

~~M E M O R A N D U M~~

Office of Environmental Research and Standards
State Water Control Board

2111 N. Hamilton Street P. O. Box 11143 Richmond, Virginia 23230

SUBJECT: Gold Mining Activities - Potential Mercury Contamination
X-trib to Wilderness Run, Orange Co.

TO: Tom Felvey

FROM: Mike Shelor

DATE: June 10, 1988

COPIES: W.L. Woodfin, A.J. Anthony, W. Gregory, R.A. Gregory, G.N. Moore



This memo is to briefly summarize my visit to the above site. I met with Gary Moore, Greg Brown and Jan Pickrel of NRO and Richard Runion, the "miner", on May 10, 1988. The location was the old Vaucluse Mine area. The tailings from gold mining processes were deposited in a 60ft. deep pit located in the streambed of the current X-trib. The pit has completely silted in over the years and now appears as a very shallow (1-2 ft. deep) beaver pond. The stream below this pond was composed of a series of smaller beaver ponds and small (1 meter width), slow flowing channels that had been heavily disturbed by recent mining activities. NRO collected a sediment sample here.

Mr. Runion then demonstrated his portable dredge/sluice. The location of the demo was roughly 100 meters downstream of the above area at a road crossing. His equipment basically "vacuums" the stream sediment into a floating sluice and discharges it back to the stream. I placed my aquatic dip net at the discharge and collected sand, detritus, leaves, and a few benthic macroinvertebrates. This area had obviously been "cleaned" by this equipment before as the substrate had a very sterile appearance and only a few macroinvertebrates were collected. The discharge causes extremely turbid conditions downstream. NRO also collected a sediment sample immediately below this site.

A site on another unnamed trib revealed a small stream cobble dam that Mr. Runion admitted to having constructed. The pool behind the dam had also been dredged as had other natural pools in this tributary.

All of the stream segments and associated riparian vegetation in the area appeared disturbed and Mr. Runion informed us that as many as 70 persons (estimated) had visited the area on weekends. However, most of these used less sophisticated manual methods for collecting the sediment.

I actually saw no globules of mercury in any of the areas we looked at. I did see flecks of gold during Mr. Runion's panning process and the particles would appear to vanish as they were coated by the mercury at which point I couldn't distinguish them from the rest of the substrate particles. He also showed us some larger nuggets that had been collected earlier that were covered with a dull silver or

solder-like coating. At this point in time I see a real problem with stream substrate disturbance and habitat destruction. Gary Moore has received a preliminary indication that sediment mercury levels below the demo site were elevated. I am planning to collect fish for tissue analysis at a few stations to determine if a problem exists in the downstream ecosystem. I hope to accomplish this next week.

Mr. Runion has provided me with a copy of his proposal. If you would like to review it just let me know.

Copy to
Gene Disanna

FYL

FOR YOUR INFORMATION:

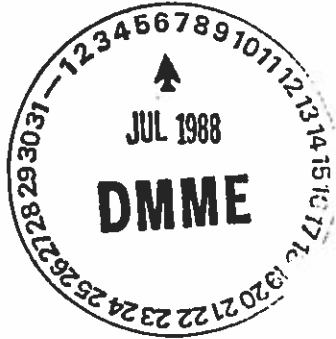
ALLEN BISHOP
JOE HITE
BOB MORGAN



COMMONWEALTH of VIRGINIA

STATE WATER CONTROL BOARD
2111 Hamilton Street

JUL 5 1988



Richard N. Burton
Executive Director

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Mr. Anthony I. Hooper
City Manager
City of Fredericksburg
P. O. Box 7447
Fredericksburg, Virginia 22404-7447

Dear Mr. Hooper:

Thank you very much for your letter dated June 14, 1988 expressing the City's concern over the presence of mercury in tributaries to the Rappahannock River. I am also very concerned about this situation and the possibility of similar occurrences state-wide.

We have been evaluating appropriate sites for collecting water, sediment, and fish samples for mercury analyses. Information regarding historical gold mining activities has been received from the Department of Mines, Minerals and Energy. This information will be used to determine the extent of mercury contamination downstream from a given site.

I appreciate the historical information from Mr. Hodge included with your letter. This information will be of use in determining the scope of our activities this summer. We are investigating the possibility of gathering samples from the Embrey Dam area as well as at other sites throughout the basin. I would encourage the City to collect and analyze water samples near the water supply intake. This will provide you with important information relative to the presence of mercury in this area.

