SW compost
Permit # 19-06
McGill

NCDENR

North Carolina Department of Environment and Natural Resources

Dexter R. Matthews, Director | Division of Waste Management | Michael F. Easley, Governor
William G. Ross Jr., Secretary

September 15, 2005

Mr. Noel Lyons
McGill Environmental Systems
634 Christian Chapel Church Road
New Hill, North Carolina 27562

Re: McGill Environmental Systems – SWC-19-06 Permit Modification

Dear Mr. Lyons:

The Division of Waste Management has reviewed your request to modify the biofilter design for McGill Environmental Systems of North Carolina, Inc. Large Type 4 Solid Waste Compost Facility at 634 Christian Chapel Church Road in Chatham County, North Carolina.

Your request also indicates that the existing filter media will be replaced and that the recipe for the new media changed. Our understanding is that the new media will be a combination of inert material (brick and gravel), wood chips and compost.

Your request to modify the biofilter design and the biofilter media are considered approved. Dennis Shackleford and Ted Lyon should be notified prior to starting to replace the new media. When you have completed construction of the biofilter modifications at least two sets of as built, engineered sealed plans will need to be submitted to the Solid Waste Section.

Please note that the other proposed facility modifications you discussed are not approved by this letter. Should you have any questions please feel free to contact Ted Lyon at 919-508-8508.

Sincerely,

James Coffey

James Coffey, Chief
Solid Waste Section

cc: Dennis Shackleford, Waste Management Specialist, Fayetteville Regional Office
Central File, Solid Waste Section

h:cla/Compost/permits/19-chatham/Mcgill/SWC-19-06_09-05_pmod

1646 Mail Service Center, Raleigh, North Carolina 27699-1646
Phone: 919-508-8400 \ FAX: 919-733-4810 \ Internet http://wastenotnc.org

Subject: Re: Biofilter media change
From: Ted Lyon <ted.lyon@ncmail.net>
Date: Thu, 08 Sep 2005 13:33:22 -0400
To: Noel Lyons <nlyons@mcgill-leprechaun.com>
CC: Dennis Shackelford <Dennis.Shackelford@ncmail.net>
BCC: angela.birchett@ncmail.net

More questions concerning the biofilter:

1. With the average brick size of the brick around the pipes is 4 inches. Does this large a particle create the possibility of material sifting down and restricting airflow?
2. It appears that your media is going to be 80% inert and 20% compost. With this much inert material is there not a risk of a significant delay in the media being effective? With this size material is there a risk of the 20% compost sifting down and reducing effectiveness or restricting air flow.
3. What is the retention time or CFM/square foot for the biofilter.
4. There are other means of managing leachate from the biofilter. You could for example collect it and manage it with the compost. This would require that you design and install some type of collection system. We would of course need to review the palns for the collection system.

Once these issue have been clarified you should be able to proceed with the biofilter changes.

Issues concerning other changes:

1. We need written documentation from local zoning that the changes to the facility footprint are acceptable. The curing pad expansion and the truck and trailer parking lot increase the origional facility area.
2. The specific location of the proposed grinder, storage area for material to be ground, and the 20,000 gallon storage tank need to be on the site plan.
3. Construction specifications need to be provided for the support structure for the 20,000 storage tank.
4. A copy off the approved erosion control plan needs to be provided.
5. Changes in the operation plan needed to reflect these additions to the facility

These issues need to be addressed before the work is done.

If I think of anything else I will let you know.

Noel Lyons wrote:

> Ted,
>
> I am anxious to here from you about the media replacement for the biofilter information .I feel it is important to have it completed before the winter sets in.
> I hope you can fit it into your schedule .
>
> Hope all is well.

M. Noel Lyons
Mcgill-leprechaun
nlyons@mcgill-leprechaun.com
910 990 3188

Page Break

August 8, 2005

Ted Lyon, Supervisor
Composting and Land Application Branch
NCDENR Division of Waste Management
1646 Mail Service Center
Raleigh, NC 27699-2646

RE: Request for additional information on proposed biofilter.

Dear Mr. Lyon:

This is our response to your request for further information on the biofilter media change.

