

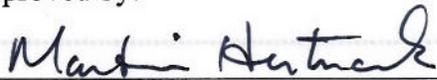
**Five-Year Review Report**  
**Fourth Five-Year Review Report**  
**for**  
**Arsenic Trioxide Superfund Site**  
EPA ID NDD980716963

**Ransom, Richland, and Sargent Counties, North Dakota**

September 2013

Prepared By:  
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## List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
ARRA	American Recovery and Reinvestment Act
bgs	below ground surface
CCR	Consumer Confidence Report
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five-Year Review
IC	Institutional Control
MCL	Maximum Contaminant Level
mg/L	milligrams per liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NDDH	North Dakota Department of Health
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
RAO	Remedial Action Objective
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SCADA	Supervisory Control and Data Acquisition
SDWA	Safe Drinking Water Act
SEWUD	Southeast Water Users District
µg/L	micrograms per liter

## **Executive Summary**

The Arsenic Trioxide Superfund Site (the Site) is located in southeastern North Dakota. The Site covers 26 townships and 940 square miles, including portions of Richland, Ransom and Sargent counties. Historic use of arsenic-laced bait to combat grasshopper infestations during the 1930s and 1940s resulted in contamination of groundwater at the Site. In 1983, the United States Environmental Protection Agency (EPA) placed the Site on the National Priorities List. The Site consists of two operable units (OUs).

The triggering action for this policy five-year review (FYR) was the signing of the previous FYR on September 26, 2008.

The remedy at OU1 currently protects human health and the environment because the Southeast Water Users District (SEWUD)-East water treatment plant has been upgraded and expanded to provide rural users, formerly on privately owned, impacted wells, with potable water that meets the arsenic MCL. However, in order for the remedy to be protective in the long term, treated groundwater should be monitored on a more frequent basis, a summary of institutional control activities and results should be submitted to EPA on a regular basis, and the Site fact sheet should be updated to discuss watering of livestock and poultry.

The remedy at OU2 is protective of human health and the environment. Rural users who had relied on the Wyndmere and Lidgerwood water treatment plants are now connected to the SEWUD-East water treatment plant.

Because the remedial actions at all OUs are protective or protective in the short term, the Site is protective of human health and the environment in the short term.

## Five-Year Review Summary Form

SITE IDENTIFICATION		
<b>Site Name:</b> Arsenic Trioxide Site		
<b>EPA ID:</b> NDD980716963		
<b>Region:</b> 8	<b>State:</b> ND	<b>City/County:</b> Hankinson, Lidgerwood, Wyndmere and Milnor Cities/Richland, Ransom and Sargent Counties
SITE STATUS		
<b>NPL Status:</b> Deleted		
<b>Multiple OUs?</b> Yes	<b>Has the site achieved construction completion?</b> Yes	
REVIEW STATUS		
<b>Lead agency:</b> EPA		
<b>Author name:</b> Frances L. Costanzi and Claire Marcussen		
<b>Author affiliation:</b> EPA Region 8 and Skeo Solutions		
<b>Review period:</b> 12/10/2012 – 09/26/2013		
<b>Date of site inspection:</b> 07/01/2013		
<b>Type of review:</b> Policy		
<b>Review number:</b> 4		
<b>Triggering action date:</b> 09/26/2008		
<b>Due date (five years after triggering action date):</b> 09/26/2013		

## Five-Year Review Summary Form (continued)

### Issues/Recommendations

**OU(s) without Issues/Recommendations Identified in the Five-Year Review:**

OU2

**Issues and Recommendations Identified in the Five-Year Review:**

<b>OU(s): OU1</b>	<b>Issue Category: Monitoring</b>			
	<b>Issue:</b> SEWUD-East water treatment plant only monitors arsenic in treated water every two years.			
	<b>Recommendation:</b> Monitor arsenic concentrations in treated water on a more frequent basis to ensure levels are below the MCL for arsenic			
<b>Affect Current Protectiveness</b>	<b>Affect Future Protectiveness</b>	<b>Implementing Party</b>	<b>Oversight Party</b>	<b>Milestone Date</b>
No	Yes	State	EPA	09/01/2014

<b>OU(s): OU1</b>	<b>Issue Category: Remedy Performance</b>			
	<b>Issue:</b> NDDH has not provided EPA with regular updates to demonstrate that informational institutional controls are adequate for achieving site RAOs			
	<b>Recommendation:</b> Provide EPA information on a quarterly basis summarizing the activities related to ensuring informational institutional controls are adequate.			
<b>Affect Current Protectiveness</b>	<b>Affect Future Protectiveness</b>	<b>Implementing Party</b>	<b>Oversight Party</b>	<b>Milestone Date</b>
No	Yes	State	EPA	09/01/2014

<b>OU(s): OU1</b>	<b>Issue Category: Remedy Performance</b>			
	<b>Issue:</b> The current fact sheet does not address uses of rural wells for watering livestock and poultry			
	<b>Recommendation:</b> Revise the fact sheet to address watering of livestock and poultry.			
<b>Affect Current Protectiveness</b>	<b>Affect Future Protectiveness</b>	<b>Implementing Party</b>	<b>Oversight Party</b>	<b>Milestone Date</b>
No	Yes	State	EPA	09/01/2014

**Protectiveness Statement(s)**

*Operable Unit:*  
OU1

*Protectiveness Determination:*  
Short-term Protective

*Addendum Due Date  
(if applicable):*  
Not Applicable

*Protectiveness Statement:*

The remedy at OU1 currently protects human health and the environment because the SEWUD-East water treatment plant has been upgraded and expanded to provide rural users, formerly on privately owned, impacted wells, with potable water that meets the arsenic MCL. However, in order for the remedy to be protective in the long term, treated groundwater should be monitored on a more frequent basis, a summary of institutional control activities and results should be submitted to EPA on a regular basis, and the Site fact sheet should be updated to discuss watering of livestock and poultry.

*Operable Unit:*  
OU2

*Protectiveness Determination:*  
Protective

*Addendum Due Date  
(if applicable):*  
Not Applicable

*Protectiveness Statement:*

The remedy at OU2 is protective of human health and the environment. Rural users who had relied on the Wyndmere and Lidgerwood water treatment plants are now connected to the SEWUD-East water treatment plant.

**Sitewide Protectiveness Statement (if applicable)**

*Protectiveness Determination:*  
Short-term Protective

*Addendum Due Date (if applicable):*  
Not Applicable

*Protectiveness Statement:*

Because the remedial actions at OU1 are protective in the short term, the Site is protective of human health and the environment in the short term. However, in order for the remedy to be protective in the long term, treated groundwater should be monitored on a more frequent basis, a summary of institutional control activities and results should be submitted to EPA on a regular basis, and the Site fact sheet should be updated to discuss watering of livestock and poultry.

# **Fourth Five-Year Review Report for Arsenic Trioxide Superfund Site**

## **1.0 Introduction**

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is protective of human health and the environment. FYR reports document FYR methods, findings and conclusions. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The United States Environmental Protection Agency (EPA) prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 121 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA Section 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 5 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.

EPA interpreted this requirement further in the NCP, 40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii), which 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 initiation of the selected remedial action.

Skeo Solutions, an EPA Region 8 contractor, conducted the FYR and prepared this report regarding the remedy implemented at the Arsenic Trioxide Superfund site (the Site) in Richland, Ransom and Sargent Counties, North Dakota. EPA's contractor conducted this FYR from December 2012 to September 2013. The North Dakota Department of Health (NDDH) is the lead agency at the Site, with EPA as the support agency. EPA, however, is the lead agency for this FYR and NDDH, representing the State of North Dakota, has reviewed all supporting documentation and provided input to EPA during the FYR process.

This is the fourth FYR for the Site. The triggering action for this policy review is the previous FYR. This is a policy review because the Record of Decision (ROD) was signed on September 26, 1986, which is before October 17, 1986, the effective date of the Superfund Amendments and Reauthorization Act (SARA). The FYR is required because hazardous substances, pollutants

or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure. The Site consists of two operable units (OUs). This FYR report addresses both site OUs.

## 2.0 Site Chronology

Table 1 lists the dates of important events for OU1 and OU2 at the Site.

**Table 1: Chronology of Site Events**

Event	Date
EPA site discovery	June 1, 1981
NDDH completed the first site inspection	August 1, 1982
NDDH started the remedial investigation (RI) for OU1	August 24, 1982
EPA proposed the Site for listing on the National Priorities List (NPL)	December 30, 1982
EPA listed the Site on the NPL	September 8, 1983
NDDH completed a second site inspection	May 1, 1984
NDDH issued the final RI report and started the feasibility study (FS) for OU1	July 1, 1985
EPA started the first removal action, which included installing a clay cap over a former bait-mixing station and installing point-of-use treatment units in rural residences on private wells	September 15, 1986
NDDH completed the OU1 Final FS Report and EPA issued the OU1 Record of Decision (ROD)	September 26, 1986
EPA completed the first removal action	December 10, 1986
NDDH started the remedial design (RD) for OU1	March 26, 1987
NDDH started the combined remedial investigation/feasibility study (RI/FS) for OU2	April 29, 1987
NDDH completed the OU2 combined RI/FS and EPA issued an Amended ROD for OU2	February 5, 1988
NDDH began first OU2 RD	February 17, 1988
NDDH began second OU2 RD	June 29, 1988
NDDH completed second OU2 RD	September 26, 1988
EPA started the second removal action	October 24, 1988
NDDH completed first OU2 RD	March 31, 1989
NDDH started the first OU2 remedial action	March 9, 1989
NDDH started the second OU2 remedial action	March 31, 1989
EPA completed the second removal action	June 9, 1989
NDDH completed the RD for OU1	June 28, 1989
NDDH completed the first and second OU2 remedial actions	March 21, 1991
EPA signed the Explanation of Significant Differences (ESD) for OU2	September 25, 1992
NDDH completed the remedial action of the rural water system to add the City of Milnor and EPA issued a Preliminary Close-Out Report	September 30, 1992
EPA conducted a final inspection of remedial action construction at Milnor and issued a Final Close-Out Report	June 30, 1993
Southeast Water Users District (SEWUD) assumed operation and maintenance responsibility for the Richland plant	July 1, 1993
EPA deleted the Site from the NPL	July 5, 1996
EPA completed the first FYR	January 19, 1999
EPA lowered the Safe Drinking Water Act (SDWA) maximum contaminant level (MCL) for arsenic from 50 micrograms per liter (µg/L) to 10 µg/L, to become effective January 2006.	January 22, 2001

Event	Date
EPA completed the second FYR	June 11, 2003
EPA started an RI/FS for OU1 to address expansion of SEWUD to address the new MCL for arsenic	June 25, 2003
NDDH started the RD for the SEWUD expansion	September 20, 2004
NDDH started construction of Segments 1 and 2 of the SEWUD expansion	August 8, 2005
EPA provided bottled water to rural users with sampling results showing arsenic levels 10 µg/L or greater	June 4, 2007
EPA issued second ESD for OU1	September 27, 2007
EPA issued third ESD for OU1	February 25, 2008
NDDH started the construction of Segment 3 to connect the cities of Hankinson and Wyndmere to SEWUD	June 10, 2008
NDDH completed construction of Segments 1 and 2	September 25, 2008
EPA completed the third FYR	September 26, 2008
EPA's removal program transferred bottled water program to NDDH	October 1, 2008
EPA completed the RI/FS for OU1	February 20, 2009
EPA signed fourth ESD on OU1	February 20, 2009
NDDH started Segment 4 and 4a construction	May 1, 2009
NDDH completed remedy construction of Segment 3, connecting 60 rural users to SEWUD	September 29, 2009
EPA issued a FYR update	February 1, 2010
NDDH completed the RD for the next phase of the SEWUD expansion	March 30, 2010
NDDH completed segment 4 and 4a construction, connecting about 119 rural users to SEWUD	November 30, 2010
NDDH started Segment 5 construction	April 20, 2010
NDDH completed Segment 5 construction	September 1, 2011
EPA issued Site's Final Remedial Action Report for the SEWUD expansion	September 29, 2011

### 3.0 Background

#### 3.1 Physical Characteristics

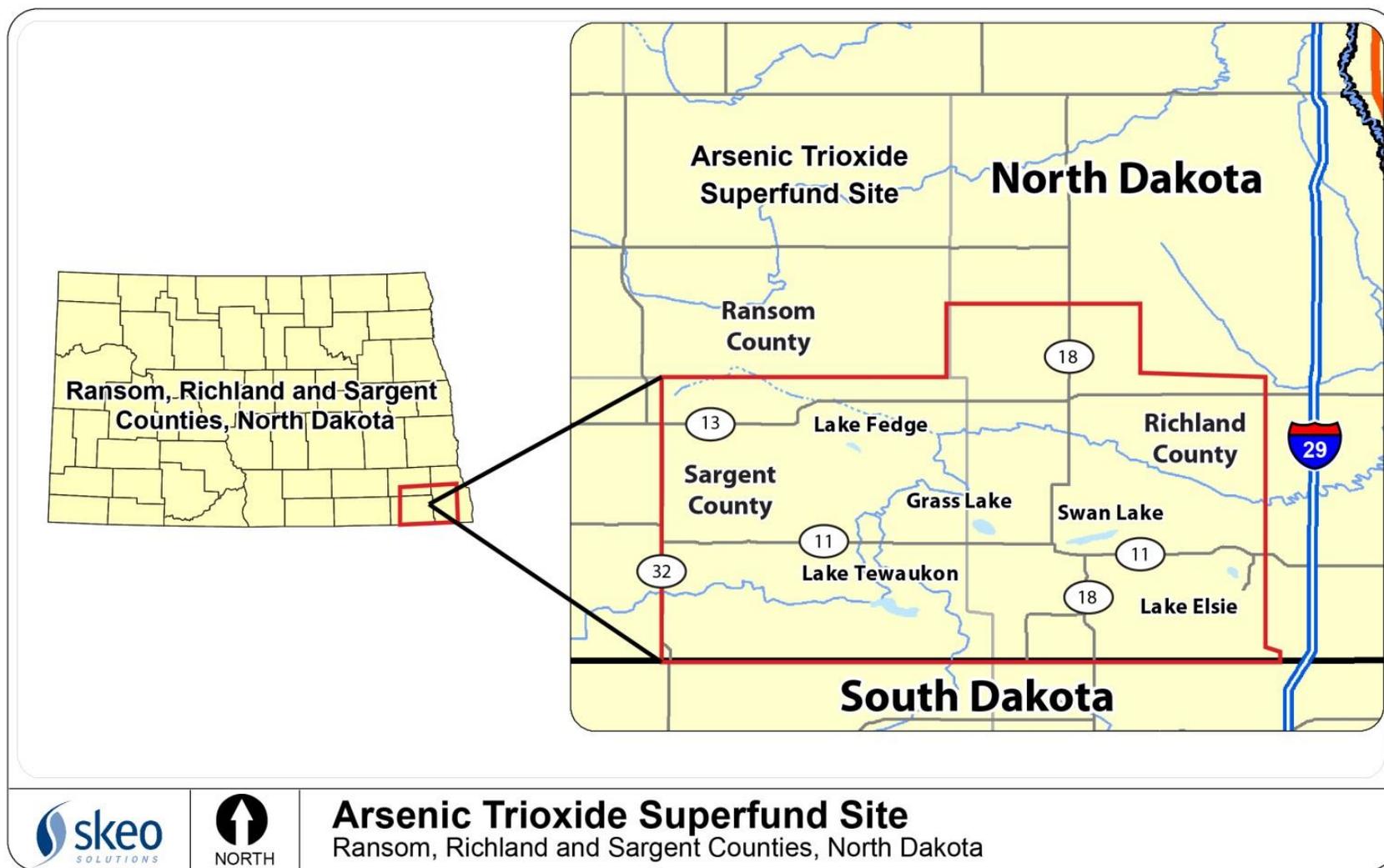
The Site is located in southeastern North Dakota. It covers 26 townships (about 940 square miles) and encompasses portions of Richland, Ransom and Sargent counties (Figure 1). The site area is sparsely populated farmland with a few small towns, including Lidgerwood, Wyndmere, Milnor and Hankinson. The Southeast Water Users District (SEWUD), headquartered in Mantador, pumps water from its source wells located in the Sheyenne National Grasslands followed by treatment in its eastern water treatment plant, referred to as SEWUD-East. The SEWUD-East supplies potable water to the cities of Lidgerwood, Wyndmere, Milnor, Hankinson and surrounding areas (Figure 2).

