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A Proposed Interim Standard for Plutonium in Soils

los alamos
scientific laboratory
of the University of California
LOS ALAMOS, NEW MEXICO 87544

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A Proposed Interim Standard for Plutonium in Soils

by

J. W. Healy

This work supported by the US Atomic Energy Commission's Division of Operational Safety.

A PROPOSED INTERIM STANDARD FOR PLUTONIUM IN SOILS

by

J. W. Healy

ABSTRACT

Current standards for controlling health effects from plutonium in the body are discussed. Available information on possible sources of exposure of people living in an area where the soils are contaminated with plutonium is analyzed to arrive at estimates of intake. From these estimates, a recommended interim standard for the upper limit of concentration of plutonium in the soils in inhabited areas is derived. The recommendation is based upon conservative assumptions where information is lacking and further studies should result in revision. The subjects of resuspension, deposition velocity of particles and effectiveness of radioactive particulates in producing lung cancer are discussed in appendices.

I. INTRODUCTION

Plutonium has been utilized and processed in relatively large quantities (hundreds to thousands of kilograms total) in several different countries over the past three decades. It now can be found in small quantities in soils and oceans over the entire world as a result of widespread dissemination from nuclear weapons tests in the atmosphere and one burn-up of a space nuclear power generator containing ^{238}Pu. More localized distributions are found in the immediate vicinity of facilities used for processing plutonium, at the locale of several accidents involving weapons containing plutonium, and in remote areas which were used for safety tests with weapons. In each of these areas, some measure of potential hazard is necessary to enable adequate decisions as to future disposition of the area or any special considerations on habitation or land use restrictions. Thus, it is necessary to have some indication of the degree of hazard associated with various levels of plutonium so that such decisions can be adequately based.

The following study was commissioned by the Division of Operational Safety of the U. S. Atomic Energy Commission to provide an interim or provisional standard for plutonium in the soil to meet this need. It was recognized that the problem of establishing such a standard is very complex due to the many potential mechanisms of exposure from this source and that the data available for detailed definition of the problem are inadequate. However, the necessity of making decisions on acceptable levels requires that some guidance be made available for comparison with measurements made in potentially contaminated areas. To answer this need, it was decided to apply the information now available and to arrive at a standard which, while overly conservative from a hazard

standpoint, would give some guidance in making these decisions. At the same time, it was felt that such a study would permit assessment of the information available so that future research and development programs could be more effectively aimed at the areas of greatest uncertainty.

It is stressed that a conscious effort has been made to err on the conservative side in view of the many uncertainties. (In this case, the conservative side is defined as the over-estimation of exposure from the plutonium in the soils.) In addition, the depth of investigation and the conditions considered have been limited in a number of possibly important areas in an attempt to arrive at some guidance as soon as possible. For these reasons, it is urged that the numerical values derived herein be regarded as truly provisional and not be incorporated into rules and regulations which are difficult to change. It is anticipated that changes in the numbers, and perhaps the concepts, will be forthcoming from future work.

In the derivation of the numerical guidance, we have considered primarily considerations of health and hazard to man. In recent years there has been a tendency to derive such standards based upon the practicality of achievement rather than upon effects on health. While such standards have their rightful place in providing control of sources of pollution, there is a tendency to regard them as safety standards so that exceeding them becomes a matter of great concern. It is also of importance, even on the practicality basis, that an upper limit be clearly established, as based on safety, so that one can assure that the practical limits are, indeed, safe, and that the additional margin of safety attained by lower limits can be assessed in comparison to the costs in resources and manpower of achieving them. With this philosophy we have not provided two standards, one for control of sources on a continuing basis and one for the application of countermeasures in an area already contaminated, although such considerations are appropriate to any safety program and in the application of a standard such as the one derived here. Again, as better information becomes available and we reach a stage where intelligent and informed assessment of actual risks at various levels of plutonium in the soils are possible, such considerations will be included.

Supplemental information on several items not covered in detail in the literature are given in appendices. These include a model for calculating resuspension of particulates in Appendix A, a treatment of the deposition velocity for particles in Appendix B, and a discussion of the effectiveness of radioactive particles in producing lung cancer in Appendix C.

II. PLUTONIUM STANDARDS

A. Properties

Plutonium is not a simple material. It is a man-made element in which the isotopic composition, and thus, the radioactive properties, vary widely depending upon the history of its production and any subsequent neutron exposure as a reactor fuel or in a detonation. There is increasing evidence that the metabolic behavior and, in some situations, the gross chemical behavior may vary with specific activity of the isotope probably because of the influence of the energy emitted as radiation as well as mass effects. The isotopic compositions of several typical mixtures are given in Table I.

The compositions given in Table I are illustrative rather than definitive with wide variations possible, particularly in the materials used for power fuels. The low irradiation material is reasonably representative of that used in the weapons programs of the AEC which has utilized a large fraction of the plutonium produced in the past.

Since the isotopes of plutonium are primarily alpha emitters with little accompanying penetrating radiations, the hazard associated with plutonium is almost completely due to potential intake into the body. Plutonium-241 is a beta emitter but,

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QUALITY ASSURANCE FOR HEALTH AND ENVIRONMENTAL CHEMISTRY: 1988

by

Margaret A. Gautier, Ernest S. Gladney, MaryBeth Phillips, and Bryan T. O'Malley

ABSTRACT

This report documents the continuing quality assurance efforts of the Health and Environmental Chemistry Group (HSE-9) at the Los Alamos National Laboratory. The philosophy, methodology, computing resources, and laboratory information management system used by the quality assurance program to encompass the diversity of analytical chemistry practiced in the group are described. Included in the report are all quality assurance reference materials used, along with their certified or consensus concentrations, and all analytical chemistry quality assurance measurements made by HSE-9 during 1988.

I. INTRODUCTION

The analytical chemistry activities in HSE-9 are diverse and encompass industrial hygiene, environmental surveillance and compliance, bioassay, industrial waste-water, and U.S. Transuranium Registry (USTR) tissue studies. This report is the fifth in an annual series from the Health and Environmental Chemistry Group (HSE-9) of the Health, Safety, and Environment (HSE) Division and succeeds those issued previously by the Environmental Surveillance Group.[1]

The mission of our group at the Los Alamos National Laboratory is to provide qualitative and quantitative analytical data to health physicists, industrial hygienists, environmental surveillance scientists, environmental compliance managers, epidemiologists, waste managers, and waste treatment plant operators. These data describe concentrations of materials in samples submitted for analysis. Incorrect results may lead to erroneous interpretation by management or operations personnel, which could adversely affect the health and safety of exposed personnel or could affect Laboratory compliance with environmental and waste disposal regulations.

One of the fundamental responsibilities of HSE-9 management is to maintain a continuing program to ensure the reliability and validity of analytical laboratory data. The quality assurance (QA) program addresses small, single-investigator projects (in which one person conducts all sampling, analytical, and interpretive functions) through large-scale facilities-monitoring programs requiring year-to-year continuity. Our philosophy is that a QA program should apply to all aspects of sample and information management. The program should begin at the conception of a project, follow through collection and storage of

samples before analysis, include all phases of chemical and physical analyses, extend through interpretation, data entry into the HSE-9 laboratory information management system (LIMS), and culminate with the final reporting of results.

We use two concepts in our QA program to provide confidence in each analytical result reported by our laboratory: quality control (QC), the mechanism established to control errors, and quality assessment, the system used to verify that our entire analytical process is operating within limits we consider acceptable.

We strive to include the following elements in our QC program: (1) development of and adherence to principles of good laboratory practice, (2) consistent use of standard operating procedures, and (3) establishment of and adherence to carefully designed protocols for specific analytical processes. Consistent use of qualified personnel, reliable and well-maintained equipment, appropriate calibrations and standards, and close supervision of all operations are primary components of our QC system. Proper conception and execution of this QC program have resulted in our analytical system operating in a state of control, in which errors are within acceptable levels and are characterized statistically.

Quality assessment describes the techniques we use to assess the quality of our analytical process. We have established a system of control charts, which are plots of multiple data points from the same or similar samples versus time. These charts are used to determine if our system is in a state of statistical control and to visualize and monitor the relative variability of repetitive data. These control charts are also used with reference materials and spiked samples to assess the accuracy of our measurements. These concepts are further discussed by Keith et al.[2] A complete listing of definitions of terms, acronyms, and abbreviations used in this report along with standard quality assurance and statistical terms used routinely by HSE-9 is given in App. A. This listing was compiled from the U.S. Environmental Protection Agency (EPA), the National Institute of Standards and Technology (NIST), formerly the National Bureau of Standards (NBS), and the Department of Energy (DOE).[3-5]

II. ANALYTICAL QUALITY ASSURANCE PHILOSOPHY

Our approach is based firmly on the concept of traceability through concurrent analysis of matrix-based certified QA materials. Traceability is a hierarchical system developed largely for regulatory purposes whereby transfer of accuracy among various components or institutions of a measurement system is established. Uriano and Gravatt[6] have examined this concept in detail. Taylor[7,8] has recently pointed out that this process has its limitations because the achievement of an acceptable result on a reference material does not guarantee a unique foundation for the result. Traceability may more often be based on inference than on firmly established scientific fact.

Laboratory policy[9] is to maintain traceability to NIST, which in turn maintains traceability to international metrology standards where applicable. We cannot achieve this traceability in all cases because NIST has limited resources for certification of matrix-based standard reference materials (SRMs) for as many elements and compounds as we need to measure. This restraint has lead us in two directions.

First, we have a large library of reference materials from other national and international agencies [EPA, U.S. Geological Survey (USGS), DOE Environmental Measurements Laboratory (EML), Canadian Geological Survey (CGS), Canadian Certified Reference Materials Project (CCRMP), International Atomic Energy Agency (IAEA), Centre de Recherces Petrographiques et Geochimiques, and the Japanese Geological Survey] in addition to the available NIST biological and environmental SRMs. Secondary QC materials are prepared in-house. All reference materials were reinventoried this year and were organized by agency (for example, NIST, USGS, IAEA, EPA, etc.) to facilitate retrieval of the

materials. Data bases were then updated to more accurately reflect our supply of reference materials.

Second, we continue to compile all available literature data on these reference materials so that consensus values for constituent concentrations that are not agency certified may be developed. We have over 300 reference materials, some of which have certified or consensus values for as many as 80 constituents. Using VAX Datatrieve software, we have created two data bases, SRMS and REFS, to permit random collection of literature data on reference materials. At any time, this collection may be sorted as a function of any logical combination of parameters and printed for our determination of a consensus value. This process is described in detail in the references.[10-22]

Some agencies recommend that splitting and analysis of duplicates on 5% of the samples are sufficient QA. We believe that this approach is inadequate, providing at best only an assessment of precision, not accuracy. Our alternative is concurrent analysis of reference materials of similar matrix with every batch of samples. In this fashion, both precision and accuracy may be assessed, and traceability to a national standards laboratory is maintained. Because the compositional properties of these reference materials simulate those of the sample routinely measured, their correct measurement can imply correct measurement of routine samples. If sufficient quantities of reference materials are not available, we develop as many of our own secondary materials, traceable to agency reference materials, as possible. Participation in intercomparison studies is a necessary but not sufficient component of our QA program because these samples appear too infrequently to ensure that day-to-day control is maintained. We strive to run a minimum of 10% of all analyses as matrix-based QA reference materials. For some determinations (for example, isotopic plutonium on silicates), this level of QA has proved to be prohibitively expensive.

Certain agencies are attempting to legislate QA through promulgation of analytical methods regulations, through licensing requirements for analysts, and through laboratory certification programs. The rapid pace of technological change in chemical instrumentation, the wide variety of sample matrices, and the broad dispersion of procedures throughout the literature make it difficult to establish a definitive method for any given determination that is not soon outdated. Licensing and certification address the qualifications of personnel and the adequacy of facilities on an infrequent basis at best, but they do not address the day-to-day data quality. A preferable alternative to the legislative approach to QA management is the development and implementation of a detailed, yet flexible QA program. This program permits each laboratory to use its existing expertise and facilities, to employ a variety of methods in the solution of ever-changing problems, and to encourage continuing innovation and adoption of the latest technology.

III. QUALITY ASSURANCE OBJECTIVES AND POLICIES

The purpose of the analytical QA program in HSE-9 is to continually monitor the scientific reliability (accuracy and precision) of reported laboratory data that are generated for use in HSE Division activities related to health and the environment. These data are also used by other organizations both within and outside the Laboratory.

Specific QA program objectives are (1) to assess the capabilities of analytical methods for meeting users' needs regarding precision, accuracy, sensitivity, and specificity; (2) to establish and monitor the routine operational performance of our laboratory through appropriate systems checks for ensuring that all aspects of the QA program are operative; (3) to run performance audits of blind standard samples for evaluation of our laboratory and to participate in collaborative test programs with peer laboratories for achieving and maintaining consistent and uniform levels of

quality; and (4) to perform corrective actions as necessary.

A. QA Program Policies.

1. *Frequency of QC.* Quality control materials will be a minimum of 10% of all analyses. QC materials will be run with each batch and will include reagent blanks or samples that represent an appropriate blank. Bench level QC is the responsibility of each analyst.

2. *Program QACHECK.* Analysts will check with the QA officer or QA computer data base (through program QACHECK) to determine whether their analyses are under control for a particular batch. Appendix B contains a printed copy of this program and shows a typical terminal session.

3. *Under control conditions.* Analyses are considered under control if the absolute value of the difference between our result (X_e) and the certified or consensus mean ($\overline{X}_c$) is within the propagated standard deviation of the experimental uncertainty (U_e) and of the certified means (S_c). N is equal to the number of measurements on a sample and in our case is equal to 1. This concept is formulated in Eq. (1) and is an adaptation of Dixon and Massey to include the experimental uncertainty.[23]

$$z = \frac{|X_e - \overline{X}_c|}{\sqrt{(U_e)^2 + (S_c)^2 / \sqrt{N}}} \quad . \qquad (1)$$

The test statistics used in this document are based on 5% and 0.2% levels of significance. The respective critical regions are defined using the t statistics 1.96 and 3.09. Data having a calculated z value $\leq$ 1.96 are accepted as in control at the 5% level of significance. Data that have a calculated z value > 1.96 and $\leq$ 3.09 are considered at the warning level, or the 0.2% level of significance. Data with a z value > 3.09 are considered out of control. This criterion is also incorporated in the QACHECK computer program. Quality assurance tests fo ranalyses completed during 1988, which used Eq. (1), are reported in App. C, Table C-I.

4. *Out-of-control conditions.* Analyses that are out of control by criterion 4 are not reported to the SAMPLES data base or requesting investigator and are performed again on new aliquots of the original sample, if that sample is available.

5. *Assessing analytical performance.* An additional approach for assessing overall performance on a variety of QA materials over longer times (for example, annually) involves the calculation of the mean of the ratios of $X_e/\overline{X}_c$ as a function of analysis and matrix types. These data are summarized as a mean ± one standard deviation for each determination in each matrix type, and σ is the standard deviation of the ratios [Eq. (2)]:

$$\frac{\sum (X_e / \overline{X}_c)}{n} \pm \sigma \quad . \qquad (2)$$

Results of this mean ratio approach for radiochemical, stable element, and organic analyses for all 1988 QC measurements made by HSE-9 are shown in App. C, Table C-I. All raw data used for these calculations, the certified or consensus values, and the sources of the reference materials are given in App. C, Tables C-II to C-VII. Summaries of elemental determinations on NIST, CCRMP, and USGS reference materials are also given in this appendix. Appendix C (Figs. C-1 to C-4) also contains plots showing 5-yr trends for routine analyses that have sufficient ratio data for evaluation and plots of 5-yr trends in various EPA Quality Assurance

trends in various EPA Quality Assurance Programs. Appendix D (Tables D-I to D-III) summarizes isotopic, elemental, and organic compound analyses completed by HSE-9 in 1988.

6. *Analytical procedure control.* Reliable, verified analytical techniques, drawn primarily from the EPA, American Association of Official Analytical Chemists, American Society for Testing Materials, NIST, and similar sources, are used. Standard methods, however, do not ensure accuracy and may in fact provide false confidence. Methods often include an assemblage of techniques that do not fully address potential problems caused by samples containing, for example, large quantities of total dissolved solids. We continually develop improved procedures, which are verified through successful analyses of various agency reference materials and of duplicate and spiked samples of the same matrix as those being routinely analyzed before the procedure becomes part of our routine analytical program. All data compiled in the validation study should be kept in a Laboratory notebook and should be summarized in the accuracy and precision section of the analytical procedure. All procedural development is justified and planned before it is undertaken.

Document control in the analytical laboratory is needed to ensure that personnel have current methods, specifications, and standards and that documents are not obsolete. A document control system establishes controls to ensure that (1) analyses and calibrations are carried out in accordance with the latest analytical document issue; (2) an effective communication system among personnel is developed; (3) a central storage, issue, and archival point for analytical documents and changes is established; and (4) the legal and accreditation requirements are met. Our current methods used for routine analytical work are contained in Gautier and Gladney.[24] Each method has a unique number, and the manual is in loose-leaf form so that new methods can be added and obsolete methods removed.

7. *Laboratory notebooks.* The distribution of Laboratory notebooks used for raw data collection is recorded in the NOTEBOOK data base. This data base contains the notebook number, dates it was in use, analyst number, where it is located, and a brief description of the contents. The analyst number is a unique number assigned to each analyst employed by HSE-9 and is stored in the ANALYST data base along with the analyst's full name. All notebooks are bound and pages are consecutively numbered. All entries are in ink; blank pages and large blank spaces are X'd; cancellation is by means of a single line that does not obscure the entry cancelled; and all entries are dated and signed with full, legal signature (not initialed) at least once per page. The section leader periodically signs the book, for example, "Read and understood, pp._____ to _____, John Smith, Section Leader."

8. *Personnel training.* Users of analytical data have become increasingly concerned about the degree of proficiency of personnel working in the laboratory. As part of the quality assurance program, we have a training data base on the VAX to address this issue. Traditionally, training of technicians has been informal and "on the job." We document this technical training by recording the dates on which a given individual was trained in specific analytical procedures, viewed training tapes, etc. Similar records are kept of training of degreed personnel in the areas of seminars and meetings attended, special courses taken, or training in advanced instrumental techniques. These records are a valuable tool in assessing the employee's analytical abilities and should be part of the employee's personnel record. The section

leader and the individual employee are responsible for keeping this data base up to date.

B. QC Guidelines for the Analysts in our Laboratory.

1. *Reagents, chemicals, and glassware.* Use fresh reagents and chemicals. Chemical calibration or standardization depends critically upon the quality of the chemicals used to provide the necessary standard solutions and upon the care exercised in their preparation. Use clean glassware of appropriate calibration.

2. *Instrument calibration.* Calibrate instruments daily. Record calibration results in a bound notebook, date, and sign. Each instrument should have its own calibration notebook kept near the instrument. Calibrate, when possible, by regression analysis of the net signal on the analyte concentration. Measure in triplicate at least three different concentrations of calibration standards. However, we recommend using more than three different concentrations. The concentrations of these standards must bracket the expected concentration of the analyte in the samples. For instruments in which absolute linearity cannot be established (for example, atomic absorption spectrophotometers), use a calibration scheme of three standards per concentration decade. For example, run the following standard concentrations to calibrate over the region of 1-100 ppm: 1, 5, 10, 50, and 100 ppm. Record instrument response to the standards and compare with previous standards run under the same conditions to ensure that system response is not degrading. Record all instrument maintenance work in the notebook.

3. *Instrument linearity.* Do NOT report extrapolated results from instruments without evidence of linearity. Bracket all samples by two standards with concentrations near the expected concentration of the unknown and determine sample concentration by interpolation.

4. *Instrument operating procedures.* Use the written, updated, instrument operating instructions and logbooks available at the bench.

5. *Balance and weight calibration.* Calibrate balances and weights using standards traceable to NIST. During 1988, HSE-9 began participation in a balance and weight calibration program run by the Standards and Calibration Laboratory of the Metrology Calibration group, MEC-8. Calibration of all balances and weight sets was achieved through the use of standards traceable to national standards. Values reported on weight sets are those that would be observed in comparing the weights to standards of density 8.0 g/cc in local air density of 0.923 mg/cc. MEC-8 states that the balances will remain within the stated accuracy for one year and the weight sets for two years, provided they are used in accordance with generally accepted operational conditions. Calibration certificates were issued by MEC-8 as well as calibration labels that were affixed to each balance and weight set.

6. *Record keeping.* Store analytical results in the HSE-9 LIMS. Each section should file raw data by Analytical Chemistry Request number and after two years archive the data in the Laboratory's Communication and Records Management Office.

7. *Analytical procedures.* Publish, distribute, and maintain current and complete analytical methods and procedures.[25] All analytical procedures used by HSE-9 are available at the bench. The Laboratory requires that these procedures undergo formal editing by the Information Services Division before they can be externally distributed. After completion of this editing process, procedures are issued as updates to LA-10300-M "Health and Environmental

Chemistry: Analytical Techniques, Data Management, and Quality Assurance."[24] The manual is issued in three-ring binders for ease in updating. To date, analytical procedures have been issued for the Radiobioassay, Radiotissue, Industrial Hygiene, and Waste Water Chemistry sections of the manual.

C. QC Guidelines for Radionuclide Counting Istrumentation.

An extensive effort was undertaken during 1988 to formalize the Quality Assurance program for additional nuclear counting systems used by HSE-9. In addition to the QC already in place for the alpha and gamma spectrometer systems, documentation has been formalized for the liquid scintillation, gas-flow proportional, and zinc sulphide counters. This program, in compliance with current EPA and DOE regulations concerning calibration, background, and efficiency measurements, provides a measure of the performance of the various systems. These data will provide accurate records of each system's performance and will document when a system has mechanical/electrical problems that should be investigated and remedied.

1. *Alpha spectrometer systems.* Background and calibration data bases are maintained that contain 10 measurements from which a running average is calculated. Each new calibration and background are compared against the data base mean and standard deviation for each detector. New calibration and background data are not added to the data base if they show evidence of out-of-control conditions. Because each system and each detector in the system are independent, control charts are kept on each detector for the spectrum of interest. Appendix E (Tables E-I to E-IV) shows four quarters of 1988 data. Tables E-V and E-VI show data on the 16 plates used for all routine alpha spectrometer calibrations. Fluctuations in these data are documentated in Laboratory notebook A6487 and are generally due to a detector being replaced or needing cleaning, electrical power surges and failures, vacuum system leaks, electronic noise, and special studies in which samples were counted without using the detector pedestals. The count room QC program developed for our seven alpha spectrometer systems is described below

a. **Backgrounds.** Run at least one 70 000-s background per week on each system. Environmental samples use an 80 000-s background. Keep a QC chart for each detector showing counts for the ^{238}Pu, ^{239}Pu, and ^{242}Pu areas (Fig. E-1). The background count distribution in these areas of the spectrum, for each detector, is Poisson.

   (1) Probabilities. Apply probabilities associated with the upper 99% limit of the mean count for each detector to determine out-of-control conditions.

   (2) Corrective action. Take corrective action if individual background counts are greater than four for two consecutive counts for the ^{239}Pu areas. The ^{238}Pu areas average four counts in 70 000 s. A measurement of two consecutive counts of nine is considered out of control.

   (3) Bioassay samples. The desired detection limit, at the 0.05 confidence level, for the plutonium bioassay procedure is 0.03 pCi/700-mL sample. To detect this concentration in routine samples, apply the following conditions to the sample for acceptance of individual sample control: 700-mL sample volume, ^{242}Pu tracer recovery greater than 40%, detector efficiency greater than 30%, count length of 70 000 s (1167 min), and background counts of four or less in 70 000 s.

(a) The calculation for the detection limit of the minimum detectable amount (MDA) of activity, based on Currie,[26,27] is

$$MDA = \frac{\sqrt{4} \cdot 4.65}{1167 \cdot .40 \cdot .30 \cdot 2.22}$$

$$= 0.03 \text{ pCi/700 mL.} \quad (3)$$

(b) Because the ^{242}Pu tracer recovery averages greater than 85%, the detection limit for the majority of the samples analyzed is 0.01 pCi/700-mL sample.

(4) Environmental samples. The desired detection limit, at the 0.05 confidence level, for environmental samples is 0.03 pCi/aliquot of sample. The calculation for the detection limit of the MDA of activity is based on Currie.[26,27]

b. Calibrations. Run at least one calibration per week on each system and keep a QC chart for each detector (Fig. E-2). Use the set of 16 matched plates, which are calibrated against NIST SRM 5906-B15, a ^{238}Pu standard plate. Apply the following criteria to evaluate whether an out-of-control condition exists for calibration data:

(1) One point outside the three-sigma control limits.

(2) Eight successive points on one side of the mean (or 10 out of 11, or 12 out of 14).

(3) Two out of three successive points between ± two and three standard deviations from the mean.

(4) Four out of five successive points between ± one and two standard deviations from the mean.

(5) A definite trend in the data.

Calibration records date to 1953. The ^{239}Pu standard, No. 2B, was prepared by Group CMR-1. The electroplated plutonium is contained in a 1-in.-diameter area on a 2-in.-diameter platinum-plated copper disk. The original estimates and subsequent measurements of the gross alpha activity on this standard, made in a two-pi gas-flow proportional counting system, are given in Table E-V. An alpha-energy spectrum made of this standard in 1988 demonstrates that 96.5% of the total alpha activity is consistent with decay energies of ^{239}Pu (5.11 and 5.16 MeV). The remaining 3.5% was associated with the energies of ^{238}Pu (5.46 and 5.5 MeV). Based on alpha-energy peak locations and ratios of the alpha counts under each peak area, we conclude that the standard's alpha activity results from decay of ^{238}Pu and ^{239}Pu radionuclides. The measurement was made using a 300-mm surface barrier detector rated to give alpha particle resolution of 19.7 keV. The data demonstrate 20-keV energy resolution. This energy resolution was achieved at a sample-to-detector separation of 2.7 cm and a counting geometry of 1.3%.

An NIST SRM alpha standard (4906-28) was obtained in 1973, and this standard or similar NIST SRMs have been used since 1973 as the primary alpha calibration standard for calibration of our gas-flow proportional counters. We have continued (from 1973 to the present) to reference measurements made against the NIST standards with measurements of the activity of standard No. 2B. The No. 2B standard was used to calibrate the instruments that were used for measuring the plutonium concentrations in bioassay urine samples collected from Los Alamos workers between 1953 and 1973. Before 1953, bioassay results were expressed in

counts/min because there was no standard available to relate counts to mass.

Record keeping. Print copies of all calibration and background data. The count room manager will review and sign all data and give them to QA for approval before release to other data reduction codes. Keep printed copies of calibration and background data indefinitely in notebooks.

NIST standards. Use an NIST standard plate to calibrate secondary standard plates. Retire all other standards to back-up status. Reference the same NIST standard plate by all computer data reduction codes.

Plate size. Use the 5/8-in. standard plate size with a 1/2-in. plating area.

System names. Refer to the alpha systems as Alpha 16, Alpha 32, Alpha 48, Alpha 64, Alpha 80, Alpha 96, and Alpha 112. The Alpha 96 is calibrated for the measurement of uranium and thorium.

2. *High-resolution gamma spectroscopy systems.*

   a. **Backgrounds.** Run at least one 50 000-s background per week for each detector for each matrix (water, soil, and vegetation). Transfer the data to the VAX data storage disk and integrate the gamma-ray photopeaks of interest using our GAMS or NGAM data reduction code. Record the results in a Laboratory notebook. Archive all background spectra to hard copy and store with count room records.

   b. **Energy calibrations.** Run one energy calibration per week on each detector after filling the detector Dewars with liquid nitrogen. Use either the NIST SRM 4370B ^{152}Eu solution or the NIST SRM 4218E ^{152}Eu point source as the full-spectrum energy source. Use three primary photopeaks (122-, 779-, and 1408-keV lines) for calibration. Transfer the spectrum to the VAX data disk and archive the data to hard copy. Record the information (date, analyst, detector, calibration line, etc.) in the GeLi calibration logbook. Plot the data semiannually to provide quality assurance documentation of the stability of the detectors (Fig. E-3).

   c. **Efficiency calibrations.** Monitor the absolute efficiencies using the NIST SRM 4370B ^{152}Eu solution to generate the spectra. Transfer the data to the VAX data disk for storage. Obtain specific radionuclide standard solutions from NIST or EPA. Spike these solutions onto the variety of matrices and configurations that are commonly encountered in the nuclear counting facility, 10- and 25-mL glass scintillation vials, 500-mL Nalgene bottles, and 1- and 4-L Marinelli configurations. Count these samples on an annual basis for 50 000 s for each matrix/configuration in each detector system. Transfer the data to disk, reduce the data using the GAMS or NGAM data reduction program, and log the results into the efficiency notebook for the gamma counting facility. Archive all data to hard copy.

   Another technique has been added to measure system performance, over time, in the gamma-counting facility. Once a month, measure the ^{152}Eu (NIST SRM 4370B) point source at a fixed distance and position from the detector face on each of our 6 detectors. Reduce the spectra using the GAMS or NGAM data reduction code to generate an efficiency for each of 12 different ^{152}Eu gamma rays present in the point source. Calculate the mean values of these efficiencies each month and compare

them to those of the previous month. Plot the data (Fig. E-4), to give a visual record of each detector's performance.

d. **Robotics.** Work was continued during 1988 on the robotics system that will provide automated sample changing for routine samples. The robotics system (PRI Robots) will be interfaced to an automated gamma spectroscopy reduction code developed by EG&G ORTEC called ADCAM. The system will initially prompt users for the appropriate counting information and all parameters needed to begin the counting processes. The program will count all the samples and provide a report of the final results for dissemination to the customer. Once this system is completed, it should significantly increase utilization of the gamma-counting facility while decreasing the human interaction with the system.

3. *Liquid scintillation counting systems.*

a. **Backgrounds.** Run triplicate background measurements with every sample set using "blank" deep well water to determine background levels. The count length will vary according to the matrix and sample with which it is counted. Data are automatically transferred to a VAX data file that is later used for data reduction.

b. **Quench curves.** Run a quench curve at the beginning of each month. A standard set, that contains a known amount of ^3H, with varying amounts of quenching agent (ethyl iodide) in each sample (n=10), is counted for 30 min. The automated program on the liquid scintillation counter will automatically generate a new quench curve with each sample set run. Print out this curve on the system printer and tape the copy to the top of the counter for visual identification. The Spectral Index of External Standard (SIE) values generated by the program are copied to other programs that are in use to provide those programs the most current quench curve information.

c. **Normalization values.** The liquid scintillation instrument contains two photomultiplier (PM) tubes. In order to determine if the tubes are in proper alignment, run a normalization standard each week to measure the varied response from the two PM tubes. If both PM tubes measure the same activity, the ratio should be equal to 1. If the ratio varies greater than 10% from that value, the PM tubes need realignment. Keep a record of these values, along with graphic representation of the data (Fig. E-5), in the liquid scintillation counter performance verification logbook.

d. **Efficiency calibrations.** Run an efficiency measurement each week to provide an alternate measure of system performance. Run standards, analyze trends, and record data in the liquid scintillation counter performance verification logbook. If the variation of the standards is greater than 15% and/or the standard value is less than 58%, the detection system is considered outside the allowable performance parameters and is in need of repair or alignment.

4. *Gas-flow proportional counting systems.*

a. **Backgrounds.** There are currently three gas-flow proportional counting systems in use, each dictating varying times for background information collection. The alpha count room proportional counting systems count backgrounds for 30 min each week. The gamma count room proportional counting systems have background counts run with each sample set. Record all data in the appropriate notebooks. This information is tabulated to show trends that may lead to corrective action as required.

b. Voltage plateaus.

(1) Alpha-counting system. Run voltage plateaus each time a new Argon/Methane (P-10) gas supply tank is put on the proportional counting system. There are two proportional counters in the alpha facility : one set for alpha counting and the other set for beta counting.

(2) Gamma-counting facility. Create a new voltage plateau on a semiannual basis for the gamma facility proportional counter. This counter is set for both alpha and beta counting.

Plot the data for all systems, generating a curve of voltage versus count rate. The point at which the voltage is set is determined to be within 10% of the "knee" of the curve. Record these values in the appropriate notebooks for archival purposes.

c. Efficiency calibrations.

(1) Alpha counting facility. Generate the efficiency values for the proportional counter each week. This is accomplished by measuring NIST SRM ^{239}Pu 4906-B33 and 4906-B34 standards and a NIST secondary ^{210}Pb standard to generate efficiency values. Record these values in the appropriate notebooks.

(2) Gamma-counting facility. A different means of efficiency measurement is used in the gamma-counting facility. Because the samples have an associated volume/mass, it is important to know the amount of self-absorption occurring within each sample. Calculate the self-absorption by counting a series of planchettes with varying, known amounts of potassium salts (KCl) and plot the count rate versus the amount of precipitate on the planchette (precipitation curves). This curve yields an equation of the line that will allow the calculation of the correct activity on a planchette, regardless of the amount of mass associated with the sample. Record all values in the appropriate notebooks for archival purposes.

d. Relative efficiency measurements. These data record relative performance of the gas-flow detectors over time.

(1) Alpha-counting facility. Measure a known set of secondary standards each week on the alpha and beta counters. System performance is measured by comparing the calculated value of these standards to their consensus values.

(2) Gamma-counting facility. Measure, with each sample set, a NIST secondary source of ^{239}Pu as the alpha standard and a NIST secondary source of ^{90}Sr as the beta standard. Record data in the counting notebook. Plot the measured values versus the consensus value and determine if corrective action is required.

5. *Zinc sulfide counting system.*

a. Backgrounds. Accumulate backgrounds each week. Count a blank planchette for 100 min on each of the 16 detectors. Record the data in the appropriate notebook.

b. Efficiency calibrations. Take efficiency measurements each month. Perform the efficiency measurements using a NIST SRM 4904L-F20 ^{239}Pu standard. Count the sample in triplicate for 10 min on each system. The mean value associated with the set of data will comprise the efficiency value for that particular

detector. Log the data onto a data logging sheet and store it in the appropriate notebook.

c. **Relative efficiency calibrations.** Measure a set of internal secondary standards (NIST traceable ^{239}Pu) of known value each week. Record the calculated value of the standards in the appropriate notebooks. Examine the data to determine if trends that show detector degradation are appearing. Take the appropriate corrective action when necessary.

