

Report on Implementation of Expert Panel Recommendations

Preliminary Injunction Order Article II.5

Bristol Integrated Solid Waste Management Facility
Bristol, Virginia
Solid Waste Permit No. 588

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INTRODUCTION

SCS Engineers (SCS) has developed this Report on Implementation of Expert Panel Recommendations (Report), on behalf of the City of Bristol, Virginia (City), in accordance with Article II.5 of the Preliminary Injunction Order, dated June 14, 2022, which requires the City to take the following action:

Submit a report to Bristol, TN setting forth how Bristol, VA will accomplish implementation of all other recommendations of the Expert Report, including the permanent closure of the Landfill, within 60 days of entry of this Preliminary Injunction Order

BACKGROUND

In March 2022, the Virginia Department of Environmental Quality (VDEQ) engaged landfill industry experts that formed into an Expert Panel (the Panel) to evaluate the Integrated Solid Waste Management Facility (ISWMF or the Facility) operated by the City of Bristol, Virginia, and specifically the active waste disposal unit identified as the Quarry Landfill (Landfill), which is governed under Solid Waste Permit No. 588.

On April 25, 2022, the Panel issued a report (Expert Panel Report) outlining recommendations to address these challenges. On May 6, 2022, VDEQ issued correspondence to the City requesting that the City develop a Plan of Action to address the Panel's recommendations. VDEQ's correspondence stated *"This Plan of Action should be phased (e.g. immediate, short-term and long-term), and must address specific itemized Panel recommendations, steps the City will execute to accomplish those items, along with a specific associated timelines for each recommendation."*

On July 6, 2022, SCS transmitted the Plan of Action in Response to Expert Panel Report (Action Plan or Plan) to VDEQ in conformance with VDEQ's correspondence. On July 29, 2022, VDEQ submitted comments regarding the Action Plan to the City for their review and consideration. The City anticipates that revisions to the Plan will be accomplished to address comments and an amended version of the Plan will be submitted to the VDEQ. Based on VDEQ's correspondence to the City, dated June 8, 2022, the City understands that the Department's intention is to incorporate the Plan of Action's actionable items, proposed approaches, and timelines into an enforcement action.

APPROACH

As noted therein, the Plan was developed to address and propose actions for implementation in response to the Panel's recommendations and, thus, accomplishes the requirement of this Report being submitted to Bristol, TN in conformance with Article II.5 of the Preliminary Injunction Order. As such, the regurgitation of lengthy portions of technical information, discussion of anticipated implementation steps, and preliminary proposed schedules already presented in the Plan into this Report would appear unnecessary. Accordingly, this Report utilizes the technique of referencing select content presented within the Plan using citation of certain sections of narrative language, along with citation of appendices, exhibits, figures, and tables, as appropriate, to establish "how Bristol, VA will accomplish implementation of all other recommendations of the Expert Report, including the permanent closure of the Landfill", excluding Items 1 through 4 of the Preliminary Injunction Order.

RECOMMENDATIONS & CORRESPONDING ACTIONABLE ITEM & PROPOSED APPROACH FOR IMPLEMENTATION

A summary of the action items, proposed approaches, and relative timelines (per the VDEQ's instructions for categorizing into a phased schedule) is presented in Table 1 of the Executive Summary Section of the Action Plan. The Plan outlines conceptual approaches for the methods to address the action items listed in the Expert Panel Report. The narratives and figures within the Plan are intended to be used as a first step in implementation of the Expert Panel recommendations. The actual number, location, alignment, configuration, and function of proposed features described in the Plan and depicted in the associated figures may need to be modified to accommodate field conditions, other monitoring activities, additional background data, or City resources.

A listing of the recommendations presented in the Expert Panel Report is presented below, each followed by the corresponding citation from the Plan that addresses implementation via an actionable item, proposed approach, and anticipated timeline.

Improve the performance of existing gas extraction wells including minimizing air intrusion pathways through landfill cover. (Item 1.2 on p.iii; Item #2 on p.10; Paragraph 2 on p.11)

- Refer to Section 3.8.1 of the Action Plan regarding implementation of a procedure to identify and mitigate air intrusion; and,
- Refer to Section 3.8.2 of the Action Plan regarding implementation of a procedure to address fugitive emissions when identified during monitoring events.

Install additional gas extraction wells to reduce emissions and temperatures. (Item 1.2 on p.iii; Item #2 on p.10)

- Refer to Section 4.2 of the Action Plan regarding the expansion of the existing landfill gas collection system by installing a series of large diameter dual extraction wells.

