

ATLANTIC

ENVIRONMENTAL SERVICES, INC.

engineers
geologists
scientists

January 26, 1993

Mr. Andrew Miniuks
Geologist
United States Environmental
Protection Agency
Region I
Federal Facilities Superfund Section
JFK Federal Building
Boston, MA 02203-2211

RE: Comments Regarding Draft Plan of Action
October 1992 Investigation of Boron in Ground Water
Atlantic Project No.: 1256-22-02

Dear Mr. Miniuks:

This letter was prepared on behalf of the Navy in response to your comments of November 20, 1992 regarding the boron investigation in the Draft Plan of Action, October 1992. Presently, personnel at the Naval Submarine Base - New London are investigating present and historical management procedures for boron containing material. When the investigation is complete, you will be informed of the findings. This investigation is proceeding even though boron does not appear to be present in residential well water.

Regarding the boron analytical issue, enclosed is a letter from NET Cambridge Division describing the erroneous boron results from previous analyses. The erroneous measurements were due to sulfur interference. To further verify that boron is not present in residential wells, the Navy plans to perform quarterly sampling for one year in 20 to 30 residential wells. The Navy will provide USEPA and CTDEP with a two-week notification of all sampling activities to allow collection of split samples. At the end of the four quarters of sampling, a technical memorandum will be provided for your and other TRC members' review and comment. This technical memorandum will summarize the data collected and will either make a recommendation for no further action, or to implement some or all of the boron investigation sections in the Plan of Action, if boron appears to present a hazard.

In regard to your specific comments, the following responses are provided:

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- Comment 1:** As stated above, an investigation of boron usage is being conducted. Any significant storage or disposal areas will be shown on Plate 4-1, Proposed Monitoring Well Location Map.
- Comment 2:** The existing work plan does provide rationale for monitoring well locations. Specifically, Table 4-2 and Sections 4.2.1.1 through 4.2.1.5 provide the rationale for monitor well locations and screen depth. If it is determined, based upon quarterly monitoring of residential wells, that the boron investigation or portions thereof should be implemented, the location and depth of all proposed wells will be re-evaluated in light of any identified boron storage or disposal areas.
- Comment 3:** As stated previously, Subase personnel are investigating boron usage at the Subase. No analysis of waste or virgin boron-containing materials is proposed at this time. If it is determined after a year of residential well monitoring that the boron investigation should proceed, this comment will be re-evaluated.
- Comment 4:** The problem has been corrected as described in the enclosed letter from NET Cambridge Division.
- Comment 5:** The Navy will provide two weeks notification to the EPA prior to the next sampling of residential wells.
- Comment 6:** Due to the uniformity of existing data and as the existing boron analytical data is believed to be erroneous, contouring would not be meaningful in our opinion at this time. The November 1992 Phase II RI Work Plan contains the Navy's most recent proposal to define ground water flow directions in Area A. Any discussions regarding flow direction are more appropriate during review of this document.
- Comment 7:** The Navy agrees and all background soil samples will be collected from locations unaffected by Subase operations. During our site visit of December 2, 1992, you observed the proposed sample locations and, as we discussed at that time, all of them appeared to be in undisturbed areas.
- Comment 8:** This comment appears to be more relevant to the preliminary assessment regarding radiological issues to be performed by NAVC as specified in the proposed FFA. As such, it is more appropriate that NAVC address this comment as part of the preliminary assessment.

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Should you have any questions, please feel free to contact me or Paul Burgess.

Sincerely,

ATLANTIC ENVIRONMENTAL
SERVICES, INC.



Barry L. Giroux
Project Manager



Paul Burgess, P.E.
Principal

BLG/PB:sr
Enclosures

cc: D. Stockdale
B. Mansfield

ATLANTIC



NATIONAL
ENVIRONMENTAL
TESTING, INC.

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December 14, 1992

Mr. Barry Giroux
Atlantic Environmental Services, Inc.
188 Norwich Avenue
Colchester, CT 06415

RE: Analysis of Boron for the New London Sub Base, Groton, CT.

Dear Barry:

We believe we have reached resolution on the issue of the accuracy of sample analysis from the Sub Base site for Boron. Due to the design of our Inductively Coupled Plasma (ICP) spectrometer, the presence of sulfur (S) in your samples was measured as boron (B). This was a spectral interference where all quality control measures performed during the analysis for boron were acceptable. This design flaw was discovered through the cooperation of our instrument manufacturer as well as the efforts of Atlantic Environmental and an industrial client of NET in the Boston area.

