FIVE-YEAR REVIEW REPORT

THIRD FIVE-YEAR REVIEW REPORT
FOR
ARSENIC TRIOXIDE SUPERFUND SITE
Southeastern North Dakota

September 2008

Prepared by:

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Region VIII
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LIST OF ACRONYMS

ARARs	Applicable or Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Difference
FS	Feasibility Study
IC	Institutional Control
MCL	Maximum Contaminant Level
NCP	National Oil and Hazardous Substance Contingency Plan
NDDH	North Dakota Department of Health
NPL	National Priorities List
O&M	Operation and Maintenance
PWSS	Public Water System Supervision Program
RA	Remedial Action
RI	Remedial Investigation
ROD	Record of Decision
SDWA	Safe Drinking Water Act
SEWUD	Southeast Water Users District

EXECUTIVE SUMMARY

The U.S. Environmental Protection Agency (EPA) Region VIII has conducted a third five-year review of the remedial actions implemented at the Arsenic Trioxide Superfund Site (the Site) in Southeastern North Dakota. The purpose of the five-year review is to determine whether the remedy at the site remains protective of human health and the environment. Remedial actions were taken to address arsenic concentrations in the groundwater, which serves as the primary drinking water source in the region. The occurrence of arsenic in groundwater is attributed to both the historical use of arsenic-based grasshopper bait and naturally occurring sources.

Five-year reviews are required because contaminants remain at the Site above levels that allow for unrestricted use and unlimited exposure. The first five-year review was completed in January 1999, and the second five-year review was completed in June 2003. The second five-year review was expedited in response to the finalized Arsenic Rule, which lowered the Safe Drinking Water Act (SDWA) Maximum Contaminant Level (MCL) for arsenic from 0.050 milligrams per liter (mg/L) to 0.010 mg/L. Treatment of arsenic-containing groundwater to provide drinking water is a key component of the remedy.

The remedy for the Arsenic Trioxide Site included expansion of three water treatment plants and associated distribution systems to provide safe drinking water to municipal and rural users that were using treated and untreated groundwater containing elevated arsenic concentrations. Other remedy components included monitoring of the source water aquifer; sampling of private wells outside the contamination boundaries; and financial incentives to increase public participation in the project, institutional controls (ICs) to restrict private supply well use within the project area and propose new state regulations requiring water quality monitoring of new wells within the project area. The remedy was considered fully implemented and operational in 1993. The Site was deleted from the National Priorities List (NPL) in July 1996.

The assessment of the second five-year review was that the remedy was operating consistent with the requirements of the Record of Decision, subsequent Explanation of Significant Difference and the EPA-approved remedy designs. However, the remedy was no longer protective of human health and the environment because one of the treatment plants (City of Lidgerwood) was not able to produce drinking water that met the new arsenic MCL, which became effective in February 2002 and became enforceable in January 2006.

Other identified issues from the second five year review included a need for increased public awareness of the site health issue and availability of the remedy, general operation and maintenance issues at the Lidgerwood and Wyndmere treatment plants, incomplete documentation of the aquifer and well monitoring programs, and incomplete documentation of the implementation of the institutional controls.

The recommended follow-up actions from the second five-year review were: 1) the State Agency and local water districts should identify the need for and evaluate necessary

improvements to the water treatment systems, 2) EPA should establish programs to increase public awareness of the site issues and the availability of the remedy, 3) EPA should obtain from NDDH documentation of the results of the monitoring programs, and 4) EPA should obtain from NDDH documentation of the full implementation of the institutional controls.

This document is the third five-year review for the site. Since the second five-year review, a number of items have been accomplished. An extensive rural user well sampling program was initiated to determine if additional rural users in the 26 townships were drinking water at or above the arsenic MCL. Approximately 375 wells were sampled and 84% were at or above the MCL, with many of them significantly above the MCL. These rural users have been offered bottled water as an interim measure.

It was decided that in order for the remedy to be protective, additional remedial action was needed. The work has been divided into phases, which are referred to as segments. Segment 1 involved connecting the cities of Hankinson and Wyndmere to the Southeast Water Users District (SEWUD) rural water system. Segment 2 involved expanding the SEWUD treatment facility, storage, and water supply well system to handle the increase demand from the additional users. Segments 1 and 2 have been completed.

Segment 3 is currently underway and involves extending water lines and connecting approximately 60 rural users who had contaminated wells to the SEWUD system.

Segments 4 through 6 involve the connection of the remaining rural users where the water is contaminated with arsenic at or above the MCL, as well as the further expansion of the SEWUD treatment system to accommodate the increased demand from these additional connections. It may be necessary to install Point-of-Use systems for a small minority of remote rural users if it becomes too costly and inefficient to install water lines to them. This will be determined during the future designs of Segment 4, 5 and 6. Construction of Segments 4, 5 and 6 will be conducted from 2009 through 2012.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION			
Site name *(from WasteLAN)*:	Arsenic Trioxide Superfund Site		
EPA ID *(from WasteLAN)*:	NDD980716963		
Region: VIII	**State:** ND	**City/County:**	Richland and Sargent Counties

SITE STATUS				
NPL status:	☐ Final	x Deleted	x Other (specify)	Additional work post 5-year review for protectiveness
Remediation status (choose all that apply):	x Under Construction	x Operating	☐ Complete	
Multiple OUs? *	x YES	☐ NO	**Construction completion date:**	06/93
Has site been put into reuse?	☐ YES	x NO		

REVIEW STATUS			
Lead agency:	x EPA ☐ State ☐ Tribe ☐ Other Federal Agency _____		
Author name:	Frances L. Costanzi		
Author title:	Remedial Project Manager	**Author affiliation:**	U.S. EPA
Review period: **	02/08 to 09/08		
Date(s) of site inspection:	04/01/08 and 06/09/08		
Type of review:	x Statutory ___/___/_____ ☐ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion		
Review number:	☐ 1 (first) ☐ 2 (second) x 3 (third) ☐ Other (specify) _____		
Triggering action:	☐ Actual RA Onsite Construction at OU #_____ ☐ Construction Completion ☐ Other (specify)	☐ Actual RA Start at OU # _____ x Previous Five-Year Review Report	
Triggering action date (*from WasteLAN*):	June 2003		
Due date (*five years after triggering action date*):	June 2008		

* ["OU" refers to operable unit.]

