South Carolina Department of Health and Environmental Control

Proposed Plan for Site Remediation

SCE&G Hauser Street Former MGP Site

131 Hauser Street, Sumter, South Carolina

July 2011

ANNOUNCEMENT OF PROPOSED PLAN

The South Carolina Department of Health and Environmental Control (DHEC or the Department) recently completed an evaluation of cleanup alternatives to address groundwater and soil contamination at the Hauser Street Former Manufactured Gas Plant (MGP) Site (the Site) in Sumter, South Carolina. This Proposed Plan identifies the Preferred Alternative for cleaning up the contaminated soil and groundwater and provides the reasoning for this preference. In addition, this Plan includes summaries of other cleanup alternatives evaluated. These alternatives were identified based on information gathered during environmental investigations conducted by SCE&G pursuant to Voluntary Cleanup Contract 98-5343-RP, dated September 1998, between SCE&G and the Department.

The Department is presenting this Proposed Plan to inform the public of our activities and to gain your input. This Proposed Plan summarizes information that can be found in greater detail in the Focused Feasibility Study (FFS) report dated December 10, 2010 and other documents contained in the Administrative Record file. The Department encourages the public to review these documents to gain a comprehensive understanding of the Site and activities that have been conducted.

The Department will select a final remedy after reviewing and considering comments submitted during the 30-day public comment period. The Department may modify the Preferred Alternative or select another response action presented in this Plan based on new information or public comments.

DHEC's Preferred Cleanup Summary

Groundwater Cleanup: DHEC's preferred groundwater remedial alternative, Alternative 5. This option involves cleanup of the impacted groundwater using a combination of the following:

- Enhancing the natural breakdown process by injecting a compound into the ground to stimulate the breakdown of contaminants in the shallow zone.
- The deep zone will be chemically treated using a compound to chemically breakdown contaminants
- Groundwater monitoring.

MARK YOUR CALENDAR

❑ PUBLIC MEETING:

When: July 25, 2011, from 6:00 PM – 7:30 PM
Where: **Sumter County Library**
111 North Harvin Street
Sumter, South Carolina

DHEC will hold a meeting to explain the Proposed Plan and all of the alternatives presented in the Feasibility Study. After the Proposed Plan presentation, DHEC will respond to your questions. Also, oral and written comments will also be accepted at the meeting.

❑ PUBLIC COMMENT PERIOD:

DHEC will accept written comments on the Proposed Plan during the public comment period until August 24, 2011. Submit your written comments to:

Lucas Berresford, Project Manager
DHEC-L&WM
2600 Bull St.
Columbia, SC 29201
berresjl@dhec.sc.gov

❑ FOR MORE INFORMATION:

Call: **Lucas Berresford,** Project Manager, 803-896-4071

See: DHEC's website at:
www.dhec.sc.gov/environment/lwm/public_notice.asp
View: The Administrative Record at the following locations:

- Sumter County Library
  111 North Harvin Street
  Sumter, South Carolina

- DHEC's Bureau of Land & Waste Management
  8911 Farrow Road - Columbia, SC
  Contact: Freedom of Information Office: (803) 898-3817
  Hours: Monday - Friday: 8:30a.m. - 5:00p.m.

SITE HISTORY

The Hauser Street Site is the location of a former Manufactured Gas Plant (MGP), an industrial facility where gas was produced by heating coal. The gas was stored on-site after production, and then piped to the surrounding areas for use. This former MGP operated from approximately 1910 to the late 1950s. Structures that were typically present at MGP locations included boiler houses, retorts, purifiers, tar vessels and gas holders. The site currently provides warehouse and office space for SCANA's gas operations serving the Sumter area. Properties surrounding the site include a mix of industrial, residential and undeveloped properties. Turkey Creek, located approximately 1,000 feet to the east, is the nearest surface water to the Site.

SCE&G entered into a Remedial Action Plan Contract (No. 98-5343-RP) for the Hauser Street Site with SCDHEC in September 1998. Investigation activities were presented in a Remedial Investigation Report. Based on the nature and extent of impacts at the Hauser Street Site the Department determined that an Interim Removal Action should be conducted to remove contaminated soil and former gas plant structures. Two phases of removal was conducted to complete the removal action. The first was on SCE&G Property and the second was in the right of way and under Hauser Street.

