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SIXTH FIVE-YEAR REVIEW REPORT FOR ARSENIC TRIOXIDE SUPERFUND SITE RICHLAND, RANSOM AND SARGENT COUNTIES, NORTH DAKOTA

Prepared by

U.S. Environmental Protection Agency
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LIST OF ABBREVIATIONS AND ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
ARRA	American Recovery and Reinvestment Act
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
FS	Feasibility Study
FYR	Five-Year Review
IC	Institutional Control
MCL	Maximum Contaminant Level
µg/L	Micrograms per Liter
mg/kg/day	Milligrams per Kilogram per Day
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NDDEQ	North Dakota Department of Environmental Quality
NPL	National Priorities List
NRC	National Research Council
O&M	Operation and Maintenance
OU	Operable Unit
RAO	Remedial Action Objective
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SEWUD	Southeast Water Users District
SWC	State Water Commission
UU/UE	Unlimited Use/Unrestricted Exposure

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues, if any, found during the review and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii)) and considering EPA policy.

This is the sixth FYR for the Arsenic Trioxide Superfund Site (Site). The triggering action for this policy review is the completion date of the previous FYR. The EPA signed the Site's first Record of Decision (ROD) on September 26, 1986, prior to the effective date of the Superfund Amendments and Reauthorization Act (SARA) of October 17, 1986, resulting in this being a policy review. The FYR has been prepared because hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of two operable units (OUs). OU1 addresses contaminated groundwater treated at the Richland Rural Water Treatment System (currently known as the Southeast Water Users District or the SEWUD). OU2 initially addressed contaminated groundwater treated at the Lidgerwood and Wyndmere treatment plants. These plants were later shut down; the areas formerly served by them are now served by the SEWUD and became part of OU1. This FYR Report addresses both OUs.

The EPA remedial project manager (RPM) Frances L. Costanzi led the FYR. The North Dakota Department of Environmental Quality (NDDEQ, known as the North Dakota Department of Health prior to 2021) is the lead agency at the Site, with the EPA as the support agency. Carl Anderson is the project manager representing the NDDEQ. Alison Cattani and Claire Marcussen from Skeo provided EPA contractor support. The review began on 6/22/2022.

Appendix A lists the documents used to prepare this FYR Report. Appendix B provides a detailed chronology of site events.

The EPA has determined in this five-year review (FYR) that the cleanup at the Arsenic Trioxide Superfund Site is protective in the short term. This means that the remedy is protective of human health and the environment and allows for residential, recreational and commercial reuse because drinking water treated by the Southeast Water Users District (https://seh2o.com) provides clean drinking water to residents at the Site. In addition, information in the form of a fact sheet is provided to water users to inform and notify residents and well drillers that groundwater at the Site may contain arsenic above acceptable levels and that there are potential risks from drinking untreated groundwater. For the remedy to be protective over the long term, this FYR recommends the following action: review risk assessment and toxicity levels for arsenic in untreated groundwater for watering of livestock and poultry, determine if additional sampling of untreated water is needed, update the fact sheet accordingly and ensure it is made available to the public.

Site Background

The Site is in southeast North Dakota. It covers 26 townships (about 940 square miles) and encompasses parts of Richland, Ransom and Sargent counties (Figure 1). The Site's area is sparsely populated farmland and prairie with a few small towns, including Lidgerwood, Wyndmere, Milnor and Hankinson. During the 1930s and early 1940s, arsenic-laced bait was commonly applied on farm fields across North Dakota to combat grasshopper

infestations. In addition, arsenic is also naturally occurring. Pesticide use and the presence of natural sources of arsenic resulted in contamination of groundwater in the communities of Hankinson, Lidgerwood, Wyndmere and Milnor, as well as at homes and farms in unincorporated areas.

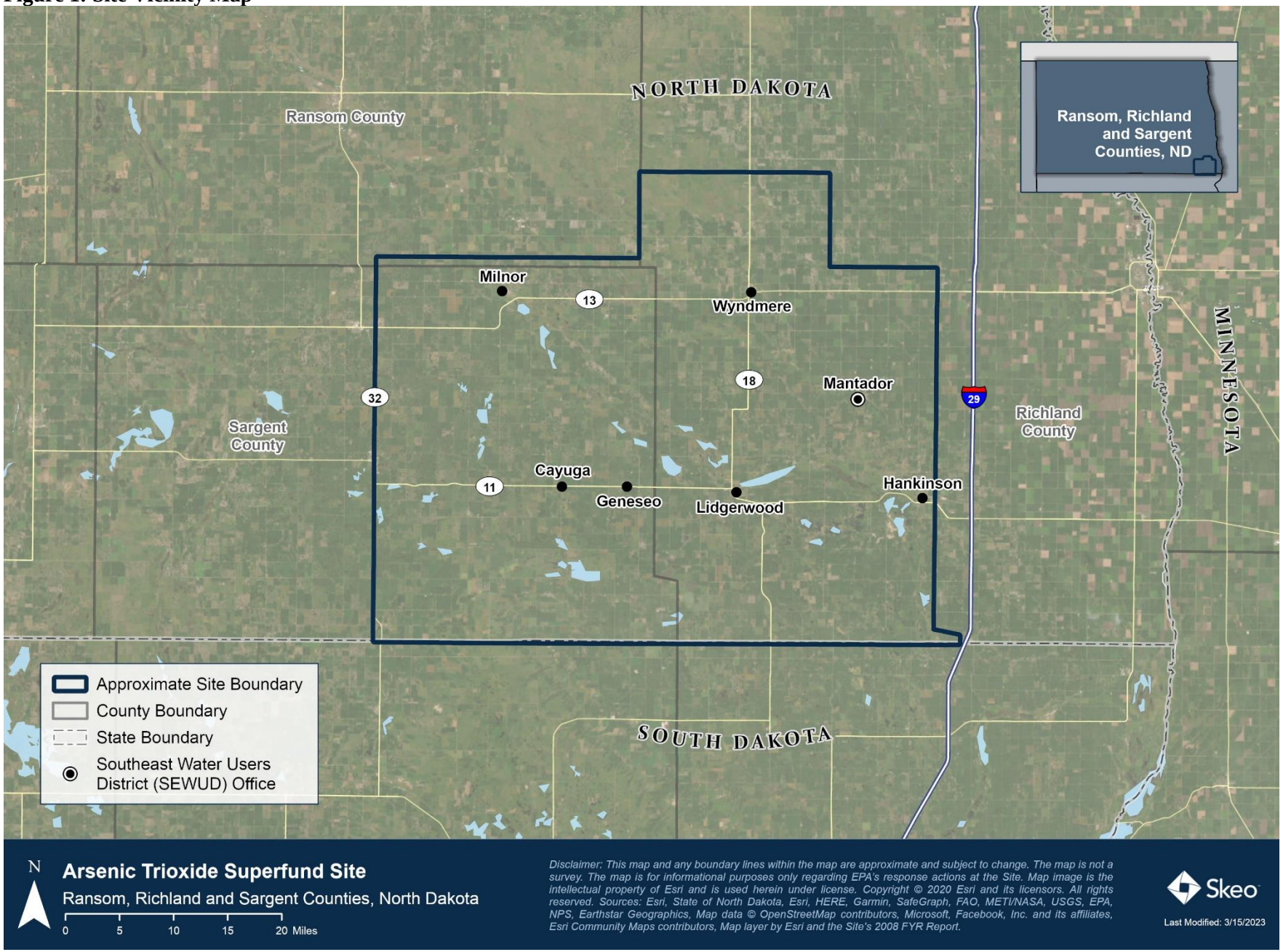
Groundwater aquifer systems at the Site include a shallow groundwater system and a deep bedrock system. The shallow system consists of several named glacial drift aquifers present within the Site's boundaries, including the Sheyenne Delta, Hankinson, Spiritwood, Milnor Channel, Brightwood and Gwinner aquifers. The bedrock aquifer is present within the Dakota Group, which includes several formations and is generally referred to as the Dakota Aquifer. Arsenic contamination is limited to the shallow groundwater system, which is used as a drinking water source in the region and for agricultural purposes, including irrigation and livestock watering. The Site is currently serviced by the SEWUD's eastern water treatment plant (SEWUD-East). It draws water from the Hankinson aquifer within the shallow groundwater system. SEWUD-East treats the water prior to distribution to the cities of Lidgerwood, Wyndmere, Milnor and Hankinson and surrounding areas (Figure C-1).