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

FIVE YEAR REVIEW SUMMARY FORM (CONTINUED)

Item No.	Issue	Affects Current Protectiveness of Remedy	Affects Future Protectiveness of Remedy
1	The new arsenic MCL and additional sampling indicates a significant number of additional rural users are drinking water above the MCL. These rural users are being provided bottled water.	No	Yes
2	Connecting affected rural users of contaminated well water will necessitate modification of the SEWUD system.	No	Yes
3	New rural users that purchase homes not connected to the SEWUD system may not be aware that their well contains arsenic concentrations above the MCL.	No	Yes
4	The Lidgerwood treatment plant appears to be poorly maintained and is in a deteriorating state of repair.	No	Yes
5	No records were available that indicated the groundwater monitoring component of the remedy had been performed previously.	No	No
6	No records were available that indicated full implementation of the institutional controls.	No	Yes

Recommendations and Follow-up Actions:

Item	Issue	Recommendation for Follow Up	Party Responsible	Milestone Date	Affects Protectiveness
1	The new arsenic MCL and additional sampling indicates a significant number of additional rural users are drinking water above the MCL. These rural users are being provided bottled water.	The lead for the bottled water program is transferring from the 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 to be connected to the SEWUD system.	EPA/NDDH	Bottled water lead transfers to NDDH by October 2008. NDDH retains lead until all qualified rural users are connected or refuse to be connected.	Yes
2	Connecting affected rural users of contaminated well water will necessitate modification of the SEWUD system.	Design and construct additional connections, treatment plant modifications, storage reservoir modifications and well field expansion.	EPA/NDDH	Anticipate the majority of the modification to be done during Segment 5 with some additional work in Segment 6.	Yes
3	New rural users that purchase homes not connected to the SEWUD system may not be aware that their well contains arsenic concentrations above the MCL.	ICs should be implemented to address this situation and prevent it from occurring. See #6 below.	EPA/NDDH	ICs addressing long term protectiveness will be documented in the next ROD Amendment (anticipated December 2008)	Yes

Item	Issue	Recommendation for Follow Up	Party Responsible	Milestone Date	Affects Protectiveness
4	The Lidgerwood treatment plant is experiencing declining performance for arsenic removal.	The City of Lidgerwood decided to participate in the ORD Demonstration project and has taken on financial responsibility and operation and maintenance of their treatment system.	Lidgerwood	To be determined by City of Lidgerwood	Yes
5	No records were available that indicated the groundwater monitoring component of the remedy had been performed previously.	EPA and NDDH need to decide if this earlier ROD component continues to be necessary.	EPA/NDDH	Decision to be documented in next ROD Amendment (anticipated December 2008)	No
6	No records were available that indicated full implementation of the institutional controls.	Coordinate with NDDH to develop and implement institutional controls that will provide long-term protectiveness for the Site.	EPA/NDDH	ICs for the site to be documented in the next ROD Amendment (anticipated December 2008)	Yes

Protectiveness Statement:

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.

Other Comments: None.

Arsenic Trioxide Superfund Site
Richland and Sargent Counties, North Dakota
Third Five-Year Review Report

I. Introduction

The U.S. Environmental Protection Agency (EPA) Region VIII has conducted a third five-year review of the remedial actions implemented at the Arsenic Trioxide Superfund Site (the Site) in southeastern North Dakota. The Site is composed of 26 townships located in portions of Richland and Sargent Counties, including the cities of Lidgerwood, Wyndmere and Milnor. Remedial actions taken to address arsenic concentrations in groundwater, which serves as the primary water source in the region, are the focus of this five-year review.

The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of the review are documented in the five-year review report. In addition, the five-year review report identifies deficiencies found during the review, if any, and identifies recommendations to address them. This third five-year review was conducted from February 2008 through September 2008. This five year review was done in-house by EPA with no contractor support.

This review is required by statute. The EPA must implement five-year reviews consistent with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA 121(c), as amended, states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.*

The NCP, Part 300.430(f)(4)(ii) of the Code of Federal Regulations (CFR), states:

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

This is the third five-year review of the Arsenic Trioxide Superfund Site. The initial five-year review, completed on January 19, 1999, found the remedy to be fully implemented and protective. The second five-year review was completed in June 2003 and was expedited in response to a change in the Arsenic Rule, (effective February 2002; enforceable January 2006), which lowered the Safe Drinking Water Act (SDWA) Maximum Contaminant Level (MCL) for arsenic from 0.050 mg/L to 0.010 mg/L. Issues associated with the revised MCL were considered in the second five-year review to ensure that the previous remedial actions continued to provide protection of human health and the environment.

II. Site Chronology

Table 1. Chronology of Site Events

Date	Event
1930s and early 1940s	Arsenic-laced bait used throughout North Dakota to combat grasshopper infestations
1979	Routine water quality monitoring identified elevated arsenic levels in the drinking water supply at Lidgerwood and Wyndmere
1979 to early 1980s	The State ordered Lidgerwood to take actions to meet the arsenic MCL (0.050 mg/L). The Wyndmere plant was meeting MCL
December 1982	Site proposed for the National Priorities List (NPL)
September 1983	Site listed on the NPL
December 1985	State issued Final Remedial Investigation (RI)
July 1986	State completed Final Feasibility Study (FS)
1986	City of Lidgerwood completed new water treatment plant
September 1986	ROD issued by EPA identifies expansion of Richland Rural Water Users (RRWU) treatment plant or construction of a new treatment plant and new distribution system as the selected remedy (Operable Unit 1)
Winter 1986	EPA conducted emergency response actions which included installing a clay cap over a former bait-mixing station and the installation of point-of-use treatment units in rural residences on private wells
April 1987	EPA awarded a Cooperative Agreement to NDDH to study design and capacity issues at Richland Rural, Lidgerwood and Wyndmere water treatment plants
February 1988	EPA amended the ROD to include improvements to the Lidgerwood and Wyndmere treatment plants (Operable Unit 2)
August 1989	EPA awarded a Cooperative Agreement to NDDH for remedial action at the Richland Rural treatment plant
August 1989	Construction initiated at the Lidgerwood and Wyndmere plants
January 1990	Modifications to the Lidgerwood and Wyndmere treatment plants were completed
July 1990	Construction initiated at Richland Rural treatment plant
July 1990	Water quality monitoring program established
January 1991	Post-construction performance period successfully completed for Lidgerwood plant. City of Lidgerwood assumed O&M responsibility for the plant
March 1991	Post-construction performance period successfully completed for Wyndmere plant. City of Wyndmere assumed O&M responsibility

