

Five-Year Review Report

Third Five-Year Review Report for Saltville Waste Disposal Ponds Superfund Site Saltville, Virginia

September 2007

**United States Environmental Protection Agency
Region III
Philadelphia, Pennsylvania**

Approved by:

Date:



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List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DDA	Demolition Debris Area
EPA	U.S. Environmental Protection Agency
FCPS	Former Chlorine Plant Site
FS	Feasibility Study
HDPE	High Density Polyethylene
LLDPE	Linear Low Density Polyethylene
NCP	National Contingency Plan
NPL	National Priorities List
NFHR	North Fork Holston River
OU1	Operable Unit One
OU2	Operable Unit Two
OU3	Operable Unit Three
OU4	Operable Unit Four
O&M	Operation and Maintenance
µg/L	Micrograms per Liter
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
SCLP	Saltville Community Liaison Panel
USACE	U.S. Army Corps of Engineers
VDEQ	Virginia Department of Environmental Quality
VPDES	Virginia Pollution Discharge Elimination System

Executive Summary

The remedy for the Saltville Waste Disposal Ponds Site in Saltville, Virginia ("Site") included diverting clean storm water around the waste ponds, capping/covering the waste ponds (Ponds 5 and 6), treating leachate in the onsite wastewater treatment plant, institutional controls (fencing, limiting excavation in disposal areas and groundwater use restrictions), and monitoring. The Site has been addressed in the following four operable units ("OUs"):

- OU1 - Pond 5 surface water diversion;
- OU2 - Wastewater treatment plant for Pond 5 leachate;
- OU3 - Pond 5 Cap, Pond 6 Cover, and upgrade to the Pond 5 wastewater treatment plant for Ponds 5 and 6 leachate; and
- OU4 - Mercury impacts at the Former Chlorine Plant Site ("FCPS") and mercury impacts in approximately 150 miles of river (80 miles of the North Fork Holston River and 70 miles of the Holston River).

The first three OUs have been completed and are operational and functional. A Remedial Investigation and Feasibility Study ("RI/FS") for the fourth and final OU is underway. The second five-year review for this Site was completed in September 2002.

The assessment of this, the third five-year review found that the remedy was implemented in accordance with the cumulative requirements of the two Records of Decision ("RODs"). The risks presented by the waste disposal ponds have been addressed and the selected remedy is protective.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name: Saltville Waste Disposal Ponds		
EPA ID: VAD003127578		
Region: 3	State: Virginia	City: Saltville
SITE STATUS		
NPL status: Final		
Remediation status: OU1, OU2 and OU3 completed; OU4 RI/FS underway		
Multiple Operable Units (OUs)? Yes		
Has site been put into reuse? Yes, the remediated waste ponds are functioning as wildlife habit area.		
REVIEW STATUS		
Lead agency: EPA		
Author name: Eric Newman		
Author title: Remedial Project Manager	Author Affiliation: U.S. EPA, Region 3	
Review period: 6/2007 - 9/2007		
Date of site inspection: 7/26/2007		
Type of review: Post SARA		
Review number: 3 (third)		
Triggering action: Second Five-Year Review completed 9/30/2002		
Triggering action date: 9/30/2002		
Due date: 9/30/07		

Five-Year Review Summary Form, cont'd.

Issues:

- OU4 RI/FS focusing on FCPS and NFHR needs to be completed to quantify risk to human health and the environment. The fact that the OU4 RI/FS has not been completed does not call into question whether the remedy selected in ROD-1 and ROD-2 is protective; however, EPA is not yet in position to state whether the Site is protective.

Recommendations and Follow-up Actions:

- Olin needs to complete the ongoing OU4 RI/FS; EPA to issue ROD-3.

Protectiveness Statement:

- The remedy at OU1 is protective of human health and the environment. This interim remedial action was selected to reduce the volume of clean storm water entering Pond 5, a contaminated area, thereby reducing the quantity of contaminated leachate generated. The remedial action objectives have been met.
- The remedy at OU2 is protective of human health and the environment. Exposure pathways that could result in unacceptable risks are being controlled. The wastewater treatment plant that was constructed to treat mercury-contaminated leachate exiting Pond 5 has consistently met its performance standards. The remedial action objective has been met.
- The remedy at OU3 is protective of human health and the environment. Engineering controls have been completed in a manner that: prevent direct contact with disposed wastes; limit the quantity of storm water coming into contact with the disposed wastes, and reduce the volume of contaminated leachate requiring treatment prior to NFHR discharge. In addition to Pond 5 leachate treatment, Pond 6 leachate is conveyed to the wastewater treatment plant for pH adjustment prior to NFHR discharge. The wastewater treatment plant effluent meets water quality performance standards which are protective of human health and the environment. Institutional controls are in place to prohibit disturbance of the implemented remedy, limit property use, and prevent the risk of exposure to contaminants managed on the property. The remedial action objectives have been met.

Other Comments: None

Saltville Waste Disposal Ponds Superfund Site
Saltville, Virginia
Third Five-Year Review Report
EPA ID No. VAD003127578

I. INTRODUCTION

The purpose of a 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 these reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

The Agency is preparing this Five-Year Review report pursuant to CERCLA §121 and the National Contingency Plan ("NCP"). CERCLA §121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action.

The Agency interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

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

The U.S. Environmental Protection Agency ("EPA"), Region 3, conducted this five-year review of the remedy being implemented at the Saltville Waste Disposal Ponds Superfund Site ("Saltville" or "Site") in Saltville, Virginia. This review was conducted by the Remedial Project Manager of the Site between June 2007 and September 2007. This report incorporates monitoring data obtained since the last five-year review and documents the results of the review.

This is the third five-year review for the Saltville Site. The triggering action for this statutory review is the completion of the second five-year review in September 2002. The five-year review is required because the remedy allows mercury and high pH waste material to remain on-Site at levels which do not allow for unlimited use and unrestricted exposure.

II. SITE CHRONOLOGY

TABLE 1 - CHRONOLOGY OF SITE EVENTS

Date	Activity
1895-1972	Olin Corporation or its predecessors (Olin Mathieson Chemical Corporation, Mathieson Chemical Corporation and Mathieson Alkali Works) operated various chemical manufacturing operations in Saltville.
1950-1972	Olin Corp or its predecessors operated a mercury cell chlor-alkali plant on the bank of the North Fork Holston River. The Facility was demolished in June 1973.
November 1982	Olin entered into a Consent Special Order with the Virginia State Water Control Board wherein Olin agreed to remove mercury contaminated sediment from River, encapsulate sediment on foundation of Former Chlorine Plant Site (FCPS) and cap with clay.
September 8, 1983	EPA promulgated the Site on the National Priorities List (NPL).
June 30, 1987	EPA issued first Record of Decision (ROD-1) requiring interim remedial measures and an additional RI/FS.
September 15, 1988	Olin entered into a Consent Decree wherein Olin agreed to implement the ROD-1 selected remedy.
May 17, 1991	Olin completed the Remedial Design for surface water diversion required by ROD-1 (defined as OU1 Remedial Action start in WasteLAN).
June 1991	Contractors were mobilized to the Site to begin OU1 construction
September 22, 1992	EPA approved report documenting that Olin completed OU1 Remedial Action
April 27, 1993	Olin completes Remedial Design for water treatment plant (defined as OU2 Remedial Action start in WasteLAN).
October 11, 1993	Contractors were mobilized to Site to begin OU2 construction
July 8, 1994	Untreated discharge of Pond 5 leachate stopped; leachate diverted to equalization basin.
September 28, 1994	The wastewater treatment plant passed proof-of-performance testing and began to treat Pond 5 leachate
September 29, 1995	EPA issued second ROD (ROD-2) requiring upgrade to the water treatment plant and engineering controls for waste disposal ponds. EPA defers decision on FCPS and North Fork Holston River pending additional studies.
September 3, 1996	EPA approved RA Report documenting that Olin completed construction of water treatment plant required by ROD-1 (defined as OU2 Remedial Action complete in WasteLAN).
July 29, 1997	Olin enters into Consent Decree wherein Olin agrees to implement ROD-2 selected remedy.
September 1997	EPA issued initial 5-Year Review
March 27, 2001	Olin completed Remedial Design for the remedy selected in ROD-2: Pond 5 and 6 containment, shallow ground water diversion and more stringent leachate treatment (defined as OU3 Remedial Action start in WasteLAN).
April 2, 2001	Olin contractors were mobilized to Site to begin OU3 construction
November 15, 2001	Pond 6 leachate pump house went on-line and Pond 6 leachate was permanently routed to the wastewater treatment plant.
September 30, 2002	EPA issued second 5-Year Review
July 11, 2003	EPA approved RA Report documenting that Olin completed construction of the remedy set forth in ROD-2, including a multi-layered cap over Pond 5
March 27, 2007	Olin files Environmental Protection Easement and Declaration of Restrictive Covenants in Smyth and Washington Counties

