

APPENDIX I

- **Hazards and Hazardous Materials Background Information**

--An Assessment of Potential Impacts to Public and Worker Health –
Occupational Safety and Health Audit of the Composting Facility
(October 2010)

--An Assessment of Potential Impacts to Public and Worker Health –
Public Impacts
(November 2010; Revised January 2011)

--Environmental Health Memo
(December 2010)

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**An Assessment of Potential Impacts to Public and Worker Health
Posed by the
Cold Canyon Landfill and Composting Facility
San Luis Obispo County, Ca.**

Occupational Safety and Health Audit of the Composting Facility

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October 7, 2010

Introduction

The Cold Canyon Landfill and composting facility (see photo 1) is the subject of community concern regarding human health risks, composting activities, and odors. Two phases of investigations have been initiated in a step-wise approach to ascertain a basis for these concerns. This report constitutes Task 3 of three tasks that are part of Phase 1 designed to document existing conditions at the landfill composting facility. Task 1 consisted of the review and evaluation of obtainable air, surface water, and groundwater monitoring data from the RWQCB, SLO County Air Pollution Control District, SLO County Environmental Health, Cold Canyon Landfill, the California Department of Resources Recycling and Recovery (Cal Recycle), and scientific articles addressing potential hazards from composting activities. Task 2 included the preparation, administration, and evaluation of a questionnaire designed to determine the frequency and spatial location of persons claiming symptoms, the types and frequency of symptoms alleged, and the alleged observable impacts to eco-receptors. The questionnaire has been developed and administered and the responses are now being evaluated. Phase 2 consists of additional environmental monitoring (if appropriate) and the preparation of a human health risk assessment addressing the potential hazard and risk posed by the facility.

Occupational Safety and Health Audit of the Composting Facility

A site visit and audit of the composting facility was conducted on August 25, 2010. It was initially proposed that this audit would serve to identify potential sources of worker exposure, include interviews with workers and management, and determine if Cal-OSHA regulations pertaining to a composting activity were being followed. If worker exposure above Cal OSHA standards was suspected, a sampling and analysis plan would be recommended in Step 2.

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During the audit, Mr. Lacy Ballard answered all questions posed and accompanied the auditor around the composting facility and landfill. Also present during the initial questioning was Mr. Randy Friedlander, IWMS, CalRecycle, State of California. It was by coincidence that Mr. Friedlander was on the site during the time of the audit and his presence was most beneficial.

The following topics were reviewed and evaluated during the audit:

Site Design:

- It is well established in the composting industry that the presence and location of berms, windbreaks, trees, and windrows greatly aids in the composting activity and in the prevention of potentially hazardous bioaerosols.
 - During the site tour via an enclosed vehicle, it was clear while berms existed on the north, east, and west sides of the composting area (see photo 2; all directions are approximate as the compost area is not laid-out in a direct N-S alignment), no artificial windbreaks or trees were strategically placed to assist in the diminution of odors moving off-site and no berms were located on the south end thus allowing free movement of air onto or from the composting area (see photo 3).
 - The windrows, however, were placed at appropriate separation distances and were of appropriate height.
- Recommendations:
In order to better control the off-site migration of bioaerosols, dusts, and odors, any compost facility at the Cold Canyon Landfill should have wind breaks and vegetation on all four sides.

Operations:

- The application of a fine water spray when “turning” compost windrows is important to maintain odor control.
- This practice was conducted at the site although no “turning” was conducted during the time of the audit.
- Reduction or cessation of compost windrow “turning” during periods of increased wind speeds also helps keep odors from migrating off-site as “turning” causes a significant increase in odors.
- Although this facility’s SOP is to “turn” the windrows in the morning when wind speeds tend to be lower, it does not have any wind-speed cut-off limit.
- Maintaining a compost moisture content at ~55% is the best for composting activity and shortens the composting time.
- The stated practice is a moisture range of 50-60%, determined by the “hand test”.
- Maintaining the compost windrows at a height of no more than 10 ft. high and a temperature of not more than 140 °F is optimum for composting activity which also decreases odor production.
- The facility keeps its windrows at 8 ft. or less (see photo 4) and monitors the temperature during the pathogen cycle so that it is less than 140 °F.

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- During the tour of the compost facility, moderately strong odors were noticed downwind close-in (within 50 ft.) of a compost windrow but not upwind. (Wind direction that morning was toward the landfill – N by NW – and wind speed was light, estimated at <3 mph.) The odor was only considered “strong” when observing a front-end loader moving a pile of screened-out waste into a haul vehicle. This waste also was dry and a considerable dust cloud was generated when the pile was disturbed and loaded into the haul vehicle (see photo 5).
 - Dust was also generated during the “screening” procedure when the compostable material was dropped onto the site for movement to the windrows. The material was dry and dust could be seen coming from the pile (see photo 6).
- Recommendations:
- Generation of dust during any movement of compost material or green waste should be kept to an absolute minimum by adding additional moisture via a water spray and establishing a “high wind” shut-down level for activities that generate dust. Visible clouds of dust should be avoided. While the “hand test” for soil moisture is adequate on some days, actual soil moisture should be measured by instrument on most days.

PPE (Personal Protective Equipment):

- NIOSH and other occupational safety and health institutes recommend the use of environmental cabs on heavy equipment used to move composting material around a facility. Environmental cabs have climate control, HEPA filters, and special door seals that are regularly inspected and replaced to ensure a controlled environment for the operator.
 - This facility has no environmental cabs but does operate front-end loaders with an operator cab. One cab is newer and is equipped with AC and HEPA filters (photo 5) but not with advanced door seals and there is no seal inspection and replacement program. The other cab is enclosed but it is an older model that lacks AC and HEPA filters. All workers have N95 dust mask respirators available which are approved for use at composting facilities but none of the workers or management seen during the audit wore these respirators. It was stated that the workers are not required to wear them and most workers do not wear them during loading, screening, turning, or while in the cab. They usually wear them when grinding. (The auditor wore a N95 dust mask when stepping outside the vehicle at the compost facility.)
 - It was stated that no air monitoring has been conducted in the history of the compost facility.
 - The potential for workers to contract ODTS (Organic Dust Toxic Syndrome) is real.
- Recommendations:
- The cabs of heavy equipment should be inspected for poor window and door seals and worn seals replaced. Workers should be required to wear N95 dust masks when not inside a heavy equipment cab, auto, or truck if at the compost

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facility when turning, grinding, screening, or the movement of any compost or green waste material is occurring. A baseline air monitoring evaluation program should be implemented and follow-up programs established based upon the results of the baseline program.

Training and Education and Medical Surveillance:

- Workers were shown a respiratory protection video.
- Only a hearing protection program is administered; no other programs.
- Annual fire training is conducted.

- Recommendations:
Workers should be trained in better housekeeping procedures and encouraged to change clothes at the facility. A medical surveillance program for workers should be established to ensure early identification of symptoms related to ODS. This program should include, among other components, tetanus and Hepatitis A vaccinations, health checks prior to commencing employment to identify predisposing conditions, instructions to report any unusual respiratory symptoms to management, and annual medical exams.

Housekeeping:

- Workers at the compost facility and at the landfill have lockers and changing rooms available. However, according to Mr. Ballard, the lockers are seldom used and while some workers do change out of work clothes before heading home after their shifts, most compost site workers wear their work clothes home. This is poor housekeeping practice as it is well known that workers can bring toxic substances, mold, bacteria, and viruses home and spread them to household members.
- The compost facility is kept neat and the dirt areas around and between the windrows and the area around the screening are kept clear of significant amounts of compost materials.

- Recommendations:
Workers should be required to change out of their work clothes before leaving for home.