Surface waters in the vicinity of the Site consist of the Wild Rice River and its tributaries, and area sloughs and prairie potholes. These surface water bodies recharge the aquifer during the spring and summer.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Arsenic Trioxide		
EPA ID: NDD980716963		
Region: 8	**State:** North Dakota	**City/County:** Hankinson, Lidgerwood, Wyndmere and Milnor/Richland, Ransom and Sargent
SITE STATUS		
NPL Status: Deleted		
Multiple OUs? Yes	**Has the Site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA		
Author name: Frances L. Costanzi and Paul Stoick with support from Skeo		
Author affiliation: EPA Region 8 and Skeo		
Review period: 6/22/2022 – 9/21/2023		
Date of site inspection: 9/27/2022		
Type of review: Policy		
Review number: 6		
Triggering action date: 9/21/2018		
Due date *(five years after triggering action date)*: 9/21/2023		

Figure 1: Site Vicinity Map



II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In 1979, the North Dakota Department of Health, now the NDDEQ, identified elevated levels of arsenic at the water treatment systems in Lidgerwood and Wyndmere during routine water quality monitoring of municipal water. The levels exceeded the federal drinking water standard or maximum contaminant level (MCL) at the time of 50 micrograms per liter (µg/L). Additional monitoring detected more widespread occurrence of arsenic in groundwater in surrounding rural areas. NDDEQ conducted the remedial investigation and feasibility study (RI/FS) from 1982 to 1986 with EPA oversight. Based on the findings, the agencies concluded that the most likely exposure pathways of arsenic are from human ingestion of groundwater and locally produced meat or dairy products in areas of Richland and Sargent Counties because the livestock may have been exposed to high-arsenic drinking water. Human exposure to soils did not pose a concern, as soil sampling that targeted areas of confirmed bait spreading did not show evidence of arsenic contamination in the top six feet of soil and similar soil borings taken from other portions of the study area yielded similar results. The RI demonstrated that grasses and woody-stemmed bushes grown in arsenic-impacted soil are not expected to raise arsenic levels in grazing animals.

Response Actions

The EPA proposed listing the Site on the Superfund Program's National Priorities List (NPL) in December of 1982. The EPA finalized the Site's listing on the NPL in September of 1983. Based on the results of the RI, the NDDEQ ordered Lidgerwood to provide drinking water that met the MCL for arsenic. In response, Lidgerwood constructed a new water treatment plant in 1986 as an early action.

Originally, the EPA designated the Site as a single OU, which was the Richland Rural Water Treatment System (now SEWUD-East). The EPA selected the Site's long-term, groundwater remedy in the Site's 1986 ROD, which called for expanding the Richland Rural Water Treatment System to distribute treated groundwater to rural communities. At the time, the Lidgerwood and Wyndmere water treatment systems were effective in the removal of arsenic. However, after the EPA signed the 1986 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 so that expansion costs could be reimbursed. Therefore, the EPA issued a ROD Amendment in 1988 designating the Richland Rural Water Treatment System as OU1 and the Lidgerwood and Wyndmere treatment plants as OU2. Due to increased demand and declining performance for arsenic removal at the Wyndmere and Lidgerwood water treatment plants, those plants shut down, and the cities of Wyndmere and Lidgerwood were connected to SEWUD-East and became part of OU1 in 2006 and 2010, respectively, which now serves the entire Site (Appendix C).

The remedial action objective (RAO) established for the Site in the 1986 ROD was to reduce exposure to arsenic-contaminated groundwater. The 1986 ROD required remediation of groundwater to the background concentration of 25 µg/L. The EPA changed this cleanup goal to 10 µg/L in a 2007 Explanation of Significant Differences (ESD) to reflect the revised federal MCL.

Table 1 provides a summary of the remedy components described in the Site's 1986 ROD, 1988 ROD Amendment and multiple ESDs. 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 from 1986 to 1992. The EPA issued multiple ESDs for OU1 to address additional phases of expansion of the SEWUD-East water treatment plant to accommodate the increased demand due to the change in the arsenic MCL from 50 µg/L to 10 µg/L and the shutdown of the other water treatment plants. In addition, a 2009 ESD required implementation of institutional controls. Details of the specific institutional controls are presented in the institutional controls review section of this FYR report.

Table 1: Summary of OU1 and OU2 Remedy Components

OU	Remedial Component	Decision Document
OU1	Expansion of SEWUD-East and its associated distribution system to provide safe drinking water to rural households where arsenic exceeded 50 µg/, the MCL at that time.	1986 ROD
	Monitoring of the treatment plants, glacial aquifer systems and private wells.	1986 ROD
	Implementation of multiple layers of institutional controls to encourage public participation in the project and restrict private water supply well use. OU2 later became part of OU1 such that the institutional controls applied to the entire Site.	1986 ROD 2009 ESD
	Increased capacity of SEWUD-East and wells added to meet the increased water demands of the Wyndmere and Hankinson communities.	September 2007 ESD
	Provision of bottled water to interested rural households within the site boundary whose groundwater wells contained arsenic levels above the 10 µg/L MCL and expansion of the SEWUD-East and production wells to meet the increased water demands of the Wyndmere and Hankinson communities.	September 2007 ESD October 2007 ESD
	Connection of about 60 rural users to the SEWUD-East 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.	2008 ESD
	Connection of qualified rural households to the SEWUD-East system (about 330 rural households) and expansion of the SEWUD-East treatment plant and system to accommodate the increased demand.	2009 ESD
OU2	Reimbursement from the Superfund program to the Lidgerwood city government for remedy costs associated with construction of its water treatment plant.	1988 ROD Amendment
	Modification of the Lidgerwood water treatment plant.	1988 ROD Amendment
	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.	1988 ROD Amendment
	Construction of a potable water reservoir and distribution system in the city of Milnor.	1992 ESD

Status of Implementation

OU1 – SEWUD-East

The NDDEQ completed the remedial design between March of 1987 and June of 1989. Remedial construction occurred in two phases. Phase 1, to expand SEWUD-East and the distribution system, began in July of 1990. It included installation of about 300 miles of water distribution pipeline, seven more water storage reservoirs, installation of three additional water supply wells and the doubling of the size of the treatment plant.

Phase 2 began in September of 1991 and ended in June of 1993. The project added Milnor to the distribution system. 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. Both phases of remedial construction activities finished in June of 1993. After Phase 2 activities, the Richland Rural Water Treatment System took over operation and maintenance of the treatment system. The EPA documented the completion of work in a Final Close-Out Report, dated June 30, 1993. The EPA deleted the Site from the NPL on July 5, 1996.

The EPA revised the arsenic MCL from 50 µg/L to 10 µg/L in 2001. In June of 2003, the EPA conducted an extensive rural user well sampling program to determine if rural users in the 26 townships were drinking water with arsenic concentrations over the new MCL. Based on the sampling, the EPA and the NDDEQ determined that the remedy needed to be expanded using a segmented design and construction approach, with the scope of work for each segment dictated by the amount of available funding. In the interim, the EPA and the NDDEQ offered bottled water to interested rural households as an early action from June of 2007 to January of 2009 for households within the Site's boundaries whose groundwater wells had arsenic levels above the 10 µg/L MCL.

The expanded remedy included six new segments – 1, 2, 3, 4, 4a and 5. The NDDEQ completed the remedial design for the expansion of SEWUD-East from September of 2004 to March of 2010. The NDDEQ entered into a contract with the SEWUD, and the SEWUD conducted the design and construction under oversight from the NDDEQ and the EPA. The SEWUD completed remedy construction in 2011.

Segment 1 included installing and extending new water lines from existing lines to new underground reservoirs and construction of pump facilities for the cities of Wyndmere and Hankinson. In addition, modifications were made to SEWUD-East Reservoir B. Segment 2 included expansion of the well field and upgrades to the treatment train of the SEWUD-East water treatment plant. Segment 3 included connection of rural households from the cities of Wyndmere and Hankinson to the SEWUD-East distribution system. Segments 4 and 4a included connection of rural users to SEWUD-East in the cities of Cayuga and Geneseo and upgrading of water supply reservoirs. Segment 5 included well field expansion to provide treated water to the city of Lidgerwood and other users, expansion of system capacity through construction of new reservoirs, installation of an emergency generator to diminish service interruptions, more upgrades to the SEWUD-East treatment facility, and installation of a geothermal system to lessen the reliance of SEWUD's headquarters facility in Mantador on non-renewable energy sources. Appendix B provides additional detailed information on remedy implementation (Table B-2).

OU2 – Cities of Lidgerwood and Wyndmere

Primary OU2 remediation activities initially consisted of the expansion of the water treatment buildings in the cities of Lidgerwood and Wyndmere. Due to the decline in system performance in both cities, both cities became part of OU1 once they were connected to the SEWUD system. The NDDEQ connected the cities of Wyndmere and Lidgerwood to the SEWUD system in 2006 and 2010, respectively. Appendix B provides a detailed summary of the construction activities completed as part of the expansion of water treatment facilities in the cities of Lidgerwood and Wyndmere prior to their eventual connection to SEWUD-East as part of OU1 (Table B-3).

Institutional Controls Review

The 2009 ESD for OU1 identified institutional controls for the Site. They included: (1) preparation of annual consumer confidence reports (CCRs); (2) completion of well searches by the NDDEQ of the State Water Commission's (SWC) database for new wells drilled at the Site; (3) provision of a fact sheet to property owners within the Site's boundaries when new wells are drilled; (4) the NDDEQ working with the State Board of Water Well Contractors to provide information, including the fact sheet, to North-Dakota-certified well drillers regarding arsenic-contaminated groundwater; and (5) posting of the Site's fact sheet located on EPA Region 8's website and the NDDEQ's Groundwater Protection website. Table 2 lists the institutional controls and their implementation dates.

The informational institutional controls continue to be implemented, meeting the objective of educating, informing and notifying residents and well drillers that shallow groundwater at the Site may contain arsenic levels above Safe Drinking Water Act (SDWA) MCLs and that there are potential risks of consuming arsenic-contaminated water. The primary informational control is a fact sheet that the EPA and the NDDEQ prepared in 2012 and share with the public through a variety of mechanisms. It provides information on the potential health effects of arsenic exposure in drinking water and information on how to limit exposure. It also informs owners of existing groundwater wells that they should determine if their water has been tested for arsenic levels and that the NDDEQ maintains records of previously tested wells and provides results to owners at no charge.[1]

[1] The NDDEQ only has well sample data for residences that participated in the Site's well sampling project or those residences that may participate in the NDDEQ's ambient groundwater monitoring project. Private well owners who have had their wells tested outside of these two projects are not required to send data to the NDDEQ. Consequently, the NDDEQ may not have data available even though a well has been sampled in the past.

