



Sota Instruments Inc.
PO Box 1269
Revelstoke, BC
VOE 2S0

December 16, 2001

Attention: Russell J Torlage

Re: Ozonator Testing

Dear Mr. Torlage

Maxxam Analytics was contacted to test the performance of a model WOZ3 ozonator used for water purification. The tests conducted were looking for oxides of nitrogen in ambient air, particulate matter and trace metals. The tests were conducted at Maxxam Analytics facility located in Edmonton Alberta. The purpose of the tests were to determine if oxides of nitrogen would create an acidic condition plus if particulate matter would contain any trace metals from degradation of internal components. All testing conducted involved ambient air samples only. None of the testing involved any water samples during this test period.

The equipment used to test for oxides of nitrogen were a Thermo Electron model 42 NOx analyzer, Dasibi model 5008 calibrator, certified Nitric Oxide standard and a Fluke model 83 digital volt meter. The particulate sampling used a Teflon filter holder, preweighed Teflon filter and analytical balance.

The analysis of oxides of nitrogen included calibrating the NOx analyzer to read the correct response. Ambient levels were determined and then the ozonated air from the ozonator was introduced to the ambient air monitoring sampling line. The analysis of particulate matter included taking a 1 hour, 8 hour and 24 hour sample. The ozonator airflow was passed over the filters to determine if any particulate matter was being collected and if the particulate matter contained any trace metals.

The sampling for oxides of nitrogen conducted during this test determined that the level of oxides of nitrogen did not change when ozone was introduced to the ambient sampling line. Ambient levels seen during the test period-included levels for nitric oxide and nitrogen dioxide. Nitric oxide levels recorded were on average 23 ppb during the test period. Nitrogen dioxide levels recorded during the test period were 2 ppb. Ambient levels were recorded for 20 minutes. Ozone from the ozonator was introduced to sample from a tee in the sampling line. Levels of nitric oxide decreased to 0 ppb and nitrogen dioxide levels increased to 25 ppb. These were recorded for 20 minutes.

The particulate sampling was then conducted after the oxides of nitrogen sampling. The ozonator line was connected to a Teflon filter holder containing a pre-weighed Teflon filter element. Three samples were collected over a 3-day period. The ozonator was



turned on and run for a 1-hour test period. The filter element collected and weighed. A second pre-weighed filter element was installed and the ozonator was run for an 8-hour test period. The filter element was collected and weighed. The third pre-weighed filter element was installed and run for a 24-hour period. The filter element was collected and weighed. In all three tests the filter showed no recorded particulate matter on the filters tested. As a result no trace metal analysis was conducted at this time.

In summary ambient levels seen prior to testing were normal under our laboratory conditions. The addition of ozone to the sample converted all nitric oxide to nitrogen dioxide. With the levels of oxides of nitrogen present during sampling, NO in equals NO₂ out. No nitric acid testing was conducted based on this observation. Conversations with the manufacturer indicated that the water would be passed through the ozonator system so no water would stand. If a standing water situation occurred then an acidic condition could occur.

Particulate sampling was conducted in a clean room for all three tests. Only minimal amounts of particulate matter were collected during the three tests. As a result of these findings and with the volume of air sampled during each run Maxxam would not be able to reach the detection limits for trace metal analysis. Therefore no trace metal analysis was done on the particulate runs. With the new unit supplied for testing purposes it is possible no signs of metal degradation will be seen. Further testing on a unit that has several hours of continuous use may provide different results. Please review the attachments for complete testing results.

Sincerely

A handwritten signature in black ink, appearing to read "Allan Clark".

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