Approximately 7,600 tons of material (soil and debris) were excavated and disposed off-site during the IRA activities (Phases I and II), at a cost of approximately $1.2 million.

Groundwater monitoring was conducted before and after the removal action. After the removal action a new well was placed near the former tar vat area. Based on groundwater concentrations around the former tar vat area it was determined that additional action was needed. The purpose of the proposed remedy is to address the tar vat area as well as improve groundwater quality.

The groundwater and soil data was evaluated in a Focused Feasibility Study (FFS). The FFS uses the information collected during the Remedial Investigation and associated studies to develop and evaluate potential remedial alternatives and their overall protection of human health and the environment. Both soils and groundwater were considered in the FFS.

SITE CHARACTERISTICS

Sources

Investigations show that the tar vat area is the main remaining source of contamination at the site. The coal tar in this area is primarily sparsely distributed blebs or residual scattered contamination. The extent of contamination is limited to approximately 9-15 feet in soil and 18-39 feet in groundwater with approximate dimensions of 25 feet by 40 feet.

Groundwater

A monitoring well network was installed to characterize groundwater quality following implementation of the Phase I and Phase II IRA activities. Consistent with typical former MGP sites, the constituents of concern include volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). The specific VOCs include benzene, toluene, ethylbenzene and xylenes (BTEX), and specific SVOCs include a number of polynuclear aromatic hydrocarbons (PAHs).

SCOPE AND ROLE OF THE ACTION

This action is intended to be the final cleanup action for the Site. The remedial action objectives include preventing exposure to contaminated media through the treatment of soil and groundwater at the Site.

SUMMARY OF SITE RISKS

The area adjacent to the Site is zoned for industrial, commercial, and residential usage. The affected aquifer is a potential underground drinking water source. The primary exposure route would be contact or ingestion of affected groundwater containing contamination. Public water is available in this area, and seems to be used by the residents in the area.

It is the Department's current judgment that the Preferred Alternative identified in this Proposed Plan, or one of the other active measures considered in the Proposed Plan, is necessary to protect public health or the environment from actual or threatened releases of hazardous substances. Based on information collected during the previous investigations, a Focused Feasibility Study (FFS) was conducted to identify, develop, and evaluate cleanup options and remedial alternatives.

REMEDIAL ACTION OBJECTIVES

The remedial action objectives for the development and evaluation of alternatives for the Site are to treat and/or remove DNAPL and source material to the maximum extent practicable (DNAPL and source material removal has been achieved by the two IRA activities); and to address aqueous constituents to achieve Maximum Contaminant Levels (MCLs) for groundwater.

SUMMARY OF REMEDIAL ALTERNATIVES

Alternative 1 – No Further Action

The no further action alternative provides a baseline for comparison with the other alternatives, and is included in the evaluation for consistency with the EPA guidance. No active remediation would occur beyond the IRA activities already completed at the site. Routine groundwater monitoring would not be implemented under this alternative.

The no further action alternative would not impact current land uses or expected future land uses at the site, other than the need to properly abandon existing wells if their locations interfere with future land uses. Groundwater quality would not be effected other than through natural attenuation, which would not be monitored. The groundwater remedial goals would not be addressed with this alternative. Since no action is being conducted the net present worth of this alternative is $0.

Alternative 2 – Monitored Natural Attenuation

This Alternative would involve monitoring the natural attenuation of constituents in groundwater. Given the relatively low level of impact that remains, natural attenuation would be monitored with existing wells using constituent concentrations as the primary indicator.

Groundwater level measurements would be obtained to evaluate groundwater flow directions and assure that an appropriate well network is maintained. This alternative would not impact current or expected future land uses, other than the need to maintain the monitoring well network. Groundwater quality would benefit from the effects of natural attenuation, and the dissolved phase constituent concentrations would be monitored. The net present worth of this alternative is $387,000 based on monitoring for 15 years.