Table 2: Summary of Planned and/or Implemented Institutional Controls (ICs)

Media That Do Not Support UU/UE Based on Current Conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date
Groundwater	Yes	Yes	Site	Restrict or prohibit domestic use of water from the shallow aquifer.	None[a]
				Educate, inform and notify residents and well drillers that shallow groundwater at the Site may contain arsenic levels above SDWA MCLs and that there are potential risks from consuming arsenic-contaminated water.	9/5/2013 • The EPA and the NDDEQ prepared a fact sheet and posted it on their websites. • The SEWUD includes the fact sheet in annual water quality reporting to its members. • The NDDEQ provided the fact sheet to the SWC. • The NDDEQ provided the fact sheet to the Board of Water Well Contractors and North Dakota-certified well drillers. • The NDDEQ informed local government officials to include a notification to owners obtaining building permits. • The NDDEQ and the EPA continue to work with the SEWUD to discuss various options for expanding its informational outreach to non-members in the 26 townships at the Site.

Notes:

a. The NDDEQ 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 to be infeasible because it would prohibit the installation of wells in areas where arsenic in groundwater is below the arsenic MCL.

There is no requirement that a new potable well be sampled prior to use to ensure that the MCL for arsenic is not exceeded. For existing wells that have not been tested, the fact sheet provides more information on how an owner can get their well tested. The fact sheet also lists several options for owners of existing potable wells to consider should arsenic concentrations exceed the MCL. The options include: (1) household point-of-use treatment – water purification units installed at owners' homes; (2) connection to the public water supply; and (3) use of bottled drinking water. The well owner is responsible for the costs related to these options. The 2018 FYR Report recommended updating the 2012 fact sheet to include information regarding the uses of rural wells for watering livestock and poultry. The EPA has conducted additional review of current science on arsenic exposure to livestock and poultry and is currently working with the NDDEQ to update the fact sheet to address this issue. Once finalized, the fact sheet will be included in the annual CCR distribution and posted on the SEWUD, NDDEQ and EPA websites.

The fact sheet is also included with the annual mailing of the water quality report to SEWUD members, as summarized in the CCRs. The CCRs and fact sheets are mailed to rural water subscribers in May of each year. The fact sheet is also posted on the SEWUD and NDDEQ websites.[2,3]

The NDDEQ does not require permits for the drilling of potable wells on private property. The NDDEQ provides the fact sheet to the State Board of Water Well Contractors, which includes the fact sheets to licensed well drillers each December. In addition, the NDDEQ conducts well searches using queries in SWC's database on a quarterly basis to identify wells installed within the Site's boundaries. As of July of 2018, the NDDEQ sends the results of the quarterly database search to the EPA, along with a list of the new wells drilled and the well type (e.g., domestic, municipal, for livestock). The NDDEQ sends letters and fact sheets to well owners after completion of new wells. In addition, SWC sends out drilling contractor license renewals each December, at which time the fact sheets are included with the renewal notices. The NDDEQ provides the fact sheet to SWC prior to its December mailings.

Based on a review of the NDDEQ's quarterly reporting, a total of six new wells were identified between 2019 through the second quarter of 2023 reporting and include three wells in December of 2019, one well in December of 2020, and two wells in June of 2021. Copies of the quarterly reports documenting the identification of the six new wells along with confirmation that the fact sheets were sent to the new well owners are included in Appendix D. In addition, a cumulative summary table of the quarterly well searches is provided in Appendix D.

County officials do not issue building permits or require permits for new well installations for construction projects in the 26 townships at the Site. Instead, the NDDEQ furnished fact sheets to the North Dakota Township Officers Association, which oversees townships at the Site, for distribution to each township officer. The township officer uses the fact sheets to support the Board of Township Supervisors' review of all building projects within a particular township.

Appendix D includes an example of NDDEQ correspondence documenting the distribution of information to various agencies.

Systems Operations/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. Because the cities of Lidgerwood and Wyndmere were connected to the SEWUD-East treatment plant, these two cities are no longer responsible for treatment plant O&M activities. The SEWUD assumed responsibility for O&M activities at the SEWUD-East treatment plant in July of 1993. This responsibility is ongoing. Primary O&M activities for the treatment and distribution systems include:

- Water supply well O&M activities.
- Routine treatment plant process monitoring and quality control.
- Distribution system O&M activities.
- Maintenance of chemical delivery lines and filtration units.
- Water quality reporting to the NDDEQ.

The above activities are conducted according to the Site's 2010 O&M Plan. No deviations from these activities were noted during the inspection of the Site on September 26, 2022.

According to the Site's 2009 ESD, the NDDEQ is responsible for overseeing remedy-related O&M activities and implementation of institutional controls. Further, according to the 2009 ESD, the EPA is not responsible for future improvements to the public water system, barring changes to the protectiveness of the remedy. The EPA provides oversight and prepares the Site's FYR reports.

[2] https://seh2o.com/pdf/arsenic_trioxide_factsheet.pdf.
[3] https://deq.nd.gov/publications/wq/1_GW/Arsenic/ArsenicTrioxideSuperfundSiteFactSheet.pdf.

III. PROGRESS SINCE THE PREVIOUS REVIEW

This section includes the protectiveness determinations and statements from the previous FYR Report (Table 3) as well as the recommendation from the previous FYR Report (Table 4) and the status of that recommendation.

Table 3: Protectiveness Determinations/Statements from the 2018 FYR Report

OU #	Protectiveness Determination	Protectiveness Statement
1	Short-term Protective	The OU1 remedy 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. For the remedy to be protective over the long term, the fact sheet should be updated to discuss watering of livestock and poultry and be made available on the NDDEQ, SEWUD-East and EPA websites.
2	Protective	The OU2 remedy 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 OU1 SEWUD-East water treatment plant.
Sitewide	Short-term Protective	Because the remedial actions at OU1 are protective in the short term, the site remedy is protective of human health and the environment in the short term. For the remedy to be protective in the long term, the site fact sheet should be updated to discuss watering of livestock and poultry and be made available on the NDDEQ, SEWUD-East and EPA websites.

Table 4: Status of Recommendation from the 2018 FYR Report

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
OU1	The publicly-available fact sheet has not been updated since the 2013 FYR to address the watering of livestock and poultry.	Update the fact sheet to include information regarding watering of livestock and poultry and ensure it is made available to the public.	Ongoing	The EPA is working with the NDDEQ on completing the review of drinking water levels for livestock and poultry to be included in an updated fact sheet.	Not applicable

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Community Involvement and Site Interviews

The results of the FYR and this report will be made available at the Site's information repository, SEWUD's offices, located at 206 Main Street in Mantador, North Dakota 58058. Upon completion of the FYR, the EPA will place a public notice in *The Daily News* to announce the availability of the final FYR Report in the Site's information repository. The FYR Report will also be available on EPA's website at http://www.epa.gov/superfund/arsenic-trioxide.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy implemented to date. The interviews are summarized below, and the completed forms are included in Appendix E.

Carl Anderson and Shannon Suggs, with the NDDEQ, indicated that the project provided qualified rural residents within the Site's boundaries with the opportunity to obtain a safe source of drinking water by providing rural water supplied by the SEWUD. They stated that the remedy required a cooperative effort between state and federal agencies, the SEWUD and rural residents, and upon completion, it successfully met the objectives of the project. They stated that the remedy is performing well because the SEWUD ensures that treated water meets drinking water criteria. The NDDEQ is not aware of any complaints or concerns from the local community, and the NDDEQ continues to review new wells installed within the Site's boundaries, to discuss the project with new well owners and to provide them with a copy of the Site's fact sheet.

Steve Hansen is the general manager of SEWUD and stated that overall, the project performed very well to provide safe drinking water to families. He is not aware of any major issues with the cleanup or maintenance. He believes the water treatment plant is effective at removing arsenic to levels below the MCL. Mr. Hansen indicated that no unexpected O&M-related difficulties have occurred. There is a daily presence of O&M staff at the water treatment plant to ensure the plant is running at peak efficiency. The plant is also monitored remotely, which can head off any problems in a timely matter before anything becomes a major issue.

Data Review

This FYR reviewed the data collected in support of the CCRs specific to the SEWUD-East water treatment plant, because the plant services the Site (Appendix F). Table 5 lists the arsenic concentrations in treated water samples. Appendix F provides copies of the laboratory data. The arsenic results in treated water from SEWUD-East demonstrate that the treatment plant consistently treats water to meet the SDWA MCL of 10 µg/L for arsenic.

Table 5: Arsenic Concentrations in SEWUD-East Treated Water (2014-2022)

Year	Arsenic Concentration (µg/L)
2014	8.50
2015	7.00
2016	8.00
2017	8.00
2018	6.00
2019	7.00
2020	6.65
2021	9.38
2022	8.91
Source: Annual laboratory results provided by the SEWUD.	

