Bill as Introduced

SB 88-FN – AS INTRODUCED

2003 SESSION

03-1013
08/10

SENATE BILL ***88-FN***

AN ACT relative to testing and monitoring requirements at soil manufacturing and reclamation sites.

SPONSORS: Sen. Johnson, Dist 2

COMMITTEE: Environment

ANALYSIS

This bill provides specific directions for testing and monitoring of groundwater in certain reclamation sites that manufacture soil or perform reclamation with biosolids or paper fiber.

Explanation: Matter added to current law appears in ***bold italics.***
Matter removed from current law appears [~~in brackets and struckthrough.~~]
Matter which is either (a) all new or (b) repealed and reenacted appears in regular type.

03-1013
08/10

STATE OF NEW HAMPSHIRE

In the Year of Our Lord Two Thousand Three

AN ACT relative to testing and monitoring requirements at soil manufacturing and reclamation sites.

Be it Enacted by the Senate and House of Representatives in General Court convened:

1 New Subparagraph; Groundwater Testing and Monitoring. Amend RSA 485-A:4, XVI-c by inserting after subparagraph (b) the following new subparagraph:

(c) Notwithstanding any law to the contrary, the department of environmental services may commence or increase, as applicable, groundwater monitoring and testing at sites undertaking soil manufacturing or reclamation in which class B biosolids or short paper fibers are applied to the same area more than one time in a permit term. Groundwater shall not be tested or monitored at a soil manufacturing or reclamation site at which class B biosolids or short paper fiber is applied to the same area only once in a permit term.

2 Effective Date. This act shall take effect 60 days after its passage.

LBAO
03-1013
1/30/03

SB 88-FN - FISCAL NOTE

AN ACT relative to testing and monitoring requirements at soil manufacturing and reclamation sites.

FISCAL IMPACT:

Due to time constraints, the Office of Legislative Budget Assistant is unable to provide a fiscal note for this bill at this time. When completed, the fiscal note will be forwarded to the Senate Clerk's Office.

Committee Minutes

SB

Date: February 19, 2003
Time: 12:35 p.m.
Room: LOB Room 104

The Senate Committee on Environment held a hearing on the following:

SB 88 relative to testing and monitoring requirements at soil manufacturing and reclamation sites

Members of Committee present:
Senator Johnson
Senator Cohen
Senator Barnes
Senator Below
Senator Prescott

The Chair, Senator Clifton Below, opened the hearing on SB 88 by calling on Senator Johnson, prime sponsor of the bill, to provide testimony.

Senator Carl R. Johnson, D. 3: I will be very brief. Thank you, Mr. Chairman. For the record, I'm Carl Johnson, Senator from District 2. District 2 is four towns in Belknap County, twenty-six towns in Grafton County, and two towns in Merrimack County. A total of thirty-two towns.

SB 88 provides specific directions for testing and monitoring of groundwater at certain reclamation sites that manufacture soil or perform reclamation with biosolids or paper fiber. It directs New Hampshire Department of Environmental Services to, as necessary, require monitoring of groundwater at sites where biosolids and short paper fiber are applied more than once in a permit term. Permit terms are usually five years. For those sites where biosolids and short paper fiber are applied for reclamation purposes just once in a permit term, groundwater monitoring would not be required.

With that, Mr. Chairman, I will end my testimony and I'm sure there are others behind me who will be speaking for and against this legislation.

Senator Clifton Below, D. 5: Senator Barnes?

Senator John S. Barnes, Jr., D. 17: I have one quick question.

Senator Carl R. Johnson, D. 3: Yes, Senator Barnes.

Senator John S. Barnes, Jr., D. 17: I keep looking at this and I have for the last ten years up here. But, you know that I can't vote on a bill that doesn't tell us in the fiscal note how much it is going to cost. I'm kind of a conservative guy and I can't spend money unless I know how much I'm spending. I'm sure you are going to be talking to the proper people to get that to us before this bill is execed.

Senator Carl R. Johnson, D. 3: I will do that, Senator Barnes.

Senator John S. Barnes, Jr., D. 17: I appreciate that.

Senator Carl R. Johnson, D. 3: Thank you.

Senator Clifton Below, D. 5: Thank you.

Senator Carl R. Johnson, D. 3: Are there any other Senators or Representatives here who either haven't signed up or wanted to speak? If not, we will call on Helaine Shields. I'm sorry. I didn't see your name. Please come forward.

Representative Derek Owen: Thank you, Mr. Chairman. For the record, I'm Representative Derek Owen, as previously stated, from Merrimack County District 34 composed of seven towns. I am opposed to relaxing any testing that may be necessary and will put in a few cents worth.

In the '70s the rivers were being poisoned. Some of them were literally on fire. They passed the Clean Water Act and the rivers stopped burning up, the fish were living, we could then swim in the rivers. What they put into these rivers they took out and salvaged it at sewage treatment plants. In some cases, they put the sludge in the ocean and then Congress decided that was a no no, so we didn't do it. Then the EPA came along with the bright idea that we can't put it in the ocean, so we will dilute it and spread it on the farmlands. I feel we shouldn't put the same poison in the farmlands that you put in the oceans. Along came the legislation and the efforts to promote this material for recycling and, in order to make it more attractive, they had a contest and, guess what, they came up with the name biosolids. That sounds a little sweeter, but you know, a rose is a rose. By any other color, it is still a rose. By any other name, I should say.

The EPA standards 503 is when they came out with them and some of us were quite concerned about it. The one that drew the biggest attention, my

biggest attention, was the cumulative levels. EPA said, as soon as you reach certain levels of certain minerals or metals, you stop spreading it and don't do any more. You couldn't spread any more. The land was apt to be ruined. They had been farming in Europe and other countries for thousands of years and this sounds like a hurry up way of spoiling our lands. Testing works both ways. It tells what is good about it and what's bad about it.

Those are most of my personal comments about this particular bill, 88-FN.

I also have some testimony from Jan Pendlebury, who is unable to be here and I was requested to submit it. Before I do, if I may, if Mr. Chairman will allow me to submit this, I will just pull off a couple of highlights. **Please see memo to Chairman Carl Johnson and the Senate Environment Committee from Jan Pendlebury, MS Environmental Administration, BS Medical Technology, dated February 19, 2003, attached hereto and referred to as Attachment #1.**

Senator Carl R. Johnson, D. 3: Yes, if you would just give us the highlights.

Representative Owen: Yeah. Treated sewage sludge is not sterile. Current regulations permit sludges with average fecal coliform levels of up to two million colony-forming units of bacteria per gram of dry sludge to be land applied. That sounds more technical than it is and, for that reason, I am going to submit this testimony and let you peruse it when you have a little more time.

I will take any questions.

Senator Carl R. Johnson, D. 3: Are there any questions of Derek?

Senator John S. Barnes, Jr., D. 17: I don't understand why this bill is a problem to you. Tell me one more time why this is a problem.

Representative Owen: Because I feel you shouldn't relax any testing. We don't do enough testing. For an example, way back when we got involved in this, the EPA required testing once or four times a year and they didn't require testing every load. Every single load of sludge that comes out of a sewage treatment plant is not going to be the same. You may have spikes. We learned about spikes. You know, those spikes are when you have a high level determined of some sort of metals or something else.

Senator John S. Barnes, Jr., D. 17: Spikes every year. They have their ups and their downs.

Representative Owen: Right. And, you can't test enough to find out whether...

Senator Carl R. Johnson, D. 3: Thank you very much.

Representative Owen: Thank you.

Senator Carl R. Johnson, D. 3: Dick Flanders?

Dick Flanders: I have a letter of testimony here from the Department of Environmental Services. **Please see letter from Robert Monaco, Acting Commissioner, Department of Environmental Services, dated February 19, 2003, attached hereto and referred to as Attachment #2.**

Again, Dick Flanders. I represent the Sludge and Septic Program within the Department of Environmental Services and we come before you this afternoon to offer a mixed support of the bill as drafted.

The bill, as outlined, proposes to completely eliminate groundwater monitoring at sites where only one application is proposed to be made within a five-year permit period. We can't support that aspect of it since it is not consistent with our current policies and draft rulemaking, which we are about to launch into. We feel that that aspect of the bill has received insufficient study by our experts that we rely on at UNH. We do, under our current rules, not provide for a relaxation of groundwater monitoring for sites where biosolids or short paper fiber are applied to gravel pits that are reclamations and that has been one of the main impediments to seeing more use of these materials in gravel pits. That largely had to do with the expense of putting in the groundwater monitoring required as part of our permitting process.

I do, in my letter of testimony, refer to recently completed research done by UNH, Professor McDowell and others, on a site in Hooksett, New Hampshire, and their findings pointed to issues with timing magnitude, and frequency of application, as well as stockpiling potential sources of some elevated nitrate levels in groundwater tests at that particular site. While they felt that stockpiling was the likely source of some of those elevated levels, they did conclude that they felt that additional research was necessary to document the impact of a one-time application of biosolids to reclaim gravel pits. Our data shows that repeated stockpiling at a gravel pit carries significant risks to groundwater, but they should not be used to condemn all gravel pit reclamations with biosolids.

So, basically, we are trying to reflect on what we see as a distinction between soil manufacturing, which is a repetitive process where you are constantly bringing materials in, amending it with on-site materials, and creating a soil for sale off-site to one-time application, which is basically going into a gravel pit and reclaiming it. But, we have concerns relative to the issue of one-time versus routine type application as it relates to potential risks in terms of groundwater. We feel that there are some concerns relative to that aspect of it.

We have been dealing with several bills on gravel pit reclamation during the last several sessions and did not come to any agreement. Last session, Representative Melker had a bill in to try to fine tune some of the language as it related to reclamation use of biosolids that ended up in a study committee and no definitive result came out of that. Essentially what we are seeing here, I think, is another bill to try to take a different approach to the whole issue of reclamation, which we think has some merit, but we don't feel it has our complete support. We need to make a distinction between reclamation, which is one-time, and soil manufacturing, which is repetitive, as it relates to risks and so on. However, we feel that our current rules are in the process of being updated and re-invigorated and will address some of the issues, especially stockpiling issues, that were pointed out. We think we are going to have better control over that once those rules are implemented if in fact they are as they are currently worded. But, we would like to think that there should be some ongoing constraints over repetitive applications such as done at the Hooksett site.

So, again, we are somewhat ambivalent relative to the overall intent here of the bill. There were questions raised relative to the fiscal note. I did a fiscal note analysis of the bill. I don't know. You probably haven't seen that. There is some reference to fiscal analysis in the current bill that says the Legislative Budget Assistant has determined that this legislation has a total fiscal impact of less than $10,000 in each of fiscal years 2003 to 2007. My analysis suggests that there is a potential net benefit to the State if this bill were to be passed because essentially it would allow for gravel pits to be reclaimed using biosolids. We do have a fee that goes to the general fund, so our estimate, my estimate that I gave, was a plus $3,000 per year increase to the general fund if this bill were to pass.

Again, that doesn't necessarily mean that we support the bill just because I gave a positive fiscal analysis to it. There are two different processes involved here, but we do have some information that will probably come eventually to the bill maybe later on in the process. I'm not sure in terms of the details, but I can certainly provide my fiscal analysis if you are interested in that.

I'm trying to keep it short so, if there are any queestions.

Senator Carl R. Johnson, D. 3: If you could get that fiscal analysis to the Committee, I would appreciate it. Any further questions for Dick? Hearing none. We are under some severe time constraints here, so I would hope that those who follow be as brief as they can and not be repetitive. Helaine Shields.

Unidentified speaker: She's gone.

Senator Carl R. Johnson, D. 3: Jan Pendlebury?

Unidentified speaker: You have her testimony in front of you. She never came because of the snowstorm.

Senator Carl R. Johnson, D. 3: Alright. Caroline Snyder?

Professor Caroline Snyder: I will be very short. Again, I'm Caroline Snyder on behalf of the Sierra Club.

The ongoing practice of using New Hampshire sand and gravel pits for sludge farming is totally unacceptable. No other state in the nation routinely places sludges, at the rate of hundreds of tons per acre, on excessively drained soils where the water tables are high and where we have unpolluted drinking water.

The reason the Sierra Club is opposed to this bill is that, if you no longer require water monitoring at reclamation, this would encourage this practice, which is already impacting groundwater. I have given you a package that shows a number of documented cases where water has been impacted, including McDowell's study.

We also have given you, I think, last week, a report that I wrote, an eight-page report that is well documented with scientific papers that show the problems and the serious problems of that particular study and our response to McDowell's report. So, I hope you have a chance to read that.

When pollutants get into groundwater, they take much longer to break down than if they get into surface water. So, polluting groundwater, in many ways, is more serious or equally serious, I suppose.

The sludge industry appears to be ignoring the secondary affects of putting paper mill sludge and sewage sludge on these sites. Maine hydrologist,

Richard Behr, and a number of other scientists, are concerned that arsenic can be released in groundwater by a reaction of iron oxide with organic carbon such as paper mill sludge. In other words, even if paper mill sludge is as clean as what you saw in that bag, and that is not as clean as what we are putting on our land, even if it is that way, the carbon itself can mobilize arsenic. In Maine and New Hampshire we already have a serious problem of arsenic in our drinking water. This will be just an additional source of arsenic in that unpolluted water.

The final question that you should ask is, does it really make sense to continue to promote the sludging of spent sand and gravel pits when other, less expensive, more effective, and risk-free methods exist to reclaim these sites such as planting warm season grasses? Native, non-invasive warm season grasses do not require topsoil or sludge; they thrive in sand. Unlike sludged vegetation, which is dependent on nitrates and water, these plants survive drought. We have dramatic photographs that were taken last year during the drought, last summer, that showed sludge vegetation was brown and stressed. The warm season grasses were thriving at these sites. But, of course, most important, they do not pollute groundwater.

So, I would just urge this Committee to vote against this bill.

Senator Carl R. Johnson, D. 3: Thank you. Any questions? Senator Barnes?

Senator John S. Barnes, Jr., D. 17: I wanted to ask a question about this arsenic in the water.

Professor Snyder: It is a very complex chemical reaction. I could get you the papers. Some hydrologists don't even understand yet how it is happening. But, you are talking about the effect of...

Senator John S. Barnes, Jr., D. 17: You mentioned that we have problem in New Hampshire with arsenic. We have a gentleman on this Committee who is in the water business and knows a lot about the water. I was looking at him during the testimony and his eyes went up when you talked about the arsenic. So, I am just wondering...

Professor Snyder: Well, I don't know. Whose eyes?

Senator John S. Barnes, Jr., D. 17: I'm talking about my Senator friend across from me here who knows a lot about water.

Professor Snyder: The USGS has some testing being done at Dartmouth of a number of public and private wells and it is the geology that is naturally occurring, has nothing to do with pollution. We have a serious problem in many wells with arsenic.