Date	Event
	for the plant
September 1991	EPA and State amended the Superfund State Contract to extend the distribution system from the expanded Richland Rural plant to the City of Milnor (OU1, Phase 2).
September 1991	Expansion of the Richland Rural plant completed
August 1992	Richland Rural distribution system to Milnor completed
September 1992	EPA issued an Explanation of Significant Differences to ROD for the Milnor addition (OU1, Phase 2).
June 1993	Final inspection of Remedial Action construction at Milnor
June 1993	Remedial Action Completion and Project Closeout
July 1993	Southeast Water Users District (formerly Richland Rural) assumed O&M responsibility for the Richland plant
July 1996	Site deleted from NPL
January 1999	First five-year review completed
June 2003	Second five year review completed
January 2006	Arsenic MCL lowered from 50ppb to 10ppb. (enforceable date)
2005 - 2007	Construction of Segments 1 and 2
2007	Sampling and analysis program
July 2007	Bottle water program initiated by EPA Region 8 removal program for rural users with sampling results showing arsenic levels 10ppb or greater.
October 2007	Bottled water ESD signed
February 2008	ESD for connection of 60 initial users (Segment 3)
June 2008	Segment 3 construction start
August 2008	Conceptual design development for Segments 4 – 6
October 2008 (projected)	Design start for Segment 4

III. Background

Location and Setting

The Arsenic Trioxide Superfund Site is located in southeastern North Dakota (Figures 1 and 2). It covers 26 townships, encompassing portions of Richland and Sargent counties. The Site area is sparsely populated and predominantly comprised of farmland with a few small cities, including Lidgerwood, Wyndmere and Milnor. At the time of the Remedial Investigation (RI) in the mid-1980s, the population living within the boundaries of the Site was estimated at approximately 4,500 people. A comparison of population estimates for Richland and Sargent counties in 1985 and 2001 (U.S. Census Bureau website, 2002) indicates the total population for the two counties decreased by approximately 8.5 percent during this period. This population

change is considered indicative of the population change in residents living within the Site boundary during the same period.

The site topography consists primarily of low rolling hills and flat plains. Groundwater aquifer systems within the Site include shallow glacial drift aquifers, located approximately three to 150 feet below ground surface, and the Dakota Sandstone aquifer located approximately 200 to 1,000 feet below ground surface.

Arsenic is present in groundwater at concentrations above the drinking water MCL at the Site, including in the communities of Lidgerwood, Wyndmere and Milnor as well as at private homes and farms in unincorporated areas. 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 low yield.

Site History

During the 1930s and early 1940s, arsenic-laced bait was used extensively throughout North Dakota to combat grasshopper infestations. 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 and low-lying areas.

Routine water quality monitoring of municipal water supplies by the North Dakota Department of Health (NDDH) in 1979 identified elevated arsenic levels at Lidgerwood. These levels exceeded the existing MCL of 0.050 mg/L designated by the EPA under the SDWA and were determined to be a health risk by the State and EPA. The State ordered Lidgerwood to act appropriately to provide drinking water that met the MCL for arsenic, and in response, Lidgerwood constructed a new water treatment plant by 1986. The raw water supply for Wyndmere was also identified as exceeding 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.

The Site was initially proposed for the National Priorities List (NPL) in December 1982. Final listing of the Site on the NPL occurred on September 8, 1983.

Additional sampling of public and private water wells in the surrounding communities and rural areas was performed by NDDH through a Remedial Investigation/Feasibility Study (RI/FS) overseen by EPA between 1982 and 1986. The investigation included collection and analysis of 704 samples from 558 groundwater supply locations. Test results identified widespread occurrence of arsenic in groundwater that was attributed to both the use of arsenic-based grasshopper bait and naturally occurring sources (glacial tills in the unconfined aquifer zones were found to contain arsenic and were identified as possible sources to groundwater). The background groundwater arsenic level was estimated in the RI to be 0.025 mg/L. This value was determined qualitatively by dividing the MCL by 2. It was estimated that approximately 330,000 pounds of arsenic bait may have been applied to the study area, although no specific disposal sites and only one likely contaminant source area, a bait mixing area near Wyndmere, were identified.

Data from the RI and a Health Risk Assessment performed by NDDH estimated that 748 people in 278 homes were subject to increased health risk due to exposure to arsenic above the MCL in water supplies. All represented 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 one-acre former bait mixing area near Wyndmere by installing a clay cap over the site.

IV. Remedial Actions

EPA issued a Record of Decision (ROD) for the Site on September 26, 1986. The selected remedy was:

- Provide treated water to affected rural users by expanding the existing Richland Rural (now Southeast Water Users District or SEWUD) water distribution system to additional residents within Richland's existing service boundaries and construct a new water treatment and distribution system (or expand and extend the Richland system) to affected residents outside of Richland's service boundaries;

- No action for individuals using water from the Lidgerwood and Wyndmere systems due to effective removal of arsenic by the towns' treatment systems;

- Continue monitoring of groundwater through quarterly monitoring of the Lidgerwood 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; and

- Further investigate institutional controls during final design and implement those that are feasible and implementable.

The scope of the rural water system design was to "provide water that attains and exceeds the SDWA MCL of 0.050 mg/L arsenic by removing arsenic to the background concentration of 0.025 mg/L."

After the ROD was signed, several issues developed that pertained to the remedy. Lidgerwood requested that construction of its water treatment plant and replacement of its distribution system be considered as part of the response action, and therefore, reimbursable. In addition, the Lidgerwood treatment plant did not operate correctly after its initial six months of operation in summer 1986. The City of Wyndmere requested that expansion of its treatment plant be considered as part of the overall remedial action for the Site. The Wyndmere plant lacked the capacity to cover periods of high demand and the only way to provide sufficient water to satisfy demand during these times was to bypass the plant and provide untreated water high in arsenic.