IV. QUALITY ASSURANCE MANAGEMENT AND COMPUTING RESOURCES

The quality assurance program is run by a QA coordinator, who heads an independent Quality Assurance, Sample and Data Management (QASDM) Section within the group. The coordinator is responsible for carrying out our QA program and for taking or recommending measures to fulfill the quality objectives in the most efficient and economical manner possible, while ensuring continuing accuracy and precision of all data produced. The coordinator evaluates data as they are reported, prepares a written report quarterly about critical issues, and publishes this annual summary, which contains all raw QC data for historical archiving.

Our ability to address this diverse mission is strongly based on our overall QA management system. Our computing facility consists of a central Digital Equipment Corporation VAX 8200 computing system with 25 keyboard terminals, 50 microcomputers, and several data acquisition systems all linked to the VAX through Ethernet and DECnet. The VAX 8200 is equipped with three RA series disc drives capable of holding 833 Mbytes of data, three RLO2 10-Mbyte removable-cartridge disc drives, and one magnetic tape drive (Fig. 1). Our system manager maintains over 400 existing programs and 30 data bases containing approximately 500 000 records. Our in-house LIMS has been structured around the VAX Datatrieve software system, which permits users to tailor data bases and interactive software to suit their particular needs. A primer entitled "Introduction to VAX/VMS" is distributed to HSE-9 users. It is an extensive introduction to the VAX/VMS operating system that consolidates a vast amount of usable information from numerous reference manuals.

Our system manager developed and implemented an automated back-up system for the VAX during 1988 that replaced our long-standing manual back-up system. A complete back-up system includes both incremental back-ups (back up only the files that have changed since the last time back-ups were done) and image back-ups (back up all files on all disks). When performing either of these types of back-ups, an operator must be present to mount and dismount the tapes, and because the tapes tend to take up a lot of physical space, the image back-ups are usually rotated (old image back-up save sets are written over with the new).

The HSE-9 data processing environment has many daily updates to large data bases, and it has been difficult to back-up those files during normal working hours due to the number of open files and verification errors that result. It is now possible to achieve unattended incremental back-ups late at night for up to a month's worth of data because of the introduction of an 8 mm tape cartridge, roughly the size of an audio cassette cartridge, and helical scan technology. Since the physical size of the cartridge is small, it is no longer necessary to rotate image back-up save sets. This has allowed a much greater level of insurance against catastrophic loss of data such as from the very gradual or subtle introduction of bad data into back-ups as good data gets rotated off the tapes.

The CY-8200-U Cartridge Tape Subsystem, manufactured by Contemporary Cybernetics Group, is a high-performance, high-capacity 8 mm cartridge tape subsystem that incorporates an integral SCSI bus interface. The subsystem utilizes advanced helical scan technology capable

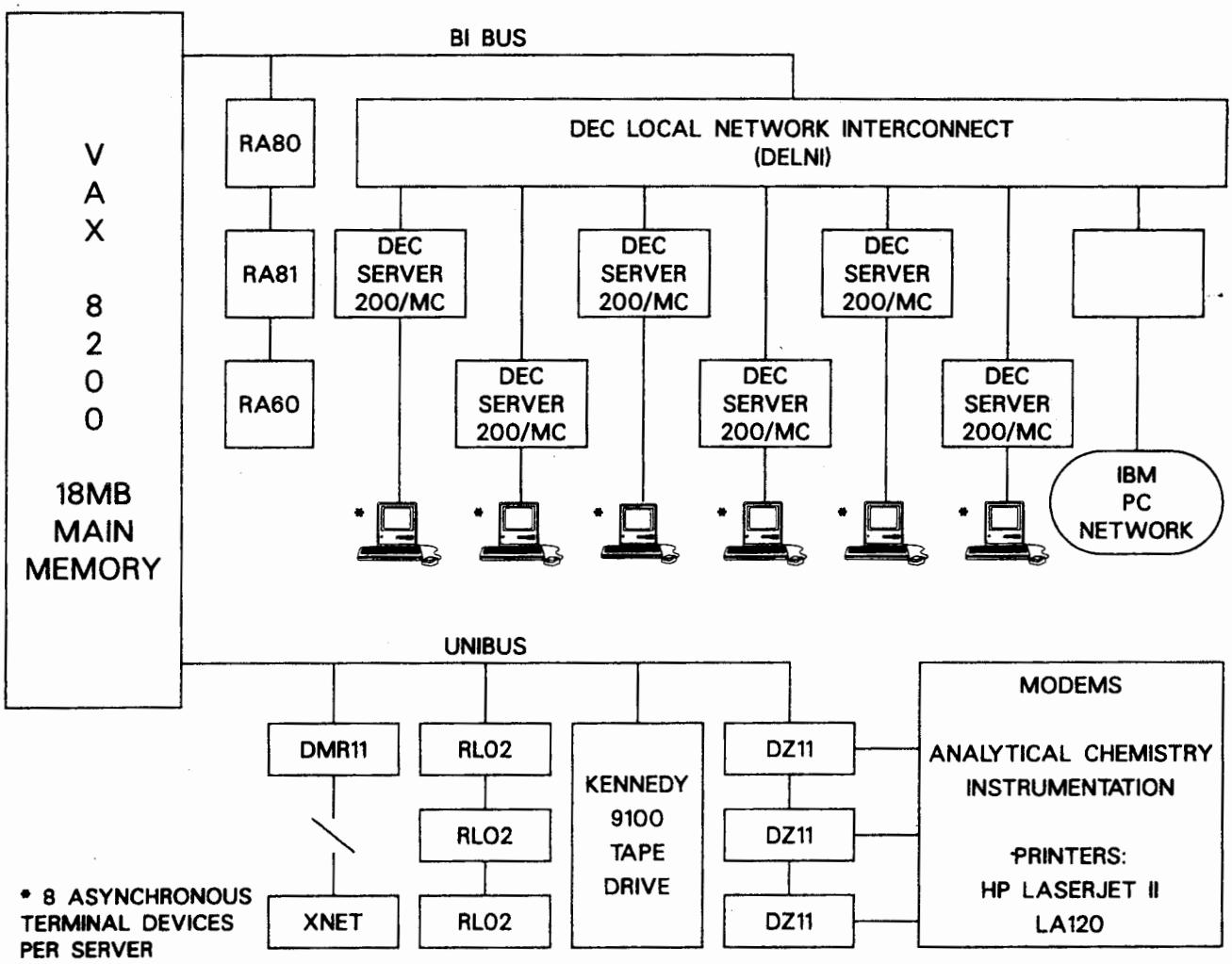

Fig. 1. Diagram of VAX 8200 system.

of storing more than two billion bytes of formatted user data on a single cartridge. Features of this subsystem include: (1) a powerful, onboard Error Correction Code, (2) error recovery procedures implemented in the cartridge tape subsystem controller, (3) read-after-write error checking and automatic rewrite, (4) nonrecoverable error rate of less than 1 bit in 1013 bits, and (5) high-performance SCSI bus data transfer rates of up to 1.5 Mb per second. The CY-8200-U is an add-on subsystem designed to be integrated into a DEC Unibus machine. The operating system considers the tape subsystem to look and act like a TK50 tape drive and even uses the standard VMS TUDRIVER tape driver. This feature of compatibility insures that the subsystem will be compatible with future DEC upgrades to the VMS operating system.

The back-up program, H9BACKUPS, runs continuously in a special batch queue or until the system is restarted. The tape drive is initially mounted and is not dismounted until the type of back-up changes from incremental to image. This happens twice a month when the day of the month is equal to 1 or 15. Because the tape is mounted for two weeks at a time, the possibility of mount failures, each time an incremental back-up is begun, is eliminated. The tape is left positioned just after the last written incremental save set and at the location where the new save set is to be written.

H9BACKUPS uses two disk files. One is entitled BACKUPS.LOG, and the other is a back-up journal file whose filename depends on the month of the year and the type of back-up. For example, if H9BACKUPS is doing incremental back-ups and the date is February 1988, the back-up

journal file would be FEB-1988-INC.BJL. The BACKUPS.LOG file contains a complete account of each back-up operation performed each day. The log file is closed, and a new revision is created each time image back-ups are run (the 1st and 15th of each month). This file logs the status of the back-ups and notes if there are any problems with the program as it runs in the batch queue. The journal file is an rms sequential file that contains information about every file that storing more than two billion bytes of formatted user data on a single cartridge. Features of this subsystem include: (1) a powerful, onboard Error gets backed up. This file is specifically formatted so that the back-up utility can scan it based on any combination of disk name, save set name, creation date, or filename to find the exact information needed from any number of different back-up save sets. This functionality is very useful when a user needs an old file restored and the system manager is not sure on which physical volume the file is located.

Each morning at 12:00 a.m., H9BACKUPS checks the day of the month. If the day is equal to Saturday or Sunday, back-ups are not begun, and the program reverts to standby mode until Monday morning at 12:00 a.m. If the day is not equal to 1 or 15, incremental back-ups are performed and the program reverts to standby mode until the next day at 12:00 a.m. If the day is equal to 1 or 15, the program knows that image back-ups are needed and at 8:30 a.m. notifies the system console and all terminals enabled as operator consoles that the incremental tape needs to be replaced with that month's image back-up tape. A unique message number is printed with this message, and a mail file is sent to SYSTEM and MANAGER detailing what needs to be done by the operator. When the operator changes the tape, he logs into the system at a keyboard terminal and does a REPLY/TO=message-number. H9BACKUPS receives the REPLY from the operator, proceeds to initialize the image back-up tape, if it is the first of the month, and mounts the tape. The program then waits until 8:30 p.m. before it proceeds to do image back-ups. When image backups are completed, H9BACKUPS again waits until 8:30 a.m., mails a message, requests an operator to replace the image tape with the incremental tape, waits for a reply, initializes the incremental tape, closes the log file, resubmits itself to the batch queue to begin running at 12:00 a.m. the next day, and exits. A listing of the H9BACKUPS software is given in App. B.

Figure 2 shows our overall QA operational system. A fundamental principle of our philosophy is that analytical service work is not a linear transfer of samples from customer to analyst and of analytical results from analyst to customer. Continuing interaction between these parties is required and alerts HSE-9 analysts to future research needs for new methodology. Ideally, the analyst is brought into the project at its inception and participates in the experimental design. This interaction gives the customer the benefit of the analyst's perspective on what can be readily determined in a particular matrix and on sample handling and preservation problems. During 1988, HSE-9 developed Guidelines for the Collection and Preservation of Liquid Samples and distributed these guidelines to all of our customers. This set of tables will be incorporated into the General Information section of LA-10300-M. At the conclusion of the presampling conference, the QASDM Section generates computer-compatible sample numbers printed on stick-on labels and gives these to the customer for sample identification. This procedure avoids sample number duplication, eliminates computer-incompatible customer-generated numbering schemes, and minimizes transcription errors between customer and analyst.

Once samples are taken, the customer submits them to the appropriate analytical chemistry section leader with an HSE-9 Analytical Chemistry Request multicarbon form (Fig. 3) filled out during a discussion between the customer and the section leader. The QASDM Section is responsible for transferring information from the request form to the master SAMPLES data base from a keyboard terminal using our interactive program SUBMIT. The chemistry section leader involved then distributes a color-coded copy of the form to each analyst responsible.

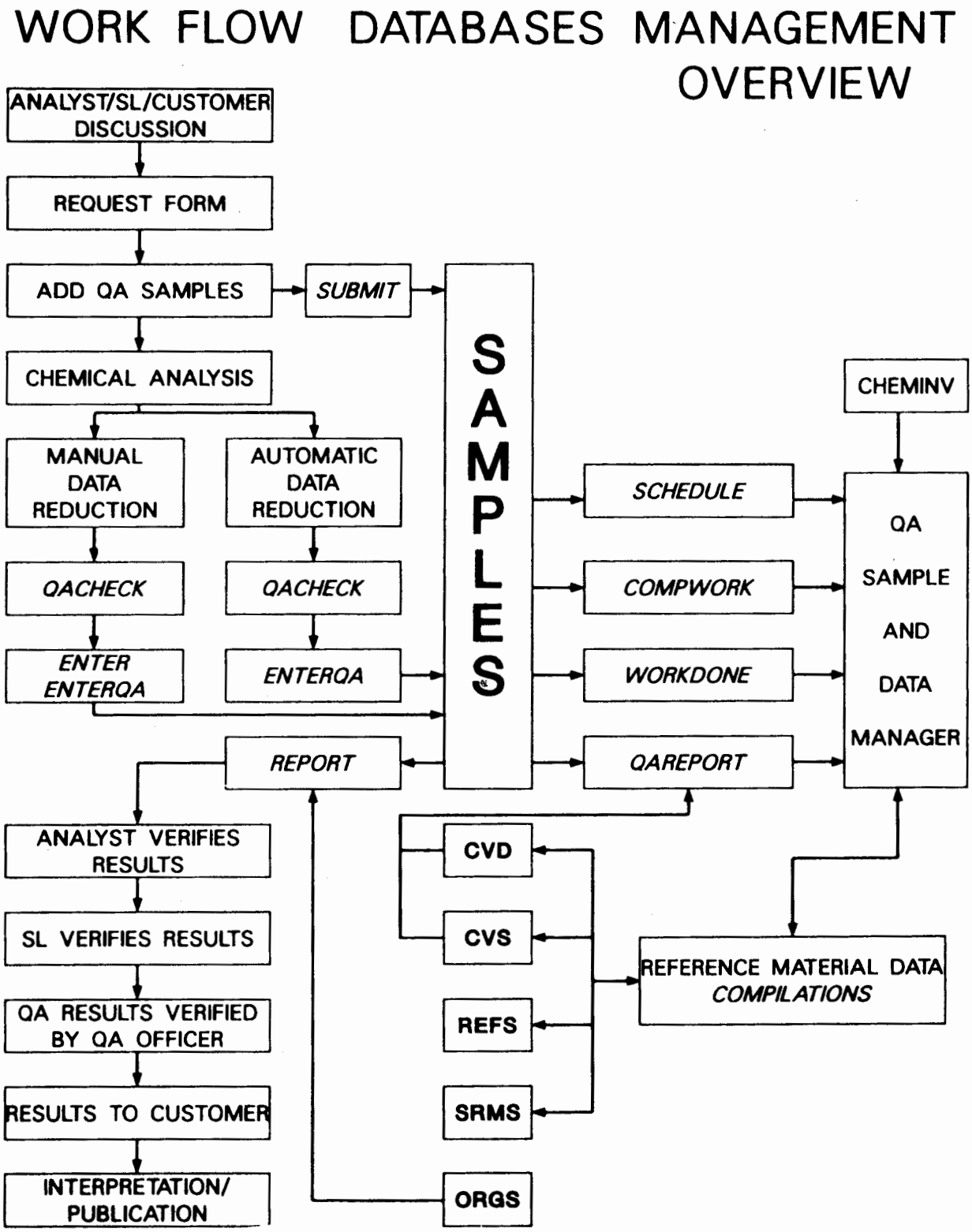

Fig. 2. Diagram of the overall quality assurance system.

Los Alamos
Los Alamos National Laboratory

HSE-9 Analytical Chemistry Request

5122

Requestor	Program Code	Sample Owner	Date	Total No. Samples

Sample Numbers	Matrix	Analysis	Tech	Analyst	Priority	Remarks

Fig. 3. Analytical Chemistry Request form.

In an effort to streamline our operations, improve our QC and chain-of-custody efforts, and better serve our customers, HSE-9 developed a sample receiving area that will begin operation in 1989. We also developed an Analytical Service Agreement (Fig. 4) that will document the customer's request and also provide necessary sample information for the analysts. This agreement should be completed at or before the required presampling conference with the appropriate HSE-9 section leader.

In order to comply with the requirements for a "blind" quality assurance program, beginning in 1989, HSE-9 personnel will no longer furnish sample number labels to our customers. Customers may use up to 12 characters in any combination of numbers and/or letters for sample identification. HSE-9 will renumber the samples upon receipt and include blind quality control samples. The HSE-9 CUSTOMER-NUMBER data base will store both the customer's sample number and the HSE-9 number. Both numbers will appear on all analytical reports and will be stored in the annual archives along with the analytical data. Our new labels will include the date received, request sheet number, sample number, and customers initials.

The SAMPLES data base is the core of our QA system and has been structured to contain the following information: HSE-9 sample number, customer sample number, owner, matrix, phase, analysis, request number, requester, request date, due date, project number, analyst, technique, symbol, result, uncertainty, units, completion date, status, notebook, page, analytical procedure number, and analytical comment. The power of the Datatrieve system then becomes important, because more than 100 000 analyses per year flow

HSE-9 ANALYTICAL SERVICE AGREEMENT

Request No._____

I. PRESAMPLING CONFERENCE

Program Code_____ No. Samples Expected_____

Submission Date_____ Completion Date_____

Chain of Custody?_____ Special Protocol? *(EPA etc.)*_____

Analyses Requested: List analyses on HSE-9 Analytical Chemistry Request Sheet.
(Indicate expected concentration range and required detection limits under remarks.)

Container Type_____ Preservative_____
(See Memo HSE-9/88-304. Guidelines for Collection and Preservation of Liquid Samples.)

Storage Conditions *(circle one or more)*: None Refrigerate Freeze Darkness

Sample Hazards Present? *(Circle one or more)*
No hazard Toxic Radioactive: alpha beta gamma Flammable Explosive/Reactive

Sample Disposal: Return_____ Discard_____
(All hazardous samples or TRU wastes will be returned to the customer.)

Customer_____ HSE-9 Section Leader _____Organic
Customer Phone_____ MS_____ _____Inorganic
_____Radiochem

Date_____

II. EMERGENCY SAMPLES

Emergency Status **requires** the following signatures:

Customer Group Leader_____
HSE-9 Group Leader _____
Date_____

III. SAMPLE RECEIPT

Signature_____ Date_____ Total No. Samples Received_____

HSE-9 Sample No. Range_____ to _____.

Customer Sample No. Range_____to_____.

Fig. 4. Analytical Service Agreement form.

between it and our 40 analysts. Datatrieve permits a search of the data base as a function of any single parameter or any logical combination of parameters. These data can be transmitted to the analyst by video terminal or hard-copy line or laser printers. Using logical combinations of simple Datatrieve commands, the analyst can get a real time assessment of what has been requested, what remains unfinished, what procedures have been suggested for certain determinations, etc. This procedure eliminates the necessity for each analyst maintaining a hard-copy record system and offers the analytical manager quick access to the overall status of a section or the entire group. Archived data, from 1981 to the present, are available on-line with read access by typing :ARCHIVE at the DTR> prompt on the computer video screen.

Our sample-numbering system uses a number of the structure AA.xxxxx in which AA designates the last two digits of the current calendar year and xxxxx is a five-digit number serially assigned in blocks to various customers. This structure facilitates efficient computer management of the data. Because QC samples may carry over each year, we assign them constant numbers in the series 00.xxxxx to make them easily distinguishable from various years' samples.

Los Alamos National Laboratory considers sample data from the bioassay and tissue analysis programs to be confidential personal information, and we keep these data bases on the NOS administrative machine at the Central Computing Facility. The associated QC sample information is kept in the SAMPLES data base on our VAX.

Organic chemistry nomenclature is complex and readily subject to typographical errors during entry into SAMPLES. We have adopted a modified version of the Chemical Abstract Service (CAS) compound numbering system to facilitate our record keeping for the diversity of organic analyses performed. The CAS number for a given compound is stripped of the dashes and entered into the "Analysis" field in SAMPLES. An organics data base, ORGS, is kept on the VAX to facilitate translation of these numbers to compound names before the data are reported to the customer. New compounds are added to this data base by the Organic Chemistry Section, and listings of the data base can be generated alphabetically by compound name or numerically by CAS number.

Many of our analytical instruments store their raw data directly on VAX discs for off-line reduction, and in several cases, the entire data generation process is now computer controlled. The analyst has a battery of data reduction programs, which in most cases generate Datatrieve executable command files that input final analytical results directly into SAMPLES upon analyst approval. For those instruments that still take raw data in the form of chart recordings, the analyst uses the interactive ENTER program to transfer his final calculated values back to SAMPLES. When a set of samples has been completed for a given analysis, the analyst uses the REPORT program to generate an HSE-9 Analytical Report (Fig. 5). The results of QC samples run with the sample batch are printed on a separate form by using REPORT. The program recognizes QC sample numbers and prints the current certified or consensus value on these reports along with the calculated control status from Eq. (1). The analyst and section leader review and sign the data reports, which go to the QA coordinator for approval before release to the customer.

We have a utility program QAREPORT that looks at QC data in one-week windows. The report runs automatically in the report batch queue, mails the completed report to the QA Coordinator, and resubmits itself to run again the next week. This program permits the QA coordinator to assess on a weekly basis our success in meeting the analytical QA goals described above. With the Datatrieve view concept, program QAREPORT associates data from several data bases, which include routine QC results as well as certified and consensus values for a given material and element. For a user-selected time, the resulting report consists of: (1) the ratio of QC samples to customer samples submitted by matrix and analysis, (2) a detailed list of submitted QC samples that have matrix or unit conflicts with

********** HSE-9 ANALYTICAL REPORT **********

Prepared by: G. BROOKS on 19-Apr-1988

REQUEST NUMBER: 7253 ANALYSIS: ALPHA MATRIX: W OWNER: RB

SAMPLE NUM	SYMBOL	RESULT	UNCERTAINTY	UNITS	COMPLETION DATE	COMMENT
88.00715		2.	1.	PCI/L	4/19/88	
88.00716		0.4	0.7	PCI/L	4/19/88	
88.00717	-	0.9	0.6	PCI/L	4/19/88	
88.00718		1.4	0.9	PCI/L	4/19/88	
88.00719		2.	1.	PCI/L	4/19/88	
88.00720	-	0.4	0.7	PCI/L	4/19/88	
88.00721	-	0.2	0.7	PCI/L	4/19/88	
88.00722		0.7	0.8	PCI/L	4/19/88	
88.00723		50.	10.	PCI/L	4/19/88	

********** HSE-9 QUALITY ASSURANCE REPORT *********

Prepared by: G. BROOKS on 19-Apr-1988

REQUEST NUMBER: 7253 ANALYSIS: ALPHA MATRIX: W OWNER: RB

SAMPLE NUM	SYMBOL	RESULT	UNCERTAINTY	UNITS	CERTIFIED VALUE	CERTIFIED VALUE UNCERTAINTY	COMPLETION DATE	COMMENT
00.97081		6.	1.	PCI/L	7.	5.	4/19/88	UNDER CONTROL
00.97081		6.	1.	PCI/L	7.	5.	4/19/88	UNDER CONTROL
00.97081		7.	2.	PCI/L	7.	5.	4/19/88	UNDER CONTROL

Analyst	Section Leader	QA Officer
4/20/88	4/22/88	4/24/88
Date	Date	Date

The control status of the preceeding data was evaluated using the standard statistical criteria set forth in 'Quality Assurance for Health and Environmental Chemistry: 1986,' LA-11114-MS, pp. 3-4.

Fig. 5. Analytical Report form.

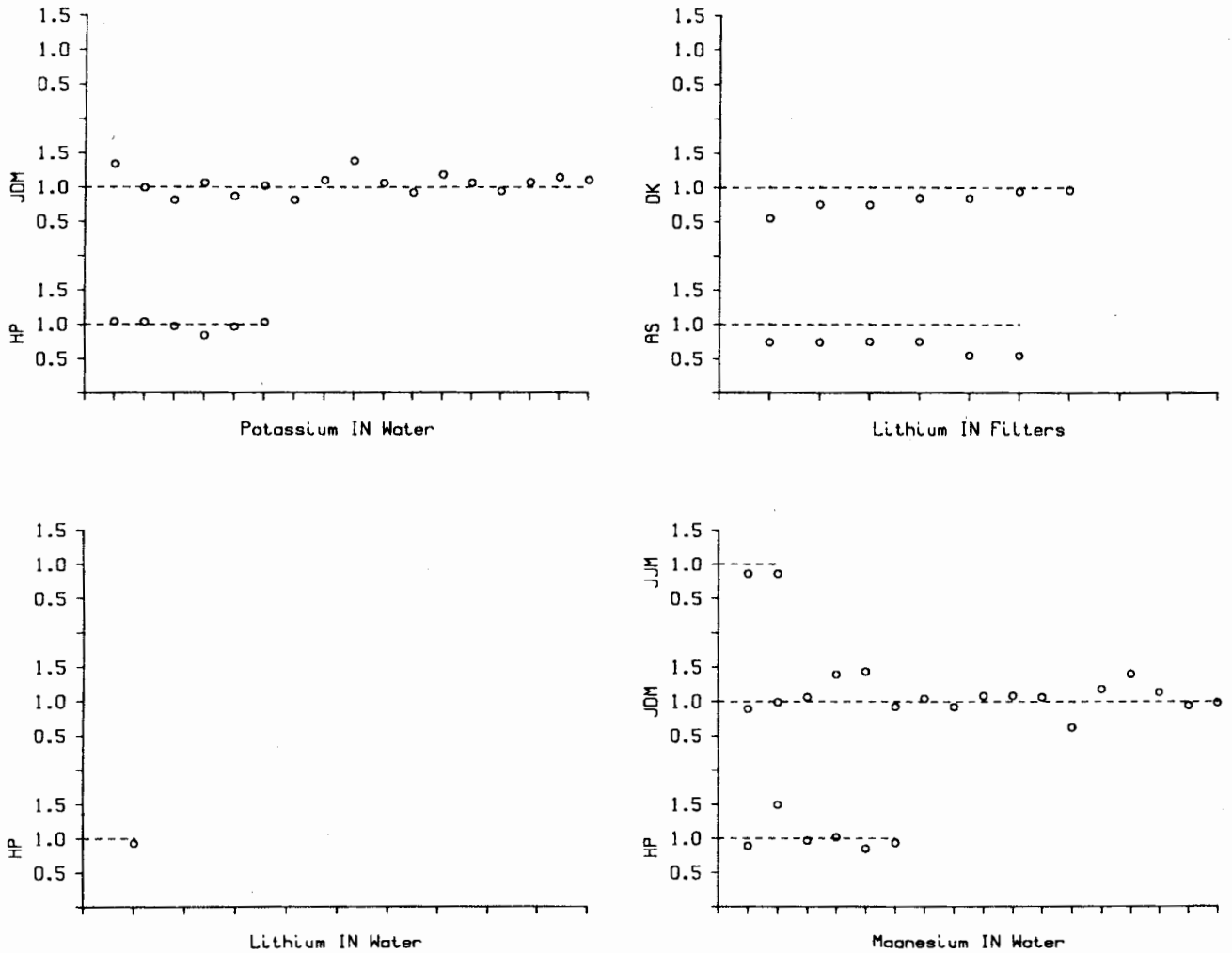

Fig. 6. Quality Control charts.

certified values, and (3) a listing of QC data falling inside or outside the acceptable limits of analytical error as defined by Eqs. (1) and (2). Table C-I in App. C is generated directly by QAREPORT.

One of the oldest methods used to monitor and control the quality of a procedure is the control chart. The control chart is a graphic representation on which the values of the characteristic under investigation are plotted sequentially. We use the type of chart (devised by Shewhart[28]) that consists of a central line and two limit lines spaced above and below the central line. These are usually termed the inner and outer control limits. The distribution of the plotted values with respect to the control limits provides valuable statistical information on the quality of our analytical results. Work was completed during 1988 on a computerized graphics package that imports a file created by QAREPORT. This data file is transferred each quarter from the HSE-9 VAX over the network to a VAX within the Laboratory's Central Computing Facility. DISSPLA is then used to create graphic representation of our QC data. These graphs are based on analyte, matrix, and analyst, and four graphs are plotted on each page (Fig. 6). More than 200 graphs, containing over 3000 data points, are plotted each quarter. The mean of all data for a given analyte and matrix is computed each quarter by this program and is stored in a file called YEARLY for use in our 5-yr trend plots shown in App. C (Figs. C-1 to C-4).

We have several other program tools available for sample management that formalize the common sets of logical commands mentioned above. SCHEDULE permits an overview of the current group backlog of unfinished work as a function of analyst, requested determination, sample number, request number, or matrix. WORKCOMP (work completed) and REPBYMAT (report by matrix) are utilities that facilitate rapid generation of reports for management concerning the number and type of determinations requested or completed during a given time and the cost code information. Tables D-I to D-III of App. D are generated directly by REPBYMAT.

V. CHEMICAL INVENTORY AND TRACKING SYSTEM

HSE-9 inventories all chemicals in the group on an annual basis as part of the Federal Hazard Communication (Right-to-Know) legislation. We designed and developed a chemical inventory and tracking system in 1987 using the latest bar-code and data base technology. All new chemicals are given a bar code and are logged into the system immediately upon receipt by the group. Our stock of more than 12 000 chemicals is one of the Laboratory's largest and is spread throughout our three locations at TA-59, TA-50, and TA-35.

This inventory is critical for compliance with the law and provides an excellent vehicle for our chemists to use to locate available chemicals as opposed to purchasing new ones. The system utilizes two different bar-code reading devices. One device is attached to a VT220 terminal communicating with the VAX that allows immediate deletion of expended chemicals from CHEMINV, the active-inventory data base. At the same time, all information associated with that particular chemical is automatically moved to EXPENDED-CHEMINV, the expended chemicals data base from which reorder lists and estimated usage data can be derived. Our inventory of radioactive materials resides in a separate data base called RMD (radioactive materials data base). The second bar-code reading device communicates with a programmable hand-held computer terminal that facilitates taking the annual inventory.

HSE-9 chemical inventory records are available in the QASDM Section. EXPENDED-CHEMINV will be maintained indefinitely to meet legal requirements. All records are auditable and include the following information: (1) the identity of each chemical as it is referenced on an appropriate Material Safety Data Sheet (MSDS); (2) the CAS registry number; (3) the location(s) in which the chemicals are present; and (4) the estimated amount of the chemical on hand. MSDSs for all of our chemicals are available in alphabetical order in three-ring binders that are distributed throughout our group.

VI. INTERLABORATORY QUALITY ASSURANCE PROGRAM

We use the terms reproducibility, repeatability, intralaboratory variability, and interlaboratory variability in describing the various aspects of our measurement process. Repeatability is the variation in data generated on one sample by one analyst or instrument or both over a short time. Reproducibility is the variation over an extended time or by different laboratories or analysts. Intralaboratory variability is the difference in results obtained when a single laboratory repeatedly measures aliquots of the same sample, whereas interlaboratory variability is the difference in results obtained by various laboratories in measurements of aliquots of the same sample. Variabilities caused by equipment, conditions, and different operators (but independent of sample variabilities) affect reproducibility and are parts of intralaboratory variability. Laboratory biases, paired with differences in the capabilities of various laboratories, result in an interlaboratory variability that can be much larger than intralaboratory variability. Our well-designed and well-executed QA program helps to reduce both intralaboratory and interlaboratory variability.

An effective QC program should have external quality assessment to confirm the effectiveness of

the internal program.[29] Proficiency testing provides a strong incentive for laboratories to maintain high standards of quality and provides interested agencies with a tangible record of laboratory performance. An argument sometimes put forth by detractors of proficiency testing is that laboratories concentrate their best efforts on proficiency test samples.[30] Although this may be true, their competency is nonetheless tested, even if it is not truly representative of their day-to-day operation. If a laboratory is indeed incompetent, it is not likely to do well on a proficiency test no matter what special efforts are made. Our experience indicates that proficiency testing is an incentive for our laboratory to maintain a high level of performance and that it generally leads to analytical improvement.

Group HSE-9 maintains widespread participation in intragroup, intergroup, and interlaboratory quality evaluation programs that use blind samples. We currently participate in the intercomparison programs described below, and App. C, Table C-V, reports data from these studies.

A. **National Institute for Occupational Safety and Health (NIOSH), Proficiency Analytical Testing (PAT) Program.**

This program provides reference samples to our industrial hygiene chemistry efforts. Each quarter, sample kits are mailed to participating laboratories, and data analysis is completed in time to allow participants to obtain repeat samples and correct analytical problems before the next round starts. The reference samples are designed to cover a variety of analytical methods used by occupational health laboratories and include contaminants in which analytical agreement is often poor. We receive metals on filters (a combination of lead, cadmium, and zinc) and organic solvents on charcoal tubes (a combination of up to three of the following: benzene, carbon tetrachloride, chloroform, 1,2-dichloroethane, methylene chloride, methyl chloroform, methyl ethyl ketone, methyl isobutyl ketone, p-dioxane, toluene, trichloroethylene, cellosolve acetate, and o-xylene). The concentration levels are randomly selected from a range of concentrations that is typical of samples taken near current or proposed 8-h time-weighted-average threshold limit values (TLVs).

B. **Environmental Monitoring and Support Laboratory, Cincinnati (EMSL-CI) Drinking Water Program.**

As part of an independent evaluation of U.S. EPA regional laboratories, state laboratories, and other selected laboratories for the drinking-water certification program, EMSL-CI sends us Water Supply Performance Evaluation (PE) Study samples. The study covers an ever growing list of analytes, most at two concentration levels. We must satisfactorily analyze PE samples annually for each chemical for which certification has been granted. We currently analyze for nitrate, fluoride, trace metals (a combination of arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver), chlorinated hydrocarbon pesticides (insecticides) and herbicides, trihalomethanes, and regulated and unregulated volatile organic chemicals (VOCs). Three VOC samples were being shipped by the end of 1988. One sample contained the eight VOCs for which minimum concentration levels are being regulated. The second VOC contained an unspecified number of VOCs selected from the eight VOCs listed for regulation and selected from the Section 1445 unregulated contaminants listed on page 25 710 of the Federal Register of July 8, 1987. Sample three was to be analyzed using EPA Method 504 for volatiles. Because of the proposed regulation of a number of synthetic organic chemicals, 26 analytes were available for the first time with this study: three new herbicides (Dalapon, Picloram and Dinoseb), two new pesticides (simazine and hexachlorocyclo-pentadiene), vydate, diquat, endothall, bis(2-ethylhexyl)dipate, butylbenzyl phthalate, bis(2-ethylhexyl)phthalate, and a selected number of the 15 PAHs (acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoran-

thene,benzo(k)fluoranthene,benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, fluorene, indeno(1,2,3-c,d)pyrene, phenanthrene, pyrene, fluoranthene and naphthalene). EMSL-CI prepares reports for each laboratory and reviews unacceptable data with the laboratory to identify and resolve problems. Once problems are corrected, a laboratory must analyze a second series of PE samples for problem parameters during a follow-up EMSL study.