Site Inspection

The inspection of the Site took place on 9/27/2022. Participants included Frances Costanzi (EPA RPM), Carl Anderson and Shannon Suggs (NDDEQ), Steve Hansen (SEWUD) and Alison Cattani (Skeo). The purpose of the inspection was to assess the protectiveness of the remedy.

The inspection participants met in the SEWUD conference room. Mr. Hansen provided an update on recent maintenance activities and additional system expansions. Mr. Anderson provided an update on the institutional controls. After the meeting, Mr. Hansen led a tour of the Site, beginning with the geothermal unit and associated emergency backup generator at the SEWUD building. Participants then toured the SEWUD-East water treatment plant. All components and the building were in good condition and well maintained. Production wells in the well field in the Sheyenne National Grasslands were observed to be secured and in good condition. The tour concluded with visits to underground reservoirs identified as Reservoir N, Reservoir G and the Hankinson Water Reservoir. These reservoir buildings were in good condition and are well maintained. The Site's information repository is located at SEWUD headquarters; it is up to date. The inspection checklist for and photographs of the Site are provided in Appendix G and Appendix H, respectively.

V. TECHNICAL ASSESSMENT

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

Question A Summary:

The review of documents, data, applicable or relevant and appropriate requirements (ARARs), interviews, and the results of the inspection of the Site indicate that the remedy is functioning as intended by the Site's ROD and ROD Amendment as modified by the ESDs. The EPA, the NDDEQ and the SEWUD completed remedial construction activities at the Site in September of 2011. The activities included the connection of affected residences and businesses to public water systems, the expansion of SEWUD-East water treatment facilities and the installation of pipelines to connect rural users to the public water supply. Private wells are not required to be abandoned, as owners may use the wells for purposes other than drinking. New private well owners, identified during the NDDEQ's database searches, are provided with a fact sheet that informs them of possible risks if a well is used for drinking water. Treated water samples from SEWUD-East are sampled and analyzed annually for arsenic. Concentrations of arsenic in treated water remain below the current MCL. In addition, the EPA and the NDDEQ have implemented informational institutional controls to educate, inform and notify residents and well drillers that shallow groundwater at the Site may contain arsenic levels above SDWA MCLs.

The EPA and the NDDEQ prepared a fact sheet in 2012 and revised it in 2015. It informs SEWUD-East members about the Site's arsenic groundwater contamination and options available for residential users with concerns about their well water. In addition, the fact sheet is distributed to well drillers, existing potable well owners and new well owners to help minimize the potential for human exposure to arsenic contamination in the future. The NDDEQ is working with the EPA to revise the fact sheet to include information about guidance levels of arsenic in drinking water for livestock and poultry. Once finalized, the fact sheet will be made available to the public on the NDDEQ, SEWUD and EPA websites. It will also be included in annual CCR mailings and be provided to the State Board of Water Well Contractors, which includes the fact sheets in mailings to licensed well drillers each December. The NDDEQ recently established a schedule for providing the EPA with summaries of the NDDEQ's quarterly institutional control reviews to help keep the EPA up to date on the status of existing institutional controls. The quarterly summaries include a summary of wells drilled within the Site's boundaries, the purpose of the well and the date when the fact sheet was sent to the well owner.

The FYR inspection of the Site in September of 2022 found that the treatment facility was in good working condition.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels and RAO used at the time of the remedy selection still valid?

Question B Summary:

The exposure assumptions, toxicity data and the 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 per milligram per kilogram-day $(mg/kg\text{-}day)^{-1}$, which is more stringent than the current cancer slope factor of 1.5 $(mg/kg\text{-}day)^{-1}$. The EPA revised the cleanup goal for arsenic in the 2007 ESD from 50 µg/L to 10 µg/L, the most current 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 annual monitoring of treated water from SEWUD-East indicates that dissolved concentrations of arsenic remain below the current MCL of 10 µg/L, which is also below the background concentration of 25 µg/L set forth in the ROD.

The RI showed that the most likely exposure pathway to arsenic is from human ingestion of groundwater or from consumption of locally raised meat or dairy products. 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. Arsenic trioxide release areas were not located during the RI. Samples taken along a

confirmed area of bait spreading indicated no evidence of arsenic in the soils, while samples collected from other areas of the Site yielded similar results.

According to the National Research Council (NRC), chronic oral arsenic toxicosis in domestic animals is seldom reported. This may be because arsenic is relatively nontoxic to domestic animals and is typically excreted in the urine rather than absorbed into their bodies.[4] A study of dairy cows in Minnesota found that arsenic does not transfer into milk or cheese, even from cattle exposed to arsenic at 10 times higher than the human drinking water standard.[5] 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 soils at the Site and for transfer through the food chain, the cleanup level and RAO are appropriate for this pathway.

The Missouri, North Dakota and Ohio State Extension Services have established an acceptable upper limit of 200 µg/L for arsenic in water for livestock or poultry.[6,7,8] The RI indicated that only seven of 437 public and private wells sampled exceeded the safe upper limit of 200 µg/L for watering livestock and poultry. The NDDEQ and the EPA are currently revising the fact sheet to include information regarding uses of rural wells for watering livestock and poultry.

Although several lakes are within the Site's boundaries, 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, because source-area soils were not identified during the RI.

The remedy has achieved the RAO of reducing exposure to arsenic-contaminated groundwater through the installation of public water supply lines to groundwater users affected by historical use of arsenic containing insecticide. Informational institutional controls are in place to educate, inform and notify residents and well drillers that shallow groundwater at the Site may contain arsenic levels above the arsenic MCL and that there are potential risks from consuming arsenic-contaminated water.

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

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

[4] Mineral Tolerance of Animals: Second Revised Edition, National Research Council. 2005. http://www.nap.edu/catalog/11309.html.
[5] Biennial Report 2005 - 2006, Water Resources Center. University of Minnesota. Assessing the Impact of Arsenic on Upper-Midwestern Dairy Operations. https://conservancy.umn.edu/bitstream/handle/11299/181401/cfans_asset_113709.pdf?sequence=1&isAllowed=y
[6] Livestock Water Quality. Miranda A. Meehan, Extension Livestock Environmental Stewardship Specialist, Gerald Stokka, Extension Veterinarian/Livestock Stewardship Specialist, and Michelle Mostrom, Veterinary Toxicologist. North Dakota State University Extension Office. AS1764, February 2021. https://www.ndsu.edu/agriculture/sites/default/files/2022-08/as1764.pdf.
[7] Water Quality for Livestock Drinking. Donald L. Pfost and Charles D. Fulhage. Agricultural Engineering Extension, University of Missouri Extension. December 2016. http://extension.missouri.edu/p/EQ381.
[8] Livestock and Water. Stephen Boyles, Ohio State University Extension Beef Specialist. Ohio State University Extension. No date provided: https://agnr.osu.edu/sites/agnr/files/imce/pdfs/Beef/LivestockAndWater.pdf

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the FYR:
OU2

Issues and Recommendations Identified in the FYR:

OU(s): 1	**Issue Category: Institutional Controls**			
	Issue: The Missouri, North Dakota and Ohio State Extension Services have established an acceptable upper limit of 200 µg/L for arsenic in water for livestock or poultry. The RI indicated that only seven of 437 public and private wells sampled exceeded the safe upper limit of 200 µg/L for watering livestock and poultry.			
	Recommendation: Review risk assessment and toxicity levels for arsenic in untreated groundwater for watering of livestock and poultry, determine if additional sampling of untreated water is needed, update the fact sheet accordingly and ensure it is made available to the public. Provide the fact sheet when updated to the North Dakota Township Officers Association.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA/State	EPA	9/28/2025

VII. PROTECTIVENESS STATEMENTS

Protectiveness Statement	
Operable Unit:	*Protectiveness Determination:*
OU1	Short-term Protective
Protectiveness Statement: The OU1 remedy 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. For the remedy to be protective over the long term, this FYR report recommends the following action: review risk assessment and toxicity levels for arsenic in untreated groundwater for watering of livestock and poultry, determine if additional sampling of untreated water is needed, update the fact sheet accordingly and ensure it is made available to the public. Provide the fact sheet when updated to the North Dakota Township Officers Association.	

Protectiveness Statement	
Operable Unit: OU2	*Protectiveness Determination:* Protective
Protectiveness Statement: The OU2 remedy is protective of human health and the environment. Rural users who relied on the Wyndmere and Lidgerwood water treatment plants are now connected to the OU1 SEWUD-East water treatment plant.	

Sitewide Protectiveness Statement
Protectiveness Determination: Short-term Protective
Protectiveness Statement: Because the remedial actions at OU1 are protective in the short term, the Site's remedy is protective of human health and the environment in the short term. For the remedy to be protective over the long term, this FYR Report recommends the following action: review risk assessment and toxicity levels for arsenic in untreated groundwater for watering of livestock and poultry, determine if additional sampling of untreated water is needed, update the fact sheet accordingly and ensure it is made available to the public. Provide the fact sheet when updated to the North Dakota Township Officers Association.

VIII. NEXT REVIEW

The next FYR Report for the Arsenic Trioxide Superfund site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

North Dakota Department of Health. 2022. Arsenic Trioxide Superfund Site Fact Sheet: What You Should Know if You Drink Water from a Well. https://deq.nd.gov/publications/wq/1_GW/Arsenic/ArsenicTrioxideSuperfundSiteFactSheet.pdf (accessed June 28, 2022).

Southeast Water Users District (SEWUD). 2018. Consumer Confidence Report. https://seh2o.com/ccr/SEWUD-CCR%20-2018.pdf (accessed June 28, 2022).

