City of Columbia

701 East Broadway, Columbia, Missouri 65201

Agenda Item Number: B 159-15
Department Source: Public Works
To: City Council
From: City Manager & Staff
Council Meeting Date: 6/1/2015
Re: Settlement Agreement for Notice of Violation at the Columbia Sanitary Landfill

Documents Included With This Agenda Item

Council memo, Resolution/Ordinance, Exhibits to Resolution/Ordinance
Supporting documentation includes: None

Executive Summary

Authorizing the City Manager to execute a Settlement Agreement with the Missouri Attorney General's Office and the Missouri Department of Natural Resources concerning Notice of Violations received at the Columbia Sanitary Landfill.

Discussion

On June 3, 2013, the Missouri Department of Natural Resources (MDNR) conducted inspections at the Columbia Landfill and issued an NOV for failing to maintain and operate the leachate collection system to prevent discharge in compliance with the operational permit. On November 4, 2013, MDNR inspected the facility and noted problems in applying daily cover resulting in animals feeding, and issued another NOV. The penalty for the combined NOVs is $36,500; however, in lieu of payment the City agrees to perform supplemental environmental projects equal to at least $109,550. These projects include the construction of a new public recycling drop-off location (Old Fire Station No. 7 site) on S. Providence at an estimated cost of $95,484; an Odor Management Plan for the landfill at a cost of $15,830; and other odor control measures estimated to cost $10,125. All projects must be completed within 10 months of execution of this agreement.

Fiscal Impact

Short-Term Impact: The City is responsible for performing supplemental environmental projects equal to at least $109,550 within 10 months of the execution of this agreement. These projects include the new Recycling Drop-off site on S Providence estimated to cost $95,484; an agreement with Shell Engineering for the Landfill Odor Management Plan, in the amount of $15,830; and other odor control measures estimated at $10,125, to be paid from Landfill Operations account.
Long-Term Impact: None

Vision, Strategic & Comprehensive Plan Impact

Vision Impact: Environment
Strategic Plan Impact: Health, Safety and Wellbeing
Comprehensive Plan Impact: Environmental Management

City of Columbia

701 East Broadway, Columbia, Missouri 65201

Suggested Council Action

Authorize the settlement agreement with the Missouri Attorney General's Office and the Missouri Department of Natural Resources.

Legislative History

3/02/15 (R34-15) Setting a public hearing for April 6, 2015 for construction of a recycling drop-off area located north of the northwest intersection of Providence Road Outer Roadway and State Route AC/Nifong Boulevard (former site of Fire Station No. 7) and improvements to the State Farm Parkway recycling drop-off site.

3/31/15 - Authorizing a professional engineering services agreement with Shell Engineering for odor and pollutant monitoring of Landfill activities.

Department Approved

City Manager Approved

Introduced by _____

First Reading _____ Second Reading _____

Ordinance No. _____ Council Bill No. _____B 159-15_____

AN ORDINANCE

authorizing a settlement agreement with the Missouri Attorney General's Office and the Missouri Department of Natural Resources relating to compliance issues at the Columbia Sanitary Landfill; and fixing the time when this ordinance shall become effective.

BE IT ORDAINED BY THE COUNCIL OF THE CITY OF COLUMBIA, MISSOURI, AS FOLLOWS:

SECTION 1. The City Manager is hereby authorized to execute a settlement agreement with the Missouri Attorney General's Office and the Missouri Department of Natural Resources relating to compliance issues at the Columbia Sanitary Landfill. The form and content of the agreement shall be substantially in the same form as set forth in "Exhibit A" attached hereto.

SECTION 2. This ordinance shall be in full force and effect from and after its passage.

PASSED this _____ day of _____, 2015.

ATTEST:

_____ _____

City Clerk Mayor and Presiding Officer

APPROVED AS TO FORM:

_____

City Counselor

SETTLEMENT AGREEMENT

This Settlement Agreement is made by and among the Missouri Attorney General's Office ("Attorney General"), the Missouri Department of Natural Resources ("Department") and the City of Columbia ("City"). This agreement is deemed to be executed on the date this document is signed and dated by the Department.

WHEREAS, the City owns and operates the Columbia Sanitary Landfill under Solid Waste Sanitary Landfill Permit No. 101908, located at 5700 Peabody Road, Columbia, Boone County, Missouri.

WHEREAS, on June 3, 2013, the Missouri Department of Natural Resources' Northeast Regional Office conducted an inspection at the Columbia Sanitary Landfill to evaluate compliance with conditions in permit No. 101908 and issued Notice of Violation ("NOV") No. NER2013070911114026 for violations of the Missouri Solid Waste Management Law and regulations. The individual violations observed during the inspection at Columbia Sanitary Landfill Permit No. 101908 are:

a. Failing to operate in accordance with approved modifications related to leachate management in violation of 10 CSR 80-2.020(1)(F) and 10 CSR 80-3.010(5)(C)1; and

b. Failing to maintain and operate the leachate collection system in accordance with approved plans and conditions in violation of 10 CSR 80-3.010(9)(C)1 and 10 CSR 80-3.010(9)(C)2.

WHEREAS, on November 4, 2013, the Department conducted an inspection of the Columbia Sanitary Landfill, Permit No. 101908 and issued NOV No. NER20131220115442 84 for violations of the Missouri Solid Waste Management Law and regulations. The individual violations for Columbia Sanitary Landfill Permit No. 101908 are:

a. Failing to operate the site in accordance with approved plans and specification in violation of 10 CSR 80-2.020(1)(F) and 10 CSR 80-3.010(5)(C)1;

b. Failing to minimize contact between water and solid waste in violation of 10 CSR 80-3.010(8)(C)2;

c. Failing to control vectors in violation of 10 CSR 80-3.010(15)(C);

d. Failing to apply adequate daily cover in violation of 10 CSR 80-3.010(17)(C)1;

e. Failing to regrade and recover as necessary in violation of 10 CSR 80-3.010(17)(C)9; and

f. Failing to compact cover as much as practicable in violation of 10 CSR 80-3.010(18)(C)1C.