C. **Environmental Monitoring and Support Laboratory, Cincinnati (EMSL-CI) Water Pollution Study.**

These studies are part of a continuing effort to provide independent evaluation of U.S. EPA regional laboratories, state laboratories, and other selected laboratories analyzing for water pollution parameters. EMSL-CI sends Water Supply PE Study samples twice a year. The study covers trace metals, minerals, nutrients (ammonia-nitrogen, nitrate-nitrogen, orthophosphate, Kjeldahl-nitrogen, and total phosphorus), demands [chemical oxygen demand (COD), total organic carbon (TOC), and 5-day biological oxygen demand (BOD)], PCBs in water and transformer oil, chlorinated hydrocarbon pesticides (insecticides), volatile halocarbons, and volatile aromatics. EMSL-CI prepares reports for each laboratory and reviews unacceptable data with the laboratory to identify and resolve problems.

D. **EPA Environmental Monitoring Systems Laboratory-Las Vegas (EMSL-LV).**

The Quality Assurance Division of EMSL-LV has been assigned the responsibility for radiation QC on environmental measurements. The EPA supplies samples to us through an extensive laboratory intercomparison studies program involving environmental media (milk, water, air, and food) and a variety of radionuclides with activities at or near environmental levels. Simulated environmental samples, containing one or more radionuclides, are prepared and periodically distributed to laboratories upon request. A report is returned to each participant. This program enables us to document the precision and accuracy of our radiation data, to identify instrument and procedural problems, and to compare our performance with that of other laboratories. Drinking-water laboratories certified for radiochemistry must satisfactorily analyze two intercomparison crosscheck samples and a set of PE samples annually. Intercomparison samples differ from PE samples in that the former contain only one or two radionuclides (for example, ^{226}Ra and ^{228}Ra), whereas PE samples for radiochemistry are complex mixtures of alpha, beta, and photon-emitting radionuclides. Contaminant concentrations are furnished to the laboratory after completion of the study.

E. **Environmental Measurements Laboratory (EML).**

EML operates the Quality Assessment Program (QAP) for the DOE. The program is designed to test the quality of the environmental measurements being reported to the DOE by its contractors. Since 1976, real or synthetic environmental samples that have been prepared and thoroughly analyzed at EML have been distributed to these contractors. We receive semiannual samples for various radionuclide, trace metal, and complex anion determinations. The sample matrices include soil, water, vegetation, tissues, and air filters. Our results are returned to EML within 90 days, compiled with EML's results, and reported to us 30 days later.

F. **National Pollutant Discharge Elimination System (NPDES).**

The U.S. EPA and state agencies with approved programs have a QA program for all major permittees under the NPDES. We receive performance samples containing constituents normally found in industrial and municipal waste waters. Participation in this program is mandated by Sec. 308(a) of the Clean Water Act. We are required to analyze and report only

those pollutants specified in our NPDES permit (cadmium, chromium, copper, iron, mercury, nickel, zinc, pH, total suspended solids, ammonia as N, nitrate as N, total phosphorus as P, and chemical oxygen demand). An evaluation of our results is returned along with the true values. A copy of the evaluation is also sent to the appropriate EPA regional office and state agency.

G. **Beryllium Intercomparison.**

We participate in a beryllium filter analysis "round-robin" intercomparison with three other laboratories that routinely perform beryllium analyses: Rocky Flats, Oak Ridge, and Livermore. Each quarter, one of the participating laboratories is responsible for preparing 60 filters containing between 0.5 and 10.0 mg of beryllium. Twenty of the filters are the cellulose-ester type generally used in personal air samplers, and the remaining 40 filters are the paper type used for environmental air sampling and surface swipes. These filters are analyzed by each of the participating laboratories. Results are reported to the quarterly sponsor within 30 days after receipt of the samples. The quarterly sponsor is responsible for conducting statistical evaluation of the analytical measurements and providing timely results to other participants.

VII. AUDITS

The nonweapons QA staff at the DOE Albuquerque Operations Office conducted a QA program review of HSE-9 during 1988. A presentation was given to the team by HSE-9, and a tour of the chemistry laboratories was taken. Jim Hines, head of nonweapons QA, Larry Ortiz, lead surveyor, and Harold Willis conducted the review. The team was accompanied by Paul Guthalls, Associate Director for Support/Quality Assurance Office, and was escorted by Rudy Valdez of the Los Alamos Area Office. No formal findings came out of this review and the team praised our QA program. Nonweapons and weapons QA are viewed with the same importance by DOE ALO, and they are striving for expansion of QA in all areas at the Laboratory.

VIII. CONTRACT LABORATORY QUALITY ASSURANCE

Our laboratory contracted very little analytical work to outside laboratories during 1988. The laboratories selected for this work were chosen on their performance rather than on cost or reputation. Quality control samples were submitted with all contracted work as a check on the reliability of the analysis. These QC samples consisted of matrix-based NIST and EPA reference materials as well as duplicates and matrix-based spikes. Analytical reports to our customers indicate when a contract laboratory performed the analyses. Contract laboratory QC data follow HSE-9 data in the various tables listed in the appendixes of this report.

IX. QC SAMPLE PREPARATION

Compounds closely related chemically to the analytes of concern are used as spikes. These spikes are used indirectly for quantitation of analytes, as well as for determination of recovery efficiency, and to evaluate analytical methodology. The analyte of interest is spiked onto blank samples of a matrix similar to that of the actual sample. The spiked sample is analyzed under the same conditions as the sample. Spikes are usually made after the samples have been returned to the laboratory, sometimes days or even longer after the samples are taken in the field. The recovery of both laboratory spikes and field samples is made with due consideration for differences of behavior that can occur between naturally incorporated substances and those added artificially. An analyte strongly associated with other components in the sample matrix may not be recovered as efficiently as is an analyte from the blank matrix that we spike and then immediately extract.

Recovery of analytes is influenced by such factors as sample matrix, concentration of the

analytes, and storage time. Because recovery often varies with concentration, our spikes and analyte concentrations are as close as practical. Recoveries of the analytes of interest are inferred from those found when spiked materials are used. Recovery data for the bioassay, tissue, and waste-water programs, as well as a comparison of recovery of HSE-9 spiked samples with recovery of samples from the NIOSH PAT Program, are shown in App. F (Tables F-I to F-X).

A. Bioassay Quality Assurance Program

QC samples for the bioassay program are prepared by spiking the analytes of interest into blank urine samples. These spiked samples compose 10% of the routine sample load. Appendix F summarizes spike recovery results. The main areas of the bioassay program are discussed below.

1. *Tritium.* The results reported in 1988 were obtained on a Packard Tri-Carb Model 4530 liquid scintillation spectrometer without benefit of internal quench correction. A 5% quench correction factor was applied to each sample. All tritium QC solutions and routine reference standards were calibrated against NIST SRM 4927-B. The mean background for 1988 data was 200 counts in 10 min, and the 0.05 confidence level was 0.1 μCi/L of urine. The recovery of tritium in QC samples averaged 103 ± 11%.

2. *Depleted uranium.* The reference standard used for uranium bioassay was prepared from NIST SRM 950a and contained 1 μg/L of normal uranium. Aliquots of this solution are used to prepare the calibration curve used with each set of routine samples analyzed and to prepare the QC samples. Because Laboratory employees are working with and are potentially exposed to depleted uranium (0.18% ^{235}U content by mass), the values in Apps. C and F reflect the concentration of depleted uranium relative to the concentration of ^{235}U. This value is obtained by dividing the uranium concentration by 4 (for example, 1 μg of normal uranium containing 0.72% ^{235}U divided by 4 is equal to 4 μg of 0.18% depleted uranium). The 0.05 confidence level for this procedure, delayed-neutron activation (DNA), is based on the counts observed on blank urine samples analyzed concurrently with the routine samples. The mean background count for the data collected in 1988 was 89 ± 11 counts (one sigma). Each sample set had a different set off background values, but, as expected, 95% of the values fell within the two-sigma limits. The MDA for the procedure is calculated from the standard deviation about the linear regression calibration curve. This curve is obtained by using the regression of the observed counts on the uranium standard concentration added to blank urine samples. Four standards and two blanks are analyzed with each set of samples. For 1988 analyses, the MDA was 4 ± 1 μg/L (one sigma). The recovery of uranium in QC samples averaged 102 ± 17%. The large standard deviation associated with the ^{238}U analysis in urine is related to the measurement of depleted uranium and its corresponding low production of neutron counts. The uranium standard used in the bioassay program is only 0.18% enriched.

3. *Enriched uranium.* QC samples are spiked with an enriched-uranium standard (93.16% ^{235}U) prepared from NIST SRM U-930 and are analyzed concurrently with the routine samples. The analyst uses a separate dilution of this same NIST standard to prepare the calibration curve in blank urine. The 0.05 confidence level for the detection of enriched uranium by DNA is based on counts from blank urine samples. The mean background count for the method in 1988 was 89 ± 11 counts at the one-sigma level. The MDA for samples containing 93% enriched uranium is calculated from the standard deviation about the intercept of the linear regression calibration curve. This corresponds to 1 pCi/L for 1988 data. The recovery of ^{235}U in QC samples averaged 89 ± 8%.

4. *Plutonium.* During 1988, the mean recovery of QC samples, prepared by adding ^{239}Pu to blank urine samples, averaged 99 ± 12% after correction for the ^{242}Pu tracer chemical losses.The mean recovery of ^{238}Pu was 100 ± 12%. The mean tracer recovery of all samples containing 2.1 pCi of ^{242}Pu, added by the analyst at the beginning of analysis, was 84 ± 8% (one sigma). The standard deviation associated with the QC samples was a function of ^{239}Pu activity level.

5. *Americium.* The mean recovery of ^{241}Am added to blank urine QC samples averaged 101 ± 6% after correction for the ^{243}Am tracer chemical losses. The mean tracer recovery of all samples containing 1.8 pCi of ^{243}Am, added by the analyst at the beginning of analysis, was 88 ± 9% (one sigma). The standard deviation associated with the QC samples was a function of ^{241}Am activity level.

The distribution of alpha activity associated with the analysis of blank urine samples was used to determine the detection limits for the plutonium bioassay procedure. These data demonstrated a Poisson distribution about a mean of 1.13 counts/1000 min in the ^{239}Pu area. By the use of the Currie[22,23] method for calculation of the detection limit for low alpha activity, the MDA for the plutonium procedure is as follows:

$$\text{MDA} = \sqrt{1.13} \cdot 4.65 + 3 \qquad (4)$$
$$= 8 \text{ counts.}$$

Currie recommends that the exact Poisson distribution be applied for the accurate setting of critical levels and detection limits if background counts are less than five. The introduction of 3 counts in Eq. (4) follows Currie's theory that 2.71 counts (rounded to 3) may be associated with a zero blank case. Currie also recommends for extreme low-level counting that the value 2.71 be added if fewer than 70 background counts are observed. Samples with 8 or fewer counts are considered not detected at the 0.05 confidence level. Nine counts represent measurement level of 0.01 pCi/L of sample.

B. Tissue Quality Assurance Program

The USTR is interested in the uptake, distribution, and retention of all of the transuranic elements in the human body. The greatest concerns at the present time are for the isotopes of plutonium and americium because production and use of these radionuclides have been more extensive than for the other transuranic elements, resulting in a greater number of workers potentially or actually exposed to internal depositions.

Extensive animal studies have been made of the biokinetics and toxicology of transuranics. Extrapolation of these findings from animal experiments to man cannot be considered reliable until supplemented and supported by human data. Therefore, the primary objective of the USTR is to obtain improved understanding of the biokinetics and dosimetry of the transuranic elements in humans through analysis of autopsy tissues of occupationally exposed workers and to provide basic scientific data for radiation protection standards.

The USTR program relies entirely upon securing samples of various organs at autopsy or receipt of donated whole bodies of occupationally exposed personnel. HSE-9 performs the radiochemical analysis of USTR autopsy tissue samples.

Attempts have been made to use several different matrices for the preparation of routine QC samples that simulate bone and tissue. Among the matrices used were spiked aliquots of calcium phosphate; human tissues spiked with ^{238}Pu (liver, lung, bone, kidney, lymph node, and thyroid); and animal liver, lung, and bone spiked with ^{238}Pu. Previously analyzed tissue samples were overspiked with ^{238}Pu and were also used as QC samples.

None of these matrices was entirely satisfactory because the characteristics of individual sets of human tissues were not predictable (they had different ashing and dissolution characteristics). The addition of ^{242}Pu tracer is a more realistic method of monitoring the chemical procedure and satisfies the needs of the QC program. The mean tracer recovery of all tissue samples containing 3.95 pCi of ^{242}Pu, added by the analyst at the beginning of analysis, was 84 ± 13%. Tissue samples were also analyzed for ^{242}Am, and the mean tracer recovery of all tissue samples containing 1.83 pCi of ^{242}Am tracer was 93 ± 5%. Appendix F summarizes data on blanks and on spike recovery.

We have decided to analyze either NIST SRM 4351 human lung or NIST SRM 4352 human liver quarterly. NIST states there is such significant inhomogeneity in the lung SRM, primarily because of fine particles containing plutonium, that a working sample should be an entire bottle (45 g). Smaller aliquots are not certified. More frequent analysis of entire bottles of these SRMs is prohibitive because of cost. NIST does not mention inhomogeneity in the liver SRM. Two-gram aliquots of NIST SRM 4352 were overspiked with ^{238}Pu and were run as QC samples during 1988. The data are summarized in App. F.

C. Organic Chemistry Quality Assurance Program

For many years, the Organic Chemistry Section has analyzed a variety of matrices for a wide selection of organic compounds in support of the Laboratory's industrial hygiene program. Industrial hygiene samples collected on charcoal and silica tubes, organic vapor monitors, polychlorinated biphenyls (PCBs) in soil, air and oil, and products that hygienists feel are hazardous to a worker's health are examples of these sample types. The number and type of organic analyses have expanded in recent years to meet the needs of the Laboratory's environmental compliance efforts. This trend continued during 1988 with the analysis of water and soil samples for volatile and semivolatile organic compounds (SVOC), herbicides, and pesticides. QC preparation techniques were developed in support of these new analytical requirements. The following organic QC sample preparation procedures are extracted from written QC procedures developed for use in our laboratory:

1. *Charcoal tubes*. The majority of industrial hygiene samples are organics collected on charcoal tubes. These organics are analyzed by gas chromatography using flame ionization detection. To run these samples as routinely as possible, the Organic Chemistry Section analysts assume that a standard 10-L sampling volume was used and set up the calibration curve accordingly. A typical calibration curve will run 0.1-2 times the TLV of the compound of interest. TLVs are obtained from "Threshold Limit Values and Biological Exposure Indices for 1988-1989," by the American Conference of Governmental Industrial Hygienists.[31] If a TLV is not available for a certain compound, the analyst assumes a range of 1-10 mg per tube. The following example shows how to determine the range used to prepare a QC sample:

   a. Obtain the TLV for the compound of interest, in this example, benzene: TLV = 30 mg/m^3 or 30 μg/L (1 m^3 = 1000 L).

   b. Assume a 10-L sampling volume: 30 μg/L x 10 L = 300 μg.

   c. One TLV is equivalent to 300 μg. The spike range should be between 0.1 and 2 TLV; therefore, the amount of benzene spiked onto the charcoal tube would be 30-600 μg.

A stock solution is prepared gravimetrically by adding 1-3 organic compounds to the solvent of choice. Carbon disulfide has been the primary solvent for industrial hygiene sample charcoal tubes. Methanol was used this year as the solvent for environmental pore gas samples because it lacks benzene,

an impurity found in carbon disulfide. The stock solution is prepared at a concentration level such that 2-15 μL is spiked on the small tube with a gas-tight syringe to obtain the desired spike range. Up to 25 μL can be spiked onto large charcoal tubes. The stock solution should be spiked onto the middle 80% of the charcoal bed to decrease loss of the volatile solvent. Most charcoal tubes are spiked with compounds of interest in the range of 0.3-2.0 mg/tube. The following procedure is used in spiking charcoal tubes:

a. Measure the chosen volume of stock solution into the syringe.

b. Place the syringe needle into the center of the tube and halfway into the front charcoal bed.

c. Slowly expel the solution, making certain no glass surfaces become wet.

d. Withdraw the syringe, cap the tube, and seal with Parafilm. Allow the spike solution to adsorb on the charcoal for at least 4 h. Refrigerate all samples pending analysis. Table F-X demonstrates how well we prepare charcoal tubes. The percent recovery of charcoal tube QC samples prepared by HSE-9 is compared with the percent recovery of the NIOSH PAT samples. All samples were analyzed together as a set.

2. *Fluorisil tubes.* Air sampling for halogenated compounds, such as PCBs, requires fluorisil tubes. PCBs are then analyzed by gas chromatography using electron capture detection. The electron capture detector is very sensitive to halogenated compounds but can easily be saturated. Because of this sensitivity, the analyst prepares a calibration curve in the range of 0.01-10 mg/mL of diluent. QC samples should be spiked in this range as follows:

a. Assume that the analyst will desorb small tubes with 2 mL of desorbant.

b. Spike two times the range of the calibration curve or 0.02-20 μg of PBCs on a fluorisil tube.

3. *Organic vapor monitors.* Occasionally compounds will be sampled by diffusion onto an organic vapor monitor (OVM) manufactured by 3M Corporation. These monitors are not suitable for all organics, and the calculations to obtain spike ranges are different from those used for charcoal tubes. Both information on suitable solvents and calculations is obtained from the "3M Brand Organic Vapor Monitor #3500 Compound Guide" available from the Occupational Health and Safety Products Division of 3M.[32] The following steps describe how to determine a suitable spike level and how to spike the compound on the badge:

a. Remove the plastic ring and white film from a monitor.

b. Place a 25-28 mm diameter Whatman No. 41 paper filter on the spacer plate.

c. Snap the closure cap on the monitor and close both ports.

d. Calculate the amount of material to be injected. The formula below will calculate the injection amount, in milligrams, that corresponds to the amount that would be collected by a monitor at chosen sampling conditions. A recovery coefficient can be generated by varying the chosen concentration levels and exposure times.

$$W = (K_o) \cdot (C) \cdot (t) \cdot (10^{-6}\ m^3/cm^3),$$

where W = amount of liquid injected (mg),
K_o = sampling rate of monitor (cm^3/min),
C = average concentration (mg/m^3), and
t = sampling time (min).

e. Prepare a stock solution in carbon disulfide such that a 5-12 mL injection is needed to spike the required number of milligrams of the compound. Assume an average concentration of one TLV and an 8-h exposure (t = 480 min). Determine that these assumptions do not recommend a spike level that exceeds the capacity of the monitor for the compound of interest. The example below uses benzene to determine the spike range for an OVM.

(1) Find benzene in the Analysis Guide section of the "3M Brand Organic Vapor Monitor #3500 Compound Guide."

(2) Obtain the sampling rate (K_o) and the capacity:

K_o = 35.5 ± 0.6 cm^3/min, and capacity = 13 mg.

(3) Find the TLV of benzene (TLV = 30 mg/m^3).

(4) Use the values in the following equation:

W = (35.5 cm^3/min) (30 mg/m^3) (480 min) (10-6 $m3/cm^3$) = 0.51 mg.

(5) Make sure the spike range does not exceed the monitor capacity. The spike range for benzene is 0.1-2 TLV or 0.05-1.02 mg.

(6) Inject 5-12 μL of the stock solution onto the filter paper through the center port.

(7) Allow the monitor to sit 16-24 h for total transfer of the organic material from the filter paper to the sorbent before elution.

(8) Remove the filter paper from the monitor.

(9) Refrigerate the sample pending analysis.

4. *Oil samples*. Oil samples were received for the analysis of PCBs and organic solvents. The majority of these oils awaits disposal by the Waste Management Group, HSE-7, and includes oil from decommissioned transformers. The remaining oil samples were environmental or industrial hygiene samples taken from areas of possible contamination.

Quality control samples for PCBs were prepared by diluting EPA standards or by preparing standards in hexane from the pure compound. In the United States the only PCBs that have been found in transformers have been PCB 1242, 1254, and 1260. Samples submitted for analysis have contained only these PCBs, so these

PCBs have been used to spike quality control samples.

Vacuum pump oil was chosen for the oil base blank after an experiment with various brands of motor oil showed excessive matrix interferences. Methods for preparing PCB in oil quality control samples follow:

a. The spike range for these analytes is 5-500 μg/g.

b. Prepare a stock PCB standard by dissolving the pure compound in hexane to a concentration of 250-280 mg per 5 mL of hexane. Add 20 μL-2 mL of stock PCB to approximately 220 g of blank vacuum pump oil. Add from one to three different PCBs at three concentration levels. The PCB spike range should be 5-500 μg/g oil. Shake samples overnight in an ultrasonic mixer before aliquots are taken and submitted for analysis.

c. EPA standards are available in capacitor, hydraulic, and transformer oils at concentrations of 10, 50, and 500 μg/g. Directly spike these standards into 20-g aliquots of blank vacuum pump oil, using 0.25-0.75 g of the 500-μg/g standard or 2.5-7.5 g of the 50-μg/g standard. Shake samples overnight in an ultrasonic mixer before submitting for analysis.

5. *Mixed solvents.* During 1988 it was decided to stop analyzing solvents dissolved in vacuum pump oil by gas chromatography with a mass selective detector because the oil was difficult to flush from the system in preparation for other analyses. A mixed solvent matrix was chosen instead.

   a. The spike range is 0.3-1.25% by weight or 50-300 μg/mL.

   b. Add approximately 4 mL of solvent, such as methyl isobutyl ketone, chloroform or mineral oil to a clean, tared 5-mL volumetric flask. Record the mass. Do NOT tare the balance.

   c. Add between 0.02-0.10 g of 2 to 4 standard grade organic compounds to the flask. Record the mass after each addition. Do NOT tare the balance between additions. Determine the mass of each individual standard and the primary solvent by difference. Mix by inverting 5-10 times. Place the sample in a vial with minimal headspace.

   d. Determine percent solvent by weight or mass/volume concentration.

6. *Soil samples.* Soil samples are received for the analysis of volatile and semivolatile organic compounds (VOCs and SVOCs), pesticides, and herbicides for compliance work done under the Resource Conservation and Recovery Act (RCRA). Certified matrix-based reference materials were not available for these analyses, so stock solutions of the analytes were prepared and were spiked directly on blank soil by the QA section. Because homogeneity of the sample could not be ensured, the entire sample was analyzed. The VOCs are analyzed by gas chromatography/mass spectrometry. In the last 12 months, the detection limit for these compounds has decreased by a factor of 100 because of a change in the technique used to introduce the samples into the gas chromatograph. This lower detection limit was accomplished by utilizing a heated purged trap methodology instead of purge and trap performed at ambient temperature. The in-house QC samples are now spiked in the μg/kg range to reflect this change in detection limits. The following procedures were used in the preparation of these samples:

   a. Volatile organic compounds.

   (1) Spike range for these analytes is 100-200 μg/kg of soil.

   (2) Place 8 mL of methanol in a 10-mL volumetric flask. Stopper and tare the flask on a balance.

   (3) Dilute 2 to 4 standard grade VOCs by adding 15-20 μL (10-30 mg) of each to the methanol. Add the compounds by drops from a 50-μL syringe just above the surface of the methanol. This technique eliminates loss resulting from syringe emplacement in the volumetric flask. Record the mass of the compound added and tare the balance. Repeat for each compound. Dilute sample to volume with methanol. Invert the flask three times to mix. Discard the solution in the neck of the volumetric flask because it may not be thoroughly mixed.

   (4) Prepare a 1:40 dilution of the above solution by adding 250 μL of the stock to a 10-mL volumetric flask

and diluting to volume with methanol. Invert the flask three times to mix. Discard the solution in the neck of the flask.

(5) By keeping stock solutions and their dilutions in vials with zero headspace and stored at -20°C, we demonstrated that they are stable for six months.

(6) Tare a clean, 4-mL, flat-bottomed glass vial. Weigh a 3- to 4-g aliquot of blank soil into the vial. The blank soil used for QCs has been tested by our laboratory and was determined to be organic free. Tamp the sample and add more soil repeatedly to assure leaving NO headspace. Record the mass.

(7) Spike the soil with 20-50 μL of stock solution. Refrigerate the samples until analysis. These samples are subject to loss of the organic analytes after preparation and should be analyzed as soon as possible.

b. Semivolatile organic compounds.

(1) Spike range for these analytes is 50-150 μg/sample.

(2) Add 5-15 mg of each of 2 to 4 standard grade semivolatile acid compounds to a clean 10-mL volumetric flask. Because many of these compounds are solid, add the first compound to an empty, tared volumetric flask. Record the mass and tare the balance. Repeat for each of the remaining compounds. Dilute the sample to volume with acetone after adding the last compound. Our experience has demonstrated that refrigerated stock solutions are stable for two weeks.

(3) Dilute 2 to 4 standard grade base/neutral compounds by adding 5-15 mg of each to a second, clean 10-mL volumetric flask. Add solid compounds first. Add approximately 8 mL of acetone and then add liquid compounds by drops from a syringe just above the surface of the acetone. Record the mass of each compound added and tare the balance between compounds. Dilute to volume with acetone. Invert the flask several times to mix. Refrigerated stock solutions are stable for two weeks.

(4) Provide both stock solutions to the Organic Section. They will spike the designated volume ofeach solution onto 30 g of blank soil.

c. Pesticides and herbicides.

(1) Spike range for these analytes is 1-10 μg/g of soil.

(2) Place 90 mL of a 1:1 hexane/acetone mixture in a 100-mL volumetric flask. Stopper the flask and tare the balance.

(3) Add approximately 10-20 mg of a standard to the flask and record the weight. Tare the balance. Repeat for each standard used.

(4) Dilute to volume and mix by inversion. Refrigerated stock solutions are stable for two weeks.

(5) Weigh 1-g aliquots of soil into 4-mL, flat-bottomed glass vials. Record the mass of each soil sample.

(6) Spike soils with 10-50 μL of stock solution. Cap the vials and submit for analysis.

d. Polychlorinated biphenyls.

(1) Spike range for these analytes is 20-50 μg/g soil.

(2) Weigh 10 g of blank soil into a clean 60-mL glass jar with a Teflon-lined screw cap. Record the mass.

(3) Spike 20-50 μL of EPA PCB standards in isooctane or methanol, with concentrations between 1000-10 000 μg/mL, by placing drops on the surface of the soil using a 50-μL syringe. Record the volume added. Replace the Teflon-lined screw top and submit for analysis.

7. *Water samples.* The majority of samples submitted during 1988 were environmental compliance samples for the analysis of pesticides, herbicides, semivolatiles, volatiles, and PCBs. Methods were developed and refined for in-house preparation of quality control samples for volatile and semivolatile organics in water. Loss of the volatile compounds was the most difficult problem to overcome. The following methods reflect measures taken to decrease this loss:

a. Volatile organic compounds.

(1) Spike range for these analytes is 50-100 μg/L of water.

(2) Add 9 mL of methanol to a clean 10-mL volumetric flask. Stopper the flask and tare it on a balance.

(3) Dilute 2 to 4 standard grade VOCs by adding 15-20 μL of each to the methanol. Add the compounds by drops from a syringe held just above the surface of the methanol. This technique eliminates loss resulting from syringe emplacement in the volumetric flask. Replace the stopper in the flask and record the mass of the compound added, then tare the balance. Repeat for each compound. Dilute the sample to volume with methanol. Invert the flask three times to mix. Discard the solution in the neck of the volumetric flask. Stock solutions in vials with zero headspace are stable for six months when kept at -20°C.

(4) Further dilute this solution 1:20 in methanol by adding 500 μL of the stock to 8 mL of methanol and diluting to volume. Invert the flask three times to mix. Discard the solution in the neck of the flask.

(5) Spike 20-50 mL of the 1:20 dilution into approximately 45 mL of deionized, distilled water in a 50-mL volumetric flask. Dilute to volume with the same water. Invert three times to mix. Discard the solution in the neck of the flask and transfer the sample to a 1-oz bottle with zero headspace. Stopper with a cap that is fitted with a Teflon-lined septum. Refrigerate until analysis.

b. Semivolatile organic compounds.

(1) Spike range for these analytes is 20-150 μg/L of water.

(2) Add 2-15 mg of each of 2 to 4 standard grade semivolatile acid compounds to a clean 10-mL volumetric flask. Since many of these compounds are solid, add the first compound to an empty, tared volumetric flask. Record the mass and tare the balance. Repeat for each of the remaining compounds. Dilute the sample to volume with acetone after adding the last compound. Refrigerated stock solutions are stable for two weeks.

(3) Dilute 2 to 4 standard grade base/neutral compounds by adding 2-15 mg of each compound to a second clean, tared 10-mL volumetric flask. Add solid compounds first. Record the mass and tare the balance

between additions. Add approximately 8 mL of acetone, stopper the flask and tare the balance, then add any liquid compounds by drops from a syringe held just above the surface of the acetone. Record the mass of each compound added and tare the balance between compounds. Dilute to volume with acetone. Invert the flask several times to mix. Refrigerated stock solutions are stable for two weeks.

(4) Prepare a 1:10 dilution of these two stock solutions by adding 1 mL of the base/neutral stock and 1 mL of the acid stock to approximately 7 mL of acetone in a clean 10-mL volumetric flask. Dilute to volume with acetone.

(5) Transfer 1 mL of the 1:10 dilution to about 950 mL of deionized, distilled water in a 1.0-L volumetric flask. Dilute to volume with the same water. Invert several times to mix. Refrigerate the sample until analysis.

c. Herbicides.

(1) Spike range for these analytes is 1-10 μg/L.

(2) Add 0.01-0.10 g of standard grade herbicide to an empty, tared 100-mL volumetric flask. Record the mass and tare the balance. Repeat for each additional herbicide. Dilute to volume with methanol.

(3) Dilute this stock solution by adding 1 mL of stock to a 100-mL volumetric flask and dilute to volume with methanol.

(4) Transfer 1 mL of the 1:100 dilution to a 1-L volumetric flask and dilute to volume with deionized, distilled water. Invert several times to mix. Submit the entire sample for analysis.

d. Pesticides.

(1) Spike range for these analytes is 0.05-0.5 ug/L.

(2) Add 0.005-0.050 g of pesticide to an empty, tared, 100-mL volumetric flask. Record the mass and tare the balance. Repeat for each additional pesticide. Dilute to volume with acetone.

(3) Dilute this stock solution by adding 1 mL of stock to a 100-mL volumetric flask and dilute to volume with acetone.

(4) Make a second dilution of the stock by taking 1 mL of the 1:100 dilution and dilute to 10 mL with acetone.

(5) Transfer 1 mL of the 1:10 dilution to a 1-L volumetric flask and dilute to volume with deionized, distilled water. Invert several times to mix. Submit the entire sample for analysis.

e. Polychlorinated biphenyls.

(1) Spike range for these analytes is 5-20 μg/L.

(2) Add 25-100 μL of 1000 μg/mL EPA PCB standard, in a solvent such as isooctane, to a 5-mL volumetric flask and dilute to volume with methanol.

(3) The Organic Section will spike 1 mL of this stock into 1 L of deionized, distilled water.

D. Environmental Radiochemistry Quality Assurance Program

Quality control samples for radioactive constituents are obtained from outside agencies

as well as being prepared internally. The Quality Assurance Division of EMSL-LV distributes reference soil samples that have been characterized for ^{235}U, ^{238}U, ^{228}Th, ^{230}Th, ^{232}Th, ^{226}Ra, ^{228}Ra, and ^{210}Pb. The NIST provides several soil and sediment SRMs for environmental radioactivity. Soil, rock, and ore samples obtained from the CGS are used for quality control of uranium and thorium determinations in silicate matrices. Our own "in-house" QC samples are prepared by adding known quantities of liquid NIST or EPA radioactivity standards to blank matrix materials. The mean tracer recovery of all samples analyzed for plutonium, that contained 5.05 pCi of 242Pu added by the analyst at the beginning of analysis, was 75 ± 10% (one sigma). Samples with less than 35% recovery of tracer are reanalyzed.

E. **Environmental Inorganic Quality Assurance Program**

Quality control for the stable constituent analysis program is maintained by analysis of certified or well-characterized environmental samples. The NIST has a large set of silicate, water, and biological SRMs. The EPA distributes mineral analysis and trace analysis water standards. Rock and soil reference materials have been obtained from the CGS and the USGS. The analytical quality control program for a specific batch of samples is the combination of "fit of the calibration," instrument drift, calibration of the instrument and/or reagents, recovery of SRMs, and precision of results. In addition, there is a program for evaluation of the quality of results for an individual water sample as described in Sec. X.

1. *Stable elements on filters.* The Industrial Hygiene and Environmental Surveillance Groups sample for the presence of airborne stable elements in Laboratory work areas and in the local air-shed by passing a measured volume of air through filters. Work surfaces, such as laboratory benches, fume hoods, and machine tools, are swiped to monitor for the presence of selected elements. Millipore cellulose acetate, Gelman cellulose ester fiber and cellulose nitrate, and Whatman cellulose paper filters are used for sampling. The spike range for the in-house QC samples depends upon the analytical methodology used and the sensitivity of analysis requested by the customer. Filters are analyzed by instrumental thermal neutron activation (ITNA), delayed neutron activation (DNA), inductively coupled plasma mass spectrometry (ICPMS), and atomic absorption spectrometry (AA). Commercial stock solutions are available in the range of 100-10 000 μg/mL. The following technique is used to prepare QC samples for these analyses:

a. Determine the QC spike range that will fall within the middle 70% of the analyst's standard curve.

b. Determine the concentration of standard needed to spike a volume between 10-100 mL onto the filter. If a stock standard is available at the appropriate concentration, make a direct spike of the standard. If the proper concentration is not available, prepare a dilution of one of the available standards in 1-10% nitric acid or 1-10% hydrochloric acid using the same matrix as the standard.

c. Place a blank filter on a clean beaker or bottle cap for support such that 80-95% of the filter surface is within the rim of the beaker.

d. Spike 10-100 mL of the stock standard or an appropriate dilution onto the middle of the filter. Repeat for each analyte. Several analytes may be spiked onto the same filter but drying may be necessary between spikes if the total volume of all solutions to be added exceeds the capacity of the filter, or if the volume spiked spreads to or beyond the surface supporting the filter.

e. Dot the spiking solution evenly around the filter to assure the proper geometry for irradiation when preparing samples for analysis by ITNA or DNA.

f. Dry the filters in the air or under a heat lamp. Submit the samples for analysis.