In April 1987, a Cooperative Agreement (CA) was awarded to the State to study the Lidgerwood and Wyndmere plants, to determine the extent of the repairs necessary to correct problems at the Lidgerwood plant and to verify the Wyndmere plant's capacity problem. Subsequently, an Amendment to the ROD was signed on February 5, 1988. It provided for reimbursement from Superfund to Lidgerwood for allowable costs associated with its treatment plant construction, modification of the Lidgerwood plant, and expansion of the Wyndmere plant to provide additional storage capacity through addition of a new storage reservoir and minor modifications to the plant. At that time, EPA designated the Richland Rural water treatment system as Operable Unit 1 (OU1) and the Lidgerwood and Wyndmere plants as OU2.

Additional water quality monitoring between 1986 and February 1990 identified groundwater with elevated arsenic concentrations near the town of Milnor. Milnor is located within the

boundary of the Site and a number of city residents obtained their drinking water from shallow groundwater with elevated arsenic levels. In addition, private local water supply companies which provided water from deeper zone wells to the residents of Milnor informed the State that they planned to discontinue service which would force most Milnor residents to depend on shallow zone wells for their drinking water needs. At the recommendation of the Bureau of Reclamation, which was tasked by EPA and the State to investigate the issue, EPA elected to extend the distribution system from the Richland Rural water treatment plant to serve the residents of Milnor. This action was identified in an Explanation of Significant Differences (ESD) dated September 25, 1992. Because the expansion involved a second phase expansion of the Richland Rural treatment system (OU1), the Milnor expansion was designated as OU1, Phase 2.

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

- Expansion of the Richland Rural (now called SEWUD) water treatment plant and its associated distribution system to provide safe drinking water to households within 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 within Lidgerwood;

- Expansion and modification of the existing Wyndmere water treatment plant to increase treatment capability and storage capacity and, thereby, provide safe drinking water to households within Wyndmere;

- Monitoring of the treatment plants, monitoring of the glacial aquifer systems and monitoring of private wells; and

- Institutional controls to encourage public participation in the project and restrict private water supply well use.

Remedy Implementation Prior to 2003

The primary remedy components were implemented through construction and/or expansion of the Lidgerwood, Wyndmere and Richland Rural water treatment plants and distribution systems between 1986 and 1992. Details of remedy implementation at each plant are described below.

Lidgerwood Treatment System

Construction of the Lidgerwood treatment plant was initially completed in 1986 in response to a directive from the State. The plant was constructed as a conventional aeration, detention and filtration plant designed to oxidize (through aeration and addition of chlorine/potassium permanganate) and remove iron and manganese by precipitation and filtration with co-precipitation and removal of arsenic. Following filtration, chlorine is added to inhibit microbial growth and provide residual disinfection.

Following construction, the plant proved difficult to operate and frequently produced water of unacceptable quality. Plant performance was evaluated by the Bureau of Reclamation 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.

The recommended plant modifications were implemented between August 1989 and January 1990. Following construction the plant was subjected to a one-year operational and functional test period to demonstrate that the plant had achieved the design criteria. The operational test period, which included treated water quality monitoring in accordance with a monitoring program developed by the NDDH, indicated the plant was able to consistently reduce arsenic concentrations from approximately 0.13 – 0.16 mg/L in the source water to approximately 0.02 – 0.03 mg/L following treatment. The treatment system was turned over to the City of Lidgerwood for the ongoing operation and maintenance.

Wyndmere Treatment System

In 1987, the NDDH investigated concerns expressed by Wyndmere that the existing treatment plant (an oxidation, precipitation and filtration system) had inadequate capacity to meet periods of high water demand. Based on their findings EPA amended the 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, problems were experienced in the backwash cycle. Installation of a separate backwash system for the filters was planned, but in-plant testing prior to construction indicated that addition of a post-chlorination system rather that the backwash system was warranted.

The initial modifications to increase plant capacity and add the storage tank were implemented between August 1989 and January 1990. Additional activities related to the backwash filters and the post-chlorination unit were completed between April 1990 and January 1991.

Following the initial construction modifications, the plant was subjected to a one-year operational and functional test period to demonstrate that the plant had achieved the design criteria. The test period, which included treated water quality monitoring in accordance with a monitoring program developed by the NDDH, indicated the plant was able to consistently reduce arsenic concentrations from approximately 0.085 mg/L in the source water to 0.002 mg/L following treatment. The treatment system was turned over to the City of Wyndmere for the ongoing operation and maintenance.

Richland Rural Water Treatment System

Construction to expand the Richland Rural water treatment plant and distribution system began in 1990. During construction, approximately 300 miles of water distribution pipeline were placed, seven additional water storage reservoirs were added, three additional water supply wells were drilled and the treatment system was approximately doubled in size. Construction in all areas outside of Milnor was completed by September 1991.

Construction to add Milnor to the distribution system began in September 1991. During the summer of 1992, a 135,000-gallon drinking water reservoir and distribution system to approximately 300 homes and businesses were added before construction was completed in September 1992. Final testing, construction restoration, and drilling of an additional well were completed by June 1993. The treatment system was turned over to Richland Rural for the ongoing operation and maintenance.

The Site work was deemed fully implemented and operational and the Site was deleted from the NPL in July 1996.

Remedy Implementation After 2003

The second five-year review in 2003 showed that the remedy for the Arsenic Trioxide site was no longer protective due to the arsenic MCL change from 0.050 mg/L to 0.010 mg/L. It was decided that in order for the remedy to be protective additional remedial action was needed and a number of actions have been taken or are planned to return the Site to a protective status. An extensive rural user well sampling program was initiated to determine if additional rural users in the 26 townships were drinking water over the arsenic MCL. Approximately 375 wells were sampled and 84% were at or above the MCL, many of them significantly above the MCL. These rural users have been offered bottled water as an interim measure.

The remaining work has been divided into phases and which are referred to as segments. The project has been implemented using a "segmented" design and construction approach. Construction activities completed to date have been associated with Segments 1 and 2 of the ATS project, and Segment 3 is currently being constructed. Future construction work is anticipated for Segments 4, 5, and 6, as well as further institutional control development for long-term protectiveness. It is anticipated that this future work will be documented in a ROD Amendment in late 2008.

Segment 1 Construction

Segment 1 construction activities were completed to provide treated water to the cities of Hankinson and Wyndmere. Construction activities at Wyndmere included installing approximately 11 miles of new finished water pipeline from an existing line to a new 100,000 gallon underground water storage reservoir and pumping facility that were constructed on a vacant lot directly west of the existing Wyndmere water treatment plant. In order to adequately serve Wyndmere, modifications to SEWUD's existing Reservoir B pumps, piping, and controls were also completed.

