Stoller Jericho Chemical Site — August 2007
Adams Run, South Carolina
Proposed Plan for and Amendment to the Record of Decision for OU1 (Groundwater) Dated April 1999

Introduction

This Proposed Plan for Remedial Action includes a proposal to amend the Department's Record or Decision (ROD) for OU1 (Groundwater) dated April 1999. The Department is providing an opportunity for public participation and public comment in accordance with CERCLA Section 117 and Section 300.435 (C) (2)(ii) of the National Contingency Pan (NCP). This Proposed Plan Amendment summarizes and compares the existing remedy with other alternatives. These alternatives were evaluated in detail in the Feasibility Study Update Report dated February 2006 (EarthTech).

Public Participation

A copy of the Feasibility Study Update Report is located in the Information Repository at the Charleston County Public Library.

Charleston County Public Library
68 Calhoun Street
Charleston SC 29401

Hours: Monday – Thursday 9-9
Friday – Saturday 9-6
Sunday 2-5

A Public Meeting is scheduled for Tuesday, September 11, 2007, at 7:00 pm. The meeting will be held at:

EB Ellington Elementary School
5600 Ellington School Road
Ravenel, SC

The Department will also publish a brief description of the proposed amendment to the ROD, information regarding the Public Meeting and the local repository's location of the updated Administrative Record in Charleston's Post and Courier on Monday, September 10, 2007 as well as a posting notice in neighboring businesses and schools.

Site Description and History

The Stoller Chemical Jericho Site (Site) is located at 7747 Highway 17 South in Adams Run, South Carolina, approximately 23 miles southwest of the City of Charleston (see **Figure 1**). The Stoller Facility includes approximately 37 acres. The Site is surrounded

by a residential area to the West, Highway 17 and several residences to the North, and by open fields and wetlands to the South and East. The former processing area, including the warehouse and storage building, is surrounded by a six foot chain link fence to restrict access. **Figure 2** includes a layout of the facility.

For the purposes of this document, the terms on-site and off-site are used to describe locations that correspond to areas within or outside the facility boundaries. However, all proposed remedial actions intended to address releases both on or beyond the facility boundaries from the Stoller Chemical facility are considered on-site, as defined in the NCP.

From 1932 to 1945, the facility was owned and operated as a sawmill by the West Virginia Pulp and Paper Company. From approximately 1945 to 1962, the facility was owned by Southern Coatings and Chemical Company, a predecessor-in-interest to the Georgia Pacific Corporation. Based on a review of available information, including responses to SCDHEC's and the United States Environmental Protection Agency's (EPA) Requests for Information, SCDHEC does not at this time have sufficient reason to believe that contamination from hazardous substances occurred during these periods of ownership and operation.

Later, the facility was owned and operated principally as a fertilizer manufacturing facility by Kerr-McGee Chemical Co. (Kerr-McGee), and Kerr-McGee's predecessor-in-interest, from approximately 1962 until 1978. For a two month period from May 13, 1978 to July 13, 1978, Kerr-McGee as owner, leased the facility to Stoller Chemical Company (Stoller) for the operation of a fertilizer manufacturing facility. From approximately 1978 until 1992, the facility was owned and principally operated as a fertilizer manufacturing facility by Stoller. The Site is currently inactive.

Stoller and Kerr-McGee manufactured, or used, micronutrient fertilizers in their operations. The process converted insoluble dry feedstocks into a granulated material containing minerals that are required in specified trace amounts by agricultural crops. The dry feedstocks were stored in partitioned bins inside the warehouse. The dry feedstocks were acidified with sulfuric acid in a process that produced the granulated material.

From 1972 until 1985, the wastewater from the air scrubber system was discharged to a wastewater impoundment located in the northwest corner of the facility. The sludge removed from the wastewater impoundment was recycled into the feedstock for use in the production process. In 1987, sludge and contaminated soils were removed, the impoundment was backfilled with clean fill, and a low-permeability multi-layer cap was placed over the impoundment.

Previous Response Actions

The Stoller Jericho Working Group (SJWG), a group of potentially responsible parties, entered into a Unilateral Administrative Order with the USEPA in January 1994 for removal response activities. Stoller Jericho Working Group undertook a Removal Action in 1994. The initial steps included a Site-wide assessment of surface soils (RMT, November 1994). Soils and other materials exceeding a clean-up level of 500 mg/kg for lead were then excavated. Additionally, all soil excavation areas were sampled and analyzed for site-related constituents to ensure that industrial risk-based cleanup levels were attained.