Senator Carl R. Johnson, D. 3: Senator Prescott?

Senator Russell E. Prescott, D. 23: You are saying that the spreading of sludge does what to the natural occurring...?

Professor Snyder: Very rich carbon or nitrogen...

Senator Russell E. Prescott, D. 23: Excuse me. May I finish my question?

Professor Snyder: Yes. I'm sorry.

Senator Russell E. Prescott, D. 23: You are saying that the application of sludge when it doesn't come into contact with the groundwater, even though the sludge may not have arsenic, the groundwater can naturally have arsenic. What's the problem?

Professor Snyder: It is mobilized even more so. Otherwise, it would be bound. But, if you put oxidizing... It's a very complex thing and it would take me a long time to explain it, but I can send you the material. When Richard Behr gave his presentation at UNH, he said, I'm not worried about nitrates, because you hear everybody saying nitrates. I'm worried about the arsenic mobilization with this material and he is doing a survey with paper mill sludge mixed with pellets of sewage sludge and he tracked the ongoing research to show the arsenic is way up.

Senator Carl R. Johnson, D. 3: Thank you. Michelle Bouchard? Good afternoon.

Michelle Bouchard: Good afternoon, gentlemen. I am Michelle Bouchard. I am the Environmental Manager at Monadnock Paper Mill. Monadnock Paper Mill is the longest continuously running paper manufacturer in the United States. We have been running since 1819, twenty-three years before the incorporation of the Town of Bennington, which we are located in.

As a by-product of the paper manufacturing process, approximately seven hundred and fifty tons of dry paper solids are produced by Monadnock each year and so, in recent years, these solids were supposed to be put into the already overcrowded New England landfills.

We are in support of both SB 88 and 89 – 88 dealing with the monitoring requirements and 89 encouraging the use of biosolids and short paper fiber in road construction projects.

Currently, right now, 100% of Monadnock's short paper fiber is being for beneficial reuse. The majority of that is for landfill closure and gravel pit reclamations and some of it for animal bedding. Monadnock currently spends over half a million dollars a year to clean the contaminants out of the solids so that we can continue to apply these to the land. We do this because Monadnock has always been very proud of its environmental stewardship and we would rather see the solids going to beneficial reuse than to be put into the landfills. So, just the ability to say that we are beneficially reusing these solids is worth us spending $500,000 in excess per year to go through additional treatment for these solids to be sure that they meet very strict sludge quality certification requirements so that they can be land applied.

In New Hampshire, short paper fiber from Monadnock has been used in two gravel pit reclamation sites and six landfill closures, the two most recent being in Hooksett and currently our short paper fiber is being used in Manchester, New Hampshire for landfill closure.

The gravel pit sites have the groundwater monitored twice a year. The landfill closure sites are three times per year. Groundwater monitoring has been done for the past four years and has demonstrated that metals, VOTs and stuff have not been an issue at all. The only exception to this was a landfill closure site we did in Pelham back in '97 where the short paper fiber was stockpiled for months and months and months and the VOTs were becoming pregnant during the decomposition process. But, the management practices that we put into place working with Resource Management and the ...(inaudible)... themselves have eliminated this problem and we haven't seen this issue.

Stockpiling some of the biosolids are specifically the biosolids from municipalities, which do seem to produce higher than usual nitrates. The issue is only seen when these solids are stockpiled for long periods of time or if they are applied over and over again. So, the justification for not requiring groundwater monitoring at sites when you use the residuals only one time is that the only issue that we have seen in the past is where they have been stockpiled or added additional over and over. So, that's why we support the bill that if these solids are only applied once during the permit, that groundwater monitoring should not need to be required.

Also, as far as Env WS 800, we are required each quarter to have our solids tested and this is so we can retain our short paper fiber quality certificate

holder through the State of New Hampshire. These results are sent to the State Department of Environmental Services to be looked at and plotted. Some previous groundwater data that has been collected from places Monadnock reclamation sites and closure sites has been demonstrated that manufacturing topsoil that uses biosolids and short paper fiber can be applied to the land without having adverse effects.

The establishment of a healthy grass ecosystem using manufactured topsoil has been successful at all of these closure sites that we have been involved. Using the short paper fiber and the biosolids, it also decreases the need to strip agricultural land of its own topsoil in order to complete the reclamation and closure projects. So, encouraging using short paper fiber and biosolids also in road construction, which is the next bill on the list, it is just one more way that New Hampshire can find ways to beneficially use these solids and keep them out of our landfills.

I would be happy to answer any questions.

Senator Carl R. Johnson, D. 3: Senator Barnes?

Senator John S. Barnes, Jr., D. 17: Thank you, Mr. Chairman. If you people are doing fine with the law the way it is, why do we need to change it?

Ms. Bouchard: That's sort of why we're here. I don't believe we do. The State of New Hampshire, under Env WS 800, has very strict rules about monitoring the biosolids and specifically short paper fiber. Again, we do extensive VOTs, metals, extensive testing every quarter, four times per year. If they do not meet the quality certifications that is outlined in Env WS 800, then the solids are not applied.

Senator John S. Barnes, Jr., D. 17: I guess I messed up. Why do we need this piece of legislation that you're in favor of if everything is working so good for you? Why do we need this legislation?

Ms. Bouchard: We believe, as well as Senator Johnson, who is the prime supporter of this bill, that if you are going to reclaim a site and you are only going to place the solids on it one time, past reclamation projects have shown that groundwater contamination is not an issue. So, why should we be required to spend all this additional money on groundwater analysis when...? (tape change)...

Senator John S. Barnes, Jr., D. 17: You mentioned $500,000. This bill isn't gonna save you $500,000.

Ms. Bouchard: No. It's not going to save us...

Senator John S. Barnes, Jr., D. 17: How much, if this bill goes through, is it going to save your company?

Ms. Bouchard: It is not going to save us one penny.

Senator John S. Barnes, Jr., D. 17: Then, why do we need the bill?

Ms. Bouchard: It will not save us per se money because we're not the ones who pay for the groundwater analysis. It is going to cost the people who have to pay for the groundwater, the additional unnecessary groundwater analysis that will need to be performed if this bill does not go through.

Senator John S. Barnes, Jr., D. 17: Thank you.

Senator Carl R. Johnson, D. 3: Further questions? Thank you, Michelle. Chris Rueggeberg.

Chris Rueggeberg: Good afternoon. I'm here once again on behalf of Citizens for a Future New Hampshire to oppose the passage of SB 88. Once again, I gave you my testimony last week on this, so that pretty much explains why we are opposed to the legislation.

Today, I have also give you a copy of Professor William McDowell's research that he conducted for the last three years at Hooksett at a soil manufacturing site there. Once again, you can pick your dueling experts on this issue. His research shows that, through groundwater monitoring, that sludging gravel pits does in fact cause groundwater contamination and, in his report, he specifically says that, I think it is on page 2 if you have the time to look at what I gave you. You don't have to go very far into it. Just don't go any farther than page 2. It says further research is necessary to determine the impact of one-time application at reclamation sites. So, by doing away with the requirement for testing, even when it is a one-time application, you are still, once again, it is one of the things. If you don't test for it, you don't know whether or not there is a problem.

I would agree with Senator Barnes that I don't think this bill is necessary and the current groundwater monitoring and testing should be kept in place as it is. Senator Barnes also asked how much the bill is going to cost. Well, it is going to save the sludge industry money because they won't have to pay for the monitoring. It is potentially going to cost the towns money because they will be left holding the bag in case their aquifers are contaminated from this. But, once again, if you don't test for it, how are you going to find out?

The final point I have about this bill is that it really shouldn't leave it up totally to the Department of Environmental Services to decide when testing is going to be required, where it is going to be required, and how often it is going to be required. That's basically what this bill says. The bill says the Department of Environmental Services gets to decide whether or not and when testing takes place and I think, right now with the current Env 800 rule, leave it the way it is.

So, that's my very brief testimony here.

Please see memo from Citizens for a Future New Hampshire addressed to Members of the Senate Environment Committee, dated February 19, 2003, together with attachments, attached hereto and referred to collectively as Attachment #3.

Senator Carl R. Johnson, D. 3: Thank you. Charley Hanson?

Charley Hanson: Thank you, Senator. Charley Hanson from Resource Management. I support this bill and some of that actually goes to the prior bill, something we haven't talked anything about is the impact to the landowners.

What this bill would allow to have happen, I think goes to Senator Barnes' earlier question. There are a lot of gravel pits currently that, because of this groundwater monitoring which is quite expensive to install and put in, there are many small pits, three to five to seven acres, that you just can't afford to do it. These are sites, and there are literally hundreds scattered throughout the State, that are just barren areas. Barren gravel pits, and I assume you have probably at least been by one from time to time, they are excessively drained soils, as some prior speakers said. So, think of it as basically a funnel right down to the groundwater. The idea of covering that up makes a lot of sense in terms of groundwater protection and a way to do that is with these manufactured soils.

So, what we would like to do, what this legislation attempts to do, is open it up so that some of the smaller landowners can reap the benefits of these manufactured soils that will vegetate, will be more aesthetically pleasing. In contrast to what one of the prior speakers said about these soils looking terrible, they work very well in gravel conditions and, depending on the time of year, they look much better than some of these non-native warm season grasses, which I think is interesting that you would be talking about them, the species talk that has been around for the last year or so.

Anyway, please support this legislation. I'll answer any questions.

Senator Carl R. Johnson, D. 3: Senator Barnes? If you will excuse me for about fifteen minutes. I have to testify on a bill and then I will return.

Senator John S. Barnes, Jr., D. 17: Okay. Let's see. Betty Hall. Former Representative Betty Hall.

Betty Hall: I will spare you my comments on this bill.

Senator John S. Barnes, Jr., D. 17: It says you wanted to speak. That was your speech right there? Betty, that's not like you.

Ms. Hall: Well, if you really want to give me the opportunity, I'll say one or two words and then I will go back and sit down again because I am going to have another opportunity on the next bill.

Senator John S. Barnes, Jr., D. 17: We don't want to shortchange you, Betty.

Ms. Hall: I won't feel shortchanged, you can be sure of that.

The one thing that I am concerned about, that we still haven't really examined the maximum contaminant level that we can endure on gravel pits. I just don't think we know what is going to happen to our aquifers if we put stuff on gravel pits. Of all the places that you shouldn't put this stuff is gravel pits. That is permeable soil. It goes right straight down and it goes right into the groundwater and can contaminate our aquifers. Of all the things we don't want to contend with, it is the aquifers. I want to protect the soil, but I really want to protect the aquifers.

So, that's all I really want to add at this point.

Senator John S. Barnes, Jr., D. 17: Can you give this Committee a case where it has done harm to an aquifer somewhere in the State? Obviously it is being done; I am hearing testimony that it is being done.

Ms. Hall: I'm sure there are other people who can testify to that. I don't have that data in my mind.

Senator John S. Barnes, Jr., D. 17: You don't have that at your fingertips?

Ms. Hall: No, I don't.

Senator John S. Barnes, Jr., D. 17: I guess I am the only one asking the questions, so thank you very much.

Ms. Hall: Please do. I welcome your questions, Senator.

Senator John S. Barnes, Jr., D. 17: No. I am all done.

Ms. Hall: Alright. Thank you.

Senator John S. Barnes, Jr., D. 17: I am having a little problem understanding Senator Johnson's bookkeeping process here. Maryann Clark, that's the lady from Deerfield, one of my constituents, who went home with her little girl. She was opposed to this bill. Carl Paulsen. Have we heard from Carl Paulsen? Carl Paulsen checked out. He was signed up as against the piece of legislation. Judy... Miss Connelly, who is in favor of the bill.

Shelagh Connelly: Yes I am in favor of the bill. My name is Shelagh Connelly and, again, I am representing Resource Management. I am pretty much in favor of this as it relates to the fact that, during the past five years, we have had additional testing and monitoring requirements and manufacturers that have dramatically increased the level of these programs and, as a result, the cost has gone up and one particular area is this groundwater monitoring piece which, for a very small gravel pit operator, is an expense that is not, makes recycle nonviable. While the additional requirements have had the overall tightening up of the program, in some cases, it has actually shut it down. So, I specifically hope that we can move forward so that these small operators, these small businesses, can continue to move forward with reclamation activities in a cost-effective manner.

There are actually over six hundred of these that get taxed currently and are required to reclaim those. Betty could speak to that because she was the one who worked very hard twenty-five thirty years ago to get that in place and it is a requirement now that all of these things have to be reclaimed. So, this is an option that works well. It is currently not an option because of the cost of monitoring for these small sites and this would allow one-time small sites to get in the program and it would be very beneficial for them.

I also would like to commend former Representative Betty Hall on her persistence in getting the vigorous testing requirements passed because, before you can even get approval to use this material, you have to test for one hundred and seventy-eight parameters. It talks about $2,000 to $2,500 per test and you have to do it four times before they will even look at you. Then, you have to meet all those conditions and then you can get approval for the use.

One of the things we have to test for is dioxin, which is a fairly significant concern. The beautiful thing that we have found as a result of all this testing is that the paper fiber that is used here in New Hampshire, especially the ones at the Monadnock Paper Mills, has lower dioxin levels than the world's best Ben & Jerry's vanilla ice cream, a lower level of dioxin than what we buy from our Ben & Jerry's ice cream shop. So, Betty has done a good job forcing us to do this testing and it has demonstrated that indeed this material is very, very clean.

Senator John S. Barnes, Jr., D. 17: How much does the lack of having this piece of legislation cost your company and how much would you save if this piece of legislation went through?

Ms. Connelly: I guess the issue is not so much the cost to our company because what we do is set up larger operations that would sustain repeat applications over several years. What we are intending to do is open up to very small business owners who are sand and gravel Mom and Pop operations. For them, it would represent a substantial savings and reclamation costs. Currently, they have the choice to buy topsoil, which is anywhere from $8 to $15 a yard, where you are located, or to try the warm season grasses. They are required, in order to comply with their bonding requirements with their towns, to reclaim those acres and, if they don't reclaim them, they are subject to a penalty and so the cost is going to be borne. The average cost for that on a five-acre pit...

Unidentified speaker: It is significant. You could have it as a commercial property or potentially put into current use.

Ms. Connelly: So then it is just the cost of the topsoil to do that?

Unidentified speaker: Oh yes. $4,000 or $5,000.

Senator John S. Barnes, Jr., D. 17: I hate to harp on something, but in the previous bill, I was complaining that I hadn't heard from two hundred and fifty farmers that will be affected by this legislation. Now I'm saying that I haven't heard from one of those small business people that it has cost them a fortune to reclaim their pits. Where are they? Are they out still plowing so they can't call me or what?

