

Minutes – Regular Meeting  
Solid Waste Advisory Board  
February 9, 2011  
**Approved March 9, 2011**

Attendance: Jan Sassaman, BJ Tipton Al Vickers, Remus Smith, Steve Yuhasz Stan Cheren and Jim Ward

Staff: Blair Pollock, Cody Marshall, Muriel Williman Jane Cousins and Wanda McCain

Audience: Robert Campbell, David Caldwell, Barbara Hopkins

1. **Opening and Welcome** Sassaman states that the main topic for discussion is Dr. Chris Heaney's presentation on the impact of landfills on neighboring community air quality. Prior to that there are a couple of other items on the agenda. I would like to establish some ground rules. At the public comment period I would like that to be comments on issues not associated with the air quality study. During the presentation rather than get into a back and forth comment period I've asked Dr. Heaney to accept questions only from the table. Once the presentation is done then we will open it up for the public.
2. **Adoption of Minutes from January 12 SWAB meeting** Vickers moves to accept. Cheren 2<sup>nd</sup>. Passes unanimously.
3. **Public Comment Period** – No comments.
4. **Presentation on Impacts of Landfill on Neighboring Community Air Quality – Chris Heaney, PhD** Heaney states that this is a partnership effort. This study was done with the UNC – Chapel Hill School of Public Health in partnership with the Rogers Rd. – Eubanks Rd. Neighborhood Association (RENA). When we present these results I present with a team with the community members. I will ask David Caldwell and Minister Campbell to speak also.

This study is in the context of a long history of organizing in this community, the Rogers Rd. – Eubanks community adjacent to where we are now. David Caldwell will describe the history in the context of the study and the time line.

Caldwell states that Rogers Rd. was founded in the 1780s. 1870-1920 was a successful farming era and had leadership by freed slaves. In 1972 the county regional landfill was sited in the Rogers Rd. community. B. B. Olive, the Rogers-Eubanks community and Orange County Planning Board opposed the landfill siting based on water contamination concerns. The Commissioners rejected the planning board's recommendation and moved forward with the Eubanks Rd. site. The NC Superior Court ruled in favor of Orange County New Hope Improvement Association vs Orange County. Local governments promised the landfill would close in 1982 and the residents would be connected to the basic amenities – water, sewer, paved roads, recreation center and community park and so forth.

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Karen E Jacobson [inaudible] community is the odor and air quality [inaudible] safe water and sewer infrastructure, buzzards and vermin, illegal dumping, landfill noise and the traffic.

What we've done in our community to take control is to empower ourselves. We've had a community clean-up and will be planning another one this year. We've power washed mobile homes for senior citizens, picked up six truck loads of trash along the side of the road with video documentation. We had the air analyzers set up on the edge to help analyze the air quality. Tom Consler with the Orange County Health Department came out to help do the well inspections. There were classes where he taught how to check the well caps and well heads.

Heaney states that within the context of the concerns of the community and the efforts by the community members to organize themselves around these issues, we met a number of times to talk about the priority ranking of some the concerns what could we feasibly address with a scientific investigation or study. The issue that we've had some experience with at UNC-CH is measuring odorant air pollutants in the air and then through a series of panel studies designed with repeated measures we can investigate these concerns with in the context of participation by residents who live near sources of odor. Around specifically landfills there is much previous work that has gone on but it turns out that the previous studies have either measured exposure, air pollutants in the air with instrumentation, or they have had an odor sniffing team method which is very popular in Europe.

These are the kinds of assessments of odor from facilities and there is a series of assessments that are more epidemiologic and they have examined health outcomes. They have been studies in large urban areas that have compared long term chronic health problems like cancer or birth defects among people who live close to landfills and then compared them to a population that does not live close to a landfill and they try to adjust for all the potential factors that could be different between the two groups that are important to control for or reduce or eliminate sources of bias. [With respect to] the previous literature there is room to improve it in terms of an analytic design that would measure both exposure with instrumentation and have outcome reports at the same time - concurrently in time.

In thinking about the targets in air that we could measure that could be a marker or an indicator of odor of these odorant gases we know that hydrogen sulfide is one gas that is produced. It is a relatively small contribution compared to other gases that are produced from landfills from the decomposition of the organic matter in landfills. We also know that hydrogen sulfide has a very distinct rotten egg smell. We can think of hydrogen sulfide within the context of this study as a marker of a larger more complex mixture of odorant gases.

