	<0.5	
	04-05	1.10	10.0	2.80	<1.0	<2.0	<1.0	<0.5	
	10-05	2.13	19.6	6.06	<1.0	<2.0	<1.0	<0.5	
	04-06	1.20	11.0	4.71	<1.0	<2.0	<1.0	<0.5	
	04-07	1.59	17.2	20.5	<1.0	<2.0	1.75	<0.5	
	04-08	1.33	8.20	3.71	<1.0	<2.0	<1.0	<0.500	
	04-09	1.17	4.54	1.08	<1.0	<2.0	<1.0	<0.500	
	05-10*	<1.00/<1.00	2.34/2.15	<1.00/<1.00	<1.00 C/<1.00	<2.00/<10.0	<1.00<1.00	<0.500/<0.500	
MW-1B	07-92	7	250	860	9	2	7	1	
	02-93	<100	230	1,400	12, J	<100	<100	<100	
	12-93	-	-	-	-	-	-	-	
	08-94	2	60	380	3	3	<20	<2	
	12-94	5.5	115	703	5.2	1.4	<2	<1	
	06-95	3.0	27.7	35.1	<1	<1	<2	<1	
	09-95	5.1	55.4	110	1.0	<1	<2	<1	
	12-95	6.5	81.4	175	2.4	<1	<2	<1	
	03-96	4.0	47.4	46.5	<2	<2	<2	<2	
	03-96	4.0	47.4	46.5	<2	<2	<2	<2	
	06-96	4.3	41.1	23.4	<1	<1	<2	<1	
	09-96	5.8	56.8	40.9	<1	<1	<2	<1	
	04-01	1.7	11.9	6.2	<1.0	<2.0	<1.0	<0.5	

TABLE 4-4 (CONTINUED)

HISTORICAL GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS
(Results in µg/L)
ROCKWELL COLLINS, INC., FORMER RALSTON DISPOSAL SITE - CEDAR RAPIDS, IOWA

Well No.	Sample Date	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	Vinyl Chloride	Benzene	Other VOC Detections
MW-8D	10-02	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
(Continued)	04-03	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-03*	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<2.0/<2.0	<1.0/<1.0	<0.5/<0.5	
	04-04	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-04	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-05	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	10-05	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-06	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-07	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-08	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	04-09	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<0.5	
	05-10	<1.00	<1.00	<1.00	<1.00	<10.0	<1.00	<0.500	
MW-9B	08-94	<20	110	330	3,J	95	4, J	110	
	12-94	<1	3.6	153	<1	1.3	<2	<1	
	06-95	<1	5.5	371	2.7	4.8	3.2	<1	
	09-95	<1	1.6	52.6	<1	<1	<2	<1	
	12-95	<1	<1	31.9	<1	<1	<2	<1	
	03-96	<1	1.3	22.1	<1	<1	<2	<1	
	06-96	<1	4.2	39.0	<1	<1	<2	<1	
	09-96	<1	6.5	99.3	<1	1.1	<2	<1	
	06-96	<1	4.2	39.0	<1	<1	<2	<1	
	09-96	<1	6.5	99.3	<1	1.1	<2	<1	
	04-01	<1.0	5.8	500	5.8	4.8	4.6	<0.5	
	10-01	<1.0	3.4	381	1.3	2.8	<1.0	<0.5	
	04-02	<1.0	1.6	73.0	<1.0	<2.0	2.5	<0.5	
	10-02	<1.0	4.3	366	3.3	<2.0	2.4	<0.5	
	04-03	<1.0	<1.0	13.5	<1.0	<2.0	<1.0	<0.5	
	10-03	<1.0	3.17	229	2.00	3.21	17.0	<0.5	
	04-04	<1.0	4.90	648	4.08	6.23	8.26	<0.5	
	10-04	<1.0	1.89	225	1.69	2.35	<1.0	<0.5	
	04-05	<1.0	2.09	82.7	<1.0	<2.0	5.43	<0.5	
	10-05	<1.0	2.09	36.6	<1.0	<2.0	<1.0	<0.5	
	04-06	<1.0	1.21	19.1	<1.00	<2.0	3.88	<0.5	
	04-07*	<1.0/<1.0	4.84/4.83	981/874	7.97/9.96	9.14/8.29	10.4/10.0	<0.5/<0.5	
	04-08*	<1.0/<1.0	2.44/2.48	498/499	2.83/23.46	5.12/5.41	19.5/.19.2	<0.500/<0.500	
	04-09	<1.0/<1.0	1.59/1.58	233/241	1.02/<1.0	2.36/2.30	13.5/15.0	<0.500/<0.500	
	05-10	<5.00	<5.00	205	<5.00	<50.0	17.8	<2.50	
MW-9D	08-94	<2	5	12	<2	0.2, J	<2	<2	
	12-94	<1	4.2	11.1	<1	<1	<1	<1	