A total of 30,000 tons of contaminated soils were excavated, segregated, and stored inside the warehouse. Approximately 15,000 tons of feedstock and product materials were also located in the warehouse in various piles, containers, drums, bags, etc. An inventory of these materials was originally prepared during the removal investigation (RMT, November 1994). The majority of feedstock and product materials (approximately 93 percent) were present in piles located in three-sided bins which were located along the sides of the warehouse. Bagged material consisted primarily of finished products and un-reacted raw materials. Containers generally consisted of products related to property maintenance. Drums were primarily sealed, but not clearly labeled. These drums contained raw materials for use in production of agricultural supplements and materials related to property maintenance. The majority of vats observed were empty, however, five vats contained solids that consisted primarily of iron and zinc.

In July 1996, SCDHEC supervised the excavation of a total of 2,000 tons of pesticide-containing materials. These materials were discovered buried west of the warehouse. The excavated materials were temporarily stored inside three segregated bins at the east end of the warehouse pending further characterization and disposal.

On February 28, 1997, the Stoller-Jericho Working Group (SJWG) entered into an Administrative Consent Agreement with the Department in which the SJWG agreed to fund response activities outlined in the Response Action Record of Decision and as well as reimburse the Department's past response costs and other costs associated with the Site.

SCDHEC conducted a detailed evaluation of potential response alternatives for the feedstock and excavated materials stored in the warehouse. The Response Action Record of Decision (SCDHEC, November 1997) presented a summary of the evaluation and selection criteria. The response alternative selected consisted of on-site treatment and solidification of the metals-containing soils and feedstock materials and long-term encapsulation within a RCRA-equivalent land vault. Construction of the land vault and retention basin was completed in April 1998 (Earth Tech, February 1999). The vault was constructed on the western portion of the facility and includes a clay and synthetic liner, leachate collection system, and a cap. Stabilization of approximately 43,000 tons of soils, feedstocks, and products was completed in August 1998.

In June 1998, the Department completed a Remedial Investigation to determine the nature and extent of groundwater, surface water, and sediment contamination. After a public meeting and a 30-day comment period, the Department issued the ROD for OU1 (Groundwater) in April 1999.

Existing Groundwater Remedy as Outlined in the April 1999 ROD

The Record of Decision selected a pump and treat system to address groundwater at the Site. However, prior to construction, the Department agreed to implement a scaled down version of the pump and treat system while concurrently implementing studies of in-situ remedies that could potentially be as technically effective and significantly more cost effective. The scaled back system, referred to as the Interim Groundwater Treatment System or IGWTS, was constructed such that it would control the downgradient migration of contamination while remediating the most contaminated portion of the surficial aquifer. Construction of the IGWTS began in March 2001.

The IGWTS process consists of:

- Extraction of groundwater from the most contaminated area (or "hot spot");
- Treatment of the groundwater; and
- Injection of the treated groundwater upgradient of the extraction trenches.

This system extracts approximately 15 gallons of contaminated groundwater per minute (GPM) from two horizontal recovery trenches. The extracted groundwater is pumped to the treatment system for treatment. Soluble metals are precipitated from groundwater by raising the pH and by the addition of chemical flocculant aids. Precipitated metals are separated from the groundwater using a membrane filtration system. Metals are then dewatered into a sludge using a plate and frame filter press. Groundwater leaving the membrane system is injected back into the aquifer upgradient of the extraction trenches. The IGWTS has significantly reduced the concentrations of contaminants of concern (COCs) in groundwater (Earth Tech, November 2005a) and has helped control contaminant migration. A process flow diagram of the IGWTS is presented on **Figure 3.** **Figure 4** illustrates the reduction of the cadmium plume from 1998 to 2005 as a result of the operation of the IGWTS.

Justification for Modification of Existing Remedy

The existing interim groundwater treatment system has been effective in the area in which it was implemented. Downgradient wells continue to show decreases in contamination and the area of contamination is being contained. However, the system was not designed to address contamination on the North side of Highway 17 that requires remediation to meet cleanup goals for groundwater and surface water and to be protective of Caw Caw Swamp. Concurrent with implementation of the IGWTS, the Department and a second group of settling parties (the Ravenel Site Group or RSG) performed several

treatability studies in an effort to identify a more effective and less costly alternative for site-wide groundwater cleanup.

Summary of Additional Remedial Alternatives Considered

The RSG evaluated an alternative that proposed the construction of an upgradient trench containing limestone and/or calcium polysulfide. The purpose of the trench would be to create conditions that would raise the pH in the groundwater and cause the dissolved metals to be removed from the aqueous phase. The Department had concerns that this alternative would clog the aquifer and permanently impact the ability to cleanup the groundwater contamination. The clogging issue was never resolved and further studies were not completed. The Department decided not to consider this option any further.

