



Explanation of Significant Differences (ESD)
Tutu Wells (GW)
Remedial Design
St. Thomas, Virgin Islands
Work Assignment No.: 008-RDRD-021D

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Explanation of Significant Differences

TUTU WELLS SITE ST. THOMAS, U.S. VIRGIN ISLANDS

U. S. Environmental Protection Agency

Region 2

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INTRODUCTION

In accordance with Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and Section 300.435(c)(2)(i) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), if the Environmental Protection Agency (EPA) selects a remedial action and, thereafter, it determines there is a significant change required with respect to that action, an explanation of the significant differences and the reasons for such changes must be published.

EPA issued a Record of Decision (ROD) in 1996 with regard to the Tutu Wells Superfund site (Site). The remedy selected in the ROD included four property-specific clean-ups, Site-wide containment and treatment of contaminated groundwater at the source areas and leading edges of contaminant plume, and cleanup of contaminated soils at the property now occupied by Virgin Islands Department of Education Curriculum Center.

This Explanation of Significant Differences (ESD) describes the modifications to the cleanup remedy set forth in the ROD for Site-wide groundwater and the Curriculum Center. These changes resulted from pre-design investigations and design analyses.

The changes to the cleanup plan, as presented in this ESD, are not considered by EPA and the Virgin Islands Department of Planning and Natural Resources (DPNR) to have fundamentally altered the remedy selected in the ROD. The remedy remains protective of human health and the environment and complies with federal and state requirements that were identified in the ROD.

This ESD will become part of the Administrative Record file for the Site. The entire Administrative Record for the Site includes, among other things, the ROD and other relevant documents. These documents are available for review at the following locations:

EPA Virgin Islands Coordinator's Office

U.S. EPA Region 2
Caribbean Environmental Division
The Tunick Building
1336 Beltjen Road, Suite 102

St. Thomas, USVI 00808
Contact: Jim C. Casey
(340) 714-2333

Department of Planning and Natural Resources

Division of Environmental Protection Agency
Cyril E. King Airport
St. Thomas, USVI 08802
Contact: Annette Roebuck
(340) 774-3320
Hours: Mon. - Fri., 9 AM - 4 PM

U.S. Environmental Protection Agency

290 Broadway, 18th Floor
New York, NY 10007-1866
Contact: Record Center
(212) 637-4308
Hours: Mon. - Fri. 9 AM - 5 PM

Should there be any questions regarding this Explanation of Significant Differences, please contact Caroline Kwan, Remedial Project Manager at (212) 637-4275 or Kwan.Caroline@epamail.epa.gov.

SUMMARY OF SITE HISTORY AND CONTAMINATION PROBLEMS

The Tutu Wells Site is located in the upper Turpentine Run basin in east central St. Thomas, VI at the Estate Anna's Retreat section of the island. The Turpentine Run is an intermittent stream that traverses the length of the basin and generally flows from north to south following Route 38. The Site is surrounded by hills to the west, north and east.

Numerous commercial establishments, including gas stations, car repair shop, a shopping center, a dry cleaner, fast food restaurants, etc., line the major roads in the area. Private homes and multi-family housing,

such as the Virgin Islands Housing Authority (VIHA) buildings, occupy the less heavily traveled roads. The numerous water supply wells located in the Turpentine Run basin are owned by the VIHA, water purveyors, and private entities. The wells formerly supplied water for domestic and commercial purposes.

According to 1990 census data, approximately 9,100 people live in the Tutu subdistrict of St. Thomas. The Tutu subdistrict, also known as Anna's Retreat, covers 1.5 square miles and is second to Charlotte Amalie in population density on St. Thomas, containing about 20 percent of the island's population.

In 1987, EPA tested several wells in the area after reports of a strong, unpleasant odor from the water. These wells, several of which were major commercial well suppliers of public drinking water, were found to have elevated concentrations of gasoline, chlorinated organic compounds, and chlorinated volatile organic compounds (VOCs). As a result, DPNR closed 13 commercial and 5 private wells in the Tutu area. Additional sampling of over 100 wells resulted in a 1988 Superfund removal action to address potential immediate threats posed by the Site and additional wells were disconnected. Affected residents were either connected to non-contaminated public water or provided with water via a local water hauler.

On February 1, 1992, EPA proposed the Site for placement on the National Priorities List, EPA's list of significant sites that qualify for long-term cleanup. From 1992 to 1995, EPA lead an extensive Remedial Investigation/Feasibility Study (RI/FS) at the Tutu Wells Site. The purpose of the investigation was to determine the nature and extent of contamination in Site soils and groundwater, and evaluate possible cleanup options. EPA determined that actual or threatened releases of hazardous substances from the Site, if not addressed, may pose a risk to public health or the environment.