III. BACKGROUND

Surface Features

The Saltville Waste Disposal Ponds Superfund Site is part of Olin Corporation's former Saltville facility located along the north bank of the North Fork Holston River ("NFHR" or "river") between the towns of Saltville and Allison Gap, in western Smyth and eastern Washington Counties, Virginia (See Attachment 1). The NFHR forms the southern border of the Site and Virginia State Route 611 runs along the northern border at the foot of Little Mountain. The Site consists of the Former Chlorine Plant Site ("FCPS") and two waste disposal ponds, Ponds 5 and 6, and areas to which contamination has migrated, including the river. Pond 5 and its dikes cover an area of about 76 acres. Pond 6 is immediately west and downstream of Pond 5. Pond 6 and its dikes cover an area of about 45 acres. The FCPS is about one-half mile upstream of Pond 5 and has an area of about 4 acres.

Land and Resource Use

From approximately 1895 to 1972, the Saltville facility was owned and used by Olin Corporation ("Olin") or its predecessors (Olin Mathieson Chemical Corporation, Mathieson Chemical Corporation and Mathieson Alkali Works) as the location for various chemical manufacturing operations. Mathieson Chemical Corporation constructed a mercury cell chlor-alkali plant (also referred to as the chlorine plant) in 1950 and operated that plant until 1972.

The Olin facilities are located in the narrow mountain valley of the North Fork Holston River. The setting is rural with steep mountain slopes on either side of the river.

A human population study completed in 1994 identified three residential clusters in the vicinity of the Site. Approximately 40 residential dwellings are located to the south of Pond 5 and NFHR on Henrytown Road. To the northeast of Ponds 5 and 6, there are approximately 20 residences. The third area is on the northwestern side of Pond 5 on State Route 611 and has five homes.

Land use adjacent to the FCPS is industrial and consists of the Saltville municipal wastewater treatment plant to the north, the Tri Cities Dry Ice plant to the northwest, a former settling pond to the west, a metal manufacturing plant to the east across the NFHR, and a soil treatment and reclamation plant (currently closed and all equipment removed) and auto repair/welding shop to the south across the NFHR.

Poor water quality stemming from the presence of bittersweet, iron, and salt (hence the name Saltville) in the NFHR in the vicinity from providing satisfactory water supply. Some industries have relied on ground water sources in deep wells of the Witt Spring located in Plasterco, the Cardwell area, Allison Gap and approximately one mile north of Allison Gap. Broady Bottom area that are each over one mile

including iron, potash, and salt in the local area. These wells consist of open pits and wells in the

The Town of Saltville has an ordinance requiring residential and industrial developments to be on city water. Residences and adjacent industrial sites are supplied with city water. The city operates a 10-inch water main along State Road 634 adjacent the FCPS.

All areas comprising the Site, excepting the river itself, are currently fenced. At the FCPS, mercury-contaminated sediments are contained in an impermeable "envelope" which is covered with a clay and soil cap. Pond 5 is capped with a composite RCRA-type impermeable barrier. Pond 6 is covered with 18 inches of soil. The FCPS, Pond 5 and Pond 6 are capped or covered and vegetated to prevent erosion.

History of Contamination and Chemical Plant Operations

As mentioned above, Olin manufactured various chemicals on the Site from approximately 1895 to 1972, including the production of chlorine gas from 1950 through 1972. The chlorine plant produced chlorine gas and sodium hydroxide by passing brine, obtained by solution mining salt deposits in the area, between electrodes. The cathode used in this process was mercury and is considered the source of mercury in the pond wastes. The electrical current passing through the brine caused the formation of chlorine gas at the anode through electrolytic oxidation. At the same time, a sodium amalgam was formed at the cathode. The amalgam was passed into a decomposing tower where the sodium was separated by flushing the water from the sodium hydroxide. Some of the mercury was lost in the production process and was solubilized and passed into Pond 5 in the wastewater.

Pond 5 was operated from approximately 1925 to 1971 and Pond 6 was put into service in 1964. The ponds were primarily used for the containment of ammonia soda ash wastes. In 1951, Pond 5 began receiving mercury-contaminated wastewater from the mercury cell chlor-alkali plant. The wastewater was discharged on the surface of Pond 5 near the eastern edge and directed around the northern perimeter by berms on the pond surface. The process and washdown wastewater was conveyed to the eastern end of Pond 5 separately from the ammonia soda ash waste slurry. Pond 6 also shows evidence of receiving mercury-contaminated wastewater but not to the extent of Pond 5. The intent of managing the mercury-contaminated wastewater in the settling ponds was to allow wastewater to percolate into the pond solids and allow mercury to adsorb onto the fine, alkaline particles of the ammonia soda ash waste.

The dikes containing the ponds were constructed of rockfill cores (starter dikes) and built up with accumulations of slaker wastes. The slaker wastes were primarily composed of spent coke and roasted limestone waste. The Pond 5 dikes are approximately 100 feet high and the depth of settled solids varies from about 35 feet to 70 feet, with an average of about 63 feet. The Pond 6 dikes are approximately 35 feet high and the depth of the solids varies from about 20 feet to 30 feet. Until 1994, surface water discharge from Pond 5 was controlled by a decant structure located at the southwest corner which discharged directly to the river. Since 1994, discharge from Pond 5 has been routed through a wastewater treatment plant for mercury abatement and pH adjustment prior to discharge. The dikes have kept the water level in the ponds beneath the surface of the settled solids.

After Olin shut down the Saltville facility in 1972, demolition of the chlorine plant began. Process mercury was removed from the equipment and shipped to Olin plants in Georgia and

Alabama for re-use. The equipment was cleaned with wash water which was allowed to percolate into the soils at the Former Chlorine Plant Site. Some of the debris and obsolete equipment from the plant demolition was placed at the eastern edge of Pond 6. Debris was also placed on the lower bench of the dike between Pond 5 and Pond 6 (referred to as the Demolition Debris Area or DDA). No sampling of the debris was conducted prior to disposal which was completed in June 1973. The debris was covered with locally-obtained soil.

Initial Response Activities

Environmental studies of the Site began in conjunction with heightened concern about mercury discharges nationwide. An investigation of the Site and adjacent river by Olin, the Commonwealth of Virginia, and local agencies during the late 1960's revealed mercury contamination in both locations. In 1970, as a result of mercury concentrations found in fish, both Virginia and Tennessee placed a ban on fishing in the river. Both bans were later modified (Tennessee's in 1972, Virginia's in 1974) to permit fishing on a catch and release basis.

In 1978, a Task Force was formed which included the Virginia State Water Control Board, Virginia Attorney General's Office, Tennessee and Virginia State Departments of Health, Tennessee Valley Authority, and EPA. The Task Force required Olin to conduct studies to identify the sources of mercury contamination at the Saltville facility, and negotiated cleanup measures to reduce mercury input to the river.