Alternative 3 – Enhanced Attenuation With *In-Situ* Biotreatment and Monitoring

Alternative 3 would involve enhanced attenuation of impacted groundwater using *in-situ* treatment, along with groundwater monitoring. The treatment would involve injection of an oxygen-supplying product, using temporary borings into the shallow groundwater zone at selected locations on-site and along Hauser Street. This process will increase dissolved oxygen concentrations in groundwater and stimulate microbial activity, which will enhance constituent biodegradation in the saturated zone.

Significant access constraints are present within the areas of remaining groundwater impacts, including a public roadway (Hauser Street) and underground utilities. The injection interval would be limited to the shallow zone because the presence of DNAPL at the former tar vat location would limit the effectiveness of the bioremediation approach in the deep zone. The applications are assumed to occur on an annual basis. The cost estimate assumes three injection events in the area identified south of Hauser Street and in the eastern portion of the area identified along the south property boundary, and four events in the western portion of the southern boundary area in the vicinity of the former tar vat location

The net present worth of this alternative is $533,100 based on 15 years of groundwater monitoring.

Alternative 4 – *In-Situ* Chemical Oxidation and Monitoring

Alternative 4 would involve treatment of impacted groundwater using *in-situ* chemical oxidation (ISCO), along with groundwater monitoring. ISCO treatment involves the chemical destruction of constituents and, where effective, results in a permanent solution. Treatment is generally achieved through the installation of injectors screened within the target treatment zone, and the injection of reagents that chemically oxidize the constituents of interest. The delivery of reagents throughout the target treatment zone is critical to the successful implementation of ISCO technology. The area targeted for treatment is the former tar vat area where coal tar and DNAPL have been observed.

ISCO treatment in the shallow zone is not practicable because of the limited saturated thickness and shallow groundwater depth. The treatment objective is to remediate the coal tar and DNAPL that have been observed, and that may act as a source of groundwater contamination. Two injection events within the area of concern are assumed for evaluation purposes, with one initial treatment and one polishing step.

This alternative should not impact current or expected future land uses, other than the need to maintain the monitoring well network. Short-term impacts to the immediate area would occur during ISCO treatment. Natural attenuation of dissolved phase constituents would be supplemented by the ISCO treatment, and the anticipated reduction in dissolved phase constituent concentrations would be monitored. The net present worth of this alternative is $757,550 based on 15 years of groundwater monitoring.

Alternative 5 – Combined *In-Situ* Treatment and Monitoring

Alternative 5 would involve the combination of enhanced attenuation using *in-situ* biotreatment within the shallow zone from Alternative 3 and ISCO treatment within the deep zone from Alternative 4, in addition to groundwater monitoring.

The *in-situ* biotreatment would involve injection of a commercially available oxygen-supplying product using temporary borings to increase dissolved oxygen concentrations and stimulate microbial activity, enhancing constituent biodegradation in the shallow zone groundwater. The applications are assumed to occur on an annual basis with three injection events throughout the identified areas and a fourth event in the vicinity of the former tar vat location.

ISCO treatment is generally achieved through the installation of injectors screened within the target treatment zone, and the injection of reagents that chemically oxidize the constituents of interest. Similar to Alternative 4, the area targeted for treatment is the former tar vat area where coal tar and DNAPL have been observed. The treatment objective is to remediate the coal tar and DNAPL, which may act as a source of groundwater impacts. Two injection events within the area of concern are assumed for evaluation purposes, with one initial treatment and one polishing step.

This alternative should not impact current or expected future land uses, other than the need to maintain the monitoring well network. Short-term impacts to the immediate area would occur during ISCO treatment. The limited injection events for oxygen addition should not have significant adverse effects on land uses. Natural attenuation of dissolved phase constituents would be supplemented by the ISCO treatment and oxygen addition, and the anticipated reduction in dissolved phase constituent concentrations would be monitored. The net present worth of this alternative is $903,650 based on 15 years of groundwater monitoring.

EVALUATION OF ALTERNATIVES

The National Contingency Plan requires the Department to use specific criteria to evaluate the different remediation alternatives individually and against each other in order to select a remedy. This section of the Proposed Plan profiles the relative performance of each alternative against the criteria, noting how it compares to the other options under consideration. The criteria are discussed below:

1. Overall Protection of Human Health and the Environment

When evaluating alternatives in terms of overall protection of human health and the environment, consideration is given to the degree to which site-related risks are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

Exposure to groundwater does not currently exist and is not expected in the future. The source removal activities completed at the Site have mitigated the potential threat of environmental impacts from the DNAPL previously present in the subsurface.