Ms. Connelly: I took your feedback to heart and I will make sure that you get feedback from these people directly.

Senator John S. Barnes, Jr., D. 17: Everybody else... They've got reams... They have killed a hundred trees. This Committee here has killed a hundred trees, I want you to know that. There is more paper here than I have seen in a long time.

Ms. Connelly: There are a handful of very committed activists who did that for you and they do it every time.

Senator John S. Barnes, Jr., D. 17: I'm concerned about the small businessperson. Okay? I used to be a small business guy and then I put on some weight and I became a large businessperson. The bottom line is we should be hearing from these people. You knew that it was here; the lady behind you knew it was here. You deal with these people. For God's sake, if it is important to my pocketbook, I'm gonna be here or at least I am going to call. You know who these Senators are on this Committee. Everybody else seems to know. Sometime I will show you the mail I get at home and a lot of people are out plowing or shoveling manure or something. They are writing letters to me.

Ms. Connelly: Well, I appreciate that. Again, I...

Senator John S. Barnes, Jr., D. 17: It's important for the input to come in here to people who are ultimately going to make these decisions and Betty Hall can tell you that a hundred times over.

Ms. Connelly: Well, I can tell you that...

Senator John S. Barnes, Jr., D. 17: She used to write letters, I think, or have all her neighbors write letters to me.

Ms. Connelly: I can say that, as a president of a small business here in New Hampshire, I employ twenty-two people and meet payroll every week because we work very hard in this program. If these programs get shut down, we won't be doing that.

Senator John S. Barnes, Jr., D. 17: You're saying that if this bill doesn't pass, you won't be doing that?

Ms. Connelly: I'm saying that the cumulative effect of shutting down the options to recycle these materials on all of these bills...

Senator John S. Barnes, Jr., D. 17: We are talking about SB 88 now. You will have a chance on 89 to tell us about that. You had your chance on 87. We are talking about 88. If 88 fails, it is gonna cost you money?

Ms. Connelly: Yes.

Senator John S. Barnes, Jr., D. 17: How much? Off the top of your head.

Ms. Connelly: Off the top of my head. Well, it will require to permit sites that will need a minimum of twenty acres to be reclaimed. It will require something on the order of $15,000 up front costs for groundwater monitoring to be installed year one.

Senator John S. Barnes, Jr., D. 17: For your company?

Ms. Connelly: For my company.

Senator John S. Barnes, Jr., D. 17: So, SB 88 is going to save your company $15,000? Earlier I heard that it wasn't gonna cost.

Ms. Connelly: It's not as simple as that in that...

Senator John S. Barnes, Jr., D. 17: It's spread out.

Ms. Connelly: Yeah, it is. It depends on how many sites you have to permit a year through this additional expense versus if you didn't have to have that additional expense because you've got a smaller site, you've got one-time impact, you've got the benefit to that landowner. If you have five of those sites versus one of these sites required in order to recycle the material from Monadnock Paper, that's the difference.

Senator John S. Barnes, Jr., D. 17: Off the top of your head, it could cost you in the course of a year, could save you $15,000?

Ms. Connelly: Sure.

Senator John S. Barnes, Jr., D. 17: Plus or minus.

Ms. Connelly: Plus or minus, sure.

Senator John S. Barnes, Jr., D. 17: Okay. I appreciate that.

Ms. Connelly: And, if you would like, I can get you additional sort of cost projections of the five-year permit that I would be happy to put together.

Senator John S. Barnes, Jr., D. 17: Well, I'm not so sure that's necessary. I think the fact that there is a cost involved, it has got to be talked about.

Ms. Connelly: There is a cost.

Senator John S. Barnes, Jr., D. 17: Seeing there are no other questions from members of this Committee, thank you very much.

Ms. Connelly: Thank you.

Senator John S. Barnes, Jr., D. 17: Well, coming down this list, I know Representative Spang from Dover, I know who she is and she's not here. She must be at the committee hearing and, guess what, she is opposed. She is opposed to this piece of legislation. Linda Rauter. Linda, are you here?

Charley Hanson: She's another one of your constituents from Chichester and she...

Senator John S. Barnes, Jr., D. 17: I just got told by my secretary here that the hole wasn't filled in so she wasn't speaking. Yes, the name sounds familiar. Chichester. A wonderful town in District 17.

Charley Hanson: It is indeed.

Senator John S. Barnes, Jr., D. 17: She is also opposed to this bill as she let me know through correspondence and via the telephone. Carl Johnson, you have already spoken. Doug Bogen?

Doug Bogen: It appears we should have taken a lunch break. I'm glad again to have an opportunity to speak. My name is Doug Bogen from Clean Water Action.

Again, I think it is instructive to go back to some of the history of this regulation. I and others in this room participated in the process and discussions with DES back at the time about how to strengthen the regulations on sludge spreading and monitoring requirements that we are talking about in this bill was really a compromise. Those of us concerned about this issue argued very strenuously that there should be no spreading of particularly Class B sludges on these gravel pits, these reclamation areas, these very poor soil. The compromise was that we will allow the spreading, but we will test, we will monitor. At least, if you monitor, you have some early warning system, some idea of what's going on with the gravel. You don't wait until some homeowner a mile down the road says, "Hey, I've got this stuff in my water. What's going on?" And, as you know, Senator, that is not where you want to be. You don't want to have to explain to them why you didn't see this coming. Right?

So, we feel at the very minimum it is very important to have these monitoring systems in place. Sure, they cost money; it's not free. But, we are saving money by using this practice, by not doing, as Ms. Connelly has mentioned, not doing the other forms of reclamation. Other forms of reclamation don't run the same risks to groundwater that happens in those kinds of impacts and so that's really why we ask more of this process.

Again, it has been mentioned, the research that has gone on, again, the State sponsored research showing that there is contamination of groundwater going on at some of these sites. You know, if there were dozens of sites, hundreds of wells, a bill that demonstrated that there was no impact on groundwater, it might be considered that it is not necessary to continue this, if it was over a long period of time. I believe this requirement has only been in for a few years and it may take many years for the actual contamination to show up. It isn't necessarily going to happen overnight. Certainly, you want to have a system that is going to see it over time.

But, if there was no evidence, if you had lots and lots of data to look at and nothing to show for, you might consider that this isn't necessary, but that doesn't seem to be the case. We have very limited data, the data that we do have, the research that has been done, does show problems with infiltration of groundwater and we really need to maintain this program.

If they are not willing to monitor, how can we really be assured that the program is not causing impacts? This proposal, if it is enacted, I think will encourage heavy one-time spreading and one-time use. It sounds good, but if you put a large quantity, which has been done in the past, very thick spreading of this material, you run greater risks of contamination to groundwater.

So, we do urge the Committee to vote Inexpedient to Legislate and this really isn't necessary to be done. Thank you.

Senator John S. Barnes, Jr., D. 17: Thank you very much. Seeing no questions. Now, I look at this sheet and I don't see any other speakers. Is there someone here that I haven't called upon that wishes to speak on SB 88? Is there anyone that wishes to speak a second time on SB 88? Yes. Come right ahead.

Ms. Rueggeberg: You are being very generous. I would go back one or two questions on your part where you were talking about places where there is evidence of contamination, groundwater contamination, and I would direct you to the Town of Sandown in your district which has a ban on sludge

spreading because of what happened there. I would suggest, and I have already talked with Representative Varrell about it, but the next time you see Tom Varrell, ask him about that because he lives in Sandown and he was involved in the whole Sandown issue and the legislation that went on about that. I think he could verify the fact that it does happen.

Senator John S. Barnes, Jr., D. 17: Could you be a little bit more specific? I have heard about Sandown. Nobody ever called me about it. People have talked to me about, but never heard a thing about a problem. I haven't read about it. The selectmen didn't call me. No citizens called me. I have been their Senator for ten years, so please help me. Right now, give us sort of a thumbnail of what went on.

Mr. Rueggeberg: Well, maybe Caroline could do that.

Professor Snyder: Perhaps Hooksett would be a better example.

Senator John S. Barnes, Jr., D. 17: Hold on. One at a time. I saw your hand, so I was going to ask you, but this gentleman has the microphone now. He paid for it, so he's got it now. Go ahead and tell us about Sandown.

Mr. Rueggeberg: Apparently there was a reclamation operation going on there that contaminated water in the town. Mary Ellen Tufts, who was the health officer at the time, really led the effort to let legislators know. This may be why you may not have heard about it because this was through the legislation that was going on in the House. I don't know that the issue was ever officially resolved because the Department of Environmental Services said there wasn't conclusive evidence, quote, unquote. (tape change)

Senator John S. Barnes, Jr., D. 17: That's what you know?

Mr. Rueggeberg: That's what I know.

Senator John S. Barnes, Jr., D. 17: I appreciate you giving us an update. Sir, will you come up and tell us what you know about Sandown?

Mr. Hanson: Sandown, that was not a reclamation operation. That was a gravel pit that had been reclaimed. A gentleman by the name of Albert Hoyt owns the property located adjacent to the Exeter River. He had done land application on grass, grass fields to fertilize the fields. We operate the site.

During one of the spring notifications, he had built a development on one side of his property and, in notifying the people up there, they heard that we were doing biosolids and had been for a number of years, and they got all up in

arms. A couple of these new houses had done some well testing and got some results that they took and had some hits on certain parameters and they tried to say that it was the biosolids application that was taking place. Actually, if you had these houses up here on one side, the site here and the Exeter River here and typically the groundwater flow goes in this direction. So, it was conclusive in my mind that biosolids had nothing to do with it. People got all in an uproar and away we went. They passed an ordinance.

Senator John S. Barnes, Jr., D. 17: I really appreciate that update. The guy from Environmental Services, what can you tell me about Sandown?

Mr. Flanders: This is a perfect example of emotional reaction to a known problem. We can provide you with the reports that we did on the study. We followed it. We worked with the health officer, Mary Ellen Tufts, for a long period of time and we were not able to convince her to the contrary. She was already convinced that there was a problem and didn't think that the data or science that we had proved otherwise mattered, I guess.

But, there are people that take these strong positions. I think that has been testified to earlier today and no amount of science, no amount of data, will convince them that there is or isn't a problem, depending upon their preconceived notions. So, this gives you kind of a good example where people, either through science or non-science, to defend a particular position on things. But, the more you look into the details, the Department of Environmental Services records are open. Anybody that bothers to ask, we will provide the facts. But, tremendous spin whenever the word biosolids is used or sludge.

Senator John S. Barnes, Jr., D. 17: Okay. I'm hearing from your testimony that Sandown has no problem.

Mr. Flanders: Not that we're aware of. The problem that apparently did exist was potentially due to some materials that were in a garage on site from perhaps a degreaser compound, something like that, nothing to do with biosolids at all, in our position.

Senator John S. Barnes, Jr., D. 17: Thank you very much for clearing up the Sandown example. I see no one else who wishes to speak a second time, so I am going to close the hearing on SB 88.

Hearing concluded at 1:20 p.m.

Respectfully submitted,

Susan Bridge

Recorded by Susan Bridge
Senate Secretary
Transcribed by L. Gail Brown

2/26/03

3 Attachments

ATTACHMENT #1

February 19, 2003

To: Chairman Carl Johnson and the Senate Environment Committee
From: Jan Pendlebury, MS Environmental Administration, BS Medical Technology (ASCP)

Re: **Senate Bill 88,** An Act Relative To Testing And Monitoring Requirements At Soil Manufacturing And Reclamation Sites

Thank you for accepting these comments opposing SB 88. By the very nature of the geo-morphological events that shaped our terrain thousands of years ago, it is no coincidence that sand and gravel pits exist where they do, over stratified drift aquifers, sources of unpolluted drinking water. The chemical composition of the sandy soils that comprise the pits repel absorption, allow quick drainage, and offer little filtering ability. Texture is the critical factor determining the pore spaces in soil, and its capacity to hold water. Sand contains the coarsest grains in soil, making it the driest and lightest of soils. This allows water and to percolate downward under the influence of gravity, and drain rapidly. Because silica, the primary mineral of sandy soil, does not dissolve readily during eluviation (downward transport), it does not provide the binding sites and chemical charge necessary to attract foreign materials to adhere to it.

Treated sewage sludge is not sterile. Current regulations permit sludges with average fecal coliform levels of up to 2 million colony- forming units of bacteria per gram of dry sludge to be land applied. Even if this number is lower, microbial colony forming units multiply at very rapid rates, especially in the nutrient rich medium of paper mill sludge and municipal sewage sludge, and if this material is stockpiled. Microbes produce many offspring and spread their seeds far and wide. Speaking in terms of natural selection, they are 'r' selected' to ensure the perpetuation of the species. They are able to transpose genes and adapt to many stressors that pose a threat, whether naturally occurring or from manmade antimicrobial agents. That is why, more specifically, E. coli is the organism of choice for use in genetic engineering and biotech.

Rapid replication, many offspring, short lifespan and genetic flexibility have contributed to more resistant and deadly strains. Antibiotics work in several ways; by protein inhibition, attacking the cell wall, or by DNA replication in bacteria (Pharmaceutical Information Associated, Ltd., 1994). A pathogen becomes resistant to the targeted antibiotic through mutation or through the acquisition of a plasmid for resistance from another strain of bacteria. This is not limited to species but may also apply to genera. Plasmids transfer this genetic material. Plasmids are small messenger units that facilitate rapid and broad dissemination of drug genetic resistant information to other bacteria. "Furthermore, cross-resistance to the newer agents can develop in short order because of an abundant pool of existing resistant genes," writes Nicole Johnston, Modern Drug Discovery, June, 2002.

Pathogens are able to transfer their resistant genes to previously 'harmless' bacteria, in vitro as well as vivo. As the survival of the bacteria becomes challenged, they are able to take on a stronger, more virulent strain, forcing the recessive resistant genes to become dominant. **Studies have shown that this can happen to sludge bacteria as the material moves through the sewage treatment plant.** Plasmids from the MDRB pathogens have been able to transfer their

genetic identity to other coliform bacteria, resulting in the transformation of a broader variety of MDRB. Some have demonstrated resistance, not just to antibiotics but to chlorine as well.

To make matters worse, patients in hospitals, nursing homes and others with low immunity have succumbed from infection due to the formation of microbial biofilms, "a phenomenon that can render the potent antimicrobials completely useless, enabling bacteria to survive stressors such as antibiotic therapy and to become 1000 times as resistant to antibiotics as free-dwelling cells Biofilms are elaborate networks of bacterial cells that communicate with each other once their numbers reach a certain threshold." (Modern Drug Discovery, Seeking superbug busters, June 2002).