Under a special order issued in 1982 by the Virginia State Water Control Board, Olin dredged contaminated sediments from a 1000 foot section of the river adjacent to the FCPS. The excavated sediments were placed on the FCPS. The contaminated sediments were segregated by size, with the fine fraction sealed in a 36-mil hypalon envelope and the larger sediments power-washed and placed near the hypalon envelope. The sediments were then covered with approximately 2 feet of clay and 6 inches of topsoil. This project was supplemented by the construction of a diversion ditch around the western, upstream side of Pond 5 (the Western Diversion Ditch) to reduce surface water flow onto the pond. The diversion ditch project captured surface water flowing from four natural swales (i.e., swales numbered 2-5) leading from Little Mountain and re-routed the clean water to the ditch which conveyed the water to the NFHR by gravity flow. At the time that this diversion ditch project was completed it was decided that a fifth natural swale ("swale 1") leading from Little Mountain to the eastern end of Pond 5 could not be diverted due to lack of subsurface stability in the area.

Remedial Overview and Basis for Taking Action

EPA proposed the Saltville Waste Disposal Ponds Site for inclusion on the National Priorities List ("NPL") in December 1982, and placed the Site on the NPL on September 8, 1983, 48 Fed. Reg. 40658. In July 1986 and August 1986, EPA conducted a risk assessment and feasibility study ("FS"), respectively. These reports were based on existing data and available information supplied by the Saltville Task Force and Olin. EPA did not perform a remedial investigation ("RI") at the time because of the significant amount of available data and continuing sampling effort being conducted under the 1982 special order between Olin and the Virginia State Water Control Board. EPA conducted a risk assessment based on all available data and identified to determine what data gaps existed. Several data gaps were identified in the 1986 risk

assessment, however, it became clear that some initial steps could be taken to address obvious environmental problems at the Site. Accordingly, EPA determined that it was appropriate to address the Site in operable units ("OUs").

The first Record of Decision ("ROD-1"), issued in 1987, addressed the management of clean storm water flowing into Pond 5 from Little Mountain via swale 1 and the treatment of mercury-laden leachate released from Pond 5 prior to its discharge to the North Fork Holston River. The surface water diversion project and the construction of the wastewater treatment plant to handle Pond 5 leachate were managed as standalone projects. Therefore, EPA identified the surface water diversion component of the selected remedy as Operable Unit 1 ("OU1"); the wastewater treatment plant component was designated as Operable Unit 2 ("OU2"). Olin entered into a Consent Decree with EPA in 1988, wherein Olin agreed to implement the ROD-1 selected remedy and to conduct the additional RI/FS studies necessary to identify the remaining Site risks. In accordance with the consent decree, Olin completed the OU1 remedial action in 1991 and the OU2 remedial action in 1994.

The second ROD ("ROD-2"), issued in 1995, addressed waste disposal Pond 5 and Pond 6, and upgrading the OU2 wastewater treatment plant to meet more stringent discharge standards for mercury abatement. ROD-2 also required interception and diversion of an uncontaminated shallow ground water aquifer and neutralization of the Pond 6 discharge. This ROD was based on an RI/FS prepared by Olin. The process wastes contained in Ponds 5 and 6 had a pH of approximately 12; wastes in Pond 5 also contained high concentrations of mercury. The selected remedy included: installation of a low permeability RCRA-Subtitle C cap to prevent direct contact with wastes and to reduce the volume of contaminated leachate from Pond 5; installation of a permeable soil cover over Pond 6 to prevent direct contact with high pH wastes; treatment of the combined flow of leachate from Ponds 5 and 6 to meet water quality standards in NFHR; and interception and diversion of shallow ground water flowing from Little Mountain into Pond 5. EPA identified the work required by ROD-2 as Operable Unit 3 ("OU3"). Olin entered into a Consent Decree with EPA in 1997, wherein Olin agreed to implement the ROD-2 selected remedy. In accordance with the consent decree, Olin completed OU3 remedial action in July 2003.

Operable Unit 4 ("OU4") will address the Former Chlorine Plant Site (including ground water beneath that area) along with the impact of mercury contamination on the river. The OU4 RI study area begins at the Former Chlorine Plant Site and extends 80 miles downstream to the North and South Fork Holston Rivers confluence, then another 70 miles to River Mile 53 within the Cherokee Reservoir on the Holston River. The OU4 RI/FS is scheduled to be completed Spring 2008 and is the final operable unit for the Site. A final ROD is scheduled for September 2008.

IV. REMEDIAL ACTION

OU1 and OU2 Remedy Selection

On June 30, 1987, EPA issued ROD-1 selecting an interim remedy intended to take action to control migration of mercury from the Site. The selected remedy included the construction of a

surface water diversion ditch/downchute around the eastern side of Pond 5, and construction and operation of a wastewater treatment plant to handle ground water/leachate collected at Pond 5. As stated above, ROD-1 was based on a risk assessment and feasibility study ("FS") conducted by EPA utilizing previously existing data. The major components of the selected remedy include:

- Upgradient controls to divert clean storm water flowing from Little Mountain around Pond 5 with ditches/berms/downchutes;
- On-Site treatment of Pond 5 outfall sufficient to achieve an in-stream concentration of 0.05 µg/L mercury in the NFHR;¹
- Installation of ground water monitoring wells and conduct of a site-wide remedial investigation and feasibility study; and
- Operation and maintenance of the wastewater treatment facility.

OU1 and OU2 Remedy Implementation

On September 15, 1988, EPA and Olin entered into a consent decree wherein Olin agreed to perform the remedial design/remedial action necessary to implement the ROD-1 remedy and to pay the United States' past response costs associated with the Site. The surface water diversion project and the construction of the wastewater treatment plant for Pond 5 leachate were managed as standalone projects. The remedial design for the surface water diversion project (OU1) was approved by EPA on May 17, 1991.

Olin contractors mobilized to the site in June, 1991 to begin OU1 remedial action in the field. Specific tasks entailed capturing surface water flowing from swale #1 from the Little Mountain area north of Pond 5 and diverting that clean water around the waste ponds, thereby reducing the volume of contaminated leachate requiring treatment in the OU2 wastewater treatment plant. The major components of the OU1 remedial action were the following:

- High Density Polyethylene ("HDPE") liner and grout matting in collection basins upgradient of Pond 5;
- HDPE liner and grout matting in an open channel drainage ditch;
- Subsurface 42" HDPE pipe to convey clean water flowing from swale #1 across Pond 5; and
- Discharge chute and stilling basin to control outfall to NFHR.

In addition to the components above, Olin upgraded the engineered diversion ditches for swales 2, 3, 4 and 5. These diversion ditches were constructed in 1982 to more efficiently convey that clean water from those swales to the western diversion ditch which discharges to the NFHR.

¹It was determined that the treatment plant effluent must meet 20 µg/L mercury to achieve an in-stream concentration of 0.05 µg/L mercury in the NFHR.

Construction and demobilization were completed on November 11, 1991. On September 22, 1992 an OU1 Remedial Action Report was issued documenting the completion of the upgradient stormwater run-on controls.

The remedial design for the wastewater treatment plant (OU2) was approved by EPA on April 27, 1993. Olin contractors mobilized to the site on October 11, 1993 to begin remedial action in the field. The major components of the OU2 remedial action were the following:

- Sump and pumping station to convey Pond 5 leachate to a 2,000,000 gallon equalization basin;
- Membrane-lined, 2,000,000 gallon equalization basin; and
- Wastewater treatment plant which provides pH adjustment and carbon filtration for mercury abatement.