Identify and eliminate to the extent practical any landfill gas fugitive emissions at the Landfill surface. Weekly monitoring activities of gas emissions at the Landfill surface will be required. (Item 1.3 on p.iii; Item #3 on p.10)

- Refer to Section 3.7 of the Action Plan regarding proposed activated to control and reduce LFG fugitive emissions; and,
- Refer to Section 3.5 of the Action Plan regarding conducting weekly monitoring of surface emissions.

Install settlement plates and conduct monthly surveys to document the locations and rates of settlement in the waste mass. (Item 1.4 on p.iii; Item #7 on p.8; Item #4 on p.10)

- Refer to Section 3.4 of the Action Plan regarding installation of settlement plates at select locations within the landfill; and,
- Refer to Section 3.6 of the Action Plan regarding measuring and recording topography within the Quarry Landfill on a monthly basis using photogrammetric methods.

Install at least five (5) deep dedicated monitoring wells to enable sampling and characterization of leachate and measurement of temperature profiles in the waste. (Item 1.6 on p.iv; Item #6 on p.10)

- Refer to Section 4.2 of the Action Plan regarding the expansion of the existing landfill gas collection system by installing a series of large diameter dual extraction wells, which will enable sampling and characterization of leachate; and,
- Refer to Section 3.3 of the Action Plan regarding the installation of temperature measurement instrumentation in borings within the waste mass and equipping the temperature monitoring system with remote monitoring equipment.

Install and operate large-diameter dual-phase extraction wells for removal of gas and leachate. Treatment requirements for extracted leachate must be determined. (Item 1.7 on p.iv; Item #7 on p.10)

- Refer to Section 4.2 of the Action Plan regarding the expansion of the existing landfill gas collection system by installing a series of large diameter dual extraction wells for removal of gas and leachate; and,
- As noted in Section 3.9.2.2 of the Action Plan, the City is engaged in development of an industrial wastewater treatment system for the Facility, which will involve establishing the treatment requirements for extracted leachate.

Install a temporary geosynthetic cover over the entire Landfill. This will require substantial grading of the existing Landfill surface to direct runoff to the southeast corner of the Landfill where it is expected a stormwater management pond can be constructed to manage stormwater that is collected on top of the geomembrane cover. (Item 1.8 on p.iv; Item #8 on p.10)

- Refer to Section 5.2 of the Action Plan regarding the installation of a temporary exposed geomembrane cover following grading of the landfill surface; and,
- Refer to Section 4.5 of the Action Plan regarding grading the landfill to a perimeter channel that will direct stormwater to the southeast corner.

Develop and implement an effective and sustainable stormwater management plan and settlement management plan for the Landfill. (Item 1.9 on p.iv; Finding #9 on p.9; Item #9 on p.10; Paragraph 3 on p.12)

- Refer to Section 4.4 of the Action Plan regarding the planned Excavation of a stormwater storage pond in the southeast corner of the quarry and installation of a pump station to remove stormwater out of the quarry.
- Refer to Section 3.6 of the Action Plan regarding how the periodic topographic surveys will assist addressing changes to stormwater management features attributed to settlement.
- Refer to Section 4.6 of the Action Plan regarding stormwater sampling and testing.

The Panel recommended an active community outreach program to communicate strategies, provide status and progress reports, and receive citizen feedback. (Item 1.10 on p.iv; Item #10 on p.10)

- Refer to Section 3.2 of the Action Plan regarding the City's intention to engage a public relations firm to manage public outreach.

Short-term waste filling operations to shape the surface of the Landfill for the placement of the interim geomembrane cover must be carefully coordinated with engineers working on remedial actions. (Item 2.2 on p.iv; Item #2 on p.13)

- The City's planned cessation of waste acceptance and termination of waste filling operations within the Quarry Landfill (as discussed in Section 5.1.1) eliminates the potential to implement this recommendation for shaping of the surface of the Landfill utilizing waste materials to be coordinated with remedial actions. In the event that waste placement operations are reactivated at some future time, the surface configuration will be coordinated with ongoing remedial actions.

Installing a permanent landfill cap designed to accommodate expected waste mass settlement without additional disposal of waste (other than shaping the Landfill surface) once odors and landfill temperatures are adequately reduced is a feasible option. (Item 3.1 on p.iv; Item #1 on p.15)

- Refer to Section 5.1.2 of the Action Plan regarding construction of a permanent final cover system, in the event of permanent landfill closure.

Resuming operations at the Landfill in the future may be technically feasible once the odors are controlled and ETLF conditions managed. (Item 3.3 on p.iv; Item #3 on p.15)

- Refer to Section 5.2 of the Action Plan regarding the installation of a temporary exposed geomembrane cover following grading of the landfill surface, which may enable resumption of waste placement operations at some future time.