The excessively drained soils of sand and gravel pits, the ability of microbes to mutate quickly into more virulent resistant strains, the potential for microbes to transfer genetic material cross species and genera and ultimately the escalating rate of MDRB or superbugs is strong testimony for this committee to oppose SB88. The question we should be asking is why do we spread sludges on gravel pits?

ATTACHMENT #2

State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES
6 Hazen Drive, P.O. Box 95, Concord, NH 03302-0095
(603) 271-3503 FAX (603) 271-2982

February 19, 2003

The Honorable Carl R. Johnson, Chairman
Senate Environment Committee
Room 104
Legislative Office Building
Concord, New Hampshire 03301

Re: SB 88-FN, relative to testing monitoring requirements at soil manufacturing and reclamation sites

Dear Chairman Johnson:

Thank you for the opportunity to testify on SB 88-FN which proposes to increase the testing and monitoring requirements at reclamation sites where manufactured topsoil consisting of biosolids and short paper fiber (SPF) are applied to reestablish vegetative cover. The bill also proposes to eliminate groundwater monitoring at sites where only one application is made per 5 year permit period. The Department of Environmental Services (DES) cannot fully support this bill since it not consistent with our current policies and rulemaking initiative and has received insufficient study by UNH researchers.

Currently, the DES rules for sludge management under Env-Ws 800 do not provide for a relaxation of groundwater monitoring for sites where biosolids and short paper fiber are applied for gravel pit reclamation. State-funded research has been performed by Dr. William McDowell of the University of New Hampshire (UNH) on biosolids and SPF land application at sites with highly permeable soils, a common characteristic of reclamation sites. This research was documented in the *Final Report to DES and NH Legislature, June 1998 – November 2001, Monitoring Demonstration at Top-Soil Manufacturing Site in New Hampshire, William H. McDowell & Tamara J. Chestnut, UNH, March 15, 2002.* Dr. McDowell pointed to the timing, magnitude, and frequency of applications, as well as stockpiling as potential sources of the elevated levels of nitrate in groundwater at the Hooksett study site. He felt that stockpiling is the most likely cause of water quality problems. However, he concluded that:

> "*Further work with a strong experimental design (including groundwater data before biosolids application and replicated sites) would be necessary to document the impacts of one-time applications of biosolids to reclaim gravel pits. Our data shows that repeated stockpiling at a gravel pit carries significant risks of groundwater contamination, but they should not be used to condemn all gravel pit reclamation with biosolids.*"

"Soil manufacturing" is a repetitive process by which artificial topsoil is produced by mixing biosolids and SPF, or both, with sand and removed for sale or use elsewhere. In contrast, "reclamation" is typically a one-time process of adding organic matter and nutrients from biosolids, SPF, or a combination of both to promote establishment of vegetation on severely disturbed soils such as gravel pits. Because Dr. McDowell's work has clearly demonstrated that the long-term environmental risks created by soil manufacturing operations are significantly higher than for a typical reclamation project, it makes sense that

the regulation of these different operations should be considered differently. In fact, this was proposed last legislative session in HB 1313, relative to spreading sludge on excavation sites for reclamation. However there was no agreement as to the details and this bill was sent to study committee. SB 88-FN essentially continues this earlier discussion and seeks to simplify the earlier bill and achieve consensus by avoiding detailed criteria for determining whether activity at a site is a one-time reclamation or recurring. The bill seeks to limit the use of biosolids and short paper fiber for reclamation to once during a 5 year permit period and to eliminate the current requirement for groundwater monitoring for such operations. For recurring site use, such as for soil manufacturing, groundwater monitoring would be required as is presently the case. Since the costs involved with installing groundwater monitoring wells, and sampling and testing each well for several water quality parameters two or more times a year are substantial, very little reclamation using biosolids and SPF is currently being practiced in New Hampshire. If this bill becomes law, and a distinction is made between reclamation and soil manufacturing requiring groundwater monitoring, a significant number of gravel pits currently facing reclamation could be cost-effectively vegetated using biosolids and SPF, with some marginal risk of low level or temporary groundwater impacts. Nevertheless, each site would have to be permitted under the Env-Ws 800 rules, and only sludge that has received sludge quality certification (including viral testing) could be applied.

In conclusion, DES remains ambivalent concerning SB 88-FN due to the above-cited concerns. Given the proposal is not consistent with our current policies and rulemaking initiative, we would welcome legislative policy directive.

Thank you for your consideration. If you have any questions, please contact me at 271-3503 or Richard Flanders at 271-3571.

Very truly yours,

Robert Monaco
Acting Commissioner

ATTACHMENT #3

CITIZENS FOR A FUTURE NEW HAMPSHIRE

P.O. Box 38
North Sandwich, New Hampshire 03259
Phone and Fax (603) 284-6998
cgsnyder@post.harvard.edu

February 19, 2003

To: Members of the Senate Environment Committee
From: Chris Rueggeberg
Re: Senate Bill 88, An Act Relative To Testing And Monitoring Requirements At Soil Manufacturing And Reclamation Sites and Senate Bill 89, An Act Relative To Encouraging The Use Of Biosolids And Short Paper Fiber In Road Construction Projects

I am enclosing additional information on Senate Bills 88 and 89 for your hearing on Wednesday.

The Citizens For A Future New Hampshire Report entitled ***Spreading Sludges on Sand and Gravel Pits not Scientifically Defensible*** critiques University of New Hampshire Professor William McDowell's Final Report on his 3-year Monitoring Demonstration at a Top-Soil Manufacturing Site in New Hampshire. Professor McDowell's Final Report on his test site at Hooksett shows that repeated spreading and stockpiling of sludges on excessively drained soils with shallow water tables can seriously impact groundwater.

The language in SB 88 that would make groundwater monitoring and testing at soil manufacturing and reclamation sites optional at best ignores Professor McDowell's findings.

The National Institute for Occupational Safety and Health (NIOSH) document entitled ***Guidance for Controlling Potential Risks to Workers Exposed to Class B Biosolids*** lists the protections employers should provide for workers who have direct contact with Class B sludge and exposure to the pathogens it contains. NIOSH recommends: **(1) hygiene precautions; (2) personal protective equipment; (3) hand-washing stations; (4) portable sanitation equipment for workers in the field; (5) periodic training on standard hygiene practices; (6) training on reporting potentially work-related illnesses or symptoms; and (7) up-to-date tetanus-diphtheria immunizations.**

The language in SB 89 is a legislative mandate for the Department of Transportation to use sludge in road construction projects throughout the state. In order to implement this new program, the DOT would also ideally want to protect its workers' health by adopting the NIOSH recommendations. SB 89 does not contain any appropriation for the DOT to establish a comprehensive set of precautions for use by its employees.

I look forward to discussing environmentally friendly alternatives to spreading sewage sludge.

CITIZENS FOR A FUTURE NEW HAMPSHIRE
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Spreading Sludges on Sand and Gravel Pits not Scientifically Defensible

Final Report to DES and NH State Legislature
June 1998 –November 2001
Monitoring Demonstration at a Top-Soil Manufacturing Site in New Hampshire

William H. McDowell & Tamara J. Chestnut
University of New Hampshire
March 15, 2002

Comments by Caroline Snyder, President
Citizens for a Future New Hampshire

May 16, 2002

Introduction

Citizens for a Future New Hampshire wishes to thank Professor William McDowell for making available the Final Report of his research which included monitoring nitrate concentrations in groundwater at the Hooksett test site, where a biomix was applied in October 1999.

Professor McDowell's Final Report confirms the findings of peer reviewed and published research, as well as the conclusions of the Citizens for a Future New Hampshire/Sierra Club report *Policy Driven Water Pollution: The Dangers of Using Sludge to Reclaim Gravel Pits in New Hampshire* (December 2000). **Repeated spreading and stockpiling of sludges on excessively drained soils with shallow water tables can seriously impact ground water and is not scientifically defensible.**

Professor McDowell's research was done on a site already contaminated by previous sludging; his research was limited to short term monitoring of nitrates and a few metals. Additional information that the New Hampshire Department of Environmental Services(DES) and legislators need in order to draft comprehensive sludge legislation and administrative rules is missing from the Final Report. Professor McDowell concludes

that "**further work with a strong experimental design would be necessary to document the impacts of one-time applications of biosolids to reclaim gravel pits.**" The Final Report, however, also contains some misleading, contradictory, and inaccurate statements. And it has not been peer reviewed or published. These are some of the reasons why the Final Report should not be the primary or sole basis for drafting new sludge legislation or administrative rules.

The Research was Conducted on a Contaminated Site

Municipal sewage sludge (biosolids), which the Federal Clean Water Act defines as a pollutant, had been applied at the Hooksett test site annually since 1989. When the bill for funding this project came before the New Hampshire House of Representatives, CFNH and the Sierra Club opposed it because we knew that research done on a contaminated site would yield confusing and inconclusive data.

During his November 6, 2000, public presentation about his Hooksett research, Professor McDowell admitted that " this was not a strict research project." It was not a controlled study with good data.

The original sludged site started out with five acres. However, between 1990 and 1995, the top- soil manufacturing area was expanded to ten acres. During this time, high application rates were used. The hydrologic flow study and test wells should have included this larger area. Doing so might have provided a scientific explanation for some of the confusing test results in the up gradient and control wells.

The Final Report Contains Misleading, Contradictory, and Inaccurate Statements

- The Final Report states " *topsoil was removed from the site approximately every five years.* "

Not so. The 1997-98 Progress Report says that 1000 yards of "artificial topsoil" were removed from the test site in 1993, and another 2000 yards were removed in 1996.

- The Final Report claims, "*several studies have examined the effects of utilizing . . .a combination of (municipal sewage sludge and paper mill sludge).* "

Not so. There are **no** studies that have examined the effects of using a mixture of pathogen rich Class B sewage sludge and paper mill sludge to revegetate sand and gravel pits. Nor has the United States Environmental Protection Agency ever done a risk assessment on using paper mill sludge, a material that contains many priority pollutants, as well as pollutants that are currently not regulated.

- Throughout much of the Final Report the material that was applied in October of 1999, is referred to as "biosolids." In fact, the material was not biosolids, but a biomix, a material that consists mostly of paper mill sludge.(1)

- The Final Report implies that sludge or topsoil are necessary for timely revegetation of sand and gravel pits. The report fails to mention that since 1990, Ossipee Aggregates has successfully used native species of non-invasive warm season grasses to revegetate its reclamation sites. **Warm season grasses do not require topsoil or sludge, survive droughts and floods, provide wildlife habitat, and do not pollute groundwater.**

  After working for sixteen years on hundreds of test plots in nineteen other New Hampshire sand and gravel pits, the US Department of Agriculture Natural Resources Conservation Service has shown that warm season grasses provide long-term, low-maintenance, and inexpensive cover that satisfies reclamation mandates.

- The Final Report says: "*We can state with equal assurance that DES regulations are sufficiently protective to prevent groundwater contamination with trace metals.*"

This assurance is based on short-term monitoring of a limited number of toxic metals, after **one** application of biomix. Since biomix is mostly paper mill sludge, and since paper mill sludge typically contains very low levels of toxic metals, one would not expect **any** metal spikes after one application, especially if the samples are filtered. The fact that spikes did occur above ambient levels, shows that even a low- metal sludge mixture will impact groundwater if the mixture is placed on excessively drained soils. Other published research corroborates this. Since no water or soil metal monitoring was done at this site during the previous ten years when Class B sewage sludge was applied, no conclusion can be drawn on how groundwater was affected by metals at this site before 1999. The data are further limited, because soils were not tested for metals before and after the October 1999 biomix application. The data from this research is much too limited to claim that "DES regulations (with regard to metals) (are) sufficiently protective". **On the contrary, the metal spikes after the biomix application are yet another warning that even sludges with very low metal levels should not be spread on excessively drained soils.**

The unfiltered samples taken at this site tested very high for a number of toxic metals. One monitoring well indicated lead levels at 461 parts per billion, which is thirty-one times higher than what is considered a safe lead level in drinking water for an adult.

- The Final Report says,"*the only semi-volatile organic compound detected was bis (2ethyhexyl) phthalate.*"

The Final Report fails to mention that the detection limits for many other toxic organics were extremely high. For example, the detection limits for bromodichloromethane, dibromochloromethane, and hexachlorobenzene were ten to thirteen times higher than the New Hampshire drinking water standard. For hexachlorobutadiene, the detection limit

was twenty times higher, for pentachlorophenol, 30 times higher, and for benzidine, 50 times higher. For all the carcinogenic polynuclear aromatic hydrocarbons the detection limits were 50 to 2000 times higher than the human health standard. Clearly, with such high detection limits, no conclusion can be drawn on whether or not groundwater was being contaminated by chemical compounds at this site. Professor McDowell admitted this during his November public presentation: **" with such wildly high detection limits we don't know anything."**

The Final Report Omits Key Facts that Legislators and DES Should Know Before Crafting Sludge Legislation or Administrative Rules.

- The amount of nitrates leaching into groundwater from sludged sites depends on many other factors besides C:N ratio, application rates, and stockpiling. It depends on what crops are grown and on the rate of nitrogen mineralization. This rate (i.e. how fast and how much organic nitrogen is converted to plant-available nitrogen) is not well understood. It depends, for example, on soil property, soil moisture, soil pH, microbial activity, weather conditions, temperature, and on a number of other unpredictable factors.

- Nitrate levels well below 10mg/L have been linked to adverse effects on human health and the environment.

- Arsenic can be released in groundwater by reaction of iron oxide with organic carbon such as paper mill sludge. Current research in Maine, where paper mill sludge and sewage pellets were used to reclaim a gravel pit, indicates arsenic mobilization from such a reaction.

- Hundreds of other sludge contaminants can impact groundwater. These include persistent and bioaccumulative pollutants, carcinogens, and hormone disrupting chemicals. Many of these contaminants are currently not monitored or not adequately regulated.

- **Contaminants that break down quickly in surface water often persist for a long time in groundwater.**

- Even treated Class B sewage sludge still contains dangerous levels of human pathogens. Cool and moist climates favor survival and re-growth of pathogens in stockpiles and soils. Excessively drained soils facilitate the movement of pathogens into groundwater, especially if the distance between the surface where sludge is applied and the water table is less than 10 meters.

- The conservation grasses used to vegetate sand pits where sludge has been spread do not survive well in droughts. When these plants wilt or die, nitrates and other contaminants will leach, even during the growing season, especially if drought is followed by a heavy rainfall. This was pointed out in previously published

research done in Maine, (of which Professor McDowell was a co-author) but Professor McDowell omits mentioning this important fact in the Final Report.

In fact, the Final Report does not even address vegetation or plant uptake of nitrates. It does not mention what plants (if any) were grown on the test site between October 1999 and January 2001. It does not mention whether these plants survived drought conditions, whether they were harvested, and how these conditions might have affected the nitrate-leaching rate. The whole point of this research was to show whether or not revegetating sand and gravel pits with sludge will impact groundwater. Not even to mention vegetation grown on the test site seems a curious omission.