The OU2 remedial action was conducted by Olin's contractor as planned. EPA, VDEQ and CH2M Hill, EPA's oversight contractor, performed routine inspections throughout field implementation. EPA and the State conducted an inspection on November 28, 1994. The carbon column effluent exhibited a pH below 8.0 and mercury concentrations were well below $1.0 \mu\text{g/L}^2$ (a calibration standard of $1.0 \mu\text{g/L}$ prepared by Olin was used in the on-site laboratory). Olin began discharging treated effluent on November 28 when the effluent from the carbon columns had reached a pH of 7.5. Olin discharged treated water to the NFHR between November 28 and November 29, 1994 until the low-level cutoff was reached at the system pump station adjacent to the equalization basin. All monitoring demonstrated that the pH was between 6.0 and 9.0 and the mercury concentrations were below $1.0 \mu\text{g/L}$ for the treated water discharged to the river. As a result of the inspection it was concluded that construction had been completed in accordance with the remedial design plans and specifications and did not result in the development of a punch list. On September 3, 1996 the OU2 Remedial Action Report documenting the completion of the OU2 remedial action was approved by EPA.

OU3 Remedy Selection

On September 29, 1995, EPA issued ROD-2, selecting a remedy which addresses the source materials (process wastes contained in Pond 5 and Pond 6) and the leachate exiting the Ponds. The remedial action objectives are prevention of direct contact with wastes, minimizing the volume of leachate, and treating the leachate to meet discharge standards. The major components of the selected remedy for Ponds 5 and 6, respectively, are listed below.

The selected remedy for the Pond 5 area consisted of the following major components:

- Installation of a multi-layered cap over the entire Pond 5 area (approximately 76 acres);

² The $1.0 \mu\text{g/L}$ mercury effluent concentration achieved was 20 times lower than the ARAR set forth in ROD-1.

- Construction of an up-gradient ground water interceptor system;
- Revision of the effluent discharge limit for the Pond 5 wastewater treatment plant to achieve the Virginia surface water standard for mercury³ and modification of the Pond 5 wastewater treatment plant discharge⁴, if necessary;
- Implementation of institutional controls (prohibiting land use that may harm the integrity of the engineered cap and prohibiting installation of drinking water wells);
- Site security and operation and maintenance ("O&M") programs; and
- Long-term monitoring.

The selected remedy for Pond 6 and the contingent remedial action consisted of the following components:

- A permeable soil cover over the entire Pond 6 area of approximately 40 to 45 acres, including the demolition debris burial area;
- A pH adjustment system to neutralize the discharge from the Pond 6 decant structure;
- Institutional controls (prohibiting land use that may harm the integrity of the soil cover and prohibiting installation of drinking water wells);
- Maintenance of the Site security and maintenance programs; and
- Long-term monitoring, including installation of monitoring well(s) downgradient of the Demolition Debris Area.

The ROD stated that the following additional remedial action shall be required if mercury contamination from the buried debris is demonstrated to be migrating toward the river through the ground water in Pond 6:

- Isolation of FCPS demolition debris buried in the eastern end of Pond 6 by vertical barrier wall and a multi-layered cap over the two to three acres where the debris is buried.

³ The chronic water quality standard of 0.012 µg/L mercury for protection of aquatic life.

⁴ By letter dated November 22, 2000, VDEQ issued effluent limitations and operational procedures to meet ARARS. Treatment plant effluent must meet 3.6 µg/L mercury when river flow is higher than 160 cubic feet per second (cfs). If the river flow is lower than 160 cfs, a sliding scale which allows a decreased discharge rate from the plant must be followed.

OU3 Remedy Implementation

Olin is implementing ROD-2 in accordance with the consent decree entered in U.S. District Court on July 29, 1997. The OU3 remedial design was approved by EPA on March 27, 2001. Olin contractors mobilized to the site on April 2, 2001 to begin remedial action in the field. The major components of OU3 remedial action, listed in approximate order of implementation, were the following:

- Installation of additional Site security fence around Ponds 5 and 6;
- Construction of an 18-inch thick permeable soil cover over Pond 6 with slopes between one and four percent. The surface of the landfill was seeded with a diverse mix of grasses and grains to provide a valuable wildlife habitat as beneficial reuse;
- Upgrades to Little Mountain swales 1-5 to intercept clean, shallow ground water. Route augmented flow to rehabilitated western and eastern diversion ditches leading to NFHR;
- Closing Pond 6 outfall to eliminate discharge of high pH effluent to NFHR; retrofit stilling well (collection station) to receive Pond 6 effluent; installing vertical turbine pumps to pump Pond 6 effluent from stilling well to the existing wastewater treatment plant; installing new section of force main tied in to existing Pond 5 force main; pumping Pond 6 effluent to the wastewater treatment plant for pH adjustment of 6 to 9;
- Construction of a multi-layered RCRA-Subtitle C compliant landfill cap with a profile (from bottom up) of: 40-mil Linear Low Density Polyethylene ("LLDPE") geomembrane; a geosynthetic clay liner (in areas of less than two percent slope and drainage swales); a geocomposite drainage layer; and a 24-inch thick soil layer vegetated with diverse seed mix to provide wildlife habitat as beneficial reuse; and
- Deed restrictions on Ponds 5 and 6 to prevent unsuitable development of the property or the installation of drinking water wells on the property.

The OU3 remedial action progressed in a manner consistent with the ROD-2, and the EPA-approved Remedial Design and Remedial Action Work Plans. The Remedial Design Reports, including Quality Assurance Project Plans, incorporated all EPA and State quality assurance and quality control procedures and protocol. Olin developed and implemented construction and quality control plans in accordance with the Remedial Design specifications. EPA, VDEQ and USACE, EPA's field inspection and technical oversight professional, performed routine inspections throughout Olin's implementation of the OU3 remedial action. EPA and the State conducted final inspection on September 24, 2002. On July 11, 2003, the OU3 Remedial Action Report documenting the completion of the OU3 remedial action was approved by EPA.

To augment the OU3 constructed remedy, on March 27, 2007 Olin filed a signed copy of the Environmental Protection Easement and Declaration of Restrictive Covenants ("Easement") executed between Olin ("grantor") and the Commonwealth of Virginia Department of

Environmental Protection (“grantee”). The Easement “shall run with the land....prohibit[s] any type of activity that could disturb the surface or the underlying waste, as well as the use of groundwater from that area as a source of potable water, or in any way increase the risk of exposure to contaminants on the property...”. During the July 26, 2007 site inspection and community interviews, no activities were observed that violated the institutional controls. The subject property is fenced. The cap on Pond 5 and cover on Pond 6 and surrounding areas were undisturbed, and no new uses of ground water were observed.

Long-Term Monitoring/Operation and Maintenance (“O&M”) for OU1, OU2 and OU3

Olin submitted a detailed O&M plan for the wastewater treatment plant as a component of the as-built package attached to the OU2 Remedial Action Report approved by EPA on September 3, 1996. Operational changes/limitations have more recently been put in place to ensure that the wastewater treatment plant continues to meet the revised discharge performance standard of 3.6 µg/L mercury and that the plant scales back the discharge rate if the NFHR flow rate is less than 160 cfs. As a practical matter, historic operations have documented that during periods of low flow in the NFHR the leachate flow rate also decreases to the point that operation of the wastewater treatment plant is unnecessary. During these low flow events, collected leachate accumulates in the equalization basin.

Olin is conducting long-term monitoring and operation and maintenance activities according to the O&M plan (Appendix M of the OU3 Remedial Design, March 27, 2001). The primary activities associated with long-term monitoring focused on the following areas:

- Ground water samples for mercury at the Ponds 5 and 6 dike wells and Demolition Debris Area trigger wells; and
- Monitoring of the wastewater treatment plant effluent for compliance with the Virginia State Water Control Law, Code of Virginia §§ 62.1-44.2 et seq., and the VPDES Regulations (VR 680-14-01).

The primary activities associated with O&M included the following:

- Visual inspection of the Pond 5 cap and Pond 6 cover for vegetation, settlement, stability, and any need for corrective action. The mowing plan for Pond 5 prevents colonization of woody plants with tap roots capable of damaging the geomembrane while maintaining a wildlife habitat. Pond 6 has less stringent mowing requirements (i.e., there is no geomembrane to maintain) and supports the wildlife habitat end-use;
- Inspection of the swale interceptor system, Ponds 5 and 6 surface drainage system and eastern and western diversion ditches for blockage, erosion and instability and any need for corrective action;
- Inspection of dikes separating the Ponds from the NFHR for erosion and instability; and

- Inspection of site security fencing and condition of ground water monitoring wells.