Alternative 1, the no further action alternative, does not provide adequate protection, because no groundwater monitoring or active remediation would be conducted to reduce the levels of contamination.

Alternative 2, Natural Attenuation, is more protective than Alternative 1 because it would continue to monitor the reduction of constituent concentrations in groundwater. However, no active remediation would be conducted.

Alternative 3 is an enhancement of Alternative 2 because the addition of oxygen is expected to continue reductions in shallow groundwater constituent concentrations at a similar or increased rate compared with current, natural conditions. ISCO treatment (Alternative 4) would reduce the mass of constituents that remain in the former tar vat area within the deep groundwater zone.

Alternative 5 (combined *in-situ* treatment) would be the most protective of human health and the environment by implementing treatment that would reduce the mass of constituents that remain in both the shallow and deep groundwater zones.

2. Compliance with State and Federal Regulations

Each of the alternatives is evaluated with respect to its ability to comply with applicable state and federal regulations.

Compliance with action-based ARARs would be achieved with Alternative 1 because no actions would occur other than potential well abandonments. However, no further action does not address the remedial goals for groundwater and is, therefore, not acceptable in overall acceptability regarding this criterion.

Alternative 2 allows groundwater concentrations within the shallow and deep zones to dissipate through natural attenuation processes and approach the cleanup goals.

Because no actions other than groundwater monitoring are involved, Alternative 2 would over a long period of time comply with state and federal regulations but would not provide active treatment.

Alternative 3 would involve the injection of an oxygen-supplying product into the shallow groundwater zone, including injections at off-site locations. Compliance with ARARs would involve addressing requirements associated with the injections, particularly at off-site locations, which should be achievable. Alternative 3 should improve the rate that natural attenuation processes reduce constituent concentrations and approach the cleanup goals in the shallow zone.

Actions under Alternative 4 would include the application of ISCO technology within the deep zone at the former tar vat area. Alternative 4 should improve the rate of reductions in groundwater concentrations by chemically oxidizing the constituents of interest. ARARs may pose some constraints during implementation that affect the overall acceptability of Alternative 4.

Actions under Alternative 5 would include the *in-situ* bio-treatment component of Alternative 3 and the ISCO component of Alternative 4. Therefore, Alternative 5 involves the most ARARs associated with implementation. Alternative 5 should provide the greatest reduction in timeframe needed to achieve remedial goals to the extent practicable by reducing the mass of constituents in the shallow and deep groundwater zones.

3. Long-term Effectiveness and Permanence

This factor considers the ability of an alternative to maintain protection of human health and the environment over time.

Exposure to groundwater does not currently exist and is not expected in the future. Residual risks are primarily related to the groundwater impacts that remain subsequent to completion of the IRA activities. Because no further action, does not include groundwater monitoring Alternative 1 is the least reliable and effective in the long-term.

Groundwater monitoring provides additional long-term protection from possible constituent migration, allows for tracking the natural attenuation of dissolved phase constituents, and provides data pertaining to the effectiveness and permanence of the source removal activities. Therefore, Alternative 2 (monitored natural attenuation) is marginally more acceptable than Alternative 1 regarding this criterion.

Alternatives 3, 4 and 5 are considered better than Alternative 2 because of the additional groundwater treatment involved, although the benefits and reductions in exposure potential are not significant. The addition of oxygen (Alternative 3) should enhance conditions within the shallow saturated zone so that biodegradation of dissolved phase constituents will continue to occur, although access constraints and the limited saturated thickness of the interval targeted for treatment may limit improvements. ISCO treatment (Alternative 4) results in a permanent destruction of constituents where it can be safely implemented. Alternative 4 may be better than Alternative 3 regarding this criterion because it addresses the deep groundwater zone in the former tar vat area where conditions may be least conducive to natural attenuation.

Alternative 5 should result in the most reductions in dissolved phase concentrations and shortest timeframe to achieve remedial goals to the extent practicable because both the shallow and deep groundwater zones are addressed.