To date, we have sediment results from streams in the vicinity of the Vaucluse Mine site and have completed the collection of fish tissue samples from Wilderness Run and the

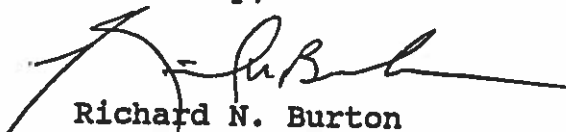
Mr. Anthony I. Hooper
Page Two

Rapidan River. Additional sediment samples will also be collected at several mine sites suggested by the Department of Mines, Minerals and Energy.

We have also completed a review of historical monitoring data for mercury in water, sediment and fish tissue in the Rappahannock Basin. Results of this review were encouraging as there was no pattern of widespread mercury contamination in the Basin. However, we will need the results of our current sampling program before reaching definite conclusions.

Again, thank you for expressing the City's concern about this problem. Please contact us if you have questions, or if you become aware of information which may assist us in our studies.

Sincerely,



Richard N. Burton
Executive Director

/fd

bcc: Mr. Gene Dishner - DMME



CITY OF FREDERICKSBURG

VIRGINIA

14 June 1988

ANTHONY I. HOOPER
CITY MANAGER
P.O. BOX 7447
FREDERICKSBURG, VA 22404-7447

AREA CODE 703
373-5011

Mr. Richard N. Burton
Executive Director
State Water Control Board
P. O. Box 11143
Richmond, VA 23230



Dear Mr. Burton:

On behalf of the City Council and the citizens of Fredericksburg, I am writing to express the City's deep concern over recent indications of the presence of potentially dangerous concentrations of mercury in streams tributary to the Rappahannock River. Because of the City's interest in the preservation and protection of the Rappahannock River, its tributaries, and the Chesapeake Bay and given the fact that the City's water supply is taken from the Rappahannock River, the City is profoundly concerned about this contamination.

The City is aware that the Board's staff has reacted quickly in attempting to assess the extent and magnitude of the mercury contamination by collecting various samples in the Wilderness Run area. This prompt response is recognized and is appreciated.

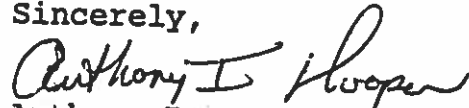
The origin of the mercury was the loss of mercury in the gold mining activities that existed in Orange, Culpeper, Fauquier, Stafford, and Spotsylvania counties. Since Gold was mined and extracted using the amalgamation process in these counties, the City requests that the Board include these counties in an expanded and intensive mercury investigation. We have attached photocopies of information supplied by Mr. Robert A. Hodge, a local historian, which should assist you in determining the locations of gold mines.

In addition, because of the vulnerability of the City's water supply, the City requests that a more frequent program of mercury sampling be established for the Rappahannock River from Embrey Dam to the confluence of the Rapidan and Rappahanock Rivers. Among the questions that such a program would answer are: what levels of mercury does the sediment behind Embrey Dam contain, do mercury concentrations in sediments or in the water column change with the season of the year or with the flow of the river, and how serious is the threat to the City's water supply.

Mr. Richard N. Burton
Page 2
14 June 1988

The City is confident that the Board will proceed expeditiously in a comprehensive investigation and abatement of this serious contamination. If the City can be of any assistance to the board in this matter please contact us.

Sincerely,


Anthony I. Hooper
City Manager

cc: Chairmen of Boards of Supervisors for
Orange County
Culpeper County
Fauquier County
Stafford County
Spotsylvania County



COMMONWEALTH of VIRGINIA

STATE WATER CONTROL BOARD

2111 N. Hamilton Street

Richard N. Burton
Executive Director

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March 20, 1990

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William Roller
Virginia Division of Minerals and Mining
P.O. Box 4499
Lynchburg, Virginia 24502
(804) 239-0602

Mr. Roller:

We have completed the data retrieval and review that you requested on March 16, 1990. In this request, you indicated that you needed information from the Rapidan River and Wilderness Run. Specifically, you wanted any data from VWCB water column, sediment, and fish tissue samples collected in these areas and analyzed for mercury. You also requested that we give you an interpretation of these data based on their comparison to available criteria, standards, and/or action levels.