This area of southeastern North Dakota is primarily sparsely populated farmland. Site topography consists of gently rolling hills and relatively flat plains. Groundwater aquifer systems within the Site include shallow glacial drift aquifers, located approximately 3 to 150 feet below ground surface (bgs), and the Dakota Sandstone aquifer, located approximately 200 to 1,000 feet bgs. The occurrence of arsenic in groundwater is attributed to both the historical use of arsenic-based grasshopper bait and naturally occurring sources. Arsenic is present in groundwater at concentrations above the drinking

water maximum contaminant level (MCL) at the Site, including in the communities of Lidgerwood, Wyndmere and Milnor, as well as at private homes and farms in unincorporated areas. EPA designated the Richland Rural Water Treatment System (now known as SEWUD) as OU1 and the water treatment systems in the cities of Lidgerwood and Wyndmere as OU2.

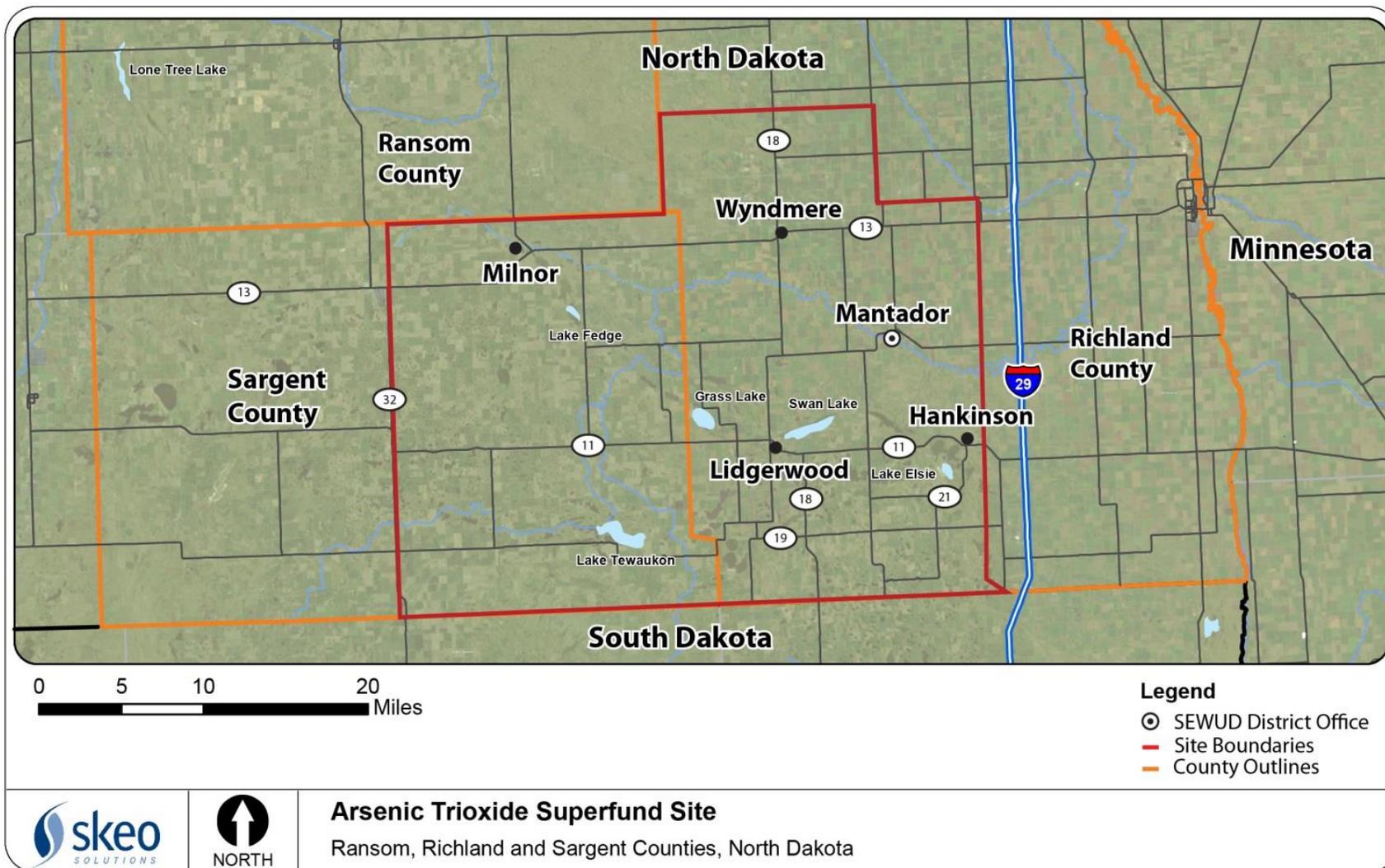
Surface waters in the vicinity of the Site consist of perennial and intermittent lakes along the Milnor Channel, the Wild Rice River and its tributaries, and area sloughs and prairie potholes. The perennial lakes and intermittent lakes recharge the Milnor Channel Aquifer. Area sloughs and prairie potholes behave similarly to intermittent lakes; however, recharge to the aquifer is much slower because of finer-grained sediments in these areas. The Wild Rice River and its tributaries and throughout most of its length within the Site, the river is a gaining stream whereby groundwater contributes directly to the flow of the river.

**Figure 1: Site Location**



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

**Figure 2: Site Vicinity**



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

### 3.2 Land and Resource Use

The primary land use in this sparsely populated site area currently is agricultural, with very little unaltered prairie land; this land use is expected to continue. Agriculture is mostly cash crop farming, and is the base of the local economy. The Site area includes a few small cities, including Lidgerwood, Wyndmere, Milnor and Hankinson.

Groundwater in the area is used for agricultural and domestic purposes. Agricultural uses include irrigation and livestock watering. Domestic uses include residential consumption and lawn and garden watering.

Groundwater with elevated arsenic levels appears to be limited to the upper, unconfined glacial drift aquifers and does not extend into the deeper sandstone unit. The upper aquifer is a commonly used drinking water source in the region, since the deeper sandstone unit is typically high in total dissolved solids and has low yield. The Site is currently serviced by the SEWUD-East.

### 3.3 History of Contamination

Grasshopper infestations in the years between 1910 and 1950 resulted in congressional funding to provide arsenic bait to the State and counties of North Dakota and a number of federal-state cooperative programs. The U.S. Department of Agriculture distributed federal funds and assistance to the State of North Dakota, which facilitated the distribution of arsenic bait to the counties and individual farmers and landowners through extension service and county agents. In addition, county governments funded and facilitated individual farmers' and landowners' use of arsenic-laced bait, both independently and in conjunction with federal funding. The bait, which included arsenic trioxide, sodium arsenate, Paris Green and other arsenic compounds, was commonly applied to farm fields. Unused materials were often buried or dumped in pits or low-lying areas. It was estimated that 330,000 pounds of arsenic trioxide bait may have been applied to the Site.

### 3.4 Initial Response

Data from the remedial investigation (RI) and a Health Risk Assessment performed by NDDH estimated that 748 people in 278 homes were subject to increased health risk because of exposure to arsenic above the MCL in water supplies; all were rural users using private wells. In response, EPA instituted an emergency response action in 1986 to address the immediate health impacts of the arsenic-contaminated groundwater. The response action consisted of installing point-of-use treatment units on one tap per affected household. The response action also included closure of the approximately 1-acre former bait mixing area near Wyndmere by installing a clay cap over the area. EPA initially proposed the Site for listing on the National Priorities List (NPL) on December 30, 1982. Final listing of the Site on the NPL occurred on September 8, 1983.

### 3.5 Basis for Taking Action

Routine water quality monitoring of municipal water supplies by NDDH in 1979 identified elevated levels of arsenic at the water treatment systems in Lidgerwood and Wyndmere. These levels exceeded the MCL of 50 micrograms per liter ( $\mu\text{g/L}$ ) designated by EPA pursuant to the Safe Drinking Water Act (SDWA) at that time, and were determined to be a health risk by NDDH and EPA. Additional monitoring detected more widespread occurrence of arsenic within groundwater in surrounding rural areas.

From 1982 to 1986, NDDH conducted a remedial investigation/feasibility study (RI/FS) overseen by EPA. NDDH and EPA concluded in a final RI Report dated July 1985, that the elevated levels of arsenic in groundwater resulted both from use of arsenic-based grasshopper bait and naturally occurring sources. Concentrations of arsenic ranged from undetected to 1,560  $\mu\text{g/L}$  in 704 samples collected from 558 groundwater supply locations. However, the degree of influence of arsenic on groundwater quality because of bait application could not be determined because background levels for arsenic were not available prior to the RI. The arsenic contamination in the groundwater appeared to be limited to the seven major unconfined aquifers in the glacial drift.

With the exception of the Wyndmere mixing area, contaminant source areas were not located during the RI. RI samples taken along a confirmed area of bait-spreading indicated no evidence of remnant arsenic within the soils. RI soil borings taken from other areas of the Site resulted in arsenic concentrations similar to background levels. The RI also indicated that grasses and woody-stemmed bushes grown in arsenic-impacted soil are not expected to raise arsenic levels in grazing animals. The RI concluded that the most likely exposure pathway of arsenic is from human ingestion of groundwater, meat products or dairy products. Any locally produced meat or dairy products have the potential to contribute arsenic to the human diet since the livestock may have been exposed for a significant length of time to high-arsenic drinking water.

NDDH issued an FS on September 26, 1986. During the same time, the City of Lidgerwood was ordered to take appropriate measures to provide drinking water that met the MCL for arsenic. The city built a new water treatment plant, overseen by NDDH under the SDWA, which was completed in 1986. NDDH investigations during that time also determined that the raw water supply for Wyndmere exceeded the MCL for arsenic. However, the existing Wyndmere treatment plant was found effective in reducing the arsenic to below the MCL, so no additional immediate action was required.

## 4.0 Remedial Actions

In accordance with CERCLA and the NCP, remedial actions are required to protect human health and the environment and to comply with applicable or relevant and appropriate requirements (ARARs). A number of remedial alternatives were considered for the Site. The final remedy selection was made based on an evaluation of following criteria:

- Effectiveness in protecting human health and the environment

- Cost
- Engineering implementation, reliability and constructability
- Feasibility
- Applicability
- Reliability.

The evaluation included an assessment of the extent to which each remedial alternative would effectively prevent, mitigate or minimize threats to, and provide adequate protection of public health, welfare and the environment. The evaluation also included an analysis of potential adverse environmental impacts associated with each alternative.

#### 4.1 Remedy Selection

Originally, EPA designated the Site as a single OU, which was the Richland Rural Water Treatment System (now known as Southeast Water Users District, or SEWUD). In 1986, the Lidgerwood and Wyndmere water treatment systems were effective in the removal of arsenic. However, after EPA signed the Site's 1986 Record of Decision (ROD), the cities of Lidgerwood and Wyndmere requested consideration of their respective water treatment plant expansions as part of the Site's overall remedial action. Therefore, as part of the February 5, 1988 Record of Decision Amendment (ROD Amendment), EPA designated the Richland Rural Water Treatment System as OU1 and the Lidgerwood and Wyndmere treatment plants as OU2.

##### OU1

EPA selected the OU1 remedy in the Site's OU1 ROD, which was signed on September 26, 1986. The purpose of the remedy was to reduce human exposure to arsenic-contaminated groundwater by providing treated drinking water through rural water distribution systems to households with elevated levels of arsenic. The selected remedy was to treat arsenic-contaminated groundwater to achieve the background concentration of 25 µg/L, which was below the MCL at that time of 50 µg/L for arsenic pursuant to the SDWA. The remedy included:

- Expansion of the existing Richland water treatment plant, currently known as SEWUD-East, and its associated distribution capacity to provide drinking water to rural households.
- "No action" for individuals using water from the Lidgerwood and Wyndmere systems because of effective removal of arsenic by the cities' treatment systems.
- Continuation of quarterly groundwater monitoring in the Lidgerwood system and rural systems, annual monitoring of the Wyndmere system, annual monitoring of the glacial aquifer systems, and random annual sampling of private wells outside of the existing contamination boundaries.
- Investigation of institutional controls, including restrictions on existing well use, restrictions on well drilling, a well permitting system, and economic incentives for participation in the new distribution system.

Several developments occurred after EPA issued the Site's ROD. The City of Lidgerwood requested consideration of the construction of its water treatment plant and the replacement of its distribution system as part of the overall remedial action for the Site under Section 104 of CERCLA. Therefore, associated costs could be considered reimbursable. In addition, the Lidgerwood plant did not operate correctly after the first six months of operation in the late summer of 1986. The City of Wyndmere also requested consideration of the expansion of its water treatment plant capacity to cover periods of high demand, during which it must bypass its plant with untreated water high in arsenic, as part of the overall remedial action for the Site.