4. Reduction of Toxicity, Mobility or Volume through Treatment

This factor evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

Groundwater concentrations within the shallow zone are expected to continue to dissipate through natural attenuation processes and approach the cleanup goals. No further treatment or monitoring of groundwater would occur with Alternative 1. Therefore, Alternative 1 is the least acceptable alternative regarding this criterion.

Active treatment of groundwater would not occur with Alternative 2. However, concentrations would be monitored to determine the rate and extent of reductions through natural attenuation processes over time.

Alternative 3 would involve *in-situ* treatment within the shallow groundwater zone via oxygen addition to stimulate microbial activity and increase biodegradation of constituents. Alternative 3 is therefore better than Alternative 2 regarding this criterion.

ISCO treatment under Alternative 4 may provide more overall reductions than with Alternative 3, assuming that the injected reagents are effective at oxidizing the DNAPL occurrence with the deep zone in the former tar vat area.

Alternative 5 combines *in-situ* bio-treatment within the shallow zone from Alternative 3 and ISCO treatment within the deep zone from Alternative 4, it provides the most overall mass reduction of the alternatives.

5. Short-term Effectiveness

The short-term effectiveness evaluation considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.

Short-term environmental impacts beyond the current extent of remaining groundwater impacts are not expected with any alternative. No further action (Alternative 1) would have no short-term effects on the community or remediation workers. Groundwater quality would gradually improve through natural attenuation, although it would not be monitored.

Adverse short-term impacts associated with implementation of Alternative 2 (monitored natural attenuation) are not anticipated. The short-term effectiveness of Alternative 2 regarding groundwater would depend upon the rate of natural attenuation processes, which may be currently inhibited in the deep zone due to the presence of DNAPL. The overall short-term effectiveness of Alternative 2 is considered fair to moderate.

Injection of oxygen products (Alternative 3) is a common remediation method that can be safely and reliably implemented. Although land uses may be temporarily impacted during the injection process, some discretion is available in placement of the borings. Only a limited number of short duration events are anticipated. *In-situ* bio-treatment should improve groundwater conditions and the rate of natural attenuation, and reduce the timeframe to achieve remedial goals in the shallow zone to the extent practicable. Access constraints within areas of remaining groundwater impacts and the relatively limited thickness of the saturated interval targeted for treatment may limit the improvements,. Also, enhancing biodegradation in the deep zone is not practicable because of the presence of some DNAPL. The overall short-term effectiveness of Alternative 3 is considered moderate to good.

Alternative 4 would have a limited short-term effect on land uses during the installation of injectors and subsequent injection of reagents. Given the nature of the ISCO process, potential risks to the community or remediation workers would need to be effectively managed. The timeframe to achieve remedial goals would be reduced in the deep zone compared with Alternatives 1 through 3.

Alternative 5 has the potential for the most short-term impacts during implementation, although the risks can be effectively managed. The overall short-term effectiveness of Alternative 5 is comparable to or slightly better than Alternatives 3 and 4, due mainly to the reduced timeframes to achieve remedial goals because active treatment would occur in both the shallow and deep zones.

6. Implementability

The analysis of implementation considers the technical feasibility and administrative feasibility of implementation, as well as the availability of required materials and services.

Groundwater monitoring is an on-going activity at the site, and continued monitoring and maintenance of the well network would be readily implementable with any of the alternatives. All of the Alternatives are implementable.

No actions are involved in the implementation of Alternative 1, therefore there are no constraints. Alternative 2 would not adversely impact current or expected future land uses. The natural attenuation monitoring associated with this alternative is readily implementable.

Alternative 3 would not impact current or expected future land uses, other than the need to maintain the well network and for access for periodic injection of the oxygen-supplying product. Some discretion is available in determining boring locations and only a limited number of injection events of relatively short duration are anticipated. The primary constraints to successful implementation of Alternative 3 are the limitations on access within the impacted area and the relatively limited thickness of the saturated zone, particularly north of Hauser Street. Administrative requirements to implement Alternative 3 should not affect the implementability.

Alternative 4 would have a short-term impact on land use during the installation and use of the injectors. Following active remediation, land use would not be adversely impacted. Administrative requirements for the ISCO treatment would need addressed, but should not affect the implementability. Overall, Alternative 4 may be easier to implement than Alternative 3 because the treatment area is on-site and fewer injection events are anticipated.