Through September 2007, the primary O&M activities have been monitoring the effectiveness of the wastewater treatment plant meeting surface water discharge standards, monitoring the cap and cover for erosion and grade reversal (differential settlement). The water treatment plant has operated since 1994. The most recent Annual Operating Report for the water treatment plant for calendar year 2006 is attached (See Attachment 2). The treatment plant was operated on 49 days in 2006 during which approximately 11,500,000 gallons were discharged to the NFHR. This volume of water is near the annual average for the treatment plant. The daily monitoring documents that all water discharged achieved the 3.6 µg/L mercury and pH 6 to 9 performance standards. The average mercury concentration of the treated water was 0.2 µg/L. This is the seventh consecutive year that the average mercury concentrations of the treated effluent averaged less than 0.8 µg/L. Attachment 2 includes an operating summary documenting that the water treatment plant has met the mercury concentration performance standard each year since the plant began operations. Monitoring settlement monuments and visual inspections have confirmed that no grade reversals have occurred and erosion issues are addressed through routine maintenance.

V. PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

The second five-year review for the Site was completed in September 2002. The 2002 five-year review included protectiveness statements concluding that the remedy at OU1 and OU2 were protective of human health and the environment. The protectiveness statement for OU3 determined that the remedy was protective in the short term; however, in order for the remedy to be protective in the long-term, the institutional controls restricting development of Ponds 5 and 6 and restricting installation of potable wells on the property must be put in place. The report noted that an OU4 RI/FS focusing on the FCPS and NFHR were planned. Major achievements since the last five-year review include:

- Institutional Controls are now in place to prohibit disturbance of the implemented remedy or ground water use from the vicinity of Pond 5 and 6 for potable purposes, or in any way increase the risk of exposure to contaminants on the property.

The Environmental Protection Easement and Declaration of Restrictive Covenant was filed with Smyth and Washington Counties on March 27, 2007.

VI. Five-Year Review Process

Administrative Components

EPA notified Olin, the Saltville Community Liaison Panel ("SCLP") and state and local officials of the initiation of the five-year review in the Summer of 2007. EPA formally notified the community by presenting at the July SCLP meeting and by public notice in the Smyth County News and Messenger on September 12, 2007. The Saltville Five-Year Review team was led by Eric Newman, EPA's Remedial Project Manager ("RPM") for the Site. The review team also

included David Polish, EPA's Community Involvement Coordinator, and members from the Regional Technical Advisory staff with expertise in hydrology, biology and risk assessment. Tom Modena, Virginia Department of Environmental Quality, assisted in the review.

The review team established the review schedule with the following components:

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

The schedule extended from June 2007 through September 2007.

Community Involvement/Interviews

The SCLP was established in 1996 and has been actively following the Superfund process and responses since that time. The SCLP is comprised of 10 to 12 local citizens representing a cross-section of community leaders and interested residents including, but not limited to, individuals from local government, law enforcement and emergency workers, public health and hospital workers, environmental activists, churches, high school students and former Olin employees. The SCLP is facilitated by a local community involvement firm retained by Olin and the meetings are attended by current Olin employees, VDEQ, EPA and topic-specific experts as warranted. The panel meets quarterly and the agenda features topics related to Site plans. Recent SCLP meetings have focused on environmental investigations related to the on-going OU4 RI/FS. Panel members communicate on a daily basis with their respective friends, neighbors, and co-workers to inform them of information that they have learned at the SCLP meetings and, in turn, solicit questions and concerns that their peers may have about the Site. No questions or concerns are "out-of-bounds" at SCLP meetings.

EPA RPM Newman participated in the SCLP meeting July 27, 2007 to inform the panel that EPA was, once again, completing the Five-Year Review process to confirm that the constructed remedy remains protective. Mr. Newman outlined the review process, including a detailed review of environmental monitoring and maintenance reports, a field inspection of the constructed remedy, and a literature review to confirm that the performance standards remain protective when considering the most up-to-date regulatory standards and toxicity data of site-related compounds. Mr. Newman conveyed the importance of communicating with local citizens and public officials to learn of any concerns related to the Site.

On July 27, 2007, Mr. Newman, conducted interviews with several local citizens on the SCLP. Panel members noted that concerns about the site have diminished over the years. Local citizens have been comfortable with the work completed. There has been some discussion about the possible river cleanup; the long-time residents remember the extensive NFHR cleanup performed in the early 1980's (as described in the 1982 NFHR cleanup on page 5). The town of Saltville hosts an annual festival over the Labor Day weekend. The SCLP participates with an information booth showing before and after poster-sized pictures of the Site and other support material designed to inform the citizens of the status of cleanup activities. From approximately

2000 through 2004, the SCLP offered Site tours as part of the Labor Day festival with SCLP members functioning as the tour guides and Olin representatives available for technical backup. Over the years participation in Site tours dropped from approximately 70 to 12 citizens. Accordingly, the tours were discontinued in 2005. During the July 2007 meeting, EPA and the SCLP decided to offer a site tour on the day that the OU4 Proposed Plan meeting is scheduled at the conclusion of the OU4 RI/FS in 2008.

On the afternoon of July 27, 2007, Mr. Newman was on-Site to conduct interviews with Keith Roberts, Olin's Project Manager, and Stanley Haynes, Olin's water treatment plant operator and liaison to the SCLP (Mr. Haynes is also a long-time resident of Saltville). Mr. Roberts and Mr. Haynes informed Mr. Newman that the last citizen concerns related to the Site occurred during the Summer of 2003 when Mr. [REDACTED] a Saltville citizen requested EPA to investigate a white foam that was generated on the storm water flowing off Ponds 5 and 6 during heavy rain events. Mr. Newman recollected the event and related investigation completed by EPA. EPA coordinated with experts from U.S. Fish and Wildlife and the EPA Biological Technical Assistance Group. The experts determined that the phenomenon is common and is created in high velocity water in the presence of natural starches leached from degrading vegetation. The combination of the freshly mowed vegetated cover on the Ponds with the swiftly moving storm water flowing to the river creates the foam. In addition to communicating the findings to Mr. [REDACTED] EPA provided the results of the investigation to Ms. Lee Ann Prescott, a writer with the Smyth County News & Messenger. Mr. Roberts and Mr. Haines informed Mr. Newman that no other negative concerns related to the protectiveness of the selected remedy have been raised to their attention. Mr. Haynes mentioned that a variety of wildlife have been observed on or in the vicinity of the Site, including bear and bald eagles. According to local experts, a large percentage of the warbler species known to be present in Virginia have been observed at the Saltville site. Mr. Roberts confirmed that the Environmental Protection Easement and Declaration of Restrictive Covenant was filed with Smyth and Washington Counties on March 27, 2007. Mr. Newman acknowledged that EPA was in possession of a copy of the official easements stamped by the respective County Clerks.

On July 27, 2007 Mr. Newman visited Saltville Police Chief Steve Surber in the City Hall office. Chief Surber told Mr. Newman that the Site has been quiet. Chief Surber is not aware of any citizen complaints or concerns regarding the Saltville Superfund site. Chief Surber is not aware of any unusual activity occurring on the property.

On July 27, 2007 Mr. Newman conducted an interview with Mr. [REDACTED] proprietor of the Tri Cities Dry Ice Co., Inc. Mr. [REDACTED] company is located on a parcel between the Former Chlorine Plant Site and Pond 5. Mr. [REDACTED] informed Mr. Newman that since the cap construction was completed several years ago, the Saltville site has not concerned him. Mr. [REDACTED] is aware that EPA will be completing the environmental investigation at the Former Chlorine Plant Site (next door) and the river and will present the findings along with any additional cleanup that may be required some time next year. Mr. [REDACTED] confirmed that he knows Stanley Haines, the water treatment plant operator and would have no reservations about contacting Mr. Haines, or EPA, if he had any questions about the Superfund site.