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Focusing on the research questions for the study and the design we will hone in on hydrogen sulfide as the marker and pose the question "what is the ambient level of hydrogen sulfide in a community bordering a landfill?", "what's the frequency and intensity of odor that is reported from landfill?" and then "what's the relationship between the measures by instrumentation of hydrogen sulfide and odor?", what is the relationship between odor and changes in daily activities, stress, negative mood states, irritant and physical symptoms. These questions will be investigated with in the context of longitudinal study. This is a panel design where we enrolled in this case adults who were eighteen years of age or older living within three quarters of a mile of the Orange County landfill. They record and rate landfill odor twice each day – once in the morning and evening for 14 days. During that 14 days we measure with instrumentation. We used two instruments – a single point monitor and a thermo 450 hydrogen sulfide analyzer to record the hydrogen sulfide levels during the time periods when the participants are recording in their odor diaries. The measures were made every 15 minutes and recorded in the machine. We then linked the time periods of the measure on the instrument to the time periods in people's diaries. Within this design there is an analysis approach that focuses on these repeat measures of acute or transient events. We think of odor plumes as being acute and they come and go within a periodicity that's transient. Also the outcomes that people are reporting and that we're empowered to investigate were transient. Within this design each person serves as their own control so there is not a need like in those other studies around urban areas to find a comparison population for these outcomes that we're investigating in terms of health and quality of life. For all time and variant characteristics within individual things like race, sex, age and other characteristics that are stable over time actually each person serves as her own control.

The analytical approach[es] we used are fixed effects linear and logistic regression models and we want to adjust for trying to think of the time variant factors that could be potential confounders, so we think of time-of-day and we adjust for time-of-day in our analytical approach. We also, given the geography of the area, want to think about wind direction and look at periods when the wind is blowing in a direction from the source of odor which is from the north to the south and then compare that to periods only when the wind is blowing from a direction other than that north to south direction.

Here is an example of the odor diary that participants would fill out information on, they would record the time they sat outside for five minutes in the morning and evening and then rate the odor.

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## Twice daily diary – landfill malodor

Day 1: \_\_\_\_\_ MORNING

### Part II. Go inside. Complete Steps 4-7

**STEP 4.** Record time when timer goes off after 5 minutes outside. Be sure to use the study clock when you record the time.



Record Current Time	Circle AM or PM
_____	AM PM

**STEP 5.** Describe odor when you were outside. During the 5 minutes that you spent outside, did you notice any odor from the landfill? If no, check none, and proceed to Step 4. If yes, check the box that best describes the level of odor from the landfill during the 5 minutes you spent outside, describe what the odor smelled like, and mark whether the odor was continuous or came and went.

None	faint	moderate	strong	very strong	Please describe what the odor smelled like.	Was the odor continuous or did it come and go? <input type="checkbox"/> Continuous <input type="checkbox"/> Come and go
▼	▼	▼	▼	▼		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

## Twice daily diary – mood states

Day 1: \_\_\_\_\_ MORNING

**STEP 7.** Record feelings. How do you feel now? Check the box that best describes how you feel after spending 5 minutes outside. Important: If you do not have any of the feelings described below, please mark not at all. There should be a box marked for every feeling described in the table.

	not at all	a little	moderate	a lot	extreme
	▼	▼	▼	▼	▼
Stressed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nervous or anxious?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gloomy, blue or unhappy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Angry, grouchy or bad-tempered?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Confused or unable to concentrate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Active, energetic, or full of pep?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Weary, bushed, or exhausted?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Twice daily diary – physical symptoms

Day 1: \_\_\_\_\_ MORNING

**STEP 6.** Record symptoms. Do you currently have any of the following symptoms? Check the box that best describes the extent to which you are experiencing each symptom, if at all. Important: If you do not have a symptom, please mark none. There should be a box marked for every symptom listed.

	none	mild	moderate	severe		none	mild	moderate	severe
	Y	Y	Y	Y		Y	Y	Y	Y
Excessive cough	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ringing in ears	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Runny nose or congestion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Burning, tearing, or irritated eyes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sore throat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Burning or irritated nose	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Difficulty breathing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Burning or scratchy throat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Loss of appetite	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Skin irritation or redness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nausea or vomiting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ulcer or boils on skin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diarrhea	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Round patches or scaly areas on skin (coin-sized)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Trouble urinating	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	White or moist areas on skin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General ill feeling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Rash with spots or bumps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fever or chills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Itching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Headache	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Other symptom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Light headed or dizzy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Please describe symptom:			

In the results there were 23 people that provided complete information within the context of the study design. The median age was 55 years and it ranged from 18 to 78. The vast majority were African-Americans roughly even male vs. female and 61% reported that they had grown up around the landfill which would indicate some familiarity with odor associated with landfills.