SEWUD. 2019. Consumer Confidence Report. https://www.seh2o.com/ccr/CCR-REPOR-EAST-2020.pdf (accessed June 28, 2022).

SEWUD. 2020. Consumer Confidence Report. https://www.seh2o.com/ccr/CCR-2020.pdf (accessed June 28, 2022).

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SEWUD. 2022. Water Analysis East, January 2022. https://seh2o.com/ufile/f1/2022_East_Water_Analysis.pdf.

SEWUD. 2021. Water Analysis East, January 2021. https://seh2o.com/image2/files/ecf64a1afa77426bd571c1e85568d872220eb823.pdf.

SEWUD. 2020. Water Analysis East, March 2020. Provided by the SEWUD via email in September 2022.

SEWUD. 2019. Water Analysis East, 2019. https://www.seh2o.com/image2/files/296cccadc716d4aa40ff95b14e1de7aac7865b73.pdf.

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

EPA. 1988. OU2 Record of Decision Amendment, EPA ID NDD980716963.

EPA. 1992. OU2 Explanation of Significant Differences, EPA ID NDD980716963.

EPA. 1992. Preliminary Close-Out Report, EPA ID NDD980716963.

EPA. 1993. Final Close-Out Report, EPA ID NDD980716963.

EPA. 1999. First Five-Year Review Report, EPA ID NDD980716963.

EPA. 2003. Second Five-Year Review Report, EPA ID NDD980716963.

EPA. 2007. OU1 Explanation of Significant Differences, EPA ID NDD980716963.

EPA. 2008. OU1 Explanation of Significant Differences, EPA ID NDD980716963.

EPA. 2008. Third Five-Year Review Report, EPA ID NDD980716963.

EPA. 2009. OU1 Explanation of Significant Differences, EPA ID NDD980716963.

EPA. 2009. Remedial Action Report Rural Water System Expansion – Segment 3, EPA ID NDD980716963.

EPA. 2010. Annual Update to the Five-Year Review Report, EPA ID NDD980716963.

EPA. 2013. Fourth Five-Year Review Report, EPA ID NDD980716963.

EPA. 2018. Fifth Five-Year Review Report, EPA ID NDD980716963.

APPENDIX B – SITE CHRONOLOGY

Table B-1: Site Chronology

Event	Date
Site discovery by the EPA	June 1, 1981
The NDDEQ completed the first site inspection	August 1, 1982
The NDDEQ started the RI for OU1	August 24, 1982
The EPA proposed the Site for listing on the NPL	December 30, 1982
The EPA finalized the Site's listing on the NPL	September 8, 1983
The NDDEQ completed the second site inspection	May 1, 1984
The NDDEQ issued the final RI Report and started FS for OU1	July 1, 1985
The 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
The NDDEQ completed the OU1 Final FS Report, and the EPA issued the OU1 ROD	September 26, 1986
The EPA completed the first removal action	December 10, 1986
The NDDEQ started the remedial design for OU1	March 26, 1987
The NDDEQ started the combined RI/FS for OU2	April 29, 1987
The NDDEQ completed the OU2 RI/FS and the EPA issued the ROD Amendment for OU2	February 5, 1988
The NDDEQ began the first OU2 remedial design	February 17, 1988
The NDDEQ began the second OU2 remedial design	June 29, 1988
The NDDEQ completed the second OU2 remedial design	September 26, 1988
The EPA started the second removal action	October 24, 1988
The NDDEQ started the first OU2 remedial action	March 9, 1989
The NDDEQ completed the first OU2 remedial design and started the remedial action	March 31, 1989
The EPA completed the second removal action	June 9, 1989
The NDDEQ completed the remedial design for OU1	June 28, 1989
The NDDEQ completed the first and second OU2 remedial actions	March 21, 1991
The EPA signed the ESD for OU2	September 25, 1992
The NDDEQ completed the remedial action of the rural water system by connecting the city of Milnor to the system and the EPA issued the Site's Preliminary Close-Out Report	September 30, 1992
The EPA conducted a final inspection of remedial action construction at Milnor and issued the Site's Final Close-Out Report	June 30, 1993
The SEWUD assumed O&M responsibilities for the Richland plant	July 1, 1993
The EPA deleted the Site from the NPL	July 5, 1996
The EPA issued the Site's first FYR Report	January 19, 1999
The EPA lowered the SDWA MCL for arsenic from 50 µg/L to 10 µg/L, effective January 2006	January 22, 2001
The EPA issued the Site's second FYR Report	June 11, 2003
The EPA started the RI/FS for OU1 to address SEWUD expansion to address new MCL for arsenic	June 25, 2003
The NDDEQ started the remedial design for the SEWUD expansion	September 20, 2004
The NDDEQ started construction of Segments 1 and 2 of the SEWUD expansion	August 8, 2005
The EPA provided bottled water to rural users with sampling results with arsenic levels 10 µg/L or greater	June 4, 2007
The EPA issued the second ESD for OU1	September 27, 2007
The EPA issued the third ESD for OU1	February 25, 2008
The NDDEQ started construction of Segment 3 to connect the cities of Hankinson and Wyndmere to the SEWUD	June 10, 2008
The NDDEQ completed the construction of Segments 1 and 2	September 25, 2008
The EPA issued the Site's third FYR Report	September 26, 2008
The EPA's removal program transferred the bottled water program to the NDDEQ	October 1, 2008
The EPA completed the RI/FS for OU1 and signed the fourth OU1 ESD	February 20, 2009
The NDDEQ started Segment 4 and 4a construction	May 1, 2009

Event	Date
The NDDEQ completed remedy construction of Segment 3, connecting 60 rural users to the SEWUD	September 29, 2009
The EPA issued a FYR update	February 1, 2010
The NDDEQ completed the remedial design for the next phase of SEWUD expansion	March 30, 2010
The NDDEQ started Segment 5 construction	April 20, 2010
The NDDEQ completed Segment 4 and 4a construction, connecting about 119 rural users to the SEWUD	November 30, 2010
The NDDEQ completed Segment 5 construction	September 1, 2011
The EPA issued Site's Final Remedial Action Report for SEWUD expansion	September 29, 2011
The EPA issued the Site's fourth FYR Report	September 30, 2013
The EPA issued the Site's fifth FYR Report	September 21, 2018
The EPA and the NDDEQ competed the site inspection for the sixth FYR	September 26, 2022

Table B-2: Summary of OU1 Remedy Construction Activities Post Site Deletion

Segment	Construction Activities	Completion Date
1	<u>City of Wyndmere</u> • Installation of 11 miles of new waterlines from an existing line to a new 100,000-gallon underground water storage reservoir. • Construction of a pumping facility on a vacant lot directly west of the existing Wyndmere water treatment plant. • Modifications to SEWUD-East's existing Reservoir B pumps, piping and controls. <u>City of Hankinson</u> • Installation of 3 miles of new waterlines from an existing line to a new 200,000-gallon underground water storage reservoir. • 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.	August 2005 to October 2006
2	• Well field expansion and expansion of SEWUD-East. • Completion of two production wells. • Installation of 3,200 feet of piping to connect the new production wells to their tie-in with the existing transmission line. • Expansion of the existing water treatment plant building to include an addition directly north of the existing building and the installation of new equipment (e.g., new water filters, high service pumps, backwash pumps, chemical feed equipment, miscellaneous process piping, valves and fittings, clear well, chemical feed room, an operator control room, and an electrical/motor control center room). • Modifications to the backwash and sanitary sewer pond at the treatment plant site.	May 2006 to August 2007
3	<u>Rural households north and west of Wyndmere and south and west of Hankinson</u> • Installation of 36 miles of water line and associated valves, hydrants, curb stop assemblies and residential meter units.	June 2008 to August 2009
4	<u>Rural users and cities of Cayuga and Geneseo</u> • Connect about 125 rural users to SEWUD-East and to the cities of Cayuga and Geneseo.	May 2009 to November 2010
4a	<u>Rural users and cities of Cayuga and Geneseo</u> • Expansion of water supply reservoirs B and G to supply new customers.	October 2009 to July 2010

Segment	Construction Activities	Completion Date
5	• Expansion of the well field to ensure availability of an adequate quantity of raw water, including connecting the city of Lidgerwood and other users. • Upgrade of the water treatment facility with an additional filter vessel. • Construction of a new reservoir and pump station to maintain adequate flows to an area previously unserved by rural water. • Upgrade of four pump stations so that adequate service would be provided to new users and so that existing users maintained the level of service experienced prior to the expansion. • Construction of two new storage reservoirs to provide system capacity. • Installation of an emergency generator to diminish the impact of service interruptions because of loss of power. • Installation of a geothermal system to lessen the system's dependence on non-renewable energy sources. • Installation of water lines and associated valves, hydrants, curb stop assemblies and residential meter setter units to provide water service to about 132 rural households. • City of Lidgerwood signed a water purchaser agreement with the SEWUD on February 11, 2010.	April 2010 to September 2011

Table B-3: Summary of OU2 Remedy Construction Activities

Construction Activities	Date Completed
City of Lidgerwood [a] • Expansion of the treatment building. • Construction of a 23,000-gallon potable water storage reservoir, automation of the backwash system and several operational changes.	August 1989 to January 1990
City of Wyndmere[b] • Construction modifications to increase treatment capacity and the addition of a 50,000-gallon potable water storage tank. • Modifications to the backwash filters and post-chlorination unit.	August 1989 to January 1991
Notes: a. City of Lidgerwood was connected to the SEWUD system and became part of OU1 in 2010 using American Recovery and Reinvestment Act (ARRA) funding made available to the NDDEQ. b. City of Wyndmere connected to the SEWUD system as part of OU1 Segment 1 construction in October 2006.	