Mr. Newman went door to door along Perryville Road to interview residences living nearest the Saltville site. Mr. Newman interviewed [REDACTED] and [REDACTED] local residents. After Mr. Newman provided an overview of the Five-Year Review process and the role of the community

interviews Mr. and Mrs. [REDACTED] told Mr. Newman that they do not have any specific concerns related to the Site. Mr. & Mrs. [REDACTED] expressed satisfaction that EPA does maintain an interest in the Sites and reviews them for continued protectiveness after cleanups have occurred.

Document Review

This five-year review consisted of a review of relevant documents including O&M records and monitoring data. Applicable or relevant and appropriate requirements ("ARARs") identified in Section 8.2 and Section 9.0 of ROD-2 were reviewed. The only major ROD-1 ARAR was the surface water discharge standard for mercury which was superseded by the more stringent ROD-2 ARARs.

The following documents were reviewed for this five-year review:

- Interim Record of Decision-1 (June 30, 1987)
- ROD-1 Remedial Design/Remedial Action Consent Decree (entered September 15, 1988)
- OU1 Milestone Report No. 6 – Construction Certification and As-Built Drawings for Eastern Diversion Ditch (dated March 4, 1992)
- Operation and Maintenance Manual for Water Treatment Plant (October 1994)
- OU2 Remedial Action Report for Water Treatment (approved September 3, 1996)
- Record of Decision-2 (September 29, 1995)
- ROD-2 Remedial Design/Remedial Action Consent Decree (entered July 29, 1997)
- Saltville Waste Disposal Ponds First Five-Year Review Report (September 1997)
- OU3 Remedial Design Report (approved March 27, 2001)
- Focused Remedial Investigation for Former Chlorine Plant Site (March 2004)
- Monthly Progress Reports and Quarterly and Annual Monitoring Reports
- Saltville Waste Disposal Ponds Second Five-Year Review Report (September 2002)
- OU3 Remedial Action Report (approved July 11, 2003)
- Environmental Protection Easement and Declaration of Restrictive Covenants (filed March 27, 2007)

Data Review

The wastewater treatment plant generates routine water quality monitoring data from plant influent and effluent. The wastewater treatment plant only operates when enough water has accumulated in the equalization basin. The Five-Year Review Team reviewed the Quarterly and Annual Operation Reports. In accordance with the action-specific ARARs for the discharge, effluent at the “end of pipe” must meet 3.6 µg/L mercury and pH between 6 and 9. The wastewater treatment plant has consistently met the performance standards for discharge to NFHR. See Attachment 2, a summary of the most recent annual report.

EPA also reviewed environmental data gathered during the on-going OU4 RI/FS to look for anomalies which may bring into question the site conceptual model. Surface water has been monitored on a weekly, monthly and quarterly basis for more than a decade. The concentration of mercury in the NFHR has been demonstrated to meet the ARARs for surface water quality. The low concentration of mercury in the water column reinforces that the source control measures implemented at the Site have been effective.

Site Inspection

On July 26, 2007, Eric Newman, EPA’s Remedial Project Manager for the Site, and Olin representatives (Keith Roberts, Olin Project Manager and Stanley Haynes, Water Treatment Plant Operator) conducted a Site inspection to as a vital part of the five-year review process. The objective of the inspection was to assess the protectiveness of the remedy, including the integrity of the Pond 5 cap and the Pond 6 cover, the Pond 5 and 6 leachate collection and conveyance system, and the operation of the wastewater treatment plant. The water treatment plant was physically inspected with a walk through, the caps constructed over Ponds 5 and 6 were inspected by driving the perimeter and stopping for closer inspection of dike cuts, conveyance details such as ditches and culverts, and storm water discharge points to the river. All components of the OU1, OU2 and OU3 remedial actions were confirmed operational and functional. No significant issues have been identified regarding the constructed Pond 5 cap, Pond 6 cover or operation of the water treatment plant.

Institutional controls are in place to prohibit disturbance of the implemented remedy or use of ground water from the vicinity of Pond 5 and 6 for potable purposes, or in any way increase the risk of exposure to contaminants on the property. In addition to the Site, RPM Newman physically toured the residential and industrial properties in the vicinity of the Site. The property use limitations were also raised during each of the community interviews conducted. No activities were observed or reported that would violate the institutional controls. The subject property was fenced, the cap and surrounding areas were undisturbed, and no new uses of ground water were observed.

VII. Technical Assessment

QUESTION A: IS THE REMEDY FUNCTIONING AS INTENDED BY THE DECISION DOCUMENTS?

Yes. The review of site-related documents, risk assumptions, and the results of the Site inspection indicated that the constructed remedy is functioning as intended by ROD-1 and ROD-2. The strategy of diverting clean stormwater and shallow ground water around the disposal ponds as well as capping the waste disposal ponds to reduce infiltration has greatly reduced the volume of contaminated leachate generated and requiring treatment. The combined flow of leachate from Ponds 5 and 6 is conveyed to the on-Site wastewater treatment plant. The wastewater treatment plant has consistently met the performance standards of 3.6 µg/L mercury and pH between 6 and 9 for discharge to NFHR.

The institutional controls are in place to prevent development and the installation of drinking water wells on the property. The Site inspection and community interviews affirmed that no prohibited land use has occurred. The subject property is fenced. The cap on Pond 5 and cover on Pond 6 and surrounding areas were undisturbed, and no new uses of ground water were observed.

QUESTION B: ARE THE EXPOSURE ASSUMPTIONS, TOXICITY DATA, CLEANUP LEVELS, AND REMEDIAL ACTION OBJECTIVES (“RAOs”) USED AT THE TIME OF THE REMEDY SELECTION STILL VALID?

Yes.

Remedial Action Objectives

There have been no changes in the Site conditions that would affect RAOs or the overall protectiveness of the remedy. The work that has been accomplished has been designed and implemented to meet the RAOs.

Changes in Standards and To Be Considered (“TBCs”)

There have been no changes in ARARs or TBCs that affect the protectiveness of the remedy. The most important ARAR applies to the quality of the effluent discharged from the waste watertreatment plant. Contaminated leachate from Ponds 5 and 6 is collected, treated, and discharged to the NFHR river in accordance with effluent limits and flow rates established by the VDEQ Water Division under the Virginia State Water Control Law, Code of Virginia §§ 62.1-44.2 et seq., and the Virginia Pollutant Discharge Elimination System Regulations (VR 680-14-01). The existing effluent limit is in compliance with the Virginia surface water standard for mercury.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

The exposure assumptions used to develop the risk assessment included a child trespasser, child and adult residents and industrial workers. There have been no changes in the toxicity factors for mercury, the contaminant of concern, since the baseline risk assessment was completed. These

assumptions are considered to be conservative and reasonable in evaluating risk and developing risk-based cleanup levels. No change to these assumptions, or the cleanup levels developed from them is warranted. The ROD-2 clean-up criteria continue to be protective of human health and the environment.

An OU4 RI/FS focusing on the FCPS and residual contamination in the NFHR is currently being performed. This on-going RI/FS includes human health and ecological risk assessments.

QUESTION C: HAS ANY OTHER INFORMATION COME TO LIGHT THAT COULD CALL INTO QUESTION THE PROTECTIVENESS OF THE REMEDY?

No.

No other information has come to light that calls into question the protectiveness of the OU1 or OU2 remedies as constructed in conformance with ROD-1 or the OU3 remedy as constructed in conformance with ROD-2.

An OU4 RI/FS focusing on the FCPS and the NFHR is currently being performed. The on-going OU4 RI/FS will include human health and ecological risk assessments and provide the basis for a final ROD for the Site, to be designated ROD-3.