On the exposure side we took the H<sub>2</sub>S measures every 15 minutes. When we wanted to assign that to the diary measures we had to take an average of those 15 minutes to look at the one hour average H<sub>2</sub>S within a window directly surrounding that time period that people reported being outside for that five minutes. When we take the one hour average of those, we see the H<sub>2</sub>S levels were .22ppb. This is quite low. Getting back to the idea of H<sub>2</sub>S as a marker of a more complex plume of odor and gases it ranged from 0 to 2.30 ppb within the one-hour average. So how many times is H<sub>2</sub>S present? During all the records and all the time periods that people contributed information it was present in 72% of the diary periods and people reported odor in 26% of those diary periods.

The breakdown of reports of odor we were interested to see if there is a range in terms of odor reporting from faint to very strong. There is a nice range of reports of odor.

## Is there an association between H<sub>2</sub>S and landfill odor?

### And is there evidence of variability by wind direction?

	No. of records	1-hour mean H <sub>2</sub> S (SD)	Beta Coefficient <sup>a</sup>	SE	t-Value
H <sub>2</sub> S (ppb)	709	0.22 (0.27)	0.30	0.11	2.75
Wind direction (toward community)	105	0.36 (0.36)	0.67	0.19	3.49
Wind direction (otherwise)	588	0.19 (0.24)	0.08	0.14	0.58

<sup>a</sup>Fixed effects linear regression models adjusted for time of day (morning/evening) of diary record. SD=standard deviation; SE=standard error.

So looking that the association of H<sub>2</sub>S as landfill odor the first row above focuses on the pool of results across all the data regardless of wind direction. This is kind of the grand mean of the association between H<sub>2</sub>S and landfill odor. On that scale of reporting odor from none to very strong that reporting increased .3 units on that scale for every unit increase of H<sub>2</sub>S. When it is stratified by wind direction we see that when the winds blow towards the community this increase of reporting on that scale increases more than double. When looking at periods when the wind is blowing from a direction other than from the source of odor towards the community we see that there is a substantial reduction in the strength of that association.

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When we look at the association of malodor and symptoms this is looking at reports of malodor as the exposure and the symptoms as the outcome. We see a range in the strength of the associations - the strongest being between "alter our daily activities" next "upper respiratory symptoms", "mucus membrane irritation" "headache and generally feeling ill". The one thing to call you attention to is to get at this issue of whether people are generally over reporting all symptoms whenever there are periods of odor. That is not the case because see we for gastrointestinal illness and also for feeling active or energetic or peppy there is no evidence of an association here in terms of periods of odor and reporting of symptoms.

Ward asks what does "9" mean.

Heaney replies that these are odds ratios so it is looking at the strength of the association where 1, an odds ratio of one is a no relationship between reports of odor and the outcomes and the symptoms. For gastrointestinal illness is basically no association here.

Ward states that something that is strongly associated is that 100 or 9.

Heaney states that in environmental epidemiology many effect sizes that we look at are quite small but it depends on the precision of the estimate. Here the 95% confidence intervals are indications of precision of the estimates. When we look at the hypothesis testing within the context of the relationship between the exposure and the outcome if we have an overlap of that 95% confidence interval with one, that is something to consider in terms of our interpretations of the findings. You will notice that the outcomes are all quite strong associations and are fairly precise in terms of their indication of a positive association.

Vickers asks what is the highest association you can have.

Heaney states that in theory you can have infinity.

Vickers asks if this scale is 1 through infinity.

Heaney replies yes. To put some context into this if you had outbreak investigations outbreak like the CDC runs all the time to try to identify whether it is the potato salad that caused the norovirus outbreak or something else they typically look for odds ratio on the scale of 12 to 20 to give them an indication of the association or the indication where to look for the followup laboratory testing. For example to then say we see an odds ratio 12 or 20 here and we want to have the potato salad investigated in terms of a lab test for norovirus. So that's the context of strength of these associations.