September 25, 1992 Explanation of Significant Differences (ESD): The Bureau of Reclamation, through an Interagency Agreement with EPA and NDDH, recommended expansion of the Richland Rural water treatment plant's distribution system to incorporate Milnor. This action would limit the potential exposure of residents in Milnor to arsenic-contaminated drinking water supplies. EPA approved Milnor's addition to the remedy for OU1; this was designated as Phase 2 of OU1. The ESD explains the decision to add Milnor as a second phase of the remedial action for OU1. The addition of Milnor did not alter the original RAO; it only expanded the scope and cost of the remedial action. Therefore, EPA did not consider it a fundamental change to the original remedy.

With these modifications, the primary components of the site-wide remedy included:

- Expansion of the SEWUD-East and its associated distribution system to provide safe drinking water to households in Milnor and rural areas within the Site.
- Expansion and modification of the Lidgerwood water treatment plant to increase treatment capability and storage capacity and thereby provide safe drinking water to households in Lidgerwood.
- Expansion and modification of the existing Wyndmere treatment plant to increase treatment capability and storage capacity.
- Monitoring of the treatment plants, glacial aquifer systems and private wells.
- Institutional controls to encourage public participation in the project and restrict private water supply well use.

September 27, 2007 ESD: The Site's second FYR in 2003 concluded that the remedy may no longer be protective because of the arsenic MCL change from 50 µg/L to 10 µg/L. For the remedy to be protective, EPA determined that additional remedial action was needed. Activities included increasing the capacity of the SEWUD water treatment plant and adding wells to meet the increased water demands of the Wyndmere and Hankinson communities. As an interim measure, EPA and NDDH offered bottled water to interested rural households located within the site boundary whose groundwater wells contained arsenic levels in excess of the 10 µg/L MCL. EPA issued an ESD dated October 8, 2007, documenting the bottled water interim action.

February 25, 2008 ESD: The 2008 ESD consisted of connecting approximately 60 rural users to the SEWUD water supply system near Wyndmere and the Lake Elsie area for residents whose groundwater wells contained arsenic levels that exceeded or were equal to the MCL of 10 µg/L. Additionally, the ESD documented the expansion of the SEWUD water treatment plant's treatment capacity and the addition of wells to meet the increased water demands resulting from providing the rural water service to the communities of Wyndmere and Hankinson.

February 20, 2009 ESD: As a result of the third FYR, EPA and NDDH determined that work needed to continue to connect rural users with contaminated wells meeting the criteria for inclusion in the project, and to expand the SEWUD treatment system to accommodate the increased demand from these users. Additionally, the third FYR determined the need for implementation of institutional controls to protect future users of domestic groundwater wells in the Site area.

The 2009 ESD documented the decision to connect remaining qualified rural households to the SEWUD system (about 330 rural households). In addition, the SEWUD treatment plant and system required expansion to accommodate the increased demand. The 1986 ROD stated that institutional controls would be investigated further and that feasible and implementable institutional controls would be adopted. This ESD documented the need for institutional controls, defined required specific institutional controls, and presented additional institutional controls for evaluation and implementation, if feasible. The 2009 ESD required the implementation of the following informational institutional controls:

1. As required by the SDWA, the SEWUD produces an annual Consumer Confidence Report (CCR), which is mailed to existing members and placed on the SEWUD website. EPA and NDDH will develop a fact sheet for inclusion with the annual mailing that contains information about the Site, arsenic in the groundwater that exceeds drinking water standards, and options available for residential users with concerns about their well water. The fact sheet also states that after completion of the site remedy, EPA will not be responsible for future improvements to the public water system, barring changes to the protectiveness of the remedy. SEWUD will provide an annual report to NDDH and EPA that summarizes this effort and includes any contacts with citizens regarding the Site.
2. In accordance with North Dakota Administrative Code, the North Dakota Water Commission receives well logs from drillers when new wells are constructed. NDDH proposes an agreement with the Commission where NDDH will receive copies of the well logs for the 26 townships included in the site area, and will provide the fact sheet described above to property owners within the Site's boundaries when new wells are drilled.
3. NDDH will work with the State Board of Water Well Contractors to provide information, including the fact sheet, to North Dakota certified well drillers regarding the arsenic contaminated groundwater and about what can be done.

4. At a minimum, the fact sheet will also be posted on EPA Region 8's website and NDDH's Groundwater Protection website.

In addition, the 2009 ESD also stated that “because the most protective situation is to have multiple layers of institutional controls, NDDH, with EPA's assistance, will evaluate and implement the following institutional controls, if feasible:

1. NDDH will coordinate with appropriate local government officials in both counties to request the addition of a notification to building permits and/or to provide building applicants a fact sheet informing residents about the arsenic-contaminated groundwater. Additionally, NDDH will request that local officials consider implementing a requirement that new domestic wells be tested for arsenic and that new wells drilled within the city limits not be approved for domestic purposes.
2. NDDH will evaluate whether the site can be designated as a “groundwater protected area” for the purposes of installing domestic water wells.
3. NDDH will investigate whether a “One Call” system may be used prior to domestic well drilling to provide further notification to residents regarding the contaminated groundwater.
4. NDDH and EPA will discuss with SEWUD various options for expanding their informational outreach to non-members in the 26-township area, such as by mailings and newspaper notices.

## OU2

The City of Lidgerwood requested that the construction of its water treatment plant and the replacement of its distribution system be done at the same time as the overall remedial action for the Site. Therefore, associated costs could be considered reimbursable. In addition, the Lidgerwood plant did not operate correctly after the first six months of operation in the late summer of 1986. The City of Wyndmere also requested the expansion of its water treatment plant capacity to cover periods of high demand, during which it must bypass its plant with untreated water high in arsenic, be done at the same time as the overall remedial action for the Site. Associated costs were also reimbursable.

In April 1987, a Cooperative Agreement was awarded to NDDH to study the Lidgerwood and Wyndmere water treatment plants, with the objective of determining the extent of repairs necessary to correct problems at the Lidgerwood plant and of verifying the Wyndmere plant's capacity problem. EPA selected the remedy in the Site's February 5, 1988 ROD Amendment and designated the Lidgerwood and Wyndmere water treatment systems as OU2. The ROD Amendment for OU2 provided for:

- Reimbursement from the Superfund to the City of Lidgerwood for remedy-associated costs associated with construction of its water treatment plant.
- Modification of the Lidgerwood water treatment plant.
- Expansion of the Wyndmere water treatment plant to increase its storage capacity with a 50,000-gallon potable water storage reservoir and related minor adjustments and modifications to the existing plant.

## 4.2 Remedy Implementation

The primary remedial components included the expansion of the SEWUD-East (OU1), and the Lidgerwood and Wyndmere water treatment plants (OU2) and their associated distribution systems between 1986 and 1992. Additional components of the remedy for both OUs included bottled water provisions prior to the completion of the water treatment plant and distribution system expansions, as well as institutional controls. Details of remedy implementation at each OU are described below.

### OU1 – SEWUD-East

Remedial design for the OU1 remedial action started March 26, 1987 and was completed on June 28, 1989. The groundwater treatment plant uses a precipitation technology using a chemical (e.g., ferric coagulant) to co-precipitate arsenic into an insoluble solid. The insoluble arsenic precipitant is then removed from the liquid phase by filtration.

Phase I of construction to expand the SEWUD-East and distribution system began July 19, 1990. Expansion activities included the installation of about 300 miles of water distribution pipeline, the addition of seven additional water storage reservoirs, installation of three additional water supply wells and doubling of the size of the treatment plant.

Phase 2 of construction activities began in September 1991 to add Milnor to the distribution system and ended in June 1993. During the summer of 1992, remedial actions included the connection of about 300 homes and businesses to a new 135,000-gallon drinking water reservoir and distribution system. Phase 1 and Phase 2 of the construction activities for OU1 was completed on June 23, 1993. Following the completion of Milnor remedial activities, Richland Rural water treatment system took over operation and maintenance of the treatment system.

EPA documented the completion of work in a Final Close-Out Report, dated June 30, 1993, and deleted the Site from the NPL on July 5, 1996.

In 2001, the MCL for arsenic was lowered to 10 µg/L, with this new standard becoming enforceable in January 2006. This prompted a FYR in June 2003. The review determined that the remedy may no longer be protective of human health as a result of the changing MCL. EPA started an extensive rural user well sampling program in June 2003 to determine if rural users in the 26 townships were drinking water with arsenic concentrations over the MCL. Of the 375 wells sampled, 84 percent were at or above the MCL. Many of them were significantly above the MCL. As an interim measure, EPA and

NDDH offered bottled water to interested rural households located within the site boundary whose groundwater wells contained arsenic levels in excess of the 10 µg/L MCL. EPA issued an ESD dated September 27, 2007, documenting the bottled water interim action.

EPA and NDDH expanded the remedy using a segmented design and construction approach, with the scope of work for each segment dictated by the amount of available funding. In total, six segments were constructed: segments 1, 2, 3, 4, 4a and 5. The remedial design for the expansion of the SEWUD started on September 20, 2004 and was completed on March 30, 2010. NDDH was the lead for this work and EPA was the support agency. NDDH entered into a contract with the SEWUD, and the SEWUD conducted the design and construction under oversight from NDDH and EPA.

#### *Segment 1 Construction*

Segment 1 construction activities provided treated water to the cities of Hankinson and Wyndmere. Construction activities in Wyndmere began in August 2005 and were completed in October 2006. They included the installation of about 11 miles of new water pipeline from an existing line to a new 100,000-gallon underground water storage reservoir and construction of a pumping facility on a vacant lot directly west of the existing Wyndmere water treatment plant. Construction activities also included modifications to SEWUD's existing Reservoir B pumps, piping and controls.

Construction activities associated with providing water to Hankinson included the installation of about three miles of new water pipeline from an existing line to a new 200,000-gallon underground water storage reservoir and construction of a pumping facility in Hankinson. Improvements to Hankinson's water distribution system also provided water to eight households within city limits that did not previously have municipal water service.

On November 21, 2007, EPA performed the final inspection for Segment 1 remedial action. The operational and functional period began on November 21, 2007. On November 21, 2008, the remedy was declared operational and functional, and SEWUD took over operation and maintenance of the Segment 1 work.

EPA encouraged the City of Lidgerwood to abandon its aging treatment plant and connect to the SEWUD system. The city declined and chose to enter an EPA Office of Research and Development demonstration project. The project examined potential process modifications for existing water treatment plants to reduce arsenic levels and bring them into compliance with the new arsenic MCL. While EPA funded this work, its scope was outside of the Superfund program and process. Since the City of Lidgerwood chose not to connect to the SEWUD-East system and chose instead to participate in the demonstration project, the City of Lidgerwood took on financial and operation and maintenance responsibilities for the treatment system.

### *Segment 2 Construction*

Prior to the design and construction of Segment 1, it was determined that SEWUD's existing water supply wells and water treatment equipment serving eastern North Dakota would not provide a sufficient quantity of water for the existing user base and also satisfy the water demands for the communities of Hankinson and Wyndmere during peak demands. Therefore, Segment 2 included well field expansion and expansion of the SEWUD-East water treatment plant.

The well field expansion included the completion of two production wells and associated appurtenances along with the construction of two meter pits. The raw water transmission from the new production wells to their tie-in with the existing transmission line included the installation of 3,200 feet of piping.

The existing water treatment plant building was expanded to include an addition directly north of the existing building and the installation of the following equipment: two new water filters, high service pumps, backwash pumps, chemical feed equipment, miscellaneous process piping, valves and fittings; clear well, chemical feed room, a operator control room, and an electrical/motor control center room. Expansion activities also included modifications to the backwash and sanitary sewer pond at the treatment plant site.

Construction of Segment 2 began in May 2006 and was completed in August 2007. EPA performed a final walk-through of the SEWUD-East water treatment plant on March 19, 2008. When the remedy was declared operational and functional in fall 2009 SEWUD became responsible for all future operation and maintenance activities.

### *Segment 3 Construction*

Segment 3 construction activities provided treated water to 54 rural households in the area north and west of the City of Wyndmere and to the south and west of the City of Hankinson. Activities included the installation of approximately 36 miles of water line and the installation of associated valves, hydrants, curb stop assemblies and residential meter units. Construction began in June 2008 and completed in August 2009.

### *Segment 4/4a Construction*

Segment 4 construction began in May 2009 and was completed in November 2010. It connected approximately 125 rural users to SEWUD-East and provided individual connections to the cities of Cayuga and Geneseo. Additionally, two water supply reservoirs, B and G, were expanded to supply new customers; this segment is referred to as Segment 4a. Its construction took place between October 2009 and July 2010.

### *Segment 5 Construction*

The American Recovery and Reinvestment Act (ARRA) provided 100 percent of the design funds and 90 percent of the construction funds for Segment 5, which is the final phase of the project. Segment 5 was divided into three separate designs and related construction contracts for pipeline installation, facilities construction and well field

expansion. Construction on Segment 5 began in April 2010. It was completed in September 2011. The construction included:

- Expanding the well field to ensure availability of an adequate quantity of raw water to include connecting the City of Lidgerwood and other users;
- Upgrading the water treatment facility with an additional filter vesse;.
- Constructing a new reservoir and pump station to maintain adequate flows to an area previously unserved by rural water;
- Upgrading four pump stations so that adequate service would be provided to new users and so that existing users maintained the level of service they were experiencing prior to the expansion;
- Constructing two new storage reservoirs to provide system capacity;
- Installing an emergency generator to diminish the impact of service interruptions because of loss of power;
- Installing a geothermal system to lessen the system's dependence on non-renewable energy sources; and
- Installing water lines and associated valves, hydrants, curb stop assemblies and residential meter setter units to provide water service to approximately 132 rural households.

The City of Lidgerwood signed a water purchaser agreement with SEWUD on February 11, 2010.

#### *Institutional Controls*

In 1993, NDDH prepared a review document identifying feasible and implementable institutional controls for the Site. The following institutional controls were proposed by NDDH:

1. Initiate economic incentives to maximize public participation in the rural water supply project.
2. Restrict public water supply well use within the project area.
3. Propose to require water quality monitoring of new wells within the project area.

The institutional control review document also indicates that NDDH will continue to evaluate newly available water quality data and based on its review may act to expand the scope of the institutional controls to provide additional protection of public health.

As of the 2008 FYR and 2010 FYR update, no records were available that documented full implementation of the institutional controls. Further, specific institutional controls were not outlined in decision documents until the Site's 2009 ESD. The 2009 ESD specified four informational institutional controls as well as evaluation and implementation of four additional institutional controls, if feasible. Section 6.3 provides a summary of the institutional controls and their implementation.