APPENDIX C – SERVICE AREA OF SEWUD-EAST

Figure C-1: Service Area of SEWUD-East

Source: SEWUD-East Water Web. Accessed 3/3/2023. https://seh2o.com/service-area

APPENDIX D – NDDEQ CORRESPONDENCE, WELL SEARCH DATABASE AND SITE FACT SHEET

Quarterly Reporting of New Wells

COPY

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January 29, 2020

Frances L. Costanzi, P. E.
Remedial Project Manager and
Superfund Redevelopment Initiative Coordinator
USEPA Region 8
1595 Wynkoop Street
Mail code 8EPR-SR
Denver, CO 80202

Re: Arsenic Trioxide Superfund Site Quarterly Activity Summary

Ms. Costanzi,

The North Dakota Department of Environmental Quality (NDDEQ) is pleased to present this summary of tasks completed as part of the on-going remedy for the North Dakota Arsenic Trioxide Superfund Site (ATS). This report covers the period from October 1, 2019 to December 31, 2019.

Communications with Stakeholders, EPA, and SEWUD

The NDDEQ submitted a quarterly activity summary report to EPA on October 11, 2019; the report summarized activities completed during the third quarter of 2019.

Institutional Controls

The NDDEQ completed a well installation review on December 31, 2019. The review consisted of searching the State Water Commission's boring contractor logs to identify wells installed within the boundary of the ATS. Three new wells were identified, and ATS Fact Sheets were mailed to the registered well owners. A cumulative summary of well searches is summarized on the attached table.

The ATS Fact Sheet was mailed to a portion of North Dakota licensed water well contractors on December 30, 2019 (email verification attached). ATS Fact Sheets will be mailed to the remainder of the contractors in January 2020.

Please do not hesitate to call me at 701-328-5213 or email me at cjanders@nd.gov if you have any questions or require additional information.

Sincerely,

Carl Anderson

Carl Anderson
Groundwater Protection Program Manager
NDDEQ - Division of Water Quality

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Director'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
Division of Chemistry 701-328-6140
2635 East Main Ave
Bismarck ND 58501

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January 20, 2021

Frances L. Costanzi, P. E.
Remedial Project Manager and
Superfund Redevelopment Initiative Coordinator
USEPA Region 8
1595 Wynkoop Street
Mail Code 8EPR-SR
Denver, CO 80202

Re: Arsenic Trioxide Superfund Site Quarterly Activity Summary

Ms. Costanzi,

The North Dakota Department of Environmental Quality (NDDEQ) is pleased to present this summary of tasks completed as part of the on-going remedy for the North Dakota Arsenic Trioxide Superfund Site (ATS). This report covers the period from October 1, 2020 to December 31, 2020.

Communications with Stakeholders, EPA, and SEWUD

The NDDEQ submitted a quarterly activity summary report to EPA on October 20, 2020; the report summarized activities completed during the third quarter of 2020.

Institutional Controls

The NDDEQ completed a well installation review on December 31, 2020. The review consisted of searching the State Water Commission's boring contractor logs to identify wells installed within the boundary of the ATS. One new well was identified during the reporting period and the ATS Fact Sheet was mailed to the registered well owner. A cumulative summary of well searches is summarized on the attached table.

The ATS Fact Sheet was mailed to North Dakota licensed well contractors in December (email verification attached).

Please do not hesitate to call me at 701-328-5213 or email me at cjanders@nd.gov if you have any questions or require additional information.

Sincerely,

Carl Anderson

Carl Anderson
Groundwater Protection Program Manager
NDDEQ - Division of Water Quality

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September 2, 2021

Frances L. Costanzi, P. E.
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Denver, CO 80202

Re: Arsenic Trioxide Superfund Site Quarterly Activity Summary

Ms. Costanzi,

The North Dakota Department of Environmental Quality (NDDEQ) is pleased to present this summary of tasks completed as part of the on-going remedy for the North Dakota Arsenic Trioxide Superfund Site (ATS). This report covers the period from April 1, 2021, to June 30, 2021.

Communications with Stakeholders, EPA, and SEWUD

The NDDEQ submitted a quarterly activity summary report to EPA on May 10, 2021; the report summarized activities completed during the first quarter of 2021. The NDDEQ received the results of SEWUD's treated drinking water testing in a letter dated April 15, 2021; a copy of the results is attached.

Institutional Controls

The NDDEQ completed a well installation review on June 30, 2021. The review consisted of searching the State Water Commission's boring contractor logs to identify wells installed within the boundary of the ATS. Two new wells were identified during the reporting period. Arsenic Trioxide Site Fact Sheets were sent to the new well owners. A cumulative summary of well searches is summarized on the attached table.

Please do not hesitate to call me at 701-328-5213 or email me at cjanders@nd.gov if you have any questions or require additional information.

Sincerely,
Carl Anderson
Carl Anderson
Groundwater Protection Program Manager
NDDEQ - Division of Water Quality

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Division of Water Quality 701-328-5210
Division of Chemistry 701-328-6140 2635 East Main Ave Bismarck ND 58501

Summary of Database Well Searches		
Search Date	**Search Result**	**Database Searched**
7/25/2012	0 wells found	North Dakota State Water Commission (SWC)
9/19/2012	0 wells found	North Dakota State Water Commission (SWC)
12/27/2012	4 wells found	SWC
3/7/2013	6 wells found	SWC & North Dakota One Call (ND1)
6/20/2013	9 wells found	SWC & ND1
9/20/2013	0 wells found	SWC & ND1
12/17/2013	5 wells found	SWC & ND1
3/20/2014	5 wells found	SWC & ND1
6/20/2014	2 wells found	SWC & ND1
9/20/2014	1 well found	SWC & ND1
1/12/2015	1 well found	SWC & ND1
3/2/2015	0 wells found	SWC & ND1
6/17/2015	0 wells found	SWC & ND1
9/15/2015	0 wells found	SWC & ND1
12/1/2015	4 wells found	SWC & ND1
3/1/2016	0 wells found	SWC
6/13/2016	3 wells found	SWC
9/6/2016	1 well found	SWC
12/15/2016	0 wells found	SWC
3/21/2017	0 wells found	SWC
6/22/2017	2 wells found	SWC
9/21/2017	0 wells found	SWC
12/13/2017	0 wells found	SWC
4/16/2018	0 wells found	SWC
5/29/2018	0 wells found	SWC
8/20/2018	1 well found	SWC
9/4/2018	0 wells found	SWC
12/4/2018	0 wells found	SWC
12/31/2018	0 wells found	SWC
3/19/2019	0 wells found	SWC
6/17/2019	1 well found	SWC
6/28/2019	0 wells found	SWC
9/30/2019	0 wells found	SWC
12/31/2019	3 wells found	SWC
3/31/2020	0 wells found	SWC
6/30/2020	0 wells found	SWC
9/30/2020	0 wells found	SWC
12/31/2020	1 well found	SWC
3/31/2021	0 wells found	SWC
6/30/2021	2 wells found	SWC
9/31/2021	0 wells found	SWC
12/31/2021	0 wells found	SWC
3/31/2022	0 wells found	SWC
6/30/2022	0 wells found	SWC
9/30/2022	0 wells found	SWC
12/31/2022	0 wells found	SWC
3/31/2023	0 wells found	SWC
6/30/2023	0 wells found	SWC

SWC = State Water Commission

ND1 = North Dakota One Call

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EPA United States Environmental Protection Agency

Arsenic Trioxide Superfund Site Fact Sheet

What you should know if you drink water from a well

Contacts

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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 Environmental Quality (NDDEQ) 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?

As_2O_3

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 aquifer 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. NDDEQ, in Bismarck, ND, maintains records of previously tested wells and will provide results to owners at no charge. If your well has not been tested, contact NDDEQ for more information.

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 NDDEQ 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 NDDEQ. 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

SOUTHEAST WATER USERS

Source: https://deq.nd.gov/publications/wq/1_GW/Arsenic/ArsenicTrioxideSuperfundSiteFactSheet.pdf

APPENDIX E – INTERVIEW FORMS

ARSENIC TRIOXIDE SUPERFUND SITE FIVE-YEAR REVIEW INTERVIEW FORM	
Site Name: Arsenic Trioxide	
EPA ID: NDD980716963	
Interviewer name: Alison Cattani	**Interviewer affiliation:** Skeo
Subject name: Carl Anderson and Shannon Suggs	**Subject affiliation:** North Dakota Department of Environmental Quality
Interview date: 10/6/22	**Interview time:** 9:30 a.m.
Interview location: State office	
Interview format (circle one): In Person Phone Mail Email X Other:	
Interview category: State Agency	

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?
   The project provided qualified rural residents located within the ATS project boundary with the opportunity to obtain a safe source of drinking water by providing rural water supplied by the SEWUD. The project required a cooperative effort between state and federal agencies, SEWUD, 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?
   The SEWUD is required to comply with the SDWA, which includes compliance sampling. The SEWUD collects annual samples for arsenic testing to ensure that the water supplied to rural residents meets the federal MCL of 10 µg/L for arsenic. The arsenic concentration in all compliance samples has been below the arsenic MCL. Consequently, the water treatment system is providing water 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?
   No.