2. *Stable elements in oil-based solvents.* The Waste Management Group samples many oil drums to determine disposal protocol. The Inorganic Section analyzes these samples for As, Ba, Cd, Cr, Pb, Hg, Ni, Se, Tl, and Zn. The three techniques employed in analysis are inductively coupled plasma mass spectrometry (ICPMS), electrothermal vaporization atomic absorption (ETVAA), and flame atomic absorption (FAA). Commercial organometallic standards were available for all of the above elements except thallium, and we researched a method for making an organothallium standard. After trying several inorganic and organic thallium salts, we were able to create a stable thallium standard by combining thallium acetylacetonate with 2-ethylhexanoic acid that acts as a stabilizer. All of the commercial standards were available at concentrations of 5000 μg/g except for As, Se, and Hg which were available at 100 μg/g levels.

a. Add 2 g of a 5000-μg/g organometallic standard to a clean, tared 100-mL polypropylene bottle. Record the mass added but DO NOT tare the balance. Repeat for the remaining 5000 μg/g elemental standards. Add 1-mL of commercial stabilizer solution. Add the manufacturer's 75 Base Oil to bring the total mass to 100 g. This is the working standard for Ba, Cd, Cr, Pb, Ni, Ag, and Zn and is 100 μg/g for each of these elements. Cover with foil to prevent deterioration of silver from the light.

b. Make a 100 μg/mL working standard of thallium acetylacetonate by adding 3.7 mg of thallium acetylacetonatea and 250 μL of 2-ethylhexanoic acid. Dilute to volume with xylene.

c. Preparation of the in-house QC sample depends upon which instrument will be used for the analysis. Both the solvent of choice and the spike range vary with the analytical technique as listed in Table I.

d. Determine the number of micrograms of each 100 μ/g standard necessary to give the appropriate concentration in a total volume of 100.0 mL.

e. Add the desired amount of the first standard solution to a clean, tared 100-mL volumetric flask. Record the mass. Tare the balance and repeat for all remaining standards, except thallium. Add the desired volume of thallium standard by automatic pipette. Dilute to volume with the appropriate solvent listed above. Mix well.

f. Submit the QC sample for analysis. QC samples must be prepared for each sample set. Stability studies are being performed.

3. *Trace elements in water.* Water samples are received for the analysis of many stable elements and compounds, some of which are unique to our work environments at the Laboratory and to northern New Mexico where levels of silicates and natural uranium are higher than in other parts of the country. Quality control efforts involve preparation of samples with single and multiple elements or compounds in dilute acid matrices. The acid matrix of choice depends upon the elements present. Most samples are prepared in 1-10% nitric or hydrochloric acid. Use is made of several different commercially available single and multiple element aqueous standards including solutions prepared by EPA and NIST. For some QC samples, such as the preparation of Cr+6, the sample is prepared gravimetrically from a pure inorganic

TABLE I. QC Preparation Based on Analytical Technique

Instrument	Spike Range	Solvent
ICPMS	0.5-1.0 μg/mL	kerosene
ETVAA	0.5-1.0 μg/mL	methylisobutyl ketone
FAA	4-6 μg/mL	d-limonene methylisobutyl ketone

compound, potassium dichromate. The water samples are analyzed by a variety of techniques including ICPMS, inductively coupled plasma atomic emission spectrometry (ICPAES), ETVAA, cold vapor atomic absorption spectroscopy (CVAA), FAA, ion chromatography (IC), ion selective electrodes (ISE), and spectrophotometry.

a. Determine the total volume of sample needed by the analyst for analysis of all elements present by the appropriate techniques.

b. Determine the total volume of sample concentration for each element or compound so that the QC will fall in the middle 70% of the analyst's standard curve for each analysis. The total volume multiplied by the final desired concentration gives the mass of the element to be spiked in the sample.

$$1.0 \text{ L} \times 2.5 \text{ mg/L} = 2.5 \text{ mg } Cr^{+6}$$

c. For commercial aqueous standards, the concentration is given for the element of interest. For samples prepared from pure inorganic compounds, the weight percent of the element of interest must be determined in order to correctly calculate the concentration of that element. To prepare a 1.0 L solution of Cr^{+6} from potassium dichromate, the following amount of $K_2Cr_2O_7$ is needed:

$$X = \frac{2.5 \cdot 294.2}{2.0 \cdot 52.0}$$

$$= 7.1$$

where X = weight of K_2Cr_2O added (mg),
294.2 = molecular weight of $K_2Cr_2O_7$ (g), and
2(52.0) = twice the atomic weight of Cr^{+6} (g).

c. Prepare the acid matrix in which to spike the sample and fill the appropriate volumetric flask with deionized, distilled water to about 80-90% capacity. Slowly add enough appropriate concentrated acid to the water to get between 1-10% acid by volume. For ICPMS work we use low temperature redistilled nitric and hydrochloric acids.

d. Spike the aqueous elements singly or from a multi-elemental standard into the acid solution. Use volumetric pipettes or automatic pipettors to add the standards. Weigh solid compounds in a tared weighing boat, record the mass, and quantitatively transfer to the acid solution.

e. Dilute to volume with deionized, distilled water.

4. *Total organic halides.* Many organic compounds of special concern to environmentalists contain F, Cl, Br, and I. The total organic halide analysis gives

semiquantitative presumptive evidence of the presence of pesticides, herbicides, PCBs, and refrigerants, as well as industrial solvents, such as 1,1,1-trichloroethane. The analysis uses the MCI Total Organic Halogen Analyzer and is based upon EPA Method 450.1. The organic halides in a sample are adsorbed onto a column containing activated carbon. The column is washed with a nitrate solution to remove inorganic halide ions. The adsorbed organic material is pyrolized in an oxygen stream that produces carbon dioxide and hydrogen halides as by-products. These halides are coulometrically titrated with silver ions. The current produced upon precipitation of the silver is proportional to the halide present. This method is most sensitive to chlorine, reasonably sensitive to bromine and iodine, but is insensitive to fluorine. The results are expressed as mg/mL of chloride. We prepare the in-house QC sample by diluting a halogenated volatile or semivolatile compound, such as 2,4,6-Trichlorophenol, in methanol, and then spiking this stock into water.

a. The spike range is 0.5-2.0 mg/L.

b. Add 5-20 mg of 2,4,6-trichloro-phenol to a clean, tared 10-mL volumetric flask. Record the mass.

c. Dilute to volume with methanol. Invert several times to mix.

d. Add approximately 490 mL of deionized, distilled water to a clean 500-mL volumetric flask. Using a volumetric pipet, spike 1.0 mL of the stock solution into the bottom of the flask and dilute to volume with water. Invert several times to mix. Store in a glass container.

e. Submit for analysis.

5. *Total organic carbon.* Both drinking water and environmental samples are analyzed for TOC, which includes all carbon covalently bonded in organic molecules. These analyses are required under RCRA and the Comprehensive Environmental Response Compensation and Liability Act. Drinking water is monitored for all possible contaminants, with TOC requested only infrequently. More than 80% of the TOC analyses requested are in support of environmental compliance work, looking for evidence of contamination of ground water by sewage or other organic compounds. The TOC analysis will indicate the presence of organic carbon that may be naturally occurring or due to organic contamination, but it cannot indicate the type or source of the contamination. TOC is analyzed using an EPA approved method in which inorganic carbon is first removed or subtracted. The remaining organic carbon is oxidized by the addition of potassium persulfate at 90-100°C. The resulting carbon dioxide is purged, trapped, and then detected with a nondispersive infrared analyzer.

a. The spike range is 1-5 μg/L.

b. Dry approximately 4 g of potassium acid phthalate for 1 h at 110°C. Add approximately 2.12-2.13 g of the dried chemical to a tared weighing boat and record the actual mass.

c. Quantitatively transfer the potassium acid phthalate to a clean 1-L volumetric flask and dilute to volume with double deionized water. Concentration of the stock standard is 1 g/L.

$$1.0 \text{ g/L} = \frac{2.12 \cdot 96.08}{204.22}$$

where 2.12 = weight of $KC_8H_5O_4$ (g),
96.08 = six times the atomic weight of carbon (g), and
204.22 = molecular weight of $KC_8H_5O_4$ (g).

d. Prepare a dilution of the stock by adding 100-500 μL of the stock solution to a clean 100-mL volumetric flask and dilute to volume with double deionized water to make a 1-5 mg/L QC sample.

X. INDIVIDUAL WATER SAMPLE QUALITY ASSURANCE

The program for evaluation of the quality and internal consistency of results for an individual natural or waste-water sample was continued this year. The methods for calculation of ratios were standardized previously and a value of 1.00 ± 0.10 was established as a criterion for reporting results. Allowances are made for reporting of results that appear to be outliers if justification can be demonstrated. We monitor the following six ratios:

- Ratio of sum of meq cations to the sum of meq anions.
- Ratio of meq hardness to the sum of meq Ca^{++} and Mg^{++}.
- Ratio of total dissolved solids to the defined calculated solids.
- Ratio of observed conductivity to the sum of the individual conductivities.
- Ratio of the observed conductivity to the meq cations.
- Ratio of the observed conductivity to the meq anions.

These ratios are used as guides for identification of erroneous results. Appendix G (Table G-I) summarizes the ratios for natural waters and presents the raw data. Reanalysis of a sample for one or more chemical constituents is based on these sample quality parameters, the historical considerations, and the possible presence of constituents not requested by the investigator. Details of this approach are published separately.[33]

Complexities of instrumentation and analytical methodology impose additional needs. For instance, in atomic absorption, the interferences among flame, graphite furnace, hydride generation, and cold vapor are sufficiently different so that the same QC material may not be adequate to address all subcategories within an overall analytical technology. For example, the Cincinnati EPA office distributes samples for nonradioactive QC analysis on request. These materials sometimes impart a false sense of QA for atomic absorption analyses. These water samples for trace inorganic analysis usually do not contain calcium, magnesium, etc., which create important interference problems with many analyses on the EPA primary pollutant list. The NIST SRMs 1643A and 1643B (trace metals in water) do contain reasonable levels of these interference producers, and we have found that many of our procedures can be adjusted to produce agreement with either of these QA materials, but not with both. Therefore, in production and use of reference materials, both agencies and analysts must realize the importance of matrix matching of interferences as well as the elements of analytical interest.

XI. SUMMARY OF 1988 QUALITY ASSURANCE PERFORMANCE

A total of 15 000 QC analytes were analyzed by HSE-9 during 1988 in conjunction with the routine analysis of over 100 000 determinations giving a 15% QC level of effort. More than 2100 of these QC analytes were spiked on various matrices by the QASDM section. A summary of mean ratio data for bioassay, environmental, waste treatment, and industrial hygiene QC samples is presented in App. C, Table C-I. The mean ratios have been calculated as a function of analysis and matrix and are summarized as a mean ± one standard deviation for each matrix type. This is an appropriate way to display data for our laboratory that operates on a demand basis and may perform any given analysis only infrequently. Analyses are considered under control when the absolute value of the difference between our result and the certified or consensus mean is within two

TABLE II. Summary of Quality Assurance Tests for Analytical Data Completed During 1988

Analysis and Matrix	No. of QC	<2 Sigma (%)	2-3 Sigma (%)	>3 Sigma (%)
Stable Elements:				
Biological Materials	129	85.0	4.0	11.0
Filters	284	94.5	2.2	3.5
Bulk Materials	247	97.6	1.6	0.8
Sludge	129	96.8	1.6	1.6
Silicate Materials	4253	93.8	3.6	2.6
Water	5248	98.0	1.0	1.0
Urine	133	98.7	1.3	0.0
Radiochemical:				
Water	2735	99.0	0.4	0.6
Filters	124	95.2	2.4	2.4
Biological Materials	94	85.0	11.0	4.0
Silicate Materials	185	92.4	2.8	4.8
Urine	684	93.4	5.3	1.3
Organic:				
Water	437	63.0	10.0	27.0
Silicate Materials	79	66.0	10.0	24.0
Bulk Materials	71	95.7	2.9	1.4
Charcoal tubes	215	72.0	10.0	18.0

propagated standard deviations of the experimental uncertainty and of the certified means.

The data in Table II provide a summary of the overall state of statistical control for analytical work performed by HSE-9 during 1988. More than 92% of most radiochemical and inorganic analyses are within the ± 2 propagated standard deviations of the certified/consensus mean values and are considered under control. Trace levels of radiochemical and inorganic constituents in biological materials still provide more analytical difficulty as was demonstrated by the slightly lower level of overall analytical control. Overall control of organic analyses in bulk materials (oils, solvents, etc.) is good, but we have approximately 25% of organic determinations in water and silicate matrices outside 3 propagated standard deviations of the certified/consensus mean values. This area will be the focus of increased analytical effort during 1989. During 1988 the ^{242}Pu tracer used in the routine plutonium analysis in both the tissue and bioassay programs averaged 84% and in the environmental program averaged 75%. Americium-243 tracer recovery for the bioassay program averaged 88% and for the tissue program averaged 93%.

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APPENDIX A
GLOSSARY

Acceptable minimum detectable amount (AMDA). See detection limit.

Accreditation. A formal process by which a laboratory is evaluated with respect to established criteria for its competence to perform specified types of measurements.

ACS. American Chemical Society.

Accuracy. The degree of agreement of a measurement with an accepted reference or true value, usually expressed as the difference between the two values.

Adsorption. The physical process in which molecules of gas, dissolved substances, or liquids adhere in an extremely thin layer to the surface of solid bodies with which they are in contact.

Aliquot. Measured portion of a sample that is used in an analysis.

Alpha (α) probability. The proportion of false detection. Detection of an analyte that is not present.

Analyte. The specific component measured in a chemical analysis.

Analytical batch. Samples that are analyzed together with the same method sequence, the same lots of reagents, and with the manipulations common to each sample within the same time period. Samples in each batch should be of similar composition.

ANSI. American National Standards Institute.

Aroclor. Chlorinated diphenyl resin; dielectric; plasticizer. Monsanto Corporation marketed PCBs under the tradename Aroclor from 1930 to 1977. Aroclors were sold for use in transformers, capacitors, printing inks, paints, dedusting agents, pesticides, and many other applications.

Audit. A systematic check to determine the quality of operation of a function or activity. Audits may be of two basic types:

Performance audits. Quantitative data are independently obtained for comparison with data routinely obtained in a measurement system.

System audits. A systematic on-site qualitative review of facilities, equipment, training, procedures, record keeping, data validation, data management, and reporting aspects of a total QA system to arrive at a measure of capability of the measurement system to generate data of the required quality.

Average (mean). The sum of a series of results divided by the number of results. The symbol is $\overline{X}$.

Beta (β) probability. The proportion of false nondetection. The nondetection of an analyte that is present.

Bias. An effect that systematically distorts a statistical result. A systematic displacement of all the observations in a sample from the true or accepted value.

Bioassay. Measurements to determine the amount of material in the excreta or in other biological materials removed from the body.

Biokinetics. The science of the movements within developing organisms.

Blank. A sample that is identical, in principle, to the sample of interest, except that the substance being analyzed is absent. The measured value or signal for the substance being analyzed is believed to be due to artifacts and should be subtracted from measured sample values to give a net value caused by the substance contained in the sample. We differentiate blanks into the following categories:

Analytical or reagent blank. A blank used as a baseline for the analytical portion of a method. It may be an aliquot of analyte-free water, solvent, or carrier gas analyzed with the analytical batch and used to adjust or correct routine analytical results.

Field blank. A blank that is an aliquot of analyte-free water or a solvent brought to the field in sealed containers and transported back to the laboratory with the sample containers.

Trip blank. A blank that checks on sample contamination originating from sample transport, shipping, and from site conditions.

Equipment blank. A blank prepared in the field by collecting water that has been run over the sampling equipment prior to use to show if samples were contaminated by the sampling equipment.

Blind sample. A sample submitted for analysis with a composition known to the submitter but unknown to the analyst. A blind sample is one way to test proficiency of the measurement process.

Calibration. Comparison of one measurement standard or instrument with another standard or instrument to report or eliminate by adjustment any variation in the accuracy of the item being compared.

Calibration check. Verification of the ratio of instrument response to analyte amount, performed by analyzing for analyte standards in an appropriate solvent. Calibration check solutions are made from a stock solution that is different from the stock used to prepare standards.

CAS number. An organic compound numbering system developed by the Chemical Abstract Service.

CCRMP. Canadian Certified Reference Materials Project.

Certified reference material. A reference material with one or more property values certified by a technically valid procedure, accompanied by or traceable to a certificate or other documentation issued by a certifying body such as NIST.

Certified value. The value that appears in a certificate as the best estimate of the value for a property of a reference material.

Chain-of-custody. A procedure for preserving the integrity of a sample or of data. A written record that lists the location of the sample and data at all times. A procedure complete with signatures of those responsible for the sample.

Check sample. A blank that has been spiked with the analyte from an independent source in order to monitor the performance of the analytical method. The level of the spike should be at the regulatory action level when applicable. Otherwise, the spike shall be five times the estimate of the quantification limit. The matrix used shall be phase matched with the samples and well characterized.

COD. Chemical oxygen demand.

Concentration. The quantity of material in activity, or mass per unit volume, or mass of a sample.

Cond. Conductivity.

Confidence interval. The interval within which the estimated parameter may lie with some given degree of probability.

Confidence level. The probability associated with a confidence interval.

Consensus value. A value assigned to the concentration of an element in a reference material by an investigator who compiles available literature data on international reference materials. Many methods exist for arriving at the assigned value; the most common is the calculation of a

mean and standard deviation following the elimination of obvious outliers.

Control chart. The graphic record of values, results, samples, or controls recorded successively. The ordinate of the graph is scaled in units of the test result, and the abscissa is scaled in units of time or sequence of results.

Control limit. Limits on the control chart, established at ± 2 or 3 standard deviations from the mean, that are used as criteria for action or for judging the significance of variations between duplicate samples. Values falling outside the upper or lower control limit are considered out of control.

Data validation. The systematic review of a data set to identify outliers, suspect values, and transcription errors.

Detection limit. Examination of the analytical and radiochemical literature for an appropriate definition of the limit of detection revealed an abundance of widely ranging terminology.

Acceptable minimum detectable amount. The amount of radioactive material that analytical measurement procedures should measure with the assumption that the material is free of interference from other radionuclides.

Environmental detection limit. The smallest level at which an analyte in an environmental medium can be unambiguously distinguished, for a given confidence level by the use of a particular combination of sampling and measurement procedures, sample volume, analytical detection limit, and processing procedure.

Limit of detection. The smallest concentration of a substance that can be measured by a single measurement with a stated level of confidence.

MDA. Minimum detectable amount. The smallest amount of an analyte in a sample that will be detected with a beta probability of nondetection (type II error) while accepting an alpha probability of erroneously detecting that analyte in an appropriate blank sample (type I error). The alpha and beta probabilities are commonly set at 0.05.

MDL. Minimum detectable level (limit of detection). The limit of detection of an analytical method is the minimum concentration of the analyte of interest that can be observed by the instrument and distinguished from instrument noise with a specified degree of probability.

MQL. Method quantification limit. The minimum concentration of a substance that can be measured and reported.

Desorption. The process of freeing a substance from a sorbed state.

DNA. Delayed-neutron assay. The determination of fissionable materials through measurement of neutron emission from their neutron-rich fission products. Most commonly used for the measurement of uranium using calibration standards with a known atom % of ^{235}U.

DOE. Department of Energy.

Duplicate analysis. An analysis performed at the same time on equal quantities taken from the same sample or on two samples collected at the same time and place.

EML. Environmental Measurements Laboratory, New York, that operates the Quality Assessment Program for the DOE.

EMSL. Environmental Monitoring and Support Laboratory of the EPA, Las Vegas (LV), Nevada, and Cincinnati (CI), Ohio.

Environmental detection limit. See detection limit.

Environmental surveillance. The collection and analysis of samples of air, water, soil, foodstuffs, biota, and other environmental media from

Laboratory sites and their environs and the measurement of various analytes for purposes of demonstrating compliance with applicable standards, and assessing effects, if any, on the local environment.

EPA. Environmental Protection Agency.

Error. The difference between an observed value and its true value.

Gross alpha. The total amount of measured alpha activity without identification of specific radionuclides.

Gross beta. The total amount of measured beta activity without identification of specific radionuclides.

HSE-7. Waste Management Group, Los Alamos National Laboratory.

HSE-8. Environmental Surveillance Group, Los Alamos National Laboratory.

HSE-9. Health and Environmental Chemistry Group, Los Alamos National Laboratory.

Hard. Hardness.

H_2O^+. Bound water removed from geological materials by heating at 1000°C after removal of unbound water.

H_2O^-. Unbound water removable by drying at 110°C for 24 h.

Homogeneity. The degree to which a property or substance is randomly distributed throughout a material.

IAEA. International Atomic Energy Agency, Vienna, Austria.

Interlaboratory variability. The difference in results obtained by different laboratories when portions of a common sample are measured.

Intralaboratory variability. The difference in results when a single laboratory repeatedly measures portions of a common sample.

In-vitro. Measurements to determine the presence of or to estimate the amount of radioactive material in the excreta or in other biological materials removed from the body.

In-vivo. The measurement of radioactive material in the human body utilizing instrumentation that detects radiation emitted from the radioactive material in the body.

LIMS. Laboratory information management system.

Matrix/spike-duplicate analysis. Predetermined quantities of stock solutions of certain analytes added to a sample matrix prior to sample extraction/digestion and analysis. Samples are split into duplicates and are spiked and analyzed. Percent recoveries are calculated for each of the analytes detected. The relative % difference between the samples is calculated and used to assess analytical precision. The concentration of the spike should be at the regulatory standard level or the estimated or actual method quantification limit.

Measures of central tendency. Measures of the tendency of values within a set of data to be centered at some location (e.g., median, mode, arithmetic mean).

Measures of dispersion or variability. Measures of the differences, scatter, or variability of values within a set of numbers. Commonly used measures of the dispersion or variability are the range, standard deviation, variance, and coefficient of variation.

Median. The middle value of a set of data when the set is ranked in increasing or decreasing order.

MDA. See detection limit.

MDL. See detection limit.

Mean. Equal to the sum of units divided by the number of units (arithmetic average).

Mode. The value occurring most frequently in a data set.

MQL. See detection limit.

MSDS. Material Safety Data Sheet. Written data on the hazards and properties of a particular material, including instructions for its safe use.

NIOSH. National Institute for Occupational Safety and Health.

NIST. National Institute of Standards and Technology formerly the National Bureau of Standards, Gaithersburg, Maryland.

NPDES. National Pollutant Discharge Elimination System.

NRC. Nuclear Regulatory Commission.

Outlier. A value that appears to deviate markedly from the value for other members of the data set in which it occurs. The chance probability of its being a valid member of the group is very small. Such a questionable value may be eliminated from the group on the basis of further statistical investigation of the data set.

Overspike. The addition to a sample of a known amount of analyte over and above that which may be already present in the sample.

OVM. Organic vapor monitor.

P Alk. Phenolphthalein alkalinity.

PAT. Proficiency Analytical Testing Program from NIOSH.

PCB. Polychlorinated biphenyls are a class of 209 discrete chemical compounds, called congeners, in which one to ten chlorine atoms are attached to a biphenyl.

PE. Performance evaluation samples from EML.

Poisson distribution. The exponential limit of a binomial distribution as the probability (p) approaches zero and the number of events (n) approaches infinity. Describes the frequency pattern of counts emitted by radioactive decay in a continuous interval of time. A distribution of counts from radioactive decay greater than 20 events may be considered normally distributed and the t distribution statistics may be used to test results obtained.

Precision. The degree to which data generated from replicate or repetitive measurements agree. Frequently assessed by calculating the standard deviation in a set of data points.

Preventive maintenance. An orderly program of positive actions for preventing failure of equipment and ensuring, as much as possible, that the equipment is operating with the reliability required for quality results.

Primary standards. A class of single elements or compounds that are well-characterized, stable, homogeneous, and produced in quantity. Their physical or chemical properties have been determined within specified measurement uncertainties by a recognized national standards laboratory such as NIST or NPL. Examples include NIST SRM 83c (As_2O_3) and NIST SRM 950b (U_3O_8).

Probability. The likelihood of the occurrence of any particular form of an event, estimated as the ratio of the number of ways or times that the event may occur in that form to the total number of ways that it could occur in any form.

Proficiency testing. A systematic testing program in which a sample, or random series of samples, is analyzed by a number of laboratories to determine the accuracy of each laboratory's analysis.

QA. Quality assurance. The total integrated program of planned and systematic actions necessary to provide confidence in and assure the reliability of each analytical result or measurement reported by a laboratory.

QAP. Quality Assessment Program from EML.

QASDM. Quality Assurance, Sample, and Data Management Section.

QC. Quality control. Actions taken within a QA program to ensure validity of results. As used in this document, QC means all routine activities and checks, such as calibration of equipment, duplicate analyses, use of certified reagents, use of spiked samples etc., included in normal internal procedures to control the accuracy and precision of a measurement process.

QNS. Quantity not sufficient.

Quality assessment. The system or techniques used to verify that the entire analytical process is operating within acceptable limits. Control charts are an example.

Quality assurance manual. A written document that identifies the policies, organization, objectives, functional activities, and specific quality assurance activities designed to achieve the quality goal desired for the operation of a laboratory.

Radiobioassay. Measurements to determine the presence of or to estimate the amount of radioactive material in the excreta or in other biological materials removed from the body.

Radiotissue. Measurements to determine the presence of or to estimate the amount of radioactive material in tissues removed from the body.

Random error. Variations of repeated measurements made within a sample set that are random in nature and individually not predictable. The causes of random error are assumed to be indeterminate or nonassignable and are generally assumed to be normally distributed.

Range. The absolute value of the difference between the maximum and minimum values in a set of results.

RCRA. Resource Conservation and Recovery Act.

Reagent grade. Analytical reagent (AR) grade, ACS reagent grade, and reagent grade are synonymous terms for reagents that conform to the current specifications of the Committee on Analytical Reagent of the American Chemical Society.

Reference material (RM). A material or substance with one or more properties that are sufficiently well established to be used for the calibration of an apparatus, the assessment of a measurement method, or for the assignment of values to materials.

Regression. A statistical method for investigating the relationship between a dependent variable or response and one or more independent or predicated variables.

Reliability. The ability of an item or a system to perform a required function under stated conditions for a stated period of time.

Repeatability. The variation in data generated on a single sample by a single analyst or instrument or both over a short period of time.

Relative standard deviation (RSD). The standard deviation (precision) of a set of values divided by the arithmetic mean, $S/\overline{X}$. In this document it is expressed as percentage (%). The term is equivalent to coefficient of variation.

Replicate analysis. Repeated but independent determinations of the same sample, by the same analyst, at essentially the same time, and under the same conditions.

Replicate sample. Prepared by dividing a sample into two or more separate aliquots.

Representative sample. A sample taken to depict the characteristics of a population as accurately and precisely as possible.

Reproducibility. Variation over an extended time or by various analysts or laboratories.

Secondary standards. Materials produced by commercial organizations, laboratories, or governmental agencies that are well characterized, stable, and homogeneous. The secondary standards are produced in quantity and have one or more physical or chemical properties experimentally determined within stated measurement uncertainties. The important distinction between primary and secondary standards is that the latter may be complex natural materials (rocks, vegetation, etc.) as well as high-purity compounds or elements.

We differentiate secondary standards between two classes:

Class I. Complex materials whose composition or physical properties have been determined and certified within specified measurement uncertainties by a recognized national standards laboratory. The NIST SRM program has produced a large number of such materials for use in bioassay and environmental analyses.

Class II. Complex materials whose preparation has been similar to that of Class I materials, but whose composition has not been certified by a national standards laboratory. Certain elements in NIST SRMs and all materials from USGS, CCRMP, IAEA, or EPA fall in this category. Mean elemental concentrations are frequently established by consensus.

Sensitivity. The degree to which an instrument or method can detect a particular analyte.

Shall statements. Indicate performance criteria and procedures required to operate and maintain an acceptable QA program.

Should statements. Indicate flexible guidance for an acceptable QA program.

Spike. The addition to a blank sample of a known amount of a reference material, containing the analyte of interest.

Standard addition. A method in which small increments of a substance under measurement are added to a sample under analysis to establish a response function, or by extrapolation, to determine the amount of a constituent originally present in the test sample.

Standard curve. A curve that plots concentrations of known analyte standard versus the instrument response to the analyte.

Standard deviation. The square root of the average of the squares of the deviations of single observations from their arithmetic mean.

Standard method. A test method or procedure developed by a standards-writing organization, based on consensus opinion or other criteria, and often evaluated for its reliability by a collaborative testing procedure.

Standard operating procedure (SOP). A procedure adopted for repetitive use when performing a specific measurement or sampling operation.

Standard reference material (SRM). A reference material distributed and certified by the National Institute of Standards and Technology.

Statistical control. Errors are within acceptable levels based on values calculated from a sample of observations.

Surrogate. Organic compounds that are similar to analytes of interest in chemical composition, extraction, and chromatography that are not normally found in environmental samples. These

compounds are spiked into all blanks, standards, samples, and spiked samples prior to analysis. Percent recoveries are calculated for each surrogate and are an indication of the % recovery of the analytes in the sample.

Systematic error. The condition in which there is a consistent deviation of the results from the actual or true values by a measurement process. The cause for the deviation or bias may be known or unknown but is considered assignable.

TDS. Total dissolved solids.

TLV. Threshold limit values. Airborne concentrations of substances that represent conditions under which nearly all workers may be repeatedly exposed without adverse effect.

Tot alk. Total alkalinity.

Traceability. A hierarchical system used largely for regulatory purposes wherein transfer of accuracy among various components of a measurement system is established or inferred. For example, a working standard should be traceable to a secondary standard, Class II secondary standards to Class I secondary standards, and secondary standards to primary standards. A documented chain of comparisons connecting a working standard to a national standard such as those maintained by NIST.

Tritium. A radioisotope of hydrogen with a half-life of 12.3 years.

TSS. Total suspended solids.

Uncertainty. The range of values within which the true value is estimated to lie. It is a best estimate of possible inaccuracy due to both random and systematic error.

Uranium, natural. Uranium having an isotopic abundance the same as that normally found in the earth's crust. The $^{235}U/^{238}U$ ratio is 0.00725 (0.72 wt % ^{235}U).

Uranium, depleted. Uranium having isotopic abundance that is altered from that normally found in the earth's crust. The $^{235}U/^{238}U$ ratio is less than 0.00725. Depleted uranium is almost exclusively anthropogenic, occurring only very rarely in nature (Oklo Mine, Africa).

Uranium, enriched. Uranium having isotopic abundance that is altered from that normally found in the earth's crust, with ^{235}U in excess of 0.72 wt %. The $^{235}U/^{238}U$ ratio is greater than 0.00725. Enriched uranium is exclusively anthropogenic in origin.

Uranium, total. The amount of uranium in a sample, calculated by summing the contributions from all the isotopes. Total uranium in a sample may be derived from enriched, depleted, or natural isotopic abundance uranium, or any combination of the three.

USGS. United States Geological Survey.

USTR. United States Transuranium Registry.

Variance. The sum of the squares of the difference between the individual values of a set and the arithmetic mean of the set, divided by one less than the number of values. The square of the standard deviation.

VAX. Virtual Address Extension. VAX is a high-performance, multiprocessing computer system based on a 32-bit architecture. VAX is made by Digital Equipment Corporation.

VAX/VMS. The abbreviation for Virtual Address Extension/Virtual Memory System. The operating system for VAX computer systems.

Working standard. A secondary or in-house standard that has been calibrated against a primary reference standard.