TABLE 4-4 (CONTINUED)

HISTORICAL GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS
(Results in µg/L)
ROCKWELL COLLINS, INC., FORMER RALSTON DISPOSAL SITE - CEDAR RAPIDS, IOWA

Well No.	Sample Date	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	Vinyl Chloride	Benzene	Other VOC Detections
MW-9D (Continued)	06-95	<1	6.0	16.3	<1	<1	<1	<1	
	09-95	<1	5.2	17.8	<1	<1	<1	<1	
	12-95	<1	5.5	18.7	<1	<1	<1	<1	
	06-96	<1	5.9	14.8	<1	<1	<2	<1	
	09-96	<1	<1	13.2	<1	<1	<2	5.2	
	04-01	<1.0	4.3	14.2	<1.0	<2.0	<1.0	<0.5	
	10-01	<1.0	3.6	17.0	<1.0	<2.0	<1.0	<0.5	
	04-02	<1.0	5.3	19.5	<1.0	<2.0	<1.0	<0.5	
	10-02	<1.0	5.3	21	<1.0	<2.0	<1.0	<0.5	
	04-03	<1.0	5.0	20.3	<1.0	<2.0	<1.0	<0.5	
	10-03	<1.0	3.99	21.2	<1.0	<2.0	<1.0	<0.5	
	04-04	<1.0	5.09	32.3	<1.0	<2.0	<1.0	<0.5	
	10-04	<1.0	5.60	34.4	<1.0	<2.0	<1.0	<0.5	
	04-05	<1.0	4.50	23.2	<1.0	<2.0	<1.0	<0.5	
	10-05	<1.0	5.20	23.2	<1.0	<2.0	<1.0	<0.5	
	04-06	<1.0	3.04	11.4	<1.0	<2.0	<1.0	<0.5	
	04-07	<1.0	3.56	20.7	<1.0	<2.0	<1.0	<0.5	
	04-08	<1.0	4.17	29.1	<1.0	<2.0	<1.0	<0.5	
	04-09	<1.0	3.78	24.1	<1.0	<2.0	<1.0	<0.5	
	05-10	<1.00	4.40	33.1	<1.00	<10.0	<1.00	<0.500	
Groundwater Action Level		5	5	70	NE	7	2	5	

Notes:

J Analyte reported below detection limit and is an estimated value.
- Indicates sample was not collected.
* Duplicate sample collection designations are as follows:
  MW-1B, 04-06; blind duplicate sample collected from MW-1B, labeled as MW-1E (duplicate sample indicated second).
  MW-1C, 04-03; blind duplicate sample collected from MW-1C, labeled as MW-1E (duplicate sample indicated second).
  MW-1C, 04-04; blind duplicate sample collected from MW-1C, labeled as MW-2C (duplicate sample indicated second).
  MW-1C, 10-05; Iowa Department of Natural Resources (IDNR) split result.
  MW-1D, 04-05; blind duplicate sample collected from MW-1D, labeled as MW-1E (duplicate sample indicated second).
  MW-1D, 10-05; IDNR split sample result.
  MW-2B, 04-03; blind duplicate sample collected from MW-2B, labeled as MW-2C (duplicate sample indicated second).
  MW-2B, 10-04; blind duplicate sample collected from MW-2B, labeled as MW-2C (duplicate sample indicated second).
  MW-2B, 10-05; blind duplicate sample collected from MW-2B, labeled as MW-2C (duplicate sample indicated second).