WHEREAS, the Department, the Attorney General and the City desire to amicably resolve all disputes or claims, which could be made against NOV Nos. NER2013070911114026 and NER2013122011544284 for Missouri Solid Waste Management Law and regulations violations associated with Columbia Sanitary Landfill Permit No. 101908.

WHEREAS, the Department, Attorney General and the City have discussed terms of settlement and desire to amicably resolve all disputes or claims of violations of the Missouri Solid Waste Management Law and regulations documented in the two NOVs listed above, without admitting the validity or accuracy of any such claims.

NOW, THEREFORE, in consideration of the mutual promises contained herein and other good and valuable consideration, the Department, the Attorney General and the City agree as follows:

1. The provisions of this Agreement shall apply to and be binding upon the parties executing this Agreement, their agents, subsidiaries, affiliates and lessees, including the officers, agents, servants, corporations and any persons acting under, through, or for the parties agreeing hereto.

2. In compromise and satisfaction of the allegations or claims relating to the above-referenced claimed violations, agrees, without admitting liability or fault, to a total penalty of $36,550.00. Any civil penalties paid must be by check made payable to the *"State of Missouri (Boone County)"* and

mailed along with the Settlement Agreement to: Collections Specialist, Missouri Attorney General Office, P.O. Box 899, Jefferson City, MO 65102-0889.

3. The City agrees to perform supplemental environmental projects ("SEPs"), outlined on Attachment A and Attachment B equal to at least $109,650.00 in cost to the City, which shall resolve the total penalty of $36,550.00, with the following stipulations:

a. All SEP projects on Attachment A and Attachment B must be completed within 10 months of execution of this agreement and any deadline extension requests must be submitted at least 30 days before any deadline; and

b. The City shall provide written SEP actions completed along with copies of all receipts and documentation proving cost of SEP within 13 months of execution of this agreement to "Mr. Russell Sullivan, Permitted Facilities Unit Chief, Solid Waste Management Program, P.O. Box 176, Jefferson City, Missouri 65102;" and

c. An itemized accounting of the costs incurred per project in performance of the SEPs. The itemization shall be submitted with the following statement, signed by the City: *"I certify that the information accompanying this submittal is true, accurate,*

and complete. I am aware that there are significant penalties for submitting false information to the State, its agencies and departments, including the possibility of fine and imprisonment for knowing violations."

d. The Solid Waste Management Program may dispute individual costs by showing cause to the City.

e. The City agrees to expend a minimum of $109,650.00 on SEPs as described on Attachment A and Attachment B, which include projects to develop an odor management plan, the development of recycling drop-off locations and the purchase of recyclable material picnic tables. The projects described as "odor management plan," and "development of recycling drop-off locations," must be completed. However, the "purchase of recyclable material picnic tables," is a third project that will be used to expend the portion of the SEP penalty not otherwise spent on the "odor management plan" and "development of recycling drop-off locations." Whenever possible, product purchases for SEPs must be from businesses located in Missouri.

f. Any portion of the SEPs cost of $109,650.00 to the City not expended will result in a penalty of $1.00 for every $3.00 of SEP

cost. Any penalties due will be paid within 10 days of request and as stated in paragraph 2.

g. The City hereby certifies that, as of the date of this agreement, the City is not required to perform or develop the SEPs listed on Attachment A or B by any federal, state or local law or regulation; nor is the City required to perform or develop the SEPs listed on Attachments A or B by agreement, grant, or as injunctive relief in any other enforcement action or in compliance with state or local requirements. The City further certifies that the City has not received and is not presently negotiating to receive credit in any other enforcement action for the SEPs listed on Attachment A or B.

4. The Department and the Attorney General agree not to bring or cause to be brought any civil action against the City for penalties arising out of the above-referenced claimed violations of the Missouri Solid Waste Management Law and regulations referred to in the aforementioned NOVs provided that the City comply with the terms herein.

5. The City agrees to comply with the Missouri Solid Waste Management Law and regulations.

6. No portion of any penalties paid pursuant to this Agreement may be used to reduce the City's federal or state tax obligation.

7. None of the cost incurred in implementation of the SEPs may be funded in any part by a federal or state grant or other form of federal or state financial assistance.

8. The Department and its authorized representatives shall have access to the property the City owns that is the location of the SEP at all reasonable times to monitor the City's implementation of the SEP. The City shall use its best efforts to obtain for the Department access to property not owned by the City that is the location of a SEP at all reasonable times to monitor the City's implementation of the SEP. Best efforts shall include payment of reasonable costs to obtain access. Nothing herein shall be construed to limit the Department's access authority under the Missouri Solid Waste Management Law and regulations or any other law.

9. The City agrees not to contest the validity or terms of this Agreement, or the procedures or circumstances underlying or relating to it, in any action brought by the Department or Attorney General to enforce the terms of this Agreement.

10. The Department reserves the right to enforce the terms of this agreement by initiating any action pursuant to § 260.240.1 RSMo.

11. With respect to matters not addressed in this agreement, the Department reserves the right to take any enforcement action pursuant to the Missouri Solid Waste Management Law and regulations, or any other

available legal authority, including without limitation, the right to seek injunctive relief, monetary penalties and for punitive damages.