APPENDIX B
COMPUTER SOFTWARE

Typical Terminal Session for
QACHECK Computer Program

TYPICAL TERMINAL SESSION FOR QACHECK COMPUTER PROGRAM

```
Username: USER
Password: XXXXXX

**************************************************************************
**************************************************************************

     Last interactive login on Monday, 27-MAR-1988 14:55
     Last non-interactive login on Monday, 27-MAR-1988 08:21


USER$ QACHECK
ENTER THE NUMBER OF YOUR CHOICE AND <CR>,

     1. PRELIMINARY REPORT

     2. FINAL REPORT

     3. NEWREPORTQA (QACHECK THAT WRITES TO SAMPLES DATABASE)

     4. QACHECK  (THIS DOES NOT WRITE TO SAMPLES)

     9. EXIT.  RETURN TO USER PROCESS

MENU CHOICE?: 3
DO YOU WANT TO ENTER QA THROUGH QACHECK? [Y/N]: Y
Enter ANALYST INITIALS (UP TO 3 CHARACTERS): ESG
Enter # OF DIFFERENT QA MATERIALS TO BE CHECKED AT THIS SESSION: 3


Enter HSE-9 SAMPLE NUMBER OF QA MATERIAL: 00.00533
Enter ANALYTICAL TECHNIQUE USED (UP TO 5 CHARACTERS): TCGS
Enter # OF DIFFERENT REQUEST NUMBERS TO BE ASSIGNED TO THIS QA: 1
Enter REQUEST NUMBER FOR THIS QA: 1111
Enter # OF ANALYSES OF THE SAME QA MATERIAL AND ANALYTICAL METHOD: 2

     Enter ANALYSIS (UP TO 10 CHARACTERS): B
     UNITS OF ENTRY MUST BE UG/G
     Enter RESULT     : 30.
     Enter UNCERTAINTY: 1.
     ANALYSIS UNDER CONTROL FOR 00.00533 B


     Enter ANALYSIS (UP TO 10 CHARACTERS): B
     UNITS OF ENTRY MUST BE UG/G
     Enter RESULT     : 25.
     Enter UNCERTAINTY: 1.
     ANALYSIS UNDER CONTROL FOR 00.00533 B
```

```
Enter HSE-9 SAMPLE NUMBER OF QA MATERIAL: 00.00576
Enter ANALYTICAL TECHNIQUE USED (UP TO 5 CHARACTERS): ITNA
Enter # OF DIFFERENT REQUEST NUMBERS TO BE ASSIGNED TO THIS QA: 2
Enter # OF ANALYSES OF THE SAME QA MATERIAL AND ANALYTICAL METHOD: 2

     Enter ANALYSIS (UP TO 10 CHARACTERS): AL
     UNITS OF ENTRY MUST BE %
     Enter RESULT     : 6.
     Enter UNCERTAINTY: .01
     ANALYSIS UNDER CONTROL FOR 00.00576 AL
     Enter REQUEST NUMBER: 1111
     Enter REQUEST NUMBER: 2222


     Enter ANALYSIS (UP TO 10 CHARACTERS): CA
     UNITS OF ENTRY MUST BE UG/G
     Enter RESULT     : 6000.
     Enter UNCERTAINTY: 100.
     ANALYSIS OUT OF CONTROL FOR 00.00576 CA        **REPEAT SAMPLE BATCH
     Enter REQUEST NUMBER: 1111
     Enter REQUEST NUMBER: 2222


Enter HSE-9 SAMPLE NUMBER OF QA MATERIAL: 00.00531
Enter ANALYTICAL TECHNIQUE USED (UP TO 5 CHARACTERS): FAA
Enter # OF DIFFERENT REQUEST NUMBERS TO BE ASSIGNED TO THIS QA: 1
Enter REQUEST NUMBER FOR THIS QA: 2222
Enter # OF ANALYSES OF THE SAME QA MATERIAL AND ANALYTICAL METHOD: 1

     Enter ANALYSIS (UP TO 10 CHARACTERS): BE
     UNITS OF ENTRY MUST BE NG/G
     Enter RESULT     : 100.
     Enter UNCERTAINTY: 10.
     ANALYSIS OUT OF CONTROL FOR 00.00531 BE        **REPEAT SAMPLE BATCH

AGAIN? [Y/N]: N

$ USER
```

Program QACHECK

```
PROCEDURE QACHECK2

! COMPARES USER INPUT VALUES FOR QAS WITH CVS DATABASE AND WRITES QA RECORDS
! TO SAMPLES DATABASE FOR SUBSEQUENT REPORTING; PERMITS THE ENTRY OF SEVERAL
! QA'S AND/OR SEVERAL ELEMENTS PER QA AND/OR SEVERAL REQUEST-NUMBERS PER QA
! WITH MINIMAL RETYPING OF COMMON INPUT PARAMETERS.  STATUS="X" USED TO
! DENOTE REUSE OF QA'S THAT DO NOT REPRESENT INDEPENDENT ANALYSES OF THAT QA
! SETS CUSTOMER-NUMBER = SAMPLE-NUMBER
!
DECLARE R USAGE REAL.
DECLARE RES USAGE REAL.
DECLARE UNC  USAGE REAL.
DECLARE UNS PIC X(10).
DECLARE SAMNUM PIC X(8).
DECLARE ANAL PIC X(10).
DECLARE CVRES USAGE REAL.
DECLARE CVUNC USAGE REAL.
DECLARE NOW USAGE DATE.
DECLARE USER PIC X(3).
DECLARE QUALITY PIC X(20).
DECLARE REQUEST PIC X(5).
DECLARE XTECH PIC X(5).
DECLARE XMAT PIC X(3).
DECLARE XSYM PIC X(1).
DECLARE A PIC X(2).
DECLARE B PIC X(1).
DECLARE Y PIC X(3).
DECLARE Z PIC X(3).
DECLARE COUNT1 PIC X(1).
!
READY SAMPLES SHARED WRITE;
READY CVS SHARED READ;
READY CVD SHARED READ;
USER=*."ANALYST INITIALS (UP TO 3 CHARACTERS)"
PRINT " "
Y =*."# OF DIFFERENT QA MATERIALS TO BE CHECKED AT THIS SESSION"
PRINT " "
REPEAT Y BEGIN
  PRINT " "
  SAMNUM=*."HSE-9 SAMPLE NUMBER OF QA MATERIAL"
  COUNT1 = COUNT OF CVS WITH SN=SAMNUM
  PRINT " "
  IF (COUNT1 NE 0) THEN BEGIN
    XMAT = SAMPLE_TYPE FROM CVD WITH SN=SAMNUM
  END ! IF COUNT1 NE 0
  IF (COUNT1 = 0) THEN BEGIN
    PRINT "*****************************************************************"
    PRINT "THIS QA NUMBER NOT IN OUR QA DATABASE, SO YOU WILL BE ASKED TO"
    PRINT "SOME ADDITIONAL DATA ABOUT THIS MATERIAL"
    PRINT "*****************************************************************"
    PRINT " "
    XMAT = *."MATRIX TYPE OF THIS QA"
  END ! IF COUNT1=0
```

```
  PRINT " "
  XTECH=*."ANALYTICAL TECHNIQUE USED (UP TO 5 CHARACTERS)"
  PRINT " "
  A = *."# OF DIFFERENT REQUEST NUMBERS TO BE ASSIGNED TO THIS QA"
  IF (A = 1) THEN BEGIN
    PRINT " "
    REQUEST=*."REQUEST NUMBER FOR THIS QA"
  END ! IF A=1
  Z = *."# OF ANALYSES OF THE SAME QA MATERIAL AND ANALYTICAL METHOD"
  REPEAT Z BEGIN
    PRINT " "
    ANAL=*."ANALYSIS (UP TO 10 CHARACTERS)"
    COUNT1 = COUNT OF CVS WITH SN=SAMNUM AND CVN=ANAL
    IF (COUNT1=0) THEN BEGIN
      PRINT " "
      PRINT "NO DATA AVAILABLE FOR "|||SAMNUM|||ANAL
      PRINT " "
      QUALITY="NO DATA AVAIL."
      RES=*."RESULT     "
      UNC=*."UNCERTAINTY"
      UNS=*."UNITS"
      NOW="TODAY";
    END ! IF COUNT1=0 BEGIN
    IF (COUNT1 NE 0) THEN BEGIN
      UNS=CV_UNITS FROM CVS WITH SN=SAMNUM AND CVN=ANAL
      PRINT " "
      PRINT "UNITS OF ENTRY MUST BE:  ",UNS(-)
      PRINT " "
      RES=*."RESULT     "
      UNC= *."UNCERTAINTY"
      PRINT " "
      CVRES=CV FROM CVS WITH SN=SAMNUM AND CVN=ANAL
      CVUNC=CVU FROM CVS WITH SN=SAMNUM AND CVN=ANAL
      IF (CVUNC LT 0.0001) THEN CVUNC = 0.1*CVRES
      NOW="TODAY";
      R=(FN$ABS(RES - CVRES))/(FN$SQRT(UNC*UNC + CVUNC*CVUNC))
      IF (R LT 2) THEN BEGIN
        PRINT "ANALYSIS UNDER CONTROL FOR "|||SAMNUM|||ANAL;
        PRINT " "
        QUALITY="UNDER CONTROL"
      END ! IF R LT 1 BEGIN
      IF ((R GE 2) AND (R LE 3)) THEN BEGIN
        PRINT "WARNING-ANALYSIS IN 2-3 SIGMA REGION FOR "|||SAMNUM|||ANAL;
        PRINT " "
        QUALITY="WARNING 2-3 SIGMA"
      END ! IF R GE 2 AND LE 3 BEGIN
      IF (R GT 3) THEN BEGIN
        PRINT "ANALYSIS OUT OF CONTROL FOR "|||SAMNUM|||ANAL|"**REPEAT SAMPLE BATCH"
        PRINT " "
        QUALITY="OUT OF CONTROL"
      END ! IF R GT 3 BEGIN
    END ! IF COUNT1 NE 0 BEGIN
    IF (RES GT 0) THEN XSYM=" " ELSE XSYM="<"
! B IS COUNTER FOR SENSING WHEN TO ASSIGN STATUS=X TO DUPLICATE QA'S
```

```
    B = 0
    REPEAT A BEGIN
      STORE SAMPLES USING BEGIN
         SN=SAMNUM;
         CN=SAMNUM
         ANALYSIS=ANAL;
         MATRIX=XMAT
         OWNER="QA"
         PROJECT_NUM="QA"
         TECHNIQUE=XTECH
         SYMBOL=XSYM
         RESULT=RES;
         UNCERTAINTY=UNC;
         UNITS=UNS;
         COMMENT=QUALITY
         IF (A = 1) THEN REQUEST_NUM=REQUEST
         IF (A GT 1) THEN REQUEST_NUM=*."REQUEST NUMBER"
         CD=NOW;
         ANALYST=USER;
         IF (B = 0) THEN STATUS = "T"
         IF (B GT 0) THEN STATUS = "X"
      END ! STORE SAMPLES
    B = B + 1
    END !REPEAT A
  END !REPEAT Z
END !REPEAT Y
!
FINISH;
!
END_PROCEDURE
```

Program H9BACKUPS

```
$!
$!      PROGRAM:        USERS:[H9CHEM]BACKUPS.COM
$!      AUTHOR:         BRYAN O'MALLEY
$!      DATE:           6-22-1988
$!      DESCRIPTION:
$!      THIS PROGRAM RUNS IN THE SPECIAL BATCH QUE AT A PRIORITY OF 6.  IT
$!      FIRST CHECKS THE DATE AND TIME, AND:
$!              IF DAY OF THE MONTH = 1 THEN REMOVE INCREMENTAL TAPE AND INSERT
$!                                      IMAGE TAPE, INIT TAPE, RUN IMAGE BACKUPS,
$!                                      REMOVE TAPE, INSERT INCREMENTALS TAPE,
$!                                      INIT & MOUNT INCREMENTALS TAPE, DELETE
$!                                      OLD INCREMENTAL JOURNAL FILES, WAIT UNTIL
$!                                      TOMORROW.
$!
$!              IF DAY OF THE MONTH = 15 THEN REMOVE INCREMENTAL TAPE AND INSERT
$!                                      IMAGE TAPE, RUN IMAGE BACKUPS, REMOVE TAPE
$!                                      INSERT INCREMENTALS TAPE, INIT & MOUNT
$!                                      INCREMENTALS TAPE, DELETE OLD INCREMENTAL
$!                                      JOURNAL FILES, WAIT UNTIL TOMORROW.
$!
$!              IF DAY OF THE MONTH = SATURDAY OR SUNDAY THEN WAIT UNTIL MONDAY
$!              ELSE RUN INCREMENTAL BACKUPS
$!
$!      ASSOCIATED FILES: USERS:[H9CHEM]DAY1BACKUPS.MES, DAY2BACKUPS.MES,
$!                        DAY15BACKUPS.MES, DAY16BACKUPS.MES
$!      REVISIONS: set process/priority=6 to allow the backup and mount
$!                 utilities a bigger time slice.
$!
$!      USAGE: this program tries to avoid mounting and dismount the cy8200
$!      as much as possible.  To that end, it never exits except on error or
$!      when it finishes image backups.
$!      To start it, you must have the incremental backup tape loaded, so
$!      if you use a new tape, manually initialize it before you run this
$!      program.
$!
$!
$!
$on severe_error then goto finish
$set proc/priority=6
$set proc/priv=all
$set verify
$allocate mua0:
$wait 00:00:30
$mou/for/block_size=32768 mua0: increm
$wait 00:00:30
$!
$START:
$show time
$!
$!
$!get mmm-yyyy for part of the backup journal file name on dla2:
$!
$stamp=f$time()
$stamp=f$extract(3,8,stamp)
$sh symb stamp
```

```
$!
$!get day, if day is 1 or 15 set image to true, do biweekly image backups
$!
$date=f$time()
$day=f$extract(0,2,date)
$weekday=f$cvtime(date,,"weekday")
$sh symb day
$!
$!create string ddmmyy for part of the backups save set name
$!
$date=f$cvtime(date)
$string=f$extract(5,2,date)+f$extract(8,2,date)+f$extract(2,2,date)
$sh symb date
$sh symb string
$!
$! check day to see which label to call
$!
$if day .eqs. " 1" then goto day1
$if day .eqs. "15" then goto day15
$if weekday .eqs. "Saturday" .or. weekday .eqs. "Sunday" then goto wait
$!
$!start of incremental backups
$!
$INCREMENTAL:
$!
$backup/rec/fast/journal=users:[omalley.bjl]'stamp'-inc.bjl/buffer_count=5/-
ignore=(inter) dua0:[*...]/since=backup mua0:'string'_du0.inc/block_size=32768
$!
$backup/rec/fast/journal=users:[omalley.bjl]'stamp'-inc.bjl/buffer_count=5/-
ignore=(inter) dja1:[*...]/since=backup mua0:'string'_dj1.inc/block_size=32768
$!
$backup/rec/fast/journal=users:[omalley.bjl]'stamp'-inc.bjl/buffer_count=5/-
ignore=(inter) dua2:[*...]/since=backup mua0:'string'_du2.inc/block_size=32768
$!
$goto wait
$!
$!start of day1 image backups
$!
$DAY1:
$!
$!
$!wait until 8:30am before requesting operator intervention to remove the
$!incrementals tape and install the image backups tape
$!
$now=f$time()                      !dd-mmm-yyyy hh:mm:ss.cc
$now=f$extract(12,8,now)           !hh:mm:ss
$offset=f$cvtime("8:30:00-''now'") !yyyy-mm-dd hh:mm:ss.cc
$offset=f$extract(11,12,offset)    !hh:mm:ss.cc
$wait 'offset'
$!
$!
$dismount mua0:         !remove incremental tape and insert image tape
$wait 00:00:30
$mail/subject="Image Backups, Day1" users:[h9chem]day1backups.mes omalley,system
$request/reply -
```

```
$"Replace incrementals tape with blank tape labeled this month's image backups. Also read system's mail"
$wait 00:00:30
$init/over=(access,expir,owner) mua0: images
$wait 00:00:30
$mou/for/block_size=32768 mua0: images
$!
$!wait until 8:00pm today to start doing image backups, minimize # open files
$!
$now=f$time()                        !dd-mmm-yyyy hh:mm:ss.cc
$now=f$extract(12,8,now)             !hh:mm:ss
$offset=f$cvtime("20:00:00-''now'")!yyyy-mmm-dd hh:mm:ss.cc
$offset=f$extract(11,12,offset)      !hh:mm:ss.cc
$wait 'offset'
$!
$backup/image/ver/rec/jou=users:[omalley.bjl]'stamp'-ima.bjl/buffer_count=5/-
ignore=(inter) dua0: mua0:'string'_du0.ima/block_size=32768
$!
$backup/image/ver/rec/jou=users:[omalley.bjl]'stamp'-ima.bjl/buffer_count=5/-
ignore=(inter) dja1: mua0:'string'_dj1.ima/block_size=32768
$!
$backup/image/ver/rec/jou=users:[omalley.bjl]'stamp'-ima.bjl/buffer_count=5/-
ignore=(inter) dua2: mua0:'string'_du2.ima/block_size=32768
$!
$backup/image/ver/jou=users:[omalley.bjl]'stamp'-ima.bjl/buffer_count=5/-
ignore=(inter) dla1: mua0:'string'_du2.ima/block_size=32768
$!
$dismount mua0:
$!
$!wait until tomorrow at 8:30am to start requesting operator intervention
$!to remove the image tape and insert the incrementals tape
$!
$now=f$time()                          !dd-mmm-yyyy hh:mm:ss.cc
$now=f$extract(12,8,now)               !hh:mm:ss
$offset=f$cvtime("tomorrow-''now'")    !yyyy-mm-dd hh:mm:ss.cc
$offset=f$extract(11,12,offset)        !hh:mm:ss.cc
$sh symb offset
$offset=f$cvtime("''offset'+8:30:00") !#hrs to 12:00am + 8.5 hrs
$offset=f$extract(11,12,offset)        !hh:mm:ss.cc
$sh symb offset
$wait 'offset'
$!
$mail/subject="Incremental backups day2" users:[h9chem]day2backups.mes omalley,system
$request/reply -
$"Replace image tape with tape labeled this months incremental backups.  Also read system mail."
$wait 00:00:30
$init/over=(access,expir,owner) mua0: increm
$!mou/for/block_size=32768 mua0: increm
$del users:[omalley.bjl]*inc.bjl;*
$!
$goto resubmit
$!
$!end day1 image backups
$!
$!
$!start day15 image backups
```

```
$!
$DAY15:
$!
$!wait until 8:30am before requesting operator intervention to remove the
$!incrementals tape and install the image backups tape
$!
$now=f$time()                        !dd-mmm-yyyy hh:mm:ss.cc
$now=f$extract(12,8,now)             !hh:mm:ss
$offset=f$cvtime("8:30:00-''now'") !yyyy-mm-dd hh:mm:ss.cc
$offset=f$extract(11,12,offset)      !hh:mm:ss.cc
$wait 'offset'
$!
$dismount mua0:          !remove incremental tape and insert image tape
$!
$wait 00:00:30
$!
$mail/subject="Image Backups, Day15" users:[h9chem]day15backups.mes omalley,system
$request/reply -
$"Replace incrementals tape with tape labeled this month's image backups. Also read system's mail"
$wait 00:00:30
$mou/for/block_size=32768 mua0: images
$!
$!wait until 8:00pm today to start doing image backups, minimize # open files
$!
$now=f$time()                        !dd-mmm-yyyy hh:mm:ss.cc
$now=f$extract(12,8,now)             !hh:mm:ss
$offset=f$cvtime("20:00:00-''now'")!yyyy-mmm-dd hh:mm:ss.cc
$offset=f$extract(11,12,offset)      !hh:mm:ss.cc
$wait 'offset'
$!
$backup/image/ver/rec/jou=users:[omalley.bjl]'stamp'-ima.bjl/buffer_count=5/-
ignore=(inter) dua0: mua0:'string'_du0.ima/block_size=32768
$!
$backup/image/ver/rec/jou=users:[omalley.bjl]'stamp'-ima.bjl/buffer_count=5/-
ignore=(inter) dja1: mua0:'string'_dj1.ima/block_size=32768
$!
$backup/image/ver/rec/jou=users:[omalley.bjl]'stamp'-ima.bjl/buffer_count=5/-
ignore=(inter) dua2: mua0:'string'_du2.ima/block_size=32768
$!
$backup/image/ver/jou=users:[omalley.bjl]'stamp'-ima.bjl/buffer_count=5/-
ignore=(inter) dla1: mua0:'string'_du2.ima/block_size=32768
$!
$!wait 20:00:00  !wait until approx. 8:00am the next morning to start requesting
$!               operator reply's.
$dismount mua0:
$!
$!wait until tomorrow at 8:30am to start requesting operator intervention
$!to remove the image tape and insert the incrementals tape
$!
$now=f$time()                          !dd-mmm-yyyy hh:mm:ss.cc
$now=f$extract(12,8,now)               !hh:mm:ss
$offset=f$cvtime("tomorrow-''now'")    !yyyy-mm-dd hh:mm:ss.cc
$offset=f$extract(11,12,offset)        !hh:mm:ss.cc
$sh symb offset
$offset=f$cvtime("''offset'+8:30:00") !#hrs to 12:00am + 8.5 hrs
```

```
$offset=f$extract(11,12,offset)       !hh:mm:ss.cc
$sh symb offset
$wait 'offset'
$!
$mail/subject="Incremental backups day16" users:[h9chem]day16backups.mes omalley,system
$request/reply -
$"Replace image tape with tape labeled this months incremental backups.  Also read system mail."
$wait 00:00:30
$init/over=(access,expir,owner) mua0: increm
$!mou/for/block_size=32768 mua0: increm
$del users:[omalley.bjl]*inc.bjl;*
$set proc/priority=6  !set back to 6 when running at night
$goto resubmit
$!
$!end day15 image backups
$!
$WAIT:
$!
$!wait until tomorrow, then goto start
$!
$now=f$time()
$now=f$extract(12,8,now)
$offset=f$cvtime("tomorrow-''now'")
$offset=f$extract(11,12,offset)
$wait 'offset'
$!
$goto start
$!
$FINISH:
$!
$dismou/nounl mua0:
$exit
$RESUBMIT:
$!
$submit/que=special/after=tomorrow/notify/log_file=-
users:[omalley.cy8200]backups.log/noprint/keep users:[omalley]backups.com
$exit
```

APPENDIX C
SUMMARY TABLES OF QUALITY ASSURANCE DATA FOR 1988 AND PLOTS OF FIVE-YEAR TRENDS

TABLE C-I

SUMMARY OF HSE-9 QUALITY ASSURANCE TESTS FOR ANALYSES COMPLETED BY HSE-9 DURING 1988

Stable Element Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
M	% PHASE	0	13	0.0	-	-	-	-	-	-	-
W	% PHASE	0	1	0.0	-	-	-	-	-	-	-
C	% SOLIDS	0	19	0.0	-	-	-	-	-	-	-
B	AG	0	1	0.0	-	-	-	-	-	-	-
C	AG	22	61	26.5	22	100	-	-	-	1.03	0.14
F	AG	0	13	0.0	-	-	-	-	-	-	-
M	AG	27	195	12.2	27	93	4	-	4	0.99	0.10
S	AG	3	41	6.8	3	33	67	-	-	1.31	-
W	AG	182	616	22.8	181	92	8	-	-	1.02	0.34
B	AL	6	37	14.0	6	100	-	-	-	0.95	0.05
C	AL	0	1	0.0	-	-	-	-	-	-	-
F	AL	0	8	0.0	-	-	-	-	-	-	-
M	AL	0	2	0.0	-	-	-	-	-	-	-
S	AL	175	650	21.2	289	71	22	2	4	1.00	0.06
W	AL	55	45	55.0	55	91	4	5	-	0.97	0.14
B	AS	2	84	2.3	2	100	-	-	-	1.10	0.04
C	AS	2	15	11.8	2	-	-	100	-	0.70	-
F	AS	10	41	19.6	6	100	-	-	-	0.96	0.05
M	AS	19	133	12.5	19	79	16	5	-	1.15	0.12
S	AS	11	75	12.8	11	64	36	-	-	1.14	0.36
W	AS	241	537	31.0	239	74	19	3	4	1.06	0.13
B	AU	0	1	0.0	-	-	-	-	-	-	-
F	AU	0	13	0.0	-	-	-	-	-	-	-
S	AU	0	6	0.0	-	-	-	-	-	-	-
W	AU	0	81	0.0	-	-	-	-	-	-	-
B	B	0	68	0.0	-	-	-	-	-	-	-
C	B	0	1	0.0	-	-	-	-	-	-	-
F	B	0	13	0.0	-	-	-	-	-	-	-
M	B	0	2	0.0	-	-	-	-	-	-	-
S	B	0	6	0.0	-	-	-	-	-	-	-
W	B	17	127	11.8	17	88	12	-	-	1.00	0.07
B	BA	0	1	0.0	-	-	-	-	-	-	-
C	BA	0	18	0.0	-	-	-	-	-	-	-
F	BA	3	129	2.3	3	100	-	-	-	0.99	0.05
M	BA	17	194	8.1	17	100	-	-	-	0.99	0.08
S	BA	199	1015	16.4	195	74	22	3	1	1.00	0.22
W	BA	196	563	25.8	196	87	11	1	2	1.01	0.08
B	BE	0	179	0.0	-	-	-	-	-	-	-
C	BE	0	1	0.0	-	-	-	-	-	-	-
F	BE	115	497	18.8	115	88	10	1	1	0.99	0.13
M	BE	0	6	0.0	-	-	-	-	-	-	-
S	BE	37	424	8.0	37	84	16	-	-	1.15	0.71
W	BE	184	218	45.8	184	77	21	2	1	1.04	0.12

TABLE C-I (cont)

Stable Element Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
B	BI	0	1	0.0	-	-	-	-	-	-	-
C	BI	0	1	0.0	-	-	-	-	-	-	-
F	BI	0	13	0.0	-	-	-	-	-	-	-
M	BI	0	2	0.0	-	-	-	-	-	-	-
S	BI	0	6	0.0	-	-	-	-	-	-	-
W	BI	4	89	4.3	4	100	-	-	-	0.97	0.04
B	BR	0	1	0.0	-	-	-	-	-	-	-
C	BR	0	1	0.0	-	-	-	-	-	-	-
F	BR	0	17	0.0	-	-	-	-	-	-	-
M	BR	1	114	0.9	-	-	-	-	-	-	-
S	BR	0	11	0.0	-	-	-	-	-	-	-
W	BR	1	88	1.1	1	100	-	-	-	0.90	-
B	CA	2	36	5.3	2	50	50	-	-	0.90	0.02
M	CA	0	2	0.0	-	-	-	-	-	-	-
S	CA	175	647	21.3	286	73	24	1	1	1.00	0.13
W	CA	33	203	14.0	33	82	6	-	12	0.91	0.18
B	CD	0	94	0.0	-	-	-	-	-	-	-
C	CD	18	36	33.3	18	100	-	-	-	0.89	0.07
F	CD	40	20	66.7	39	67	18	8	8	1.07	0.41
M	CD	26	191	12.0	26	88	12	-	-	0.93	0.09
S	CD	29	163	15.1	29	86	14	-	-	0.93	0.15
W	CD	274	603	31.2	272	88	10	2	-	1.00	0.13
B	CE	0	1	0.0	-	-	-	-	-	-	-
C	CE	0	1	0.0	-	-	-	-	-	-	-
F	CE	0	13	0.0	-	-	-	-	-	-	-
M	CE	0	2	0.0	-	-	-	-	-	-	-
S	CE	49	358	12.0	64	88	13	-	-	1.05	0.09
W	CE	0	87	0.0	-	-	-	-	-	-	-
W	CF	0	1	0.0	-	-	-	-	-	-	-
B	CL	2	36	5.3	2	100	-	-	-	0.89	0.04
F	CL	0	5	0.0	-	-	-	-	-	-	-
M	CL	1	113	0.9	-	-	-	-	-	-	-
S	CL	139	654	17.5	127	63	17	15	5	1.39	0.59
W	CL	50	257	16.3	50	96	4	-	-	1.00	0.05
W	CL2	7	0	100.0	6	67	33	-	-	0.88	0.11
W	CN	119	248	32.4	119	76	24	-	-	0.88	0.07
W	CN(FREE)	0	10	0.0	-	-	-	-	-	-	-
B	CO	0	1	0.0	-	-	-	-	-	-	-
C	CO	0	1	0.0	-	-	-	-	-	-	-
F	CO	0	13	0.0	-	-	-	-	-	-	-
M	CO	0	8	0.0	-	-	-	-	-	-	-
S	CO	46	334	12.1	61	79	10	7	5	1.01	0.32
W	CO	32	100	24.2	32	72	28	-	-	1.06	0.09
M	CO2	0	6	0.0	-	-	-	-	-	-	-
S	CO2	69	531	11.5	69	48	43	7	1	1.07	0.04

TABLE C-I (cont)

Stable Element Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
C	CHEM O2 DEMAND	0	2	0.0	-	-	-	-	-	-	-
W	CHEM O2 DEMAND	54	395	12.0	54	100	-	-	-	1.00	0.07
W	CONDUCTIVITY	38	187	16.9	38	92	8	-	-	0.98	0.04
B	CR	0	68	0.0	-	-	-	-	-	-	-
C	CR	25	50	33.3	25	100	-	-	-	1.02	0.05
F	CR	2	20	9.1	2	100	-	-	-	0.97	-
M	CR	21	177	10.6	21	95	5	-	-	1.00	0.14
S	CR	45	393	10.3	45	56	31	7	7	1.00	0.10
W	CR	307	720	29.9	305	88	12	-	-	1.01	0.11
M	CR(+6)	0	1	0.0	-	-	-	-	-	-	-
W	CR(+6)	123	235	34.4	123	99	-	-	1	0.99	0.09
B	CS	6	13	31.6	6	67	33	-	-	1.20	0.32
C	CS	0	1	0.0	-	-	-	-	-	-	-
F	CS	0	13	0.0	-	-	-	-	-	-	-
M	CS	0	2	0.0	-	-	-	-	-	-	-
S	CS	40	328	10.9	40	93	8	-	-	1.09	0.25
W	CS	0	87	0.0	-	-	-	-	-	-	-
B	CU	0	2	0.0	-	-	-	-	-	-	-
C	CU	0	1	0.0	-	-	-	-	-	-	-
F	CU	2	47	4.1	2	100	-	-	-	1.00	0.10
M	CU	0	5	0.0	-	-	-	-	-	-	-
S	CU	115	537	17.6	111	88	11	1	-	1.00	0.21
W	CU	215	643	25.1	215	82	14	4	-	1.03	0.21
B	DY	0	1	0.0	-	-	-	-	-	-	-
C	DY	0	1	0.0	-	-	-	-	-	-	-
F	DY	0	13	0.0	-	-	-	-	-	-	-
M	DY	0	2	0.0	-	-	-	-	-	-	-
S	DY	139	655	17.5	136	74	10	10	7	0.93	0.26
W	DY	0	87	0.0	-	-	-	-	-	-	-
B	ER	0	1	0.0	-	-	-	-	-	-	-
C	ER	0	1	0.0	-	-	-	-	-	-	-
F	ER	0	13	0.0	-	-	-	-	-	-	-
M	ER	0	2	0.0	-	-	-	-	-	-	-
S	ER	0	6	0.0	-	-	-	-	-	-	-
W	ER	0	87	0.0	-	-	-	-	-	-	-
B	EU	0	1	0.0	-	-	-	-	-	-	-
C	EU	0	1	0.0	-	-	-	-	-	-	-
F	EU	0	13	0.0	-	-	-	-	-	-	-
M	EU	0	2	0.0	-	-	-	-	-	-	-
S	EU	91	524	14.8	90	82	11	2	4	0.99	0.09
W	EU	0	87	0.0	-	-	-	-	-	-	-
B	F	6	71	7.8	6	67	33	-	-	0.94	0.08
F	F	0	6	0.0	-	-	-	-	-	-	-
M	F	1	113	0.9	-	-	-	-	-	-	-
S	F	28	58	32.6	27	33	52	11	4	1.26	0.19

TABLE C-I (cont)

Stable Element Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
W	F	64	261	19.7	64	94	5	2	-	1.04	0.09
B	FE	0	1	0.0	-	-	-	-	-	-	-
C	FE	0	1	0.0	-	-	-	-	-	-	-
F	FE	0	13	0.0	-	-	-	-	-	-	-
M	FE	0	5	0.0	-	-	-	-	-	-	-
S	FE	49	328	13.0	60	68	15	-	17	1.00	0.05
W	FE	133	665	16.7	133	88	11	1	-	1.05	0.10
M	FLASH POINT	24	100	19.4	-	-	-	-	-	-	-
W	FLASH POINT	0	3	0.0	-	-	-	-	-	-	-
W	FM	0	1	0.0	-	-	-	-	-	-	-
B	GA	0	1	0.0	-	-	-	-	-	-	-
C	GA	0	1	0.0	-	-	-	-	-	-	-
F	GA	4	38	9.5	-	-	-	-	-	-	-
M	GA	0	4	0.0	-	-	-	-	-	-	-
S	GA	61	334	15.4	60	98	2	-	-	1.15	0.25
W	GA	0	87	0.0	-	-	-	-	-	-	-
B	GD	0	1	0.0	-	-	-	-	-	-	-
C	GD	0	1	0.0	-	-	-	-	-	-	-
F	GD	0	13	0.0	-	-	-	-	-	-	-
M	GD	0	2	0.0	-	-	-	-	-	-	-
S	GD	0	6	0.0	-	-	-	-	-	-	-
W	GD	0	87	0.0	-	-	-	-	-	-	-
B	GE	0	1	0.0	-	-	-	-	-	-	-
C	GE	0	1	0.0	-	-	-	-	-	-	-
F	GE	0	13	0.0	-	-	-	-	-	-	-
M	GE	0	2	0.0	-	-	-	-	-	-	-
S	GE	0	6	0.0	-	-	-	-	-	-	-
W	GE	0	87	0.0	-	-	-	-	-	-	-
M	H2O	0	2	0.0	-	-	-	-	-	-	-
S	H2O+	20	0	100.0	20	75	25	-	-	1.08	0.28
S	H2O-	20	1	95.2	20	80	20	-	-	1.17	0.26
W	HARDNESS	11	73	13.4	11	82	9	-	9	0.91	0.17
B	HEAT CAPACITY	0	2	0.0	-	-	-	-	-	-	-
M	HEAT CAPACITY	5	60	7.7	5	40	60	-	-	1.00	0.02
B	HF	0	1	0.0	-	-	-	-	-	-	-
C	HF	0	1	0.0	-	-	-	-	-	-	-
F	HF	0	13	0.0	-	-	-	-	-	-	-
M	HF	0	2	0.0	-	-	-	-	-	-	-
S	HF	55	361	13.2	55	71	20	7	2	1.02	0.08
W	HF	0	87	0.0	-	-	-	-	-	-	-
B	HG	0	56	0.0	-	-	-	-	-	-	-
C	HG	6	61	9.0	6	83	17	-	-	0.96	0.22
F	HG	0	14	0.0	-	-	-	-	-	-	-
M	HG	32	150	17.6	32	56	34	6	3	1.08	0.48
S	HG	1	41	2.4	1	100	-	-	-	0.98	-

TABLE C-I (cont)