US Environmental Protection Agency and Department of Agriculture Guide To Field Storage of Biosolids

The Final Report attributes the high nitrate levels in test wells to stockpiling. This corroborates other research. In fact, in 2000, the US Environmental Protection Agency and the Department of Agriculture published a guidance document on how to manage sludge stockpiles. This document, based on peer reviewed and published science, warns repeatedly **that no stockpiles should ever be placed on excessively drained soils or where water tables are high and variable.** The concern is not only that nitrates may impact groundwater, but also that these sandy and porous soils are not an effective barrier to the movement of other sludge contaminants, such as metals, toxic organics, and pathogens.

Yet Professor McDowell does not mention this EPA/USDA document and does not list it among his references. This is a serious omission.

Conclusion

It is clear from the Final Report that even using biomix with the right C: N ratio, rather than biosolids alone, did not prevent groundwater at the Hooksett test site from being impacted by nitrates.

Sludges contain hundreds of other contaminants of concern, including dozens of carcinogens and hormone disrupting chemicals. *"The number of chemicals in commerce is estimated at 100,000. A large percentage of these end up in waste water and ultimately in sludges."*(Hale and LaGuardia, 2002). Very little toxicity data is available for most of these contaminants. Even less is known about their degradates and synergistic interactions or their secondary effects on groundwater.

This lack of knowledge makes it difficult to draft protective sludge legislation or administrative rules. At the very least, such legislation and rules should be grounded in peer reviewed, published, accurate, and comprehensive research and EPA guidelines.

Such research is included among our references listed below. **This research indicates that sludges can easily impact groundwater, if they are stockpiled and spread on excessively drained soils with high water tables.**

Why then continue this risky practice? Does it really make sense, to first place hundreds of tons of contaminated materials on excessively drained soils, and then try to remediate these sites by using costly best management practices, many of which apparently do not work? Depleted sand and gravel pits are not superfund sites. They are uncontaminated excavations located over uncontaminated aquifers. They can be reclaimed economically using proven methods that do not jeopardize the state's remaining unpolluted drinking water resources.

* * * * * *

(1) **Biosolids versus Biomix**

- **Biosolids = municipal sewage sludge**
- **Biomix = mostly industrial paper mill sludge which the industry calls "short paper fiber".**

The original purpose of this New England Biosolids and Residuals Association (NEBRA) /University of New Hampshire research was to assess how current management practices impact nitrates leaching at sludged reclamation sites and at top soil manufacturing sites. For example, researchers wanted to find out whether short paper fiber (SPF) , or a biomix (three parts SPF and one part Class B sewage sludge) with the right C:N ratio would inhibit nitrate leaching. Professor McDowell's previous sludge research focused on this question and that was, presumably, why he was asked to do this research.

On February 2, 2000, NEBRA wrote an eight-page lobbying letter to State Representative Melcher and Senator Below, defending gravel pit sludging. This letter quotes extensively from McDowell's Hooksett research, repeatedly assuring legislators that, using "biosolids alone" with a low C:N ratio could result in nitrate leaching, but if biosolids is mixed with paper mill sludge, groundwater would be protected. NEBRA specifically cites the Hooksett research on this issue: *" (the) protocol at the Hooksett site has been changed so that a biomix with a higher C:N ratio will be applied in the fall of 1999."* NEBRA's letter assured New Hampshire legislators that using biomix will protect groundwater. *"Clearly, the current UNH research – as reported by the researchers themselves – seems to corroborate the findings of other researchers: if (biomix) is applied to gravel pit sites, using a C:N ratio of 25 – 30 :1, there is little likelihood of significant impacts from nitrate."*

However, after the October 1999 biomix application to the test site, with a C:N ratio of 27: 1, there was significant impact of nitrates to groundwater. In fact, the test results totally contradicted what NEBRA had promised legislators: nitrate levels increased in many wells to "unacceptably high levels." These dramatic nitrate spikes were illustrated on a chart in McDowell's 2000 Progress Report. The chart, however, was mislabeled; it indicated (falsely) that the material that had been applied was biosolids, not biomix. On October 9, 2000, we alerted Professor McDowell to this significant labeling error. **Yet in subsequent public presentations, as well as in the Final Report, the error was never corrected. We counted 31 instances in the Final Report where the term "biosolids" is used, instead of the (correct) term for the material that was applied, namely "biomix".**

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Guidance for Controlling Potential Risks to Workers Exposed to Class B Biosolids

This guidance is intended only for controlling health risks to workers from Class B biosolids during handling and land application. This guidance is not intended to address nonoccupational exposure.

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

July 2002

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Publication Number 2002–149

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Introduction

Biosolids are the organic residues resulting from the treatment of commercial, industrial, and municipal wastewater (sewage). One purpose of the treatment is to significantly reduce the concentration of disease-causing organisms (also known as pathogens). Treatment also reduces the attractiveness of the residues to insects, birds, and rodents. The product is a material that can be recycled for uses such as adding organic material to the soil.

The U.S. Environmental Protection Agency (EPA) has established two categories of biosolids:

- Class A biosolids have undergone treatment to the point where the concentration of pathogens is reduced to levels low enough that no additional restrictions or special handling precautions are required by Federal regulations [40 CFR* Part 503]. If the Class A biosolids meet *exceptional quality* requirements for metals content, they may be sold in bags and applied in the same way as other soil conditioners such as peat moss.
- Class B biosolids have undergone treatment that has reduced but not eliminated pathogens. By definition, Class B biosolids may contain pathogens. As a result, Federal regulations for use of Class B biosolids require additional measures to restrict public access and to limit livestock grazing for specified time periods after land application [40 CFR Part 503]. This allows time for the natural die-off of pathogens in the soil.

Whereas EPA rules [40 CFR Part 503] restrict public access to lands treated with Class B biosolids in order to protect public health, these rules do not apply to workers involved with Class B biosolids handling and land application.

Workers may come in contact with Class B biosolids during the course of their work. Workers and employers may be well aware of the need for precautions when contacting untreated sewage but less aware of the need for basic precautions when using Class B biosolids. This document provides information, guidance, and recommendations to employers and employees working with Class B biosolids to minimize occupational risks from pathogens. It does not address other potential safety and health issues such as injuries or exposures to chemicals.

How are biosolids used?

Biosolids are typically treated to Class B or Class A standards at the wastewater (sewage) treatment plant, where a liquid or semi-solid material is produced. In a liquid state, biosolids can be transported by truck to a land application site where they are applied directly to the land using tractors, tank wagons, irrigation systems, or special application vehicles. Alternatively, biosolids may undergo mechanical dewatering that may include the use of polymers. Dewatered and liquid biosolids are often temporarily stored at the treatment plant or application site. Dewatered biosolids are transported and applied to land using front-end loaders, trucks, tractors, or biosolids-spreading equipment. Most biosolids are applied with spreaders in semisolid form and then incorporated into the soil using a disc plow. Workers may come into either direct or indirect contact with biosolids during any phase of the treatment, transport, or application process, or after they are land applied. Currently, more than 50% of the biosolids generated in the United States is recycled as soil conditioners to improve and maintain productive soils and stimulate plant growth rather than being sent to landfills or incinerated. Biosolids are applied on agricultural land, forestlands, and surface mine reclamation sites. Class A biosolids are also used in horticultural applications. EPA estimates that 7.1 million tons of biosolids were generated for use or disposal in 2000.

*Code of Federal Regulations.

What is in biosolids that requires control of worker exposures?

There are four major types of human disease-causing organisms (pathogens) that can be found in sewage: (1) bacteria, (2) viruses, (3) protozoa, and (4) helminths (parasitic worms). Class B biosolids may contain the same types of pathogens as the source sewage, but at reduced concentrations. Both Class A and Class B biosolids may also contain chemicals (including metals) and allergens.

To protect public health, the EPA's 40 CFR Part 503 rule prescribes a *restricted period* of up to 1 year to limit public access to lands where Class B biosolids have been applied. These EPA restrictions do not apply to occupational access. EPA does recognize that occupational exposure can occur and states that workers exposed to Class B biosolids might benefit from several additional precautions such as use of dust masks when spreading dry materials, the use of gloves when touching biosolids, and routine hand washing before eating, drinking, smoking, or using the bathroom.

The risk of worker exposure to infectious agents in Class B biosolids is likely greatest prior to, during, and immediately after land application of the biosolids. Because the concentration of pathogens declines through natural processes, the potential for pathogen exposure decreases over time.

Do we know these pathogens can cause disease?

Yes, the association between poor hygiene, raw sewage, and infectious disease is well established. Most of the pathogenic bacteria, viruses, and parasites in biosolids are enteric, which means they are present in the intestinal tracts of humans and animals. Enteric organisms that may be found in biosolids include, but are not limited to, *Escherichia coli*, *Salmonella*, *Shigella*, *Campylobacter*, *Cryptosporidium*, *Giardia*, Norwalk virus, and enteroviruses. Exposure may potentially result in disease (e.g., gastroenteritis) or in a carrier state in which an infection does not clinically manifest itself in the individual but can be spread to others. These enteric organisms are usually associated with self-limited gastrointestinal illness but can develop into more serious diseases in sensitive populations such as immune-compromised individuals, infants, young children, and especially the elderly.

The disease risk is a function of the number and types of pathogens in the Class B biosolids relative to the exposure levels and infective dose. Because data are sparse on what constitutes an infective dose, it is prudent public health practice to minimize workers' contact with Class B biosolids and soil or dusts containing Class B biosolids during production and application, and at land application sites during the period when public access is restricted. Class A biosolids may also present some health risk to workers, since some chemicals and biologic constituents in Class A biosolids are not regulated by the EPA.

Can workers be exposed to pathogens from biosolids?

Workers could be exposed to pathogens and irritants when working with Class B biosolids during the period when public access is restricted. During a NIOSH field investigation at one biosolids land application and storage site that did not comply with EPA requirements, the following was observed:

- NIOSH interviewed employees who worked in all phases of the biosolids operation. Some

employees reported repeated episodes of gastrointestinal illness after working with the biosolids, either at the treatment plant or during land application.

- NIOSH observed among workers an inconsistent awareness, provision, and use of protective equipment and hygiene practices appropriate for handling Class B biosolids (or biosolids that do not comply with EPA standards).
- NIOSH collected bulk samples from different locations within the biosolids storage site and found measurable concentrations of fecal coliforms. Fecal coliforms are used as an indicator for the presence of other enteric microorganisms. Enteric bacteria were detected in air samples collected at the land application site.
- The local department of environmental services recently informed NIOSH that biosolids applied at this site intermittently exceeded (by up to 4.5 times) the EPA fecal coliform upper limit for Class B biosolids prior to the NIOSH survey.
- The substandard biosolids were applied at the agricultural site before the monitoring results were received from the laboratory.

EPA reports that high-pressure spray applications may result in some aerosolization of pathogens and that application or incorporation of dewatered biosolids may cause very localized fine particulate/dusty conditions. Also, farm workers may be exposed to biosolids after application and during the restricted period. Ancillary workers (for example, laborers hired to clean trucks that were used to haul biosolids) can be exposed to biosolids. Exposures to substandard biosolids can occur when these materials are loaded and hauled to approved landfills or incinerators for disposal.

Additional study of worker exposures to pathogens and other toxics possibly present in Class B biosolids is needed. This will reduce scientific uncertainty about these issues and allow further refinement of worker precautions.

What should employers do to prevent work-related illness?

To protect workers who have direct contact with Class B biosolids and thus are likely to have an exposure to pathogens, employers should provide a basic level of protection, including appropriate measures from those listed below. While the measures are worded to refer to Class B biosolids, most also apply to tasks involving contact with sewage, untreated or partially treated sludge, or substandard biosolids.

Provide basic hygiene recommendations for workers.

Basic hygiene precautions are important for workers handling biosolids. The following list, originally developed by EPA, provides a good set of hygiene recommendations.

1. Wash hands thoroughly with soap and water after contact with biosolids.
2. Avoid touching face, mouth, eyes, nose, genitalia, or open sores and cuts while working with biosolids.
3. Wash your hands *before* you eat, drink, or smoke and before and after using the bathroom.
4. Eat in designated areas away from biosolids-handling activities.
5. Do not smoke or chew tobacco or gum while working with biosolids.

6. Use barriers between skin and surfaces exposed to biosolids.

7. Remove excess biosolids from footgear prior to entering a vehicle or a building.

8. Keep wounds covered with clean, dry bandages.

9. Thoroughly but gently flush eyes with water if biosolids contact eyes.

10. Change into clean work clothing on a daily basis and reserve footgear for use at worksite or during biosolids transport.

11. Do not wear work clothes home or outside the work environment.

12. Use gloves to prevent skin abrasion.

In addition, NIOSH recommends the following steps to provide a more comprehensive set of precautions for use by employers and employees:

Provide appropriate protective equipment, hygiene stations, and training.

Personal Protective Equipment (PPE).—Appropriate PPE should be provided for all workers likely to have exposure to biosolids. The choices of PPE include goggles, splash-proof face shields, respirators, liquid-repellent coveralls, and gloves. Face shields should be made available for all jobs in which there is a potential for exposure to spray or high-pressure leaks, or aerosolized biosolids during land application. Management and employee representatives should work together to determine which job duties are likely to result in this type of exposure, to conduct appropriate on-site monitoring, and to determine which type of PPE is needed in conjunction with a qualified safety and health professional. If respirators are needed, a comprehensive program would include respirator fit-testing and training or retraining.

Hygiene and Sanitation.—Hand-washing stations with clean water and mild soap should be readily available whenever contact with biosolids occurs. In the case of workers in the field, portable sanitation equipment, including clean water and soap, should be provided. Cabs should be wiped down and cleaned of residual mud (or settled dust) frequently to reduce potential for exposure to biosolids.

Training.—Periodic training on standard hygiene practices for biosolids workers should be conducted by qualified safety and health professionals to cover issues such as the following:

- Frequent and routine hand washing (the most valuable safeguard in preventing infection by agents present in biosolids), especially before eating or smoking

- The proper use of appropriate PPE, such as coveralls, boots, gloves, goggles, respirators, and face shields

- The removal of contaminated PPE and the use of available on-site showers, lockers, and laundry services

- Proper storage, cleaning, or disposal of contaminated PPE

- Instructions that work clothes and boots should not be worn home or outside the immediate work environment

- Prohibition of eating, drinking, or smoking while working in or around biosolids

- Procedures for controlling exposures to chemical agents that may be in biosolids

Reporting.—Workers should be trained to report potentially work-related illnesses or symptoms to the appropriate supervisory or health care staff. This may aid in the early detection of work-relat ed health effects.