Included in the package are the site plan, a drawing of the proposed biofilter cross-section, a chart on media selection and a projects update list.

The following paragraphs list responses to each of your specific questions.

1)The brick will be an average size of 4 inches. Optimal lateral air movement will be achieved by using the brick, which is considerably more porous than the media. The existing low permeability pad will remain in place under the biofilter.

2)Dual piping is made of HDPE plastic and is also known as dual wall/smooth core piping. This is the same piping as the 12-inch piping now in use for the biofilter. Dual piping's reinforced wall structure provides considerable weight-bearing capacity, making it suitable for heavy weight-bearing applications. The most common application is for covered drains which need to withstand heavy traffic loads.

3)The media will be extended 42 inches from the air outlet point. The additional 6 inches will permit better air movement through the brick material prior and up through the media. The inert media, composed of crushed brick or rock of particle size 3 inches or less, will serve similar functions to those now served by woodchips. One function is that of bulking agent, but with the advantage of longer life than woodchips. Another function is to provide surface area for colonization by microbial populations. Inert media, though lacking in nutrients, are common in biofiliers. In

this proposed biofilter, nutrients come from two sources: the 20% compost portion of the media, and the air being filtered from the building. See attached.

4) The perimeter layer of finer material will stabilize the sides of the biofilter. There will be sufficient area for the grass margin, which we will grade finer and replant upon completion of the biofilter. Additionally, we recently cleared a strip of land along the lower side of the biofilter for improved immediate access to the biofilter, as well as for potential future uses as a roadway and a pad. This clearing project has also created space to expand the grass margin if necessary. Our erosion and sedimentation control plan was approved by NCDENR on April 21, 2005, prior to start of the clearing operation.

Related to the use of the grass strip as a leachate filter, we are studying alternative leachate management options. This is a topic we have wanted to discuss with you for some time. We are particularly interested in how leachate is managed at other outdoor facilities

5)The material used on the perimeter will be screened existing media, applied to a 12-inch thickness. This material is much finer, will seal the sides and improve the appearance of the finished biofilter.

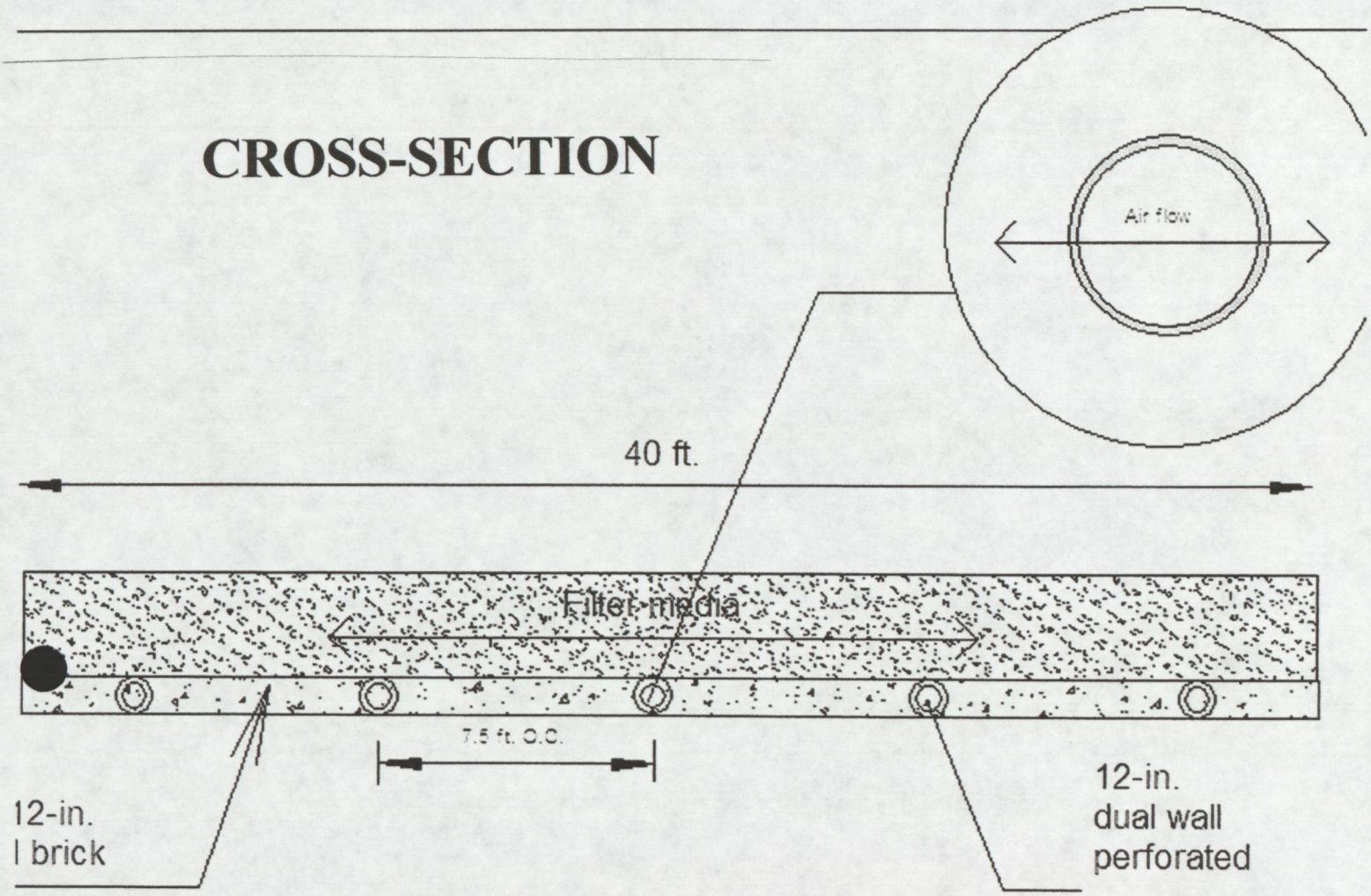
Should you require further information, please contact either Steve Cockman, or me, at 919-362-1161. Steve can also be reached on his cell phone at 919-542-8903.