## OU2 – Lidgerwood and Wyndmere Treatment Plants

### *Lidgerwood Treatment System*

Following construction in 1986, the Lidgerwood water treatment plant proved difficult to operate and frequently produced water of unacceptable quality. The Bureau of Reclamation evaluated plant performance between 1988 and 1989. Based on this evaluation, the Bureau recommended expansion of the treatment building, addition of a 23,000-gallon potable water storage reservoir, automation of the backwash system and several operational changes.

Implementation of the recommended plant modifications occurred between August 1989 and January 1990. The operational and functional period, which included treated water quality monitoring in accordance with a monitoring program developed by NDDH, indicated the plant was able to consistently reduce arsenic concentrations from approximately 130 to 160 µg/L in the source water to approximately 20 to 30 µg/L following treatment, meeting the MCL of 50 µg/L at that time. Following the operational and functional determination, the City of Lidgerwood assumed responsibility for the ongoing operation and maintenance of the treatment system.

According to the February 2010 FYR update, because of declining performance for arsenic removal at the Lidgerwood treatment plant, the City of Lidgerwood chose to enter an EPA Office of Research and Development demonstration project. On May 28, 2009, NDDH received ARRA funding to implement construction activities at the Site, which included funds for SEWUD to connect the City of Lidgerwood to the SEWUD system and become part of OU1. SEWUD signed a water purchaser's agreement with the City of Lidgerwood on February 11, 2010, providing the city with potable water from SEWUD.

### *Wyndmere Treatment System*

In 1987, NDDH investigated concerns expressed by the City of Wyndmere that its existing treatment plant had inadequate capacity to meet periods of high water demand. Based on NDDH findings, EPA amended the Site's ROD to address the capacity issue. Remedial measures initially included modifications to increase treatment capacity and the addition of a 50,000-gallon potable water storage tank. However, once plant operations resumed, plant operators identified problems with the plant's backwash cycle. Initial modifications to increase plant capacity and add the storage tank took place between August 1989 and January 1990. Between April 1990 and January 1991, additional activities related to the backwash filters and the post-chlorination unit occurred.

Following initial construction modifications, there was a plant shakedown period to demonstrate the successful achievement of the design criteria. The test period, which included treated water quality monitoring in accordance with a monitoring program developed by NDDH, indicated the plant consistently reduced arsenic concentrations from approximately 85 µg/L in the source water to 2 µg/L following treatment. Following the operational and functional determination, the City of Wyndmere assumed responsibility for the ongoing operation and maintenance of the treatment system.

Because of the change in the arsenic MCL from 50 µg/L to 10 µg/L, additional rural users required connection to SEWUD. In the interim, users were provided with bottled water. As part of Segment 1 construction for OU1, the City of Wyndmere was connected to SEWUD. Construction activities in Wyndmere began in August 2005 and were completed in October 2006 and Wyndmere became part of OU1.

#### 4.3 Operation and Maintenance (O&M)

As described in the Site's decision documents, each respective locality assumed long-term water treatment plant O&M responsibilities: the City of Lidgerwood for the Lidgerwood treatment plant, the City of Wyndmere for the Wyndmere treatment plant and SEWUD for its water treatment plant. Following the connection of the cities of Wyndmere and Lidgerwood to SEWUD's treatment plant, these two cities were no longer responsible for treatment plant O&M activities. SEWUD assumed responsibility for O&M of the SEWUD treatment plant in July 1, 1993. This responsibility continues. The primary activities associated with O&M for the treatment and distribution systems include:

- Water supply well operation and maintenance;
- Routine treatment plant process monitoring and quality control;
- Distribution system operation and maintenance;
- Maintenance of chemical delivery lines and filtration units; and
- Water quality reporting to NDDH.

The above activities are conducted according to the O&M plan; no deviations from these activities were noted during the site inspection conducted on July 1, 2013.

According to the Site's 2009 ESD, NDDH is responsible for overseeing the operation and maintenance of the remedy and the implementation of institutional controls. Further, according to the 2009 ESD, EPA is not responsible for future improvements to the public water system, barring changes to the protectiveness of the remedy. EPA provides oversight and prepares the FYR reports.

## 5.0 Progress Since the Last Five-Year Review

The protectiveness statement from the 2008 FYR for the Site stated:

*The remedy is expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. Many rural users have well water that contains arsenic at or above the new arsenic MCL (effective February 2002; enforceable January 2006). In order to be protective, EPA in coordination with NDDH and the SEWUD should connect qualified rural users to the SEWUD system and upgrade the SEWUD system to be able to handle the increased demand. Bottled water should continue to be provided to rural users until those rural users are connected to the SEWUD system or until they refuse to be connected. The SEWUD needs to continue operating and maintaining their water treatment plant in order to be able to continue providing safe*

*drinking water to users. Finally, EPA and NDDH must work together to develop ICs that will ensure new rural users are informed of the health hazards associated with the consumptive use of groundwater from private wells in the project area.*

The 2008 FYR included six issues and recommendations. This report summarizes each recommendation and its current status below.

**Table 2: Progress on Recommendations from the 2008 FYR**

<b>Recommendations</b>	<b>Party Responsible</b>	<b>Milestone Date</b>	<b>Action Taken and Outcome</b>	<b>Date of Action</b>
The lead for the bottled water program is transferring from EPA Region 8 removal program to NDDH. NDDH needs to continue to provide bottled water to rural users until those rural users are connected or refuse connections to the SEWUD system.	EPA/NDDH	10/01/08	The lead was transferred to NDDH to provide bottled water until connections to the SEWUD system are made. Complete.	10/01/08
Design and construct additional connections, treatment plant modifications, storage reservoir modifications and well field expansion.	EPA/NDDH	2010	Completed as part of Segment 5.	09/01/11
Institutional controls should be implemented to inform new rural users that their wells may contain arsenic above the MCL	EPA/NDDH	1Q2009	Informational institutional controls are documented in a 2009 ESD and implemented by NDDH. Complete.	9/5/2013
The City of Lidgerwood decided to participate in an EPA demonstration project and has taken on financial responsibility and O&M of its treatment system.	City of Lidgerwood	TBD	Lidgerwood was connected to the SEWUD system and signed a water purchaser agreement with SEWUD. Complete.	02/11/10
EPA and NDDH need to decide if the groundwater monitoring component of the ROD is necessary.	EPA/NDDH	1Q2009	The 2009 ESD eliminated the monitoring component. Complete.	02/23/09
Coordinate with NDDH to develop and implement institutional controls that will provide long-term protectiveness for the Site.	EPA/NDDH	1Q2009	Informational institutional controls are documented in a 2009 ESD and implemented by NDDH. Complete.	9/5/13

As shown in Table 2, informational institutional controls have been documented in the 2009 ESD.

## 6.0 Five-Year Review Process

### 6.1 Administrative Components

EPA Region 8 started the FYR in December 2012 and scheduled its completion for September 2013. EPA Remedial Project Manager (RPM) Frances Costanzi led the EPA site review team, with contractor support provided to EPA by Skeo Solutions. The review schedule established consisted of the following activities:

- Community notification,
- Document review,
- Data collection and review,
- Site inspection,
- Local interviews, and
- FYR Report development and review.

### 6.2 Community Involvement

EPA will make the final FYR Report available to the public. EPA will place copies of the document in the designated site repository: Southeast Water Users District, 206 Main Street, Mantador, North Dakota 58058. Upon completion of the FYR, EPA will place a public notice in The Daily News in Wahpeton to announce the availability of the final FYR Report in the Site's document repository. The FYR Report will also be available on EPA's website.

### 6.3 Document Review

This FYR included a review of relevant, site-related documents, including the ROD, ROD Amendment, ESDs, remedial action reports and recent monitoring data. A complete list of the documents reviewed can be found in Appendix A.

#### ARARs Review

Remedial actions are required to comply with the chemical-specific ARARs identified in the ROD. In performing the FYR for compliance with ARARs, only those ARARs that address the protectiveness of the remedy are reviewed. No new or changed ARARs were identified that would impact the protectiveness of the remedies

#### Institutional Controls Review

Specific institutional controls were outlined in the Site's 2009 ESD, which included four informational institutional controls as well as evaluation and implementation of four additional institutional controls, if feasible. A summary of the institutional controls and when each was implemented is summarized in Table 3.

**Table 3: Institutional Control (IC) Summary Table for OU1 and OU2 Groundwater**

ICs Needed?	ICs Required by Decision Document?	IC Objective	IC Instrument in Place
Yes	Yes, 2009 ESD	If feasible, restrict or prohibit domestic use of water from the shallow aquifer.	None <sup>a</sup>
		ICs established that educate, inform and notify residents and well drillers that shallow groundwater within the Site may contain arsenic levels above SDWA MCLs and that there are potential risks of consuming arsenic-contaminated water.	<ul style="list-style-type: none"> <li>• EPA/NDDH prepared a fact sheet and posted on their websites.</li> <li>• SEWUD included fact sheet in annual water quality reporting to its members.</li> <li>• NDDH provided fact sheet to State Water Commission.</li> <li>• NDDH provided fact sheet to Board of Water Well Contractors and North Dakota certified well drillers.</li> <li>• NDDH informed local government officials to include a notification to be added to building permits.</li> <li>• NDDH implemented a review of the “One Call” system prior to domestic well drilling to provide further notification to residents regarding the contaminated groundwater.</li> <li>• NDDH/EPA continue to work with SEWUD to discuss various options for expanding their informational outreach to non-members in the 26 townships within the Site</li> </ul>
<p>a. NDDH did not designate the Site as a groundwater protected area because of the high spatial variability in the distribution of arsenic exceeding the MCL of 10 µg/L; establishing the entire site as a “protected area” was considered but determined infeasible since it would prohibit the installation of wells in areas where arsenic in groundwater is below the arsenic MCL.</p>			

As shown in Table 3, NDDH investigated designating the site area as a “groundwater protected area” in order to address the institutional control objective of restricting or prohibiting domestic use of water from the shallow aquifer. However, because of the high variability in the distribution of elevated arsenic concentrations this institutional control was deemed infeasible. Although well drillers are responsible for furnishing a fact sheet to customers requesting a new well on their property, there is no requirement that the well be sampled prior to use to ensure that the MCL for arsenic is not exceeded.

The remaining institutional controls implemented were informational, meeting the institutional control objective of educating, informing and notifying residents and well drillers that shallow groundwater within the Site may contain arsenic levels above SDWA MCLs and that there are potential risks of consuming arsenic-contaminated water.

EPA and NDDH prepared a fact sheet for inclusion with the mailing of the annual water quality report to SEWUD members as summarized in the CCRs. The fact sheet was included in the CCR mailing to inform SEWUD members about the Site, arsenic in the groundwater that exceeds drinking water standards, and options available for residential users with concerns about their well water. The CCR reports and facts sheets are mailed to rural water subscribers in May of each year with the inclusion of the fact sheet starting

in May of 2012. The fact sheet is also posted on SEWUD's website (<http://www.seh2o.com/index.php>) as well on NDDH's website (<http://www.ndhealth.gov/WQ/GW/pubs/FinalATSFactSheet.pdf>), while EPA Region 8 has posted links to NDDH and SEWUD websites where the fact sheet can be located.

NDDH does not require permits for potable wells to be drilled on private property. NDDH receives drilling logs from the State Water Commission and enters them into its database, which can be accessed on a searchable Web page. On a quarterly basis, NDDH personnel search the database for wells which have been installed within the Site boundary. Searches were conducted by NDDH on July 25, 2012; September 19, 2012; December 27, 2012; March 7, 2013; and June 20, 2013, while letters and fact sheets were sent on June 20, 2013. An example of the letters is included in Appendix E. In addition, the SWC sends out drilling contractor license renewals each December, at which time fact sheets are included in the renewal notices. NDDH provided the fact sheet to the State Water Commission prior to its mailing in December 2011 and 2012.

Since county officials in Richland and Sargent counties do not issue building permits or require permits for new well installations for construction projects in the 26 townships included in the Site, NDDH furnished fact sheets to Mr. Steve Ginsbach, District Director of Southeast North Dakota for the North Dakota Township Officers Association, which oversees townships within the Site. Fact sheets were sent to Mr. Ginsbach on June 28, 2013 for distribution to each individual township officer in support of the review of all building projects within a particular township by the Board of Township Supervisors.

In addition, NDDH reviews the North Dakota One Call Records to identify residents planning to drill a domestic well and inform these new well users of the Arsenic Trioxide Superfund Site. NDDH reviewed the One Call Records on March 7, 2013 and June 20, 2013 and sent letters on June 20, 2013.

Copies of NDDH correspondence documenting the distribution of information to various agencies is provided in Appendix E.

#### 6.4 Data Review

The Site's 2009 ESD required the implementation of informational institutional controls, which includes the submittal of the CCRs. Thus, the available data used for this FYR are those data collected in support of the CCRs specifically for SEWUD-East water treatment plant, since this plant services the Site. In preparing this FYR Report, data from the CCRs and recent data received from SEWUD for its East water treatment plant servicing the site was reviewed. Arsenic concentrations in the treated water samples are listed in Table 4. Complete laboratory results for the analysis performed in 2013 are included in Appendix F.

**Table 4: Summary of SEWUD Arsenic Concentrations**

Concentration (µg/L)	Sample Date	Sample Result Source
7.1	2008	2009 SEWUD Annual Water Quality Report for Year Ending 2008; and 2010 SEWUD Annual Water Quality Report for Year Ending 2009
9.73	2010	2011 and 2012 CCRs
9.45	2/27/2013	SEWUD-East correspondence

The purpose of this monitoring is to confirm that the SEWUD-East water treatment plant servicing the Site is producing water that meets the SDWA MCLs. As shown above, the treated water from the SEWUD-East water plant continues to meet the currently enforceable MCL of 10 µg/L for arsenic. However, SEWUD is only requested by NDDH to sample for arsenic every two years. Since the concentrations measured in 2010 and 2013 have increased since 2008, annual sampling of arsenic is recommended at the SEWUD-East to ensure the concentrations of arsenic remain below the MCL of 10 µg/L.

#### 6.5 Site Inspection

A site inspection was conducted on July 1, 2013. The purpose of the site inspection was to observe site conditions and interview, where appropriate, state government personnel and other people associated with the Site. Parties in attendance at the site inspection included: Frances Costanzi (EPA RPM), Carl Anderson (NDDH), Steve Hansen (SEWUD), Brian Bergantine (AE<sub>2</sub>S), and Treat Suomi and Claire Marcussen (Skeo Solutions). For a full list of site inspection activities, see the Site Inspection Checklist in Appendix C. For photographs of the Site, see Appendix D.