12. The terms stated herein constitute the entire and exclusive agreement of the parties hereto. There are no other obligations of the parties, be they express or implied, oral or written, except those which are expressly set out in this Settlement Agreement. The terms of this Settlement Agreement supersede all previous memoranda of understanding, notes, conversations and agreements whether express or implied. This agreement may not be modified orally.

IN WITNESS WHEREOF, the parties hereto have executed this agreement as follows:

MISSOURI DEPARTMENT OF NATURAL RESOURCES

By: _____
Leanne Tippett Mosby, Director
Division of Environmental Quality

Date: _____

CITY OF COLUMBIA

By: _____

Printed Name: Mike Matthes

Title: City Manager

Date: _____

CHRIS KOSTER ATTORNEY GENERAL

By: _____
Timothy P. Duggan
Assistant Attorney General

Date: _____

CITY OF COLUMBIA, MISSOURI

Attest: (SEAL)

By _____
Sheela Amin
Title City Clerk

APPROVED AS TO FORM:

By _____
Nancy Thompson
Title City Counselor

Attachment A

CITY OF COLUMBIA, MISSOURI

PUBLIC WORKS DEPARTMENT

January 14, 2015

Mr. Russell Sullivan
Permitted Facilities Unit Chief
Missouri Department of Natural Resources
Solid Waste Management Program
Compliance/Enforcement Section
P.O. Box 176
Jefferson City, MO 65102-0176

Re: *Revised* Proposed Supplemental Environmental Performance Project in relation to Notices of Violations (NOVs) #NER2013070911114026 and #NER2013122011544284

Dear Mr. Sullivan:

Per the telephone discussion among MDNR and City staff on December 17, 2014, following is a revised proposal for a Supplemental Environmental Performance Project (SEPP) for your department's consideration in relation to the above referenced NOVs:

Since the issuance of the NOVs, the city landfill has experienced odor complaints and a Notice of Excess Emission was received for the date of October 29, 2014. The city has had continuing conversations with MDNR and various consultants. The city proposes to commission Shell Engineering to prepare an Odor Management Plan including the following tasks:

1.1 Identifying/Quantifying the Presence of Odor
- 1.1.1 Review of Daily Odor Surveys/Reports
- 1.1.2 Perform Onsite Baseline Survey – Summa Canisters\Hydrogen Sulfide Sampling\Analysis
- 1.1.3 Identify Likely Source(s) of Odor
- 1.1.4 Identify Potential Mitigation Procedures
- 1.1.5 Identify Public Areas that have Greatest Potential to be Affected by Odors

1.2 Development of Odor Management Team
- 1.2.1 Identify Personnel Responsible for Odor Management
- 1.2.2 Identify Main Facility Odor Contact Person for Citizens to Contact
- 1.2.3 Develop Forms/Tasks/Tools for Documenting Complaints/Investigation of Complaints/Mitigation Efforts Attempted/Results of Mitigation

1.3 Propose Documentation
- 1.3.1 Odor Self-Inspections
- 1.3.2 Odor Complaint Investigations
- 1.3.3 Odor Mitigation Research Studies
- 1.3.4 Odor Monitoring Results
- 1.3.5 Odor Management Training

Further, the city would like to purchase odor control substances to be added to spray-on ADC to test the effectiveness. Cost estimates for pursuing solutions to odors generated at the landfill along with an Odor Management Plan as identified on the enclosed SEPP budget breakdown total **$25,955.**

701 E. Broadway • P.O. Box 6015 • Columbia, Missouri 65205-6015
(573) 874-7250 • FAX (573) 874-7132 • www.GoColumbiaMo.com

For a second component to the SEPP, the city proposes to develop a recycling drop-off location on city property formerly serving as Fire Station #7 on South Providence that was decommissioned several years ago and recently cleared. The City's Drop-off Recycling program offers containers for citizens to bring commingled fibers and commingled containers that we accept in our recycling program to nine locations around the community.

The community lost one opportunity for drop-off recycling at the end of December, 2014, when Gerbes-W. Broadway proceeded with construction plans to remodel the store and install a fueling station. Citizens have submitted many comments and requests for additional sites. The southwest quadrant of the city is underserved in this area, and other sites are overloaded. The site after building demolition in 2014 is pictured at left.

The estimated cost of constructing a 10,000 sq.ft. recycling drop-off site including surface finishing, perimeter confinement, container acquisition and signage is **$85,640.** The investment made this summer to clear the lot was just over $35,000, not included in the $85,640 figure.

The city of Columbia is dedicated to waste minimization and recycling and intend to do so in an environmental, community-friendly manner. We expanded the plastics we accept for recycling in early January to include #3-7 and other #1-2 not formerly accepted, with the exceptions of film and Styrofoam. The market value to these "other plastics" is very low, but waste diversion is the focus and we are responding to several years of customer requests to accept more plastics.

Overall, this brings the sum of our proposed SEPP to **$111,595.** We appreciate the Department recognizing our efforts and working with us to resolve these NOVs. Please advise if this is acceptable to the Department or if you need additional information from us. I can be reached at cmmitche@gocolumbiamo.com or 573-874-6290.