The Department conducted a pilot study of a sulfate reducing bioreactor ("SRBR") that uses a certain bacteria to help remove dissolved metals from groundwater. The pilot study results indicate that this technology would be effective in remediating the groundwater at the Site (Table 1). More detail on this alternative is found below in the discussion of Alternative 5. Based on the pilot study results, the Department performed a Feasibility Study Update (EarthTech 2006) that compared five alternatives, including: 1) No Action, 2) Monitored Natural Attenuation, 3) Groundwater Extraction, Treatment, and Reinjection, 4) In-Situ SRBR, and 5) Groundwater Extraction, Treatment, and Reinjection in Combination with In-situ SRBR.

Detailed Discussion of Remedial Alternatives

Alternative 1: No Further Action

The no action alternative is required by the National Contingency Plan. For the Stoller Site, this alternative is more correctly referred to as the No Further Action (NFA) alternative since active remediation of the Unit I aquifer has been ongoing since March 2001. Alternative 1 would include no further action beyond the remedial steps that have already been completed. The No Further Action Alternative does not include monitoring to verify any reduction in chemicals of concern concentrations through natural processes.

Alternative 2: Monitored Natural Attenuation

Alternative 2 consists of monitoring Unit 1 groundwater to verify concentration reductions of the COCs. Alternative 2 relies solely on natural attenuation mechanisms to reduce metal constituent concentrations. Monitored natural attenuation (MNA) is similar to NFA except periodic monitoring is conducted to verify the reduction of metals concentrations over time.

Alternative 3: Groundwater Extraction, Treatment, and Reinjection (Selected Alternative in the 1999 ROD)

Alternative 3 would remediate the groundwater by upgrading and expanding the existing IGWTS. The existing extraction and reinjection system south of Highway 17 would be kept in place to remediate the remaining on-site groundwater plume. The existing ex-situ treatment equipment would be upgraded or replaced in order to remain in service for the duration of the project. However, as can be seen in **Figure 5**, a significant portion of the plume has already migrated off-site and would not be removed for treatment via the existing extraction trenches. Therefore, new groundwater interceptor trenches would be installed north of Highway 17 to capture the majority of the groundwater exceeding the remedial goals. As a cost saving measure, the less concentrated portion of the plumes would be remediated via monitored natural attenuation. The primary means of natural attenuation are dispersion and retardation, resulting in reduced metals concentrations reaching offsite areas such as Caw Caw Swamp. Based on modeling results, the combined extraction rate from the extraction trenches under Alternative 3 would be 23 gpm.

Extracted groundwater from Unit 1 would be treated according to the required discharge limits for reinjection via existing injection trenches. The injection trenches are located upgradient of the impacted area to assist in flushing the area under the Petromat Cap and thereby potentially expediting the remediation process. The current Underground Injection Control permit discharge limits for the existing IGWTS are listed below and are the basis of the treatment system proposed in this alternative.

UIC Permit Discharge Limits (mg/L)	
Aluminum	16.9
Arsenic	0.05
Barium	2
Beryllium	0.05
Cadmium	0.01
Chromium	0.1
Copper	0.5
Iron	10
Lead	0.05
Manganese	5
Nickel	0.1
Selenium	0.05
Silver	0.1
Thallium	0.05
Zinc	5

The estimated present worth cost for this alternative is $7, 772,731.

Alternative 4: In-Situ Sulfate Reducing Bioreactor

SCDHEC contracted with Earth Tech in June of 2004 to evaluate a passive in-situ treatment system. Earth Tech performed a pilot test of a sulfate reducing bioreactor (SRBR) installed as an in-situ passive permeable reactive barrier (PRB) wall. The purpose of the study was to evaluate SRBR performance in removing metals contamination in shallow groundwater at the Stoller Site. Sulfate reduction facilitated by the bacteria *desulfovibrio* was shown to effectively treat the acidic, metals impacted groundwater at the Stoller site. A summary of the result of these studies can be found in the pilot study final report (Earth Tech, October 2005).

The sulfate reducing bacteria (SRB) remove metals from groundwater by reducing sulfate to sulfides which then combine with the soluble metals to form insoluble compounds (e.g., CdS, ZnS). A substrate media, a carbon source, and anaerobic conditions are necessary for the SRB to flourish. During the field pilot study, in order to create these conditions in the groundwater, a trench was installed and filled with a substrate of organic matter (saw dust, wood chips, hay and horse manure). The decomposition of the organic matter created the anaerobic conditions, the wood and hay provided the carbon source, and the horse manure provided the initial *desulfovibrio* bacteria seed population. The trench serves as a bioreactor for the groundwater to flow through, allowing the bacteria to react with the sulfates in the groundwater. Consequently, it is referred to as a sulfate reducing bacteria bioreactor (SRBR).