Alternative 5 would be the most difficult alternative to implement because it combines the treatment components of Alternatives 3 and 4. Alternative 1 or 2 would be the easiest, but do not provide for active treatment.

7. Cost

The cost analysis evaluated capital costs and annual operation and maintenance (O&M). The net present value of an alternative is the sum of initial capital costs and the discounted value of O&M costs over the lifespan of the remedy.

Alternative 1	$0
Alternative 2	$387,000
Alternative 3	$533,100
Alternative 4	$757,500
Alternative 5	$903,650

8. Community Response

Community acceptance of the preferred remedy will be evaluated after the public comment period ends. Public comments will be summarized and responses provided in the Responsiveness Summary Section of the Record of Decision document that will present the Department's final alternative selection. The Department may choose to modify the preferred alternative or select another based on public comments or new information.

SUMMARY OF THE DEPARTMENT'S PREFERRED ALTERNATIVE

Alternative 5 – Combined *In-Situ* Treatment and Monitoring

Alternative 5 would involve the combination of enhanced attenuation using *in-situ* biotreatment within the shallow zone from Alternative 3 and ISCO treatment within the deep zone from Alternative 4, in addition to groundwater monitoring.

The *in-situ* biotreatment would involve injection of a commercially available oxygen-supplying product using temporary borings to increase dissolved oxygen concentrations and stimulate microbial activity, enhancing constituent biodegradation in the shallow zone groundwater. The applications are assumed to occur on an annual basis with three injection events throughout the identified areas and a fourth event in the vicinity of the former tar vat location.

ISCO treatment is generally achieved through the installation of injectors screened within the target treatment zone, and the injection of reagents that chemically oxidize the constituents of interest. Similar to Alternative 4, the area targeted for treatment is the former tar vat area where coal tar and DNAPL have been observed. The treatment objective is to remediate the coal tar and DNAPL, which may act as a source of groundwater impacts. Two injection events within the area of concern are assumed for evaluation purposes, with one initial treatment and one polishing step.

This alternative should not impact current or expected future land uses, other than the need to maintain the monitoring well network. Short-term impacts to the immediate area would occur during ISCO treatment. The limited injection events for oxygen addition should not have significant adverse effects on land uses. Natural attenuation of dissolved phase constituents would be supplemented by the ISCO treatment and oxygen addition, and the anticipated reduction in dissolved phase constituent concentrations would be monitored. The cost of this alternative is $903,650 based on 15 years of groundwater monitoring.

This alternative provides for the most protection of human health and the environment, and reduces the concentrations in groundwater in both the shallow and deeper zones. It is implementable and although it is the highest in cost, it provides the shortest time for cleanup.

COMMUNITY PARTICIPATION

The Department will evaluate comments from the public before selecting a final alternative. A comment period has been established to allow the public an opportunity to submit written comments to the Department. The community is also invited to a public meeting where the Department will discuss the Feasibility Study results, present the preferred alternative, and accept comments on the remedial alternatives.

The dates for the public comment period, the date, location, and time of the public meeting, and the locations of the Administrative Record files, are provided on the first page of this Proposed Plan.

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Technical Reports

- A **Remedial Investigation (RI)** identifies the potential sources of contamination; and determines what contaminants are at the site, and the extent of the contamination.
- A **Feasibility Study (FS)** considers various cleanup alternatives for the soil and groundwater.
- A **Proposed Plan (PP)** describes cleanup alternatives to address contamination.
- A **Record of Decision (ROD)** identifies the selected cleanup method.
- The **Remedial Design (RD)** is the development of specifications and drawings necessary for the construction and implementation of the ROD.

USE THIS SPACE TO WRITE YOUR COMMENTS

Your input on the Proposed Plan for the SCE&G Hauser Street Manufactured Gas Plant Site is important. Comments provided by the public are valuable in helping DHEC select a final cleanup remedy.

You may use the space below to write your comments, then fold and mail. Comments must be postmarked by. If you have any questions, please contact Lucas Berresford at 803-896-4071. You may also submit your questions and/or comments electronically to berresjl@dhec.sc.gov by August 24, 2011.