Fire Detection and Suppression:

- Water trucks and 20-lb fire extinguishers are present on-site.
- Annual fire training of employees is conducted.
- There have been no fires at the compost facility since its start (there was a fire at the working face of the landfill last spring).

- Recommendations:
none

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Vector control:

- It was stated that little vector control is needed or used because no food waste goes into the compost material.
- Recommendations:
none

Odor Control:

- Control consists of maintaining reduced moisture content and maintenance of compost windrows at temperature less than 140 °F.
- An odor suppressant was tried and discontinued.
- Recommendations:
In order to better control the off-site migration of odors, any compost facility at the Cold Canyon Landfill should have wind breaks and vegetation on all four sides. Generation of dust during any movement of compost material or green waste should be kept to an absolute minimum by adding additional moisture via a water spray and establishing a “high wind” shut-down level for activities that generate dust. Visible clouds of dust should be avoided. Actual soil moisture should be measured by instrument.

Public Health Issues:

It is well documented in the scientific literature that composting operations are sources of ammonia, respirable dust, and bioaerosols that contain bacteria, endotoxins, and molds at varying times of the year and at varying concentrations. Monitoring data from other composting facilities across the country show that the airborne concentrations of dust, ammonia, bacteria, endotoxins and molds in bioaerosols coming from green waste are often many times higher than those coming from composting piles made from food wastes and sewage sludges (NIOSH 1999. Health Hazard Evaluation of Springfield MO composting facility). Since acceptable levels of bacteria, molds, and endotoxins have not been established, maintaining practices that limit the production, dispersion, and public exposure are to be emphasized. However, additional studies have shown that the airborne concentrations of the pathogens in the compost bioaerosols diminish greatly over distance (down to background at 200 m or 656 feet or ~ 1/10 mile) and present an insignificant risk to the off-site public (The Composting Association of Great Britain and The Health and Safety Executive of the United Kingdom. 2003. Occupational and Environmental Exposures to Bioaerosols from Composts and Potential Health Effects – A Critical Review of Published Data). According to this report, the public which comes on the compost site, either to drop off green waste or pick up compost material for personal use, experiences greater exposure than on-site workers and hence the greatest risk of contracting ODS.

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➤ Recommendations:

Although data concerning on-site airborne concentrations of bioaerosols is somewhat limited, existing studies demonstrate that occupational on-site exposures can be effectively limited by engineering controls, administrative controls, and PPE. On-site public exposure, however, has not been widely studied but those that have addressed this issue show that the risk of ODS can be significant. The public dropping-off green waste should be directed to keep their vehicle windows closed and have the climate control on interior air recirculation when in the composting area. The public should also be educated and encouraged to purchase and use a NIOSH N95 dust mask when outside their car while in the compost area. Regarding off-site public exposure, although the data is sparse, the existing studies that included sampling off-site have indicated a low risk to the off-site public is posed by bioaerosols emanating from the compost piles. If an additional level of certainty or comfort is desired, or if specific monitoring is desired for the Cold Canyon Composting facility, on-site and off-site monitoring can be conducted.

Discussion

The composting facility was started in 1996 and has been operating under a modified permit since 2004. At the time of the audit, the composting operation had ceased grinding new green waste for composting. The existing compost windrows were being turned, watered, monitored, and allowed to complete the compost process but no new windrows were being added. The existing composting was expected to be completed by the end of October. As per the RWQCB Order, all compost material must be removed from the site unless the project owner complies with the drainage repair order or obtains a variance to allow it to continue to sell the compost. It was estimated that at the current compost sale rate, it would take into 2011 to sell all of it. The landfill continues to accept green waste as it now goes to the grinder which was moved to an area near the open face of the landfill operation and ground green waste was being used as alternative daily cover.

Odor complaints from the neighbors have been verified by Mr. Randy Friedlander of CalRecycle. One such verified complaint resulted in the issuance of a Notice of Violation (NOV). Mr. Friedlander described the odors as “burnt wood” and “fresh green waste”. He has not confirmed an odor of “dog poop”.

A discussion of enclosing the composting activity disclosed that the landfill had considered doing that but that past experience with an enclosure at a landfill in Washington State led the parent company to decide against enclosing compost operations. It was stated that the high levels of ammonia produced by the composting action caused corrosion on the inside of the building. Instead, the landfill is considering relocating the composting activity to a higher location near the middle of the landfill.

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Conclusions and Recommendations

This compost facility is aware of and follows what can be considered Best Management Practices (BMPs) for maximizing composting action and minimizing odors with a few notable exceptions. [note: BMPs for composting operations are in the process of development by CalRecycle. This audit refers to BMPs developed by New York State Department of Environmental Conservation, U.S. EPA office of Solid Waste, Cornell University Waste Management Institute, and the Department of Environment and Conservation of New South Wales Australia.] The facility also adheres to Cal OSHA standards regarding safety and health of the workers but also with a few notable exceptions. It is highly recommended that if composting is continued at the landfill, that the recommendations made in this report be implemented, especially those designed to control odors and public exposure to bioaerosols.

Photo 1



Photo 2



Photo 3



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Photo 4



Photo 5



Photo 6



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Posed by the
Cold Canyon Landfill and Composting Facility
San Luis Obispo County, Ca.**

Public Impacts

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**November 1, 2010
Revised January 19, 2011**

Introduction

The Cold Canyon Landfill and composting facility (see photos 1, 2, and 3) is the subject of community concern regarding human health risks, composting activities, and odors. Two phases of investigations have been initiated in a step-wise approach to ascertain a basis for these concerns. This report constitutes Task 2 of three tasks that are part of Phase 1 designed to document existing conditions at the landfill and composting facility and provide the basis for determining the need for further investigation and evaluation.

Task 1 consisted of the review and evaluation of obtainable air, surface water, and groundwater monitoring data from the RWQCB, SLO County Air Pollution Control District, SLO County Environmental Health, Cold Canyon Landfill, the California Department of Resources Recycling and Recovery (Cal Recycle), and scientific articles addressing potential hazards from composting activities. A summary of the reports reviewed and their findings can be found in Appendix A to this report.

Task 2 includes the preparation, administration, and evaluation of a survey questionnaire designed to determine the frequency and spatial location of persons claiming symptoms, the types and frequency of symptoms alleged, and the alleged observable impacts to eco-receptors. The questionnaire has been developed and administered; an evaluation of the responses is presented below.

Task 3 consisted of an occupational safety and health audit of the composting facility conducted on August 25, 2010. Observations and recommendations were made in an October 8, 2010 draft report.

Phase 2 consists of additional environmental monitoring (if appropriate) and the preparation of a human health risk assessment addressing the potential hazard and risk posed by the facility (if appropriate).