Stable Element Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
W	HG	172	577	23.0	169	87	9	-	4	1.12	0.68
B	HO	0	1	0.0	-	-	-	-	-	-	-
C	HO	0	1	0.0	-	-	-	-	-	-	-
F	HO	0	13	0.0	-	-	-	-	-	-	-
M	HO	0	2	0.0	-	-	-	-	-	-	-
S	HO	0	6	0.0	-	-	-	-	-	-	-
W	HO	0	87	0.0	-	-	-	-	-	-	-
B	I	0	1	0.0	-	-	-	-	-	-	-
C	I	0	1	0.0	-	-	-	-	-	-	-
F	I	0	17	0.0	-	-	-	-	-	-	-
M	I	1	115	0.9	-	-	-	-	-	-	-
S	I	44	257	14.6	34	94	6	-	-	0.99	0.13
W	I	1	88	1.1	1	100	-	-	-	0.92	-
B	IN	0	1	0.0	-	-	-	-	-	-	-
C	IN	0	1	0.0	-	-	-	-	-	-	-
F	IN	0	13	0.0	-	-	-	-	-	-	-
M	IN	0	2	0.0	-	-	-	-	-	-	-
S	IN	128	595	17.7	106	99	1	-	-	0.67	0.10
W	IN	0	87	0.0	-	-	-	-	-	-	-
B	IR	0	1	0.0	-	-	-	-	-	-	-
C	IR	0	1	0.0	-	-	-	-	-	-	-
F	IR	0	13	0.0	-	-	-	-	-	-	-
M	IR	0	2	0.0	-	-	-	-	-	-	-
S	IR	0	6	0.0	-	-	-	-	-	-	-
W	IR	0	87	0.0	-	-	-	-	-	-	-
B	K	2	36	5.3	2	-	100	-	-	1.59	0.14
M	K	0	2	0.0	-	-	-	-	-	-	-
S	K	148	726	16.9	225	65	27	6	2	0.99	0.15
W	K	27	202	11.8	27	85	11	-	4	0.92	0.14
B	LA	0	1	0.0	-	-	-	-	-	-	-
C	LA	0	1	0.0	-	-	-	-	-	-	-
F	LA	0	13	0.0	-	-	-	-	-	-	-
M	LA	0	2	0.0	-	-	-	-	-	-	-
S	LA	14	111	11.2	14	79	7	14	-	1.10	0.09
W	LA	0	87	0.0	-	-	-	-	-	-	-
B	LI	0	17	0.0	-	-	-	-	-	-	-
C	LI	0	1	0.0	-	-	-	-	-	-	-
F	LI	0	13	0.0	-	-	-	-	-	-	-
M	LI	0	4	0.0	-	-	-	-	-	-	-
S	LI	37	129	22.3	37	54	43	3	-	0.89	0.38
W	LI	17	143	10.6	9	89	11	-	-	1.01	0.08
B	LU	0	1	0.0	-	-	-	-	-	-	-
C	LU	0	1	0.0	-	-	-	-	-	-	-
F	LU	0	13	0.0	-	-	-	-	-	-	-
M	LU	0	2	0.0	-	-	-	-	-	-	-

TABLE C-I (cont)

Stable Element Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
S	LU	18	51	26.1	18	72	22	6	-	1.12	0.16
W	LU	0	87	0.0	-	-	-	-	-	-	-
B	MG	2	37	5.1	2	-	100	-	-	0.80	-
C	MG	0	1	0.0	-	-	-	-	-	-	-
F	MG	0	8	0.0	-	-	-	-	-	-	-
M	MG	0	4	0.0	-	-	-	-	-	-	-
S	MG	175	654	21.1	230	77	15	3	4	1.01	0.16
W	MG	26	242	9.7	26	88	4	-	8	0.91	0.15
B	MN	2	37	5.1	2	100	-	-	-	1.02	0.02
C	MN	0	1	0.0	-	-	-	-	-	-	-
F	MN	0	13	0.0	-	-	-	-	-	-	-
M	MN	0	2	0.0	-	-	-	-	-	-	-
S	MN	174	655	21.0	170	65	33	2	-	1.02	0.06
W	MN	72	203	26.2	72	71	25	4	-	1.04	0.12
B	MO	8	35	18.6	8	88	-	13	-	0.49	-
C	MO	0	1	0.0	-	-	-	-	-	-	-
F	MO	0	13	0.0	-	-	-	-	-	-	-
M	MO	0	3	0.0	-	-	-	-	-	-	-
S	MO	0	6	0.0	-	-	-	-	-	-	-
W	MO	35	173	16.8	35	31	49	3	17	1.18	0.05
B	MSCAN	0	4	0.0	-	-	-	-	-	-	-
F	MSCAN	0	8	0.0	-	-	-	-	-	-	-
S	MSCAN	0	2	0.0	-	-	-	-	-	-	-
W	MSCAN	0	78	0.0	-	-	-	-	-	-	-
M	N2	0	1	0.0	-	-	-	-	-	-	-
M	N2H4	0	1	0.0	-	-	-	-	-	-	-
M	N2O	0	5	0.0	-	-	-	-	-	-	-
B	NA	2	37	5.1	2	100	-	-	-	0.45	0.15
C	NA	0	1	0.0	-	-	-	-	-	-	-
F	NA	0	16	0.0	-	-	-	-	-	-	-
M	NA	0	4	0.0	-	-	-	-	-	-	-
S	NA	187	733	20.3	272	73	23	4	-	0.98	0.04
W	NA	41	320	11.4	41	83	12	2	2	0.98	0.09
B	NB	0	1	0.0	-	-	-	-	-	-	-
C	NB	0	1	0.0	-	-	-	-	-	-	-
F	NB	0	13	0.0	-	-	-	-	-	-	-
M	NB	0	2	0.0	-	-	-	-	-	-	-
S	NB	0	6	0.0	-	-	-	-	-	-	-
W	NB	0	86	0.0	-	-	-	-	-	-	-
B	ND	0	1	0.0	-	-	-	-	-	-	-
C	ND	0	1	0.0	-	-	-	-	-	-	-
F	ND	0	13	0.0	-	-	-	-	-	-	-
M	ND	0	2	0.0	-	-	-	-	-	-	-
S	ND	0	6	0.0	-	-	-	-	-	-	-
W	ND	0	97	0.0	-	-	-	-	-	-	-

TABLE C-I (cont)

Stable Element Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
W	NH3(F)	0	4	0.0	-	-	-	-	-	-	-
W	NH3-N	95	517	15.5	95	96	3	-	1	1.01	0.06
B	NI	0	1	0.0	-	-	-	-	-	-	-
C	NI	0	2	0.0	-	-	-	-	-	-	-
F	NI	0	13	0.0	-	-	-	-	-	-	-
M	NI	6	128	4.5	6	100	-	-	-	1.03	0.06
S	NI	65	279	18.9	65	58	40	2	-	0.95	0.24
W	NI	151	299	33.6	151	85	13	1	1	1.01	0.10
M	NO	0	1	0.0	-	-	-	-	-	-	-
M	NO2	0	6	0.0	-	-	-	-	-	-	-
W	NO2-N	7	110	6.0	7	100	-	-	-	1.02	0.04
W	NO3-N	88	384	18.6	88	95	5	-	-	0.99	0.07
W	NORMALITY	0	69	0.0	-	-	-	-	-	-	-
M	O2	0	5	0.0	-	-	-	-	-	-	-
W	O3	0	1	0.0	-	-	-	-	-	-	-
W	OIL/GREASE	4	8	33.3	4	100	-	-	-	1.02	-
B	OS	0	1	0.0	-	-	-	-	-	-	-
C	OS	0	1	0.0	-	-	-	-	-	-	-
F	OS	0	13	0.0	-	-	-	-	-	-	-
M	OS	0	1	0.0	-	-	-	-	-	-	-
S	OS	0	6	0.0	-	-	-	-	-	-	-
W	OS	0	86	0.0	-	-	-	-	-	-	-
B	P	0	1	0.0	-	-	-	-	-	-	-
C	P	0	1	0.0	-	-	-	-	-	-	-
F	P	0	8	0.0	-	-	-	-	-	-	-
M	P	0	2	0.0	-	-	-	-	-	-	-
S	P	0	5	0.0	-	-	-	-	-	-	-
W	P	82	435	15.9	76	92	8	-	-	0.95	0.12
W	P ALKALINITY	0	159	0.0	-	-	-	-	-	-	-
B	PB	0	175	0.0	-	-	-	-	-	-	-
C	PB	42	50	45.7	42	81	19	-	-	1.12	0.12
E	PB	0	1	0.0	-	-	-	-	-	-	-
F	PB	56	135	29.3	55	76	13	-	11	1.05	0.18
M	PB	30	219	12.0	30	87	10	3	-	1.00	0.14
S	PB	80	646	11.0	80	74	26	-	-	1.02	0.16
W	PB	411	643	39.0	409	86	11	2	1	1.03	0.13
B	PD	0	1	0.0	-	-	-	-	-	-	-
C	PD	0	1	0.0	-	-	-	-	-	-	-
F	PD	0	13	0.0	-	-	-	-	-	-	-
M	PD	0	2	0.0	-	-	-	-	-	-	-
S	PD	0	6	0.0	-	-	-	-	-	-	-
W	PD	0	87	0.0	-	-	-	-	-	-	-
C	PH	0	5	0.0	-	-	-	-	-	-	-
M	PH	0	72	0.0	-	-	-	-	-	-	-
W	PH	400	1257	24.1	400	99	1	-	-	1.00	0.01

TABLE C-I (cont)

Stable Element Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
W	PO	0	2	0.0	-	-	-	-	-	-	-
W	PO4-P	6	116	4.9	6	100	-	-	-	0.94	0.05
B	PR	0	1	0.0	-	-	-	-	-	-	-
C	PR	0	1	0.0	-	-	-	-	-	-	-
F	PR	0	13	0.0	-	-	-	-	-	-	-
M	PR	0	2	0.0	-	-	-	-	-	-	-
S	PR	0	6	0.0	-	-	-	-	-	-	-
W	PR	0	87	0.0	-	-	-	-	-	-	-
B	PT	0	1	0.0	-	-	-	-	-	-	-
C	PT	0	1	0.0	-	-	-	-	-	-	-
F	PT	0	13	0.0	-	-	-	-	-	-	-
M	PT	0	2	0.0	-	-	-	-	-	-	-
S	PT	0	6	0.0	-	-	-	-	-	-	-
W	PT	0	87	0.0	-	-	-	-	-	-	-
B	RB	0	1	0.0	-	-	-	-	-	-	-
C	RB	0	1	0.0	-	-	-	-	-	-	-
F	RB	0	13	0.0	-	-	-	-	-	-	-
M	RB	0	2	0.0	-	-	-	-	-	-	-
S	RB	33	361	8.4	33	76	6	3	15	1.00	0.11
W	RB	0	87	0.0	-	-	-	-	-	-	-
B	RE	0	1	0.0	-	-	-	-	-	-	-
C	RE	0	1	0.0	-	-	-	-	-	-	-
F	RE	0	13	0.0	-	-	-	-	-	-	-
M	RE	0	2	0.0	-	-	-	-	-	-	-
S	RE	0	6	0.0	-	-	-	-	-	-	-
W	RE	0	87	0.0	-	-	-	-	-	-	-
B	RH	0	1	0.0	-	-	-	-	-	-	-
C	RH	0	1	0.0	-	-	-	-	-	-	-
F	RH	0	13	0.0	-	-	-	-	-	-	-
M	RH	0	2	0.0	-	-	-	-	-	-	-
S	RH	0	6	0.0	-	-	-	-	-	-	-
W	RH	0	87	0.0	-	-	-	-	-	-	-
B	RU	0	1	0.0	-	-	-	-	-	-	-
C	RU	0	1	0.0	-	-	-	-	-	-	-
F	RU	0	13	0.0	-	-	-	-	-	-	-
M	RU	0	2	0.0	-	-	-	-	-	-	-
S	RU	0	6	0.0	-	-	-	-	-	-	-
W	RU	0	87	0.0	-	-	-	-	-	-	-
B	S	5	38	11.6	5	40	60	-	-	0.90	0.02
F	S	0	4	0.0	-	-	-	-	-	-	-
M	S	1	115	0.9	-	-	-	-	-	-	-
S	S	23	1002	2.2	23	22	65	13	-	0.73	0.07
W	S	1	2	33.3	1	100	-	-	-	0.94	-
W	SALINITY	0	2	0.0	-	-	-	-	-	-	-
B	SB	0	1	0.0	-	-	-	-	-	-	-

TABLE C-I (cont)

Stable Element Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
C	SB	0	1	0.0	-	-	-	-	-	-	-
E	SB	0	1	0.0	-	-	-	-	-	-	-
F	SB	2	16	11.1	2	100	-	-	-	1.03	0.03
M	SB	0	2	0.0	-	-	-	-	-	-	-
S	SB	25	283	8.1	25	76	20	4	-	1.40	0.68
W	SB	18	160	10.1	18	83	11	6	-	0.99	0.14
B	SC	0	1	0.0	-	-	-	-	-	-	-
C	SC	0	1	0.0	-	-	-	-	-	-	-
F	SC	13	63	17.1	13	100	-	-	-	1.04	0.07
M	SC	0	2	0.0	-	-	-	-	-	-	-
S	SC	55	361	13.2	55	71	24	5	-	0.96	0.07
W	SC	0	86	0.0	-	-	-	-	-	-	-
B	SE	0	34	0.0	-	-	-	-	-	-	-
C	SE	4	15	21.1	4	-	50	-	50	0.60	0.11
F	SE	2	19	9.5	2	50	50	-	-	0.98	0.22
M	SE	19	141	11.9	19	84	16	-	-	0.96	0.12
S	SE	1	32	3.0	1	-	100	-	-	1.43	-
W	SE	177	671	20.9	175	88	11	-	1	1.07	0.80
B	SI	71	15	82.6	71	59	13	3	25	1.71	2.40
S	SI	97	262	27.0	121	72	16	5	7	0.98	0.08
W	SI	24	142	14.5	24	96	4	-	-	1.04	0.06
B	SM	0	1	0.0	-	-	-	-	-	-	-
C	SM	0	1	0.0	-	-	-	-	-	-	-
F	SM	0	13	0.0	-	-	-	-	-	-	-
M	SM	0	2	0.0	-	-	-	-	-	-	-
S	SM	120	581	17.1	118	75	19	3	2	0.97	0.16
W	SM	0	87	0.0	-	-	-	-	-	-	-
B	SN	0	1	0.0	-	-	-	-	-	-	-
C	SN	0	1	0.0	-	-	-	-	-	-	-
F	SN	0	15	0.0	-	-	-	-	-	-	-
M	SN	0	2	0.0	-	-	-	-	-	-	-
S	SN	0	6	0.0	-	-	-	-	-	-	-
W	SN	2	117	1.7	2	-	50	50	-	1.35	-
M	SO2	0	6	0.0	-	-	-	-	-	-	-
W	SO3	0	82	0.0	-	-	-	-	-	-	-
F	SO4	0	1	0.0	-	-	-	-	-	-	-
W	SO4	50	259	16.2	50	90	10	-	-	0.98	0.07
C	SPECIFIC GRAV	0	5	0.0	-	-	-	-	-	-	-
W	SPECIFIC GRAV	0	2	0.0	-	-	-	-	-	-	-
B	SR	0	1	0.0	-	-	-	-	-	-	-
C	SR	0	1	0.0	-	-	-	-	-	-	-
F	SR	0	13	0.0	-	-	-	-	-	-	-
M	SR	0	2	0.0	-	-	-	-	-	-	-
S	SR	86	567	13.2	84	95	2	2	-	0.95	0.20
W	SR	6	90	6.3	6	100	-	-	-	1.02	0.03

TABLE C-I (cont)

Stable Element Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
B	TA	0	1	0.0	-	-	-	-	-	-	-
C	TA	0	1	0.0	-	-	-	-	-	-	-
F	TA	0	13	0.0	-	-	-	-	-	-	-
M	TA	0	2	0.0	-	-	-	-	-	-	-
S	TA	36	325	10.0	36	72	22	3	3	1.06	0.22
W	TA	0	88	0.0	-	-	-	-	-	-	-
W	TOT ALKALINITY	35	232	13.1	35	97	3	-	-	1.01	0.08
B	TB	0	1	0.0	-	-	-	-	-	-	-
C	TB	0	1	0.0	-	-	-	-	-	-	-
F	TB	0	13	0.0	-	-	-	-	-	-	-
M	TB	0	2	0.0	-	-	-	-	-	-	-
S	TB	11	111	9.0	11	91	9	-	-	1.02	0.21
W	TB	0	87	0.0	-	-	-	-	-	-	-
W	TOTAL CATIONS	0	40	0.0	-	-	-	-	-	-	-
W	TOT DIS SOLIDS	20	165	10.8	20	75	25	-	-	1.02	0.15
B	TE	0	1	0.0	-	-	-	-	-	-	-
C	TE	0	1	0.0	-	-	-	-	-	-	-
F	TE	0	13	0.0	-	-	-	-	-	-	-
M	TE	0	2	0.0	-	-	-	-	-	-	-
S	TE	0	6	0.0	-	-	-	-	-	-	-
W	TE	0	86	0.0	-	-	-	-	-	-	-
B	TH	0	5	0.0	-	-	-	-	-	-	-
C	TH	0	1	0.0	-	-	-	-	-	-	-
F	TH	0	14	0.0	-	-	-	-	-	-	-
M	TH	0	2	0.0	-	-	-	-	-	-	-
S	TH	93	632	12.8	93	66	26	3	5	0.91	0.20
W	TH	23	170	11.9	23	87	13	-	-	1.05	0.10
B	TI	0	2	0.0	-	-	-	-	-	-	-
C	TI	0	1	0.0	-	-	-	-	-	-	-
F	TI	0	18	0.0	-	-	-	-	-	-	-
M	TI	0	2	0.0	-	-	-	-	-	-	-
S	TI	139	660	17.4	137	65	28	5	1	0.97	0.19
W	TI	8	109	6.8	8	88	13	-	-	1.11	0.03
B	TL	0	1	0.0	-	-	-	-	-	-	-
C	TL	0	6	0.0	-	-	-	-	-	-	-
E	TL	0	1	0.0	-	-	-	-	-	-	-
F	TL	2	94	2.1	2	-	100	-	-	0.80	0.05
M	TL	11	108	9.2	11	82	18	-	-	1.04	0.17
S	TL	0	6	0.0	-	-	-	-	-	-	-
U	TL	24	0	100.0	24	100	-	-	-	0.97	0.04
W	TL	121	251	32.5	121	82	12	4	2	1.00	0.13
B	TM	0	1	0.0	-	-	-	-	-	-	-
C	TM	0	1	0.0	-	-	-	-	-	-	-
F	TM	0	13	0.0	-	-	-	-	-	-	-
M	TM	0	2	0.0	-	-	-	-	-	-	-

TABLE C-I (cont)

Stable Element Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
S	TM	0	6	0.0	-	-	-	-	-	-	-
W	TM	0	88	0.0	-	-	-	-	-	-	-
W	TOT ORG CARBON	10	16	38.5	10	100	-	-	-	0.94	0.05
W	TOT ORG HAIDES	2	9	18.2	2	50	50	-	-	0.88	0.08
W	TOT SUSP SOLIDS	50	342	12.8	50	62	36	2	-	0.92	0.06
W	TURBIDITY	5	0	100.0	2	100	-	-	-	1.01	-
B	U	24	284	7.8	18	72	22	6	-	1.05	0.17
C	U	0	1	0.0	-	-	-	-	-	-	-
F	U	36	140	20.5	24	88	4	8	-	1.04	0.14
M	U	0	2	0.0	-	-	-	-	-	-	-
S	U	226	1420	13.7	220	89	7	-	4	0.96	0.15
U	U	111	30	78.7	111	95	5	-	-	0.98	0.12
W	U	244	363	40.2	247	96	2	2	-	1.04	0.14
B	V	6	37	14.0	6	83	-	17	-	1.02	0.19
C	V	0	1	0.0	-	-	-	-	-	-	-
F	V	0	13	0.0	-	-	-	-	-	-	-
M	V	0	2	0.0	-	-	-	-	-	-	-
S	V	180	659	21.5	176	68	31	1	-	0.95	0.10
W	V	66	88	42.9	34	76	21	-	3	1.06	0.14
B	W	8	35	18.6	8	75	-	-	25	0.69	0.04
C	W	0	1	0.0	-	-	-	-	-	-	-
F	W	0	13	0.0	-	-	-	-	-	-	-
M	W	0	3	0.0	-	-	-	-	-	-	-
S	W	61	347	15.0	38	100	-	-	-	-	-
W	W	0	88	0.0	-	-	-	-	-	-	-
B	Y	0	1	0.0	-	-	-	-	-	-	-
C	Y	0	1	0.0	-	-	-	-	-	-	-
F	Y	0	13	0.0	-	-	-	-	-	-	-
M	Y	0	2	0.0	-	-	-	-	-	-	-
S	Y	0	6	0.0	-	-	-	-	-	-	-
W	Y	0	87	0.0	-	-	-	-	-	-	-
B	YB	0	1	0.0	-	-	-	-	-	-	-
C	YB	0	1	0.0	-	-	-	-	-	-	-
F	YB	0	13	0.0	-	-	-	-	-	-	-
M	YB	0	2	0.0	-	-	-	-	-	-	-
S	YB	49	350	12.3	42	74	7	7	12	1.05	0.16
W	YB	0	87	0.0	-	-	-	-	-	-	-
B	ZN	0	2	0.0	-	-	-	-	-	-	-
C	ZN	0	1	0.0	-	-	-	-	-	-	-
E	ZN	0	1	0.0	-	-	-	-	-	-	-
F	ZN	40	34	54.1	39	85	8	8	-	1.04	0.10
M	ZN	7	61	10.3	7	100	-	-	-	0.94	0.03
S	ZN	21	275	7.1	21	86	-	-	14	0.92	0.21
W	ZN	190	421	31.1	189	88	10	1	1	1.01	0.07
B	ZR	0	1	0.0	-	-	-	-	-	-	-

TABLE C-I (cont)

Stable Element Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
C	ZR	0	1	0.0	-	-	-	-	-	-	-
F	ZR	0	13	0.0	-	-	-	-	-	-	-
M	ZR	0	2	0.0	-	-	-	-	-	-	-
S	ZR	0	6	0.0	-	-	-	-	-	-	-
W	ZR	0	87	0.0	-	-	-	-	-	-	-

TABLE C-I (cont)

Radiochemical Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
C	ALPHA	0	23	0.0	-	-	-	-	-	-	-
E	ALPHA	0	4	0.0	-	-	-	-	-	-	-
F	ALPHA	37	55	40.2	37	100	-	-	-	0.90	0.04
M	ALPHA	0	112	0.0	-	-	-	-	-	-	-
S	ALPHA	0	9	0.0	-	-	-	-	-	-	-
W	ALPHA	502	1522	24.8	502	98	1	-	-	1.02	0.11
B	AM-241	12	187	6.0	11	64	27	9	-	0.94	0.10
C	AM-241	0	22	0.0	-	-	-	-	-	-	-
F	AM-241	24	80	23.1	16	69	25	6	-	0.93	0.11
S	AM-241	9	112	7.4	9	33	56	11	-	1.94	2.18
U	AM-241	4	0	100.0	4	75	25	-	-	0.98	0.07
W	AM-241	65	514	11.2	68	87	13	-	-	0.94	0.06
B	BE-7	0	32	0.0	-	-	-	-	-	-	-
F	BE-7	5	0	100.0	5	80	20	-	-	0.92	0.05
S	BE-7	0	10	0.0	-	-	-	-	-	-	-
W	BE-7	0	61	0.0	-	-	-	-	-	-	-
C	BETA	0	4	0.0	-	-	-	-	-	-	-
E	BETA	0	4	0.0	-	-	-	-	-	-	-
F	BETA	36	55	39.6	36	97	3	-	-	0.92	0.04
M	BETA	0	111	0.0	-	-	-	-	-	-	-
S	BETA	0	9	0.0	-	-	-	-	-	-	-
W	BETA	501	1232	28.9	501	96	3	-	-	0.99	0.07
C	CO-56	0	2	0.0	-	-	-	-	-	-	-
W	CO-56	0	54	0.0	-	-	-	-	-	-	-
B	CO-57	0	32	0.0	-	-	-	-	-	-	-
C	CO-57	0	7	0.0	-	-	-	-	-	-	-
F	CO-57	5	0	100.0	5	100	-	-	-	1.02	0.09
S	CO-57	0	42	0.0	-	-	-	-	-	-	-
W	CO-57	53	125	29.8	53	92	8	-	-	1.11	0.10
C	CO-58	0	4	0.0	-	-	-	-	-	-	-
W	CO-58	0	75	0.0	-	-	-	-	-	-	-
C	CO-60	0	6	0.0	-	-	-	-	-	-	-
F	CO-60	5	0	100.0	5	-	100	-	-	1.32	0.04
S	CO-60	3	32	8.6	3	67	33	-	-	0.99	0.24
W	CO-60	66	89	42.6	69	93	3	-	4	1.23	0.99
C	CR-51	0	1	0.0	-	-	-	-	-	-	-
W	CR-51	0	9	0.0	-	-	-	-	-	-	-
F	CS-134	5	0	100.0	5	100	-	-	-	1.06	0.06
S	CS-134	0	42	0.0	-	-	-	-	-	-	-
W	CS-134	68	49	58.1	71	86	14	-	-	0.96	0.43
B	CS-137	43	177	19.5	43	67	21	9	2	0.94	0.19
C	CS-137	0	2	0.0	-	-	-	-	-	-	-
F	CS-137	10	0	100.0	10	100	-	-	-	0.98	0.07
S	CS-137	45	274	14.1	48	81	19	-	-	0.92	0.11
W	CS-137	113	244	31.7	116	95	4	1	-	1.11	0.43

TABLE C-I (cont)

Radiochemical Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
B	GAMMA	0	107	0.0	-	-	-	-	-	-	-
C	GAMMA	0	6	0.0	-	-	-	-	-	-	-
E	GAMMA	0	6	0.0	-	-	-	-	-	-	-
M	GAMMA	0	83	0.0	-	-	-	-	-	-	-
S	GAMMA	50	427	10.5	50	100	-	-	-	1.04	0.02
W	GAMMA	53	1162	4.4	53	70	28	2	-	1.08	0.12
W	GSCAN	0	7	0.0	-	-	-	-	-	-	-
B	H-3	0	32	0.0	-	-	-	-	-	-	-
C	H-3	0	4	0.0	-	-	-	-	-	-	-
E	H-3	0	4	0.0	-	-	-	-	-	-	-
S	H-3	0	111	0.0	-	-	-	-	-	-	-
U	H-3	224	0	100.0	177	69	25	5	1	1.05	0.13
W	H-3	314	1247	20.1	265	89	9	2	-	0.98	0.09
B	I-131	12	0	100.0	12	67	33	-	-	0.89	0.13
W	I-133	0	8	0.0	-	-	-	-	-	-	-
S	K-40	5	0	100.0	5	40	-	-	60	8.39	6.08
W	MN-52	0	3	0.0	-	-	-	-	-	-	-
B	MN-54	0	32	0.0	-	-	-	-	-	-	-
C	MN-54	0	6	0.0	-	-	-	-	-	-	-
F	MN-54	5	0	100.0	5	100	-	-	-	1.01	0.06
S	MN-54	0	10	0.0	-	-	-	-	-	-	-
W	MN-54	52	108	32.5	55	96	4	-	-	1.10	0.06
B	NA-22	0	32	0.0	-	-	-	-	-	-	-
S	NA-22	0	10	0.0	-	-	-	-	-	-	-
W	NA-22	47	48	49.5	47	100	-	-	-	1.02	0.07
W	NB-94	0	2	0.0	-	-	-	-	-	-	-
C	NB-95	0	7	0.0	-	-	-	-	-	-	-
W	NB-95	0	87	0.0	-	-	-	-	-	-	-
B	PU-238	28	211	11.7	27	70	22	7	-	0.95	0.09
C	PU-238	0	27	0.0	-	-	-	-	-	-	-
F	PU-238	18	157	10.3	4	100	-	-	-	0.99	0.04
S	PU-238	41	454	8.3	25	52	44	-	4	0.92	0.10
U	PU-238	70	0	100.0	70	80	14	4	1	0.99	0.13
W	PU-238	61	278	18.0	49	82	16	-	2	1.01	0.16
B	PU-239	42	208	16.8	41	68	22	7	2	1.00	0.15
C	PU-239	0	27	0.0	-	-	-	-	-	-	-
F	PU-239	22	157	12.3	14	79	-	7	14	1.01	0.34
S	PU-239	44	454	8.8	34	76	6	6	12	0.88	0.29
U	PU-239	65	0	100.0	65	80	14	3	3	1.11	0.80
W	PU-239	70	280	20.0	67	78	15	1	6	0.98	0.12
W	PU-240	0	1	0.0	-	-	-	-	-	-	-
B	RA-226	1	4	20.0	1	100	-	-	-	0.97	-
S	RA-226	5	2	71.4	5	100	-	-	-	1.02	0.05
W	RA-226	36	19	65.5	35	100	-	-	-	0.98	0.05
B	RB-83	0	32	0.0	-	-	-	-	-	-	-

TABLE C-I (cont)

Radiochemical Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
S	RB-83	0	10	0.0	-	-	-	-	-	-	-
W	RB-83	0	1	0.0	-	-	-	-	-	-	-
W	RU-106	10	0	100.0	10	60	10	10	20	0.46	0.55
W	SC-46	0	16	0.0	-	-	-	-	-	-	-
W	SC-48	0	4	0.0	-	-	-	-	-	-	-
C	SE-75	0	8	0.0	-	-	-	-	-	-	-
S	SE-75	0	32	0.0	-	-	-	-	-	-	-
W	SE-75	0	175	0.0	-	-	-	-	-	-	-
C	SN-113	0	6	0.0	-	-	-	-	-	-	-
W	SN-113	0	69	0.0	-	-	-	-	-	-	-
C	SR-85	0	6	0.0	-	-	-	-	-	-	-
W	SR-85	0	120	0.0	-	-	-	-	-	-	-
W	SR-89	0	60	0.0	-	-	-	-	-	-	-
B	SR-90	6	41	12.8	6	-	17	17	67	0.70	0.18
F	SR-90	2	0	100.0	2	-	-	50	50	0.53	0.04
S	SR-90	5	82	5.7	5	20	20	40	20	- 0.13	0.95
W	SR-90	18	74	19.6	16	50	13	6	31	0.86	0.10
W	TH-232	0	1	0.0	-	-	-	-	-	-	-
C	U-234	0	27	0.0	-	-	-	-	-	-	-
W	U-234	26	51	33.8	26	92	8	-	-	1.01	0.13
C	U-235	0	28	0.0	-	-	-	-	-	-	-
U	U-235	111	0	100.0	110	59	27	11	3	0.94	0.13
W	U-235	23	54	29.9	23	100	-	-	-	0.95	0.20
B	U-235/238	0	142	0.0	-	-	-	-	-	-	-
F	U-235/238	0	7	0.0	-	-	-	-	-	-	-
M	U-235/238	3	0	100.0	3	100	-	-	-	0.96	-
S	U-235/238	4	677	0.6	2	100	-	-	-	1.02	0.01
W	U-235/238	283	61	82.3	283	85	14	1	-	1.01	0.08
U	U-238	104	0	100.0	78	73	21	6	-	1.00	0.17
W	U-238	0	2	0.0	-	-	-	-	-	-	-
W	XE-133	0	3	0.0	-	-	-	-	-	-	-
C	Y-88	0	3	0.0	-	-	-	-	-	-	-
W	Y-88	0	24	0.0	-	-	-	-	-	-	-
C	ZN-65	0	6	0.0	-	-	-	-	-	-	-
W	ZN-65	10	34	22.7	-	-	-	-	-	-	-

TABLE C-I (cont)

Organic Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
F	Identification	0	1	0.0	-	-	-	-	-	-	-
M	Identification	0	2	0.0	-	-	-	-	-	-	-
W	Identification	0	1	0.0	-	-	-	-	-	-	-
W	Semivolatiles	3	3	50.0	-	-	-	-	-	-	-
M	Volatiles	0	1	0.0	-	-	-	-	-	-	-
S	Volatiles	9	59	13.2	-	-	-	-	-	-	-
W	Volatiles	15	129	10.4	-	-	-	-	-	-	-
M	4-(1,1,3,3-Tetramethylbutyl)phenol	0	1	0.0	-	-	-	-	-	-	-
M	2-(2-(4-(1,1,3,3-Tetramethylbutyl)phenox	0	1	0.0	-	-	-	-	-	-	-
M	2-(2-(2-Butoxyethoxy)ethoxy)ethanol	0	1	0.0	-	-	-	-	-	-	-
M	1-(2-Methoxy-1-methylethoxy)-2-propanol	0	1	0.0	-	-	-	-	-	-	-
M	2-(2-Methoxyethoxy)ethanol	0	1	0.0	-	-	-	-	-	-	-
M	Acenaphthene	0	4	0.0	-	-	-	-	-	-	-
S	Acenaphthene	1	13	7.1	1	-	100	-	-	1.22	-
W	Acenaphthene	8	94	7.8	6	50	33	-	17	0.74	0.28
M	Acenaphthylene	0	4	0.0	-	-	-	-	-	-	-
S	Acenaphthylene	0	12	0.0	-	-	-	-	-	-	-
W	Acenaphthylene	5	93	5.1	-	-	-	-	-	-	-
M	Acetic acid	0	1	0.0	-	-	-	-	-	-	-
M	Acetone	6	49	10.9	3	100	-	-	-	0.97	0.02
S	Acetone	8	64	11.1	-	-	-	-	-	-	-
T	Acetone	13	59	18.1	13	23	23	8	46	1.08	0.78
W	Acetone	14	137	9.3	1	100	-	-	-	1.32	-
T	Acetonitrile	2	9	18.2	2	50	50	-	-	0.99	0.22
M	Acetylene	0	6	0.0	-	-	-	-	-	-	-
M	Acrolein	0	2	0.0	-	-	-	-	-	-	-
M	Activated carbon	0	1	0.0	-	-	-	-	-	-	-
W	Alachlor	2	0	100.0	2	100	-	-	-	1.00	0.08
M	Alcohols	0	2	0.0	-	-	-	-	-	-	-
W	Aldrin	1	19	5.0	1	100	-	-	-	0.61	-
M	Amines	0	3	0.0	-	-	-	-	-	-	-
M	InorgAmmonium chloride	0	1	0.0	-	-	-	-	-	-	-
M	InorgAmmonium nitrate	0	1	0.0	-	-	-	-	-	-	-
M	InorgAmmonium sulfate	0	1	0.0	-	-	-	-	-	-	-
W	Aniline	1	3	25.0	-	-	-	-	-	-	-
M	Anthracene	0	4	0.0	-	-	-	-	-	-	-
S	Anthracene	0	12	0.0	-	-	-	-	-	-	-
W	Anthracene	9	93	8.8	7	86	14	-	-	0.84	0.09
F	Mixed-Aroclor	0	18	0.0	-	-	-	-	-	-	-
M	Mixed-Aroclor	1	275	0.4	1	100	-	-	-	1.05	-
S	Mixed-Aroclor	0	67	0.0	-	-	-	-	-	-	-
T	Mixed-Aroclor	0	1	0.0	-	-	-	-	-	-	-
W	Mixed-Aroclor	0	2	0.0	-	-	-	-	-	-	-
M	Aroclor 1016	0	1	0.0	-	-	-	-	-	-	-