Sincerely,

M. Noel Lyons
President

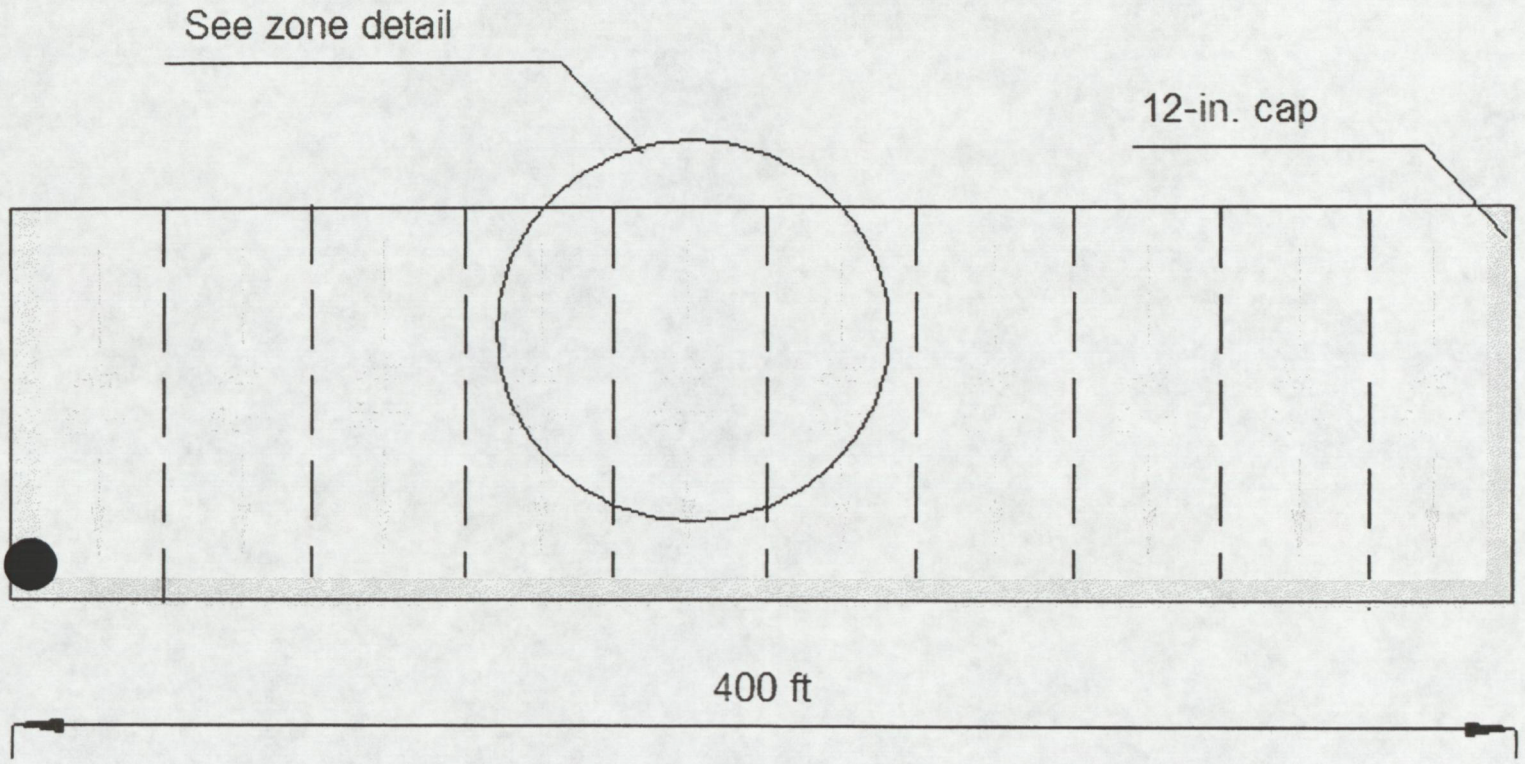
Attachments

CROSS-SECTION



BIOFILTER ZONE DETAIL

McGill-Chatham
080505 Lucas
SCALE: 1 in. = 5 ft.



BIOFILTER TOP VIEW

McGill-Chatham
080505 Lucas
SCALE: 1 in. = 50 ft.

Table 3.1 Summary of Important Properties of Common Biofilter Materials

	Compost	Peat	Soil	Activated carbon, perlite, and other inert materials	Synthetic material
Indigenous microorganisms population density	High	Medium–low	High	None	None
Surface area	Medium	High	Low–medium	High	High
Air permeability	Medium	High	Low	Medium–high	Very high
Assimilable nutrient content	High	Medium–high	High	None	None
Pollutant sorption capacity	Medium	Medium	Medium	Low–high[a]	None to high[c], very high[a]
Lifetime	2–4 years	2–4 years	>30 years[b]	>5 years	>15 years
Cost	Low	Low	Very low	Medium–high[a]	Very high
General applicability	Easy, cost effective	Medium, water control problems	Easy, low-activity biofilters	Needs nutrient, may be expensive[a]	Prototype only or biotrickling filters

[a] Activated carbon.

[b] Bohn (1988, 1996).

[c] Synthetics coated with activated carbon.

McGILL Leprechaun

Projects Update List
Chatham County Facility
August 8, 2005

1) **Future Curing Pad Expansion**-The area west of the biofilter has been cleared and erosion control measures installed as per approved erosion control plan (4/21/05). At a future date we plan to request the addition of this pad (when completed) to our operation.
2) **Biofilter Upgrade & Maintenance**-As a part of routine maintenance the biofilter media is scheduled to be changed. Ingredients and supplies are being assembled with work scheduled to begin September 1, 2005.