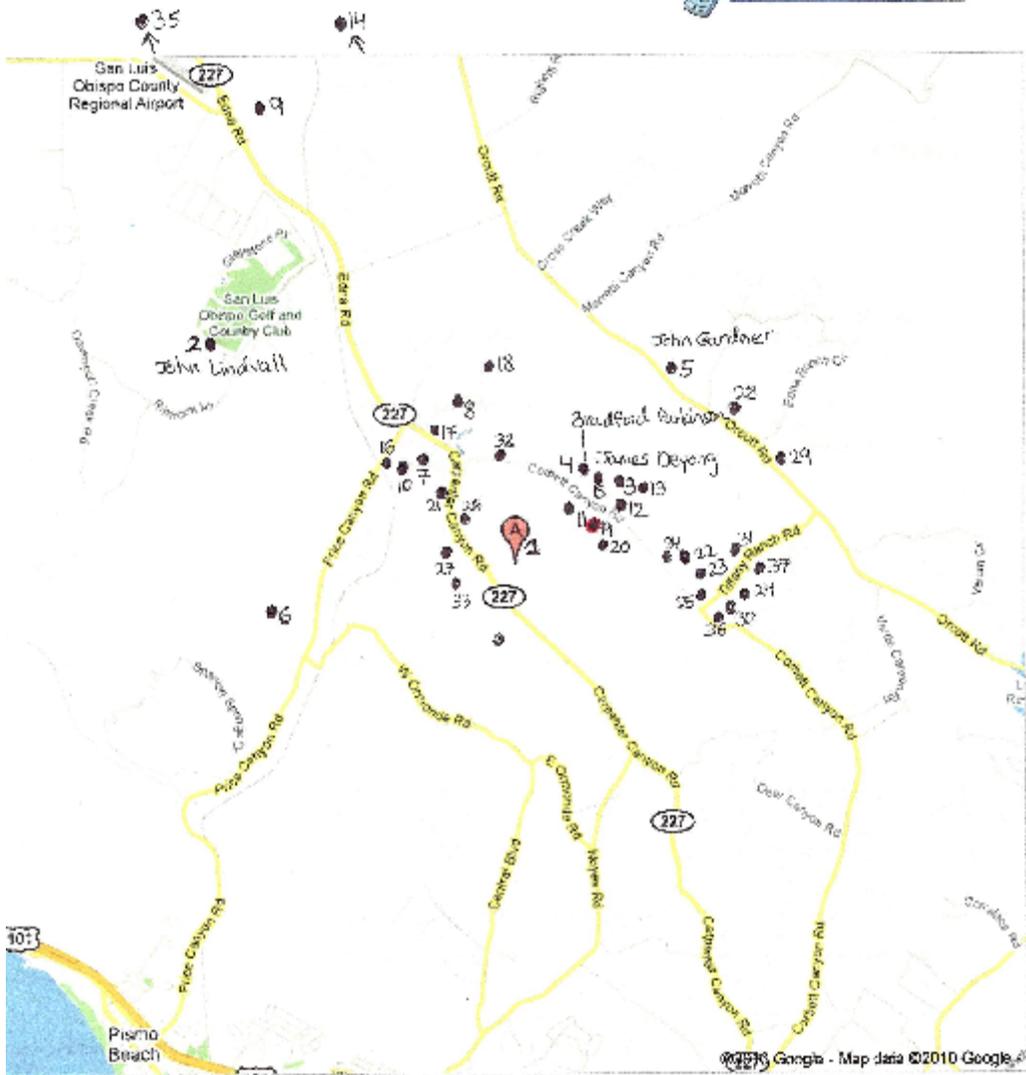
The Survey Questionnaire

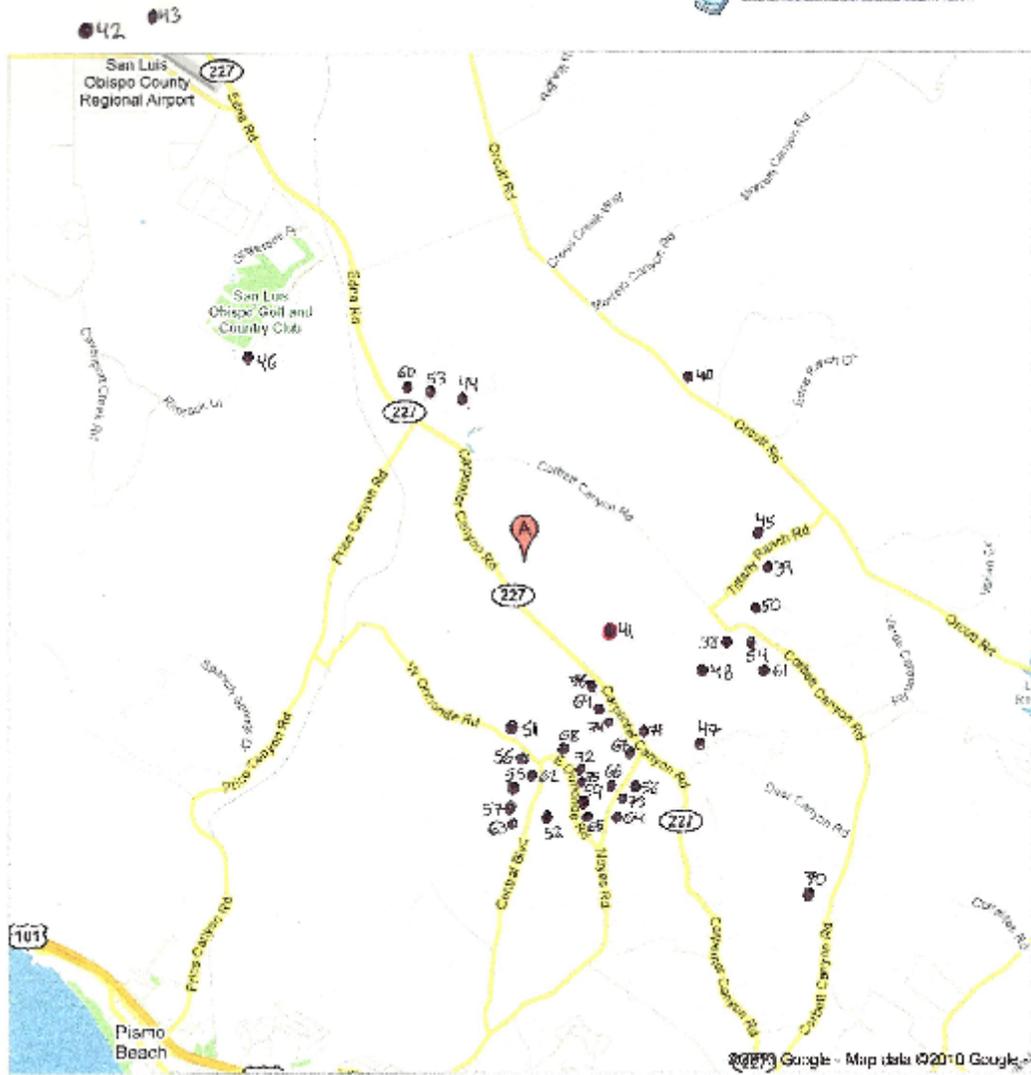
The survey questionnaire was designed so as to elicit relevant data on frequency of complaints, types of complaints, relation of complaints to distance from the compost facility, and if the complaints could reasonably be attributable to the compost operations. It is recognized that the survey results are biased towards those members of the public who have made complaints about the landfill and composting activity. This bias exists because the lists used to identify the public that resides near the landfill came from county lists of persons who are interested in the landfill and composting operations. Persons who add their name to such lists invariably have concerns about the issues; persons who are not concerned usually do not place their names on such lists. This bias, however, was expected and the survey was designed to overcome this bias to the extent feasible. Towards that, the survey was administered in-person to most respondents. In-person administration allowed the surveyor to ask follow-up questions, allowed the resident to add additional information, and gave the surveyor the opportunity to gauge the ease at which the resident presented the information. Additionally, the questions were “mixed” and not asked in logical order (the important issues of health, noise, and odor were asked later in the interview and not one after the other). However, owing to the dispersed nature of the residences in the immediate vicinity of the landfill and the understandable absences of people during the day when the survey was conducted, several residents were queried by telephone. Some residents were not interviewed at all due to lack of access or lack of time.

Additionally, some residents supplied information that was collected by the residents. Although it was not the intent of this survey or assessment to provide the residents with another forum in which to present their grievances in-depth, it was designed to give them an opportunity to provide their views and opinions in a short format and thus it was impossible to ignore their requests for time to present all the information and data they had developed. However, since this was not part of the scope of this study and in order to ensure that the information provided would not bias this report, this information was not reviewed and instead, forwarded to the County which may discuss it in a separate report.