Technical Assessment Summary

Based on monitoring data, the site inspections, and the interviews, the remedy is functioning as intended by ROD-1 and ROD-2. There have been no changes in the physical conditions or the Site that would affect the protectiveness of the remedy. The ARARs for effluent discharge from the wastewater treatment plant have been met consistently. There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment, and there have been no change to the standardized risk assessment methodology that could affect the protectiveness of the selected remedy. Appropriate institutional controls are in place to prohibit disturbance of the implemented remedy and limit use of the property to prevent the risk of exposure to contaminants managed on the property. There is no other information that calls into question the protectiveness of the selected remedy.

VIII. ISSUES

Table 2 - Issues⁵

Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Complete OU4 RI/FS - The OU4 RI/FS focusing on the FCPS and NFHR needs to be completed to quantify risk to human health and the environment. The fact that the OU4 RI/FS has not been completed does not call into question whether the remedy selected in ROD-1 and ROD-2 is protective; however, EPA is not yet in position to state whether the Site is protective.	N	N

IX. Recommendations and Follow-Up Actions

Table 3 - Recommendations and Follow-Up Actions

Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
					Current	Future
Complete OU4 RI/FS	EPA to work with Olin to complete the ongoing OU4 RI/FS and issue ROD-3	Olin	EPA	9/30/2008	N	N

X. PROTECTIVENESS STATEMENT

The remedy at OU1 is protective of human health and the environment. This interim remedial action was selected to reduce the volume of clean storm water entering Pond 5, a contaminated area, thereby reducing the quantity of contaminated leachate generated. The remedial action objectives have been met.

The remedy at OU2 is protective of human health and the environment. Exposure pathways that could result in unacceptable risks are being controlled. The wastewater treatment plant that was constructed to treat mercury-contaminated leachate exiting Pond 5 has consistently met its performance standards. The remedial action objective has been met.

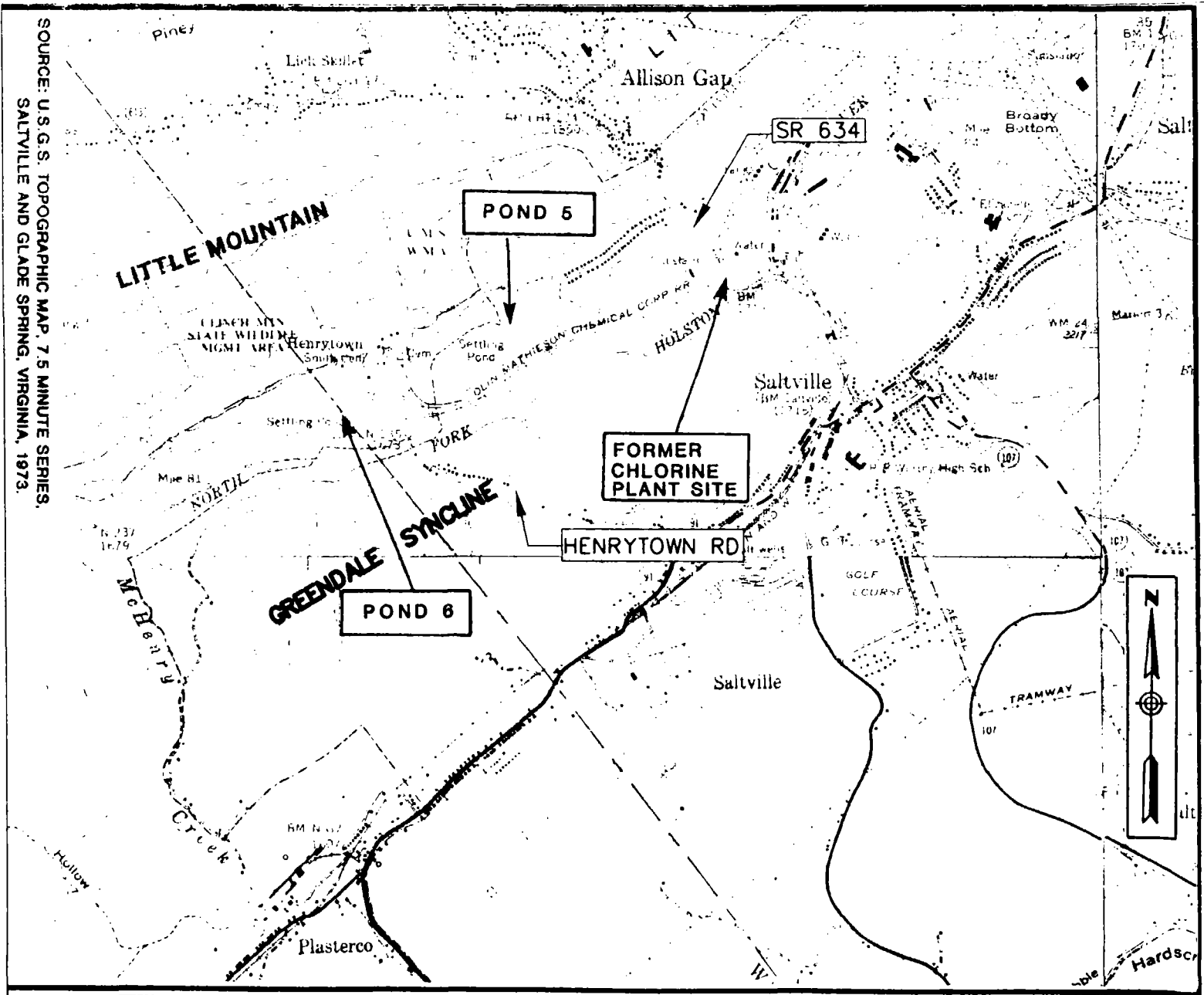
The remedy at OU3 is protective of human health and the environment. Engineering controls have been completed in a manner that: prevent direct contact with disposed wastes; limit the quantity of storm water coming into contact with the disposed wastes, and reduce the volume of

⁵ Note that the issue does not call into question the protectiveness of the remedy once it is complete.

contaminated leachate requiring treatment prior to NFHR discharge. In addition to Pond 5 leachate treatment, Pond 6 leachate is conveyed to the wastewater treatment plant for pH adjustment prior to NFHR discharge. The wastewater treatment plant effluent meets water quality performance standards which are protective of human health and the environment. Institutional controls are in place to prohibit disturbance of the implemented remedy, limit property use, and prevent the risk of exposure to contaminants managed on the property. The remedial action objectives have been met.

XI. NEXT REVIEW

The next five-year review for the Saltville Waste Disposal Ponds Superfund Site will be September 2012, five years from the date of this review.



SOURCE: U.S.G.S. TOPOGRAPHIC MAP, 7.5 MINUTE SERIES, SALTVILLE AND GLADE SPRING, VIRGINIA, 1873.

ATTACHMENT 1

SITE LOCATION MAP

OLIN CORPORATION
FORMER CHLORINE PLANT / RI
SALTVILLE, VA

REV	DATE	BY	DESCRIPTION	CADD	CHK	APP
1	JAN 05	SS				



DESIGN	JRS	01/11/02	SCALE	AS SHOWN	REV	0
CHECK	WAT	01/11/02				
DATE	01/11/02					

ATTACHMENT 2

PONDS 5 AND 6 WATER TREATMENT PLANT

SALTVILLE, VIRGINIA

ANNUAL OPERATING REPORT

2006

Summary:

The year of 2006 was the eleventh full year of operations for Pond 5 and 6 Water Treatment Plant. Plant operations began treating Pond 5 effluent in November 1994. Pond 6 effluent was directed to the Treatment Plant in November 2001. This was the fourth full year of operations since the completion of Pond 5 cap and Pond 6 cover.