3) **Truck and Trailer Parking Lot**-The area southeast of the processing building is being prepared and graded to handle parking of tractor trailer units. A compacted stone base will be maintained for all weather service. Completion of the project is scheduled for January 1, 2006.
4) **Installation of 20,000 gallon Water Tank**-A 20,000 gallon water tank is being installed adjacent to the southwest corner of the receiving ramp. The tank will serve as a storage and surge tank to wash trucks and other non-potable water needs of the plant. The tank will be supplied by the existing well on site. Completion of the project is scheduled for October 1, 2005.
5) **Wood Grinding Operation**-A permanent electric wood grinder is being designed to be located in the southwest corner outside of the Mixing Building. A concrete slab will be installed to allow for all weather operation. A $-28,000 GRANT from NCDPPA will be used to finance a portion of the $300,000 project. Completion of the project is scheduled for January 1, 2006.
6) **Building Insulation**-Research into improving the corrosion resistance of the building and improving visibility in the building during colder months has led us to investigate systems and products on the market for these needs. Spray insulation will be applied to the interior of the building to accomplish these goals. Completion of this project is scheduled for January 1, 2006.
7) **Trommel Screen (Finished Product) Upgrade**- A larger capacity permanent trommel screen is being designed to replace the existing trommel screen used for screening and mixing finished products. Completion of this project is scheduled for June 1, 2006.