Maps showing the locations of all the residences considered for the survey questionnaire are shown below.

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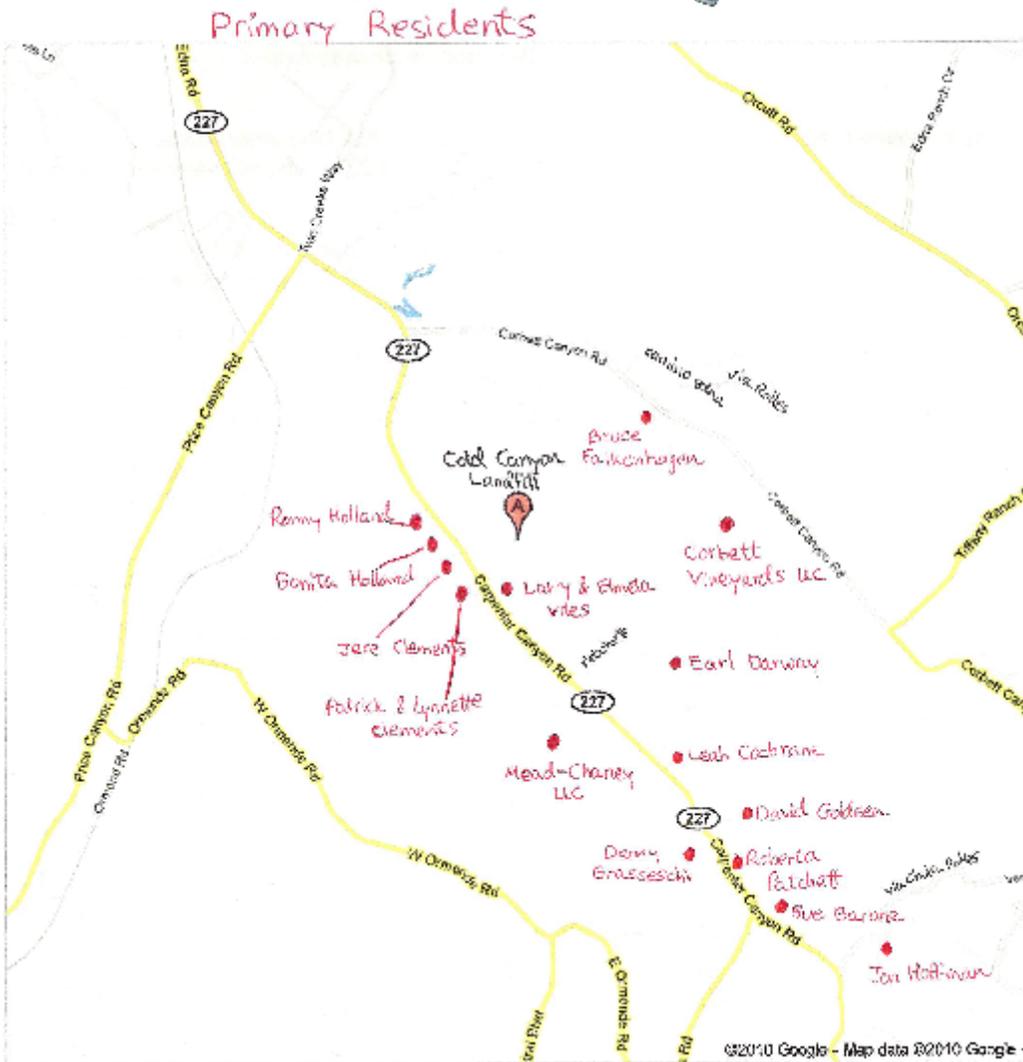






Address 2268 Carpenter Canyon Rd
San Luis Obispo, CA 93401

Get Google Maps on your phone
Text the word "GMAPS" to 466451



The survey questionnaire (see last page for the actual questionnaire) consisted of 18 questions that covered 10 general topics:

1. Address of the home, number of people in the home, name of person responding, and age range of resident when lived in the area (exact ages were not asked). This information allowed the mapping of the residence's distance to the composting facility.
2. Number of years lived in the landfill area, and number of years lived in the area if different from years lived near the landfill.

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3. Questions that applied to the time while living in the area: Occupation, work location (home or away), hours per day spent indoors doing certain activities on weekdays and weekends, time away from home, etc.
4. General health.
5. Opinion of the air quality in the area.
6. Presence of unusual outdoor odors in the past year, direction the odors come from, frequency of odors, and the suspected source of odors.
7. Breathing difficulties and dates and times of breathing difficulties.
8. Suspicious or unusual incidents of dead wildlife in the area.
9. Annoying noise in the area, when annoying noise occurred, its frequency, and what the sources might be.
10. Any other issues regarding the Cold Canyon Landfill that the County should address.

RESULTS

Although the survey questionnaire consisted of 10 general topics, 6 topics were designed to stand out as potential major indicators of trends and/or objective evidence that could possibly support conclusions as to impacts on the off-site public. The other survey topics, although relevant and potentially useful, were considered less important as a tool for assessing potential impacts to off-site residents. (The issue of a suspected increase in dead animals in the immediate area of the landfill/compost facility was addressed in the questionnaire and the responses were few, inconsistent, and more anecdotal than factual.) These major topics included numbers 1 (distance of the resident from the composting facility), 2 (number of years as a resident in the area), 4 (general health and specifically headaches), 6 (odors), 7 (breathing difficulties), and 9 (annoying noises).

- Proximity to the composting Facility
Out of 20 survey questionnaires administered in person or via the telephone, one resident was located within $\frac{1}{4}$ mile of the compost facility, one between $\frac{1}{4}$ and $\frac{1}{2}$ mile, six between $\frac{1}{2}$ and $\frac{3}{4}$ mile, six between $\frac{3}{4}$ and 1 mile, and six were located more than 1 mile away.
- Time Residing in the Area
Regarding years living in the area of the landfill, three residents had lived there less than 5 years, seven between 5 and 10 years, and ten more than 10 years.
- Headaches
Four (4) residents interviewed reported having headaches which they associated with the landfill and/or composting operation. Of these four, one was located between $\frac{1}{2}$ and $\frac{3}{4}$ mile from the composting facility, one was $\frac{3}{4}$ to 1 mile distant, and the remaining two were more than one mile away. The nearest resident noticing headaches lived in the area for >10 year, the resident between $\frac{3}{4}$ and 1 mile, and the two who lived more than a mile away lived in the are for >10 years.
- Odors

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Odors were noticed by 17 out of 20 residents interviewed. The three residents that did not notice odors were located more than a mile from the compost facility and had been residents for more than 10 years.

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- **Breathing Difficulties**

Five residents report have reported breathing difficulties that they attribute to the presence of the landfill or composting facility, with least one resident located in 4 of 5 distance groups. The nearest resident reporting breathing difficulties is located within $\frac{1}{4}$ mile of the facility and has lived at that location < 5 years. Two residents located between $\frac{1}{2}$ and $\frac{3}{4}$ mile of the composting facility reported breathing difficulties and one has lived in the are for 5-10 years and the other for >10 years. One resident located between $\frac{3}{4}$ and 1 mile has lived in the are for 5-10 years and the final person reporting breathing difficulties lives more than 1 mile away for more than 10 years.
- **Noise**

Objectionable noise from the compost operation, the landfill, or from garbage trucks driving by on the road was also noticed by 17 out of 20 residents interviewed but not the same 17 that had reported odors. One resident was different in each group; otherwise the same 16 that reported odors also reported objectionable noise. The different resident in each case lived more than one mile from the compost facility and yet both have lived in the area for more than 10 years. The residents reporting objectionable noise include the following: one located < $\frac{1}{4}$ mile; one located $\frac{1}{4}$ to $\frac{1}{2}$ mile; all six located $\frac{1}{2}$ to $\frac{3}{4}$ mile; all six located $\frac{3}{4}$ to 1 mile; and three out of six located >1 mile. All longevity groups were represented as well, with 3 in the <5 years group, 7 in the 5-10 years group, and 7 in the > 10 years group.
- **Other Health Impacts**

Three out of 20 residents mentioned cancer incidence in the area. Two expressed concern that a cancer “cluster’ may exist while one resident mentioned that his wife died of cancer but that he did not feel that her disease was any way related to the living in proximity to the landfill.