TABLE C-I (cont)

Organic Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
W	Aroclor 1016	7	6	53.8	-	-	-	-	-	-	-
W	Aroclor 1221	0	6	0.0	-	-	-	-	-	-	-
W	Aroclor 1232	6	6	50.0	2	-	50	-	50	-	-
F	Aroclor 1242	0	2	0.0	-	-	-	-	-	-	-
M	Aroclor 1242	34	8	81.0	34	68	32	-	-	0.92	0.12
S	Aroclor 1242	30	165	15.4	30	67	23	7	3	0.91	0.19
T	Aroclor 1242	2	1	66.7	2	100	-	-	-	0.84	0.03
W	Aroclor 1242	12	6	66.7	6	83	-	17	-	0.91	0.06
W	Aroclor 1248	6	6	50.0	-	-	-	-	-	-	-
F	Aroclor 1254	1	3	25.0	1	-	100	-	-	0.82	-
M	Aroclor 1254	3	18	14.3	-	-	-	-	-	-	-
S	Aroclor 1254	0	28	0.0	-	-	-	-	-	-	-
W	Aroclor 1254	8	8	50.0	1	-	100	-	-	2.14	-
F	Aroclor 1260	1	4	20.0	1	100	-	-	-	1.22	-
M	Aroclor 1260	20	14	58.8	20	45	50	5	-	0.86	0.12
S	Aroclor 1260	0	40	0.0	-	-	-	-	-	-	-
W	Aroclor 1260	8	8	50.0	2	100	-	-	-	0.63	0.07
W	Atrazine	2	0	100.0	2	100	-	-	-	0.80	0.34
W	Azobenzene	1	3	25.0	-	-	-	-	-	-	-
W	beta-BHC	0	19	0.0	-	-	-	-	-	-	-
W	alpha-BHC	0	19	0.0	-	-	-	-	-	-	-
W	delta-BHC	0	19	0.0	-	-	-	-	-	-	-
M	Benzaldehyde	0	1	0.0	-	-	-	-	-	-	-
M	1,2-Benzanthracene	0	4	0.0	-	-	-	-	-	-	-
S	1,2-Benzanthracene	0	13	0.0	-	-	-	-	-	-	-
W	1,2-Benzanthracene	6	93	6.1	2	100	-	-	-	0.89	0.01
M	Benzene	0	7	0.0	-	-	-	-	-	-	-
S	Benzene	14	68	17.1	14	14	21	7	57	0.59	0.53
T	Benzene	19	101	15.8	15	40	20	7	33	0.62	0.32
W	Benzene	23	129	15.1	14	57	7	7	29	0.87	0.18
W	m-Benzidine	1	3	25.0	-	-	-	-	-	-	-
M	Benzidine dihydrochloride	0	1	0.0	-	-	-	-	-	-	-
M	Benzo(g,h,i)perylene	0	4	0.0	-	-	-	-	-	-	-
S	Benzo(g,h,i)perylene	0	13	0.0	-	-	-	-	-	-	-
W	Benzo(g,h,i)perylene	9	93	8.8	5	60	-	40	-	0.99	0.53
M	Benzo-a-pyrene	0	4	0.0	-	-	-	-	-	-	-
S	Benzo-a-pyrene	0	13	0.0	-	-	-	-	-	-	-
W	Benzo-a-pyrene	9	93	8.8	5	40	40	-	20	1.06	0.58
M	Benzo-b-fluoranthene	0	4	0.0	-	-	-	-	-	-	-
S	Benzo-b-fluoranthene	0	13	0.0	-	-	-	-	-	-	-
W	Benzo-b-fluoranthene	9	93	8.8	5	60	40	-	-	1.11	0.45
M	Benzo-k-fluoranthene	0	4	0.0	-	-	-	-	-	-	-
S	Benzo-k-fluoranthene	0	13	0.0	-	-	-	-	-	-	-
W	Benzo-k-fluoranthene	6	93	6.1	2	50	50	-	-	0.82	0.10

TABLE C-I (cont)

Organic Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
M	Benzoic acid	0	4	0.0	-	-	-	-	-	-	-
S	Benzoic acid	0	13	0.0	-	-	-	-	-	-	-
W	Benzoic acid	3	94	3.1	-	-	-	-	-	-	-
M	Benzyl alcohol	0	4	0.0	-	-	-	-	-	-	-
S	Benzyl alcohol	0	13	0.0	-	-	-	-	-	-	-
W	Benzyl alcohol	4	93	4.1	-	-	-	-	-	-	-
M	Bibenzyl	0	3	0.0	-	-	-	-	-	-	-
M	1,1'-Biphenyl	0	2	0.0	-	-	-	-	-	-	-
M	Biphenyl-2-ol	0	1	0.0	-	-	-	-	-	-	-
M	Bis(2-chloroethoxy)methane	0	4	0.0	-	-	-	-	-	-	-
S	Bis(2-chloroethoxy)methane	0	13	0.0	-	-	-	-	-	-	-
W	Bis(2-chloroethoxy)methane	4	93	4.1	2	50	-	50	-	0.73	0.27
M	Bis(2-chloroethyl)ether	0	4	0.0	-	-	-	-	-	-	-
S	Bis(2-chloroethyl)ether	0	13	0.0	-	-	-	-	-	-	-
W	Bis(2-chloroethyl)ether	7	93	7.0	5	20	20	20	40	0.52	-
M	Bis(2-chloroisopropyl)ether	0	4	0.0	-	-	-	-	-	-	-
S	Bis(2-chloroisopropyl)ether	0	13	0.0	-	-	-	-	-	-	-
W	Bis(2-chloroisopropyl)ether	9	106	7.8	5	80	-	20	-	1.09	0.10
M	Bis(2-ethylhexyl) sebacate	0	4	0.0	-	-	-	-	-	-	-
T	Bis(2-ethylhexyl) sebacate	0	6	0.0	-	-	-	-	-	-	-
W	Bis(2-ethylhexyl)adipate	2	0	100.0	2	100	-	-	-	-	-
M	Bis(2-ethylhexyl)phthalate	0	5	0.0	-	-	-	-	-	-	-
S	Bis(2-ethylhexyl)phthalate	0	12	0.0	-	-	-	-	-	-	-
W	Bis(2-ethylhexyl)phthalate	10	94	9.6	7	71	29	-	-	2.42	2.30
S	Bromobenzene	4	17	19.0	-	-	-	-	-	-	-
W	Bromobenzene	5	12	29.4	-	-	-	-	-	-	-
S	Bromochloromethane	3	17	15.0	-	-	-	-	-	-	-
W	Bromochloromethane	5	11	31.3	-	-	-	-	-	-	-
S	Bromodichloromethane	8	58	12.1	1	-	100	-	-	2.03	-
W	Bromodichloromethane	25	129	16.2	16	88	13	-	-	0.94	0.08
S	4-Bromofluorobenzene (vol sur #3) also C	3	17	15.0	-	-	-	-	-	-	-
W	4-Bromofluorobenzene (vol sur #3) also C	2	11	15.4	-	-	-	-	-	-	-
S	Bromoform	7	58	10.8	1	100	-	-	-	1.03	-
W	Bromoform	27	130	17.2	18	44	17	22	17	0.94	0.25
M	4-Bromophenylphenyl ether	0	4	0.0	-	-	-	-	-	-	-
S	4-Bromophenylphenyl ether	0	13	0.0	-	-	-	-	-	-	-
W	4-Bromophenylphenyl ether	7	93	7.0	5	20	60	20	-	0.61	0.09
M	2-Butanol	0	1	0.0	-	-	-	-	-	-	-
M	2-Butanone	0	19	0.0	-	-	-	-	-	-	-
S	2-Butanone	7	58	10.8	-	-	-	-	-	-	-
W	2-Butanone	14	130	9.7	-	-	-	-	-	-	-
T	Butoxy-2-ethanol	0	3	0.0	-	-	-	-	-	-	-
M	n-Butyl acetate	0	2	0.0	-	-	-	-	-	-	-
S	tert-Butylbenzene	3	17	15.0	-	-	-	-	-	-	-

TABLE C-I (cont)

Organic Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
S	sec-Butylbenzene	4	17	19.0	-	-	-	-	-	-	-
S	n-Butylbenzene	5	21	19.2	-	-	-	-	-	-	-
W	sec-Butylbenzene	5	12	29.4	-	-	-	-	-	-	-
W	tert-Butylbenzene	6	13	31.6	1	-	100	-	-	1.38	-
W	n-Butylbenzene	5	12	29.4	-	-	-	-	-	-	-
M	Butylbenzyl phthalate	0	4	0.0	-	-	-	-	-	-	-
S	Butylbenzyl phthalate	0	13	0.0	-	-	-	-	-	-	-
W	Butylbenzyl phthalate	8	94	7.8	6	100	-	-	-	1.24	0.40
T	Caprolactam	0	9	0.0	-	-	-	-	-	-	-
M	Carbon disulfide	0	2	0.0	-	-	-	-	-	-	-
S	Carbon disulfide	8	62	11.4	-	-	-	-	-	-	-
W	Carbon disulfide	13	130	9.1	-	-	-	-	-	-	-
M	Carbon tetrachloride	0	1	0.0	-	-	-	-	-	-	-
S	Carbon tetrachloride	7	58	10.8	1	100	-	-	-	0.84	-
T	Carbon tetrachloride	25	97	20.5	22	82	14	5	-	1.02	0.11
W	Carbon tetrachloride	25	129	16.2	18	39	22	11	28	0.81	0.19
T	Cellosolve acetate	8	2	80.0	8	75	25	-	-	0.82	0.05
W	Chlordane	2	13	13.3	2	-	50	-	50	1.58	0.99
W	gamma-Chlordane	0	6	0.0	-	-	-	-	-	-	-
W	alpha-Chlordane	0	6	0.0	-	-	-	-	-	-	-
M	4-Chloro-3-methylphenol	0	4	0.0	-	-	-	-	-	-	-
S	4-Chloro-3-methylphenol	0	13	0.0	-	-	-	-	-	-	-
W	4-Chloro-3-methylphenol	9	96	8.6	7	29	-	14	57	0.75	0.65
M	4-Chloroaniline	0	4	0.0	-	-	-	-	-	-	-
S	4-Chloroaniline	0	13	0.0	-	-	-	-	-	-	-
W	4-Chloroaniline	3	93	3.1	-	-	-	-	-	-	-
M	Chlorobenzene	1	2	33.3	1	100	-	-	-	1.02	-
S	Chlorobenzene	9	58	13.4	8	25	38	25	13	0.89	0.44
T	Chlorobenzene	14	98	12.5	11	9	9	45	36	0.95	0.53
W	Chlorobenzene	28	129	17.8	18	44	28	6	22	0.95	0.35
S	Chlorodibromomethane	7	58	10.8	-	-	-	-	-	-	-
W	Chlorodibromomethane	27	129	17.3	15	73	13	7	7	1.00	0.24
S	Chloroethane	7	58	10.8	-	-	-	-	-	-	-
W	Chloroethane	15	129	10.4	-	-	-	-	-	-	-
M	Chloroform	5	4	55.6	3	100	-	-	-	0.94	0.10
S	Chloroform	7	58	10.8	2	-	-	-	100	0.37	0.02
T	Chloroform	24	103	18.9	19	32	53	11	5	0.88	0.23
W	Chloroform	30	130	18.8	25	56	20	-	24	0.90	0.07
S	1-Chlorohexane	4	17	19.0	-	-	-	-	-	-	-
W	1-Chlorohexane	2	11	15.4	-	-	-	-	-	-	-
M	2-Chloronaphthalene	0	4	0.0	-	-	-	-	-	-	-
S	2-Chloronaphthalene	0	14	0.0	-	-	-	-	-	-	-
W	2-Chloronaphthalene	6	94	6.0	4	25	25	25	25	0.64	0.16
M	o-Chlorophenol	0	4	0.0	-	-	-	-	-	-	-

TABLE C-I (cont)

Organic Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
S	o-Chlorophenol	0	13	0.0	-	-	-	-	-	-	-
W	o-Chlorophenol	9	94	8.7	6	17	17	50	17	1.00	0.90
W	p-Chlorophenol	1	0	100.0	1	-	-	-	100	-	-
M	4-Chlorophenylphenyl ether	0	4	0.0	-	-	-	-	-	-	-
S	4-Chlorophenylphenyl ether	0	13	0.0	-	-	-	-	-	-	-
W	4-Chlorophenylphenyl ether	7	93	7.0	5	60	20	20	-	0.92	0.10
S	p-Chlorotoluene	4	18	18.2	-	-	-	-	-	-	-
S	o-Chlorotoluene	4	18	18.2	-	-	-	-	-	-	-
W	p-Chlorotoluene	5	12	29.4	-	-	-	-	-	-	-
W	o-Chlorotoluene	5	12	29.4	-	-	-	-	-	-	-
M	Chlorotrimethylsilane	0	1	0.0	-	-	-	-	-	-	-
M	Chrysene	0	4	0.0	-	-	-	-	-	-	-
S	Chrysene	0	13	0.0	-	-	-	-	-	-	-
W	Chrysene	9	93	8.8	7	71	-	29	-	1.23	0.47
M	2,4,6-Cycloheptatriene-1-one	0	1	0.0	-	-	-	-	-	-	-
M	Cyclohexane	0	4	0.0	-	-	-	-	-	-	-
T	Cyclohexene	0	9	0.0	-	-	-	-	-	-	-
T	Cyclooctatraene	0	3	0.0	-	-	-	-	-	-	-
W	2,4-D	7	9	43.8	7	100	-	-	-	1.07	0.12
W	p,p'-DDD	0	19	0.0	-	-	-	-	-	-	-
W	p,p'-DDE	0	19	0.0	-	-	-	-	-	-	-
W	p,p'-DDT	0	19	0.0	-	-	-	-	-	-	-
W	Decachlorobiphenyl (2,2',3,3',4,4',5,5',	2	0	100.0	2	100	-	-	-	-	-
M	n-Decane	2	0	100.0	2	100	-	-	-	1.07	-
M	Di-n-butyl phthalate	0	5	0.0	-	-	-	-	-	-	-
S	Di-n-butyl phthalate	0	12	0.0	-	-	-	-	-	-	-
W	Di-n-butyl phthalate	4	93	4.1	2	50	50	-	-	0.97	0.36
M	Di-n-octyl phthalate	0	5	0.0	-	-	-	-	-	-	-
S	Di-n-octyl phthalate	0	12	0.0	-	-	-	-	-	-	-
W	Di-n-octyl phthalate	3	94	3.1	1	-	100	-	-	-	-
M	2,6-Di-t-butylphenol	0	2	0.0	-	-	-	-	-	-	-
M	2,6-Di-tert-butyl-p-cresol	0	2	0.0	-	-	-	-	-	-	-
M	Dibenzo(a,h)anthracene	0	4	0.0	-	-	-	-	-	-	-
S	Dibenzo(a,h)anthracene	0	13	0.0	-	-	-	-	-	-	-
W	Dibenzo(a,h)anthracene	9	93	8.8	5	80	-	-	20	0.96	0.42
M	Dibenzofuran	0	4	0.0	-	-	-	-	-	-	-
S	Dibenzofuran	0	12	0.0	-	-	-	-	-	-	-
W	Dibenzofuran	3	93	3.1	-	-	-	-	-	-	-
S	1,2-Dibromo-3-chloropropane	3	17	15.0	-	-	-	-	-	-	-
W	1,2-Dibromo-3-chloropropane	6	11	35.3	3	100	-	-	-	-	-
M	1,2-Dibromoethane	0	1	0.0	-	-	-	-	-	-	-
S	1,2-Dibromoethane	0	12	0.0	-	-	-	-	-	-	-
W	1,2-Dibromoethane	4	1	80.0	3	100	-	-	-	-	-
S	Dibromomethane	3	17	15.0	-	-	-	-	-	-	-

TABLE C-I (cont)

Organic Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
W	Dibromomethane	5	12	29.4	2	100	-	-	-	1.13	0.04
S	1,1-Dichloro-1-propene	5	24	17.2	-	-	-	-	-	-	-
W	1,1-Dichloro-1-propene	4	12	25.0	-	-	-	-	-	-	-
M	o-Dichlorobenzene (1,2)	1	7	12.5	1	-	-	-	100	0.56	-
M	m-Dichlorobenzene (1,3)	0	4	0.0	-	-	-	-	-	-	-
S	m-Dichlorobenzene (1,3)	3	31	8.8	-	-	-	-	-	-	-
W	m-Dichlorobenzene (1,3)	10	107	8.5	3	-	-	33	67	1.18	1.21
M	p-Dichlorobenzene (1,4)	0	4	0.0	-	-	-	-	-	-	-
S	p-Dichlorobenzene (1,4)	3	31	8.8	-	-	-	-	-	-	-
W	p-Dichlorobenzene (1,4)	15	106	12.4	10	40	30	10	20	0.54	0.24
M	Mixed-Dichlorobenzenes	0	1	0.0	-	-	-	-	-	-	-
S	Mixed-Dichlorobenzenes	0	1	0.0	-	-	-	-	-	-	-
M	3,3′-Dichlorobenzidine	0	4	0.0	-	-	-	-	-	-	-
S	3,3′-Dichlorobenzidine	0	13	0.0	-	-	-	-	-	-	-
W	3,3′-Dichlorobenzidine	3	93	3.1	-	-	-	-	-	-	-
W	Dichlorodifluoromethane	3	0	100.0	-	-	-	-	-	-	-
M	1,2-Dichloroethane	0	1	0.0	-	-	-	-	-	-	-
S	1,2-Dichloroethane	7	58	10.8	2	-	50	50	-	0.61	0.02
S	1,1-Dichloroethane	7	58	10.8	-	-	-	-	-	-	-
T	1,2-Dichloroethane	16	0	100.0	15	93	-	7	-	0.97	0.08
W	1,1-Dichloroethane	15	130	10.3	-	-	-	-	-	-	-
W	1,2-Dichloroethane	22	130	14.5	13	69	-	-	31	1.14	0.39
S	1,2-Dichloroethane d4 (vol sur 1) also C	3	17	15.0	-	-	-	-	-	-	-
W	1,2-Dichloroethane d4 (vol sur 1) also C	2	11	15.4	-	-	-	-	-	-	-
S	1,2-Dichloroethene	4	41	8.9	-	-	-	-	-	-	-
S	1,1-Dichloroethene	7	58	10.8	-	-	-	-	-	-	-
W	1,1-Dichloroethene	18	131	12.1	4	75	-	-	25	1.53	0.55
W	1,2-Dichloroethene	11	119	8.5	-	-	-	-	-	-	-
S	cis-1,2-Dichloroethylene	3	17	15.0	-	-	-	-	-	-	-
S	trans-1,2-Dichloroethylene	3	17	15.0	-	-	-	-	-	-	-
W	cis-1,2-Dichloroethylene	6	13	31.6	1	-	-	-	100	-	-
W	trans-1,2-Dichloroethylene	7	12	36.8	2	50	-	-	50	1.09	-
M	2,4-Dichlorophenol	0	4	0.0	-	-	-	-	-	-	-
S	2,4-Dichlorophenol	0	13	0.0	-	-	-	-	-	-	-
W	2,4-Dichlorophenol	5	95	5.0	3	33	33	-	33	2.03	1.93
S	2,2-Dichloropropane	3	17	15.0	-	-	-	-	-	-	-
S	1,3-Dichloropropane	4	21	16.0	-	-	-	-	-	-	-
S	1,2-Dichloropropane	7	58	10.8	-	-	-	-	-	-	-
W	2,2-Dichloropropane	5	12	29.4	-	-	-	-	-	-	-
W	1,2-Dichloropropane	16	129	11.0	2	100	-	-	-	1.54	0.23
W	1,3-Dichloropropane	5	12	29.4	-	-	-	-	-	-	-
S	trans-1,3-Dichloropropene	7	58	10.8	-	-	-	-	-	-	-
S	cis-1,3-Dichloropropene	7	58	10.8	-	-	-	-	-	-	-
W	1,3-Dichloropropene	2	0	100.0	-	-	-	-	-	-	-

TABLE C-I (cont)

Organic Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
W	cis-1,3-Dichloropropene	12	129	8.5	-	-	-	-	-	-	-
W	trans-1,3-Dichloropropene	12	129	8.5	-	-	-	-	-	-	-
W	Dieldrin	0	19	0.0	-	-	-	-	-	-	-
T	Diethenylbenzene	0	1	0.0	-	-	-	-	-	-	-
T	Diethyl ether	1	9	10.0	1	-	-	-	100	0.16	-
M	Diethyl phthalate	0	5	0.0	-	-	-	-	-	-	-
S	Diethyl phthalate	0	12	0.0	-	-	-	-	-	-	-
W	Diethyl phthalate	4	93	4.1	2	100	-	-	-	0.63	-
T	Diethylene triamine	0	2	0.0	-	-	-	-	-	-	-
M	Diisopropylbenzene	0	1	0.0	-	-	-	-	-	-	-
T	1,2-Dimethoxyethane	0	3	0.0	-	-	-	-	-	-	-
M	Dimethyl phthalate	0	4	0.0	-	-	-	-	-	-	-
S	Dimethyl phthalate	0	13	0.0	-	-	-	-	-	-	-
W	Dimethyl phthalate	7	93	7.0	5	60	20	20	-	0.85	0.27
T	n,n-Dimethylacetamide	1	1	50.0	1	-	-	-	100	0.42	-
M	N,N-Dimethylformamide	0	1	0.0	-	-	-	-	-	-	-
T	N,N-Dimethylformamide	1	16	5.9	1	100	-	-	-	1.15	-
M	3,3-Dimethyloxetane	0	1	0.0	-	-	-	-	-	-	-
M	2,4-Dimethylphenol	0	4	0.0	-	-	-	-	-	-	-
S	2,4-Dimethylphenol	0	13	0.0	-	-	-	-	-	-	-
W	2,4-Dimethylphenol	6	93	6.1	4	-	25	-	75	1.71	1.86
M	Dimethylsulfoxide	0	3	0.0	-	-	-	-	-	-	-
T	Dimethylsulfoxide	0	2	0.0	-	-	-	-	-	-	-
M	2,4-Dinitrophenol	0	4	0.0	-	-	-	-	-	-	-
S	2,4-Dinitrophenol	0	13	0.0	-	-	-	-	-	-	-
W	2,4-Dinitrophenol	3	96	3.0	-	-	-	-	-	-	-
M	2,6-Dinitrotoluene	0	4	0.0	-	-	-	-	-	-	-
M	2,4-Dinitrotoluene	0	4	0.0	-	-	-	-	-	-	-
S	2,4-Dinitrotoluene	1	13	7.1	1	-	100	-	-	1.25	-
S	2,6-Dinitrotoluene	0	13	0.0	-	-	-	-	-	-	-
W	2,6-Dinitrotoluene	5	93	5.1	3	67	33	-	-	0.74	0.05
W	2,4-Dinitrotoluene	6	93	6.1	4	25	-	25	50	0.70	0.13
M	1,4-Dioxane	0	14	0.0	-	-	-	-	-	-	-
M	m-Dioxane	0	1	0.0	-	-	-	-	-	-	-
S	1,4-Dioxane	0	2	0.0	-	-	-	-	-	-	-
T	1,4-Dioxane	9	2	81.8	9	100	-	-	-	0.95	0.04
W	1,4-Dioxane	1	4	20.0	1	100	-	-	-	-	-
M	Diphenyl ether	0	1	0.0	-	-	-	-	-	-	-
M	Diphenylmethane	0	2	0.0	-	-	-	-	-	-	-
T	Divinyl benzene	0	4	0.0	-	-	-	-	-	-	-
W	alpha-Endosulfan	0	19	0.0	-	-	-	-	-	-	-
W	Endosulfan II	0	19	0.0	-	-	-	-	-	-	-
W	Endosulfan sulfate	0	19	0.0	-	-	-	-	-	-	-
W	Endrin	3	23	11.5	3	67	-	33	-	1.02	0.19

TABLE C-I (cont)

Organic Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
W	Endrin aldehyde	0	13	0.0	-	-	-	-	-	-	-
W	Endrin ketone	0	6	0.0	-	-	-	-	-	-	-
M	Ethanol	0	15	0.0	-	-	-	-	-	-	-
T	Ethanol	6	31	16.2	6	33	17	-	50	0.66	0.24
M	2-Ethoxy ethanol	0	1	0.0	-	-	-	-	-	-	-
M	Ethyl acetate	3	2	60.0	-	-	-	-	-	-	-
T	Ethyl acetate	0	1	0.0	-	-	-	-	-	-	-
M	2-Ethyl-1-hexanol	0	2	0.0	-	-	-	-	-	-	-
T	2-Ethyl-1-hexanol	0	9	0.0	-	-	-	-	-	-	-
S	Ethylbenzene	8	62	11.4	1	-	100	-	-	2.12	-
T	Ethylbenzene	9	97	8.5	6	-	50	50	-	0.79	0.02
W	Ethylbenzene	24	131	15.5	19	74	16	-	11	0.88	0.18
M	Ethylchloroacetate	0	1	0.0	-	-	-	-	-	-	-
M	Ethylene glycol	0	4	0.0	-	-	-	-	-	-	-
T	Ethylisothiocyanate	0	1	0.0	-	-	-	-	-	-	-
F	Exiton DCM	0	2	0.0	-	-	-	-	-	-	-
M	Exiton DCM	0	1	0.0	-	-	-	-	-	-	-
M	Fluoranthene	0	4	0.0	-	-	-	-	-	-	-
S	Fluoranthene	0	12	0.0	-	-	-	-	-	-	-
W	Fluoranthene	9	93	8.8	5	60	20	-	20	0.90	0.34
M	Fluorene	0	4	0.0	-	-	-	-	-	-	-
S	Fluorene	0	12	0.0	-	-	-	-	-	-	-
W	Fluorene	9	93	8.8	7	86	14	-	-	0.85	0.09
W	2-Fluorobiphenyl	1	3	25.0	-	-	-	-	-	-	-
W	2-Fluorophenol	1	3	25.0	-	-	-	-	-	-	-
M	Fluorotrichloromethane	0	6	0.0	-	-	-	-	-	-	-
S	Fluorotrichloromethane	3	24	11.1	-	-	-	-	-	-	-
W	Fluorotrichloromethane	5	13	27.8	-	-	-	-	-	-	-
M	Halogenated hydrocarbons	0	7	0.0	-	-	-	-	-	-	-
W	Heptachlor	2	19	9.5	2	50	50	-	-	1.31	0.71
W	Heptachlor epoxide	2	19	9.5	2	-	100	-	-	0.46	0.01
M	n-Heptane	0	4	0.0	-	-	-	-	-	-	-
T	n-Heptane	1	2	33.3	1	-	100	-	-	1.35	-
W	Herbicides (Method 8150)	0	1	0.0	-	-	-	-	-	-	-
M	Hexachlorobenzene	0	4	0.0	-	-	-	-	-	-	-
S	Hexachlorobenzene	0	14	0.0	-	-	-	-	-	-	-
W	Hexachlorobenzene	4	94	4.1	2	100	-	-	-	1.01	0.11
M	Hexachlorobutadiene	0	4	0.0	-	-	-	-	-	-	-
S	Hexachlorobutadiene	3	31	8.8	-	-	-	-	-	-	-
W	Hexachlorobutadiene	9	106	7.8	2	-	50	50	-	0.48	0.06
M	Hexachlorocyclopentadiene	0	4	0.0	-	-	-	-	-	-	-
S	Hexachlorocyclopentadiene	0	14	0.0	-	-	-	-	-	-	-
W	Hexachlorocyclopentadiene	3	94	3.1	-	-	-	-	-	-	-
M	Hexachloroethane	0	4	0.0	-	-	-	-	-	-	-

TABLE C-I (cont)

Organic Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
S	Hexachloroethane	0	14	0.0	-	-	-	-	-	-	-
W	Hexachloroethane	7	94	6.9	5	20	-	20	60	0.38	0.12
M	Hexadecanoic acid	0	1	0.0	-	-	-	-	-	-	-
M	Hexamethyldisiloxane	0	2	0.0	-	-	-	-	-	-	-
M	Hexane	8	1	88.9	5	80	-	20	-	1.07	0.31
T	Hexane	0	15	0.0	-	-	-	-	-	-	-
M	2-Hexanone	1	0	100.0	1	100	-	-	-	0.94	-
S	2-Hexanone	8	58	12.1	4	25	50	-	25	1.85	0.66
W	2-Hexanone	13	129	9.2	-	-	-	-	-	-	-
M	Hexyl acetate	0	1	0.0	-	-	-	-	-	-	-
M	n-Hexyl formate	0	1	0.0	-	-	-	-	-	-	-
M	Hydrazine monohydrate	0	1	0.0	-	-	-	-	-	-	-
M	Hydrocarbons	0	64	0.0	-	-	-	-	-	-	-
T	Hydrocarbons	0	8	0.0	-	-	-	-	-	-	-
T	Hydroquinone	1	2	33.3	1	100	-	-	-	1.25	-
T	2-Hydroxyethyl methacrylate	0	6	0.0	-	-	-	-	-	-	-
M	4-(2-Hydroxyethyl)morpholine	0	2	0.0	-	-	-	-	-	-	-
M	8-Hydroxyquinoline	0	1	0.0	-	-	-	-	-	-	-
M	Indeno(1,2,3-cd)pyrene	0	4	0.0	-	-	-	-	-	-	-
S	Indeno(1,2,3-cd)pyrene	0	13	0.0	-	-	-	-	-	-	-
W	Indeno(1,2,3-cd)pyrene	5	93	5.1	-	-	-	-	-	-	-
M	Isocyanates	0	1	0.0	-	-	-	-	-	-	-
M	Isophorone	0	4	0.0	-	-	-	-	-	-	-
S	Isophorone	0	13	0.0	-	-	-	-	-	-	-
W	Isophorone	4	93	4.1	2	50	-	-	50	0.69	0.46
M	Isopropyl alcohol	3	6	33.3	-	-	-	-	-	-	-
T	Isopropyl alcohol	0	3	0.0	-	-	-	-	-	-	-
M	Isopropyl ether	0	1	0.0	-	-	-	-	-	-	-
S	Isopropylbenzene	4	17	19.0	-	-	-	-	-	-	-
W	Isopropylbenzene	5	12	29.4	-	-	-	-	-	-	-
S	4-Isopropyltoluene	3	18	14.3	-	-	-	-	-	-	-
W	4-Isopropyltoluene	6	13	31.6	-	-	-	-	-	-	-
W	Lindane	8	23	25.8	8	100	-	-	-	1.17	0.71
M	Methane	0	6	0.0	-	-	-	-	-	-	-
M	Methanol	0	4	0.0	-	-	-	-	-	-	-
T	Methanol	5	26	16.1	5	-	-	-	100	0.26	0.09
W	Methoxychlor	6	10	37.5	6	33	50	-	17	1.28	0.58
S	Methyl bromide	7	58	10.8	-	-	-	-	-	-	-
W	Methyl bromide	15	129	10.4	-	-	-	-	-	-	-
M	Methyl chloride	0	1	0.0	-	-	-	-	-	-	-
S	Methyl chloride	7	58	10.8	-	-	-	-	-	-	-
W	Methyl chloride	15	129	10.4	-	-	-	-	-	-	-
M	Methyl methacrylate	0	1	0.0	-	-	-	-	-	-	-
M	Methyl propionate	0	1	0.0	-	-	-	-	-	-	-

TABLE C-I (cont)

Organic Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
M	Methyl stearate	0	2	0.0	-	-	-	-	-	-	-
M	2-Methyl-1-pentene	1	0	100.0	-	-	-	-	-	-	-
M	3-Methyl-2-butanol	0	1	0.0	-	-	-	-	-	-	-
M	3-Methyl-2-butanone	0	2	0.0	-	-	-	-	-	-	-
M	4-Methyl-2-pentanone	2	18	10.0	-	-	-	-	-	-	-
S	4-Methyl-2-pentanone	10	59	14.5	-	-	-	-	-	-	-
W	4-Methyl-2-pentanone	19	133	12.5	13	62	15	8	15	0.93	0.14
M	1-Methyl-2-pyrrolidinone	0	1	0.0	-	-	-	-	-	-	-
M	2-Methyl-3-(1-methylethyl)-oxirane	0	1	0.0	-	-	-	-	-	-	-
M	2-Methyl-4,6-dinitrophenol	0	4	0.0	-	-	-	-	-	-	-
S	2-Methyl-4,6-dinitrophenol	0	13	0.0	-	-	-	-	-	-	-
W	2-Methyl-4,6-dinitrophenol	6	96	5.9	4	50	25	25	-	0.50	0.05
M	Methylcyclohexane	0	2	0.0	-	-	-	-	-	-	-
T	Methylcyclohexane	0	2	0.0	-	-	-	-	-	-	-
M	Methylene chloride	0	1	0.0	-	-	-	-	-	-	-
S	Methylene chloride	7	58	10.8	-	-	-	-	-	-	-
W	Methylene chloride	19	132	12.6	2	50	50	-	-	-	-
M	2-Methylhexane	0	1	0.0	-	-	-	-	-	-	-
M	4-Methylmorpholine	0	2	0.0	-	-	-	-	-	-	-
M	2-Methylnaphthalene	0	4	0.0	-	-	-	-	-	-	-
S	2-Methylnaphthalene	0	12	0.0	-	-	-	-	-	-	-
W	2-Methylnaphthalene	5	93	5.1	2	-	-	-	100	0.35	0.12
M	Methylpalmitate	0	2	0.0	-	-	-	-	-	-	-
M	4-Methylphenol	0	4	0.0	-	-	-	-	-	-	-
M	2-Methylphenol	0	4	0.0	-	-	-	-	-	-	-
S	4-Methylphenol	0	13	0.0	-	-	-	-	-	-	-
S	2-Methylphenol	0	13	0.0	-	-	-	-	-	-	-
W	4-Methylphenol	3	93	3.1	-	-	-	-	-	-	-
W	2-Methylphenol	3	93	3.1	-	-	-	-	-	-	-
M	2-Methylsuccinic anhydride	0	4	0.0	-	-	-	-	-	-	-
S	Mineral oil	0	1	0.0	-	-	-	-	-	-	-
T	Mineral oil	0	2	0.0	-	-	-	-	-	-	-
W	Mineral oil	0	1	0.0	-	-	-	-	-	-	-
M	Naphthalene	0	4	0.0	-	-	-	-	-	-	-
S	Naphthalene	5	35	12.5	-	-	-	-	-	-	-
W	Naphthalene	14	105	11.8	5	40	60	-	-	0.72	0.31
M	InorgNickel sulfamate	0	3	0.0	-	-	-	-	-	-	-
M	2-Nitroaniline	0	4	0.0	-	-	-	-	-	-	-
M	4-Nitroaniline	0	4	0.0	-	-	-	-	-	-	-
M	3-Nitroaniline	0	4	0.0	-	-	-	-	-	-	-
S	2-Nitroaniline	0	13	0.0	-	-	-	-	-	-	-
S	4-Nitroaniline	0	13	0.0	-	-	-	-	-	-	-
S	3-Nitroaniline	0	13	0.0	-	-	-	-	-	-	-
W	2-Nitroaniline	3	93	3.1	-	-	-	-	-	-	-