Sincerely,

Cynthia M Mitchell

Cynthia M. Mitchell
Solid Waste Utility Manager

enc.

c: Cavanaugh Noce, Deputy City Counselor
David A. Nichols, PE, Assistant Public Works Director
Nicholas Paul, Landfill & Recovery Superintendent

CITY OF COLUMBIA SEPP COST ESTIMATE BREAKDOWN (NOVs #NER20130709111114026 & #NER2013122011544284)

1/14/2015

New Recycling Drop-Off Site - S. Providence

	Qty	Unit Cost	Cost
WALL			
Blocks			
2'X2'X6'	50	$40.00	$2,000
2'X2'X4'	2	$40.00	$80
2'X2'X3'	8	$30.00	$240
Corner	4	$40.00	$160
Top Cap			
1'X2'X6'	33	$30.00	$990
1'X2'X3'	2	$25.00	$50
Paint	6	$45.99	$276
Primer	6	$35.19	$211
			$4,007
FENCE ABOVE WALL			
4' Coated Vinyl Chainlink - James Fencing est	250'		$6,200
CONCRETE			
Cook Concrete est.			$38,478
Rough up esixting concrete for traction & fill in former interior drains			$1,525
CONTAINERS			
10 Yard Rearloaders	6	$1,586.00	$9,516
Frieght	1	$453.00	$453
			$9,969
SIGNAGE FOR SITE AND EDUCATIONAL KIOSK			$2,000
RAIN GARDEN & WILDFLOWER EDUCATION SITE			$3,000
MATERIALS & CONTRACTED LABOR EST			$79,155
CITY LABOR & EQUIPMENT EST	Hours	Avg. Rate	
Equipment Operator/Sr. Refuse Collector	160	$26.90	$4,303.94
Wheel Loader	80	$27.26	$2,180.80
SITE TOTAL			$85,640

Landfill Odor Management Plan

	Qty	Unit Cost	Cost
Shell Engineering air sampling, analysis, reporting & completion of odor management plan including evaluation of feasibility, cost and benefit of automated monitoring	1	$15,830	$15,830
Benzaco Odor Control added to ADC, $135/load	75	$135	$10,125
SITE TOTAL			$25,955

BUDGET FOR TOTAL PROPOSED SEPP	$111,595

January 8, 2014

RE: Proposal for Odor Management Plan for City of Columbia Sanitary Landfill

Dear Ms. Mitchell:

Shell Engineering & Associates, Inc. is pleased to submit the following proposal to assist you in developing an odor management plan for the City of Columbia Sanitary Landfill. Please find below the proposed services along with the costs and terms.

SERVICES PROVIDED:

1. Perform Onsite Baseline Survey – Summa Canisters\Hydrogen Sulfide Sampling\Analysis

   We propose taking eight baseline samples at various locations around the landfill, compost area, and property boundary. The samples will then be analyzed for VOC/TO-15 list plus TICS and hydrogen sulfide and mercaptans per ASTM D 6228. We also propose using a hydrogen sulfide monitor to determine hydrogen sulfide concentrations at various locations during the sampling day.

2. Report on Sampling Results

   Analysis of sampling results and written report

3. Complete Odor Management Plan Based on the Attached Draft Outline

   Plan will include information on identifying and quantifying odors, potential mitigation procedures, development of odor management team, odor management training, and proposed documentation/recordkeeping.

4. Review Feasibility, Cost, and Benefits of Automated Monitoring

Costs:

The estimated cost for completing the services as outlined above is estimated to be as follows.

Summa Canister and Controller Rental (8 canisters) plus lab analysis of results (VOC/TO-15 list plus TICS and hydrogen sulfide and mercaptans/ASTM D 6228)	$6,900
Hydrogen Sulfide Monitor (one day rental)	$1,150
Labor (1 engineer x 8 hours x $130/hour plus 1 technician x 8 hours x $90/hour)	$1760
Analysis and Report on Sampling Results (1 engineer x 10 hours x $130/hour)	$1300
Completion of Odor Management Plan (1 engineer x 24 hours x $130/hour)	$3120
Review Feasibility, Cost, and Benefit of Automated Monitoring (1 engineer x 4 hours x 130/hour plus 1 technician x 12 hours x $90/hour)	$1600
TOTAL ESTIMATED COST	**$15,830**

Terms:

This work will be done on a not-to-exceed basis, unless the scope of the work changes. Follow-up work requested by any regulatory agency or by the City of Columbia is not included in the above costs. Any additional work outside the scope of this proposal will be performed on a time and expense basis in accordance with our current fee schedule after your approval.

We appreciate the opportunity to submit this proposal. If you have any questions regarding this proposal, please feel free to call me at (573) 445-0106.

Sincerely,
Shell Engineering & Associates, Inc.

Karen Curtit, P.E.
Senior Project Engineer


Outer Rd.

Attachment B

CITY OF COLUMBIA, MISSOURI

PUBLIC WORKS DEPARTMENT

January 30, 2015

Mr. Russell Sullivan
Permitted Facilities Unit Chief
Missouri Department of Natural Resources
Solid Waste Management Program
Compliance/Enforcement Section
P.O. Box 176
Jefferson City, MO 65102-0176

Re: Additional detail for *Revised* Proposed Supplemental Environmental Performance Project in relation to Notices of Violations (NOVs) #NER2013070911114026 and #NER2013122011544284

Dear Mr. Sullivan:

The following timeline and accompanying information are in support of the SEPP revision letter mailed to you on January 14, 2015.