ANSWERS TO QUESTIONS ON BIOFILTER

1 The proposed brick base will not restrict airflow. We know this from our observations of the existing media over the past almost 3 years. During that period the finer material which included 20% compost did not restrict airflow above the back pressure created by the blowers even though it was placed directly on the piping. In fact we expect the brick to contribute greatly to maintaining a more porous environment in the lower section of the biofilter for a longer period of time thus further delaying settling of media that occurs in all biofilters.

2 Wood does not behave as an inert material in a biofilter. Older ground woodchips will already contain the microbial populations and the energy necessary to support such populations. Additionally much of the wood to be used will come from screening the existing media therefore making it the most specifically acclimatized material to treat this airstream.The media will be mixed in advance therefore all ingredients will be well inoculated in advance of placement on the biofilter.

The scheduled change will act as a further protection in that the sections will be changed over a number of weeks.

3 The retention time will be at 45 seconds.

4 We continue to look at various options for leachade management. We are not ready at this time to submit a change request. Over the coming months I want to examine mechanisms of leachate management at other solid waste composting facilities for possible cost effective options. We will also evaluate the collection option.

Subject: Biofilter questions
From: "Noel Lyons" <nlyons@mcgill-leprechaun.com>
Date: Tue, 13 Sep 2005 09:25:18 -0400
To: "Ted Lyon" <ted.lyon@ncmail.net>
CC: "Steve Cockman" <scockman@mcgill-leprechaun.com>, "Jay Mumaw" <jmumaw@mcgill-leprechaun.com>

Ted,

Attached is our response to your questions on the biofilter.

Please let me know if you need further information.

M. Noel Lyons
Mcgill-leprechaun
nlyons@mcgill-leprechaun.com
910 990 3188

Subject: FW: Biofilter questions
From: "Steve Cockman" <scockman@mcgill-leprechaun.com>
Date: Thu, 15 Sep 2005 08:44:47 -0400
To: <ted.lyon@ncmail.net>

From: Noel Lyons [mailto:nlyons@mcgill-leprechaun.com]
Sent: Wednesday, September 14, 2005 5:22 PM
To: 'Ted Lyon'
Cc: Steve Cockman
Subject: FW: Biofilter questions

Ted,
My response got returned on the first attempt. Noel

From: Noel Lyons [mailto:nlyons@mcgill-leprechaun.com]
Sent: Wednesday, September 14, 2005 10:41 AM
To: 'Ted Lyon'
Cc: Steve Cockman
Subject: RE: Biofilter questions

Sorry Ted,

The list of materials is as follows.

Wood chips	60 - 65%,
Compost	20%
Inert materials	15 - 20%

Sorry about the lack of clarity in the letter...

Noel

From: Ted Lyon [mailto:ted.lyon@ncmail.net]
Sent: Wednesday, September 14, 2005 10:08 AM
To: Noel Lyons
Subject: Re: Biofilter questions

I am well aware that wood does not behave as an inert material. Item #3 in your letter to us indicates that the media will contain inert material and 20% compost. There is no mention of wood chips being in the media. There is a mention of screened material from the existing media being used, but that is in reference to the perimeter.

Perhaps you could simply give us a list of materials that will be used in the media and the approximate percentage of each.
Lyons wrote:

Ted,

Attached is our response to your questions on the biofilter.

Please let me know if you need further information.

M. Noel Lyons
Mcgill-leprechaun
nlyons@mcgill-leprechaun.com
910 990 3188