The following Table shows the results discussed above.

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**Cold Canyon Landfill Neighborhood Survey
results**

8/24-25/10

		≤1/4 mile (1320 ft.)	≤1/2 mile (2640 ft.)	≤3/4 mile (3960 ft.)	≤1 mile (5280 ft.)	> 1 mile	resident <5 yrs	resident 5-10 yrs	resident >10 yrs
distance from compost	800 ft.								
odors		1	1	6	6	3	3	7	10
noise		1	1	6	6	3			
headaches				1	1	2			
breathing difficulties		1		2	1	1			
complaints		1	1	6	4	3			
TOTALS	0	4	3	21	18	12	3	7	10

ANALYSIS and DISCUSSION

A review of the data shows only a slight discernable trend regarding number of complaints and distance from the compost facility, but only in the two most distant groups. Even then, there was only a slight drop-off in the total number of “complaints”. The data indicate that the majority of the total “complaints” for the four issues (odor, noise, headache, and breathing difficulties) came from the group located between $\frac{1}{2}$ and $\frac{3}{4}$ mile from the composting facility. Six out of six residents in this distance group accounted for 21 out of 58 total “complaints” (36%) which represents 3.5 “complaints” per person. The group located between $\frac{3}{4}$ and 1 mile accounted for 18 total “complaints” (31%; 3.0 per person). The other distance groups reported “complaints” as follows:

Distance -- Frequency	Complaints Per Person
< $\frac{1}{4}$ mile – 6.8%	4.0 per person (there was only one person interviewed)
$\frac{1}{4}$ to $\frac{1}{2}$ mile – 5.2%	3.0 per person (there was only one person interviewed)
$\frac{1}{2}$ - $\frac{3}{4}$ mile – 36%	3.5 per person
$\frac{3}{4}$ -1 mile – 31%	3.0 per person
>1 mile – 20%	2.0 per person

The number of years living in the area did not show any trend. Taken individually, reported odor, noise, or headaches also did not show a discernable distance trend. The only category that appears to possibly show a slight trend is reportable breathing difficulties decreasing by distance but the number of residents claiming this impact is too small (N=5) to establish distance from the composting facility as a trend. However, what is shown by this data is that of the 20 residents interviewed, the data appear to be consistent in demonstrating that, at the very least, odor issues and annoying noise do indeed exist in the immediate area of the landfill and compost facility. Even though the three surveyors did not notice odors or annoying noises in the afternoon of one day and the morning of the second day at locations that covered the entire compass up to a little more than 1 mile from the composting facility, two days is hardly enough time to be considered representative of conditions in the area.

Regarding breathing difficulties and headaches, as stated in the compost facility audit report, composting operations have been found to be sources of ammonia, respirable dust, and bioaerosols that contain bacteria, endotoxins, and molds at varying times of the year and at varying concentrations. Monitoring data from other composting facilities across the country show that the airborne concentrations of dust, ammonia, bacteria, endotoxins and molds in bioaerosols coming from green waste are often many times higher than those coming from composting piles made from food wastes and sewage sludges (NIOSH 1999. Health Hazard Evaluation of Springfield MO composting facility). Since acceptable levels of bacteria, molds, and endotoxins have not been established, maintaining practices that limit the production, dispersion, and public exposure are to be emphasized. However, additional studies have shown that the airborne concentrations of the pathogens in the compost bioaerosols diminish greatly over distance (down to background at 200 m or 656 feet or $\sim 1/10$ mile) and present an insignificant risk to the off-site public (The Composting Association of Great Britain and The

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Health and Safety Executive of the United Kingdom. 2003. Occupational and Environmental Exposures to Bioaerosols from Composts and Potential Health Effects – A Critical Review of Published Data). According to this report, the public which comes on the compost site, either to drop off green waste or pick up compost material for personal use, experiences greater exposure than on-site workers and hence the greatest risk of contracting Organic Dust Toxic Syndrome (ODTS).

A report by the California Department of Health Services Environmental Health Investigations Branch (Bioaerosols And Green-Waste Composting In California, 1999), however, shows that according to some earlier studies the airborne concentrations of some pathogens in compost bioaerosols diminish down to background at distances up to 2640 feet (1/2 mile) and thus present an insignificant risk to the off-site public at that distance rather than at 1/10 mile. It appears from the CDHS report that, for the most part, the majority of studies support a “diminish to background average distance” of around 1200 feet (~1/4 mile).

Regarding the concern of two residents that the cancer incidence rate in the area might be higher than expected, the question of whether a “cancer cluster” (a higher than expected number of people contracting cancer in the area) actually exists and if so, what the cause(s) may be, is an extremely difficult issue to address. Cancer clusters can only be confirmed by detailed epidemiological investigations and then only if a suitably-sized population is examined. The survey questionnaire intentionally did not ask a specific question about cancer incidence in the area; the three residents raised the issue on their own when responding to the general question about health. Cancer incidence was excluded because this questionnaire was not designed for a cluster investigation nor was it adequate to even begin such a study in the area. The overall background rate of cancer in the U.S. population is more than one in every three persons, meaning more than one of out three people are expected to contract cancer during any given year. The mortality rate is one out of every four persons in the U.S. That is the population risk. Individual risks vary considerable due to many factors such as genetic, smoking, diet, weight, occupational and environmental exposures to carcinogens, other diseases, etc.

RECOMMENDATIONS

Several of the recommendations made in the compost audit report will do much to reduce odors coming from a composting operation located at the landfill. These include:

- In order to better control the off-site migration of odors, any compost facility at the Cold Canyon Landfill should have wind breaks and vegetation on all four sides. Generation of dust during any movement of compost material or green waste should be kept to an absolute minimum by adding additional moisture via a water spray and establishing a “high wind” shut-down level for activities that generate dust. Visible clouds of dust should be avoided. Actual soil moisture should be measured by instrument.
- Noise is a different matter. It is recommended that a noise survey be conducted to determine if the annoying noise noted by the residents in the area exceed regulatory nuisance noise limits.

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- Health impacts are difficult to ascribe to the landfill or composting operations. Although data concerning on-site airborne concentrations of bioaerosols is somewhat limited, existing studies demonstrate that occupational on-site exposures can be effectively limited by engineering controls, administrative controls, and PPE and that off-site public exposure appears to be a low risk. If an additional level of certainty or comfort is desired, or if specific monitoring is desired for the Cold Canyon Composting facility, on-site and off-site monitoring of bioaerosols should be conducted. It is recommended that a “buffer zone” of ¼ mile (1320 feet) between a compost pile and a residence be maintained.
- There are basically three reasons why a Human Health Risk Assessment (HRA) would be prepared for a site that potential emits toxic air contaminants or bioaerosols:
 1. A facility is required to do so by law or regulation.
 2. A health risk is suspected and the presence and degree should be confirmed.
 3. A health risk is not suspected and a risk assessment is conducted to confirm this lack of impact and provide assurances to the community.