You have been working with us since August to determine the accuracy of the boron analyses. Per your requests we double and triple checked all calculations, dilutions, blanks, spikes, duplicates, laboratory control standards, calibrations and potential laboratory contamination sources. As we stated in our letter of September 8, all quality control indicators were acceptable, and no error in the analysis for boron was found. The boron analyses met the acceptance standards of EPA Method 200.7, the EPA CLP methods and the Navy's NEESA program.

Subsequent to this, additional samples were collected at the Sub Base and analyzed for boron by other laboratories. These data were substantially lower in concentration than those reported by NET. At the same time, one of our industrial clients was also discovering differences in boron data between NET and another laboratory. We were able to determine that the boron emission wavelength used by NET and the other laboratories were substantially different, and potentially the source of an interference.

At this point, NET submitted split digestates of the industrial effluent to our instrument manufacturer for broad scan analysis. The manufacturer indicated that the samples had significant concentrations of sulfur species. In addition, we were informed that sulfur has a significant emission within the 182 nm window where our instrument measures boron. This was the first information that we had regarding this possible interference.





Sulfur is not routinely analyzed by ICP. In fact, the literature reference which we use, "Inductively Coupled Plasma-Atomic Emission Spectroscopy, An Atlas of Spectral Information", R.K.Winge, V.A. Fassel, V.J. Peterson, and M.A. Floyd, does not address the spectral characteristics of sulfur.

Elements and/or other constituents which have coincidental emissions in the window for the analyte of interest have the potential to make contributions to the reading of the subject analyte. In the case of sulfur, as it influences boron (at 182.568 nm) the contribution is such that a 100 ppm S will read as 41 ppm B. Our instrument was measuring both boron and sulfur. In those sample and QC analyses with only boron, the analysis was accurate. Likewise for those samples with neither boron nor sulfur the analysis was correct. But for samples with both boron and sulfur, the concentration of both elements was measured and reported as though it were just boron. The EPA required interference check sample which is designed to account for interelement interference does not include sulfur.

NET Cambridge has been performing the analysis of boron by means of simultaneous ICP since March 1990. The instrument which we are utilizing is the Jobin-Yvon Instruments SA50. The focal curve was constructed with a fixed emission wavelength of 182.568 nm for the determination of boron.

Upon initial validation of the instrument and prior to the analysis of samples, this wavelength was checked for interelement interferences. Interelement corrections for B (Al, Ca, Cr, Fe, Mg, and V) were determined and placed in the method file. During the analytical calculation performed by the instrument, these corrections are applied to the raw counts for the analyte. After initial calibration and prior to sample analyses, verification of interelement corrections (IECs) is performed during each sample analytical run by means of an EPA Interference Check Sample (ICS). If the ICS is not within the acceptable window the analytical run is halted until recalibration and/or adjustment of IECs is performed.

In the environmental chemistry community, the adherence to established EPA methods, the rigorous application of QC measurements and the successful analysis of outside performance evaluation samples typically produces reliable data. The situation we encountered with boron goes against this assumption. This situation was not addressed in the analytical methods, by the laboratory certification inspections nor by the instrument manufacturer.



We have checked to determine if sulfur interferes with any other element on our ICP spectrometer. We have determined that concentrations of sulfur from 5 to 500 ppm do not interfere with any other element we measure by ICP. We strongly believe that the only element effected is boron, and that all other data produced by NET are reliable.

The ICP manufacturer has just completed the field installation of a new boron analysis channel on our instrument. This channel uses the 249.68 emission wavelength which is not effected by sulfur interference. We are still in the process of determining our method detection limit, but believe it will be below 0.050 ppm for this new channel. We are confident that our laboratory can now analyze for boron in samples containing sulfur with a high level of accuracy.

We apologize for the inconvenience and concern that this technical difficulty has caused Atlantic Environmental and the Navy. If we can offer you any further information or support, please do not hesitate to call us.

Sincerely,

A handwritten signature in cursive script, reading "Edward A. Lawler".

Edward A. Lawler
Director of Project Management

cc:

- Dr. Michael Delaney, NET Cambridge
- Ms. Dianne Rossi, NET Cambridge
- Mr. D. Wesley Miller, NET Cambridge
- Dr. Marilyn Melton, NET Corporate
- Mr. William Mansfield, Commanding Officer, Naval Submarine Base,
New London
- Ms. Deborah Stockdale, Northern Division, Naval Facilities
Engineering Command