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LETTER AND COMMENTS FROM FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION ON RESPONSE TO COMMENTS REGARDING BIOAUGMENTATION CORRECTIVE ACTION SUBMITTAL PACKAGE NS MAYPORT FL
7/7/1995
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Department of Environmental Protection

Lawton Chiles
Governor

Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

July 7, 1995

Ms. Elaine M. Morrison, P.E.
Department of the Navy
Southern Division Naval Facilities Engineering Command
2155 Eagle Drive, P.O. Box 190010
North Charleston, South Carolina 29419-9010 file:bacter2.doc

SUBJECT: Review of Responses by FIFCO International to comments by letters on January 13, 1995 and February 28, 1995 on "Bioaugmentation Corrective Action Submittal Package, January 1995." FIFCO International, Inc. Proposed for use at Area 1, SWMU 15 Naval Station, Mayport (NELP Program) and the Revised Remedial Action Plan, May, 1995..

Dear Ms. Morrison:

Greg Brown, P.E., and I have reviewed the responses to our previous comments and the revised RAP submitted by FIFCO International for the above project and offer the following comments. Mr. Brown's comments are attached; my comments follow.

COMMENT 6.

"*The overall scope and presentation of the project is vague and uses general terminology to describe processes and concepts. Additionally, significant aspects of the project are not adequately addressed: this includes the duration of the project, how ground water and aquifer characteristics will be utilized in the project design, the total volume of media to be injected, the media characteristics with respect to any breakdown products, the media slug migration rate, direction of migration, composition and geometry of the media slug. More importantly, what will be the effect, if any, on wells located in the city of Mayport?*"

FIFCO RESPONSE:

It is our opinion that the scope of work outlined in the RAP provides sufficient details for the planned demonstration test. The duration of the proposed demonstration test is anticipated to encompass six months or less. The volume of media injected is planned to be not more than 3 gallons per cubic yard per application. The town of Mayport will experience no negative impact in wells.

FDEP RESPONSE:

- That the Town of Mayport will experience no negative impact in wells is noted.

COMMENT 19.

"What is (are) the bacteria types (genus at least) that will be utilized in this project? What is the composition of the "100% symbiotic organic matter"? What will happen to this material as its residence time in the aquifer increases? If this material is a fulvic acid or humic acid material, will it act as a chelator to metal species that are present and increase their aquifer mobility? Why or why not?"

FIFCO RESPONSE:

Beneficial microorganisms from the genera ACHROMOBACTER, AZOTOBACTER, NITROBACTER AND NITROSONOMA are among the micro organisms found in Bac-Terra™, BR-650. The material is composed in its solid form of 100 percent organic matter selected for its naturally occurring organisms. Some of the micro organisms are water borne and some are soil borne. The exact recipe of Bac-Terra™, BR-650 is considered proprietary. Its safety is evidenced by the accompany bio-assay. Since the micro organisms in Bac-Terra™, BR-650 are naturally occurring, as their food source is depleted, they will die and be consumed by the other indigenous micro organisms. There will be no negative effect on the soil, groundwater or groundwater aquifer, as is evidenced by the accompanying bio-assay. The effect of Bac-Terra™, BR-650 on metal salts is not a chelating effect. Many of the beneficial micro-organisms in Bac-Terra™, BR-650 are capable of respirating metal salts. In other words, their metabolic processes take in, for instance the nitrate (or other chemical salts), utilizing the nitrogen(or other element in the salt ion) and exhale the now free oxygen. The metabolism or evolution of ATP releases free electrons, which are then available for combination with the metal ions, thereby stabilizing them in their non bio-available forms. Therefore, no increase in aquifer mobility is expected due to the addition of Bac-Terra™, BR-650 .

FDEP RESPONSE:

- The response is acceptable and the statement that there will be no negative effect on the soil, ground water or aquifer is noted.

COMMENT 31.

"Section 8.1 must be addressed adequately; how does FIFCO or the Navy intend to monitor and evaluate the residual media remaining in the shallow soil and water table aquifer after the project. What proposed criteria will be used to assess success or the risk, if any, from this project?"