It was determined from a review of the San Luis Obispo County Air Quality Management District files that the preparation of a HRA is not required by law or regulation. Given the previous studies, although limited in number and scope, on the potential health risks posed by bioaerosols emitted from a compost facility, it appears that a significant risk to the public does not exist. Therefore, the preparation of a HRA may not be warranted at this time unless the County and the public desire a higher degree of comfort concerning the risk to the public posed by emissions of chemicals, dusts, and bioaerosols from the landfill and/or the composting operations.

Additional monitoring also does not appear to be warranted at this time (other than for bioaerosols) because the existing groundwater and surface water monitoring programs are adequate.

Photo 1



Photo 2



Photo 3



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**COLD CANYON LANDFILL
COMMUNITY QUESTIONNAIRE**

August 2010

1. Address of home _____ # of residents in home _____

Name of person responding _____

2. What years did you live in a house near the landfill? _____ to present

3. How many years have you lived in the area? _____ years

4. How old were you when you lived in the area? ____ years old to ____ years old

5. The following questions apply to the time you have lived in the area:

a) Did you have a job? Yes No

b) What is your occupation? _____

c) Do you work at home or away? Home Away

d) Are you a student? Yes No

e) How much time do you spend indoors on weekdays? _____ hours each day

f) How much time do you spend indoors on weekends? _____ hours each day

g) On average, how many hours each day did you spend doing the following activities?

Relaxing, reading, watching TV _____ hours each day

Indoor household chores _____ hours each day

Outdoor yard chores _____ hours each day

Gardening _____ hours each day

Walking outdoors _____ hours each day

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Working on cars/trucks outdoors _____ hours each day

Exercising indoors _____ hours each day

Exercising outdoors _____ hours each day

Other _____ hours each day

h) On average, how many days each year were you away from
the area on vacation or for other reasons? _____ days each year

6. What is your general health: excellent good average fair poor

7. What is your opinion of the air quality in the area around your home?

excellent good average fair poor

8. Have you noticed any unusual outdoor odors in the past year? Yes No

9. If so, which direction do they come from? _____

10. What is the frequency of these odors? _____

11. Do you know the source of these odors? _____

12. Do you have any breathing difficulties? Yes No

13. If so, can you recall the dates and times of these events? _____

14. Are you aware of any suspicious or unusual incidents of dead wildlife in the area? Yes No

15. If so, please explain. _____

16. Have you experienced annoying noise in the area? Yes No

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17. If so, please explain when during the past _____ years this has occurred, the frequency, and what you feel the sources are. _____

18. Do you feel that there are any other issues regarding the Cold Canyon Landfill that the County should address? Yes No What are they? _____

Appendix A

Cold Canyon Landfill: Summary of Environmental Monitoring

The available reports on environmental monitoring at Cold Canyon Landfill include testing of landfill gas, leachate, groundwater, surface water, and leak detection under lined areas. Below is a summary of monitoring results mainly from RMC's Groundwater Monitoring Summary Report (May 2007) and other documents reviewed which include the Cold Canyon Revised Project Description (July 2007), the EMCON report (1992), reports from the Regional Water Quality Control Board (2002 and 2008), and reports from the San Luis Obispo Air Pollution Control District.

Landfill Gas (LFG):

Anaerobic decomposition of the waste material generates landfill gas (LFG), which consists primarily of carbon dioxide and methane with small concentrations of nitrogen, oxygen, water vapor, and non-methane organic compounds. LFG is collected through a series of wells and trenches in active and closed landfill areas. The gas collection system currently includes 36 vertical gas collection wells and 10 horizontal collectors. Gas collection well borings are approximately 30 inches in diameter and range from 30 to 110 feet deep. Horizontal collectors consist of a trench approximately 2.5 feet wide by 3.5 feet deep, into which perforated HDPE pipes are placed.

The collected gas is sold to an offsite user or is flared if offsite demand is curtailed for any reason. Landfill gas as methane is monitored in structures and a series of perimeter probes on a quarterly basis. In addition, a sample of the landfill gas is collected annually from a sampling port near the landfill gas flare and is analyzed for VOCs by EPA method TO-15. Recent landfill gas VOC monitoring results are summarized in Table 3-1 of RMC's GW Report (Table 3-1 below). No other gas monitoring data is provided.

Gas monitoring began in 1994 at seven gas probe locations (GP-1 through GP-7) in accordance with the approved LFG monitoring plan. Historical monitoring reports and studies support that most of the methane previously detected in probes GP-1 through GP-4 was naturally occurring and originated from a petroliferous zone, which is present regionally in the Monterey formation. GP-1 through GP-4 were removed from the regulatory compliance program in 2001 and were replaced by new gas monitoring probes (GP-9 through GP-12), located along the southwestern landfill property line. Since then GP-8 and GP-7 were also removed from the compliance monitoring program due to elevated levels of methane detected by these probes which was determined to be naturally occurring petroleum gas derived from petroliferous soils. A new LFG monitoring probe (GP-13) located along the southeastern property boundary was installed to replace GP-7 in 2007. No LFG data is provided past the year 2006, so no data is available for GP-13.

The San Luis Obispo Air Pollution Control District determined that the combustion of LFG at Cold Canyon Landfill using the candlestick flare has an estimated VOC destruction efficiency of 98 percent and therefore the landfill is not a significant source of toxic air contaminant emissions. Furthermore, since LFG is transferred from Cold Canyon's site to Cal Resources'

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Arroyo Grande Field for combustion, toxic and carcinogenic air contaminant emissions at Cold Canyon are significantly decreased.

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Table 3-1
SUMMARY OF RECENT LANDFILL GAS ANALYTICAL RESULTS
Cold Canyon Landfill, San Luis Obispo County

COMPOUND	UNITS	2004	2005	2006
Dichlorodifluoromethane	ug/L	6.74	9.20	2.83
Freon 114	ug/L	ND	ND	0.56
Vinyl Chloride	ug/L	ND	ND	0.71
Chloroethane	ug/L	ND	ND	0.27
Trichlorofluoromethane	ug/L	ND	ND	0.46
Acetone	ug/L	24.41	30.64	17.53
Allyl chloride	ug/L	ND	ND	0.28
Dichloromethane	ug/L	ND	ND	1.08
Carbon disulfide	ug/L	ND	ND	0.30
MTBE	ug/L	ND	ND	0.73
1,1-Dichloroethane	ug/L	ND	ND	0.41
2-Butanone (MEK)	ug/L	35.59	ND	11.96
Isobutyl alcohol	ug/L	ND	ND	2.38
cis-1,2-Dichloroethane	ug/L	ND	ND	1.48
Benzene	ug/L	4.45	6.59	1.36
n-Heptane	ug/L	19.08	17.64	5.90
Trichloroethene	ug/L	ND	ND	0.53
Methyl isobutyl Ketone	ug/L	ND	ND	2.55
Toluene	ug/L	126.52	128.92	30.55
Octane	ug/L	16.53	15.92	4.66
Tetrachloroethene	ug/L	9.65	ND	1.07
Ethylbenzene	ug/L	34.78	51.02	7.97
m & p-Xylene	ug/L	71.38	130.52	17.58
Styrene	ug/L	ND	ND	0.36
o-Xylene	ug/L	16.07	34.69	4.15
t-1,4-Dichloro-2-butene	ug/L	ND	ND	0.79
1,3,5-Trimethylbenzene	ug/L	ND	12.97	1.08
1,2,4-Trimethylbenzene	ug/L	ND	28.74	2.50
1,4-Dichlorobenzene	ug/L	ND	ND	0.32
Napthalene	ug/L	ND	NA	0.93
Ethanol	ug/L	NA	221.05	NA
2-propanol	ug/L	NA	64.27	NA
Hexane	ug/L	NA	14.99	NA
tetrahydrofuran	ug/L	NA	10.51	NA
Cyclohexane	ug/L	NA	13.36	NA
Isopropylbenzene	ug/L	NA	26.46	NA
Isopropyltoluene	ug/L	NA	41.11	NA
TOTAL VOCs	ug/L	365.2	858.60	123.28

Notes:

1. ND - Not detected.
2. NA - Not analyzed/reported.
3. ug/L is not the primary reporting units for VOCs because it is temperature and pressure dependent. Parts per billion by volume (ppbV) was converted by the laboratory assuming 60F and 1 atm pressure.
4. Only those compounds detected in one or more sample shown in the table.

