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GeoEnvironmental, Inc.

Engineers and
Scientists

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Environmental Management
Office of Compliance & Inspection

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Mr. David Chopy
Supervising Sanitary Engineer
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Re: Consent Agreement/Section C, Paragraph (4)(a)
In re: Charbert, Division of NFA Corp.
OC&I/FW/C99-0088; OC&I/WP/04-11; OC&I/SW/04-026; OC&I/ISDS/CI04-36;
OWM/SR/99-037; and OC&I/AIR/04-06

Dear Mr. Chopy:

GZA GeoEnvironmental, Inc. (GZA) submits this report on behalf of Charbert, Division of NFA Corp., pursuant to Section C, Paragraph (4)(a), of the above-referenced Consent Agreement.

This letter report summarizes the actions Charbert has taken to achieve compliance with Rhode Island Air Pollution Control Regulation No. 17, Odors. The report includes a summary of information developed by Charbert, its consultants and the RIDEM relative to odors associated with the facility's wastewater lagoons.

ACTIONS TAKEN REGARDING HYDROGEN SULFIDE

Residents living in the area of the Alton facility had made formal complaints to RIDEM concerning the occurrence of certain "rotten egg" like odors in the area of the Charbert facility, which were attributed to the generation of hydrogen sulfide in the facility's wastewater lagoons.

On May 14, 2004, RIDEM initiated operation of two continuous hydrogen sulfide monitors in the neighborhood adjacent to the Charbert facility. The monitors were located in sheds on the properties at 10 Woodville-Alton Road, across Alton Pond from the facility and at 16 River Street, adjacent to the Charbert facility.

On July 27, 2004, to reduce anaerobic degradation and thus reduce hydrogen sulfide formation by the infiltration lagoons, Charbert personnel installed a series of aerators within the lagoons. Daily measurements of dissolved oxygen from the aerated lagoons indicated that the devices were successful in increasing dissolved oxygen levels in the wastewater. The aerators were successful in reducing the hydrogen sulfide-like odors reported by area residents.



RIDEM's hydrogen sulfide monitors operated for 46 days in June and July before the aerators began operation. During that period, according to RIDEM, the monitors recorded hydrogen sulfide levels above 10 ppb during 38 days (83%) and above 30 ppb on 28 days (61%). During the 14 days after the aerators began operating, the monitors recorded hydrogen sulfide levels exceeding 10 ppb during only one period; when levels peaked at 29 ppb.

RIDEM reported that despite the occurrence of wind conditions that would have previously resulted in elevated hydrogen sulfide concentrations in the neighborhood, concentrations had remained low since the aerators began operating. With a few exceptions (during a day when one aerator malfunctioned), residents had not reported hydrogen sulfide odors since the aerator began operating.

ADDITIONAL ACTIONS REGARDING REPORTED "BURNT OIL" ODOR

After the aerators were installed, RIDEM received reports of a "burning oil odor" in early-August 2004. Despite numerous inspections and visits to the area, RIDEM did not document any violations associated with this odor.

In an effort to understand the source and cause of this "burnt oil" odor, Charbert retained the services of Odor Sciences and Engineering, Inc. (OS&E) and Trillium, Inc. (analytical testing laboratory). Their evaluation included the following activities:

- Completion of an odor survey;
- Collection of wastewater samples from the lagoons and air samples from above the lagoons for laboratory testing;
- Completion of dynamic dilution olfactometry analysis; and
- Performance of bench scale testing to evaluate measures that could be completed at the facility to control odors.

Through their field odor survey, OS&E identified "burnt oil/refinery" odors near the lagoons, and measured the rate at which those odors were emitted from aerated Lagoon 1. Laboratory testing by Trillium, Inc. revealed that sulfur compounds may be the source of these "burnt oil-like odors."

OS&E completed bench scale tests to ascertain the feasibility of odor suppression by raising the pH of the plant effluent. The results of the headspace test showed a well defined trend of decreasing odor levels with increasing pH. That is, after a pH of 9.7 Standard Units (SU), the odor stabilized at a level approximately 98% lower than an untreated lagoon liquid.



Based on these findings, and in an effort to control potential future odors, Charbert took steps to prepare for the implementation of the full-scale pH adjustment project in the spring of this year (2005). This pH adjustment plan involves raising the pH in the lagoons to about 10 SU through the addition of caustic soda to the lagoons. Charbert has purchased the necessary equipment and materials to implement this full-scale pH adjustment project. However, for the following reasons, Charbert has decided not to initiate the pH adjustment program at this time. First, monitoring of the lagoons has not resulted in the detection of hydrogen sulfide and no such odors have been identified since the implementation of the aerators. Second, no "burnt oil" odors have been reported since last fall. Third, the volume of water in the lagoons has been reduced and is expected to continue to decrease. All of these factors indicate that the lagoon odor issue is being effectively managed as outlined above. If conditions should change and the pH adjustment plan is needed, Charbert is ready to implement it. Charbert is committed to continue to aggressively manage the lagoon water levels and aeration system with continued monitoring for odors. If monitoring indicates that odors are starting to increase at the lagoons the pH adjustment program can be started in about 3 to 4 days time.

MANAGEMENT OF WASTEWATER

In the spring of this year, Charbert initiated an aggressive program to reduce the volume of wastewater discharged to and stored in the lagoons. The program involved both water saving measures in the plant and more aggressive management of the water in the lagoons. The lagoon management program was developed to maximize the rate of leaching from the lagoons in order to reduce the volume and residence time of water stored in the lagoons.

The most significant water savings measure instituted in the plant involved a change in the "boil out" procedure used to clean the dyeing equipment between dye lots. This has resulted in a water use savings of about 121,000 gallons over the seven week period since it has been in practice.

Charbert has also been successful in maintaining higher infiltration rates in the lagoons. This has resulted from the movement (through pumping) of the discharge water between the lagoons. The higher infiltration rate is caused by a maintaining higher surface water elevation in Lagoons 2 and 3, which have a higher infiltration rate compared to Lagoon 1.

A reduction in the volume of wastewater in the lagoons has increased the effectiveness of the aeration system as evidenced by an increase in the dissolved oxygen level in Lagoon 1. Lagoon 1 has historically had the lowest dissolved oxygen level, as it is the lagoon that first receives process wastewater. Because of this, Lagoon 1 is the lagoon with the greatest potential for generating hydrogen sulfide. Increasing the dissolved oxygen in Lagoon 1 has reduced the potential for the generation of hydrogen sulfide.

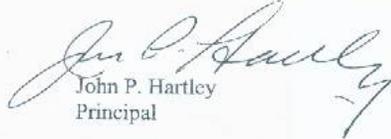


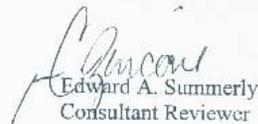
Wastewaters generated at the plant generally have a temperature of 150 degrees F. The increased effectiveness of the aeration system may have resulted in a net decrease in the lagoon water temperature. It has been suspected that an increase in water temperature could correlate to an increase in the anaerobic bacteria believed responsible for the generation of hydrogen sulfide. The impact on temperature from increased aeration efficiencies is difficult to evaluate due to the unusually warm ambient air temperatures presently being experienced.

Charbert is committed to maintaining these water management activities and is prepared to modify the measures as appropriate. Should you have any questions, please feel free to call us at 421-4140.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.


John P. Hartley
Principal


Edward A. Summerly
Consultant Reviewer

EAS/JPII:clz

cc: Mary Morgan, Town of Richmond
Clark Memorial Library