Construction activities associated with providing water to Hankinson included installing approximately three miles of new finished water pipeline from an existing line to a new 200,000 gallon underground water storage reservoir and pumping facility that were constructed in Hankinson. Improvements to Hankinson's water distribution system were also completed to provide water to eight households located within the city limits that did not previously have city water service.

A new 100,000 gallon underground water storage reservoir was constructed at the existing SEWUD water treatment plant to provide additional capacity to help meet the added water usage that resulted from adding Hankinson and Wyndmere to SEWUD's distribution system.

The Segment 1 work was substantially completed on November 7, 2006. There were several items that were not yet finished at the time of the inspection (e.g., final landscaping at the Hankinson reservoir, final Operations and Maintenance manuals, troubleshooting of several electrical issues, water intrusion into pipe galleries at one reservoir); consequently, the final inspection for Segment 1 was not completed until November 21, 2007. The one year operational and functional period began on November 21, 2007. It is anticipated that Segment 1 work will be turned over to SEWUD for operation and maintenance of November 21, 2008.

The City of Lidgerwood was also encouraged to abandon its aging treatment plant and connect to the SEWUD system. Lidgerwood declined and chose to enter an EPA Office of Research and Development (ORD) demonstration project. The ORD project examined process modifications that could be made to existing water treatment plants to reduce arsenic levels and bring them into compliance with the new arsenic MCL. This work was funded by EPA, but was outside of the Superfund program and process. Since the City of Lidgerwood chose not to connect to the SEWUD system and chose instead to participate in the ORD demonstration project, the City of Lidgerwood has taken on the financial responsibility and operation and maintenance of 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 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. Segment 2 construction activities were completed at the SEWUD water treatment plant to provide additional capacity to meet the increased water demands resulting from the expansion of the rural water system to the communities of Wyndmere and Hankinson.

The addition of the components constructed under Segment 1 required modifications to SEWUD's existing facility, including construction of additional water supply wells; expansion of SEWUD's water treatment plant building; construction of new underground storage reservoirs and a pumping station; and installation of additional pressure filters, pumps, controls, chemical feed equipment, and related appurtenances at the SEWUD water treatment plant.

The well field expansion included the completion of two production wells and the 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 approximately 3,200 feet of piping.

Expansion of the existing water treatment plant included an addition directly north of the existing building; installation of additional filters, high service pumps, backwash pumps, and chemical feed equipment; installation of miscellaneous process piping, valves and fittings; and construction of an expanded clearwell, a chemical feed room, an operator control room, and an electrical/motor control center room. Valve replacement, climate control modifications, instrumentation modifications and existing filter refurbishing were also included for the existing portion of the facility. Finally, a modification to the backwash and sanitary sewer pond were required at the treatment plant site.

A final walk through of the SEWUD water treatment plant was completed on March 19, 2008. The final Segment 2 task that remains to be completed is the resolution of problems associated with the newly installed water supply wells. It is anticipated that the final completion, inspection, and certification of Segment 2 will take place during the fall of 2008, and the one year operational and functional period will expire during the fall of 2009, when SEWUD will become responsible for all future operation and maintenance.

Segment 3 Construction

Segment 3 construction consists of connecting approximately 60 rural users to the SEWUD system, including extension of waterlines to the areas being connected. This construction began in June 2008 and is expected to be completed in early spring 2009.

Institutional Controls

In 1993, NDDH prepared a review document identifying institutional controls (ICs) for the site that were feasible and implementable. The following ICs 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.

NDDH indicated that economic incentives (IC No. 1) were used to reduce the cost to implement the remedy. These incentives included a design/construction grant from the EPA's CERCLA program and a reduction in the initial rural water membership fee from $250 to $50. Based on the IC review document, it appears that the economic incentives were not intended to continue following completion of the rural water system expansion (i.e., would not apply to future participants).

Restrictions on public water supply well use within the project area (IC No. 2) were determined to already be in place through the state's enforcement of the SDWA, which requires public water systems to discontinue use of wells that exceed an MCL or provide treatment to achieve compliance. In addition to requiring compliance with the SDWA, NDDH indicated that it would require each public water system (PWS) within the project area to annually monitor for the presence of arsenic contamination for the life of the project. The IC review document did not identify how the annual arsenic monitoring requirement would be imposed.

In addition to the public water supply well restriction, the IC review document indicated that the municipalities of Lidgerwood, Wyndmere and Milnor require that all city residents connect to the respective municipal water system. This requirement is imposed through city ordinances that restrict the use of private water supply wells for domestic consumption. Irrigation and other non-consumptive uses are not restricted. The Milnor ordinance is appended to the IC document as an example. However, Section 4 of the ordinance indicates that the connection requirement only applies for buildings located within 200 feet of the city water main. It was not clear how many buildings might be excluded by the 200 feet limit.

For IC No. 3, NDDH indicated it would proposed an amendment to the North Dakota Administrative Code (NDAC) Section 33-18 Water Well Construction and Water Well Pump Installation requiring all newly constructed wells completed by North Dakota certified drilling contractors within the project area be subject to at least one analytical test of the groundwater for arsenic prior to consumptive use. In the IC document, NDDH indicated it would propose the amendment to the water well contractor board in the fall of 1993. However, NDAC 33-18 currently only requires arsenic testing for wells intended for use by a public water system. Unspecified chemical testing is recommended for all other groundwater sources, but arsenic testing is not expressly required for non-public wells within the project area.

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

As of the time of this third five-year review, the IC are not yet finalized for the Site.

Anticipated Future Construction – Segments 4, 5 and 6

It is anticipated that there will be 3 future segments of work, with construction beginning in 2009, 2010, and 2011. Based on the conceptual design approach developed in August 2008, the work will be as follows:

- Segment 4 – 2009. Approximately 130 to 150 rural users will be connected to the SEWUD system

- Segment 5 – 2010. Approximately 60 to 80 rural users will be connected. Additionally, 2 additional wells, 1 additional filter, 1 additional reservoir and pumphouse, and modifications to two existing reservoir pumphouses will be accomplished.

- Segment 6 – 2011. Approximately 80 to 100 rural users will be connected and modifications will be done to 4 existing reservoir pumphouses.

It may be necessary to install Point-of-Use systems for a small minority of remote rural users if it becomes too costly and inefficient to install water lines to them. This will be determined during the future designs of Segment 4, 5 and 6.