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Leachate:

An investigation completed in 1989 showed leachate was not present in large quantities in the unlined portion of the landfill (EMCON, 1992; RWQCB, 2002). As a result, leachate extraction from the unlined area was not pursued. Additionally, borings for LFG collection wells in 1996 did not identify any leachate. Modules 6, 7, and 8 are lined and include leachate collection systems that discharge to the leachate storage facility. Leachate that is collected from Modules 6, 7, and 8 is routed to an 11,000 gallon above-ground storage tank. When full, the collected leachate is applied on the lined areas of the landfill for dust control or sent off-site to a wastewater treatment facility. Leachate from the storage tank is analyzed annually and recent leachate analytical results are summarized in Table 3-2 of RMC's GW Report (Table 3-2 below).

<p align="center">Table 3-2 SUMMARY OF RECENT LEACHATE ANALYTICAL RESULTS Cold Canyon Landfill, San Luis Obispo County</p>						
CONSTITUENT	UNITS	2001	2002	2003	2005	2006
Chloride	mg/L	730	810	400	NA	660
Sulfate	mg/L	200	150	120	NA	3.5
Arsenic	mg/L	ND	ND	ND	NA	0.036
Manganese	mg/L	4.8	2.1	1.8	NA	1.4
Acetone	ug/L	NA	NA	NA	9.9	NA
Benzene	ug/L	7.9	8.7	13	0.25	2.5
Toluene	ug/L	14	5.7	1.8	ND	ND
Ethybenzene	ug/L	5.1	5.7	9.2	ND	5.5
m,p-Xylene	ug/L	NA	NA	NA	ND	4.8
o-Xylene	ug/L	NA	NA	NA	ND	12.3
Total Xylenes	ug/L	8.7	7.5	6	ND	NA
MTBE	ug/L	NA	NA	NA	67	40
1,4-Dichlorobenzene	ug/L	ND	ND	ND	0.81	0.8
1,2-Dichloroethane	ug/L	ND	ND	ND	ND	0.6
2-Butanone (MEK)	ug/L	NA	NA	NA	1.6	NA
Chloroethane	ug/L	21	53	15	1.7	0.6
1,1-Dichloroethane	ug/L	27	37	27	0.92	0.6
1,2-Dichloroethane	ug/L	1.3	3.8	8.8	0.41	0.6
1,1-Dichloroethene	ug/L	0.7	ND	ND	ND	ND
cis-1,2-Dichloroethene	ug/L	4.7	5.7	8.1	ND	0.6
Isopropylbenzene	ug/L	ND	0.5	ND	ND	1.6
4-Isopropyl toluene	ug/L	0.5	0.6	ND	ND	ND
Methylene Chloride	ug/L	3.8	7.2	4.9	0.45	ND
1,2,4-Trichlorobenzene	ug/L	ND	ND	1.3	ND	ND
Trichloroethene	ug/L	2.8	1.6	ND	ND	ND
1,2,4-Trimethylbenzene	ug/L	0.9	0.8	ND	ND	1.6
Vinyl Chloride	ug/L	14	ND	ND	7.6	1.4
TOTAL VOCs	ug/L	112.4	137.8	95.1	90.64	73.5
<p>Notes:</p> <p>1. ND - Not detected.</p> <p>2. NA - Not analyzed/reported.</p> <p>3. Table only includes VOCs detected in one or more sampling round.</p>						

Groundwater:

Cold Canyon Landfill has an extensive groundwater monitoring system and a substantial amount of water quality data going back about 20 years. The current monitoring system includes 15 wells which monitor upgradient, beneath, and downgradient from the landfill. Routine monitoring parameters include: chloride, sulfate, dissolved arsenic, dissolved manganese, and the VOCs included in EPA Method 8260B. Constituents of concern (COCs) include an expanded suite of monitoring parameters that are analyzed every five years. Historic groundwater monitoring results from the site monitoring wells for the routine monitoring parameters are graphically summarized in Figures 3-1 through 3-15 of the "RMC Final GW Summary Report May 2007."

Groundwater data collected for the past 20 years shows that the landfill has not significantly impacted groundwater quality. Several incidents identified during standard monitoring required additional testing and remedial work, due to elevated levels of VOCs, chloride, sulfate, or dissolved manganese. The installation of the landfill gas collection system has reduced the VOCs in groundwater to non-detectable or occasional trace level concentrations. It is unclear if the statistical exceedences of chloride, sulfate, and dissolved manganese in groundwater point to a leachate release from the facility since they do not correlate with VOC levels in the same samples. It is possible that changes in chloride and sulfate levels are a result of fluctuating groundwater levels or natural variations in flow. In addition, the geologic formations underlying the landfill contain petroleum horizons which are sulfur-rich and contain various organic compounds.

A couple incidents have been recorded that point to releases from the landfill:

- A 2002 RWQCB report indicated that statistical evaluation of water quality data from wells MW-2 and MW-3 suggested a release from the landfill may have occurred in the vicinity of those wells. As a result, the RWQCB required CCLF to install wells P-8 and P-9 to assess the lateral and vertical extent of the potential release. Subsequent monitoring determined that the release had not migrated beyond wells MW-2 and MW-3.
- In March 2002, the Landfill documented that chloride and sulfate concentrations measured in Well P-7 were statistically significant. The cause was identified as seepage associated with a former wet-weather fill area. That seepage has since been corrected. Conditions in Well P-7 have not been replicated since, and additional monitoring or corrective action was not required.

Data collected since 2002 are generally consistent with the pre-2002 information and show inorganic parameters used to evaluate groundwater quality are intermittently present at statistically significant concentrations in some wells. The data also show marked increasing inorganic trends in some of the monitoring wells. Recent (2005-2006) VOC data show that with the exception of sporadic and non-repeating detections of acetone in three wells and methyl ethyl ketone in one well, VOCs are not present at concentrations greater than the practical

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quantification limit (PQL) in groundwater samples. Summary information regarding the water quality in each site monitoring well is presented in Table 4-2 of RMC's GW Report (scanned in below).

Location of wells:

Wells downgradient from unlined portion of landfill: MW-1 MW-3, P-4, and P-9.

Wells downgradient from lined portion of landfill: P-1A, P-1B, P-6, P-7, and P-8.

Wells cross gradient from unlined portion of landfill: MW-2, P-3A, P-3B, MW-5, and P-5.

Wells upgradient from landfill: P-2.

The following is a summary of findings for Cold Canyon Landfill found on page 12 of the December 2008 Regional Water Quality Control Board report:

“Groundwater monitoring has historically documented minor VOC impacts to groundwater downgradient of unlined areas. These impacts are generally attributed to landfill gas. The landfill has extensive landfill gas extraction within the lined and unlined areas and it appears to be reducing and preventing further impacts to groundwater. Groundwater monitoring also documents increasing trends for inorganic constituents in several downgradient wells, although this may be indicative of a leachate release from the unlined areas, the groundwater beneath and around the site is highly variable and the increasing trends could be due to the landfill's operation/design effect on local recharge. Water Board staff will continue to evaluate the monitoring results and may require the Waste Connections to enact corrective actions, potentially including installation of final cover for all unlined areas, as part of the expected future Cold Canyon expansion/WDR revision process.”