Upon receipt of signed SEPP agreement from MDNR, the city Solid Waste Utility intends to proceed to process a purchase order to Shell Engineering for the Odor Management services described for $15,830. We will also order the Benzaco odor control product (Quote from SEPP budget of $10,125) and begin applying with our spray-on ADC as weather allows and odor conditions warrant. Benzaco information is enclosed. Associated tasks are laid out on the timeline below:

Months following receipt of MDNR Signed SEPP Agreement	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
Initiate & Complete Odor Management Project with Shell Engineering	■	■	■							
Evaluate & Plan Future Odor Management as Identified in Odor Management Project			■							
Order Odor Control Agent	■									
Utilize Odor Control Agent	■	■	■	■	■	■				
Report Progress to MDNR as Desired										

The odor management team from the city's landfill staff to work with Shell Engineering and implementing any actions and operational changes resulting from the study and plan, will include the following, in addition to myself: Landfill & Recovery Superintendent, Bioreactor Specialist, Public Works Supervisors III and II and Equipment Operators and Temporary Laborers as work is assigned. The city will proceed with the most feasibly effective odor control management plan following the SEPP project.

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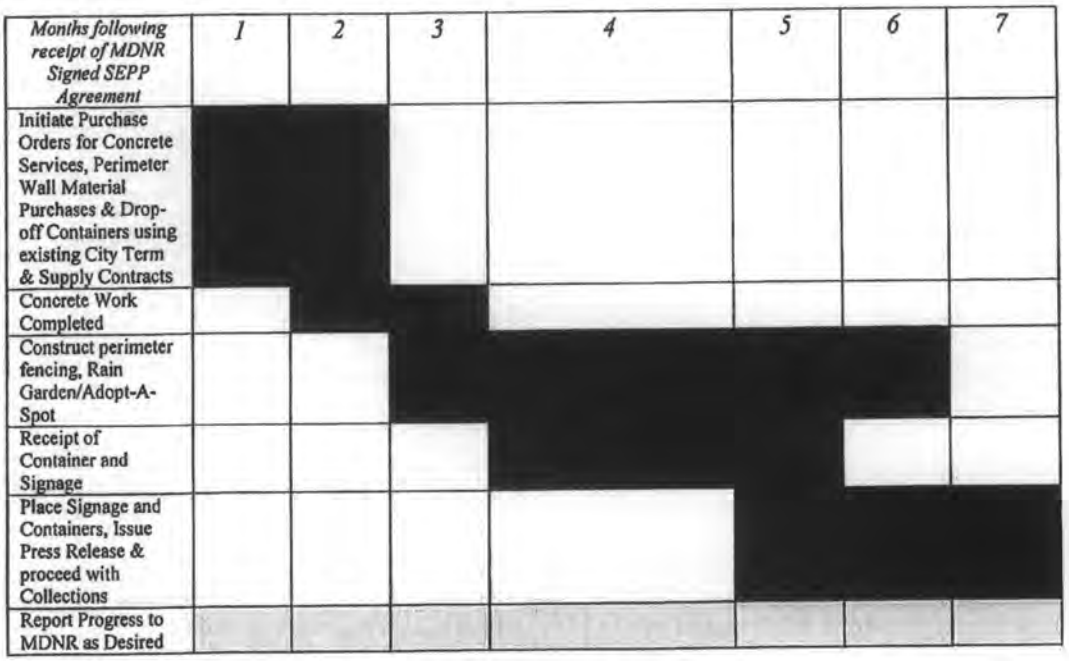
Regarding the Recycling Drop-off portion of the SEPP, the city has prepared the rendering as previously provided and is working through the process of public notification and plans to hold the Public Hearing at a city council meeting in early March. This is the local process for project approval. Upon receipt of the signed SEPP agreement, city staff will proceed to process purchase orders for previously quoted materials and services as outlined in the $85,640 budget for this portion of the SEPP. Tasks on a timeline are exhibited below:



The recycling drop-off site project team of city staff will consist of, in addition to myself, the Collection Superintendent, the Waste Minimization Supervisor, Public Works Supervisors III and I, Storm Water Educator (for Rain Garden component), and Volunteer Coordinator (Adopt-A-Spot component.) Perimeter construction will be completed by Equipment Operators and Refuse Collection employees under the supervision of the above positions.

Please advise if you have additional questions or need more information. I can be reached at cmmitche@gocolumbiamo.com or 573-874-6290.

Sincerely,

Cynthia M. Mitchell
Solid Waste Utility Manager

enc.

c: Cavanaugh Noce, Deputy City Counselor
David A. Nichols, PE, Assistant Public Works Director
Nicholas Paul, Landfill & Recovery Superintendent

Benzaco Scientific

Engineered Dust and Odor Control

Neutralizing Waste Industry Odor with the Benzaco Advantage

The Benzaco Advantage:

The Benzaco Advantage combines the acquired knowledge and expertise of our people with high quality products and equipment. By doing business with Benzaco, our clients are provided with the products and services which quantify the value of "avoided problems and related costs".

For more information on Benzaco Scientific engineered solutions for odor control, visit our website www.benzaco.com or contact your Benzaco Scientific Sales Representative, Rick O'Sadnick at 202.258.4777 or rick@benzaco.com

Introduction

Engineered Solutions for Odor Control in the Waste Industry

Controlling odor is one of the most challenging and frustrating problems facing waste handling professionals today. Nothing animates people faster than putrid odors wafting through the air in their neighborhoods. No one wants the foul odor of garbage drifting through their backyards or into their homes.The emission of odors has become much more than a mere nuisance problem for most landfills, composting facilites and waste transfer stations. Heightened environmental awareness has elevated odors in the public mind from a mere nuisance to a perceived health hazard. Although the odor may be harmless, public pressure can mount to the point that the facility has no choice but to either eliminate the odor or shut down.

BENZACO PRODUCTS ARE DESIGNED TO HELP YOU ACHIEVE OPERATIONAL ACCEPTANCE WITHIN YOUR COMMUNITY.