SRBRs can be applied in a number of different contaminated water situations. While most passive treatment systems offer simplicity of design and operation and economic advantages over active/chemical treatment, SRBRs have advantages worth considering. These include:

- No aluminum plugging
- Can easily handle low flow net acidic water or high flow net alkaline water
- Use waste organic materials
- Resilient to loading and climate variations
- Consume sulfate; capable of treating selenium and uranium
- Generates net alkalinity in effluent
- Burial can minimize vandalism

During the Pilot Study, metals concentrations in the SRBR decreased by several orders of magnitude compared to up-gradient values (Earth Tech, October 2005). Due to the successful pilot testing program, SCDHEC requested that the SRBR technology be evaluated as a site-wide treatment alternative in an update to the FS.

Alternative 4 consists of the treatment of Unit 1 groundwater containing the highest concentrations of COCs using in-situ SRBR, constructed as PRB walls (trenches). The proposed SRBR trenches will be located both north and south of Highway 17. The location and size of the proposed SRBR trenches are illustrated on **Figure 6**. The modeling also evaluated the design life of the SRBR trenches that would be required to assure that groundwater exceeding MCLs will not impact offsite areas such as Caw Caw Swamp.

As a cost saving measure, the less concentrated portion of the plumes would be remediated via monitored natural attenuation. The primary means of natural attenuation are dispersion and retardation, resulting in reduced metals concentrations reaching offsite areas such as Caw Caw Swamp. The present worth cost of this alternative is estimated to be $3,325,912.

Alternative 5: Groundwater Extraction, Treatment, Reinjection in Combination with In-situ SRBR

Alternative 5 would remediate the groundwater via a combination of the existing IGWTS and the SRBR technology. The existing extraction and reinjection system would remain in place to remediate the remaining on-site groundwater plume. The existing ex-situ treatment equipment would be upgraded or replaced in order to remain in service for the duration of the project. In addition, a SRBR trench would be installed north of Highway 17 to address the majority of the plume that has already migrated off-site. As a cost saving measure, the less concentrated portion of the plumes would be remediated via monitored natural attenuation. The primary means of natural attenuation are dispersion and retardation, resulting in reduced metals concentrations reaching Caw Caw Swamp.

Detailed Evaluation of Alternatives

The criteria for evaluating the remedial alternatives are:

1. Overall Protection of Human Health and the Environment
2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)
3. Long-term Effectiveness and Permanence
4. Reduction of Contaminant Toxicity, Mobility, or Volume Trough Treatment
5. Short-term Effectiveness
6. Implementability
7. Cost
8. Community Acceptance

Overall Protection of Human Health and the Environment

Under current conditions, there is no known on-site or off-site use of Unit 1 groundwater in the site vicinity. However, there is no public water supply in the area and potential future use of the groundwater from Unit 1 is possible. The IGWTS has made considerable progress in remediating the Unit 1 aquifer. However, under Alternatives 1 and 2, the IGWTS would be shutdown and migration of COCs above MCLs to off-site areas would continue. Additionally no groundwater monitoring is included under Alternative 1 to verify further reductions in metal concentrations over time. Therefore, protection of human health and the environment cannot be guaranteed under Alternative 1.

Alternatives 2, 3, 4 and 5 include Site reconnaissance as part of the groundwater monitoring program which could be used to evaluate potential receptors in the migration pathway of COCs. Property owners within the migration pathway would be notified and discouraged from utilizing groundwater from Unit 1 for potable purposes. Additional institutional controls, such as deed restrictions, may be required to ensure wells are not installed in the future.

Alternative 3 consists of extraction of the groundwater containing the highest concentration of metals and acidity and would reduce the future potential hazards to human health and the environment at the Site. Natural attenuation mechanisms would reduce the concentration of metal residuals and thereby reduce potential future risk to off-site areas such as Caw Caw Swamp.

Under Alternative 3, on-site migration control of COCs is included and, therefore, further migration of impacted groundwater to off-site areas will be mitigated. Additionally, impacted groundwater north of the Site, across Highway 17, will also be captured, reducing further discharge of COCs to both North Creek and Caw Caw Swamp. The monitoring included under Alternative 3 would be used to evaluate the performance of the remedial alternative and potential impacts to ecological receptors in the future.