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Sassaman states that I'm missing something here that is the odds ratio. What is the algorithm for calculating the odds ratio.

Heaney replies it is the fixed effect regression, so this is actually logistic regression to arrive at an odds ratio.

Sassaman asks what are you expressing in the odds ratio, of what to what?

Heaney replies the relationship between reports of malodor from the landfill and reports of symptoms.

Sassaman states that it is a correlation.

Heaney replies yes it is an estimate of association. The p values would be highly significant [for most variables.]

What can we take away from this study? For the first set of analyses where we look at the relationship between exposure to an air pollution source within this community there is strong evidence for a health related quality of life impacts of malodor with an objective measure [for] this disproportionately black community bordering a regional landfill. We can also think that reports of odor could be a better measure of the complex mixture of the air pollutants from the landfill than the H<sub>2</sub>S measurements that we made at one location in the community. When we think back to the odor sniffing team which is the preferred investigation approach in some countries, people's noses are much more sensitive to the complex mixture of these gases and in different places within a community than one measurement in a community at one point in time.

We do have to acknowledge that there could be correlated errors in the reporting of odor and symptoms which are both self-reported and that this could lead to some bias in the effect estimates of the relationship between odor and symptoms. However we did see that there was no evidence of a generalized over reporting during odor episodes because some symptoms like GI illness show no relationship with odor. Thinking about the broader context this is actually the first study performed from concurrent measurement of exposures and outcomes within the context of potential sources of odorant and air pollutants from the landfill. This longitudinal design very nicely controls for bias from fixed characteristics with in individuals that are measured or unmeasured and are very difficult to account for and the more classic comparison where you are comparing health outcomes in a community near an odor source to a community that is far away from an odor source.

To finish up this Minister Campbell will come talk a little about the qualitative descriptions from participants.

Campbell states that the impact of landfill odor hampers quality of life and here are the statements from participants.

### **Impact of landfill odor on health-related quality of life**

Qualitative description of changes in daily activities from participants:

"I couldn't be outside today given the stench from the landfill."

"I couldn't sit on my porch, exercise or walk to my neighbor's."

"I have to keep all of my windows and doors closed to keep the smell from coming inside."

"I couldn't walk my dog around the yard."

"I had to drive with my windows up because of the smell of the landfill."

Sharing the results with the community and government one of the things we definitely asked our community what is the affect of the odor that you smell on a daily basis. Some say they could not have a cookout. They couldn't invite friends from work to their yard because of the smell. They didn't want to expose them to the smell they were smelling on a daily basis. They had to alter the way they do things. On hot days you could not open windows on the front side so you have to run the air conditioning completely every day. So it affected us economically. The one thing that we understand is that Waste Management has been doing odor management however we still have problems with air pollution. Malodor, trash along the road way, contaminated water and illegal dump site. What we need is a partnership that can help us lessen the impact and cleaning up the problem. That is one of the reasons we are here tonight, to try to form a partnership with solid waste management.

1. We are having a big sweep clean up on March 19, 2011 from 9 am to 2pm. We need two roll-out dumpsters, 20 recycling bins and free access to the landfill and the use of

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the convenience center on that day. Can solid waste provide two drivers and two pickup trucks for the use of the community that day?

2. We have a vegetable oil recovery project that we would also like to partner with solid waste management to allow RENA and our partners to place vegetable oil collection barrels at the Eubanks Rd. convenience center to help centralize this project. Can we set up a date to talk about this partnership and how to make this project cost effective for Orange County and RENA partners. We want to incorporate what we are doing through the solid waste management. We have already gone into the community and have gone outside the community have already began to collect vegetable oil for recycling to turn in to bio-fuel. It will be more effective if we were partnered with solid waste management and people will have a central place to bring their vegetable oil. Tonight we are hoping to be able to at least began to discuss or form some type of conversation about this that we can work together to make this work for all Orange County. We have become a model for all the other counties where if you have the resident and business working together to keep this oil out of the landfill. We know that it shows up at the landfill inside the dumpsters. All the grease is not going in the grease containers that is behind the restaurants and hotels. When people have cookouts during the summer that oil is ending up in containers so we are trying to come up with a way to keep this out of the landfill.