The site inspection began in a conference room at SEWUD, where Ms. Costanzi provided an overview of the status of the Site and summarized the overall objectives of the FYR process. Ms. Costanzi also indicated that the site information repository needs to be updated to include copies of all current documents available for public review. Mr. Hansen and Mr. Bergantine then provided an overview of the various segments installed as part of the phased remedial action that occurred at the Site. Following the meeting, Mr. Hansen led a tour of the Site, beginning with the geothermal unit and associated generator located at the SEWUD building. This equipment was installed as part of the ARRA funding received for the Site. Site inspection participants then toured the SEWUD-East, viewing the series of water filters as well as pumps and chemical treatment lines inside the plant building. The control room was also viewed. The tour then proceeded outdoors to include the fill stands that deliver treated water to users without a potable connection, followed by visits to the well field located in the Sheyenne National Grasslands. Production wells in the well field were observed to be secured and in good condition. The tour then concluded with visits to underground reservoirs identified as Reservoir N and Reservoir G.

## 6.6 Interviews

The FYR process included interviews with NDDH, the O&M contractor and SEWUD. The purpose was to document the perceived status of the Site and any perceived problems or successes with the phases of the remedy implemented to date. All of the interviews took place following the site inspection in July 2013. The interviews are summarized below. Appendix B provides the complete interviews.

Carl Anderson: Carl Anderson (NDDH) indicated that, overall, the project has been a success because of a cooperative effort between State and federal agencies, the local rural water system and rural residents. The remedy continues to successfully treat water to arsenic concentrations below the MCL of 10 µg/L. Mr. Anderson indicated that he has not received any complaints or concerns regarding the project from qualified rural residents, residents whose private well exceeded the MCL for arsenic. NDDH has received inquiries related to sampling private wells and funding options that may be available for non-qualified rural residents to connect to the rural water system. Site work in the past five years includes upgrades to the SEWUD treatment plant, well field, water storage reservoirs and water distribution system. Mr. Anderson is comfortable with the current institutional controls.

Steve Hansen: Steve Hansen (SEWUD) is the general manager of SEWUD. Mr. Hansen stated that for a project of this size, coordinating contractors for the different segments was successful. Efficiencies were identified by using existing infrastructure in some areas and using existing SEWUD-East pumping stations by upgrading the pumps and controls to handle the additional users. Mr. Hansen indicated that the remedy is performing well and that arsenic concentrations continue to be maintained below the MCL. He also indicated that no unexpected O&M difficulties have occurred and efficiencies have been observed. The efficiencies include the addition of more energy efficient pumps and variable frequency drives installed on the pumps, which saves on electricity, as well as the automation the backwash system at the water treatment plant.

Brian Bergantine, P.E.: Mr. Bergantine is the operations manager for O&M contractor AE<sub>2</sub>S and oversees O&M activities for the project on behalf of SEWUD. Mr. Bergantine indicated that the selected remedy is operating and functioning well and that the remedy has been a very good solution to supplying potable water to rural users impacted by arsenic contamination in their private wells. Monitoring as documented by NDDH shows that rural residents are being supplied with water that is below the MCL for arsenic. A continuous monitoring of the remedy is not occurring since the SEWUD-East water treatment plant has been improved to better remotely monitor the operations of the water treatment plant through the Supervisory Control and Data Acquisition (SCADA) system. The SCADA system allows for remote real-time monitoring. Mr. Bergantine is not aware of any significant changes in Site O&M activities or unexpected O&M difficulties. Mr. Bergantine noted that efficiencies were realized with the treatment system when new variable frequency drive motors were installed on the pumps that allow for much more efficient operations at the water treatment plant.

## 7.0 Technical Assessment

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

Yes. The review of documents, data, ARARs, interviews and the results of the Site inspection indicate that overall the remedy is functioning as intended by the ROD and ROD Amendment, as modified by the ESDs, to include implementation of informational institutional controls. Rural users whose wells exceed the current MCL for arsenic of 10 µg/L have been provided with a connection through multiple phases of expansions to SEWUD-East, with the final expansion completed in September 2011. NDDH furnished information regarding institutional controls for the FYR that support the conclusion that the remedy is functioning as intended. However, in order to ensure that informational institutional controls continue to function as designed, NDDH should provide EPA regular updates of their findings and activities. In addition, efforts should be made to provide fact sheets to owners of new wells as quickly as possible.

Treated water samples from SEWUD-East are sampled and analyzed for arsenic once every two years. Based on a review of available data the concentration of arsenic detected in 2010 and 2013 are close to the MCL. Therefore, it is recommended that arsenic in treated water be analyzed on a more frequent basis to ensure that the treated water remains below the MCL for arsenic.

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

Yes. The exposure assumptions, toxicity data and RAO used at the time of remedy selection are still valid. The cancer slope factor originally used to evaluate drinking water human health risks associated with arsenic at the time of the RI was 15.0 milligrams per kilogram per day<sup>-1</sup> (mg/kg/day)<sup>-1</sup>, which is more stringent than the current cancer slope factor of 1.5 mg/kg/day<sup>-1</sup>. Since the cleanup goal selected was the SDWA MCL rather than a risk based concentration in drinking water, the availability of a less stringent toxicity value does not impact the protectiveness of the remedy. The SDWA MCL for arsenic was 50 µg/L at the time of the ROD and was subsequently lowered to 10 µg/L. This ARAR change was documented in the 2009 ESD. The periodic monitoring of the treated water from SEWUD-East indicates that the dissolved concentrations of arsenic remain below the current MCL of 10 µg/L.

The RI indicated that the most likely exposure pathway to arsenic is from human ingestion of groundwater or from consumption of locally raised meat or dairy products. Any locally produced meat or dairy products have the potential to contribute arsenic to the human diet, since the livestock may have been exposed for a significant length of time to elevated levels of arsenic in untreated groundwater. This exposure pathway may still be occurring, if domestic/irrigation wells continue to be used for watering livestock instead of using treated water from the distribution system. The RI also indicated that forage grasses and woody-stemmed bushes are not expected to contribute to elevated arsenic levels in locally raised grazing animals, due to lack of uptake from soils.

Contaminant source areas were not located during the RI and samples taken along a confirmed area of bait-spreading indicated no evidence of remnant arsenic within the soils, while samples collected from other areas of the Site resulted in similar results.

According to the Natural Research Council (NRC)<sup>1</sup> chronic oral arsenic toxicosis in domestic animals is seldom reported; the reason for this may be the fact that arsenic is relatively nontoxic to domestic animals and is typically excreted in the urine rather than absorbing it into their bodies. A study of dairy cows in Minnesota determined that arsenic does not transfer into milk or cheese, even from cattle exposed to arsenic at 10 times the human drinking water standard<sup>2</sup>. In addition, the NRC indicates that arsenic is often added as a mineral along with other metals to livestock feed for growth promotion. Considering the low potential for uptake from site soils and for transfer through the food chain, the cleanup level and RAO are appropriate for this pathway.

With respect to livestock and poultry themselves, an acceptable upper limit of 200 µg/L for arsenic contained in water for livestock and poultry has been established by the Montana, Missouri and Ohio State Extension Services.<sup>3,4,5</sup> The RI indicated only four out of 437 public and private wells sampled exceeded the safe upper limit of 200 µg/L for watering livestock and poultry. The current fact sheet used as part of the informational institutional control currently only addresses potable use of the groundwater and does not address the potential for adverse effects associated with using untreated well water for watering livestock.

Although a number of lakes are located within the Site boundary, the RI determined the lakes are primarily recharging groundwater, thus impacted groundwater is not discharging to the lakes. Further, although overland flow may occur during heavy precipitation events and during snow melt which could transport soil to downgradient lakes, this contaminant migration pathway is considered incomplete, however, since source area soils have not been identified during the RI.

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

No. No additional information has become available that could call into question the protectiveness of the remedy.

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<sup>1</sup> Mineral Tolerance of Animals: Second Revised Edition, Natural Research Council (<http://www.nap.edu/catalog/11309.html>)

<sup>2</sup> Assessing the Impact of Arsenic on Upper-Midwestern Dairy Operations. University of Minnesota, Water Resources Center. <http://wrc.umn.edu/randpe/agandwq/arsenicanddairies/index.htm>

<sup>3</sup> When is Water Good Enough for Livestock? By Jim Bauder *MSU Extension Soil and Water Quality Specialist* <http://www.montana.edu/cpa/news/wwwpb-archives/ag/baudr146.html>

<sup>4</sup> Water Quality for Livestock Drinking, By Donald L. Pfost and Charles D. Fulhage Agricultural Engineering Extension, University of Missouri Extension. <http://extension.missouri.edu/p/EQ381>

<sup>5</sup> Livestock and Water, by Stephen Boyles Ohio State University Extension Beef Specialist. Ohio State University Extension <http://beef.osu.edu/library/water.html>

## 7.4 Technical Assessment Summary

The review of decision documents, ARARs and the results of the site inspection indicate that parts of the remedy are functioning as intended by the ROD and 2009 ESD and other Site decision documents. Although contaminated source soils were not identified, historical use of pesticides has potentially impacted a number of rural wells; the majority of the residences using these wells have been connected to a treated water distribution system. In addition, informational controls are in place to inform potential well users that the groundwater may be contaminated with arsenic above the MCL. However, in order to ensure that informational institutional controls continue to be effective, NDDH should provide EPA routine updates of their findings and activities. In addition, efforts should be made to provide fact sheets to owners of new wells as quickly as possible. Further, treated water samples from SEWUD-East are only sampled and analyzed for arsenic once every two years with concentrations of arsenic detected close to the MCL. Therefore, it is recommended that arsenic in treated water be analyzed on a more frequent basis to ensure that the treated water remains below the MCL for arsenic. In addition, it is recommended that the fact sheet be revised to discuss the potential for adverse effects on livestock associated with watering animals with untreated Site groundwater.

## 8.0 Issues

Table 5 summarizes the current site issues.

**Table 5: Current Site Issues**

<b>Issue</b>	<b>Affects Current Protectiveness? (Yes or No)</b>	<b>Affects Future Protectiveness? (Yes or No)</b>
SEWUD-East water treatment plant only monitors arsenic in treated water every two years.	No	Yes
NDDH has not provided EPA with regular updates to demonstrate that informational institutional controls are adequate for achieving site RAOs.	No	Yes
The current fact sheet does not address uses of rural wells for watering livestock and poultry	No	Yes

## 9.0 Recommendations and Follow-up Actions

Table 6 provides recommendations to address the current site issues.

**Table 6: Recommendations to Address Current Site Issues**

Issue	Recommendation / Follow-Up Action	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Yes or No)	
					Current	Future
SEWUD-East water treatment Plant only monitors arsenic in treated water every two years.	Monitor arsenic concentrations in treated water on a more frequent basis to ensure it is below the MCL for arsenic.	NDDH	EPA	09/01/2014	No	Yes
NDDH has not provided EPA with regular updates to demonstrate that informational institutional controls are adequate for achieving site RAOs.	Provide EPA information on a regular basis summarizing the activities related to ensuring informational institutional controls are adequate.	NDDH	EPA	09/01/2014	No	Yes
The current fact sheet does not address uses of rural wells for watering livestock and poultry	Revise the fact sheet to address watering of livestock and poultry.	NDDH	EPA	09/01/2014	No	Yes

The following additional items that do not affect protectiveness warrant additional follow up:

- Update the site repository to include copies of all current documents available for public review

## 10.0 Protectiveness Statements

### OU1

The remedy at OU1 currently protects human health and the environment because the SEWUD-East water treatment plant has been upgraded and expanded to provide rural users, formerly on privately owned, impacted wells, with potable water that meets the arsenic MCL. However, in order for the remedy to be protective in the long term, treated groundwater should be monitored on a more frequent basis, a summary of institutional control activities and results should be submitted to EPA on a regular basis, and the Site fact sheet should be updated to discuss watering of livestock and poultry.

## OU2

The remedy at OU2 is protective of human health and the environment. Rural users who had relied on the Wyndmere and Lidgerwood water treatment plants are now connected to the SEWUD-East water treatment plant.

### Site-wide

Because the remedial actions at OU1 are protective in the short term, the Site is protective of human health and the environment in the short term. However, in order for the remedy to be protective in the long term, treated groundwater should be monitored on a more frequent basis, a summary of institutional control activities and results should be submitted to EPA on a regular basis, and the Site fact sheet should be updated to discuss watering of livestock and poultry.

## **11.0 Next Review**

The next FYR will be due within five years of the signature/approval date of this FYR.

## **Appendix A: List of Documents Reviewed**

United States Environmental Protection Agency, 1986. OU1 Record of Decision, EPA ID NDD980716963.

United States Environmental Protection Agency, 1988. OU2 Record of Decision Amendment, EPA ID NDD980716963.

United States Environmental Protection Agency, 1992. OU2 Explanation of Significant Difference, EPA ID NDD980716963.

United States Environmental Protection Agency, 1992. Preliminary Close Out Report, EPA ID NDD980716963.

United States Environmental Protection Agency, 1993. Final Close Out Report, EPA ID NDD980716963.

United States Environmental Protection Agency, 1999. First Five-Year Review, EPA ID NDD980716963.

United States Environmental Protection Agency, 2003. Second Five-Year Review, EPA ID NDD980716963.

United States Environmental Protection Agency, 2007. OU1 Explanation of Significant Difference, EPA ID NDD980716963.

United States Environmental Protection Agency, 2008. OU1 Explanation of Significant Difference, EPA ID NDD980716963.

United States Environmental Protection Agency, 2008. Third Five-Year Review Report, EPA ID NDD980716963.

United States Environmental Protection Agency, 2009. OU1 Explanation of Significant Difference, EPA ID NDD980716963.

United States Environmental Protection Agency, 2009. Remedial Action Report Rural Water System Expansion – Segment 3, EPA ID NDD980716963.

United States Environmental Protection Agency, 2010. Annual Update to the Five-Year Review, EPA ID NDD980716963.

North Dakota Department of Health, 2011. Arsenic Trioxide Superfund Site Fact Sheet: *What you should know if you drink water from a well*, (<http://www.ndhealth.gov/WQ/GW/pubs/FinalATSFactSheet.pdf>)

Southeast Water Users District, 2009. Annual Drinking Water Quality Report for the Year Ending 2008.

Southeast Water Users District, 2010. Annual Drinking Water Quality Report for the Year Ending 2009.

Southeast Water Users District, 2011. Consumer Confidence Report (CCR).

Southeast Water Users District, 2012. Consumer Confidence Report (CCR).