Alternative 4 consists of the treatment of Unit 1 groundwater containing the highest concentrations of COCs using in-situ SRBR, constructed as PRB walls (trenches). The proposed SRBR trenches will be located both north and south of Highway 17. The location and size of the proposed SRBR trenches are illustrated on **Figure 6**.

The location, length, and depth of the SRBR trenches under this alternative are based on the results of the SRBR Field Scale Pilot Study and groundwater modeling. The modeling also evaluated the design life of the SRBR trenches that would be required to assure that groundwater exceeding MCLs will not impact Caw Caw Swamp.

In-situ treatment of the groundwater from the Unit 1 aquifer containing metals in excess of their respective MCLs would reduce the concentrations of metal residuals in

groundwater and, therefore, the future potential noncarcinogenic hazards to human health and the environment at the Site. Under Alternative 4, on-site migration control of COCs is included and, therefore further migration of impacted groundwater to off-site areas will be mitigated. Additionally, impacted groundwater north of Highway 17 will be intercepted and treated, reducing further discharge to both North Creek and Caw Caw Swamp. The monitoring included under Alternative 4 would be used to evaluate the performance of the remedial alterative and potential impacts to ecological receptors in the future.

Under Alternative 5, on-site migration control of COCs is included and, therefore, further migration of impacted groundwater to off-site areas will be mitigated. Additionally, impacted groundwater north of the Site, across Highway 17 will also be treated, further reducing discharge to both North Creek and Caw Caw Swamp. Monitoring included under Alternative 5 would be used to evaluate the performance of the remedial alternative and potential impacts to ecological receptors in the future.

Alternatives 1 and 2 are least effective with respect to overall protection of human health and the environment. Alternatives 3, 4, and 5 are comparable with respect to overall protection of human health and the environment.

Compliance with ARARs

Chemical-Specific

The chemical-specific ARARs identified for the Unit 1 groundwater are MCLs. Under current conditions, certain constituents identified in **Table 1** exceed their respective MCLs. Alternatives 1 and 2 would not comply with ARARs.

Alternative 3 addresses a portion of the exceedances both on-site and off-site through an engineered active extraction and treatment system. **Figure 5** shows cadmium in excess of the MCL does not reach Caw Caw Swamp during the active period of treatment (30 years).

Based on groundwater extraction modeling conducted for this alternative in the 1998 FS, extracting groundwater near the on-Site wetland area would cause drawdown of the water table underlying the wetland. These effects, however, were minimized during construction of the IGWTS by placing a liner on the down-gradient side of the eastern leg of the extraction trench. Potential impacts to the wetlands have been monitored during operation of the IGWTS.

Construction of interceptor trenches on the wetlands area could disrupt current environmental conditions. Therefore, protective measures would be necessary to protect the wetlands area during construction of the interceptor trenches. Work within the wetlands will require compliance with Nationwide Permit No. 38.

Alternative 4 addresses a portion of the exceedances both on-site and off-site through an engineered passive treatment system. **Figure 6** shows cadmium in excess of the MCL does not reach Caw Caw Swamp during the active period of treatment (30 years).

Construction of SRBR trenches near the on-site wetlands area could disrupt current environmental conditions. Therefore, protective measures would be necessary to protect the wetlands area during construction. Work within the wetlands will require compliance with Nationwide Permit No. 38.

Alternative 5 would meet ARARs in a manner similar to Alternatives 3 and 4. Alternatives 3, 4, and 5 are comparable with respect to ARARs.

Long-Term Effectiveness and Permanence

The magnitude of residual risk under Alternatives 1 and 2 would reduce over time through intrinsic remediation. Under Alternative 1, no long-term monitoring would be performed to verify the reliability of this alternative, nor would any further controls be involved to adequately ensure COC migration control or that any human or environmental exposures are within acceptable levels. Alternative 2 would include monitoring to verify the long-term reliability of this alternative.

Alternative 3 requires 30 years of active extraction and treatment of groundwater containing the highest concentrations of metal constituents both on-site and off-site. Groundwater modeling of this alternative indicates that 30 years of active extraction/treatment and reinjection will reduce the mass of metals constituents adequately to prevent groundwater exceeding MCLs from reaching Caw Caw Swamp. In addition to active remedial efforts, monitored natural attenuation will be employed in areas of the Unit 1 groundwater where the engineered extraction system does not provide groundwater capture. The performance monitoring under this alternative would adequately address the overall performance of the extraction/treatment/reinjection system and the effect of the natural attenuation mechanisms.