Results identified areas of groundwater contamination (i.e., groundwater plumes) in the Turpentine Run Aquifer, which underlies the Site. Two of the plumes contain petroleum-related contaminants. Two others contain chlorinated volatile organic compounds (CVOCs), mainly tetrachloroethene (PCE), trichloroethene (TCE), and cis-1,2-dichloroethene (1,2-DCE). Together, the various plumes overlap to form a large area of groundwater contamination that has significantly impacted regional groundwater quality.

Results also identified the property currently occupied by the Curriculum Center as a main source of the CVOc contamination in groundwater. These contaminants, mainly PCE, TCE, and 1,2-DCE, are associated with dry cleaning solvents that were historically used at the Site as part of commercial textile manufacturing operations. It was further determined that significant amounts of

CVOcs are present in the subsurface behind the Curriculum Center, within the unsaturated fractured bedrock (also referred to as "soils"), which may act as a continuing source of groundwater contamination.

SELECTED REMEDY

The Record of Decision (ROD) for the Site, dated August 5, 1996, described EPA's selected remedy to clean up the soil and groundwater contamination at the Site. The remedy include four property-specific cleanups, Site-wide groundwater cleanup, and cleanup of soils at the Curriculum Center.

Property-Specific Remedies

EPA ordered six responsible parties to design and implement soil and groundwater cleanups at four properties located within the Site. The selected remedies for these four property locations were outlined in the ROD. EPA issued a separate Administrative Order (AO) to each of the following six responsible parties: Texaco Caribbean, Inc.; ESSO Standard Oil S.A., Limited; Western Auto Supply Co. and Four Winds Plaza Partnership; and L'Henri, Inc. and The Cyril V. Francois Associates. They represent two gas stations, an auto supply store, and a dry cleaner in Tutu, which are sources of chemical leaks into the soils and/or Turpentine Run Aquifer underlying the Site.

The purpose of these property-specific, mini-cleanups is source control. By ordering the responsible parties to remove hazardous soils and treat the most contaminated groundwater at these four source locations, further contamination of the Turpentine Run Aquifer can be prevented. All of the cleanups required under the AOs are either complete or underway.

Site-wide Groundwater Remedy

The groundwater remedy also called for Site-wide containment and treatment of contaminated groundwater at the source areas and the leading edges of contaminant plumes. The following groundwater cleanup activities were included in the 1996 ROD for Site-wide groundwater:

- Install two groundwater recovery wells to control CVOc contaminant source areas.
- Install three groundwater recovery wells to control movement of groundwater plumes.
- Construct a central groundwater treatment facility to treat the extracted groundwater to meet applicable discharge/end-use criteria.
- Allow low-level groundwater contamination to naturally attenuate.

- Conduct semi-annual groundwater monitoring to track changes in groundwater movement and quality.
- Implement institutional controls to prohibit unauthorized use of groundwater and installation of new wells.

Curriculum Center Soils Remedy

The preferred remedy also included cleanup of soils at the Virgin Islands Department of Education Curriculum Center. The following is a list of the 1996 ROD cleanup activities for the Curriculum Center property:

- Excavation of contaminated soils, followed by either off-Site disposal, or treatment by soil vapor extraction (SVE) and redepositing of the treated soil on-Site.
- In-situ (in place) SVE treatment of contaminated bedrock areas and soils not suitable for excavation.
- Thermal oxidation treatment of SVE offgas.
- Institutional controls in the form of Government controls and/or proprietary controls to place limitations on property usage (e.g., for commercial or industrial use only).

DESCRIPTION OF SIGNIFICANT DIFFERENCES AND THE REASONS FOR THOSE DIFFERENCES

EPA conducted a pre-design investigation of the Curriculum Center soils and Site-wide groundwater from August 1998 to November 1999. The purpose of the investigation was to further define the nature and extent of CVOC contamination in soil and groundwater, and to collect hydrologic and geologic information to be used in the Remedial Design.

Site-wide Groundwater Findings and Remedy Modifications

As part of the pre-design groundwater investigation, EPA conducted the following activities:

- **Groundwater sampling** of existing groundwater monitoring and supply wells to determine the current location and distribution of CVOC groundwater contamination.
- **Aquifer testing** to obtain additional hydraulic data and evaluate aquifer response to pumping.
- **Groundwater modeling** to assist in refining extraction and monitoring well locations and estimating remedial pumping rates.