## Appendix B: Interview Forms

### Arsenic Trioxide Superfund Site

**Site Name:** Arsenic Trioxide  
**Interviewer Name:** Claire Marcussen  
**Subject Name:** Brian Bergantine  
**Time:** 1:30 P.M.

### Five-Year Review Interview Form

**EPA ID No.:** NDD980716963  
**Affiliation:** Skeo Solutions  
**Affiliation:** AE2S (O&M Contractor)  
**Date:** 07/08/2013

**Interview Format (circle one):** **In Person**

**Phone**    **Mail**    **Other:** Email

**Interview Category:** **O&M Contractor**

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

It is my impression that the project went very well and the remedy supplied by SEWUD (Rural Water) has been a very good solution. The contractors did a very good job of cleanup prior under each segment of the project.

2. What is your assessment of the current performance of the remedy in place at the Site?

My assessment of the current performance of the remedy in place at the Site is that it is working very well. The residents living within the site boundary now have a potable source water which has arsenic concentrations below the MCL established by EPA.

3. What are the findings from the monitoring data? What are the key trends in contaminant levels that are being documented over time at the Site?

The findings were documented by NDDH during its monitoring of the wells. This data was used to determine the impacted residents.

Because the remedy hooked up the residents with elevated arsenic concentrations in their drinking water and provided them with potable water that has arsenic concentrations below the MCL, I would say the key trend is that all residents that signed up for rural water from SEWUD are being protected.

4. Is there a continuous on-site O&M presence? If so, please describe staff responsibilities and activities. Alternatively, please describe staff responsibilities and the frequency of site inspections and activities if there is not a continuous on-site O&M presence.

Although the staff is not continuously on site at the SEWUD water treatment plant, improvements were implemented under this project that allow SEWUD staff to better remotely monitor plant operations through the SCADA system. The staff visits the plant routinely as part of O&M activities; however, I'm unaware of the exact frequency.

5. Have there been any significant changes in site O&M requirements, maintenance schedules or sampling routines since startup or in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.

To my knowledge, there have not been any significant changes in site O&M requirements, maintenance schedules or sampling routines. However, as stated above, the new SCADA system has allowed the staff to better monitor and control the operations of the water treatment plant.

6. Have there been unexpected O&M difficulties or costs at the Site since startup or in the last five years? If so, please provide details.

To my knowledge, there have not been any unexpected O&M difficulties or costs since startup. Currently, arsenic is co-precipitated with the removal of the iron from the water. As was discussed during the FYR meeting in Mantador, if the well water quality was found to not have high enough iron concentrations in it for co-precipitation of arsenic with the iron, there may be a need to add a ferric coagulant. The concentration of iron within the wells is currently high enough to effectively reduce the arsenic concentrations below the MCL without the addition of a ferric coagulant.

7. Have there been opportunities to optimize O&M activities or sampling efforts? Please describe changes and any resulting or desired cost savings or improved efficiencies.

I am not aware of any opportunities to optimize O&M activities after the project was implemented, but this question would be better directed to the SEWUD General Manager. During the project, new variable frequency drive motors were installed on the pumps, which allow for much more efficient operations at the water treatment plant. Additionally, the installation of the new SCADA system has allowed plant staff to better manage their time by allowing them to remotely monitor and operate the facility.

8. Do you have any comments, suggestions or recommendations regarding O&M activities and schedules at the Site?

No additional comments.

**Arsenic Trioxide Superfund Site****Five-Year Review Interview Form****Site Name:** Arsenic Trioxide**EPA ID No.:** NDD980716963**Interviewer Name:** Claire Marcussen**Affiliation:** Skeo Solutions**Subject Name:** Steve Hansen**Affiliation:** Southeast Water Users  
District (SEWUD)**Time:** 4:00 P.M.**Date:** 07/08/2013**Interview Format (circle one):** **In Person****Phone****Mail****Other:** Email**Interview Category:** **O&M Contractor**

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

I think for a project of this size and how it had to be bid in different segments, according to the funding that was available, it went together well. We were able to keep the project moving forward each year. In a lot of the areas, we were able to tie into existing infrastructure. We were also able to use our existing pumping stations by just upgrading the pumps and controls to handle the additional users. We had very few issues with cleanup for the miles of water lines that were installed.

2. What is your assessment of the current performance of the remedy in place at the Site?

I think the system is performing very well as of today.

3. What are the findings from the monitoring data? What are the key trends in contaminant levels that are being documented over time at the Site?

We are getting good removal of contaminants and have met all NDDH standards in maintaining levels that are below the MCL established by EPA.

4. Is there a continuous on-site O&M presence? If so, please describe staff responsibilities and activities. Alternatively, please describe staff responsibilities and the frequency of site inspections and activities if there is not a continuous on-site O&M presence.

There is not someone on site continuously. We do have operators on site at the SEWUD water treatment plant on a daily basis to do testing to make sure we are getting proper removal from our filters. We also have a SCADA system to monitor the plant operations remotely from our office. We are also able to monitor all pumping stations from our office and on operators' cell phones.

5. Have there been any significant changes in site O&M requirements, maintenance schedules or sampling routines since startup or in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.

No real changes as we were already monitoring all sites. By upgrading some of the computer equipment, we are now able to get more information through our SCADA system.

6. Have there been unexpected O&M difficulties or costs at the Site since startup or in the last five years? If so, please provide details.

There have been no unexpected O&M difficulties at the Site.

7. Have there been opportunities to optimize O&M activities or sampling efforts? Please describe changes and any resulting or desired cost savings or improved efficiencies.

We have been able to optimize O&M activities with the addition of more energy efficient pumps and variable frequency drives that save on electricity and also by automating our backwash system at the water treatment plant. We are able to do a better job of maintaining our filters.

8. Do you have any comments, suggestions or recommendations regarding O&M activities and schedules at the Site?

This project has helped cities and rural residents with high levels of arsenic in their drinking water. It has given them the opportunity to have access to a safe source of drinking water.

**Arsenic Trioxide Superfund Site****Five-Year Review Interview Form****Site Name:** Arsenic Trioxide**EPA ID No.:** NDD980716963**Interviewer Name:** Claire Marcussen**Affiliation:** Skeo Solutions**Subject Name:** Carl Anderson**Affiliation:** North Dakota Department of Health (NDDH)**Time:** 8:00 A.M.**Date:** 07/12/1013**Interview Format (circle one):** **In Person****Phone****Mail****Other:** Email**Interview Category: State Agency**

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

The project provided the opportunity for qualified rural residents to obtain a safe source of drinking water. The project required a cooperative effort between state and federal agencies, the local rural water system, and rural residents. The remedy implemented was successful at meeting the objectives of the project.

2. What is your assessment of the current performance of the remedy in place at the Site?

SEWUD is required to comply with the SDWA, which includes compliance sampling. The analytical results from the most recent arsenic test (samples collected in 2010) indicated that arsenic was present in the treated water at a concentration of 9.73 parts per billion, which is below the arsenic MCL of 10 parts per billion. Therefore, the water treatment system is reducing arsenic concentrations in the raw water supply to a level that is protective of human health.

3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities from residents in the past five years?

The project was only available to qualified rural residents, which included those living within the site boundary whose domestic water supply contained arsenic at a concentration greater than the arsenic MCL. NDDH has received inquiries regarding the inclusion of rural residents living outside the site boundary. Other inquiries received included questions related to sampling private wells and funding options that may be available for non-qualified rural residents to connect to the rural water system.

4. Has your office conducted any site-related activities or communications in the past five years? If so, please describe the purpose and results of these activities.

The grant for the project ended on December 30, 2012; site work was ongoing during the past five years. Site work included upgrades to the SEWUD treatment plant, well field, water storage reservoirs and water distribution system. Other activities associated with the site included sampling private wells, attending design and construction meetings, completing project management and oversight, and completing project reports.

5. Are you aware of any changes to state laws that might affect the protectiveness of the Site's remedy?

No.

6. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues?

Yes.

7. Are you aware of any changes in projected land use(s) at the Site?

The Site encompasses approximately 936 square miles of primarily agricultural land. I am not aware of any significant land use changes; however, changes (e.g., housing developments) may have occurred.

8. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?

SEWUD is responsible for the oversight, operation and maintenance of the water treatment plant and water distribution system and is required to maintain compliance with the provisions of the SDWA. SEWUD has provided reliable service throughout the duration of the project and I expect that to continue.



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). Fill in all that apply.

Agency EPA  
 Contact Frances Costanzi Remedial \_\_\_\_\_ 303-312-6571  
 Name Title Date Phone No.  
Project  
Manager  
 Title

Problems/suggestions  Report attached: \_\_\_\_\_

Agency NDDH  
 Contact Carl Andersen Project 07/12/2013 701-328-5213  
 Name Title Date Phone No.  
Manager  
 Title

Problems/suggestions  Report attached: \_\_\_\_\_

Agency SEWUD  
 Contact Steve Hansen General 07/08/2013 701-242-7432  
 Name Title Date Phone No.  
Manager  
 Title

Problems/suggestions  Report attached: \_\_\_\_\_

Agency \_\_\_\_\_  
 Contact \_\_\_\_\_  
 Name Title Date Phone No.

Problems/suggestions  Report attached: \_\_\_\_\_

Agency \_\_\_\_\_  
 Contact \_\_\_\_\_  
 Name Title Date Phone No.

Problems/suggestions  Report attached: \_\_\_\_\_

4. **Other Interviews** (optional)  Report attached: \_\_\_\_\_

**III. ON-SITE DOCUMENTS AND RECORDS VERIFIED** (check all that apply)

1. **O&M Documents**

- |   |   |  |                              |
|---|---|--|------------------------------|
| <input checked="" type="checkbox"/> O&M manual        | <input checked="" type="checkbox"/> Readily available | <input checked="" type="checkbox"/> Up to date | <input type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> As-built drawings | <input checked="" type="checkbox"/> Readily available | <input checked="" type="checkbox"/> Up to date | <input type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Maintenance logs  | <input checked="" type="checkbox"/> Readily available | <input checked="" type="checkbox"/> Up to date | <input type="checkbox"/> N/A |

Remarks: North Dakota has an agreement with the SEWUD and EPA has agreed with North Dakota

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: \_\_\_\_\_

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

Remarks: \_\_\_\_\_

4.	<b>Permits and Service Agreements</b>	<input type="checkbox"/> Air discharge permit	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
		<input type="checkbox"/> Effluent discharge	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
		<input type="checkbox"/> Waste disposal, POTW	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
		<input checked="" type="checkbox"/> Other permits: <u>North Dakota State permit to operate water treatment plant.</u>	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
	Remarks: _____				
5.	<b>Gas Generation Records</b>		<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
	Remarks: _____				
6.	<b>Settlement Monument Records</b>		<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
	Remarks: _____				
7.	<b>Groundwater Monitoring Records</b>		<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
	Remarks: _____				
8.	<b>Leachate Extraction Records</b>		<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
	Remarks: _____				
9.	<b>Discharge Compliance Records</b>				
	<input type="checkbox"/> Air	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A	
	<input type="checkbox"/> Water (effluent)	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A	
	Remarks: _____				
10.	<b>Daily Access/Security Logs</b>		<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
	Remarks: _____				
<b>IV. O&amp;M COSTS</b>					
1.	<b>O&amp;M Organization</b>				
	<input type="checkbox"/> State in-house	<input type="checkbox"/> Contractor for state			
	<input type="checkbox"/> PRP in-house	<input type="checkbox"/> Contractor for PRP			
	<input type="checkbox"/> Federal facility in-house	<input type="checkbox"/> Contractor for Federal facility			
	<input checked="" type="checkbox"/> SEWUD pays for the O&M costs. Costs are not separable from normal operation costs.				

2.	<b>O&amp;M Cost Records</b>	<input type="checkbox"/> Readily available <input type="checkbox"/> Up to date <input type="checkbox"/> Funding mechanism/agreement in place <input checked="" type="checkbox"/> Unavailable Original O&M cost estimate: _____ <input type="checkbox"/> Breakdown attached	
		Total annual cost by year for review period if available	
	From: <u>mm/dd/yyyy</u> Date	To: <u>mm/dd/yyyy</u> Date	_____ Total cost <input type="checkbox"/> Breakdown attached
	From: <u>mm/dd/yyyy</u> Date	To: <u>mm/dd/yyyy</u> Date	_____ Total cost <input type="checkbox"/> Breakdown attached
	From: <u>mm/dd/yyyy</u> Date	To: <u>mm/dd/yyyy</u> Date	_____ Total cost <input type="checkbox"/> Breakdown attached
	From: <u>mm/dd/yyyy</u> Date	To: <u>mm/dd/yyyy</u> Date	_____ Total cost <input type="checkbox"/> Breakdown attached
	From: <u>mm/dd/yyyy</u> Date	To: <u>mm/dd/yyyy</u> Date	_____ Total cost <input type="checkbox"/> Breakdown attached
3.	<b>Unanticipated or Unusually High O&amp;M Costs during Review Period</b>		
	Describe costs and reasons: <u>None</u>		
<b>V. ACCESS AND INSTITUTIONAL CONTROLS</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
<b>A. Fencing</b>			
1.	<b>Fencing Damaged</b>	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> Gates secured <input checked="" type="checkbox"/> N/A	Remarks: _____
<b>B. Other Access Restrictions</b>			
1.	<b>Signs and Other Security Measures</b>	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A	Remarks: <u>Pump houses and waste treatment plant locked, secured and located in a rural area.</u>
<b>C. Institutional Controls (ICs)</b>			

<b>1. Implementation and Enforcement</b>			
Site conditions imply ICs not properly implemented	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
Site conditions imply ICs not being fully enforced	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
Type of monitoring (e.g., self-reporting, drive by): <u>State is responsible for reviewing institutional controls</u>			
Frequency: <u>Quarterly</u>			
Responsible party/agency: <u>NDDH</u>			
Contact	<u>Carl Anderson</u>	<u>07/01/2013</u>	<u>701-328-5213</u>
	_____		
Name	Title	Date	Phone no.
Reporting is up to date	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Reports are verified by the lead agency	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
Specific requirements in deed or decision documents have been met	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Violations have been reported	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
Other problems or suggestions: <input checked="" type="checkbox"/> Report attached			
<u>See institutional control review in Section 6.3.</u>			
<b>2. Adequacy</b> <input checked="" type="checkbox"/> ICs are adequate <input type="checkbox"/> ICs are inadequate <input type="checkbox"/> N/A			
Remarks: <u>See institutional control review in Section 6.3.</u>			
<b>D. General</b>			
<b>1. Vandalism/Trespassing</b> <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> No vandalism evident			
Remarks: _____			
<b>2. Land Use Changes On Site</b> <input checked="" type="checkbox"/> N/A			
Remarks: _____			
<b>3. Land Use Changes Off Site</b> <input checked="" type="checkbox"/> N/A			
Remarks: _____			
<b>VI. GENERAL SITE CONDITIONS</b>			
<b>A. Roads</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
<b>1. Roads Damaged</b> <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Roads adequate <input type="checkbox"/> N/A			
Remarks: _____			
<b>B. Other Site Conditions</b>			
Remarks: _____			
<b>VII. LANDFILL COVERS</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
<b>A. Landfill Surface</b>			
<b>1. Settlement (low spots)</b> <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Settlement not evident			
Aerial extent: _____		Depth: _____	
Remarks: _____			