Immunizations.—Ensure that all employees are up-to-date on tetanus-diphtheria immunizations, since employees are at risk of soil-contaminated injuries. Current CDC recommendations do not support hepatitis A vaccination for sewage workers.

Extend good environmental practices to prevent and minimize occupational exposures.

- Where feasible, substituting Class A biosolids could reduce the pathogen exposure risks during land application compared to applying Class B biosolids. Feasibility may be affected by local customer preferences, since the two types of biosolids vary in the nutrient value they provide to end-users.

- Monitor the source material coming from the wastewater treatment facility. Check monitoring results to assure they meet specified Class B or Class A standards prior to land application operations.

- Monitor stored biosolids prior to application to assure that the biosolids are properly stabilized and that unacceptable regrowth or cross-contamination from substandard material has not occurred.

- Where local conditions permit, inject biosolids below the soil or incorporate (thoroughly mix) into tilled soil. This will minimize post-application worker contact with applied biosolids and prevent resuspension into the air during periods of dryness.

- On windy days, avoid spreading or disturbing dry biosolids (e.g., compost) that would create dust.

- On windy days, avoid spreading biosolids by high-pressure spray.

- Avoid unnecessary mechanical disturbance and contact with land-applied Class B biosolids during the period when public access is restricted.

- Equip heavy equipment used at storage and application facilities with sealed, positive-pressure, air-conditioned cabs that contain filtered air-recirculation units.

- Monitor worker exposures when adjusting precautions to address site-specific issues.

For More Information

Additional information about biosolids and preventive measures can be obtained from the following government Web sites:

- Environmental Protection Agency (EPA). *Biosolids*.
  www.epa.gov/owm/bio.htm
  (This site includes links to professional associations that address biosolids.)

- National Center for Infectious Diseases (NCID). *Viral Hepatitis Resource Center.*
  www.cdc.gov/ncidod/diseases/hepatitis

- National Institute for Occupational Safety and Health (NIOSH).
  www.cdc.gov/niosh

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Speakers

SENATE ENVIRONMENT COMMITTEE

Date February 19, 2003 Time 11:00 a.m. Public Hearing on **Bill # 88**

relative to testing and monitoring requirements at soil manufacturing and reclamation sites.

(Please print) ***Please check box(es) at left that apply.***

SPEAKING?	FAVOR	OPPOSED	NAME	REPRESENTING
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✓	☐	☐	☑	Jan Pendelbury	
✓	☐	☐	☑	Caroline Snyder	Sierra Club
✓	☑	☐	☑	Chris Rueggeberg	Citizens for A Future NH
✓	☑	☐	☑	~~Rep~~ Margaret Clark	
✓	☒	☐	☒	Rep Derek Owen	Dist 34
✓	☑	☐	☐	Dick Flanders	NH Dept. Environmental Services
✓	☑	☑	☐	Charley Hanson	Resource Mgmt. Inc.
✓	☐	☐	☑	Carl Paulsen	NH Rivers Council
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✓	☐	☐	☑	Linda Rafter	self
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✓	☑	☑	☐	Carl Johnson	Dist 2
	☐	☐	☐		
	☐	☐	☐		
✓	☑	☐	☐	Betty Hall	myself

Testimony

Bridge, Susan

From: HShields [hshields@worldpath.net]

Sent: Wednesday, February 26, 2003 5:01 PM

To: prescott@forfamily.net; susan.bridge@leg.state.nh.us; cbelow@tpk.net; burtc@rcn.com; carljean@worldpath.net

Subject: GROUNDWATER CONTAMINATION ELEVATED ARSENIC AND IRON -- FROM "RECLAMATION" OF GRAVEL PIT WITH PAPER MILL SLUDGE

Dear Senators Johnson, Below, Prescott, Cohen and Barnes

Here is yet another study which confirms that spreading paper mill sludge in gravel pits over sandy, porous soil contaminates groundwater.

http://www.umasssoils.com/abstracts/Thursday/arsenic.htm

Elevated Arsenic and Iron in Groundwater at a Gravel Pit Reclamation Project Using Manufactured Topsoil

***Richard S. Behr**, Maine Department of Environmental Protection, 17 State House Station, Augusta, Maine 04333-0017 Tel: 207-287-6828, Fax: 207-287-7826*

State regulations require gravel pit owners to minimize the area open for aggregate mining. To reclaim gravel pits, soil suitable to establish a vegetative cover is occasionally obtained from nearby agricultural land. Thus, reclamation activities may inadvertently create additional erosion and sediment control problems. In an effort to reduce topsoil mining, some reclamation projects use treated sewage sludge in-lieu of natural topsoil. In this investigation, six acres of an active gravel pit was reclaimed using a mixture of short paper fiber derived from a newsprint pulp and paper mill and commercial fertilizer. To reduce nitrogen leaching to groundwater the manufactured topsoil was blended to achieve a carbon to nitrogen ratio (C:N) equal to 30:1. The established groundwater monitoring well network consists of four monitoring wells: one upgradient and three downgradient of the reclamation area. The database consists of one round collected before reclamation and six rounds post reclamation.

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As previously indicated in the report I gave you, no topsoil and no sludge is necessary to reclaim gravel pits. Ossipee Aggregates and other pit owners have been successfully revegetating sand and gravel mines with deep-rooted, drought resistant warm season grasses for many years. It was because of this preferred method of revegetation that the NH Legislature in 1989 amended the law and no longer required the stockpiling of topsoil for use in reclamation.

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Arsenic

Natural and Anrthropogenic "Background" Levels of Arsenic in Florida's Soils

Ming Chen, University of Florida, Belle Glade, FL
Lena Q. Ma, Ph.D., University of Florida, Gainesville, FL
Samira H. Daroub, Ph.D., University of Florida, Belle Glade, FL
Tait Chirenje, University of Florida, Gainesville, FL
Willie G.Harris, University of Florida, Gainesville, FL

Naturally Occurring Arsenic in Overburden in Central Massachusetts

Kevin A. Doherty, Knoll Environmental, Inc., Needham, MA
Rudolph Hon, Boston College, Chestnut Hill, MA

Bench-scale Evaluation of Sorbents for In-Situ Treatment of Groundwater Arsenic

Richard W. Arnseth, Tetra Tech NUS, Inc., Oak Ridge, TN
Raju Dantuluri, Tetra Tech NUS, Inc., Oak Ridge, TN
Steve McCoy, Tetra Tech NUS, Inc., Oak Ridge, TN
Barbara Nwokike, Southern Division Naval Facilities Engineering Command, North Charleston, SC

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Arsenic in Landfill Environments, Massachusetts, USA

Rudolph Hon, Boston College, Chestnut Hill, MA
William C. Brandon, USEPA Region I: New England Region, Boston, MA
Carol L. Stein, Gannett Fleming, Inc., New Ipswich, NH
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Arsenic Geochemistry: Ponding, Slime, Iron and Elevated Arsenic in Groundwater

Eric Butler, Gradient Corporation, Cambridge, MA
Chris Slagle, Martin & Slagle,Black Mountain, NC
Robert Martin, Martin & Slagle,Black Mountain, NC
Damian Shea, Ph.D., North Carolina State University Raleigh, NC

Natural and Anrthropogenic "Background" Levels of Arsenic in Florida's Soils

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***Willie, G. Harris**, Soil and Water Science Department, University of Florida, 2169 McCarty Hall, Gainesville, FL , 32611-0290, Tel: 352 392-1951, Fax: 352-392-3902, Email: wghs@gnv.ifas.ufl.edu*

Arsenic is a Class A human carcinogen and is a public concern due to its widespread usage in both agriculture and industry. Background concentrations of arsenic in soils are essential for establishing soil cleanup goals. The current Florida Department of Environmental Protection regulatory standards for arsenic contamination in soils, regardless of the taxonomic, geographical differences and land uses, cannot provide an adequate assessment in soil arsenic contamination. This presentation addresses issues related to the determination (sample collection, analyses and data analyses) and interpretation (geometric mean, upper confidence limit of the mean, nth percentile of the data) of natural and arthropogenic sources of arsenic and the definition of arsenic "background" levels in soils. Standardization of soil collection, sample digestion, laboratory and data analytical procedures, and a good quality assurance plan will reduce variability in arsenic determination. Our study indicates concentrations of total Fe and P are two most important soil properties that influence arsenic background levels in near pristine soils. Wet soil suborders in south Florida have naturally high arsenic background concentrations. This was also reflected in the athrogenic background levels of arsenic in urban soils. Arsenic release from bedrock and arsenic bioaccumulation by aquatic organisms are possible explanations for relatively high arsenic in those wet soils. Baseline soil concentration, which is defined as 95% of the expected range of the background arsenic concentrations in different soil categories, is necessary for properly assessing potential arsenic contamination.

Naturally Occurring Arsenic in Overburden in Central Massachusetts

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***Rudolph Hon**, Geology & Geophysics, Boston College, 140 commonwealth Avenue, Chestnut Hill, MA 02467, Tel: 617-*

552-3656, Fax: 617-552-2462

The Presence of elevated levels of arsenic in a zone that traverses N-S across Central Massachusetts had been periodically noted and reported, however, without a specific reference to neither the origin of arsenic nor the arsenic sources. Suspected sources included past applications of lead arsenate in orchards as a control for coddling moth, industrial applications in metal and leather processing facilities, and/or from natural sources. An accumulated set of data in the archives of state environmental agencies provides a confirmation of the widespread reports of arsenic levels that are well above the regulatory "background" levels (17 ppm) in overburden. We report arsenic data that (1) were compiled from selected sites listed with the Massachusetts Bureau of Hazardous Waste within this region; and (2) data obtained by this study on samples of overburden obtained from drilled profiles at randomly selected sites. The compiled data are for sites within a corridor along the NNE-SSW trending tract that passes through the geographic center of the state. Both data sets have similar arsenic frequency distribution curves (histograms) with identifiable two frequency subsets: 20 to 50 ppm and 50 to 800 ppm. Comparison with distribution curves for lead proves that there is no connection between lead and arsenic therefore suggesting that lead arsenate is not the arsenic source. Microprobe analysis of sulfides from bedrock samples confirms the presence of pyrites (FeS2) and cobaltites (CoAsS) in the underlying bedrock formations. Elevated arsenic occurrences within the overburden of Central Massachusetts is best explained by the derivation of the overburden from local bedrock formations and by the occasional incorporation of sulfides into the overburden which may account for the observed arsenic "hot" spots. The Central Massachusetts "arsenic province" is part of a larger lithotectonic zone as previously reported by Ayotte and others (1999-WRIR 99-4162).

Bench-scale Evaluation of Sorbents for In-Situ Treatment of Groundwater Arsenic

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***Raju Dantuluri**, Tetra Tech NUS, Inc., 800 Oak Ridge Turnpike, Oak Ridge, TN 37830, Tel: 865-220-4766, Fax: 865-483-2014*
***Steve McCoy**, Tetra Tech NUS, Inc., 800 Oak Ridge Turnpike, Oak Ridge, TN 37830, Tel: 865-220-4730, Fax: 865-483-2014*
***Barbara Nwokike**, Southern Division Naval Facilities Engineering Command, P.O. Box 190010, 2155 Eagle Drive, North Charleston, SC 29419, Tel: 843-820-5566, Fax: 843-820-5563*

Elevated arsenic concentrations in groundwater, whether the result of natural or anthropogenic influences, represent a human health risk. Over the last decade, with activities ranging from documenting health effects in Bangladesh to revision of international drinking water guidelines, there has been an increased focus on the effects of exposure to high arsenic

concentrations in groundwater. In the United States this focus culminated in the recent adoption of a more stringent drinking water standard, lowering the arsenic Maximum Contaminant Level (MCL) from 50 ppb to 10 ppb. Research on innovative treatment technologies to meet the new standards has been conducted in parallel with the health investigations. The Navy has identified arsenic contaminated groundwater In its environmental studies which are conducted prior to the transfer of surplus facilities to local communities. The Navy has a vested interest in identifying treatment technologies that can be shown to operate properly and successfully (OPS) in-situ and in a passive mode. Tetra Tech NUS identified three sorptive media that promised to meet the Navy's requirements. The ability of the three media, an iron-modified zeolite, a surfactant-modified zeolite and activated alumina, to sorb dissolved arsenic from site groundwater was evaluated in batch tests. Two of the sorbents, iron-modified zeolite and activated alumina, were tested further in column tests with synthetic groundwater and influent arsenic concentrations (350 – 450 mg As/L) similar to those observed at the site. Column breakthrough was defined when the effluent arsenic concentration was ^{3} 5 mg/L. The results of the tests indicated that activated alumina was capable of extracting dissolved arsenic under simulated in-situ conditions. Based on the column test results, the activated alumina treated >3900 bed volumes prior to breakthrough. The sorption capacity of the activated alumina was >2500 mg arsenic/g of sorbent. Based on these results, the Navy is proceeding with a pilot scale field implementation of activated alumina in a permeable reactive barrier.

Elevated Arsenic and Iron in Groundwater at a Gravel Pit Reclamation Project Using Manufactured Topsoil

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Arsenic in Landfill Environments, Massachusetts, USA

***Rudolph Hon**, Department of Geology & Geophysics, Boston College, 140 Commonwealth Avenue, Chestnut Hill, MA 02467, Tel: 617-552-3656, Fax: 617-552-2462*
***William C. Brandon**, Office of Site Remediation and Restoration, USEPA Region I: New England Region, 1 Congress St, Boston, MA 02114, Tel: 617-918-1391, Fax: 617-918-1394*
***Carol L. Stein** and **David F. McTigue**, Gannett Fleming, Inc., 15 Willard Road, New Ipswich, NH 03071, Tel: 603-878-4056, Fax: 603-878-4056.*
***Thomas Davidson**, Department of Geology & Geophysics, Boston College, 140 Commonwealth Avenue, Chestnut Hill, MA 02467, Tel: 617-797-9595, Fax: 617-552-2462*

Solid-waste landfills can modify the oxidation-reduction potential (ORP) of underlying groundwater, thereby influencing solubilities of redox-sensitive species. Elevated aqueous concentrations of Fe, Mn, and As have been observed at many landfill sites, but sources are a subject of conjecture. Arsenic may be associated with landfill waste; alternatively, its presence may be from natural sources. Reductive dissolution of hydrous ferric oxide (HFO) coatings on aquifer materials is a common mechanism by which sorbed constituents, particularly arsenic, are released to groundwater.