FIFCO RESPONSE:

The residual media remaining in the shallow soil will be monitored by confirmatory sampling and ground water will be checked by monitoring and sampling. The criteria to

determine the success of the project has been addressed in paragraph 1, the criteria for risk has been addressed in the bio-assay relative to the safety of the product's use. However, any additional criteria that may be required by the DON or Florida Department of Environmental Protection should be communicated to the Oversight Contractor in order to incorporate the oversight activities.

FDEP RESPONSE:

- Which paragraph 1? The question is restated alternatively: What are the *CRITERIA* by which the Navy will monitor and evaluate the residual media remaining in the shallow soil and water table aquifer after the project. Monitoring and sampling are *methods* whereby data are acquired; what will the *data* produced by the monitoring and sampling consist of? Example: FIFCO was asked to address the statement in my letter of February 28, 1995, thus: "*How can this process "degrade...stabilized heavy metal salts?" (See Section 6.1). What happens to the metal atom or ion? I can understand degrading organic compounds to their components such as CHON, but am unsure of the application of this principle regarding metals.*" The FIFCO Response number 8 (repeated in Greg Brown's memo) did not address the question of what happens to the metal atom or ion? If, as I understand the FIFCO response, the "metal salts" will "be at acceptable levels by the end of the project", I still don't understand what happens to the metal ion? It seems that unless it is transformed (not likely) or mobilized to another location, it will remain in the soil and will yield the same analytical quantities since the soil (and water) analyses do not distinguish compounds ("salts"); in other words, lead sulfate may indeed be degraded to lead, sulfur and oxygen but the lead analysis will yield the same quantity of lead. How will the Navy use this to measure "success?"

COMMENT 32.

"The method of utilizing wells in this project to place the bacterial culture and/or culture media within the subsurface will likely subject the project to permitting under Department Rule, Chapter 62-528, F.A.C., Underground Injection Control. Project Management and the Navy should recognize this during these early decision stages of the project."

FIFCO RESPONSE:

FIFCO and/or EnGEN should be provided copies of Chapter 62-528 to insure that such compliance is conformed with. However, it should be noted that the term "injection" may be a misnomer relative to the actual application technique. Injection implies that the Bac-Terra^{TM}, BR-650, will be forced under pressure within the treatment area. However, all applications of Bac-Terra^{TM}, BR-650 will be accomplished by either gravity flow through application inlets to the piping gallery, or by pumping Bac-Terra^{TM}, BR-650 from the storage tanks into the inlet locations until the inlet fills. At which time pumping will stop until equilibrium is achieved or the required metering of Bac-Terra^{TM},

BR-650 per cubic yard is achieved. At no time will applications be made through the use of "pressure injection."

FDEP RESPONSE:

- As requested, a copy of Chapter of 62-528 is enclosed. Confusion regarding the term "injection well" is understandable; however, reference to 62-528.011 (3) (c) should confirm the applicability of the rule to both the former and the present Bac-Terra™, BR-650 application schemes. Because of the nature of the project, the permitting process should be relatively straightforward, however.

Because this is an engineering document that is intended to be placed in the public record, it should be signed and sealed by a Florida Registered Professional Engineer as specified in Chapter 471.025, Florida Statutes. I also want to echo Mr. Brown's general comments at the beginning of his memo and his summary comments in that this is a demonstration project being conducted on a RCRA SWMU. My hope is that the Navy, through the NELP program, continues to seek innovative methods to address contamination at its facilities by thoughtful and reasoned approaches. Effective project design and evaluation must rely on reliable data. I hope our comments are useful in that regard. I appreciate the opportunity to comment on this project. If you have questions or require further clarification, please contact me.

Sincerely,

James H. Cason, P.G.
Technical Review Section
Bureau of Waste Cleanup

cc: Cheryl Mitchell, NAVSTA Mayport
Jay Bassett, EPA Region IV, Atlanta
John Mitchell, FDEP Natural Resource Trustee
Satish Kastury, FDEP, Tallahassee
Ashwin Patel, FDEP Northeast District, Jacksonville
Jerry Young, City of Jacksonville

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