Alternative 4 requires 30 years of active in-situ treatment off-site and on-site of groundwater containing the highest concentrations of metal constituents. Groundwater modeling of this alternative indicates that 30 years of active remedial efforts will reduce the mass of metals constituents adequately to prevent groundwater exceeding MCLs from reaching Caw Caw Swamp. In addition to active remedial efforts, monitored natural attenuation will be employed where impacted groundwater is not being addressed via active remedial efforts. The performance monitoring under this alternative would adequately address the overall performance of the SRBR trenches and the effect of the natural attenuation mechanisms.

Alternative 5 would provide adequate and reliable controls similar to Alternative 3 and 4 to ensure long-term effectiveness and permanence.

Aalternatives 3, 4, and 5 are comparable with respect to Long-Term Effectiveness.

Reduction of Contaminant Toxicity, Mobility, or Volume through Treatment

Alternatives 1 and 2 would not provide any further active treatment system to reduce the toxicity, mobility, or volume of metals in Site groundwater. Further reductions in metal concentrations through natural attenuation would be the only mechanism to reduce the volume of metals over time. Alternatives 1 and 2 do not satisfy the statutory preference for treatment for remedial alternatives.

Alternative 3 includes the extraction and treatment of the highest concentrations of metals and acidity, which would reduce the volume of impacted groundwater. **Figure 5** depicts the overall areal extent of cadmium in Unit 1 in a 30 year time frame.

Alternative 4 includes in-situ treatment of metal constituents in excess of MCLs, which would reduce the volume of impacted groundwater. **Figure 6** depicts the overall areal extent of cadmium in Unit 1 in a 30 year time frame.

Alternative 5 would reduce Toxicity, Mobility, and Volume through treatment in a manner similar to that of Alternatives 3 and 4. Figure 7 depicts the overall areal extent of cadmium in Unit 1 in a 30 year time frame.

Alternatives 3, 4 and 5 are comparable with respect to Reduction of Toxicity, Mobility or Volume of contaminants.

Short-Term Effectiveness

Alternatives 1 and 2 would not involve any new construction activities that would endanger members of the public, remedial workers, or adversely impact the environment.

Construction activities under Alternative 3 would include the installation of an extraction trench, upgrades to the existing treatment system, and a new building for the treatment system. With the use of qualified and experienced contractors and adherence to a project Health and Safety Plan, construction should pose only minimal risk to remedial workers or the community. Disruption of current environmental conditions through construction of the extraction trench could occur, although precautions to protect the on-site wetland area would be followed.

Construction activities under Alternative 4 would include the installation of the SRBR trenches and decommissioning of the existing IGWTS. With the use of qualified and experienced contractors and adherence to a project Health and Safety Plan, construction would pose minimal potential risks to remedial workers or the community. Disruption of current environmental conditions through construction of the SRBR trenches could occur, although these would be temporary and precautions would be followed, as necessary.

The Short Term Effectiveness of Alternative 5 is similar to that described in Alternatives 3 and 4. Alternatives 3, 4, and 5 are comparable with respect to Short Term Effectiveness.

Implementability

Alternatives 1 and 2 would be readily implementable, since no new construction is required. These alternatives would not add additional improvements that may interfere with the implementation of future remedial actions, if necessary.

Alternative 3 would be implementable, using readily available materials, equipment, and supplies. The time required to complete construction activities is estimated to be 6 months after approval of the final design and mobilization to the field.

Continued monitoring of groundwater and surface water/sediments at North Creek and Caw Caw Swamp should be adequate to evaluate the performance of the remedial system and for the future protection of human and ecological receptors for Alternatives 3, 4, and 5.

Alternatives 3, 4, and 5 are comparable with respect to Implementability.

Cost

The estimated present worth cost for Alternative 1 is $396,620. This cost includes a review of the remedy every five years for a 30-year period. There are no operation and maintenance costs associated with this alternative.

The estimated present worth cost for Alternative 2 is $1,013,287. Costs include installation of five additional monitoring wells, periodic sampling, performance and receptor evaluations, and a five-year remedy review for 30 years.

The estimated present worth cost for Alternative 3 is $7,772,731. Capital costs include construction of the extraction trench north of Highway 17, upgrades to the existing treatment system, and a new building for the treatment system. Operation and maintenance costs include 20 years for utilities, repairs, sludge disposal, chemicals, a site operator and 30 years for sampling and analysis, reporting and remedy reviews

The estimated present worth cost for Alternative 4 is $3,325,912. Capital costs include the SRBR trenches to treat the highest concentrations of metal constituents for a period of 30 years and decommissioning of the existing IGWTS. Operation and maintenance costs include 30 years of sampling and analysis, reporting, and remedy review.