Overburden, bedrock, and groundwater samples were collected upgradient and downgradient of four landfills in central Massachusetts. The overburden at these sites consists primarily of glaciolacustrine sediments. Bedrock lithology comprises metasedimentary rocks of the mid-Paleozoic Merrimack belt. Groundwater downgradient of the landfills is characterized by low ORP and relatively high levels of arsenic, typically 0.05 to 0.5 mg/L. Elevated arsenic is associated with high Fe and Mn. Fe and As concentrations are broadly correlated, suggesting that both are mobilized by the same process. In contrast, at two landfill sites in southeastern Massachusetts, downgradient groundwater is characterized by low ORP, but concentrations of iron and arsenic are low. Bedrock is distinctly different, consisting of Precambrian granites, and overlying glacial deposits are characteristically lower in iron and arsenic as compared to overburden in the central Massachusetts region.

Landfill leachates high in dissolved arsenic appear to be the unfavorable result of a combination of factors: location within or proximal to bedrock containing arsenic-bearing mineralogies; glacial transport of bedrock minerals; post-glacial chemical alteration and redistribution of iron and arsenic; sorption of arsenic by HFO surfaces; landfill-induced lowering of groundwater ORP; and dissolution of HFO and re-mobilization of arsenic.

Arsenic Geochemistry: Ponding, Slime, Iron, and Elevated Arsenic In Groundwater

***Eric L. Butler, Ph.D.**, Principal Scientist, Gradient Corporation, 238 Main Street, Cambridge, MA 02142, Tel: 617-395-5000, Fax: 617-395-5001*
***Chris Slagle** and **Robert Martin**, Martin & Slagle, PO Box 1023, 208 Sutton Avenue, Black Mountain, NC 28711, Tel: 828-669-3929, Fax: 828-669-5289*
***Damian Shea, Ph.D.**, North Carolina State University, Dept. of Environmental & Molecular Toxicology, 850 Main Campus Drive, Raleigh, NC 27606, Tel: 919-513-3899*

This presentation will use a case study to discuss and illustrate the biological mediation of arsenic concentrations in groundwater.

A company had satisfied its RCRA permitting obligations for a closed Hazardous Waste Management Unit - assessing the unit following cleanup, characterizing the hydrogeology of the site, and monitoring the groundwater for many years. When it came time to end the monitoring, having observed non-detectable levels of chemicals listed on it RCRA permit for three years in succession, the State balked, pointing to elevated arsenic levels in several of the wells. Although arsenic was never a notable or significant constituent in the manufacturing process, was not elevated in wastes associated with the site, nor listed in the permit, the State, approximately 18 years after closure of the unit, sought to re-write the permit to include arsenic and retain the closed unit in its program, thus requiring many more years of monitoring and associated costs.

A coherent, thorough evaluation of site characteristics, including, aerial photography, waste testing, numerous groundwater measurements, field notes, soil metals, background metals, and agriculture activity in surrounding properties was performed. The elevated arsenic concentrations (100-200 mg/L) were shown to be unrelated to the manufacturing facility or its wastes. The high arsenic levels resulted from the biogeochemistry of iron which controlled the arsenic concentrations in the wells. Although many on-site wells exhibited reducing conditions, only wells in areas which periodically endured surface water ponding were noted to foul sampling bailers with slimy bacteria and exhibit high iron concentrations. Only these wells with high iron concentrations exhibited elevated arsenic concentrations.

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To: Chairman Carl Johnson and the Senate Environment Committee

From: Professor Caroline Snyder

Re: **SB 88**

The on-going practice of using New Hampshire's spent sand and gravel pits for sludge farming is totally unacceptable. No other state in the nation routinely places sludges, at the rate of hundreds of tons per acre, on excessively drained soils that are located only a few feet above unpolluted stratified drift aquifers.

No longer requiring water monitoring at these reclamation sites, would encourage this practice that already is impacted our ground water.

Sludge farming on these sites is not scientifically defensible. It is still permitted in this state because of the aggressive and often deceptive lobbying by the New England Biosolids and Residuals Association.

Every peer reviewed published paper as well as other recently discovered data, indicates that ground water is being impacted by this practice: in North Carolina, in New Jersey, in Maine, in New Hampshire. Some sludge pollutants that end up in ground water take years to break down, a process that is much faster in surface waters.

In addition, the sludge industry and DES appear to be ignoring the secondary effects of putting paper mill sludge and sewage sludge on these environmentally sensitive sites: Maine hydrologist, Richard Behr and a number of other scientists are concerned that arsenic can be released in groundwater by reaction of iron oxide with organic carbon such as paper mill sludge. Maine and New Hampshire already have a serious arsenic problem in some private wells, without yet adding another source of arsenic to drinking water.

Does it really make any sense to continue to promote the sludging of spent sand and gravel pits when other, less expensive, more effective, and risk-free methods exist and are being used to vegetate these sites, such as planting warm season grasses? Native, non-invasive warm season grasses do not require topsoil or sludge; they thrive in sandy soil; unlike sludged vegetation, they can withstand long droughts; and, best of all, they do not pollute groundwater.

I urge this committee to oppose SB 88 that would encourage gravel pit sludging.

SIERRA CLUB
FOUNDED 1892

New Hampshire Sierra Club

#3 Bicentennial Square Concord, New Hampshire 03301

Phone: (603) 224.8222 FAX: (603) 224.4719

February 19, 2003

To: Chairman Carl Johnson and Members of the Senate Environment Committee:

From: Professor Caroline Snyder

Re: **SB 87, SB 88, SB 89.**

Thank you for the opportunity to testify. SB 87, 88, and 89 would weaken the current state rules and policies governing the land application of sludges and for this reason the Sierra Club urges the Environment Committee to oppose these bills.

The Sierra Club, the nation's oldest and largest environmental group, with over 700,000 members, opposes the land application of sewage sludge because the current rules governing this practice do not adequately protect human health and the environment. However, since land application cannot be banned overnight, the Sierra Club has issued science-based guidelines for more protective legislation. These include pH management, prompt incorporation of sludges into the soil, a prohibition on stockpiling, and prohibiting sludge on excessively drained soils or where water tables are shallow and variable.

None of these guidelines are currently part of the state rules, even though land application in New Hampshire is especially risky. We have shallow and variable water tables, sandy soils, sloping land surfaces, acidic soil and acid precipitation, few suitable agricultural sites, a short growing season, and cool, moist climates that often alternate with drought.

Sewage sludge is not a fertilizer. The Federal Clean Water Act defines sludge as a pollutant. It is, in fact, a mixture of thousands of pollutants, including carcinogens, endocrine disrupting chemicals, and disease causing pathogens. Dr. Robert Hale, an expert on toxic organics in sludge, has said: "few matrices are as pollutant-rich as sewage sludge." EPA research microbiologist and pathogen expert, Dr. David Lewis, warns that " sludge is probably the nation's largest repository of infectious human material."

A panel of experts appointed in 2000 by the nation's most prestigious science organization, the National Academy of Sciences, concluded last summer that current sludge rules are based on outdated science (or no science). The same panel also concluded that sludge is such a complex and unpredictable mixture of contaminants that

current risk management practices do not protect human health (p.252). In his July 2, 2002 news conference, panel chair, Dr. Thomas Burke, warned the nation that there is an urgent need for health studies among rural populations exposed to sludge.

Hundreds of illnesses and at least four deaths have been linked to land application. Some of these adverse health effects have recently been documented by University of Georgia scientists in peer reviewed technical and medical journals. In addition, ground water contamination from sludge in several areas, including New Hampshire, has been documented, some of it in peer reviewed technical journals.

The EPA no longer promotes land application. In fact, on September 6, 2002, EPA's Inspector General told the agency that "EPA does not know whether current regulations, when adhered to, are protective of public health and the environment.." The EPA Inspector General also told the agency that " EPA has not conducted the basic research needed to determine the risk associated with certain biosolids disposal practices."

The prospect of continuing land application under the current unprotective management practices does not look good. With the findings of the National Academy of Sciences, the documentation of adverse health effects and of ground water impact, the increase in litigation and public opposition because of the ever increasing uncertainty about the safety of this practice, it seems unwise for the state to weaken its land application regulations.

We urge the Environment Committee to vote inexpedient to legislate on all three bills.

the soil surface against rain drop impact and associated erosion. The organic matter within biosolids improves soil tilth, which improves crop growth, resulting in reduced erosion. In another study, researchers found that under high rainfall conditions (about 4 inches per hour on site slopes up to 15%), runoff water quality from biosolids sites was of higher quality than for similar sites receiving manure. Other biosolids research found that nitrate, cadmium, lead, and chromium were undetectable in the water (McLeod, R. V. and R. O. Hegg, *Journal of Environmental Quality*, 1984).

What are most important to protecting surface water quality are quality vegetated buffers and controlling erosion--not excessive setbacks.

Yours truly,

Ned Beecher
Executive Director

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nebra
New England Biosolids & Residuals Association

Cooperatively promoting the environmentally sound recycling of biosolids and other residuals

Senator Carl Johnson, Chair
Senate Environment Committee
New Hampshire Legislature
Concord, NH 03301

Delivered by facsimile 271-3027

February 19, 2003

Re: Senate Bill 88

Dear Senator Johnson and Members of the Committee:

Senate Bill 88-FN provides specific directions for testing and monitoring of groundwater in certain reclamation sites that manufacture soil or perform reclamation with biosolids or paper fiber." It directs NHDES to, as necessary, require monitoring of groundwater at sites where biosolids and short paper fiber are applied more than once in a permit term (permit terms are usually 5 years). For those sites where biosolids and short paper fiber are applied for reclamation purposes just once in a permit term, groundwater monitoring would not be required.

Land reclamation is the process of restoring land to productive use after it has been stripped of topsoil for mining or another reason. In order to establish a sustainable topsoil, organic materials like biosolids have been widely used to build organic matter and nutrients that can support vegetation. The idea behind this bill is to allow one-time reclamation activities that utilize biosolids, etc. to proceed without expensive groundwater monitoring. All other reclamation or mixing and soil manufacturing activities that use biosolids, septage, and/or short paper fiber would continue to have to have groundwater monitoring, as prescribed by Env-Ws 800.

There are dozens of examples in NH of spent gravel mines and sand pits where biosolids, short paper fiber, and/or septage have been applied in an engineered mix to establish a sustainable soil and vegetation. These projects have had good success over the past 15 years (see http://www.nebiosolids.org/pulppaper.html to see an example of this process). There has been some groundwater monitoring of some of these projects, including intensive monitoring by UNH scientists of a site in Hooksett where, in those areas that received only a one-time application, there did not appear to be negative impacts to groundwater (Chestnut, T. and W. McDowell, report to NH-DES).

This bill would not alter existing regulations that require facility permits, extensive mapping, biosolids testing,setbacks, nutrient management planning in cooperation with UNH Cooperative Extension, and many other restrictions that effectively protect groundwater when biosolids, septage, and short paper fiber are applied one-time for the purpose of land reclamation.

If you would like further research data or information on this topic, feel free to contact this office.

Yours truly,

Ned Beecher, Executive Director

STATE OF NEW HAMPSHIRE
OFFICE OF LEGISLATIVE BUDGET ASSISTANT

FISCAL NOTE WORKSHEET

Date Sent to Agency: 1/28/03

LSR #: 03-1013.1 SB 88

Agency: NH Department of Environmental Services

Bill #:

Due to LBAO: 2/11/03

Dates:
Original: 1/27/03
Revised: 1/28/03
Amended:_____

State Fund(s) Affected

GENERAL _____X_____ FEDERAL_____ OTHER_____

	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
State Revenue	$3,000	$3,000	$3,000	$3,000	$3,000
State Expenditure	0	0	0	0	0
Net State Impact	$3,000	$3,000	$3,000	$3,000	$3,000

County Revenue					
County Expenditure					
Net County Impact	None	None	None	None	None

Local Revenue					
Local Expenditure					
Net Local Impact	Indeterminable	Indeterminable	Indeterminable	Indeterminable	Indeterminable

NOTE: (1) List only the amount of change in the appropriate column.
(2) Place all negative numbers in parenthesis.
(3) You may replicate this worksheet.
(4) Refer to Fiscal Note Guidelines for further information.

Fiscal Note Worksheet (page 2 of 3)

(A) ASSUMPTIONS: Explain how estimate was derived. Describe costs that can be absorbed without additional funding. If no fiscal estimate can be prepared, explain why in detail.

This bill proposes to increase the testing and monitoring requirements at reclamation sites where manufactured topsoil consisting of biosolids and/or short paper fiber (SPF) are applied to reestablish vegetative cover. The bill also proposes to eliminate groundwater monitoring at sites where only one application is made per 5 year permit period. Assuming this bill becomes law, there would be no change for sites manufacturing topsoil, since these facilities currently require a facilities permit from the Department of Environmental Services (DES), which includes a groundwater monitoring requirement. However, for those sites proposing to be reclaimed using class B biosolids and/or short paper fiber (SPF) once in a permit term (five years), no groundwater monitoring would be required. Since the cost of installing groundwater monitoring wells is estimated to be $15,000, at a minimum, and the cost of sampling and analyzing groundwater samples at each well, at least twice per year, is $2,000 annually, reclamation of spent gravel pits using class B biosolids and SPF is not generally a viable option. Only one site is currently permitted to do reclamation using these materials.

Assuming that groundwater monitoring is not required, it was assumed that 10 gravel pits would be reclaimed each year for the next 5 years. This bill would increase state revenues by approximately $3,000 per year from site permit fee income. Current rules under Env-Ws 800 require payment of a variable permit fee based on the number of acres upon which biosolids and/or SPF are applied. It was assumed that each of the 10 gravel pit sites reclaimed each year would be greater than 10 acres, so the maximum fee was assumed ($300 for each site). State expenses would not be incurred, since staff overseeing site permitting are federally funded. Thus the net state impact would be $3,000 for each of the next 5 years. No impact to county revenue or expenses is anticipated. The impact to local government is indeterminable, and would depend on whether towns charge a local fee for reclamation activities occurring within their borders, or whether these communities would seek state approval for a topsoil manufacturing facility requiring the cost of groundwater monitoring. Municipalities are exempt from paying DES permit fees.

(B) METHOD of determining fiscal impact - show calculations:

As noted in A above, it was assumed that each year there would be 10 gravel pits reclaimed. The permit fees for each site would be $300, assuming at least a 10 acre site. Thus, 10 X $300 = $3,000 annually.

(C) ESTIMATED FISCAL IMPACT (from A and B) – Calculations must agree with and explain totals on first page:

See A above.

Fiscal Note Worksheet (page 3 of 3)

(D) ADDITIONAL COUNTY, LOCAL OR LONG-RANGE EFFECTS:

The impact to county government is none. The impact to local government is indeterminable, but may be positive financially (if local fees are charged) and lead to improved site values for increased taxation (reclaimed gravel pits may be taxed for future house lots). The long-range benefits of this bill may be the conversion of open gravel pits with no vegetation to vegetated sites more amenable to alternative uses.