2.	<b>Cracks</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Cracking not evident
	Lengths: _____	Widths: _____	Depths: _____
	Remarks: _____		
3.	<b>Erosion</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Erosion not evident
	Arial extent: _____		Depth: _____
	Remarks: _____		
4.	<b>Holes</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Holes not evident
	Arial extent: _____		Depth: _____
	Remarks: _____		
5.	<b>Vegetative Cover</b>	<input type="checkbox"/> Grass	<input type="checkbox"/> Cover properly established
	<input type="checkbox"/> No signs of stress	<input type="checkbox"/> Trees/shrubs (indicate size and locations on a diagram)	
	Remarks: _____		
6.	<b>Alternative Cover</b> (e.g., armored rock, concrete)	<input type="checkbox"/> N/A	
	Remarks: _____		
7.	<b>Bulges</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Bulges not evident
	Arial extent: _____		Height: _____
	Remarks: _____		
8.	<b>Wet Areas/Water Damage</b>	<input type="checkbox"/> Wet areas/water damage not evident	
	<input type="checkbox"/> Wet areas	<input type="checkbox"/> Location shown on site map	Arial extent: _____
	<input type="checkbox"/> Ponding	<input type="checkbox"/> Location shown on site map	Arial extent: _____
	<input type="checkbox"/> Seeps	<input type="checkbox"/> Location shown on site map	Arial extent: _____
	<input type="checkbox"/> Soft subgrade	<input type="checkbox"/> Location shown on site map	Arial extent: _____
	Remarks: _____		
9.	<b>Slope Instability</b>	<input type="checkbox"/> Slides	<input type="checkbox"/> Location shown on site map
	<input type="checkbox"/> No evidence of slope instability		
	Arial extent: _____		
	Remarks: _____		
<b>B. Benches</b> <input type="checkbox"/> Applicable <input type="checkbox"/> 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.	<b>Flows Bypass Bench</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
	Remarks: _____		
2.	<b>Bench Breached</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
	Remarks: _____		

3.	<b>Bench Overtopped</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
Remarks: _____			
<b>C. Letdown Channels</b> <input type="checkbox"/> Applicable <input type="checkbox"/> 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.	<b>Settlement</b> (Low spots)	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of settlement
Aerial extent: _____		Depth: _____	
Remarks: _____			
2.	<b>Material Degradation</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of degradation
Material type: _____		Aerial extent: _____	
Remarks: _____			
3.	<b>Erosion</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of erosion
Aerial extent: _____		Depth: _____	
Remarks: _____			
4.	<b>Undercutting</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of undercutting
Aerial extent: _____		Depth: _____	
Remarks: _____			
5.	<b>Obstructions</b>	Type: _____	<input type="checkbox"/> No obstructions
<input type="checkbox"/> Location shown on site map		Aerial extent: _____	
Size: _____			
Remarks: _____			
6.	<b>Excessive Vegetative Growth</b>	Type: _____	
<input type="checkbox"/> No evidence of excessive growth			
<input type="checkbox"/> Vegetation in channels does not obstruct flow			
<input type="checkbox"/> Location shown on site map		Aerial extent: _____	
Remarks: _____			
<b>D. Cover Penetrations</b> <input type="checkbox"/> Applicable <input type="checkbox"/> N/A			
1.	<b>Gas Vents</b>	<input type="checkbox"/> Active	<input type="checkbox"/> Passive
<input type="checkbox"/> Properly secured/locked		<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled
<input type="checkbox"/> Evidence of leakage at penetration		<input type="checkbox"/> Needs maintenance	<input type="checkbox"/> Good condition
		<input type="checkbox"/> N/A	
Remarks: _____			

2.	<b>Gas Monitoring Probes</b>	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled	<input type="checkbox"/> Good condition
		<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs maintenance	<input type="checkbox"/> N/A	
Remarks: _____					
3.	<b>Monitoring Wells</b> (within surface area of landfill)	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled	<input type="checkbox"/> Good condition
		<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs maintenance	<input type="checkbox"/> N/A	
Remarks: _____					
4.	<b>Extraction Wells Leachate</b>	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled	<input type="checkbox"/> Good condition
		<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs maintenance	<input type="checkbox"/> N/A	
Remarks: _____					
5.	<b>Settlement Monuments</b>	<input type="checkbox"/> Located	<input type="checkbox"/> Routinely surveyed	<input type="checkbox"/> N/A	
Remarks: _____					
<b>E. Gas Collection and Treatment</b>		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A		
1.	<b>Gas Treatment Facilities</b>	<input type="checkbox"/> Flaring	<input type="checkbox"/> Thermal destruction	<input type="checkbox"/> Collection for reuse	
		<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance		
Remarks: _____					
2.	<b>Gas Collection Wells, Manifolds and Piping</b>	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance		
Remarks: _____					
3.	<b>Gas Monitoring Facilities</b> (e.g., gas monitoring of adjacent homes or buildings)	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance	<input type="checkbox"/> N/A	
Remarks: _____					
<b>F. Cover Drainage Layer</b>		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A		
1.	<b>Outlet Pipes Inspected</b>	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A		
Remarks: _____					
2.	<b>Outlet Rock Inspected</b>	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A		
Remarks: _____					
<b>G. Detention/Sedimentation Ponds</b>		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A		
1.	<b>Siltation</b>	Area extent: _____	Depth: _____	<input type="checkbox"/> N/A	
	<input type="checkbox"/> Siltation not evident				
Remarks: _____					

2.	<b>Erosion</b>	Area extent: _____	Depth: _____
	<input type="checkbox"/> Erosion not evident		
	Remarks: _____		
3.	<b>Outlet Works</b>	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
	Remarks: _____		
4.	<b>Dam</b>	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
	Remarks: _____		
<b>H. Retaining Walls</b>		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	<b>Deformations</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
	Horizontal displacement: _____	Vertical displacement: _____	
	Rotational displacement: _____		
	Remarks: _____		
2.	<b>Degradation</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Degradation not evident
	Remarks: _____		
<b>I. Perimeter Ditches/Off-Site Discharge</b>		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	<b>Siltation</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Siltation not evident
	Area extent: _____	Depth: _____	
	Remarks: _____		
2.	<b>Vegetative Growth</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A
	<input type="checkbox"/> Vegetation does not impede flow		
	Area extent: _____	Type: _____	
	Remarks: _____		
3.	<b>Erosion</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Erosion not evident
	Area extent: _____	Depth: _____	
	Remarks: _____		
4.	<b>Discharge Structure</b>	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
	Remarks: _____		
<b>VIII. VERTICAL BARRIER WALLS</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	<b>Settlement</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Settlement not evident
	Area extent: _____	Depth: _____	
	Remarks: _____		

2. <b>Performance Monitoring</b>	Type of monitoring: _____
<input type="checkbox"/> Performance not monitored	
Frequency: _____	<input type="checkbox"/> Evidence of breaching
Head differential: _____	
Remarks: _____	
<b>IX. GROUNDWATER/SURFACE WATER REMEDIES</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A	
<b>A. Groundwater Extraction Wells, Pumps and Pipelines</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A	
1. <b>Pumps, Wellhead Plumbing and Electrical</b>	
<input checked="" type="checkbox"/> Good condition <input checked="" type="checkbox"/> All required wells properly operating	<input type="checkbox"/> Needs maintenance <input type="checkbox"/> N/A
Remarks: _____	
2. <b>Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances</b>	
<input checked="" type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance
Remarks: _____	
3. <b>Spare Parts and Equipment</b>	
<input checked="" type="checkbox"/> Readily available <input checked="" type="checkbox"/> Good condition	<input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided
Remarks: _____	
<b>B. Surface Water Collection Structures, Pumps and Pipelines</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
1. <b>Collection Structures, Pumps and Electrical</b>	
<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance
Remarks: _____	
2. <b>Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances</b>	
<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance
Remarks: _____	
3. <b>Spare Parts and Equipment</b>	
<input type="checkbox"/> Readily available <input type="checkbox"/> Good condition	<input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided
Remarks: _____	
<b>C. Treatment System</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A	

1.	<b>Treatment Train</b> (check components that apply)	<input checked="" type="checkbox"/> Metals removal <input type="checkbox"/> Oil/water separation <input type="checkbox"/> Bioremediation <input type="checkbox"/> Air stripping <input type="checkbox"/> Carbon adsorbers <input checked="" type="checkbox"/> Filters: _____ <input checked="" type="checkbox"/> Additive (e.g., chelation agent, flocculent): <u>When needed, ferric coagulant added to co-precipitate arsenic if iron in groundwater is not high enough.</u> <input type="checkbox"/> Others: _____ <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance <input checked="" type="checkbox"/> Sampling ports properly marked and functional <input checked="" type="checkbox"/> Sampling/maintenance log displayed and up to date <input checked="" type="checkbox"/> Equipment properly identified <input type="checkbox"/> Quantity of groundwater treated annually: _____ <input type="checkbox"/> Quantity of surface water treated annually: _____ Remarks: _____
2.	<b>Electrical Enclosures and Panels</b> (properly rated and functional)	<input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance Remarks: _____
3.	<b>Tanks, Vaults, Storage Vessels</b>	<input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs maintenance Remarks: _____
4.	<b>Discharge Structure and Appurtenances</b>	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance Remarks: _____
5.	<b>Treatment Building(s)</b>	<input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition (esp. roof and doorways) <input type="checkbox"/> Needs repair <input type="checkbox"/> Chemicals and equipment properly stored Remarks: _____
6.	<b>Monitoring Wells</b> (pump and treatment remedy)	<input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs maintenance <input checked="" type="checkbox"/> N/A Remarks: _____
<b>D. Monitoring Data</b>		
1.	<b>Monitoring Data</b>	<input checked="" type="checkbox"/> Is routinely submitted on time <input checked="" type="checkbox"/> Is of acceptable quality

2. <b>Monitoring Data Suggests:</b>	<input type="checkbox"/> N/A
<input type="checkbox"/> Groundwater plume is effectively contained	<input checked="" type="checkbox"/> Contaminant concentrations are declining
Remarks: <u>Monitoring data collected by SEWUD show that arsenic is below the MCL in treated groundwater however, monitoring is only performed every two years and the treated results are close to the MCL.</u>	
<b>E. Monitored Natural Attenuation</b>	
1. <b>Monitoring Wells</b> (natural attenuation remedy)	
<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning
<input type="checkbox"/> All required wells located	<input type="checkbox"/> Needs maintenance
	<input type="checkbox"/> Routinely sampled
	<input type="checkbox"/> Good condition
	<input checked="" type="checkbox"/> N/A
Remarks: _____	
<b>X. OTHER REMEDIES</b>	
If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.	
<input checked="" type="checkbox"/> N/A	
<b>XI. OVERALL OBSERVATIONS</b>	
<b>A. Implementation of the Remedy</b>	
Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions). <u>The remedy is effectively removing arsenic from raw water through the use of a ferric coagulant and filters to reduce arsenic concentrations in treated water below the MCL.</u>	
<b>B. Adequacy of O&amp;M</b>	
Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. <u>SEWUD has not observed any issues related to the O&amp;M procedures.</u>	
<b>C. Early Indicators of Potential Remedy Problems</b>	
Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. <u>None.</u>	
<b>D. Opportunities for Optimization</b>	
Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. <u>Optimizations include upgrading pumps with more energy efficient models as well as automating the backwash system.</u>	

## Appendix D: Photographs from Site Inspection Visit



SEWUD Office, Mantador, North Dakota.



Geothermal unit located at the SEWUD building.



Backup generator for the SEWUD building.



SEWUD water treatment plant.



Filter units inside the SEWUD water treatment plant with overhead chemical treatment lines.



Pumps inside the SEWUD water treatment plant.



**2007**

**North Dakota Arsenic  
Trioxide Superfund Project**

**Phase IV - Segment 2**

**Southeast Water Users District - East  
Wells and WTP Expansion**

**Funded by:**  
**US Environmental Protection Agency**  
**North Dakota Department of Health**

**Owner:**  
**Southeast Water Users District**  
**General Manager: Steve Hansen**

**Engineer:**  
**AE2S**  
**EAPC Architects and Engineers**

**Contractor:**  
**Swanberg Construction, Inc.**

Placard denoting the expansion of the SEWUD water treatment plant.



Control room inside the SEWUD water treatment plant.



Fill station for water users at the SEWUD water treatment plant.



Entrance to SEWUD well field, located in a wellhead protection area on the Sheyenne National Grasslands.



Secured production well for SEWUD water treatment plant.



Secured production well for SEWUD water treatment plant.



Placard on Reservoir N denoting completion of Segment 5 of SEWUD expansion.



Exterior view of Reservoir N.



Pump located within Reservoir N.



Fill station at Reservoir N.



City of Hankinson Reservoir.



Exterior of Reservoir G and fill stand.



Control panel inside Reservoir G.

## Appendix E: NDDH Correspondence and Site Fact Sheet

Documentation of SWC Database Review.

<b>Database Searched</b>	<b>Domestic Wells Found</b>	<b>Database Searched</b>
7/25/2012	0	North Dakota State Water Commission (SWC)
9/19/2012	0	SWC
12/27/2012	4	SWC
3/7/2013	6	SWC & North Dakota One Call (ND1)
6/20/2013	9	SWC & ND1
9/20/2013		
12/20/2013		



**NORTH DAKOTA**  
DEPARTMENT of HEALTH

ENVIRONMENTAL HEALTH SECTION  
Gold Seal Center, 918 E. Divide Ave.  
Bismarck, ND 58501-1947  
701.328.5200 (fax)  
www.ndhealth.gov



June 20, 2013

City of Hankinson  
PO Box 478  
Hankinson, ND 58041

COPY

Subject: Arsenic Trioxide Superfund Site

To Whom It May Concern:

This letter is to inform you that our records indicate that you recently installed a drinking water well within the Arsenic Trioxide Superfund Site and your well may be at risk for elevated levels of arsenic. Arsenic is a toxic chemical that occurs naturally in the environment in the soil, rock and minerals, but it can also appear as a by-product of agricultural and industrial uses. In certain areas within Richland and Sargent counties, arsenic-laced bait was used extensively to combat grasshopper infestations during a period from the 1930s – 1940s. This bait was commonly applied to farm fields and unused materials were often buried in pits or other low lying areas nearby. The use and disposal of this arsenic may have contributed to the elevated concentrations of arsenic found in groundwater in some areas of the site.