The estimated present worth cost for Alternative 5 is $7,644,115. Costs include upgrades to the existing treatment system, a new enclosure for the treatment system, and SRBR trench designed for 30 years of performance. Operation and maintenance costs include

20 years of power consumption, a site operator, and 30 years of sampling and analysis, and remedy review.

Preferred Alternative

The Department's preferred alternative is Alternative 4 (the SRBR remedy). This remedy is Protective of Human Health and the Environment, complies with all ARARs, is Long Term Effective, will reduce the toxicity, mobility and volume of contamination, is short-term effective, is easily implementable, and is cost-effective. This Remedy complies with Section 121(c) of CERCLA and is not inconsistent with the National Contingency Plan. Furthermore, this remedy is much more cost effective when compared with Alternatives 3, 4, and 5. After evaluating comments received during the public comment period, the Department will select a final remedial alternative for OU1 (Groundwater) and amend the existing Record of Decision. The ROD Amendment will be included in the Administrative Record and will be available at the Charleston County Public Library.

Community Acceptance

This notice marks the start of a public comment period, which will end on October 11, 2007. The Department encourages your suggestions on the proposed amendment to the Record of Decision. Please submit all comments to:

Lucas Berresford, Project Manager
2600 Bull Street
Columbia SC 29201
Phone (803)896-4071
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TABLE 1

Table 2-4
Comparison of Groundwater Monitoring Results to USEPA Drinking Water MCLs/UIC Permit Limits
Interim Groundwater Treatment System
Stoller Chemical Jericho Site

				Upgradient of Capture Zone		In Capture Zone						Downgradient of Capture Zone			
Analyte	Drinking Water Stds MCLs (1)		UIC Permit Limit	Upgradient		Monitoring Well Network						Monitoring Well Network			
	Primary	Secondary		MW-36	MW-35	MW-6	MW-18	MW-34	MW-45	PW-46	MW-47	MW-14	MW-40	MW-32R	MW-12
				06/09/05	06/08/05	06/09/05	06/09/05	06/09/05	06/09/05	06/09/05	06/09/05	06/09/05	06/09/05	07/11/05	07/11/05
Aluminum	-	0.05	16.9	<0.02	1.6	0.12	180	0.22	31	100	0.21	60	12	7.8	73
Antimony	-	-	NA	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0028	<0.005	<0.005	<0.005	NA	NA
Arsenic	0.05	-	0.05	<0.005	<0.005	0.026	0.028	0.062	0.037	0.018	0.022	0.005	<0.005	NA	NA
Barium	2.0	-	2.0	0.088	0.069	<0.025	<0.025	0.06	<0.025	<0.025	<0.025	0.019	0.031	NA	NA
Beryllium	0.004	-	0.05	<0.004	<0.004	<0.0004	0.013	<0.004	0.0031	0.0054	<0.004	0.0043	0.0012	NA	NA
Cadmium	0.005	-	0.01	<0.002	<0.002	0.049	0.14	0.0038	0.012	0.37	0.03	0.35	0.022	0.98	0.5
Chromium	0.1	-	0.1	<0.005	<0.005	<0.005	0.1	0.004	0.0067	0.013	<0.005	0.014	0.0025	<0.005	<0.002
Copper	-	1.0	0.5	<0.005	<0.005	<0.005	2.3	0.0021	0.03	1.4	0.014	5.3	0.092	0.036	1.9
Iron	-	0.3	10	<0.1	<0.1	15	96	4	48	77	2.5	56	5.7	20	36
Lead	0.015	-	0.05	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0035	<0.003	NA	NA
Manganese	-	0.05	5.0	5.4	2.1	0.51	13	4.9	8.4	14	2.6	23	2	38	24
Mercury	0.0002	-	0.0005	<0.0001	0.22	0.00012	0.00029	<0.0001	0.0001	<0.0001	0.0001	0.00013	<0.0001	NA	NA
Nickel	0.1	-	0.1	<0.04	<0.04	0.015	0.45	0.078	0.2	0.42	0.023	0.5	0.078	0.87	0.5
Selenium	0.05	-	0.05	<0.005	<0.005	<0.005	0.0028	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA	NA
Silver	-	0.1	0.1	0.00059	<0.005	0.00051	0.0055	0.0014	0.0033	0.0052	0.00043	0.0045	0.00084	NA	NA
Vanadium	-	-	NA	<0.05	<0.05	<0.05	0.26	<0.05	0.044	0.096	<0.05	0.065	0.016	NA	NA
Zinc	-	5	5	<0.02	0.62	8.2	27	8.6	29	40	22	53	2.5	130	71