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<p align="center">Table 4-2 SUMMARY OF CURRENT GROUNDWATER QUALITY EXISTING WASTE DISPOSAL AREA Cold Canyon Landfill, San Luis Obispo County, California</p>					
WELL	GEOLOGIC UNIT	MONITORING PROGRAM			GENERAL
		Detection Monitoring	Corrective Action Monitoring	Other Monitoring	
MW-1 <i>downgradient</i>	Pismo Formation (Edna Member)	X (VOCs)	X (Inorganics)		All inorganic concentrations currently below statistical prediction limit. Chloride shows statistically significant decreasing trend. No other significant inorganic trends. No confirmed VOC compounds detected. Recent data inconsistent with leachate release or landfill gas release.
MW-2 <i>CROSS-gradient</i>	Monterey Formation		X		Hydrocarbon-bearing zones noted during drilling and well installation. MW-2 dry during all 2006 quarterly monitoring events (groundwater water level below well screen). No confirmed VOC detections. Recent data inconsistent with leachate release or landfill gas release.
MW-3 <i>down-gradient</i>	Monterey Formation	X (VOCs)	X (Inorganics)		Chloride and dissolved manganese above concentration limit and show increasing trends. Sulfate and dissolved arsenic are below prediction limits. No confirmed VOC detections. Trace detections of benzene and cis-1,2-Dichloroethene detections during the 4 th quarter 2006 monitoring event suggest possible intermittent and limited landfill gas impact.
MW-5 <i>CROSS-gradient</i>	Monterey Formation	X			Hydrocarbon-bearing zones noted during drilling and well installation. All inorganic parameters below prediction limits. No confirmed VOC detections. Sporadic and non-repeating trace concentrations of 1,1-Dichloroethane and 1,4-Dichlorobenzene suggest possible intermittent and limited landfill gas impact.
P-1A <i>downgrad.</i>	Pismo Formation (Edna Member)			X	All inorganic parameters below prediction limits. No detected VOCs.
P-1B <i>downgrad.</i>	Pismo Formation (Edna Member)	X			Chloride and dissolved arsenic below prediction limits. No limit established for sulfate, but data indicate increasing trend. Dissolved manganese slightly exceeds prediction limit. No detected VOCs. Data are inconsistent with leachate release or landfill gas impacts and indicate probable natural variation for manganese concentrations.
P-2 <i>upgradient</i>	Pismo Formation (Edna Member)			X	No prediction limits established for the well. Inorganic constituents relatively consistent. VOCs not analyzed in 2005-2006 No detected VOCs in historical data set.
P-3A <i>CROSS-gradient</i>	Pismo Formation (Undifferentiated)	X (VOCs)	X (Inorganics)		Hydrocarbon-bearing zones noted during drilling and well installation. Chloride, dissolved arsenic, dissolved manganese below prediction limits. Sulfate above prediction limit and shows increasing trend. No confirmed VOC detections. Data are inconsistent with a release and indicate probable natural variation for manganese concentrations.

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<p align="center">Table 4-2 SUMMARY OF CURRENT GROUNDWATER QUALITY EXISTING WASTE DISPOSAL AREA Cold Canyon Landfill, San Luis Obispo County, California</p>					
WELL	GEOLOGIC UNIT	MONITORING PROGRAM			GENERAL
		Detection Monitoring	Corrective Action Monitoring	Other Monitoring	
P-3B <i>cross-gradient</i>	Pismo Formation (Undifferentiated)	X			Chloride and dissolved arsenic below prediction limits. Sulfate and dissolved manganese exceed prediction limit and sulfate shows steady increase. Well not currently monitored for VOCs. Previous 3Q2005 results inconclusive (toluene false positives; acetone and MEK are common laboratory contaminants). Data are inconsistent with a release and indicate probable natural variation for manganese concentrations.
P-4 <i>downgrad.</i>	Monterey Formation			X	Hydrocarbon-bearing zones noted during drilling and well installation. All inorganic constituents below prediction limits. No confirmed VOC detections.
P-5 <i>cross-gradient</i>	Monterey Formation	X			Hydrocarbon-bearing zones noted during drilling and well installation. All inorganic parameters below prediction limits. No confirmed VOC detections.
P-6 <i>downgrad.</i>	Pismo Formation (Edna Member)			X	All inorganic parameters below prediction limits. No confirmed VOC detections.
P-7 <i>downgrad.</i>	Pismo Formation (Edna Member)	X (VOCs)	X (Inorganics)		All inorganic parameters below prediction limits except sulfate. No confirmed VOC detections. Data are inconsistent with release and indicate probable natural variation or other cause for sulfate concentrations.
P-8 <i>downgrad.</i>	Pismo Formation (Edna Member)	X			All inorganic parameters below prediction limits except sulfate. No confirmed VOC detections. Data are inconsistent with release and indicate probable natural variation or other cause for sulfate concentrations.
P-9 <i>downgrad.</i>	Contact of Monterey Formation and Pismo Formation	X			All inorganic parameters below prediction limits. No confirmed VOC detections.
<p>NOTES:</p> <ol style="list-style-type: none"> 1. All Monterey Formation wells completed in the Diatomaceous Member of the formation. 2. See Table 4-1 for individual well VOC data for 2005-2006. 3. Confirmed detection is assumed to be one VOC compound above the practical quantitation limit (PQL). Common laboratory contaminants (i.e., acetone and MEK) not included. 					

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Surface Water:

Surface water has been monitored at the Cold Canyon Landfill since the SWRCB adopted Order No. 97 03-DWQ in 1997, requiring monitoring of storm water and non-storm water discharges. Visual inspections of all discharge locations and drainage systems is performed quarterly, and the first storm of the season (when possible) is sampled as well as a second storm later in the season. The samples are analyzed for pH, electrical conductivity, total suspended solids, total organic carbon or oil and grease, turbidity, and iron. Recent information has documented several significant releases from the landfill and the compost facility that has adversely impacted surface waters.

Vadose Zone monitoring/Leak Detection:

It appears that vadose zone monitoring is not performed at Cold Canyon Landfill. CCLF completed an Unsaturated Zone Monitoring Report that demonstrated the infeasibility of unsaturated zone monitoring at the landfill (RWQCB, 2002). A pan lysimeter was installed under the lined area sump for leak detection purposes. The lysimeter is monitored for the presence of fluid quarterly.

Memorandum

To: John McKenzie, Planning and Building Department, Environmental Specialist
CC: Curt Batson, Environmental Health Services Director
From: Richard Lichtenfels, Environmental Health Services Supervisor *RL*
Date: December 27, 2010
Re: Cold Canyon Landfill Expansion/Health Risk Assessment – Cancer Cluster Issue

This correspondence is provided as a follow-up to our meeting on November 3, 2010 regarding the proposed Cold Canyon Landfill Expansion project and the associated Phase I Health Risk Assessment (HRA) conducted as a result of neighborhood health concerns.

To reiterate the main points discussed that day, based on the Phase I HRA which was conducted this past October by toxicologist Alvin Greenberg, Ph.D., the San Luis Obispo County Public Health Department (SLOCOPHD) believes the Phase I HRA results do not support a more in-depth Phase II HRA. In addition, a review conducted by the SLOCOPHD does not support the neighbors' concern that the landfill may be responsible for an unusual number of human cancer cases in the surrounding neighborhood.

In closing, the SLOCOPHD supports Dr. Greenberg's findings and recommendations and encourages the landfill to implement those recommendations that are appropriate for the operations that are to be conducted at the facility.

Please feel free to contact this office if you have any questions.

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