Remedy Operation and Maintenance

No long-term operation and maintenance (O&M) requirements have been identified for the clay cap installed at the former bait-mixing site or the point-of-use treatment systems. These were interim measures used prior to selection and implementation of the remedy, and therefore, they are not subject to long-term O&M.

Long-term O&M of the treatment plants was required under the initial Site remedy to be performed by the respective operators: City of Lidgerwood for the Lidgerwood treatment plant, City of Wyndmere for the Wyndmere treatment plant and SEWUD (formerly Richland Rural Water Association) for their water treatment plant.

The primary activities associated with O&M of 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; and
- Water quality reporting to the NDDH.

A water quality monitoring program based on SDWA requirements for water treatment plants was approved by EPA and the NDDH in July 1990. The program included three-year monitoring requirements; inorganic chemical sampling and analytical requirements; approved laboratory guidelines; and reporting, public notification and record keeping requirements. Water quality monitoring results for the treatment plants were appended to their respective Remedial Action Reports, and these results were found to confirm that each plant had achieved the ROD

objective of reducing human exposure to arsenic-contaminated groundwater and was in compliance with the SDWA MCL for arsenic.

Each plant monitored water quality in accordance with an O&M plan developed by the NDDH and approved by EPA specifically for that plant. Responsibility for O&M of the Lidgerwood treatment plant was assumed by the City of Lidgerwood in February 1991 and this responsibility continues. The ORD demonstration project included an examination and updating of O&M duties as a result of the modifications. Responsibility for O&M of the Wyndmere treatment plant was assumed by the City of Wyndmere in March 1991. The City of Wyndmere has now been connected to the SEWUD and is no longer responsible for O&M of a treatment plant. Responsibility for O&M of the SEWUD treatment plant was assumed by the Southeast Water Users in July 1993, and this responsibility continues. Each of these entities provided an O&M finance and assurance plan to ensure that each plant was sufficiently funded to continue O&M.

In addition, the NDDH routinely monitors community drinking water supply systems for compliance with SDWA MCLs. Yearly treatment plant inspections and testing have demonstrated that the treatment and distribution systems for Lidgerwood and SEWUD have met the SDWA requirements. Copies of the most recent inspection reports and monitoring data, as provided by the NDDH, are included as Attachment 2.

V. Progress since Second Five-Year Review

As described in above sections, significant progress has been made, although much work remains before the Site is again in a long-term protective status. Issues raised at the second five-year review have been resolved. The City of Wyndmere is now connected to the SEWUD system and an extensive sampling and analysis program has provided needed information on users whose well water contains arsenic at or above the MCL. Those users are currently being protected since they were offered bottled water as an interim measure. Long-term protectiveness of those users will be achieved by the design and construction of Segments 4 through 6 as well as the current construction of the Segment 3 portion of the remedy.

The table below summarizes the issues and recommendations from the second five year review, and provides a summary of the resolution or status.

Table 2. Resolution of Second Five Year Review Issues and Recommendations

Item No.	Issue	Recommendation for Follow Up	Resolution/Status
1	Arsenic MCL has been revised and will become enforceable in January 2006. Lidgerwood treatment plant is unlikely to be able to achieve new arsenic MCL.	Identify and evaluate alternatives for improving or replacing Lidgerwood treatment plant	The City of Lidgerwood decided to enter an EPA ORD Demonstration Project to become compliant with the new arsenic MCL.

Item No.	Issue	Recommendation for Follow Up	Resolution/Status
2	The new arsenic MCL may prompt additional affected residents to connect to the rural water system.	Increase public awareness of new arsenic MCL and promote further public participation	Public outreach and additional sampling of rural users' wells were conducted to gather more information about the arsenic contamination.
3	New residents that purchased homes not connected to the rural water system may not be aware that their private well contains arsenic concentrations above the MCL	Address with Item 2 above and work with NDDH to establish regional education program.	Public outreach has been conducted, but ICs should be put in place to inform future new residents
4	Lidgerwood treatment plant is experiencing declining performance for arsenic removal.	Address with Item 1 above.	Lidgerwood has taken on financial responsibility and operation and maintenance of their treatment system.
5	Process constraints require that the Wyndmere treatment plant operate at approximately 60 percent of design flow rate.	Determine if plant can meet current demand by operating at 60 percent of design flow rate. Evaluate need for improvements to or replacement of plant if it is unable to meet demand.	The City of Wyndmere has been connected to the SEWUD. (Segment 1)
6	No records were available that indicated the groundwater monitoring component of the remedy had been performed.	Confirm with NDDH that the specified monitoring actions have been satisfactorily completed and document these finding in the project file.	This will be addressed in the upcoming ROD Amendment.
7	No records were available that indicated full implementation of the institutional controls.	Confirm with NDDH that the institutional controls have been fully implemented and document these findings or any corrective actions in the project file.	ICs for the project will be addressed in the upcoming ROD Amendment

VI. Five-Year Review Process

This is the third five-year review of the Arsenic Trioxide Superfund Site.

Administrative Components

The Arsenic Trioxide Site five-year review team was lead by Frances Costanzi, the EPA remedial project manager, and John Dalton of EPA acted as the Community Involvement Coordinator for the Site.

The review was initiated in February 2008 and included the following components:

- Community Involvement,
- Local Interviews,
- Document Review,
- Data Review,
- Site Inspection and
- Five-Year Review Report Development and Review

The schedule for the review extended through September 2008.

Community Involvement

During the week of August 18, 2008, a notice was placed in the local newspapers to inform the local communities that a five-year review was being conducted and to advertise two upcoming public meetings. The notice summarized what would be discussed at the meetings and directed the public on how to obtain additional information regarding the site progress and the review to EPA and NDDH. The notice was published in the following publications:

- Richland County News-Monitor, and
- Milnor Teller

In late August 2008, public information meetings were held at in Hankinson and Cayuga within the Arsenic Trioxide Superfund area to provide site information to the public and update residents on pipeline construction progress.

Local Interviews

In July and August 2008, EPA conducted interviews with elected officials from the communities of Lidgerwood, Hankinson, and Wyndmere. EPA also interviewed residents of Hankinson, Lake Elsie, Lidgerwood and Wyndmere, and a board member of the Southeast Water Users District (SEWUD).