Benzaco Scientific has the solution for controlling and neutralizing odors. Our ODOR-ARMOR® products are unique applications for use in odor control technology. Applied as an atomized spray to the odor, the products react to alter the odor molecules, rendering them odorless and imperceptible. Unlike alternatives, ODOR-ARMOR® products are designed to neutralize odor molecules – reducing the overall odor intensity. ODOR-ARMOR® products are not masking agents or perfumes which may actually increase the level of odor. ODOR-ARMOR® products are true neutralizers!

Benzaco Scientific is in the business of odor control technology. That is our only business and we believe we are the best at it. We also know the business of waste handling and the regulatory and community concerns that go along with it. Benzaco engineers and representatives are knowledgeable about every step of the waste handling and disposal process. In every step of Solid Waste Handling, Benzaco Scientific can design or advise on operational and chemical solutions to fit the application.

We know too the unique budget and cost concerns a solid waste site can have. Because our products and equipment are designed to work with the individual odor concerns of the waste industry, Benzaco Scientific representatives work with sites to ensure the highest value for the lowest use cost.

Why do Business with Benzaco Scientific for Odor Control?

Benzaco Scientific Organization

Benzaco is a privately held company that has specialized in the odor control industry for more than 20 years. Headquartered in Washington, DC with sales offices in Chicago, Illinois, and St. Catharines, ON. We manufacture our chemical odor control products and equipment at our facilities in Virginia.

Odor Control Products

Benzaco has developed a line of chemical products that eliminate odor control problems in virtually every industry and application. Our products are designed to neutralize odors not merely mask the odor. We have extensive practical knowledge and our ongoing R&D has allowed us to offer our clients the most effective products in the market place from a performance AND cost standpoint. Our products are non toxic, non hazardous, bio-degradable and absolutely safe in every respect.

Equipment Products

Benzaco recognizes that chemistry is only half the battle in odor control applications. The best chemistry can fail if incorrectly applied. We design and build our own equipment specifically for vapor phase odor control. The equipment is designed and built to minimize the problems unique to a specific application. That means we will customize a system to your specific application. ***Engineered solutions for odor control.***

Services

Benzaco provides consulting services in all areas of odor control. We provide expertise in the design, building and application of odor neutralization by mechanical and chemical methods to your entire process. We know your business and we know the regulations that apply to your business. Our odor control experts are available to support our customers as they tackle the ever-changing regulatory requirements for odor.

The Benzaco Advantage

Why do business with Benzaco? Odor control is our only business. We are specialists. We are manufacturers. We research, design and manufacture our own chemical products and equipment. We are engineers who design, build, install and service our equipment and systems. We are partners in business with our clients. We want a customer for life not for just an order. We make it easy to do business.

Why do Business with Benzaco Scientific for Odor Control?

The Benzaco Advantage

1) Specialists – We only do odor control. It's not a "side" item. That means you get odor control experts, not just peddlers. We also make it our business to know your business and the regulations that apply.

- Engineers
- Chemists
- Service representatives
- Installation service

2) Manufacturers – We only do odor control. We research, design, manufacture and apply our own products. That means you get quality and results.

- 20 years of expertise
- Research by olfactory chemists
- Supported by odor control experts
- Subtractive odor control … Products that work

3) Engineering – We design, build, install and service our systems. That means you get high quality and reliability from the time of installation onwards.

- All systems designed for odor control not retrofitted to make work
- Years of research went into product development
- All systems are custom built to fit the application

4) Partners in business – We want you as a customer for life not just for an order.

- Volume pricing
- Long term references
- On going, on-site service
- Consulting Services
- Custom formulated products/private label

Benzaco Scientific is in the business of odor control.
It's our only business and we believe we are the best at it!

Solid Waste Application in Operation

Our Client Companies

Benzaco Scientific treats landfills, composting operations and transfer stations in all regions of the United States. Many sites experience unique and difficult odor control problems that we have solved by operational, housekeeping and chemical application.

We would be happy to provide industry specific references.

Case History – California Landfill

Landfill in Environmentally Sensitive California Eliminates Odor and Reduces Odor Control Costs by Over 80%

The Problem

Co-composting with sewage sludge caused sensitive odor issues at a California landfill. The handing and drying of the sludge as well as regular landfill refuse caused escalating complaints in an especially environmentally conscious county. Since 1995, the landfill had been attempting to solve these nagging odor issues with a wide variety of odor control methods and delivery systems.

The Objective

Design ONE system to eliminate the odor emissions from the VARIOUS individual operations at the facility.

The Approach

Benzaco Scientific engineers characterized, quantified and prioritized the odor emissions emanating from the individual operations at the site. Based upon this evaluation and the identification of specific malodorous compounds, Benzaco Scientific designed and piloted a high pressure vapor phase control system operating at greater than 500 PSI to deliver a complex essential oil odor neutralizing agent.

The Results

Despite being initially skeptical, site personnel were impressed and convinced. The site installed three full-scale systems to cover the entire site. Since that time, odor complaints have dropped off from over 20 a month to less than 2 a year. More importantly, odor control costs have dropped dramatically. The facility was paying almost $200,000 a year for the previous unsuccessful system. Now, less than $12,000 per year.

Case History – Waste Transfer Station

The Problem

Odors and dust constantly wafting from waste at a Pennsylvania transfer station caused so many complaints from plant neighbors the Department of Environmental Protection threatened to close the plant if they did not eliminate odors.