Ponds 5 and 6 Treatment Plant operated periodically as needed to treated pond effluents during 2006. Ponds 5 and 6 effluents were treated and discharged on 49 days during 2006. The Treatment Plant treated and discharged 11,555,527 gallons of water to the North Fork Holston River in 2006. All water discharged achieved the OU-2 treatment goal of 3.6 ppb of mercury and a pH range of 6 to 9. The average mercury concentration of the treated water was 0.2 ppb. This is the seventh consecutive year that the average mercury concentrations of the treated effluent averaged less than 1 ppb.

Discussion:

The quantity of water collected from Ponds 5 and 6 dictated the number of days of plant operations during each month. The quantity of water from Pond 5 (which has a impermeable cap) is dependent upon groundwater inflow and drainage due to waste consolidation under the cap. The quantity of water from Pond 6 (with a permeable cover) is dependent upon precipitation. Rainfall in 2006 (45.10 inches) was above normal (43.95 inches – 1982-2005). Historically, Pond 6 flow is high (>100 gpm) in the late winter and early spring and tapers off to less than 5 gpm during the summer and fall.

The Treatment Plant discharged treated water on 49 days in 2006. This is less than the number of days operated during 2005 (104 days). See Table 1. In addition, the plant operated on recycle to the Equalization Basin on a number of other days to minimize plant start-up and shutdown. The longest continuous daily operations (treatment and discharge) occurred during the period of mid-April. The Treatment Plant operated for 8 consecutive days during this period. During this period, the plant treated and discharged 1,828,454 gallons of water. The plant treated and discharged water over eight months in 2006 (January, March through July, September, and November). See Table 1.

Daily treatment rates average 136 gpm, which is similar to the previous years. A total of 11,555,527 gallons of water treated and discharged in 2006. The volume of water treated was less than the annual average (24,457,000 gallons) for the Treatment Plant.

The maximum volume of water treated on any day in 2006 was 287,234 gallons on May 14th. This is an average treatment rate of 199 gallons per minutes.

The performance of the carbon adsorption units throughout the year was exceptional. Mercury concentrations in the treated discharge ranged from non-detectable (<0.2 ppb) to 0.8 ppb. See the attached figure. Mercury concentrations in the treated discharge were less than 1.0 ppb on all 49 days of operation. The average mercury concentration in 2006 was 0.2 ppb. The average mercury concentration in treated water in 2005 was 0.8 ppb. The Treatment Plant has consistently demonstrated it can reduce mercury concentrations in Pond 5 effluent to the low ppb range. The pH of all treated water was within the range of 6 to 9.

Few problems were encountered with plant operations. This is particularly noteworthy since this is a plant designed for the treatment of Pond 5 water. Other carbon treatment systems do not have to handle Pond 5's combination of high chlorides and dissolved solids in the treatment stream. The ease and efficiency of operations can be attributed to a well-designed system and professional operating personnel.

The carbon beds did not require change out during 2006. No serious problems related to technology or process issues were encountered during operations. Minor maintenance issues addressed during 2006 were as follows:

- Build up of calcium solids in the system feed pumps, control valves, and piping was addressed by cleaning or replacement,
- Several sections of process lines required replacement due to corrosion,
- Cleaning and repairing of the pH probes were required periodically,
- Plant piping and equipment were repainted as necessary,
- Pond 6 radio telemetry system was repaired after wind damage,
- The plant air drying system was replaced, and
- Training of backup operator for the Treatment Plant.

Conclusions:

The Pond 5 and 6 Treatment Plant treated and discharged 11,555,527 gallons of water with an average mercury concentration of 0.2 ppb within a pH range of 6 to 9. The twelfth full year of Treatment Plant operations indicated the following:

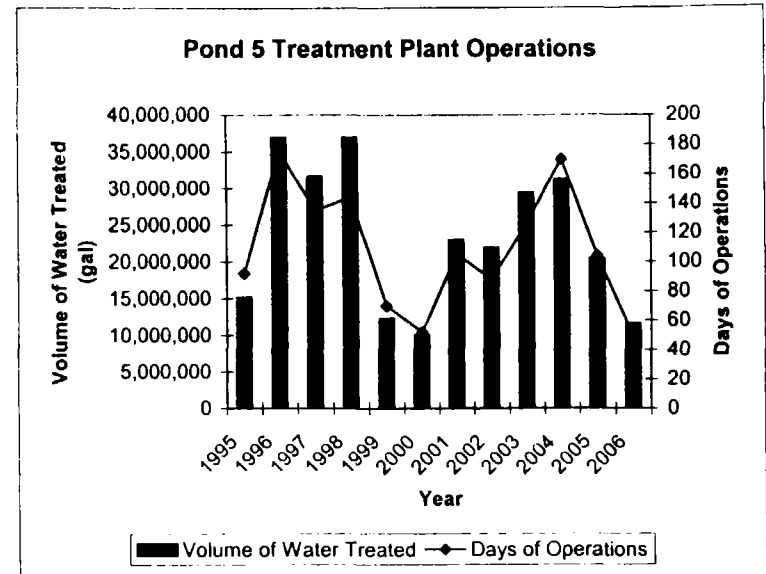
- Reliability of the plant is high.
- The Treatment Plant achieved exceptionally low mercury concentrations in the treated effluent.

- The treated effluent met the designed pH range (6 to 9).

Pond 5 Treatment Plant was able to treat all Pond 5 and Pond 6 effluents and achieve all treatment objectives for mercury concentration and pH.

TABLE 1
POND 5 TREATMENT PLANT OPERATING SUMMARY

Year	Days of Operations with Discharge	Volume (gal) of Water Treated and Discharged	Average Mercury Concentration (ppb) in Discharge	Average Chloride Concentration (ppm) in Discharge	Average Daily Treatment Rate (gpm)
1995	92	15,160,487	1.6	1,106	114
1996	176	36,969,730	1.1	1,750	146
1997	135	31,684,154	2.2	1,146	163
1998	144	36,973,197	1.7	1,239	178
1999	70	12,305,402	1.2	1,066	122
2000	52	10,015,005	0.7	2,065	134
2001	105	23,001,820	0.8	855	152
2002	88	21,874,212	0.5	1,206	173
2003	126	29,358,147	0.2	1,578	162
2004	170	31,260,324	0.5	1,547	123
2005	104	20,423,578	0.8	1,502	136
2006	49	11,555,527	0.2	1800	157
<i>Total</i>	<i>1262</i>	<i>269,026,056</i>			
<i>Average</i>	<i>115</i>	<i>24,456,914</i>	<i>1.0</i>	<i>1405</i>	<i>146</i>



Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
1995	5	19	25	11	6	17	6	0	0	0	0	3	92
1996	20	29	28	22	24	13	5	10	1	5	0	19	176
1997	23	28	30	21	15	9	1	1	0	4	3	0	135
1998	0	17	21	28	31	24	18	1	1	0	3	0	144
1999	7	12	20	15	7	4	0	0	5	0	0	0	70
2000	1	3	5	11	4	4	8	12	0	4	0	0	52
2001	0	2	4	20	5	11	11	27	17	8	0	0	105
2002	10	7	15	30	16	6	0	0	0	0	4	0	88
2003	8	14	23	10	13	11	15	10	8	5	0	9	126
2004	30	29	25	23	15	14	14	5	0	5	0	16	176
2005	8	19	20	27	21	3	0	6	0	0	0	0	104
2006	4	0	6	8	8	6	6	0	6	0	7	0	51
<i>Average</i>	<i>10</i>	<i>15</i>	<i>19</i>	<i>19</i>	<i>14</i>	<i>10</i>	<i>7</i>	<i>6</i>	<i>3</i>	<i>3</i>	<i>1</i>	<i>4</i>	<i>115</i>
<i>Min</i>	<i>0</i>	<i>0</i>	<i>4</i>	<i>8</i>	<i>4</i>	<i>3</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>52</i>
<i>Max</i>	<i>30</i>	<i>29</i>	<i>30</i>	<i>30</i>	<i>31</i>	<i>24</i>	<i>18</i>	<i>27</i>	<i>17</i>	<i>8</i>	<i>7</i>	<i>19</i>	<i>176</i>