Interviews were held with residents currently receiving bottled water and scheduled to be hooked up to the rural water system this year. EPA also talked with people whose wells tested below 0.010 mg/L arsenic and are not eligible to be hooked up to the rural water system.

During the interviews, city officials were asked for their input regarding public satisfaction levels in their area and relative costs.

Brad Hofman, Acting Mayor and a City Council member in Wyndmere, said he believes the municipal water/pipe line is meeting the needs of the community and hopes that everyone takes advantage of the municipal water hookup. Rick Hauser, a resident of Hankinson and former City

Council member, said his family switched to the municipal line about four years ago and that it has worked out well for his household.

All in all, said Hauser, most people think the pipeline is a good idea and that people in rural areas are definitely benefiting.

However, Joe O'Meara, Mayor of Hankinson, was concerned about the cost to community members, and that in the long run it would have been less expensive for his city to build a water treatment plant.

"Building a plant would have been a lot cheaper than getting water from the Southeast Water Users District," he said. "Overall, the community is not happy with the costs."

Most feedback, O'Meara said, concerns high water bills because the city must maintain its own infrastructure as well as pay the cost of drinking water to the water district.

Wyndmere's Hofman said his city council would appreciate more updates and involvement from SEWUD, through mailings and e-mails. He said most of his constituents appreciate the improved taste of municipal water, and that it is less corrosive to copper piping.

Another community, the City of Lidgerwood, opted to keep its own treatment plant but now faces operational difficulties.

Anticipating extensive and costly repairs to the plant, Lidgerwood community members are hoping for rural hookups that will result in less expensive water. "Given the problems we're having, with a bad roof and treatment tanks that are leaking, we think it will cost upwards of $1,000,000 to repair the plant," said Dennis Schuder, Mayor of Lidgerwood. "Now it may be cheaper to go with rural water."

Currently, pipeline construction is within a half mile of the city. "It would be real simple to hook in," said Bruce Elsner, a retired City Council member in Lidgerwood. "It's cost effective to hook into the pipeline, and it would be better water." Elsner added, "As much as I would like to have the plant going, it would be better to go with rural water."

Still, that thought is tempered with practicality. "People go by their pocketbook," Elsner insisted. Many people, he said, don't understand the issue because they have been drinking either well or water treatment plant water their entire lives, don't understand the necessity for a rural pipeline, and fear increased water costs.

However, some citizens are willing to foot the costs of pipeline water for its benefits, despite contamination levels that make them ineligible for the water line hookup.

"Shallow wells, like mine, don't qualify for the pipeline," said LaVonne Althoff, Secretary of the Board of Directors of the SEWUD and a resident of the outlying Lake Elsie area. "We don't drink the well water but we do use it for everything else."

Ms. Althoff's household does not receive bottled water, and she is willing to pay the price for the rural pipeline hookup.

"The cost to get into the pipeline is a $700 membership and $2 to $3 per foot pipe costs," she said. "We've budgeted $1500 to $2000 for the pipe only. And then there are the monthly base rate fees and the cost per gallon."

She said she'd been living with bad water in her area for about 30 months and will welcome the pipeline despite the cost. "One way or the other I will have water by Thanksgiving," Ms. Althoff stated. "I'm prepared to pay for it. When I lived on the farm we had good water and I got spoiled."

Document Review

A list of documents reviewed during preparation of this five-year review report can be found in Attachment 3.

Applicable drinking water regulations were also reviewed to identify changes since the second five-year review.

Data Review

The remedy provides for on-going monitoring of the quality of treated water produced by the SEWUD treatment plant. This monitoring is being performed by the State, which has primacy for the Public Water System Supervision (PWSS) program and includes enforcement for compliance with MCLs. EPA Region 8's Water Management Division provides oversight of the NDDH's PWSS program.

In preparing this five-year review report, data from the NDDH's routine treated water quality analyses for the Lidgerwood and SEWUD systems were reviewed. Arsenic concentrations in the treated water samples are listed in Table 3. Complete laboratory results for the analyses are included in Attachment 2.

Table 3. Summary of Arsenic Concentrations in Treated Water

Treatment Plant	Sample Date	Arsenic Concentration mg/L
Lidgerwood	10/9/2007	0.00665
SEWUD	10/9/2007	0.0071

The purpose of this monitoring is to confirm that the water treatment plants are producing water that meets the SDWA MCLs. Monitoring is performed and reported annually.
Arsenic concentrations in the treated water for each treatment plant meet the currently enforceable MCL for arsenic of 0.010 mg/L.

Site Inspection

EPA's project manager performed site inspections on April 1, 2008 and June 9, 2008. During the site inspections, the project manager met with water system officials and their consultants; inspected the Southeast Water Users and inspected the Lidgerwood water treatment systems at the request of the Mayor of Lidgerwood.

The Southeast Water Users system was inspected. This system treats groundwater by permanganate addition followed by green sand filtration to remove arsenic, iron and manganese. Chlorine and fluoride are added prior to distribution. The new arsenic standard is achieved by

this water system. Source wells for this system were inspected. The wells are within a wellhead protection area in the Sheyenne Grasslands managed by the US Forest Service. Lastly, treated water is conveyed through distribution lines to storage reservoirs and then further distributed to users.

In addition to municipalities, individual rural users can elect to be connected to the system. The cost to rural water users is the cost of installation of the water line (estimated cost of $4.00 per foot) and a $700 membership fee. This may be costly for users that require a long distance from the existing pipeline to the home. During the implementation of the initial remedy, EPA and NDDH provided financial assistance such that the cost to new rural water users to connect to the system was $50. During the current Segment 3 through Segment 6 work, EPA and NDDH are again providing financial assistance, although the sign-up fee has increased to $100.

Currently, residents with arsenic levels in their water at or over the MCL are offered bottled water at no charge as an interim measure. The EPA Removal Program assisted the project by initiating the bottled water program under removal authorities and operating it for approximately one year. The NDDH will take over the lead of the bottled water program in the fall of 2008, and will continue to manage the program until qualified rural users either are connected to the SEWUD system or chose to not connect to the system. Under the NDDH lead, 90% of the cost will be funded by EPA and 10% will be billed to individual customers.