Sassaman states that it sounds like you have a lot of request of the Department of Solid Waste Management. Have you formally made those requests of the department?

Campbell replies no not yet. We figured we would start here to bring it before SWAB because those people who manage solid waste sit on the SWAB. We thought we would give them the opportunity to understand where we are coming from with this trying to create a partnership where we can work on these issues. Number one, solid waste management was supposed to make sure that the trash got picked up along side the road. It is not happening. Any time that we can pickup six truck loads of waste along side Rogers and Eubanks road it tells me that it is not being picked up three times a week. It is not being picked up two times a week. So we are trying to establish a dialog where we can begin to work together to make sure this happens. Even to the point that there are people in our neighborhood that solid waste could hire to pick up trash along Rogers Rd. We are just trying to create a dialog so we can work this thing together.

Sassaman states that it seems that the most expeditious way to accomplish what you are trying to accomplish is to directly, formally make a request of the department of solid waste management. Does that make sense to you Steve?

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Yuhasz replies yes. It would be important to let people know what the response to that is.

Sassaman states that we don't have any authority. We are not an operational authority. We are just an advisory board. If you would like to copy me on any formal request that you make of the solid waste department, I'll see that the SWAB takes a look at it and maybe we would be in a position to support or encourage the department to help you out. But it is not our role to get in that level at that point.

Campbell states that we understand that. One of the other reasons why we came when we did the water survey and it showed that there was contamination in the surface water and the ground water and our drinking water there were some mixed emotion why wasn't solid waste made aware of this so figured if we start here and then we will go to solid waste then we will go to the Town of Chapel Hill and Carrboro and then to the Orange County board we were doing this out of respect to solid waste advisory board. We know that you don't have the money. We know that you can't say yes that we have to go directly to solid waste and ask them but we want to make sure that you were aware of what we were going to request.

Vickers asks regarding the contamination of the wells are you talking about what was done ten years ago?

Campbell replies no. We just did a water survey test back in 2010.

Vickers states that the reports done ten years ago by the consultants stated the water flow is away from Rogers Rd. and flows towards the east side of town. I'm just curious how the water flows back to Rogers Rd is related to solid waste. They did come up with contamination in your wells from multiple usage of BTX, gasoline, solvents which is normal for our culture and always shows up in shallow wells. Even local users dumped it in the ground. How is that related to the landfill if there is contamination in your wells? We've spent a lot of money and time doing a study that pretty well determined that whole ground water flow is on the east side of town and it is not towards Rogers Rd.

Campbell states that I spoke about contaminated water I did not say that the landfill caused the contamination. We never went out to try to prove that it was coming from the landfill. Our work was to show how out of compliance the water in this area was. We even went to the north side of the landfill. We did an extensive test around from Homestead Rd. all the way back to Millhouse Rd. The evidence showed that the water is out of compliance. We never did try to match up where the contamination was coming from but it is a coincidence that some of the same chemicals that are in the well water is in the test wells around the landfill. We were not trying to make that correlation. What we are saying is that we know that we have problems but how can

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we work together to solve these problems. We are not pointing our finger at solid waste. We are not pointing our finger at the landfill. We are saying how do we make the Rogers Rd. community a livable, healthy, sustainable community.

Vickers states that in remembering being on the board that \$600,000 was spent supplying water lines. Did the residents elect to connect or not? The solid waste department paid OWASA to put that line in so Rogers Road could have clean water.

Campbell states that it didn't happen completely. There are still homes that are so far from the infrastructure that they are still on well water. Through the work that we have been partnered with Orange County Health Department and Orange County Housing Development we were able to find \$75,000 to connect 10 or 11 houses to infrastructure without adding more infrastructure but there are still homes that are so far from the water lines that were run in 2001 they are still on well water and have to have filtration system on their water supply wells. So no the water lines are not complete. No not all the homes are not connected.

We are not here talking about that. What we are talking about is how can we form a partnership to make things better. How can we work together to make things better?

Ward states that getting back on the solid waste issues, the things that you were asking related to the clean up and vegetable oil, to me it seems like while this group doesn't have any power, it has a presence and a level of respect that it's opinion is thoughtful and the County Commissioners would value what we might say about your request that we could lend a voice of support or otherwise. I think it is appropriate for you to be here and ask for those things or see if we could lend our support to your request.