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.
   Yes, as part of the institutional controls for the project. The Department conducts searches for new wells installed within the ATS boundary. The review is conducted by reviewing well drilling logs sent to the SWC. Owners of new water supply wells are sent a letter discussing the project and a copy of the ATS fact sheet. The ATS fact sheet is also sent to North Dakota well drillers along with their annual well certifications.

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?
   No.

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

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

9. Do you consent to have your name included along with your responses to this questionnaire in the FYR Report?
   Yes.

ARSENIC TRIOXIDE SUPERFUND SITE FIVE-YEAR REVIEW INTERVIEW FORM	
Site Name: Arsenic Trioxide	
EPA ID: NDD980716963	
Interviewer name:	**Interviewer affiliation:**
Subject name: Steve Hansen	**Subject affiliation:** Southeast Water Users District
Interview date: 11/22/2022	**Interview time:**
Interview location:	
Interview format (circle one): In Person Phone Mail Email X Other:	
Interview category: O&M Contractor	

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?
   I think the project went well. It is giving families safe drinking water to their homes. No major issues on cleanup or maintenance.

2. What is your assessment of the current performance of the remedy in place at the Site?
   It is working as intended supplying safe drinking water to families that had high levels of Arsenic in their water wells.

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?
   Our Water Treatment Plant is doing a good job of removing the arsenic to below the MCL. The arsenic levels in our raw water has remained constant over the years so we are able to do a good job of treating it at our treatment plant.

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.
   Our field staff is at the water treatment plant daily running test and making sure the plant is running at peak efficiency. We are also able to monitor the plant remotely with our Scada system. We are constantly doing O&M on our chemical feed pumps and high service pumps.

5. Have there been any significant changes in site O&M requirements, maintenance schedules or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.
   As the water plant gets older their will continue to be more maintenance on the equipment in the plant and we will continue to upgrade equipment as needed to make the plant runs as efficiently as possible.

6. Have there been unexpected O&M difficulties or costs at the Site since start-up or in the last five years? If so, please provide details.
   No, more just the normal O&M.

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 think by doing your daily and monthly O&M and sampling we are able to stay on top of any problems that should come up. The ability of being able to view our water plant remotely through our Scada system we can head off any problems in a timely matter before they become major issues.

8. Do you have any comments, suggestions or recommendations regarding O&M activities and schedules at the Site?
   No, I think our staff is doing a good job with O&M at this time.

9. Do you consent to have your name included along with your responses to this questionnaire in the FYR report?
   Yes.

APPENDIX F – DATA REVIEW

Table F-1: Laboratory Results for Treated Water for SEWUD-East, January 2019

Fargo Water Treatment Plant
Environmental Laboratory
435 14th Avenue South
Fargo, ND 58103

Phone: (701)-298-6986
Fax: (701)-241-8110

CITY OF Fargo

Report of Analysis

SEWUD-East
PO Box 10
Mantador, ND 58058

Comment:
Project ID:

Attention:

Email: **SEWU@RRT.NET**

Lab Sample ID: **19_011409-01**

Collection Date: **1/14/2019**

Site: **Main Water Plant**

Location:

Analyte	Sample Result	Method	Analyst	Analysis Date	MRL*
Arsenic	0.007 mg/L	EPA 200.9	mamundson	1/25/2019	0.002 mg/L
Bicarbonate as CaCO3	231 mg/L	SM 2320B	kjirava	1/15/2019	1 mg/L
Calcium	79.4 mg/L	EPA 200.7	bselstedt	1/28/2019	1 mg/L
Carbonate as CaCO3	<1.00 mg/L	SM 2320B	kjirava	1/15/2019	1 mg/L
Chloride	5.07 mg/L	EPA 300.0	msahr	1/14/2019	2 mg/L
Conductivity	474 uS/cm	SM 2510 B	msahr	1/14/2019	uS/cm
Fluoride	0.755 mg/L	EPA 300.0	msahr	1/14/2019	0.2 mg/L
Hydroxide as CaCO3	<1.00 mg/L	SM 2320B	kjirava	1/15/2019	1 mg/L
Iron	<0.020 mg/L	EPA 200.7	bselstedt	1/28/2019	0.02 mg/L
Magnesium	14.9 mg/L	EPA 200.7	bselstedt	1/28/2019	1 mg/L
Manganese	<0.020 mg/L	EPA 200.7	bselstedt	1/28/2019	0.02 mg/L
Nitrate-Nitrite as N	<0.200 mg/L	EPA 300.0	msahr	1/14/2019	0.2 mg/L
pH	7.20 SU	SM 4500-H B	msahr	1/14/2019	0 SU
Phenolphthalein as CaCO3	<1.00 mg/L	SM 2320B	kjirava	1/15/2019	1 mg/L
Potassium	2.24 mg/L	EPA 200.7	bselstedt	1/28/2019	1 mg/L
Sodium	2.94 mg/L	EPA 200.7	bselstedt	1/28/2019	1 mg/L
Sulfate	35.1 mg/L	EPA 300.0	msahr	1/14/2019	2 mg/L
Total Alkalinity as CaC03	231 mg/L	SM 2320B	kjirava	1/15/2019	1 mg/L
Total Dissolved Solids (TDS)	320 mg/L	SM 2540 C	kjirava	1/16/2019	2.5 mg/L
Total Hardness as CaCO3	260 mg/L	EPA 200.7	bselstedt	1/28/2019	2 mg/L
Turbidity	0.100 NTU	EPA 180.1	kjirava	1/16/2019	0.01 NTU

Approved By: Matt Dodd Date: 01-31-19

*The MRL is the smallest measured concentration of a substance that can be reliably measured by an analytical method. Values below this level are reported as "less-than (<)" when an analyte either is not detected or is detected at a concentration less than the MRL. Not all analyses will have an applicable MRL.

Table F-2: Laboratory Results for Treated Water for SEWUD-East, March 2020

North Dakota Department of Environmental Quality
Division of Chemistry

Original Report Date: 4/ 3/20 Report Date: 4/ 3/20

Log Number: 20-N180

Date Collected: 3/23/20
Time Collected:
Township:
Section:
Source: Effluent/WTP
Project:
Comments: Collected by Chad Lingen

Date Received: 3/26/20
Time Received: 8:30
Range:
Owner: Southeast WUD (East)

SOUTHEAST WATER USERS
202 MAIN STREET
PO BOX 10
MANTADOR ND 58058

Sample Type: Non-potable Water

Approved by: _____
Inorganic

Chemical Analysis of Sample

Analyte	Result	Units	Evaluation
Arsenic (As)	6.65	ug/L	
Temperature	20.	Deg C	
Delivery Time (hours)	74.	hrs	

Table F-3: Laboratory Results for Treated Water for SEWUD-East, January 2021

North Dakota Department of Environmental Quality
Division of Chemistry

Original Report Date: 1/26/21 Report Date: 1/26/21

Log Number: 21-N29
Date Collected: 1/11/21 Date Received: 1/13/21
Time Collected: 11:00 Time Received: 8:24
Township: Range:
Section: Owner: SEWUD-East
Source: Distribution
Project:
Comments:
SOUTHEAST WATER USERS
202 MAIN STREET
PO BOX 10
MANTADOR ND 58058

Approved by: _____
Inorganic

Chemical Analysis of Sample

Analyte	Result	Units	
Conductivity	489.	umhos/cm	
Dissolved Solids(C)-Total	268.	mg/L	Fairly Low
Hardness Total (as CaCO3)	246.	mg/L	Average
Alkalinity (CaCO3)(Total)	233.	mg/L	Fairly Low
pH	7.85		
Iron (Fe)	< 0.05	mg/L	Satisfactory
Manganese (Mn)	< 0.01	mg/L	Satisfactory
Calcium (Ca)	74.4	mg/L	
Magnesium (Mg)	14.7	mg/L	
Sodium (Na)	< 3	mg/L	Low
Potassium (K)	2.22	mg/L	
Carbonate (CO3)	< 1	mg/L	
Bicarbonate (HCO3)	284.	mg/L	
Sulfate as (SO4)	27.4	mg/L	Low
Chloride	4.13	mg/L	Low
Nitrate + Nitrite (N)	< 0.03	mg/L	Satisfactory
Silica (SiO2)	30.3	mg/L	
Arsenic (As)	9.38	ug/L	
Fluoride (F) (IC)	0.724	mg/L	
Hydroxide (OH)	< 1	mg/L	
Temperature	18.	Deg C	
Delivery Time (hours)	45.	hrs	
Hardness (Total)	14.	gr/gal	
Turbidity	< 1	NTU	
Percent Sodium	2.5	%	
Sodium Adsorption Ratio	0.08		

If a result is noted with an alphanumeric code the result has been qualified as defined on the last page(s).
Not all codes are applicable to all results.