The point-of-use treatment units provided during early implementation of the remedy were discussed. The reported experience was that these systems were not effective, particularly if the pretreatment softening step malfunctioned. Due to this technical issue and the fact that the units were intended as an interim measure and not a component of the remedy, it is unlikely that any of these systems are functioning. The option to use a point-of-use system in Segments 4 through 6 is still available if a residence is located too far from any distribution lines, making any connection to the SEWUD cost-prohibitive. However, at this time, it is believed that all qualified users will be able to be connected to the SEWUD.

The Lidgerwood system was inspected. This system initially treated groundwater with permanganate followed by sand filtration. As a result of the ORD demonstration project, an iron addition system and an additional polymer system were added to the process train. The water is chlorinated prior to distribution. This facility appears to be poorly maintained and is in a deteriorating state of repair. The City officials have recently noted that they do not have the funds to adequately pay for an experienced operator and for maintenance of the facility. They also stated that they do not have the funds to connect to the SEWUD on their own and have asked to re-join the Superfund process for the Site. Unfortunately, the City of Lidgerwood decided to opt out of the Superfund process and EPA can not construct a second remedy for the City now.

VII. Technical Assessment

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

No. The review of documents, data, ARARs, interviews and the results of the site inspection indicate that overall the remedy is not functioning as intended by the ROD, as modified by the ESDs, although significant progress has been made since the last five-year review to bring the Site once more into a long-term protectiveness state. In the past 2 years, over 300 rural users have been identified who have well water over the revised MCL of 0.010 mg/L. Although these

users are being provided with bottled water in the interim and 60 of the rural users are currently being connected, the final remedy must provide a long-term solution for those rural users.

The SEWUD treatment plant continues to produce water that meets the MCL for arsenic and that treated water is distributed to the affected residents.

Finally, although institutional controls were required to be implemented in the first ROD, no such controls have been put into place. This leaves future rural users in the site area potentially unprotected.

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

No. The SDWA MCL for arsenic applicable to Community Water Systems (CWS) was revised from 0.050 mg/L to 0.010 mg/L effective February 22, 2002. The new MCL became enforceable on January 23, 2006. The ESD signed in February 2008 contains the current MCL as an ARAR, but there is not a decision document for the remainder of the site that has the updated MCL. It is anticipated that a ROD Amendment for the Site will be signed by the end of 2008 containing the updated arsenic MCL as well as ICs.

It was anticipated that ICs would be implemented to provide long-term protection for the site area. ICs have not been implemented except in several of the cities, where local ordinances prohibit installation of drinking water wells. As stated above, it is anticipated that this will be addressed in the upcoming ROD Amendment.

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

No, there is no other information that calls into question the protectiveness of the remedy.

Technical Assessment Summary

According to the data reviewed, the site inspection and interviews, the remedy is not currently operating and functioning as intended by the ROD, as modified by the ESDs. The remedy at the Arsenic Trioxide site currently protects human health and the environment because bottled water is being supplied as an interim remedy to rural users whose water is contaminated with arsenic equal to or greater than the MCL of 0.010 mg/L.

However, in order for the remedy to be protective in the long-term, rural users with arsenic contaminated water need to be connected to the SEWUD system and ICs must be implemented to ensure long-term protectiveness.

VIII. Issues

Based on the information collected during the third five-year review report, the following issues were identified:

Table 4. Issues Identified

Item No.	Issue	Affects Current Protectiveness of Remedy	Affects Future Protectiveness of Remedy
1	The new arsenic MCL and additional sampling indicates a significant number of additional rural users are drinking water above the MCL. These rural users are being provided bottled water.	No	Yes
2	Connecting affected rural users of contaminated well water will necessitate modification of the SEWUD system.	No	Yes
3	New rural users that purchase homes not connected to the SEWUD system may not be aware that their well contains arsenic concentrations above the MCL.	No	Yes
4	The Lidgerwood treatment plant appears to be poorly maintained and is in a deteriorating state of repair.	No	Yes
5	No records were available that indicated the groundwater monitoring component of the remedy had been performed previously.	No	No
6	No records were available that indicated full implementation of the institutional controls.	No	Yes

IX. Recommendations and Follow-Up Action

Based on the information collected during the third five-year review report, the following recommendations and follow-up actions were identified:

Table 5. Recommendations and Follow-Up Actions

Item	Issue	Recommendation for Follow Up	Party Responsible	Milestone Date	Affects Protectiveness
1	The new arsenic MCL and additional sampling indicates a significant number of additional rural users are drinking water above the MCL. These rural users are being provided bottled water.	The lead for the bottled water program is transferring from the 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 to be connected to the SEWUD system.	EPA/NDDH	Bottled water lead transfers to NDDH by October 2008. NDDH retains lead until all qualified rural users are connected or refuse to be connected.	Yes
2	Connecting affected rural users of contaminated well water will necessitate modification of the SEWUD system.	Design and construct additional connections, treatment plant modifications, storage reservoir modifications and well field expansion.	EPA/NDDH	Anticipate the majority of the modification to be done during Segment 5 with some additional work in Segment 6.	Yes
3	New rural users that purchase homes not connected to the SEWUD system may not be aware that their well contains arsenic concentrations above the MCL.	ICs should be implemented to address this situation and prevent it from occurring. See #6 below.	EPA/NDDH	ICs addressing long term protectiveness will be documented in the next ROD Amendment (anticipated December 2008	Yes

Item	Issue	Recommendation for Follow Up	Party Responsible	Milestone Date	Affects Protectiveness
4	The Lidgerwood treatment plant is experiencing declining performance for arsenic removal.	The City of Lidgerwood decided to participate in the ORD Demonstration project and has taken on financial responsibility and operation and maintenance of their treatment system.	Lidgerwood	To be determined by City of Lidgerwood	Yes
5	No records were available that indicated the groundwater monitoring component of the remedy had been performed previously.	EPA and NDDH need to decide if this earlier ROD component continues to be necessary.	EPA/NDDH	Decision to be documented in next ROD Amendment (anticipated December 2008)	No
6	No records were available that indicated full implementation of the institutional controls.	Coordinate with NDDH to develop and implement institutional controls that will provide long-term protectiveness for the Site.	EPA/NDDH	ICs for the site to be documented in the next ROD Amendment (anticipated December 2008)	Yes

EPA should address the above listed items in conjunction with NDDH and SEWUD.

X. Protectiveness Statement

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.

XI. Next Review

This Site requires ongoing five-year reviews in accordance with CERCLA §121(c). The next five-year review for the Arsenic Trioxide Site will be performed by September 2013, five years from the date of completion of this review.