Marshall states that as the Recycling Programs Manager any time you need carts for events you can just call the office and we would drop them off and come back and pick them up.

Pollock states that from staff perspective, going down the list – 20 recycling carts, a couple of roll-off, access to the landfill and the concept of setting up vegetable oil (recycling) – it would be good when the director is back to get a formal list so that we can get our head around all that and organize to work with you all to support the cleanup. The Department has generally supported various Big Sweep efforts in the past. We would certainly be able to sponsor the recycling removal, but the removal and no cost dumping of waste at the landfill is a different animal that I am unable to say "yea" or "nay" to right now. Give us a chance to look at the list of ideas and I'm sure we can get some things in place by March 19.

Heany asks if we are connected to Chapel Hill Stormwater Division.

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Pollock notes that we have worked with them before to organize disposal of materials from Big Sweep Events and our Director will meet with you when he comes back.

Williman states that being the Education and Outreach person for the Solid Waste Department I've been in conversation many times with Wendy Smith with the Town of Chapel Hill about this clean up. Grant Gale a former employee had also been in contact with Wendy about this clean up because there was an understanding that there was a considerable amount of construction waste, tires and other things that are required to be separated before recycling and proper management either by State or local legislation. The involvement of our Department was suggested back in December and there is a need for proper education to ensure proper separation to reduce disposal costs. This is above and beyond bottle and can recycling.

Sassaman states that it seems that there are a lot of things already taking place. What I would suggest if you haven't already, enumerate in writing for staff the things that you want and the areas you want help. There may be some regulatory issues that may impinge on this, but if you are not getting any help come to us at our next meeting which is before March 19<sup>th</sup>. It seems that the ball is already rolling.

Campbell agrees. As stated before out of courtesy of the Solid Waste Advisory Board we wanted to make sure that you were aware of what we are planning on doing. Our next step is to go to the different departments – Town of Chapel Hill and Orange County Board to get either get some help or to let them know what we are doing. We are trying to lower the cost to the Rogers Rd. neighborhood. We don't have the money to pay all the tipping fees to get in there but if we can use the convenience center .....

If we have the man power and you have the space, how can we lower the price of using your space? That is why we came here tonight to let you know that we understand. We started off with the air study but on the loose end of it know that you can't pay for infrastructure, knowing that you can't connect us to water lines, what is it that we can do as a partner to alleviate some of the impact of the community. Trash that is along side the road is not being put there by the residents, so how can we work to make sure these things can happen.

Ward states that in your comments earlier you mentioned some form of a promise that the solid waste folks were going to take care of roadside clean up and you said that hasn't been done. Is that paraphrased correctly?

Campbell replies just about. At one time there were workers from solid waste picking up trash along side the road. That person hasn't been out there now for about 9 months that we can see. It was something that was promised. It was one of the 14 points that the LOG and the Neighborhood Working Group come up with.

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Ward states that to the extent that we can uncover that document and that wording I think that would be helpful to justify the County stepping in with tipping fees if they had promised that they would in fact be the manpower behind it as well [unclear] that might make sense. ....

Pollock states that there is a written document that we can refer back to. There was a definitive arrangement about cleanup and not routing waste collection trucks along Rogers Road, until Carrboro started picking up garbage. But no through trucks. As far as any lack of cleanup if we are not meeting the specification of the agreement we will follow up to make sure that is happening.

Cheren states that going back to the presentation and get to the bottom line on air quality and I know solid waste (department) has been making efforts to mitigate the problems of bad air. What else can be done?

Pollock states that there is a pretty big project that is underway now that hopefully will be done by June that will resolve 99% of the odor problem. It will basically be putting a gas collection system that will pull a vacuum on all the gas that is being generated both on the north and south sides of the landfill with a series of gas collection wells then all that gas will be piped to a centralized location where it will be dewatered and for the first year burned so the odors will be destroyed along with the methane. Eventually it will be piped to a generator set, but we anticipate that when the flaring system is in the odors will be reduced.

Vickers asks if we expect any issues when you install the system and open up the landfill.

Pollock replies we have been drilling holes for the past month and it doesn't seem to be noticeably worse.