TABLE 4-4 (CONTINUED)

HISTORICAL GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS
(Results in µg/L)
ROCKWELL COLLINS, INC., FORMER RALSTON DISPOSAL SITE - CEDAR RAPIDS, IOWA

Notes (continued):

* Duplicate sample collection designations are as follows (continued):
MW-2A, 04-07; blind duplicate sample collected from MW-2A, labeled as MW-2C (duplicate sample indicated second).
MW-3A, 05-02; IDNR split sample result.
MW-3A, 10-05; IDNR split sample result.
MW-3B, 05-02; IDNR split sample result.
MW-3D, 10-03; blind duplicate sample collected from MW-3D, labeled as MW-2C (duplicate sample indicated second).
MW-3D, 04-04; blind duplicate sample collected from MW-3D, labeled as MW-1E (duplicate sample indicated second).
MW-3D, 04-05; blind duplicate sample collected from MW-3D, labeled as MW-2C (duplicate sample indicated second).
MW-3D, 10-05; blind duplicate sample collected from MW-3D, labeled as MW-1E (duplicate sample indicated second).
MW-3D, 04-06; blind duplicate sample collected from MW-3D, labeled as MW-2C (duplicate sample indicated second).
MW-3E, 10-04; blind duplicate sample collected from MW-3E, labeled as MW-1E (duplicate sample indicated second).
MW-8D, 10-03; blind duplicate sample collected from MW-8D, labeled as MW-1E (duplicate sample indicated second).
MW-9B, 04-07; blind duplicate sample collected from MW-9B, labeled as MW-1E (duplicate sample indicated second).
MW-1B, 04-08, blind duplicate sample collected from MW-1B, labeled as MW-2C (duplicate sample indicated second).
MW-9B, 04-08, blind duplicate sample collected from MW-9B, labeled as MW-1E (duplicate sample indicated second).
MW-3A, 04-09, blind duplicate sample collected from MW-3A, labeled as MW-2C (duplicate sample indicated second).
MW-9B, 04-09, blind duplicate sample collected from MW-9B, labeled as MW-1E (duplicate sample indicated second).
MW-1A; 05-10; blind duplicate sample collected from MW-1A; labeled as MW-1E (duplicate sample indicated second).
MW-2A; 05-10; blind duplicate sample collected from MW-2A; labeled as MW-2C (duplicate sample indicated second).

** Result is total 1,2-Dichloroethene (DCE).
a Carbon disulfide.
b Chloroethane.
c Carbon tetrachloride (LL).
d 1,2-Dichlorobenzene.
e 1,1-Dichloroethane (DCA).
f Toluene.
g 1,2-Dichloroethane (LL).
h Ethylbenzene.

NE = Groundwater Action Level not established (Record of Decision – September 1999).

ATTACHMENT D
THURNESS WELL MONITORING

TABLE 4-7

SUMMARY OF VOLATILE ORGANIC COMPOUND DETECTIONS IN THURNESS WELL ROCKWELL COLLINS, FORMER RALSTON DISPOSAL SITE - CEDAR RAPIDS, IOWA (Concentrations in µg/L)