Since your property lies within the boundaries of the Arsenic Trioxide Superfund Site, we are sending this Fact Sheet that explains the site in more detail. Please do not hesitate to contact me at 701-328-5210 or [sstockdill@nd.gov](mailto:sstockdill@nd.gov) if you have any questions.

Sincerely;

Shane Stockdill  
Environmental Scientist  
NDDH – Division of Water Quality

Encl. Arsenic Trioxide Superfund Site Fact Sheet

Environmental Health  
Section Chief's Office  
701.328.5150

Division of  
Air Quality  
701.328.5188

Division of  
Municipal Facilities  
701.328.5211

Division of  
Waste Management  
701.328.5166

Division of  
Water Quality  
701.328.5210



# Arsenic Trioxide Superfund Site Fact Sheet



*What you should know if  
you drink water from a well*

## Contacts

Carl Anderson, Supervisor  
Groundwater Protection Program  
North Dakota Dept. of Health  
Water Quality Division  
918 East Divide Avenue  
Bismarck, N.D. 58501-1947  
701-328-5213  
[www.ndhealth.gov](http://www.ndhealth.gov)

Southeast Water Users District  
206 Main Street  
PO Box 10  
Mantador, N.D. 58058-0010  
701-242-7432  
[www.seh2o.com](http://www.seh2o.com)

Fran Costanzi, Project Manager  
U.S. EPA, Region 8  
1595 Wynkoop Street (EPR-SR)  
Denver, CO 80202-1129  
303-312- 6571  
800-227-8917 (toll free Region 8)  
[www.epa.gov/region8/superfund/nd/arsenic/](http://www.epa.gov/region8/superfund/nd/arsenic/)

## Drinking-Water Well Users May Be at Risk

Homeowners and potential buyers of homes with existing water wells in Richland and Sargent counties in North Dakota, as well as anyone considering drilling a new well in the area, should be aware that shallow aquifer groundwater may contain elevated levels of arsenic.

The U.S. Environmental Protection Agency (EPA), in cooperation with the North Dakota Department of Health (NDDoH) and the Southeast Water Users District (SEWUD), has taken steps to remedy the health risk posed by arsenic in the area identified as the Arsenic Trioxide Superfund Site. The area encompasses about 936 square miles in southeast North Dakota and includes 26 townships.

## What is Arsenic, and Why is It a Problem?

Arsenic is a toxic chemical that occurs naturally in the environment in the soil, rocks and minerals. It can also appear as a by-product of agricultural and



industrial use. In Richland and Sargent counties, arsenic-laced bait was used extensively to combat grasshopper infestations during the 1930s and early 1940s. The bait was commonly applied to farm fields, and unused materials were often buried or dumped in pits or low-lying areas.

In 1979, in the communities of Lidgerwood, Wyndmere and Milnor, shallow wells in the shallow upper were discovered to contain arsenic at concentrations above the drinking water standard of 50 parts per billion (ppb). Arsenic was also found in wells at private homes and farms in unincorporated areas. In 2006, the standard for arsenic was changed from 50 ppb to 10 ppb, which is roughly equivalent to a few drops of ink in an Olympic-size swimming pool.

*Continued on reverse*

Some people who drink water containing arsenic in excess of the standard over many years could experience adverse health effects, such as skin damage or circulatory system problems, and may have an increased risk of getting cancer. Short-term exposure to high doses of arsenic in drinking water (about a thousand times higher than the 10 ppb drinking water standard) can also cause adverse effects in people. Such exposures are not known to occur from public water supplies in the U.S. that comply with the drinking water standard for arsenic.

### What Should I Do to Limit My Risk?

Owners of existing groundwater wells should determine if their water has been tested for arsenic levels. NDDoH, in Bismarck, N.D., maintains records of previously tested wells and will provide results to owners at no charge. If your well has not been tested, contact NDDoH for more information or view the brochure at [www.ndhealth.gov/WQ/GW/pubs/WellTestingBrochure.pdf](http://www.ndhealth.gov/WQ/GW/pubs/WellTestingBrochure.pdf).

Should arsenic levels exceed the 10 ppb drinking water standard, owners of wells with water intended for household use (drinking, cooking, etc.) have several options:

- Household point-of-use treatment—water purification units installed at owners' homes,
- Connection to the public water supply—contact SEWUD for details, or
- Using bottled drinking water.

These are options for well owners to consider. The well owner is responsible for the costs related to these options.

### What Happens Next?

EPA and NDDoH have completed the remediation activities at the site, which has included the connection of cities to public water systems, the expansion of SEWUD water treatment facilities and the installation of pipelines to connect rural users to the public water supply.

Ongoing measures include the creation of Institutional Controls (ICs) by EPA and NDDoH. ICs are “non-engineered instruments,” such as administrative and legal controls, that will help minimize the potential for human exposure to arsenic contamination in the future and protect the integrity of existing remedies. This fact sheet is a part of the IC for the Arsenic Trioxide Superfund Site.

### Townships in the Arsenic Trioxide Superfund Site

#### Richland County

Barney  
Belford  
Brightwood  
Danton  
Dexter  
Duerr (East)  
Duerr (West)  
Elma  
Grant  
Homestead  
Liberty Grove  
Moran  
West End  
Wyndmere

#### Sargent County

Dunbar  
Hall  
Herman  
Kingston  
Marboe  
Milnor  
Ransom  
Rutland  
Shuman  
Tewaukon  
Weber  
Willey





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DEPARTMENT of HEALTH

ENVIRONMENTAL HEALTH SECTION  
Gold Seal Center, 918 E. Divide Ave.  
Bismarck, ND 58501-1947  
701.328.5200 (fax)  
www.ndhealth.gov



June 28, 2013

Mr. Steve Ginsbach  
Southeast District Director - NDTOA  
16290 91<sup>st</sup> SE  
Hankinson, ND 58041

Re: Arsenic Trioxide Superfund Site Fact Sheet

Mr. Ginsbach,

As we discussed in our recent telephone conversation, I have enclosed copies of the Arsenic Trioxide Superfund Site Fact Sheet (Fact Sheet) for you to distribute to the township officers for the townships included within the Arsenic Trioxide Superfund Site (ATS). The Fact Sheet summarizes the site history, townships included with the ATS, potential health risks associated with drinking water containing elevated concentrations of arsenic, potential options for ensuring a safe drinking water supply, and project contacts.

An important component of the project is the implementation of “Institutional Controls” (ICs) that educate, inform, and notify residents and well drillers that shallow groundwater within the project boundary may contain arsenic at concentrations that pose potential risk to those consuming the water. The enclosed Fact Sheet is one of the ICs developed for the ATS.

One of the challenges of informing the public of the potential risks is to provide appropriate site information to residents prior to the installation of private water supply wells. During our conversation, you indicated that in Richland and Sargent counties, township boards are responsible for issuing building permits for projects within their jurisdiction and that it may be possible to provide the Fact Sheet to residents during the permit application process. Although the installation of drinking water wells may not be included in every project approved by a township, the information provided on the Fact Sheet may be of interest to the applicant.

I have enclosed Fact Sheets for distribution to the 26 townships included within the boundary of the ATS, and I appreciate your efforts to encourage them to provide this information to building permit applicants. I can be contacted at 701-328-5213 if anyone has any questions or if additional Fact Sheets are needed. The Fact Sheet is also included on the NDDH website at <http://www.ndhealth.gov/WQ/GW/pubs/FinalATSFactSheet.pdf>.

Sincerely,

Carl Anderson  
Ground Water Protection Program Manager  
NDDH – Division of Water Quality  
Encl. Arsenic Trioxide Superfund Site Fact Sheets

Environmental Health  
Section Chief's Office  
701.328.5150

Division of  
Air Quality  
701.328.5188

Division of  
Municipal Facilities  
701.328.5211

Division of  
Waste Management  
701.328.5166

Division of  
Water Quality  
701.328.5210

# Appendix F: Analytical Results from SEWUD 2013



**FARGO CASS PUBLIC HEALTH**  
**Environmental Laboratory**  
 435 14<sup>th</sup> Avenue South  
 Fargo, ND 58103  
 Phone 701-298-6986  
 Fax 701-241-8110  
 envirolab@cityoffargo.com

SEWUD-West  
 PO Box 10  
 Mantador, ND 58058

Order Number: 13-131  
**Sample Number: 13-295**

Phone: 701-242-7432  
 Fax: 701-242-7807

ReceiveDate: 2/28/2013  
 ReceiveTime: 11:04 AM

Customer Sample Number:

Collection Site: Waterplant  
 Collection Date: 2/27/2013  
 Collection Time: 2:00 PM

Collected by:  
 Matrix: Water

### Results for 13-295

Analyte	Result	Method	Analysis Date	Analysis Time	Analyst
Nitrate-Nitrite as N	< 0.200	mg/L EPA 300.0	2/28/2013	1:00 PM	Kim Jirava
Arsenic	9.45	ug/L EPA 200.9	3/5/2013	12:30 PM	M. Amundson
SAR	S1	CSU Ext. Service	3/15/2013	8:29 AM	D. Aufman
Silica	29.6	mg/L EPA 200.7	3/15/2013	8:01 AM	D. Aufman
Conductivity	439	uS/c SM 2510 B	3/1/2013	12:45 PM	M. Amundson
pH	7.5	SM 4500-H B	2/28/2013	11:23 AM	Kim Jirava
Total Dissolved Solids (TDS)	261	mg/L SM 2540 C	3/4/2013	10:45 AM	Kim Jirava
Turbidity	0.05	NTU EPA 180.1	3/1/2013	1:00 PM	M. Amundson
Chloride	3.32	mg/L EPA 300.0	2/28/2013	1:00 PM	Kim Jirava
Fluoride	0.509	mg/L EPA 300.0	2/28/2013	1:00 PM	Kim Jirava
Sulfate	14.5	mg/L EPA 300.0	2/28/2013	1:00 PM	Kim Jirava
Calcium	69.1	mg/L EPA 200.7	3/8/2013	9:00 AM	M. Amundson

Approved By: Da ef

Date: 03/15/13

The mission of Fargo Cass Public Health is to assure a healthy community for all people through on-going assessment, education, advocacy, intervention, prevention and collaboration





**Public Health**  
Prevent. Promote. Protect.  
Fargo Cass Public Health

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435 14<sup>th</sup> Avenue South  
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Collection Date: 2/27/2013  
Collection Time: 2:00 PM

Collected by:  
Matrix: Water

**Results for 13-295**

Analyte	Result	Method	Analysis Date	Analysis Time	Analyst
Iron	< 0.010 mg/L	EPA 200.7	3/8/2013	9:00 AM	M. Amundson
Magnesium	13.8 mg/L	EPA 200.7	3/8/2013	9:00 AM	M. Amundson
Manganese	< 0.010 mg/L	EPA 200.7	3/8/2013	9:00 AM	M. Amundson
Potassium	2.27 mg/L	EPA 200.7	3/8/2013	9:00 AM	M. Amundson
Sodium	2.68 mg/L	EPA 200.7	3/8/2013	9:00 AM	M. Amundson
Total Hardness as CaCO <sub>3</sub>	229 mg/L	EPA 200.7	3/8/2013	9:00 AM	M. Amundson
Bicarbonate as CaCO <sub>3</sub>	216 mg/L	SM 2320B	3/1/2013	11:15 AM	Kim Jirava
Carbonate as CaCO <sub>3</sub>	< 1.00 mg/L	SM 2320B	3/1/2013	11:15 AM	Kim Jirava
Hydroxide as CaCO <sub>3</sub>	< 1.00 mg/L	SM 2320B	3/1/2013	11:15 AM	Kim Jirava
Phenolphthalein as CaCO <sub>3</sub>	< 1.00 mg/L	SM 2320B	3/1/2013	11:15 AM	Kim Jirava
Total Alkalinity as CaCO <sub>3</sub>	216 mg/L	SM 2320B	3/1/2013	11:15 AM	Kim Jirava

Approved By: \_\_\_\_\_

Date: \_\_\_\_\_

03/15/13

The mission of Fargo Cass Public Health is to assure a healthy community for all people through on-going assessment, education, advocacy, intervention, prevention and collaboration

Page 2 of 2



## Water Quality Data Table – SEWUD – EAST – ND3901068

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of contaminants in water provided by public water systems. The table below lists all of the drinking water contaminants that we detected during the calendar year of this report. Although many more contaminants were tested, only those substances listed below were found in your water. All sources of drinking water contain some naturally occurring contaminants. At low levels, these substances are generally not harmful in our drinking water. Removing all contaminants would be extremely expensive, and in most cases, would not provide increased protection of public health. A few naturally occurring minerals may actually improve the taste of drinking water and have nutritional value at low levels. Unless otherwise noted, the data presented in this table is from testing done in the calendar year of the report. The EPA or the State requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminants do not vary significantly from year to year, or the system is not considered vulnerable to this type of contamination. As such, some of our data, though representative, may be more than one year old. In this table you will find terms and abbreviations that might not be familiar to you. To help you better understand these terms, we have provided the definitions below the table.

<u>Contaminants</u>	<u>MCLG</u> or <u>MRDLG</u>	<u>MCL,</u> <u>TT, or</u> <u>MRDL</u>	<u>Your</u> <u>Water</u>	<u>Range</u> <u>Low</u>   <u>High</u>		<u>Sample</u> <u>Date</u>	<u>Violation</u>	<u>Typical Source</u>
<b>Disinfectants &amp; Disinfectant By-Products</b>								
(There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants)								
Chlorine (as Cl <sub>2</sub> ) (ppm)	4	4	1.2	0.9	1.3	2011	No	Water additive used to control microbes
<b>Inorganic Contaminants</b>								
Barium (ppm)	2	2	0.223	NA		2009	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Fluoride (ppm)	4	4	1.13	NA		2009	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Arsenic (ppb)	0	10	9.73	NA		2010	No	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes

**SOUTHEAST WATER USERS DISTRICT**

**TEST RESULTS**

INORGANIC CONTAMINANTS

HIGHEST VIOLANCE	LEVEL UNITS	RANGE OF DETECTION	HEALTH LANGU
7.1	ppb	NA	Whole your skin and for as only it does cont as-min. EPA's standard is understanding of as-min's; ects as air from drinkin the health e a mineral kr concentrat such as skin