Caldwell also notes that it has not gotten worse but the removal of the tree buffer for the new development has had a negative effect and we have also uncovered about 35 small dump sites that we want to clean up. We are documenting those and will hand that information to you [Solid Waste]. Here Caldwell goes into detail on the dump locations and protocols. There are refrigerators and appliances and we are going <sup>1</sup>to ...[inaudible]

Sassaman states that all the staff needs is a formal request.

Caldwell replies that they will ask if we've gone to the SWAB first, so that is what we're doing.

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Heaney states that in conclusion I want to acknowledge Min. Campbell, David and members of the community who helped to provide input to figure out how to set up and run the study and how it would work. There were several groups from UNC – The Epidemiology Department, a student group, Engineers Without Borders has adopted the Rogers Rd. neighborhood as their ongoing service project and the Campus Y. In terms of thinking about these mitigating activities going forward in cleanup and trying to identify pots of money we encourage staff that there are group of hungry students waiting to help out in a big way and connect people between the Towns and local staff to help lead the cleanup.

This was funded by several pilot grants from UNC and my ongoing funding from the Kellogg Foundation.

Ward asks if there is any intent to continue or to redo the diaries and monitoring since Blair mentioned the infrastructure that is going in that he feels that will make a major reduction in the odor. I would love for that to be documented in your study so that the community and the staff would both feel like it was proven that the quality of life [improved] Is there intent or funding?

Heaney replies not at this point. The goal for this study was to look at the situation as it's been ongoing to try to encapsulate through a study over a period of about a year and a half where we have staggered rolling enrollments in these 14 day periods to try to really describe what the residents have been experiencing in terms of air pollution associated with odorant gases and how that air pollution has been traveling through their community for a long period of time. I think it is a great suggestion to do it going forward especially since there is a wonderful proactive project going in.

Tipton states that in thinking about this should Orange County ever site a landfill in the future something like this is interesting because if we ever find a place within our borders how do we pre-mitigate or keep this from happening in the future.? The study didn't go so far as to say “how far out [the smell goes]’ but it is interesting to think about how far up waste goes, how far out the smell goes , what real buffers are needed or if we use transfer stations it goes some place else and some neighbors that we don't look eye to eye with...it's just an interesting thing to think about as we plan future solutions.

Sassaman states that any landfill siting anywhere requires a lot of environmental analysis that this landfill was never subjected to. There've been a lot of changes in the rules.

Marshall asks has there been studies similar to this around farms and fertilizer application.

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Heaney states that the concept for this study did come out of other research around low level sources [of odor] at food animal production facilities. In this State and other states there is a manure collection system where manure from the food animals is pooled into a lagoon and then they are land applied - there are spray fields. This body of translating and observation design with in an epidemiological study into kinds of analysis that can get closer towards causal inference, closer to a randomized control trial. That is really difficult to do within the contents of an observation study.

This design where people go through time and they experience random exposure events and random periods where they are not exposed, they are their own control, similar to a randomized control in a trial. ... a lot of this work is on the advanced edge of the epidemiological methods for environmental epidemiology and occupational epidemiology. So this comes from a history of work around industrial animal operations.

H2S is a common source across both of those fields. It is an irritant and a neurotoxin but what we're dealing with are not [such high] concentrations typically but it's a marker of a more complex mixture of gasses but not at levels that would be considered a regulatory trigger by OSHA.

Marshall asks the three-quarters of mile that people participated is that all the way around the landfill or just in one direction?

Heaney replies it was open. We had an open recruitment effort. We tried to get the word out about the study as broadly as we could. That everyone was directly from the south.

Caldwell states that the landfill had nothing to do with the people that we chose. The people from that area responded.

Vickers asked if they looked at wind roses.

Heaney we looked at the airport and the Duke Forest research station.

Caldwell adds I am currently the project director for RENA. Some of the things that we are doing [are that] we spent six months building a community center. The field/yard that the kids play in the background is a mountain of trash that is the landfill that you can see clearly. We are looking at going from not being able to step outside to hopefully where the kids play without being harmed. We still have problems with vultures contaminating the gardens. We have had classes on solid waste managing, composting. We found people had things in their homes that were unhealthy we train people to make their homes healthier. We travel around the state

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talking about these things. This is one of the few places where people actually sit down and talk. There are places where there is no communication. We feel we're moving in the right direction collaborating and moving in the right direction.