Date Sampled	Trichloroethene	cis-1,2-Dichloroethene	Vinyl Chloride
February 1993	1,J	2	ND
December 1993	ND	ND	ND
August 1994	NS	NS	NS
December 1994	1.8	1.9	ND
June 1995	1.3	2	ND
September 1995	1.8	2.5	ND
December 1995	ND	ND	ND
March 1996	2	2.2	ND
June 1996	ND	ND	ND
September 1996	3.6	4.8	ND
October 1996	2.8	2	ND
January 1997	3.1	3.7	ND
April 1997	3.0	3.5	ND
July 1997	2.0	2.2	ND
October 1997	1.7	2.1	ND
January 1998	ND	ND	ND
April 1998	ND	ND	ND
July 1998	ND	ND	ND
April 1999	ND	ND	ND
November 1999	ND	ND	ND
April 2001	ND	ND	ND
October 2001	ND	ND	ND
April 2002	ND	ND	ND
May 2002[a]	ND	ND	1.0
October 2002	ND	ND	ND
April 2003	ND	ND	1.2
October 2003	ND	ND	ND
April 2004	ND	ND	ND
October 2004	ND	ND	ND
April 2005	ND	ND	ND
October 2005	ND	ND	1.1
October 2005[a]	ND	ND	ND
April 2006	ND	ND	ND
October 2006	ND	ND	ND
April 2007	ND	ND	ND
September 2007	ND	ND	ND
April 2008	ND	ND	ND
October 2008	ND	ND	ND
April 2009	ND	ND	ND
October 2009	ND	ND	ND
May 2010	ND	ND	ND
October 2010	ND	ND	ND

Notes:

J = Indicates analyte detected at estimated concentration.
ND = Analyte not detected above laboratory quantification limits.
NS = Well not sampled.
µg/L = Micrograms per liter.
[a] Iowa Department of Natural Resources split sample.

Attachment E
Site Inspection Checklist

I. SITE INFORMATION	
Site name: Ralston	**Date of inspection: 4-14-2011**
Location and Region: Cedar Rapids, IA	**EPA ID: IAD980632491**
Agency, office, or company leading the five-year review: EPA-Region 7	**Weather/temperature: 50°F, overcast**

Remedy Includes: (Check all that apply)

- ■ Landfill cover/containment
- ■ Access controls
- ■ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other _____
- ■ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Tom Gentner-Rockwell Collins Dir. of Env., Safety & Health Ops. 4-14-2011
   Name Title Date
   Interviewed ■ at site ■ at office ☐ by phone Phone no. 319-295-5710
   Problems, suggestions; ☐ Report attached _____

2. **O&M staff** Steve Varsa-MWH Project Manager 4-14-2011
   Name Title Date
   Interviewed ■ at site ■ at office ☐ by phone Phone no. 515-253-0830
   Problems, suggestions; ☐ Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

   Agency Iowa Department of Natural Resources
   Contact Greg Fuhrmann 4-14-2011 515-242-5241
   Name Title Date Phone no.
   Problems; suggestions; ☐ Report attached Greg Furhmann was filling in for the site manager, Robert Drustrup

4. **Other interviews** (optional) ☐ Report attached. None

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☐ O&M manual — ☐ Readily available — ☐ Up to date — ☐ N/A
   - ☐ As-built drawings — ☐ Readily available — ☐ Up to date — ☐ N/A
   - ☐ Maintenance logs — ☐ Readily available — ☐ Up to date — ☐ N/A

   Remarks On-site documents were not reviewed during site inspection.

2. **Site-Specific Health and Safety Plan** — ☐ Readily available — ☐ Up to date — ☐ N/A
   - ☐ Contingency plan/emergency response plan — ☐ Readily available — ☐ Up to date — ☐ N/A

   Remarks On-site documents were not reviewed during site inspection.

3. **O&M and OSHA Training Records** — ☐ Readily available — ☐ Up to date — ■ N/A

   Remarks _____

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ■ N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — ■ N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — ■ N/A
   - ☐ Other permits _____ — ☐ Readily available — ☐ Up to date — ■ N/A

   Remarks _____

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — ■ N/A

   Remarks _____

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — ■ N/A

   Remarks _____

7. **Groundwater Monitoring Records** — ☐ Readily available — ☐ Up to date — ☐ N/A

   Remarks On-site documents were not reviewed during site inspection.