The data that we used for this review were from two sources. First, a STORET retrieval of all mercury data collected at VWCB ambient monitoring stations in these areas was performed. The STORET printout is enclosed. Secondly, we obtained the data from a special study that was performed in this area in 1988. This special study was conducted in response to concern about historic gold mining sites in the area.

For assessment of the data we used EPA acute and chronic freshwater criteria, the Virginia freshwater standard, VWCB action level for mercury in sediment, the VWCB action level for mercury in fish tissue, and the FDA action level for mercury in fish tissue. Also, we used cumulative frequency distributions of the occurrence of mercury in water, sediment, and fish tissue. The use of these distributions is explained later.

STORET Data

Only two of seventy one water column samples collected from the Rapidan River over the past fifteen years had mercury levels above the analytical detection limit. These data exceeded EPA chronic and acute criteria, and violated the Virginia standard for mercury in

water. Both of these samples were collected at river mile 6.53, and they were both measured over six years ago. The most recent datum from this station (collected in October 1989) had a mercury level below the analytical detection limit.

There are fifteen observations of total mercury in sediment samples collected from the Rapidan River. Six of these observations were above the analytical detection limit. None of these samples had levels of mercury above the VWCB action level for mercury in sediment.

There are no fish tissue data in the STORET data base from the Rapidan River or from Wilderness Run.

Special Study Data - Vaucluse Mine Site

Two sediment samples were analyzed for the presence of total mercury. Mercury levels were 0.3 mg/kg dry weight and 2.90 mg/kg dry weight. Both exceeded the Virginia action level of 0.3 ppm mercury in sediment. Accordingly, fish tissue samples were collected from streams at the Vaucluse site.

A total of six fish tissue composites were analyzed for the presence of total mercury. Two composites (one each: whole body of a bottom dwelling species and edible fillet of a predator species) were taken from the Rapidan River, Wilderness Run, and Rappahannock River. Analyses were (all results are total mercury, mg/kg; wet weight):

1. Rapidan River below Wilderness Run confluence
 - sucker composite (whole fish) 0.08 mg/kg
 - rockbass/sunfish composite (edible fillets) 0.11 mg/kg
2. Wilderness Run
 - sucker composite (whole fish) 0.05 mg/kg
 - rockbass composite (edible fillets) 0.47 mg/kg
3. Rappahannock River
 - Smallmouth bass (edible fillets) < D.L. (0.05 mg/kg)
 - Smallmouth bass (edible fillets) 0.12 mg/kg

All results were below the FDA action level for methylmercury in edible fillet fish tissue (1.00 mg/kg wet weight), the Virginia action level for mercury in edible fillet fish tissue (0.75 mg/kg wet weight), and the EPA criterion for the protection of aquatic predators (0.50 ppm wet weight; whole fish analysis). However, mercury levels in predator species were above normal "background" levels for mercury in fish tissue. One composite of rockbass edible fillets had a mercury level that was very close to the EPA criterion for the protection of aquatic predators. It appears that environmental mercury in this aquatic system is entering the aquatic food chain. I wish to emphasize that at the time these samples were collected, mercury concentrations in fish tissue samples were below levels considered damaging to the environment.

I have also included a copy of a literature review from a document we produced last year. The project was a review of selected toxic substance data collected by the VWCB and stored in the EPA STORET data base. The final report included a literature review, statistical analyses of toxics data, and identification of potential problem areas based on these. The literature review enclosed contains information on the uses, basic chemistry, environmental chemistry, toxicity, and criteria, standards, and action levels for mercury in water, sediment, and fish tissue. During the course of the statistical analyses, we generated cumulative frequency distributions of the occurrence of mercury in water column, fish tissue, and sediment samples collected by the VWCB. We used these to identify areas where toxic substance levels were elevated (relative to data collected around the state). This information might be helpful to you. Also, we used the cumulative frequency distributions to determine that one of the fish tissue analyses from Wilderness Run was comparatively elevated.

In closing, we remain concerned about elevated levels of mercury in the stream sediments at the Vauclose site, and the possible impact on mercury fish tissue levels. In particular, we are concerned about any site disturbance that would render the mercury more available to the aquatic ecosystem.

I hope that this will help you. If you have any questions or additional information requests I can be contacted at (804) 367-6306.

Sincerely,

Ronald A. Gregory
Ronald A. Gregory
Environmental Program Manager

Consultant on Mercury - Ralph Boligiano
703-828-2595