- **Installing new monitoring wells** at critical locations for use during the aquifer testing and for long-term groundwater monitoring.

Based upon the results of the pre-design investigation and subsequent design analyses, EPA approved the following modifications to the selected cleanup remedy defined in the ROD:

- The recovery well configuration for the Northern CVOC Plume was refined according to the results of the pre-design investigation.
- Monitored natural attenuation will be initially implemented for the Southern CVOC Plume in lieu of recovery wells. Existing groundwater data indicate that the CVOC plume is steadily contracting and its leading edge is not advancing. Use of the recovery wells has been retained by EPA as a contingency, which would be implemented in the future, if warranted based upon long-term groundwater monitoring results.
- Two smaller-size groundwater treatment plants will be constructed proximal to recovery well clusters, rather than one centralized plant. This approach is more feasible, considering the existing Site development/use and the distance between recovery well clusters.
- Enhancement of the groundwater extraction and treatment remedy at the Curriculum Center source area will be investigated, following its implementation, to address the significant CVOC contamination identified at approximately 80 to 120 feet below ground surface. Without enhancement, it is estimated that this groundwater treatment system will need to operate in excess of 30 years. A pilot study will be performed to evaluate the feasibility of using enhanced anaerobic bioremediation to supplement this remedy.

Curriculum Soil Findings and Remedy Modifications

EPA performed shallow and deep exploratory borings and collected soil and rock samples, both around and beneath the Curriculum Center building. Prior to drilling through the floor, old process pipes were vacuum cleaned, and samples of the removed material were collected. Soil gas samples were also collected. Although soil sampling did not reveal any contamination in the soil, the results of the investigation indicated that a residual CVOC contamination source is present within the unsaturated fractured bedrock behind the Curriculum Center building.

Based on the results of the pre-design investigation, EPA performed a pilot study to assess the feasibility of using SVE for remediating the CVOC contamination

from this area and to provide a basis for the design of a full scale SVE system. An extended (5-day) and 15 short-term (up to 4 hours each) performance tests were conducted. Based on the results of the SVE Pilot Study, it was determined that appreciable CVOC mass can be extracted from the unsaturated zone using SVE. Approximately 40 pounds of CVOCs were removed from the unsaturated zone during the 5-day test.

Based upon the results of the pre-design investigation and subsequent design analyses, EPA approved the following modifications to the selected cleanup remedy defined in the ROD:

- Excavation is not required, because the shallow, overburden soils are not contaminated above the ROD cleanup goals.
- Activated carbon, followed by potassium permanganate is more feasible than thermal oxidation for SVE offgas treatment.
- Standard, performance-based cleanup criteria will be used in lieu of the ROD soil cleanup goals (SSLs). The ROD SSLs are not appropriate for application in a fractured bedrock setting, because contaminants are non-uniformly distributed in the rock fractures, and rock sample analyses will not provide an accurate representation regarding how much contamination is present. The performance-based cleanup criteria are generally based upon the net reduction of contaminants in soil gas. Remedial progress will routinely be evaluated by collecting soil gas samples and field measurements from permanent vapor monitoring points screened within the contaminated area and from the SVE system.

AFFIRMATION OF STATUTORY DETERMINATIONS

All components of this design have been reviewed by EPA and the Virgin Islands Department of Planning and Natural Resources (DPNR). The design also conforms to all DPNR permit requirements.

PUBLIC PARTICIPATION ACTIVITIES

In accordance with the NCP, a formal public comment period is not required when issuing an ESD. EPA is announcing the availability of this ESD in several local newspapers. In addition, as noted above, questions regarding this ESD may be directed to Caroline Kwan as specified above.

SUPERFUND OMBUDSMAN

U.S. EPA, Region 2 has designated an ombudsman as a point-of-contact for community concerns and questions

about the federal Superfund Program in New York, New Jersey, Puerto Rico and the U.S. Virgin Islands. To support this effort, the Agency has established a 24-hour, toll-free number that the public can call to request information, express their concerns or register complaints about Superfund. The Ombudsman for EPA's Region 2 office is:

George Zachos
U.S. EPA, Region 2
2890 Woodbridge Ave., MS-211
Edison, New Jersey 08837
(732) 321-6621
Toll Free (888) 283-7626

For general information about the Superfund program, visit our website at:

<http://www.epa.gov/region02/superfund/superfund.htm>