Sassaman states that Chris in your study you focus primarily on H<sub>2</sub>S and that's easy to measure. It would be great if you are able to look at what else might be in the ambient air that could be contributing some effects.

Heaney states that it is a science where a lot of work has been done on the different signatures of chemical profiles of these markers of these odor, of these gases. One of the tricky things about this design is thinking of something that can take relative continuous measurements over time. That was one of the things we needed to focus on. What is done and is under a more well-resourced setting would be to have multiples of what they called the "baby" because these instruments are so sensitive to take around and place in different locations and then do this kind of concurrent rating of odors and symptoms. One thing about H<sub>2</sub>S is that it is a little better than some of the semi-volatile odorant components of these air pollutants. H<sub>2</sub>S tends to build up and get a critical mass before something like wind or diurnal convection will move it. So when we see a signature on the machine that is a pretty good indication that there is some kind of globular [mass] of H<sub>2</sub>S that has been moved through the community in some way. It's been described as fingers of H<sub>2</sub>S in low lying areas that spread through valleys, there are some properties to H<sub>2</sub>S that are quite attractive.

Vickers adds that the nose is the most sensitive instrument we have.

Ward notes that the Town of Chapel Hill is working with OWASA to try to resolve odor issues at the waste water plant and they may have some perimeter odor monitors and they have worked hard to contain those odors.

Yuhasz asks Blair that regarding the request for aid from solid waste to look at the request and see how they measured against the specific provisions of the 14-point agreement. I would like to emphasize to make sure to look at how they measure against the spirit of the provisions of that agreement and if there are areas where the specific provisions don't allow the kind of aid that the neighborhood is looking for, let the manager know that, so that we can see if there is a way we can provide that aid outside the specific provisions of the agreement.

Heaney states that as a closing comment one of the things that we think about when measuring odor in the context of a study like this is to think about the quotes at the end. Those are the most telling. You can do a lot of scientific measurements and estimation but at the end of the day, what we were setting out to do was try to get a way to quantify in a defensible way what the residents had been living with for quite a long time. So in terms of its impacts odor had as we were able to show odor as

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measured objectively has been present in ways that have interfered with activities of daily living in this community and health-related quality of life issues. That is one of the things I've heard repeatedly from my meetings with Min. Campbell and David is a way to think of creatively to mitigate. If odor is just a fact of life [until measures can reduce it] to mitigate the experience of this community over the past 30+ years.

**5. Board Member Comments** – Ward states that going back to the presentation, do you have any thoughts about the vegetable oil recovery plan? I don't know if that has anything to do with the 14-points. It was something that we had talked about briefly as a possibility.

Pollock states that the vegetable oil possibility came up last year and at the point the board [SWAB] did endorse it. The staff position was as soon as we were back to fully staffed to where we could manage all the implications of collection even if it were by third parties we would then figure out what's appropriate, We would not do it at just one collection center. It's clear that it's something people want. We take it in at the HHW center now but it costs us on the other end. We would like to come up with a cheaper, better more efficient way to deal with it. I am not sure how it is going to unfold.

Campbell states that we have partnered with the Foster Foundation in Durham that is operating a bio-solid fuel process. On our first day we collected 80 gallons of used vegetable oil. It looks like we might be able to generate about 5,000 gallons in a three-month period. They are in the process of talking to the Greek [UNC Fraternity] Association and has several fraternities houses involved. We are hoping to get the rest of the county. It looks like it might be a possibility for 4 or 5 different sites for the oil to be collected. It will be a great opportunity to partner with Orange County.

Cheren asks Steve is there any feedback on the interlocal agreement.

Yuhasz states that at this point we are waiting for responses from the Towns.

Cheren asks is there a date?

Yuhasz replies we asked for a response by February 15<sup>th</sup>.

**6. Other Business** Pollock states that as we start to look at the budget issues a big one will be to figure out a productive way to have a discussion about moving towards single stream recycling and some of the implications with that. The basic project is the idea that by moving towards putting all the recycling in one cart and picking it up semi-automated with better, faster compaction equipment it'll achieve a lot better efficiencies. What are the trade offs in terms of moving from weekly to every other

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week monetarily vs. people's convenience. What are the issues around should we provide multiple sizes of carts, who should continue to use bins.

Smith moves to adjourn.

Cheren seconds.

Adjourn 8:30 pm