Sources and supply of clay/soil should be addressed immediately. (Paragraph 1 on p.11)

- Refer to Section 4.1.1 of the Action Plan regarding a proposed approach for assessing available on-site soil.

Therefore, the development of a long-term plan to monitor Landfill conditions, to repair and replace equipment, construct a Landfill cap, and maintain the gas and leachate collection systems is critical. (Paragraph 3 on p.16)

- Refer to Section 3.9 of the Action Plan regarding the planned transition of the City's existing landfill staff to roles managing and overseeing closure and monitoring of the landfill, with support from the City's environmental consultants and contractors.

RESPONSE TO EXPECTATIONS OF THIS REPORT ON IMPLEMENTATION OF EXPERT PANEL RECOMMENDATIONS

On July 29, 2022, the City received correspondence transmitted on behalf of the City of Bristol, TN pertaining to expectations for the content of this Report. The language noted in that correspondence, along with the City's response, is presented below.

(1) a schedule for completion of the actions outlined in the Expert Panel Report issued on April 25, 2022, preferably in Gantt chart format;

The Action Plan organized the recommended actions by timeframe. The timeframe categories referenced in the Plan are Immediate (generally defined as occurring within the next 90 to 180 days or so), short-term (generally defined as occurring within the next one year or so), and long-term (occurring within the next 5 years or so). Refer to Table 1 in the Executive Summary Section of the Plan for identification of the timeframe category for each action item. Table 1, excluding

Items 1 through 4 of the Preliminary Injunction Order, has been included at the end of this Report for reference and convenience. These timeframes correlate to the preliminary approximate schedule, commencing in July 2022, in which the City will begin the process of collecting additional information, refining the design, procuring contract services, and implementing the actions. These timeframes do not necessarily correlate to completion of the various actionable items and proposed approaches to implement the Expert Panel recommendations or full commissioning of the resulting environmental control and/or monitoring systems.

The nature and scope of the work necessary to plan, fund, evaluate, assess, monitor, design, procure, construct, commission, operate, and maintain the corrective actions and remedial measures associated with the various recommendations is substantial. These efforts and endeavors are still very much under development and are subject to various parameters beyond the City's control that will most certainly impact schedule, such as supply-chain availability of materials, economic factors (workforce, contractor's schedules), etc. Accordingly, it is infeasible to develop a detailed schedule for completion of these actions in Gantt chart format that would be meaningful at this time.

(2) the evaluation criteria Bristol, Virginia will use to assess the success of the actions taken in accordance with the Plan;

The Expert Panel Report stated that the Panel met “for the express purpose of reaching a consensus on what the City of Bristol should do to alleviate Landfill odor emissions that are negatively affecting neighboring communities in Virginia and Tennessee.” Thus, it is reasonable to infer that the recommendations presented therein are intended to accomplish improved odor mitigation and abatement related to the potential for malodorous conditions to develop that are attributed to the Facility. A review of the Expert Panel Report reveals that another objective of the recommendations is to implement monitoring and best management practices related to the characteristics exhibited by Elevated Temperature Landfills (ETLFs). Accordingly, the evaluation criteria that the City will use to assess the effectiveness of each specific action outlined in the Action Plan will consider these two primary objectives. However, it is infeasible to produce a detailed inventory of evaluation criteria that may be utilized in assessing the effectiveness of such a diverse array of corrective actions and remedial measures at this time, especially considering that these efforts and endeavors are still very much under the planning and development stage.

(3) details about how implementation of the actions and monitoring data collected in accordance with the Plan will be communicated to the public and how feedback from the public will be solicited;

Section 3.2 of the Action Plan communicated the approach the City intends to implement pertaining to a community outreach and engagement program, and specifically committed the City to retaining a public relations organization to assist the City with activities such as communication of monitoring data, progress on implementation of actions, and soliciting input and feedback from the public.

(4) the actions and schedule for permanent closure of the landfill in accordance with the Virginia Solid Waste Management Regulations. The Order specifies that the report should set forth how permanent closure of the landfill will be implemented.

The Expert Panel Report summarized consensus Panel recommendations pertaining to the feasibility of continued waste disposal operations of the Landfill and options for early closure of

the Landfill, either temporary or permanent. According to Finding #2 on Page 13, the Panel recommended “The City should strongly consider a cessation of waste disposal operations at the Landfill due to incompatibility of operations with the necessary odor mitigation and ETLF remedial strategy.” According to Finding #1 and #3 on Page 15, the Panel concluded that “Installing a permanent landfill cap designed to accommodate expected waste mass settlement without additional disposal of waste (other than shaping the Landfill surface) once odors and landfill temperatures are adequately reduced is a feasible option” and that “Resuming operations at the Landfill in the future may be technically feasible once the odors are controlled and ETLF conditions managed.”