Table F-4: Laboratory Results for Treated Water for SEWUD-East, January 2022

North Dakota Department of Environmental Quality
Division of Chemistry

Original Report Date: 2/ 3/22 Report Date: 2/ 3/22

Log Number: 22-N36
Date Collected: 1/25/22 Date Received: 1/26/22
Time Collected: Time Received: 8:36
Township: Range:
Section: Owner:
Source: WTP/Wells - Effluent SEWUD EAST
Project:
Comments:
SOUTHEAST WATER USERS
202 MAIN STREET
PO BOX 10
MANTADOR ND 58058

Approved by: _____ Inorganic

Chemical Analysis of Sample

Analyte	Result	Units	
Conductivity	614.	umhos/cm	
Dissolved Solids(C)-Total	349.	mg/L	Fairly Low
Hardness Total (as CaCO3)	290.	mg/L	Average
Alkalinity (CaCO3)(Total)	242.	mg/L	Fairly Low
pH	7.65		
Note:	C0.25		
Iron (Fe)	< 0.05	mg/L	Satisfactory
Manganese (Mn)	< 0.01	mg/L	Satisfactory
Calcium (Ca)	86.5	mg/L	
Magnesium (Mg)	18.0	mg/L	
Sodium (Na)	3.58	mg/L	Low
Potassium (K)	2.11	mg/L	
Carbonate (CO3)	< 1	mg/L	
Bicarbonate (HCO3)	295.	mg/L	
Sulfate as (SO4)	83.1	mg/L	Fairly Low
Chloride	7.79	mg/L	Low
Nitrate + Nitrite (N)	< 0.03	mg/L	Satisfactory
Silica (SiO2)	30.6	mg/L	
Arsenic (As)	8.91	ug/L	
Fluoride (F) (IC)	1.02	mg/L	
Hydroxide (OH)	< 1	mg/L	
Temperature	13.	Deg C	
Delivery Time (hours)	26.	hrs	
Hardness (Total)	17.	gr/gal	
Turbidity	< 1	NTU	
Percent Sodium	2.6	%	
Sodium Adsorption Ratio	0.09		

If a result is noted with an alphanumeric code the result has been qualified as defined on the last page(s).
Not all codes are applicable to all results.

APPENDIX G – SITE INSPECTION CHECKLIST

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

I. SITE INFORMATION

Site Name: Arsenic Trioxide	**Date of Inspection: September 27, 2022**
Location and Region: Ransom, Richland and Sargent Counties, ND/Region 8	**EPA ID: NDD980716963**
Agency, Office or Company Leading the Five-Year Review: EPA Region 8	**Weather/Temperature: Sunny/63ºF**

Remedy Includes: (check all that apply)

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

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (check all that apply)

1. **O&M Site Manager** _____ Name _____ Title _____ Date
   Interviewed ☐ at site ☐ at office ☐ by phone : _____
   Problems, suggestions ☐ Report attached: _____

2. **O&M Staff** _____ Name _____ Title mm/dd/yyyy Date
   Interviewed ☐ at site ☐ at office ☐ by phone : _____
   Problems/suggestions ☐ Report attached: _____

3. **Local Regulatory Authorities and Response Agencies** (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.

   Agency NDDEQ
   Contact Carl Andersen Name | Project Manager Title | _____ Date | _____ Phone
   Problems/suggestions ☐ Report attached: _____

   Agency SEWUD
   Contact Steve Hansen Name | General Manager Title | _____ Date | _____ Phone
   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**				
	☒ O&M manual	☒ Readily available	☒ Up to date	☐ N/A	
	☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A	
	☒ Maintenance logs	☒ Readily available	☒ Up to date	☐ N/A	
	Remarks: _____				
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.	**Permits and Service Agreements**				
	☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A	
	☐ Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A	
	☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A	
	☒ Other permits: North Dakota state permit to operate water treatment plant	☐ Readily available	☐ Up to date	☐ N/A	
	Remarks: _____				
5.	**Gas Generation Records**	☐ Readily available	☐ Up to date	☒ N/A	
	Remarks: _____				
6.	**Settlement Monument Records**	☐ Readily available	☐ Up to date	☒ N/A	
	Remarks: _____				
7.	**Groundwater Monitoring Records**	☒ Readily available	☒ Up to date	☐ N/A	
	Remarks: _____				
8.	**Leachate Extraction Records**	☐ Readily available	☐ Up to date	☒ N/A	
	Remarks: _____				
9.	**Discharge Compliance Records**				
	☐ Air	☐ Readily available	☐ Up to date	☒ N/A	
	☐ Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A	
	Remarks: _____				
10.	**Daily Access/Security Logs**	☐ Readily available	☐ Up to date	☒ N/A	
	Remarks: _____				

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for state

☐ PRP in-house ☐ Contractor for PRP

☐ Federal facility in-house ☐ Contractor for Federal facility

☒ The SEWUD pays for the O&M costs. Costs are not separable from normal operation costs.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date

☐ Funding mechanism/agreement in place ☒ Unavailable

Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From: mm/dd/yyyy	To: mm/dd/yyyy	_____	☐ Breakdown attached
Date	Date	Total cost	
From: mm/dd/yyyy	To: mm/dd/yyyy	_____	☐ Breakdown attached
Date	Date	Total cost	
From: mm/dd/yyyy	To: mm/dd/yyyy	_____	☐ Breakdown attached
Date	Date	Total cost	
From: mm/dd/yyyy	To: mm/dd/yyyy	_____	☐ Breakdown attached
Date	Date	Total cost	
From: mm/dd/yyyy	To: mm/dd/yyyy	_____	☐ Breakdown attached
Date	Date	Total cost	

3. **Unanticipated or Unusually High O&M Costs during Review Period**

Describe costs and reasons: None

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

A. Fencing

1. **Fencing Damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks: _____

B. Other Access Restrictions

1. **Signs and Other Security Measures** ☐ Location shown on site map ☐ N/A

Remarks: Pump houses and waste treatment plant are locked, secured and located in a rural area.

C. Institutional Controls (ICs)

1. **Implementation and Enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (e.g., self-reporting, drive by): State responsible for reviewing institutional controls

Frequency: Quarterly

Responsible party/agency: NDDEQ

Contact	Carl Anderson	_____	06/04/2018	701-328-5213
	Name	Title	Date	Phone

Reporting is up to date ☒ Yes ☐ No ☐ N/A

Reports are verified by the lead agency ☐ Yes ☒ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A

Violations have been reported ☐ Yes ☒ No ☐ N/A

Other problems or suggestions: ☒ Report attached

See institutional control review in Section II.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

Remarks: See institutional control review in Section II.

D. General

1. **Vandalism/Trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks: _____

2. **Land Use Changes On Site** ☒ N/A

Remarks: _____

3. **Land Use Changes Off Site** ☒ N/A

Remarks: _____

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads Damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: _____

B. Other Site Conditions

Remarks: _____

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps and Pipelines ☒ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing and Electrical**

☒ Good condition ☒ All required wells properly operating ☐ Needs maintenance ☐ N/A

Remarks: _____

2. **Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☒ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☒ Readily available ☒ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

B. Surface Water Collection Structures, Pumps and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps and Electrical**

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

C. Treatment System ☒ Applicable ☐ N/A

1. **Treatment Train** (check components that apply)

☒ Metals removal ☐ Oil/water separation ☐ Bioremediation

☐ Air stripping ☐ Carbon adsorbers

☒ Filters: _____

☒ Additive (e.g., chelation agent, flocculent): When needed, ferric coagulant added to co-precipitate arsenic if iron in groundwater is not high enough.

☐ Others: _____

☒ Good condition ☐ Needs maintenance

☒ Sampling ports properly marked and functional

☒ Sampling/maintenance log displayed and up to date

☒ Equipment properly identified

☐ Quantity of groundwater treated annually: _____

☐ Quantity of surface water treated annually: _____

Remarks: _____

2. **Electrical Enclosures and Panels** (properly rated and functional)

☐ N/A ☒ Good condition ☐ Needs maintenance

Remarks: _____

3. **Tanks, Vaults, Storage Vessels**

☐ N/A ☒ Good condition ☐ Proper secondary containment ☐ Needs maintenance

Remarks: _____

4. **Discharge Structure and Appurtenances**

☒ N/A ☐ Good condition ☐ Needs maintenance

Remarks: _____

5. **Treatment Building(s)**

☐ N/A ☒ Good condition (esp. roof and doorways) ☐ Needs repair

☐ Chemicals and equipment properly stored

Remarks: _____

6. **Monitoring Wells** (pump and treatment remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☒ N/A

Remarks: _____

D. Monitoring Data

1. **Monitoring Data**

☒ Is routinely submitted on time ☒ Is of acceptable quality

2. **Monitoring Data Suggests:** ☐ N/A

☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

Remarks: Monitoring data collected by the SEWUD show that arsenic is below the MCL in treated groundwater.

E. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☒ N/A

Remarks: _____

X. OTHER REMEDIES

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.
☒ N/A

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

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).
The remedy connected affected residences and businesses to a public water system that is treating groundwater to meet the MCL.

B. Adequacy of O&M

	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. The SEWUD has not observed any issues related to the O&M procedures.
C.	**Early Indicators of Potential Remedy Problems**
	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. None.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. Optimizations include upgrading pumps with more energy-efficient models as well as automating the backwash system.

APPENDIX H – SITE INSPECTION PHOTOGRAPHS

SEWUD building and Site information repository

Geothermal unit inside SEWUD building

Emergency generator for geothermal unit, located outside SEWUD building

SEWUD-East water treatment plant building and emergency generator

Interior of SEWUD-East water treatment plant

SEWUD-East wellhead protection area

Production well located in Sheyenne National Grasslands

Reservoir N building

Interior of Reservoir N building

Control panel in Reservoir N building