Units = mg/L

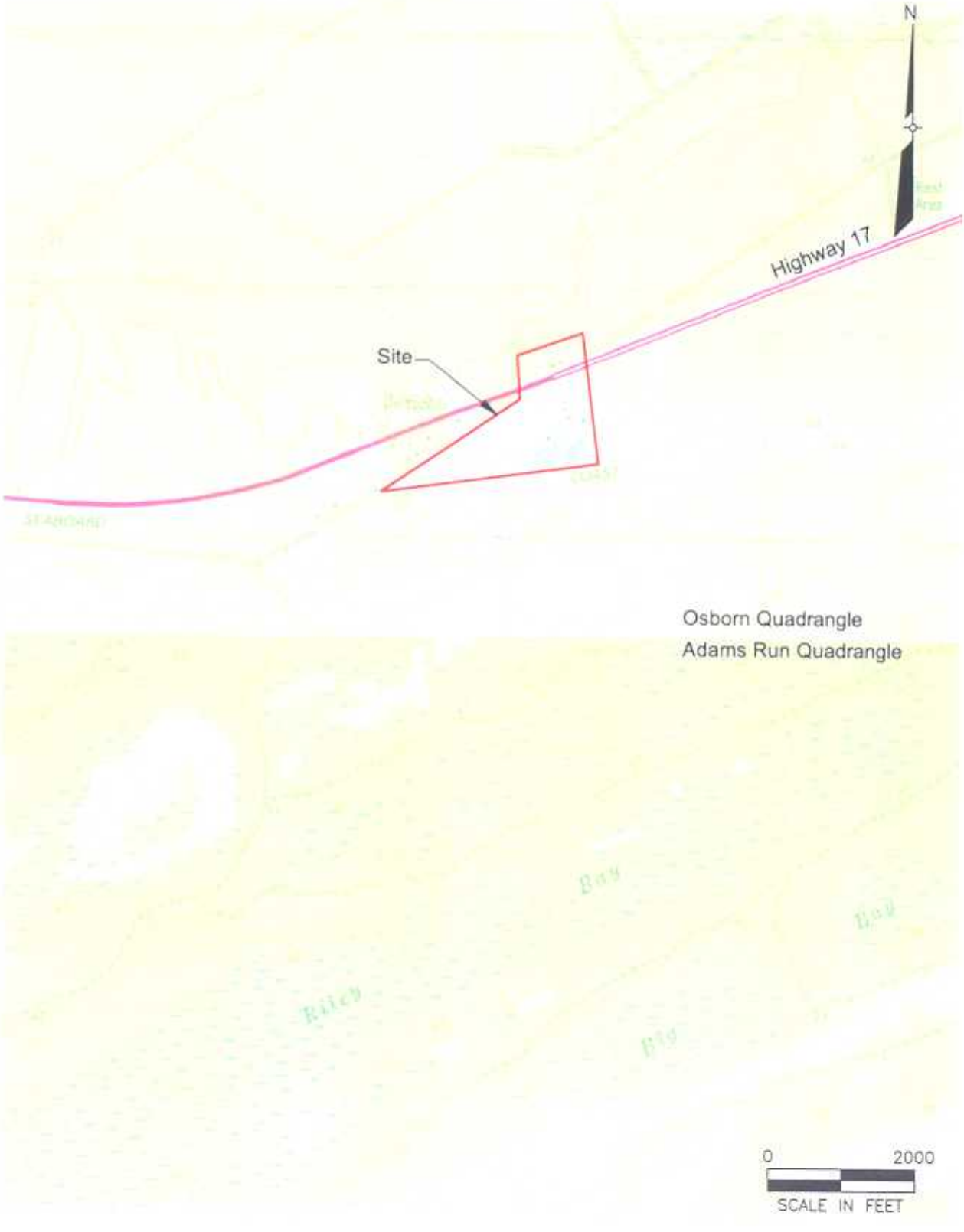
(1) Ref: R61-58.5 titled, The Maximum Contaminant Levels in Drinking Water

Bold Font indicates exceedence of MCLs

Blue shading indicates exceedence of UIC Permit Discharge Limits

NA = Not Analyzed

FIGURE 1



EarthTech
A tyco International Ltd. Company

FIGURE 2-1
SITE LOCATION MAP

STOLLER CHEMICAL SITE
JERICHO, SOUTH CAROLINA

JANUARY 2006

89606.03

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