The Expert Panel Report does not reach any consensus regarding permanent closure of the Quarry Landfill in its current configuration. Given the current shape of the Landfill and related stormwater challenges after closure, a variety of factors must be considered. Furthermore, the inclusion of a statement that resuming operations in the future may be technically feasible suggests the Panel considered either temporary or permanent closure scenarios to be equally capable of accomplishing the objective of addressing the incompatibility of simultaneous operations and implementation of the necessary odor mitigation and ETLF remedial strategy.

Any plan for permanent closure of the Quarry Landfill will need to be approved by the VDEQ. The City will be discussing with VDEQ the potential options for permanent closure of the landfill, including in its current configuration, after resumption of filling operations, and other possible approaches (such as removal of the waste). Working with VDEQ, the City will seek to develop a plan that would achieve an environmentally sound and sustainable permanent closure of the Quarry Landfill.

The nature and scope of the work necessary to evaluate the options, as well as plan, fund, design, procure, construct, and execute permanent closure of the landfill, whether at its current configuration or after resumption of filling operations, or in some other manner (e.g., waste removal), are substantial. These efforts and endeavors are still very much under development and are subject to various parameters beyond the City’s control that will most certainly impact the actions and schedule. Accordingly, it is infeasible to develop a detailed inventory of actions and a detailed schedule for permanent closure that would be meaningful at this time.

Table 1. Summary of Action Items and Proposed Approaches

Action Item from Expert Panel Report	Proposed Approach	Section Where Addressed	Timeframe for Implementation
Sources and supply of clay/soil should be addressed	A proposed approach for assessing available on-site soil	4.1	Short-Term
Improve the performance of existing gas extraction wells including minimizing air intrusion pathways through landfill cover	Implement a procedure to identify and mitigate air intrusion	3.8.1	Immediate
Address any air intrusion caused by well over-drawing from the landfill	Implement an approach to reduce over-drawing of the GCCS	3.8.2	Immediate
Weekly monitoring activities of gas emissions at the Landfill surface	Conduct weekly monitoring of surface emissions	3.5	Immediate

Action Item from Expert Panel Report	Proposed Approach	Section Where Addressed	Timeframe for Implementation
Identify and eliminate to the extent practical any landfill gas fugitive emissions at the Landfill surface	Implement a procedure to address fugitive emissions identified during emissions monitoring events	3.5	Immediate
Install settlement plates	Installation of settlement plates at select locations within the landfill	3.4	Immediate
Conduct monthly topographic surveys to document the locations and rates of settlement in the waste mass	Capture topography within the quarry on a monthly basis using photogrammetric methods	3.6	Immediate
Install additional gas extraction wells to reduce emissions and temperatures	Expand the existing gas system by installing a series of large diameter dual extraction wells	4.2	Short-Term
Install at least five (5) deep dedicated monitoring wells to enable sampling and characterization of leachate and measurement of temperature profiles in the waste. Should include multi-screens at several depths			
Install and operate large-diameter dual-phase extraction wells for removal of gas and leachate			
Install a temporary geosynthetic cover over the entire Landfill	Install a temporary exposed geomembrane cover following grading of the landfill surface	5.2	Long Term
Direct runoff to the southeast corner of the Landfill where it is expected a stormwater management pond can be constructed to manage stormwater that is collected on top of the geomembrane cover	Grade the landfill to a perimeter channel that will direct stormwater to the southeast corner	4.5	Short-Term
Develop and implement an effective and sustainable stormwater management plan and settlement management plan for the Landfill	Excavate a stormwater storage pond in the southeast corner of the quarry capable of storing the 24-hour 100-yr storm and install a pump to pump water out of the quarry	4.4	Short-Term
Perform frequent testing of clean stormwater being discharged offsite to ensure no contamination has occurred	Stormwater will be tested in accordance with the facility's existing VPDES Permit	4.6	Short-Term

Action Item from Expert Panel Report	Proposed Approach	Section Where Addressed	Timeframe for Implementation
The Panel recommended an active community outreach program to communicate strategies, provide status and progress reports, and receive citizen feedback	The City will hire a public relations firm to manage public outreach	3.2	Immediate
Develop a long-term plan to monitor landfill conditions, repair and replace equipment, construct a Landfill cap, and maintain the gas and leachate collection systems	The City's existing landfill staff will be transitioned to roles managing and overseeing closure and monitoring of the landfill. They will be supported by the City's environmental consultants and contractors	3.9	Immediate