(F) TECHNICAL OR MECHANICAL DEFECTS: (Note any conflicts with existing law. Do not comment on the merits of the LSR).

None

(F) OTHER COMMENTS: (tax variables, federal mandates, etc.)

None

AGENCY REPRESENTATIVE PREPARING WORKSHEET:

Richard Flanders _____
Name/Signature

Director, Permits & Surveillance, Water Division, NHDES (271-3571)
Title, Agency and Phone Number

January 28, 2003
Date

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Fax # 3027	Fax # x 4128	

State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES
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(603) 271-3503 FAX (603) 271-2982

February 19, 2003

The Honorable Carl R. Johnson, Chairman
Senate Environment Committee
Room 104
Legislative Office Building
Concord, New Hampshire 03301

Re: SB 88-FN, relative to testing monitoring requirements at soil manufacturing and reclamation sites

Dear Chairman Johnson:

Thank you for the opportunity to testify on SB 88-FN which proposes to increase the testing and monitoring requirements at reclamation sites where manufactured topsoil consisting of biosolids and short paper fiber (SPF) are applied to reestablish vegetative cover. The bill also proposes to eliminate groundwater monitoring at sites where only one application is made per 5 year permit period. The Department of Environmental Services (DES) cannot fully support this bill since it not consistent with our current policies and rulemaking initiative and has received insufficient study by UNH researchers.

Currently, the DES rules for sludge management under Env-Ws 800 do not provide for a relaxation of groundwater monitoring for sites where biosolids and short paper fiber are applied for gravel pit reclamation. State-funded research has been performed by Dr. William McDowell of the University of New Hampshire (UNH) on biosolids and SPF land application at sites with highly permeable soils, a common characteristic of reclamation sites. This research was documented in the *Final Report to DES and NH Legislature, June 1998 – November 2001, Monitoring Demonstration at Top-Soil Manufacturing Site in New Hampshire, William H. McDowell & Tamara J. Chestnut, UNH, March 15, 2002.* Dr. McDowell pointed to the timing, magnitude, and frequency of applications, as well as stockpiling as potential sources of the elevated levels of nitrate in groundwater at the Hooksett study site. He felt that stockpiling is the most likely cause of water quality problems. However, he concluded that:

> *"Further work with a strong experimental design (including groundwater data before biosolids application and replicated sites) would be necessary to document the impacts of one-time applications of biosolids to reclaim gravel pits. Our data shows that repeated stockpiling at a gravel pit carries significant risks of groundwater contamination, but they should not be used to condemn all gravel pit reclamation with biosolids."*

"Soil manufacturing" is a repetitive process by which artificial topsoil is produced by mixing biosolids and SPF, or both, with sand and removed for sale or use elsewhere. In contrast, "reclamation" is typically a one-time process of adding organic matter and nutrients from biosolids, SPF, or a combination of both to promote establishment of vegetation on severely disturbed soils such as gravel pits. Because Dr. McDowell's work has clearly demonstrated that the long-term environmental risks created by soil manufacturing operations are significantly higher than for a typical reclamation project, it makes sense that

the regulation of these different operations should be considered differently. In fact, this was proposed last legislative session in HB 1313, relative to spreading sludge on excavation sites for reclamation. However there was no agreement as to the details and this bill was sent to study committee. SB 88-FN essentially continues this earlier discussion and seeks to simplify the earlier bill and achieve consensus by avoiding detailed criteria for determining whether activity at a site is a one-time reclamation or recurring. The bill seeks to limit the use of biosolids and short paper fiber for reclamation to once during a 5 year permit period and to eliminate the current requirement for groundwater monitoring for such operations. For recurring site use, such as for soil manufacturing, groundwater monitoring would be required as is presently the case. Since the costs involved with installing groundwater monitoring wells, and sampling and testing each well for several water quality parameters two or more times a year are substantial, very little reclamation using biosolids and SPF is currently being practiced in New Hampshire. If this bill becomes law, and a distinction is made between reclamation and soil manufacturing requiring groundwater monitoring, a significant number of gravel pits currently facing reclamation could be cost-effectively vegetated using biosolids and SPF, with some marginal risk of low level or temporary groundwater impacts. Nevertheless, each site would have to be permitted under the Env-Ws 800 rules, and only sludge that has received sludge quality certification (including viral testing) could be applied.

In conclusion, DES remains ambivalent concerning SB 88-FN due to the above-cited concerns. Given the proposal is not consistent with our current policies and rulemaking initiative, we would welcome legislative policy directive.

Thank you for your consideration. If you have any questions, please contact me at 271-3503 or Richard Flanders at 271-3571.

Very truly yours,

Robert Monaco
Acting Commissioner

Tel. 603-224-1955
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FAX Cover Sheet

New Hampshire
Office
National Environmental Trust
AND
Global Warming Campaign

TO: Susan Bridge

FROM: Jan Pendlebury

DATE: 2/19/03

TOTAL # of Pages, including cover sheet 3

MESSAGE:

28 South Main Street
Concord, New Hampshire 03301

February 19, 2003

To: Chairman Carl Johnson and the Senate Environment Committee
From: Jan Pendlebury, MS Environmental Administration, BS Medical Technology (ASCP)

Re: Senate Bill 88, An Act Relative To Testing And Monitoring Requirements At Soil Manufacturing And Reclamation Sites

Thank you for accepting these comments opposing SB 88. By the very nature of the geo-morphological events that shaped our terrain thousands of years ago, it is no coincidence that sand and gravel pits exist where they do, over stratified drift aquifers, sources of unpolluted drinking water. The chemical composition of the sandy soils that comprise the pits repel absorption, allow quick drainage, and offer little filtering ability. Texture is the critical factor determining the pore spaces in soil, and its capacity to hold water. Sand contains the coarsest grains in soil, making it the driest and lightest of soils. This allows water and to percolate downward under the influence of gravity, and drain rapidly. Because silica, the primary mineral of sandy soil, does not dissolve readily during eluviation (downward transport), it does not provide the binding sites and chemical charge necessary to attract foreign materials to adhere to it.

Treated sewage sludge is not sterile. Current regulations permit sludges with average fecal coliform levels of up to 2 million colony- forming units of bacteria per gram of dry sludge to be land applied. Even if this number is lower, microbial colony forming units multiply at very rapid rates, especially in the nutrient rich medium of paper mill sludge and municipal sewage sludge, and if this material is stockpiled. Microbes produce many offspring and spread their seeds far and wide. Speaking in terms of natural selection, they are 'r' selected' to ensure the perpetuation of the species. They are able to transpose genes and adapt to many stressors that pose a threat, whether naturally occurring or from manmade antimicrobial agents. That is why, more specifically, E. coli is the organism of choice for use in genetic engineering and biotech.

Rapid replication, many offspring, short lifespan and genetic flexibility have contributed to more resistant and deadly strains. Antibiotics work in several ways; by protein inhibition, attacking the cell wall, or by DNA replication in bacteria (Pharmaceutical Information Associated, Ltd., 1994). A pathogen becomes resistant to the targeted antibiotic through mutation or through the acquisition of a plasmid for resistance from another strain of bacteria. This is not limited to species but may also apply to genera. Plasmids transfer this genetic material. Plasmids are small messenger units that facilitate rapid and broad dissemination of drug genetic resistant information to other bacteria. "Furthermore, cross-resistance to the newer agents can develop in short order because of an abundant pool of existing resistant genes," writes Nicole Johnston, Modern Drug Discovery, June, 2002.

Pathogens are able to transfer their resistant genes to previously 'harmless' bacteria, in vitro as well as vivo. As the survival of the bacteria becomes challenged, they are able to take on a stronger, more virulent strain, forcing the recessive resistant genes to become dominant. **Studies have shown that this can happen to sludge bacteria as the material moves through the sewage treatment plant**. Plasmids from the MDRB pathogens have been able to transfer their

genetic identity to other coliform bacteria, resulting in the transformation of a broader variety of MDRB. Some have demonstrated resistance, not just to antibiotics but to chlorine as well.

To make matters worse, patients in hospitals, nursing homes and others with low immunity have succumbed from infection due to the formation of microbial biofilms, "a phenomenon that can render the potent antimicrobials completely useless, enabling bacteria to survive stressors such as antibiotic therapy and to become 1000 times as resistant to antibiotics as free-dwelling cells Biofilms are elaborate networks of bacterial cells that communicate with each other once their numbers reach a certain threshold." (Modern Drug Discovery, Seeking superbug busters, June 2002).

The excessively drained soils of sand and gravel pits, the ability of microbes to mutate quickly into more virulent resistant strains, the potential for microbes to transfer genetic material cross species and genera and ultimately the escalating rate of MDRB or superbugs is strong testimony for this committee to oppose SB88. The question we should be asking is why do we spread sludges on gravel pits?

Bridge, Susan

From: Dale Sprague [pubwks@worldpath.net]

Sent: Monday, March 03, 2003 11:48 AM

To: Russell Prescott; John Barnes; Clifton Below; Carl Johnson; Burton Cohen

Subject: senate bills

Dear Sirs,
It has come to my attention that there are several Senate bills (#87, #88-FN, #89) that are being considered by your committee. I wish to go on record as being in favor of these 3 bills. I operate the Farmington Wastewater Facility. Our community generates biosolids as do most communities. The State should be using every means it can to promote the beneficial reuse of biosolids. If the State does not take a more reasonable approach to both biosolids and septage management these issues will become a crisis in this state. I urge you to contact the wastewater treatment personnel in your community to discuss these issues. You should be informed about both sides of the issue.
Sincerely,
Dale Sprague
Superintendent
603-755-4883

Bridge, Susan

From: HShields [hshields@worldpath.net]

Sent: Monday, March 17, 2003 2:46 PM

To: REP. BETTY HALL Hall; DEREK OWEN; Chris Rueggeberg; Flanders, Dick; ALAN RUBIN, EPA; Bastian.Robert@epamail.epa.gov; Walker.John@epa.gov; carljean@worldpath.net; burtc@rcn.com; cbelow@tpk.net; susan.bridge@leg.state.nh.us; prescott@forfamily.net

Subject: MAINE - GRAVEL PIT - RECLAMATION - SEWAGE SLUDGE - PAPER MILL SLUDGE - BIOMIX - NEO - GROUNDWATER CONTAMINATED

BANGOR NEWS MARCH 17, 2003

Gravel pit reclamation fouls wells

DEP says Sangerville contamination has not affected Black Stream

SANGERVILLE - The use of sludge to manufacture topsoil for reclaiming portions of the so-called Barr significantly affected groundwater in down-gradient monitoring wells.Although the sludge has changed t chemistry in the monitoring wells, Department of Environmental Protection officials believe it has not af quality of Black Stream, a tributary of the Piscataquis River, which lies below the pit. There are no dwell between the river and the pit.

"We don't think it affects the quality of Black Stream, but we don't know for sure," Dick Behr, a geologis Bureau of Remediation and Waste Management, said Friday. The gravel pit overlays a sand and gravel a

While there has been little effect on groundwater microbiology as measured by fecal coliform and total coliform counts, there have been significant other changes, according to Behr. These include notabl in concentrations of iron, manganese and arsenic in down-gradient samples.

DEP officials said that even though the arsenic was likely not generated from the sludge, but rather from existing sediments or parent material at the site, the toxic metal has increased to levels in excess of Maine's drinking water standard, in all down-gradient wells.

The findings were not well-received by Sangerville planning board members, who are pushing for a water quality control ordinance. "That's the largest aquifer and we need to protect it," Gerald Peters, planning board chairman, said Sunday.

The pit, now owned by Barrett Paving Co., was approved for the application of sludge by the DEP in the late 1990s as part of a reclamation project.

Approval was given to Kimberly-Clark of Winslow, formerly Scott Paper Co., to apply paper mill sludge - a mixture of sewage sludge and commercial fertilizer and bioash from its mill - as a substitute for topsoil in the reclamation of 10 acres of the gravel pit.

When the company closed its mill in June 1998, the DEP transferred the license on the remaining 5 acres not used by the paper company to Anson-Madison Sanitary District of Madison to be used as a test site for the recycling of biomix sludge.

The sanitary district last dumped at the pit two years ago, and as required by DEP, AMSD has monitored and sampled the groundwater on the 2 acres the district used.

John Leslie of New England Organics of Unity, the contractor for the recycling of biosolids for AMSD, called the changes in the groundwater a seasonal reflection. He acknowledged that there have been impacts to the down-gradient monitoring wells, but noted that the water quality is actually improving and is returning from an anaerobic environment to an aerobic environment.

Leslie believes the drought and the lack of sufficient upgradient water to dilute the site contributed to the changes. "I don't see this as affecting Black Stream," he said.

Leslie said the sanitary district intends to continue monitoring the test wells until the levels return to pre-treatment quality, and will add another down-gradient well to test.

Monitoring has shown that hardness, calcium, magnesium and alkalinity have increased in the down-gradient monitoring wells, apparently because of high lime content of the AMSD sludge, according to Behr.

Of primary concern, he said, is the occurrence of forms of nitrogen in the down-gradient wells which indicates that nitrogen has leached from the manufactured topsoil into groundwater.

Another concern is an abrupt, substantial decrease in dissolved oxygen, which was observed in all down-gradient wells shortly after application of the manufactured topsoil.

The findings were troublesome to Peters. He said that a year ago, the planning board requested the installation of another down-gradient well and sanitary district officials agreed to install it, but that they still have not done so.

What the community needs is more rights regarding water quality control, Peters said. Having a water quality control ordinance would provide the community with some clout should a dispute arise that needed to be resolved in court, he said.

Committee Report

STATE OF NEW HAMPSHIRE

SENATE

REPORT OF THE COMMITTEE

Date:

THE COMMITTEE ON Environment

to which was referred Senate Bill 88-FN

AN ACT relative to testing and monitoring requirements at soil manufacturing and reclamation sites.

VOTE: 4-0

Having considered the same, report the same with the following resolution:
Resolved, that it is: **INEXPEDIENT TO LEGISLATE.**

Senator Carl R. Johnson
For the Committee

SB88 Docket

Next|Prev|Results List|Main|Bill Status

Bill Title: relative to testing and monitoring requirements at soil manufacturing and reclamation sites.

Date	Body	Description
1/30/2003	S	Introduced and Ref. to Environment; SJ 3, Pg.34
2/7/2003	S	Hearing; February 19, 2003, Room 104, LOB, 11:00 a.m.; SC9
3/21/2003	S	Committee Report; Inexpedient to Legislate [03/27/03]; SC15
3/27/2003	S	Inexpedient to Legislate, MA, VV === KILLED ===; SJ 10, Pg.156

Next|Prev|Results List|Main|Bill Status

Docket Abbreviations