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — ■ N/A

   Remarks _____

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ■ N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — ■ N/A

   Remarks _____

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — ■ N/A

    Remarks _____

IV. O&M COSTS

1. **O&M Organization**
   - ☐ State in-house ☐ Contractor for State
   - ■ PRP in-house ■ Contractor for PRP
   - ☐ Federal Facility in-house ☐ Contractor for Federal Facility
   - ☐ Other_____

2. **O&M Cost Records –O&M costs discussed in the Five-Year Review Report**
   - ■ Readily available ☐ Up to date
   - ☐ Funding mechanism/agreement in place
   - Original O&M cost estimate_____ ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**
   - Describe costs and reasons: None

V. ACCESS AND INSTITUTIONAL CONTROLS ■ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ■ Gates secured ☐ N/A
   - Remarks No damage

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ■ N/A
   - Remarks

C. Institutional Controls (ICs)

1. **Implementation and enforcement**
   - Site conditions imply ICs are properly implemented ■ Yes ☐ No ☐ N/A
   - Site conditions imply ICs are being fully enforced ■ Yes ☐ No ☐ N/A

   - Type of monitoring (*e.g.*, self-reporting, drive by) Self-reporting, state oversight
   - Frequency Annual
   - Responsible party/agency Rockwell Collins/ IDNR
   - Contact Tom Gentner-Rockwell Collins (Name)

   - Reporting is up-to-date ■ Yes ☐ No ☐ N/A
   - Reports are verified by the lead agency ■ Yes ☐ No ☐ N/A

   - Specific requirements in deed or decision documents have been met ■ Yes ☐ No ☐ N/A
   - Violations have been reported ☐ Yes ☐ No ■ N/A
   - Other problems or suggestions: ☐ Report attached

2. **Adequacy** ■ ICs are adequate ☐ ICs are inadequate ☐ N/A
   - Remarks Current ICs are adequate although a more enforceable environmental covenant should replace the state Registry listing for the site in the future.

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ■ No vandalism evident
Remarks_____

2. **Land use changes on site** ■ N/A
Remarks_____

3. **Land use changes off site** ■ N/A
Remarks_____

VI. GENERAL SITE CONDITIONS

A. Roads ■ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ■ Roads adequate ☐ N/A
Remarks_____

B. Other Site Conditions

Remarks None

VII. LANDFILL COVERS ☐ Applicable ☐ N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ■ Settlement not evident
Areal extent_____ Depth_____
Remarks_____

2. **Cracks** ☐ Location shown on site map ■ Cracking not evident
Lengths_____ Widths_____ Depths_____
Remarks_____

3. **Erosion** ☐ Location shown on site map ■ Erosion not evident
Areal extent_____ Depth_____
Remarks_____

4. **Holes** ☐ Location shown on site map ■ Holes not evident
Areal extent_____ Depth_____
Remarks_____

5. **Vegetative Cover** ■ Grass ■ Cover properly established ☐ No signs of stress
☐ Trees/Shrubs (indicate size and locations on a diagram)
Remarks_____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
Remarks Creek bank has cable-concrete mat

7. **Bulges** ☐ Location shown on site map ■ Bulges not evident
Areal extent_____ Height_____
Remarks_____

8. **Wet Areas/Water Damage** ■ Wet areas/water damage not evident
☐ Wet areas ☐ Location shown on site map Areal extent_____
☐ Ponding ☐ Location shown on site map Areal extent_____
☐ Seeps ☐ Location shown on site map Areal extent_____
☐ Soft subgrade ☐ Location shown on site map Areal extent_____
Remarks_____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ■ No evidence of slope instability
Areal extent_____
Remarks Creek bank is only area with significant slope

B. Benches ☐ Applicable ■ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ■ N/A or okay
Remarks_____

2. **Bench Breached** ☐ Location shown on site map ■ N/A or okay
Remarks_____

3. **Bench Overtopped** ☐ Location shown on site map ■ N/A or okay
Remarks_____

C. Letdown Channels ☐ Applicable ■ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent_____ Depth_____
Remarks_____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type_____ Areal extent_____
Remarks_____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent_____ Depth_____
Remarks_____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____

5. **Obstructions** Type_____ ☐ No obstructions
☐ Location shown on site map Areal extent_____
Size_____
Remarks_____

6. **Excessive Vegetative Growth** Type_____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent_____
Remarks_____

D. Cover Penetrations ■ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
■ N/A
Remarks_____

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ■ N/A
Remarks_____

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks Landfill cover is penetrated by former DVE wells that are no longer used. They appear to be in good condition.

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ■ N/A
Remarks_____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ■ N/A
Remarks_____