The Objective

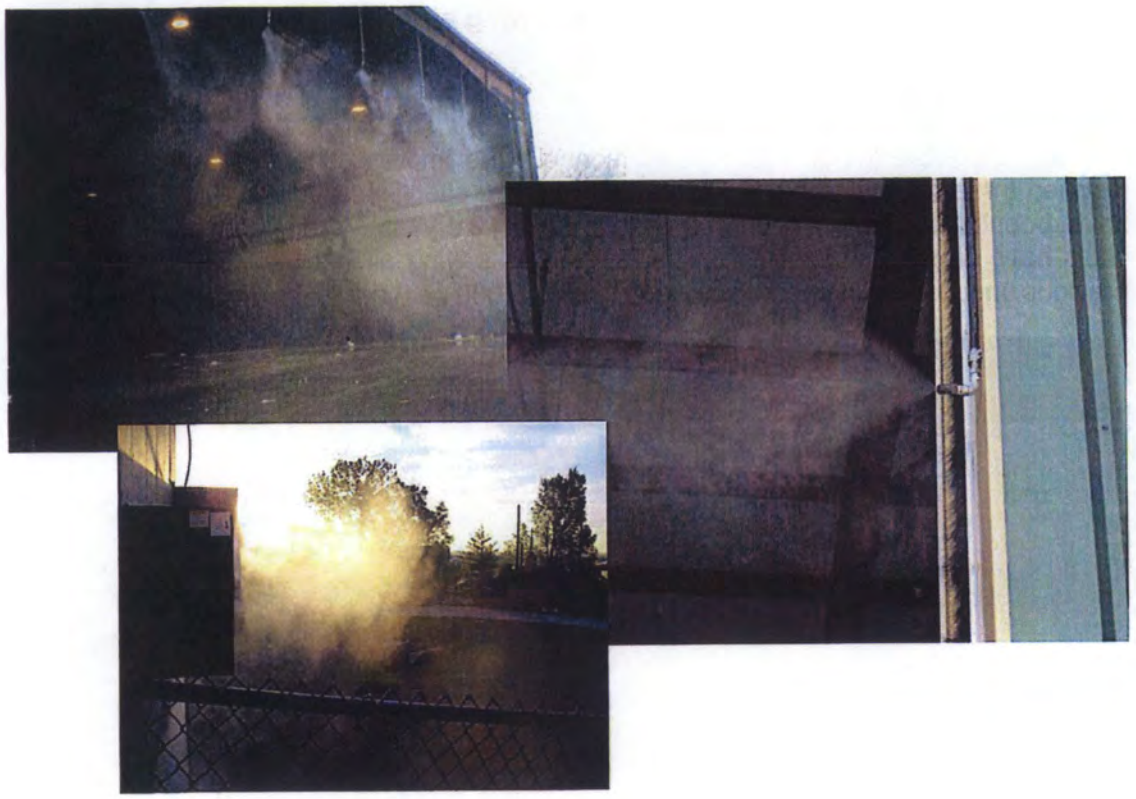
Design a system that would suppress dust when necessary while completely eliminating odors.

The Solution

Benzaco Scientific engineers designed a chemical delivery system with a concentration of nozzles to provide dust suppression AND application of ODOR-ARMOR® products.

The Results

The plant neighbors are smiling. And the plant is smiling – they reduced odor AND dust complaints to fewer than one or two a year!



Benzaco Scientific

Engineered Solutions for Odor Control

FAQ on Odor Control

1) What makes Odor Armor® so different from other essential oil odor control products?

One of the critical things to understand about essential oil technology for odor control is that not all essential oils are created equal. Essential oils used in odor control are extracts of many different fruits, vegetables and other plant material. There are thousands of these oils available and many find their way into perfumes and fragrances as well as solvents, flavor enhancers, cooking oils and other uses. However, there are a very limited number of these oils effective for the process of odor elimination.

The oils used in odor control display certain critical chemical properties that allow the oil to have a physical or chemical effect on odorous compounds. The effectiveness of any odor control product is directly dependent on how well the oils are chosen and blended to effect the correct chemical or physical reaction on those odorous compounds. Benzaco has spent years in the pursuit the IDEAL formula for odor control using essential oil technology. We believe that Odor Armor® is the best technology on the market today.

Benzaco has developed a line of odor control products that is more effective, in terms of both odor elimination and cost effectiveness, than any of our competitors' products.

2) How does essential oil technology work to eliminate odor?

Three simple reactions occur allowing Odor Armor® to effectively and safely eliminate odors.

1) chemical absorption of the malodor
2) chemical solubility of the odorous compounds
3) counteracting odor through antagonistic pairing

The chemistry involved utilizes the unique characteristics of each oil in the product to optimize the simple reactions. The result is complete odor elimination without harmful byproducts or the use of hazardous chemicals.

3) I've been told that essential oils are perfumes and fragrances; is Odor Armor® a masking type of product?

Many essential oils are indeed fragrances and are used in perfume formulations; however, not all essential oils are fragrant or used as fragrances. Odor Armor® is a blend of oils that though having some fragrance is not suitable to mask an odor. It simply does not contain a high enough level of fragrance to do so. Even at very high dosage without the presence of odorous compounds Odor Armor® is only mildly fragrant and the fragrance is nondescript. A masking agent is usually made up of one distinct fragrance that is readily detectable and

increases in intensity as the dosage is elevated. Masking agents add to the overall odor intensity by introducing an odor greater than the offending malodor often resulting in an even greater odorous condition. Odor Armor® is true neutralizing chemistry that reduces and eliminates odor.

4) What is the best way to determine if a product will work to eliminate my odor?

The best instrument yet devised for odor monitoring is still the human nose. A simple lab test using a sample of the odor causing material and a dilution of Odor Armor® at the expected dosage for treatment is all that's needed to get a good notion of whether the product will work. A simple testing procedure is available on request. Beyond that simple lab test, an actual trial on the offending area of the plant or site can also be arranged and easily accomplished with minimal expense. If the product is going to work either of the above methods will easily determine that.

