

Ms. Rose Mary Bagby  
Sewer Department  
City of Vicksburg  
4430 Rifle Range Road  
Vicksburg, Mississippi 39180

Subject:  
Discharge of Treated Water to City of Vicksburg WWTP  
Former Vicksburg Chemical Company  
Vicksburg, Mississippi

Dear Ms. Bagby:

ARCADIS in conjunction with the Mississippi Department of Environmental Quality (MDEQ) is planning for the cleaning and treatment of tanks and piping containing dinitrogen tetroxide ( $N_2O_4$ ) at the former Vicksburg Chemical Company (Site) located at 4280 Rifle Range Road in Vicksburg, Mississippi. The treatment process will include mixing the residual  $N_2O_4$  in the tanks with water to form nitric acid ( $HNO_3$ ). The  $HNO_3$  will then be neutralized with a solution of sodium hydroxide ( $NaOH$ ). The resulting treated solution will be containerized in a frac tank and tested. Upon receipt and confirmation of the test results, ARCADIS plans to discharge this treated water to the City of Vicksburg's waste water treatment plant (WWTP) collection system. According to the cleaning and treatment schedule, it is anticipated that this may occur as early as later this month.

Based on calculations conducted by ARCADIS, we anticipate the treated water to have a pH between 6 and 9 standard units with the following characteristics:

- Total volume: 12,125 gallons
- Sodium ( $Na$ ) concentration: 13,906 milligrams per liter (mg/L)
- Nitrite ( $NO_2^-$ ) concentration: 13,914 mg/L
- Nitrate ( $NO_3^-$ ) concentration: 18,752 mg/L
- Total Nitrogen concentration: 8,473 mg/L
- Total Dissolved Solids ( $Na^+ + NO_2^- + NO_3^-$ ) concentration: 46,571 mg/L

We do not expect to have any measurable Total Kjeldahl Nitrogen (TKN) concentrations due to the fact that no ammonia or organic nitrogen is input into or produced by the treatment process.

Imagine the result

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Our ref:  
LA002656.0001.00026  
MissBluffs/2656.1/C/12/egp

Because the treated water will be containerized, the flow rate of the treated water to the City of Vicksburg facility can be restricted to a flow rate acceptable to the WWTP. ARCADIS was informed that the WWTP receives a peak flow of approximately 4.5 million gallons per day (mgd), depending on the time of year. The highest flow rates are obtained primarily between the hours of 10 a.m. and 4 p.m.

Using the calculated concentrations and WWTP flow rate data, a second set of calculations were made to determine the incremental increase in the concentrations of each parameter caused by introduction of the treated water to the WWTP collection system. The following assumptions were made regarding the introduction of the treated water to the collection system:

- 1) The calculations to determine the increase in concentrations for each constituent would be made using a conservative WWTP flow rate of 2.5 mgd; and
- 2) Discharge to the WWTP collection system would only take place between the hours of 10 a.m. and 4 p.m.

The following table was populated based on the calculations made with the assumptions stated above:

Parameter	Frac Tank Concentration (mg/L)	WWTP Influent Flow Rate (mgd)	Flow Rate from Frac Tank to WWTP (gpm)	Incremental Increase in WWTP Influent Concentration (mg/L)	Number of Days to Discharge Total Volume of the Frac Tank <sup>1</sup> (days)
Sodium (Na)	13,906	2.5	10	80	3.6
Nitrite (NO <sub>2</sub> <sup>-</sup> )	13,914	2.5	10	80	3.6
Nitrate (NO <sub>3</sub> <sup>-</sup> )	18,752	2.5	10	107	3.6
Total Nitrogen	8,473	2.5	10	49	3.6
Total Dissolved Solids (Na <sup>+</sup> + NO <sub>2</sub> <sup>-</sup> + NO <sub>3</sub> <sup>-</sup> )	46,571	2.5	10	267	3.6

gpm Gallons per minute.  
mg/L Milligrams per liter.  
mgd Million gallons per day.

1 The number of days to empty the frac tank was calculated assuming that discharge would take place using the flow rate in the table and a 6-hour-per-day discharge interval as limited by the waste water treatment plant's 10 a.m. to 4 p.m. peak flow time interval.

The time to complete the discharge operations using the 10-gallon-per-minute (gpm) frac tank discharge flow rate is 3.6 days. It should be noted that a halving of the flow rate to 5 gpm would half the incremental concentration increase for each parameter; however, the time of discharge would double to 8 days.

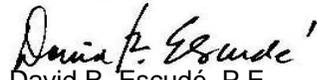
It should be noted that no water will be discharged to the WWTP without first sampling the frac tank. The calculations will be revisited at that time with the WWTP to determine the actual acceptable flow rates that will be allowed from the frac tank.

If the City of Vicksburg is agreeable to the introduction of the treated water to the WWTP, please provide written correspondence by letter or email to ARCADIS and/or MDEQ. The MDEQ contact for this project is Mr. Trey Hess. His contact information is included in the copy notation section of this letter. Please contact any of the undersigned at (225) 292-1004 if you have any questions regarding this letter.

Sincerely,

ARCADIS

  
Craig A. Derouen, P.E.  
Senior Engineer

  
David R. Escudé, P.E.  
Vice President/Principal Engineer

CAD:DRE:egp

Copies:

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