5) How many others offer vapor phase technology?

A number of companies operate in the odor control market. Those companies are scattered throughout the U.S. and are generally regional in scope. We are aware of 15 to 20 small companies offering limited products, equipment and expertise. Often their offering is not a true neutralizing technology, but a combination of masking technology, perfume and some degree of neutralizing capability. There are also a tremendous number of janitorial service companies that dabble in odor control. The offerings are usually masking agents.

6) What do you mean "not a true neutralizer"?

Most companies offer a neutralizing product or line of products that are a blend of only a handful of essential oils. Often the primary component is pine oil or some other commodity essential oil. Though pine oil is effective in some cases, it falls far short of complete effectiveness. Because the products are not effective at odor neutralization, the products are blended to contain a fragrance to compensate for the shortfall. These products have limited applications and are not effective on most odors. In addition, the products require very high dosages to achieve even limited effectiveness, yet they often cost as much or more as Odor Armor®.

7) Is Odor Armor® safe to use?

Odor Armor® is nontoxic, non-hazardous and absolutely safe to use.

8) How quickly will Odor Armor® work?

Lab data has shown that the reactions occur within seconds of contact with odorous gasses and go to completion within seconds more. That means that you can be sure that the product will neutralize odor before it leaves your site thus eliminating odor complaints. Further, unlike masking agents, which can separate from the odor, the Odor Armor® reactions are nonreversible and will not separate from the Odor Armor® and cause problems downwind of the site.

9) Is the same product good for all applications?

Odor Armor® is formulated to address a broad spectrum of odorous conditions because odors are seldom-simple one or two component gasses. The design of the product is such that it will effectively respond under changing odor intensity as well as changing odor characteristics. Because of this, it is unusual to find an application where Odor Armor® will not work.

10) Will Odor Armor® work under all conditions?

As long as the conditions being treated do not change too dramatically from moment to moment, Odor Armor® will work beautifully and without much attention to the dosage. However, if there are large swings in odor causing conditions the product may need dosage adjustment, as would any chemistry that works by neutralization.

11) Will Odor Armor® work on all odors?

In tests and applications, Odor Armor® has worked on nearly all odors. Some applications have required a different combination of ingredients because of a particular odorous compound. Benzaco can formulate to any application needing a unique product for odor control.

12) Can I test the treated air to determine effectiveness?

No. There are no easy or economical ways to quantify the treatment. However, the best test is using your nose. If it works, you won't smell anything. If it doesn't work, you will smell the odor. If it's overfed you may get a slight smell of a nondescript fragrance that's very slight but pleasant. If it's underfed, you will get odor that will be at a reduced level from before treatment. In that case, all that's needed is some slight dosage adjustment.

13) What about winter operations, does the product freeze?

The product in its concentrated form freezes at about 25 degrees F but there is no detrimental effect on the efficacy or stability of the product. In its diluted form, the solution will freeze at about 30 degrees F. Since the diluted form is a water solution, it must be freeze protected by heat tracing if freezing is a potential.

14) What references do you have and what have you treated with your products?

Benzaco has been in the odor control business for over twenty years. We have treated everything from smoke odor in airplanes to rendering plants to solid waste and sewage. We have extensive experience in odor control from every aspect - chemical, mechanical, equipment and application. We CAN engineer a solution to your odor control problem. References are available upon request.

15) Can I add Odor Armor® to my system water to affect odor control?

Though the product can be used in the water phase it is not the most effective or economical method for its use. The chemistry of neutralization requires intimate contact of the oils and odorous compounds in the vapor phase. The volatility of the oils changes

dramatically when added to a water stream. More product would be required to effect the same results as a fraction of product use in the vapor phase. It's just not economical.

16) Can I add Odor Armor® to my sludge/compost/working face etc to affect odor control at the surface?

Absolutely. Odor Armor® is an exceptional odor control agent when added to surfaces emitting odorous compounds. You would get excellent odor control as long as there was Odor Armor® present on the surface in question. Because the Odor Armor® would evaporate along with the odorous compounds, a fresh dosage should be added when odor returns.

17) Can I spray Odor Armor® on odorous equipment and containers?

Yes. Surfaces treated with Odor Armor® remain odorless as long as the product remains on the surface.

18) I am considering using a scrubber on my exhaust gasses; do I still need to treat?

Scrubbing is an excellent mechanical method of removing the bulk of the odorous gas coming from a process. However, there are certain limitations to scrubbers that one needs to consider before buying and utilizing a scrubber as a means of odor control.

1) Is the odorous gas water soluble to the levels that are below the odor detection limit for that compound?
2) What will be required to establish and maintain the proper water chemistry to allow efficient operation of the scrubber?
3) What are my ongoing operational and maintenance costs?
4) What will I need to do during scrubber downtime?

The use of scrubbing can indeed reduce the requirement for odor control but often it will not eliminate it. The question then becomes which method is more economical and easier to administer or is a combination of the two the best way to go?

19) Can I use activated carbon as a means of odor control?

Activated Carbon can be a suitable means of mechanical odor control as long as the limitations of the applications are considered. Activated carbon is really only suitable for the elimination of hydrogen sulfide. Beyond that, the method either does not work at all or is severely limited in its ability to adsorb odorous gases. Processes that may have high voc content or are high in oils and greases also limit the carbon. Fouling of the carbon bed by the oils or rapid use of the bed capacity by the volatile organics would require frequent cleaning and regeneration of the carbon beds thus adding to the overall cost of the program of odor control.