TABLE C-I (cont)

Organic Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
W	3-Nitroaniline	3	93	3.1	-	-	-	-	-	-	-
W	4-Nitroaniline	3	93	3.1	-	-	-	-	-	-	-
M	Nitrobenzene	0	4	0.0	-	-	-	-	-	-	-
S	Nitrobenzene	0	13	0.0	-	-	-	-	-	-	-
W	Nitrobenzene	7	93	7.0	5	20	40	40	-	0.62	0.17
W	Nitrobenzene-d5	1	3	25.0	-	-	-	-	-	-	-
M	o-Nitrophenol	0	4	0.0	-	-	-	-	-	-	-
M	p-Nitrophenol	0	4	0.0	-	-	-	-	-	-	-
S	p-Nitrophenol	1	13	7.1	1	-	-	-	100	1.79	-
S	o-Nitrophenol	1	13	7.1	1	-	-	-	100	0.29	-
W	o-Nitrophenol	10	96	9.4	8	13	50	13	25	1.74	2.25
W	p-Nitrophenol	6	96	5.9	4	50	25	-	25	0.50	0.44
M	N-Nitrosodi-n-propylamine	0	4	0.0	-	-	-	-	-	-	-
S	N-Nitrosodi-n-propylamine	1	13	7.1	1	100	-	-	-	1.07	-
T	N-Nitrosodi-n-propylamine	1	0	100.0	1	100	-	-	-	0.84	-
W	N-Nitrosodi-n-propylamine	4	93	4.1	2	-	50	-	50	1.87	1.20
W	N-Nitrosodimethylamine	2	3	40.0	1	-	100	-	-	-	-
M	N-Nitrosodiphenylamine	0	4	0.0	-	-	-	-	-	-	-
S	N-Nitrosodiphenylamine	0	12	0.0	-	-	-	-	-	-	-
W	N-Nitrosodiphenylamine	5	93	5.1	2	-	50	-	50	-	-
M	n-Nonane	0	1	0.0	-	-	-	-	-	-	-
M	Octane	0	1	0.0	-	-	-	-	-	-	-
M	2-Octyne	0	1	0.0	-	-	-	-	-	-	-
M	Oxalic acid	0	1	0.0	-	-	-	-	-	-	-
W	Pentachloroethane	1	0	100.0	-	-	-	-	-	-	-
M	Pentachlorophenol	0	4	0.0	-	-	-	-	-	-	-
S	Pentachlorophenol	2	13	13.3	2	50	-	-	50	2.56	-
W	Pentachlorophenol	15	95	13.6	13	62	15	-	23	0.87	0.26
M	Pentadecanoic acid	0	1	0.0	-	-	-	-	-	-	-
T	Pentane	0	4	0.0	-	-	-	-	-	-	-
M	2-Pentanone	0	2	0.0	-	-	-	-	-	-	-
M	Phenanthrene	0	4	0.0	-	-	-	-	-	-	-
S	Phenanthrene	0	12	0.0	-	-	-	-	-	-	-
W	Phenanthrene	6	93	6.1	4	75	-	25	-	0.90	0.25
M	Phenol	0	9	0.0	-	-	-	-	-	-	-
S	Phenol	1	12	7.7	1	100	-	-	-	1.04	-
W	Phenol	10	95	9.5	7	-	-	29	71	0.61	0.69
W	Phenol-d5	1	3	25.0	-	-	-	-	-	-	-
M	Phthalate ester	0	1	0.0	-	-	-	-	-	-	-
M	Phthalic anhydride	0	2	0.0	-	-	-	-	-	-	-
M	1-Propanol	0	1	0.0	-	-	-	-	-	-	-
M	n-Propyl acetate	0	1	0.0	-	-	-	-	-	-	-
S	Propylbenzene	4	24	14.3	-	-	-	-	-	-	-
W	Propylbenzene	5	12	29.4	-	-	-	-	-	-	-

TABLE C-I (cont)

Organic Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
M	Pyrene	0	4	0.0	-	-	-	-	-	-	-
S	Pyrene	0	12	0.0	-	-	-	-	-	-	-
W	Pyrene	8	93	7.9	6	83	17	-	-	1.16	0.26
W	Silvex	7	9	43.8	7	86	14	-	-	0.91	0.06
M	InorgSodium thiosulfate	0	1	0.0	-	-	-	-	-	-	-
M	Styrene	0	1	0.0	-	-	-	-	-	-	-
S	Styrene	9	59	13.2	-	-	-	-	-	-	-
T	Styrene	7	15	31.8	7	-	86	14	-	1.53	0.16
W	Styrene	14	129	9.8	1	100	-	-	-	1.11	-
W	Terphenyl-d14	1	3	25.0	-	-	-	-	-	-	-
M	1,1,2,2-Tetrachloroethane	0	1	0.0	-	-	-	-	-	-	-
S	1,1,2,2-Tetrachloroethane	7	58	10.8	2	-	-	-	100	0.28	0.02
S	1,1,1,2-Tetrachloroethane	3	17	15.0	-	-	-	-	-	-	-
W	1,1,2,2-Tetrachloroethane	17	129	11.6	2	-	50	-	50	0.59	0.16
W	1,1,1,2-Tetrachloroethane	5	12	29.4	-	-	-	-	-	-	-
M	Tetrachloroethylene	0	3	0.0	-	-	-	-	-	-	-
S	Tetrachloroethylene	7	58	10.8	-	-	-	-	-	-	-
T	Tetrachloroethylene	9	96	8.6	6	-	67	17	17	0.72	0.26
W	Tetrachloroethylene	20	130	13.3	7	43	29	-	29	0.90	0.06
M	Tetradecanoic acid	0	1	0.0	-	-	-	-	-	-	-
M	trans-Tetrahydro-5,6-dimethyl-2H-pyran-2	0	1	0.0	-	-	-	-	-	-	-
M	Tetrahydrofuran	0	1	0.0	-	-	-	-	-	-	-
T	Tetrahydrofuran	4	11	26.7	4	75	-	-	25	0.89	0.32
M	Toluene	6	11	35.3	2	100	-	-	-	1.22	0.24
S	Toluene	14	68	17.1	14	36	36	-	29	0.83	0.51
T	Toluene	26	130	16.7	20	25	50	-	25	1.79	1.84
W	Toluene	27	133	16.9	20	55	30	10	5	0.93	0.29
S	Toluene d8 (vol sur #2) also CAS=2037265	3	17	15.0	-	-	-	-	-	-	-
W	Toluene d8 (vol sur #2) also CAS=2037265	2	11	15.4	-	-	-	-	-	-	-
F	Total organics, Identification	0	1	0.0	-	-	-	-	-	-	-
M	Total organics, Identification	0	78	0.0	-	-	-	-	-	-	-
S	Total organics, Identification	0	3	0.0	-	-	-	-	-	-	-
T	Total organics, Identification	0	38	0.0	-	-	-	-	-	-	-
W	Total organics, Identification	0	5	0.0	-	-	-	-	-	-	-
W	Total trihalomethanes	1	0	100.0	-	-	-	-	-	-	-
W	Toxaphene	2	23	8.0	2	100	-	-	-	-	-
M	Tri-2-butoxyethyl phosphate	0	1	0.0	-	-	-	-	-	-	-
W	2,4,6-Tribromophenol	1	3	25.0	-	-	-	-	-	-	-
T	Tributyl phosphate	0	8	0.0	-	-	-	-	-	-	-
M	1,2,4-Trichlorobenzene	0	4	0.0	-	-	-	-	-	-	-
M	1,2,3-Trichlorobenzene	0	1	0.0	-	-	-	-	-	-	-
S	1,2,3-Trichlorobenzene	3	18	14.3	-	-	-	-	-	-	-
S	1,2,4-Trichlorobenzene	4	32	11.1	1	-	-	100	-	0.61	-
W	1,2,4-Trichlorobenzene	12	106	10.2	6	33	17	17	33	0.58	0.26

TABLE C-I (cont)

Organic Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
W	1,2,3-Trichlorobenzene	5	14	26.3	-	-	-	-	-	-	-
M	1,1,2-Trichloroethane	0	1	0.0	-	-	-	-	-	-	-
M	1,1,1-Trichloroethane	0	30	0.0	-	-	-	-	-	-	-
S	1,1,1-Trichloroethane	7	58	10.8	-	-	-	-	-	-	-
S	1,1,2-Trichloroethane	7	58	10.8	-	-	-	-	-	-	-
T	1,1,1-Trichloroethane	9	112	7.4	6	50	17	17	17	1.18	0.24
W	1,1,2-Trichloroethane	16	130	11.0	2	50	-	-	50	1.21	-
W	1,1,1-Trichloroethane	24	131	15.5	12	25	33	25	17	0.91	0.27
M	Trichloroethylene	0	7	0.0	-	-	-	-	-	-	-
S	Trichloroethylene	7	58	10.8	2	-	50	50	-	0.65	0.08
T	Trichloroethylene	19	113	14.4	10	90	10	-	-	1.03	0.14
W	Trichloroethylene	19	133	12.5	8	38	13	13	38	0.97	0.43
M	2,4,6-Trichlorophenol	0	4	0.0	-	-	-	-	-	-	-
M	2,4,5-Trichlorophenol	0	4	0.0	-	-	-	-	-	-	-
S	2,4,5-Trichlorophenol	0	13	0.0	-	-	-	-	-	-	-
S	2,4,6-Trichlorophenol	0	13	0.0	-	-	-	-	-	-	-
W	2,4,6-Trichlorophenol	6	96	5.9	4	-	50	25	25	0.97	0.71
W	2,4,5-Trichlorophenol	3	93	3.1	-	-	-	-	-	-	-
S	1,2,3-Trichloropropane	3	17	15.0	-	-	-	-	-	-	-
W	1,2,3-Trichloropropane	5	12	29.4	-	-	-	-	-	-	-
M	1,1,2-Trichlorotrifluoroethane	0	5	0.0	-	-	-	-	-	-	-
T	1,1,2-Trichlorotrifluoroethane	1	3	25.0	1	-	100	-	-	0.77	-
W	1,1,2-Trichlorotrifluoroethane	2	4	33.3	-	-	-	-	-	-	-
M	Trimethylamine	0	2	0.0	-	-	-	-	-	-	-
M	1,2,4-Trimethylbenzene	0	1	0.0	-	-	-	-	-	-	-
S	1,3,5-Trimethylbenzene	4	18	18.2	-	-	-	-	-	-	-
S	1,2,3-Trimethylbenzene	0	1	0.0	-	-	-	-	-	-	-
S	1,2,4-Trimethylbenzene	5	18	21.7	-	-	-	-	-	-	-
T	1,2,4-Trimethylbenzene	9	96	8.6	6	-	-	67	33	0.67	0.23
W	1,3,5-Trimethylbenzene	5	13	27.8	-	-	-	-	-	-	-
W	1,2,4-Trimethylbenzene	5	15	25.0	-	-	-	-	-	-	-
M	Trimethylsilanol	0	1	0.0	-	-	-	-	-	-	-
M	Triphenyl phosphate	0	1	0.0	-	-	-	-	-	-	-
M	Tritolyl phosphate	0	1	0.0	-	-	-	-	-	-	-
M	Unknown ester	0	1	0.0	-	-	-	-	-	-	-
M	Unknown organic compound	0	1	0.0	-	-	-	-	-	-	-
S	Vinyl acetate	7	58	10.8	3	-	-	-	100	0.10	-
W	Vinyl acetate	12	130	8.5	-	-	-	-	-	-	-
S	Vinyl chloride	7	58	10.8	-	-	-	-	-	-	-
W	Vinyl chloride	16	130	11.0	2	100	-	-	-	2.47	0.61
W	Volatiles	0	1	0.0	-	-	-	-	-	-	-
M	Water	0	45	0.0	-	-	-	-	-	-	-
S	m-Xylene	6	18	25.0	4	25	25	25	25	0.64	0.29
S	o-Xylene	5	17	22.7	4	-	50	-	50	0.53	0.10

TABLE C-I (cont)

Organic Analyses

MATRIX	ANALYSIS	NO. QC	NUMBER SAMPLES	% QC SAMPLES	NO. QC WITH CV	< 1 SIGMA (%)	1-2 SIGMA (%)	2-3 SIGMA (%)	> 3 SIGMA (%)	HSE-9 CV RATIO	HSE-9 CV SD
T	o-Xylene	27	96	22.0	17	71	29	-	-	0.96	0.21
T	m-Xylene	3	0	100.0	1	-	-	100	-	2.50	-
T	p-Xylene	1	0	100.0	1	-	-	-	100	1.86	-
W	o-Xylene	10	14	41.7	8	50	13	13	25	0.94	0.34
W	p-Xylene	4	0	100.0	1	-	-	-	100	-	-
W	m-Xylene	4	13	23.5	-	-	-	-	-	-	-
M	Mixed-Xylenes	0	3	0.0	-	-	-	-	-	-	-
S	Mixed-Xylenes	7	51	12.1	-	-	-	-	-	-	-
T	Mixed-Xylenes	9	105	7.9	-	-	-	-	-	-	-
W	Mixed-Xylenes	14	119	10.5	-	-	-	-	-	-	-

Matrix codes: B = Biologicals, C = Sludge, E = Extract, F = Filter, M = Bulk, S = Silicate, T = Tube, U = Urine, and W = Water, X = Miscellaneous.

Note: Many samples for organic analyses come into our laboratory as unknowns for identification as well as quantitation. Representative organic compounds are chosen to prepare QC samples for these analyses. The QC may not be the specific compound identified as the unknown but is from the same class of compounds. When analytes are sorted, as they are in Table C-I, many analyses appear not to have been run with QC samples when indeed they were. An example of this situation is PCBs for which specific aroclors were used to QC the general PCB category.

TABLE C-II

SUMMARY OF ANALYTICAL DETERMINATIONS ON NIST STANDARD REFERENCE MATERIALS BY HSE-9

Material	Constituent	Mean ± Std Dev	Units	N [a]	Technique [b]
NBS 1c Argillaceous Limestone	CO2	43.0 ± 1.4	%	44	GASEV
	F	160	ug/g	1	ISE
NBS 278 Obsidian Rock	Al	7.45 ± 0.32	%	5	ATNA
	Ba	870 ± 130	ug/g	5	ATNA
		939	ug/g	1	ITNA
	Ca	8000 ± 850	ug/g	5	ATNA
	Ce	68.5	ug/g	1	ITNA
	Cl	620 ± 120	ug/g	5	ATNA
	Cs	5.61	ug/g	1	ITNA
	Cu	< 300	ug/g	2	ATNA
	Dy	5.6 ± 0.6	ug/g	5	ATNA
	Eu	720	ng/g	1	ATNA
		766	ng/g	1	ITNA
	Fe	1.52	%	1	ITNA
	Ga	< 60	ug/g	1	ATNA
	Hf	8.93	ug/g	1	ITNA
	I	< 18	ug/g	1	ATNA
	In	< 170	ng/g	5	ATNA
	K	3.47 ± 0.20	%	5	ATNA
	Mg	< 4000	ug/g	5	ATNA
	Mn	397 ± 23	ug/g	5	ATNA
	Na	3.59 ± 0.05	ug/g	5	ATNA
	Rb	128	ug/g	1	ITNA
	Sb	2.13	ug/g	1	ITNA
	Sc	5.46	ug/g	1	ITNA
	Si	36.5	%	1	AENA
	Sm	6.6	ug/g	1	ATNA
	A	6.58	ug/g	1	ITNA
	Sr	< 300	ug/g	2	ATNA
	Ta	1.16	ug/g	1	ITNA
	Th	13.2	ug/g	1	ITNA
	Ti	1340 ± 230	ug/g	5	ATNA
	U	4.4	ug/g	1	ATNA
		4.53 ± 0.13	ug/g	43	DNA
	V	8.8	ug/g	2	ATNA
	W	< 160	ug/g	4	ATNA
	Yb	4.38	ug/g	1	ITNA
	Zn	45.8	ug/g	1	ITNA
NBS 688 Basalt Rock	Al	9.12 ± 0.33	%	10	ATNA
	As	2.8 ± 1.1	ug/g	3	ITNA
	Ba	< 4000	ug/g	10	ATNA
		210 ± 60	ug/g	9	ITNA
	Ca	8.57 ± 0.55	%	10	ATNA
	Ce	13.6 ± 1.6	ug/g	15	ITNA
	Cl	< 100	ug/g	10	ATNA
	Co	46 ± 3	ug/g	15	ITNA
	Cr	314 ± 20	ug/g	9	ITNA
	Cs	320 ± 90	ng/g	3	ITNA
	Cu	< 300	ug/g	2	ATNA
	Dy	2.6 ± 0.4	ug/g	6	ATNA
	Eu	< 0.8	ug/g	1	ATNA
		0.99 ± 0.07	ug/g	15	ITNA
	Fe	7.1 ± 0.5	%	15	ITNA
	Ga	< 50	ug/g	9	ATNA
	Hf	1.61 ± 0.17	ug/g	15	ITNA
	I	< 18	ug/g	1	ATNA
	In	< 150	ng/g	10	ATNA
	K	< 4000	ug/g	11	ATNA
		1700 ± 600	ug/g	3	ITNA
	La	6.0 ± 0.7	ug/g	7	ITNA
	Lu	370 ± 30	ng/g	6	ITNA
	Mg	5.01 ± 0.16	%	9	ATNA
	Mn	1210 ± 40	ug/g	10	ATNA
	Na	1.54 ± 0.05	%	10	ATNA
		1.52 ± 0.05	%	3	ITNA

TABLE C-II (cont)

Material	Constituent	Mean ± Std Dev	Units	N [a]	Technique [b]
NBS 688 Basalt Rock (cont)	Sb	360 ± 50	ng/g	3	ITNA
	Sc	34 ± 2	ug/g	15	ITNA
	Si	21.1	%	1	AENA
	Sm	< 2.4	ug/g	10	ATNA
		2.19 ± 0.12	ug/g	5	ITNA
	Sr	< 250	ug/g	10	ATNA
	Ta	330 ± 120	ng/g	8	ITNA
	Tb	556	ng/g	1	ITNA
	Th	360 ± 120	ng/g	9	ITNA
	Ti	6400 ± 500	ug/g	10	ATNA
	U	300	ng/g	1	ATNA
	V	245 ± 11	ug/g	10	ATNA
	W	< 200	ug/g	9	ATNA
	Yb	2.1 ± 0.4	ug/g	15	ITNA
	Zn	88	ug/g	1	ITNA
NBS 950b U308	U-235/238	0.0069 ± 0.0001	ratio	3	ICPMS
NBS 960 Uranium Metal (INC-7 dissolution)	U-235/238	0.0072 ± 0.0005	ratio	249	ICPMS
NBS 1084 Wear-Metals in Lubricating Oil, Low	Ag	91	ug/g	2	FAA
	Cr	105	ug/g	1	FAA
	Pb	75	ug/g	1	FAA
NBS 1085 Wear-Metals in Lubricating Oil, High	Ag	298 ± 17	ug/g	4	FAA
	Cr	308 ± 16	ug/g	3	FAA
	Pb	295 ± 13	ug/g	3	FAA
NBS 1549 Non-fat Milk Powder	Si	< 200	ug/g	9	IENA
NBS 1566 Oyster Tissue	Si	1290 ± 180	ug/g	9	IENA
	U	125 ± 7	ng/g	9	DNA
NBS 1567 Wheat Flour	Si	120 ± 14	ug/g	9	IENA
NBS 1568 Rice Flour	Si	140 ± 30	ug/g	9	IENA
NBS 1569 Brewers Yeast	Si	1.20 ± 0.13	%	6	IENA
NBS 1570 Spinach	Si	2900 ± 370	ug/g	9	IENA
NBS 1571 Orchard Leaves	Si	2280 ± 170	ug/g	9	IENA
NBS 1572 Citrus Leaves	Al	84 ± 2	ug/g	4	ITNA
	As	3.41	ug/g	2	IENA
	Cs	87	ng/g	2	ITNA
	Mo	< 1	ug/g	4	IENA
	Si	2130 ± 340	ug/g	9	IENA
	U	46	ng/g	2	DNA
	V	260 ± 50	ng/g	4	ITNA
	W	< 500	ng/g	4	IENA
NBS 1573 Tomato Leaves	Cs	84	ng/g	2	ITNA
	F	5.64	ug/g	2	DISE
		5.0 ± 0.4	ug/g	4	ISE
	Mo	< 1	ug/g	2	IENA
	Si	1.03 ± 0.04	%	9	IENA
	U	67	ng/g	2	DNA
	W	< 400	ng/g	2	IENA
NBS 1575 Pine Needles	Al	560	ug/g	2	ITNA
	Ca	3680	ug/g	2	ITNA
	Cl	250	ug/g	2	ITNA
	Cs	133	ng/g	2	ITNA
	K	5900	ug/g	2	ITNA
	Mg	955	ug/g	2	ITNA
	Mn	687	ug/g	2	ITNA
	Na	22	ug/g	2	ITNA
	S	1190 ± 25	ug/g	5	CEA

TABLE C-II (cont)

Material	Constituent	Mean ± Std Dev	Units	N [a]	Technique [b]
NBS 1515 Pine Needles (cont)	Si	1340 ± 110	ug/g	9	IENA
	V	340	ng/g	2	ITNA
NBS 1577 Bovine Liver	Si	< 200	ug/g	5	IENA
NBS 1577a Bovine Liver	Si	< 200	ug/g	9	IENA
NBS 1633 Trace Elements in Coal Fly Ash	Al	13.25 ± 0.14	%	3	ATNA
	Ba	2340 ± 40	ug/g	3	ATNA
	Ca	4.81 ± 0.14	%	3	ATNA
	Cl	127 ± 25	ug/g	3	ATNA
	Dy	9.8 ± 0.3	ug/g	3	ATNA
	Eu	2.40 ± 0.03	ug/g	3	ATNA
	Ga	48	ug/g	2	ATNA
	I	< 16	ug/g	3	ATNA
	In	147	ng/g	2	ATNA
	K	1.83 ± 0.17	%	3	ATNA
	Mg	1.36 ± 0.06	%	3	ATNA
	Mn	496 ± 11	ug/g	3	ATNA
	Na	3170 ± 15	ug/g	3	ATNA
	Sm	12.1 ± 0.7	ug/g	3	ATNA
	Sr	1310 ± 60	ug/g	3	ATNA
	Ti	6570 ± 240	ug/g	3	ATNA
	V	219 ± 5	ug/g	3	ATNA
	W	< 140	ug/g	3	ATNA
NBS 1633a Trace Elements in Coal Fly Ash	As	134 ± 10	ug/g	3	ITNA
	Ba	1280 ± 190	ug/g	8	ITNA
	Ce	174 ± 7	ug/g	8	ITNA
	Co	42 ± 2	ug/g	8	ITNA
	Cr	190 ± 10	ug/g	10	ITNA
	Cs	10.3 ± 0.6	ug/g	11	ITNA
	Eu	3.7 ± 0.4	ug/g	14	ITNA
	Fe	9.7 ± 0.6	%	14	ITNA
	Hf	7.1 ± 0.4	ug/g	14	ITNA
	K	1.88 ± 0.05	%	3	ITNA
	La	90 ± 2	ug/g	3	ITNA
	Lu	1.12 ± 0.12	ug/g	6	ITNA
	Na	1740 ± 90	ug/g	6	ITNA
	Rb	143 ± 17	ug/g	8	ITNA
	Sb	6.8	ug/g	2	ITNA
	Sc	37 ± 2	ug/g	14	ITNA
	Si	22.7 ± 1.2	%	15	AENA
	Sm	14.8 ± 1.2	ug/g	4	ITNA
	Ta	2.05 ± 0.32	ug/g	8	ITNA
	Tb	2.25	ug/g	1	ITNA
	Th	23.6 ± 1.4	ug/g	8	ITNA
	Yb	9.3 ± 1.2	ug/g	8	ITNA
	Zn	214	ug/g	1	ITNA
NBS 1642b Mercury in Water	Hg	1.46 ± 0.09	ug/L	89	CVAA
NBS 1643A Trace Elements in Water	Ag	2.5	ug/L	1	ICPMS
	As	81	ug/L	2	ICPMS
	Ba	48	ug/L	2	ICPMS
	Cd	10.2	ug/L	2	ICPMS
	Cr	18	ug/L	2	ICPMS
	Cu	16	ug/L	2	ICPMS
	Mn	26	ug/L	2	ICPMS
	Na	8.4	mg/L	1	ICPMS
	Pb	26 ± 2	ug/L	3	ICPMS
	Zn	68	ug/L	2	ICPMS
NBS 1643b Trace Elements in Water	Ag	10.8	ug/L	1	ETVAA
		9.8 ± 1.7	ug/L	24	ICPMS
	As	58 ± 2	ug/L	11	ETVAA
		56 +± 5	ug/L	71	ICPMS
	B	95 ± 7	ug/L	4	ICPMS
	Ba	44 ± 3	ug/L	97	ICPMS

TABLE C-II (cont)

Material	Constituent	Mean ± Std Dev	Units	N [a]	Technique [b]
Trace Elements in Water (cont)	Be	20.0 ± 0.7	ug/L	28	ETVAA
		19.8 ± 2.3	ug/L	96	ICPMS
	Bi	10.6 ± 0.5	ug/L	4	ICPMS
	Cd	19.4 ± 1.3	ug/L	3	ETVAA
		20.3 ± 1.4	ug/L	63	ICPMS
	Co	28 ± 2	ug/L	18	ICPMS
	Cr	17 ± 3	ug/L	9	ETVAA
		18.6 ± 1.5	ug/L	69	ICPMS
	Cu	22.2 ± 0.4	ug/L	5	FAA
		20.8 ± 2.1	ug/L	55	ICPMS
	Fe	99 ± 9	ug/L	18	ETVAA
		112 ± 8	ug/L	13	FAA
		125	ug/L	2	ICPAE
		106 ± 10	ug/L	5	ICPMS
	Mn	30 ± 3	ug/L	39	ICPMS
	Mo	100 ± 4	ug/L	33	ICPMS
	Ni	49 ± 5	ug/L	46	ICPMS
	Pb	23 ± 3	ug/L	9	ETVAA
		24 ± 2	ug/L	128	ICPMS
	Se	9.5 ± 0.8	ug/L	23	ETVAA
		10.4	ug/L	2	ICPAE
		10.4 ± 2.3	ug/L	17	ICPMS
	Sr	232 ± 8	ug/L	6	ICPMS
	Tl	7.2 ± 1.4	ug/L	16	ETVAA
		7.8 ± 1.4	ug/L	8	FAA
		8.4 ± 1.0	ug/L	50	ICPMS
	V	49 ± 3	ug/L	11	ICPMS
	Zn	74	ug/L	2	FAA
		67 ± 5	ug/L	56	ICPMS
NBS 1645 River Sediment	Al	2.52 ± 0.20	%	8	ATNA
	Ba	320 ± 50	ug/g	8	ATNA
		350 ± 60	ug/g	3	ITNA
	Ca	3.10 ± 0.14	%	8	ATNA
	Cd	9.2 ± 1.6	ug/g	28	ICPMS
	Cl	90 ± 30	ug/g	8	ATNA
	Cu	< 130	ug/g	2	ATNA
		116 ± 25	ug/g	36	ICPMS
		120	ug/g	1	ITNA
	Dy	< 5	ug/g	8	ATNA
	Eu	< 650	ug/g	7	ATNA
	F	1880 ± 180	ug/g	4	ISE
	Ga	< 40	ug/g	7	ATNA
	I	< 20	ug/g	7	ATNA
	In	280 ± 40	ug/g	7	ATNA
	K	1.18 ± 0.14	%	8	ATNA
	Mg	7600 ± 1800	ug/g	8	ATNA
	Mn	745 ± 44	ug/g	8	ATNA
	Na	5500 ± 200	ug/g	8	ATNA
	Ni	45 ± 11	ug/g	29	ICPMS
	Pb	765 ± 90	ug/g	41	ICPMS
	Si	22.0	%	1	AENA
	Sm	< 2	ug/g	8	ATNA
	Sr	730 ± 160	ug/g	8	ATNA
	Th	1.3 ± 0.3	ug/g	35	ICPMS
	Ti	780 ± 90	ug/g	8	ATNA
	U	1.07	ug/g	1	ATNA
		1.11 ± 0.05	ug/g	51	DNA
		1.04 ± 0.15	ug/g	33	ICPMS
	V	24.7 ± 1.4	ug/g	9	ATNA
	W	< 150	ug/g	7	ATNA
NBS 1646 Estuarine Sediment	Al	6.56 ± 0.51	%	12	ATNA
	As	13 ± 3	ug/g	3	ITNA
	Ba	350 ± 70	ug/g	11	ATNA
		425 ± 16	ug/g	3	ITNA
	Ca	8700 ± 800	ug/g	11	ATNA
	Ce	82 ± 2	ug/g	7	ITNA
	Cl	1.53 ± 0.18	%	11	ATNA

TABLE C-II (cont)

Material	Constituent	Mean ± Std Dev	Units	N [a]	Technique [b]
NBS 1646 Estuarine Sediment (cont)	Co	10.7 ± 0.3	ug/g	7	ITNA
	Cr	72 ± 5	ug/g	7	ITNA
	Cs	3.67 ± 0.25	ug/g	7	ITNA
	Dy	4.6 ± 0.7	ug/g	11	ATNA
	Eu	1.48 ± 0.06	ug/g	7	ITNA
	Fe	3.38	%	1	ITNA
	Ga	< 60	ug/g	11	ATNA
	Hf	11.1 ± 0.5	ug/g	7	ITNA
	I	34 ± 4	ug/g	9	ATNA
	In	< 200	ng/g	11	ATNA
	K	1.91 ± 0.14	%	14	ATNA
	La	39.9 ± 0.9	ug/g	3	ITNA
	Lu	485 ± 60	ng/g	6	ITNA
	Mg	1.13 ± 0.28	%	11	ATNA
	Mn	354 ± 16	ug/g	11	ATNA
	Na	1.99 ± 0.03	%	11	ATNA
		1.91 ± 0.08	%	3	ITNA
	Rb	87 ± 3	ug/g	7	ITNA
	Sb	500	ng/g	1	ITNA
	Sc	10.3 ± 0.4	ug/g	7	ITNA
	Si	25.0	%	1	AENA
	Sm	5.9 ± 0.8	ug/g	4	ATNA
		6.4 ± 0.3	ug/g	4	ITNA
	Sr	< 300	ug/g	11	ATNA
	Ta	1.34	ug/g	1	ITNA
	Tb	1.02	ug/g	1	ITNA
	Th	9.6 ± 0.3	ug/g	7	ITNA
	Ti	4700 ± 300	ug/g	11	ATNA
	U	3.10 ± 0.12	ug/g	5	DNA
	V	88 ± 4	ug/g	11	ATNA
	W	< 180	ug/g	9	ATNA
	Yb	3.15 ± 0.24	ug/g	7	ITNA
	Zn	136	ug/g	1	ITNA
NBS 2677-Blank Be and As on Filter Media	As	7.0	ug/filter	1	IENA
NBS 2677-I Be and As on Filter Media	As	96.2	ug/filter	1	IENA
NBS 2677-II Be and As on Filter Media	As	0.94	ug/filter	1	IENA
NBS 2677-III Be and As on Filter Media	As	10	ug/filter	1	IENA
NBS 3191 Aqueous Electrolytic Conductance	Conductivity	92 ± 2	uS/cm	7	CB
NBS 3192 Aqueous Electrolytic Conductance	Conductivity	460	uS/cm	2	CB
NBS 3193 Aqueous Electrolytic Conductance	Conductivity	980	uS/cm	1	CB
NBS 4350 Environmental Radioactivity Sediment	Am-241	0.04	pCi/g	2	G
	Co-60	3.3	pCi/g	2	G
	Cs-137	2.44 ± 0.19	pCi/g	21	G
	K-40	16.4	pCi/g	1	G
NBS 4350B River Sediment	Co-60	0.165	pCi/g	1	G
	Cs-137	0.74 ± 0.09	pCi/g	15	G
NBS 4353 Rocky-Flats Soil No. 1	Cs-137	0.42	pCi/g	2	G
	K-40	17.8	pCi/g	1	G
NBS 8030 Aquatic Plant (CRM 060)	Mo	< 1	ug/g	1	IENA
	W	13.1	ug/g	1	IENA
NBS 8031 Aquatic Plant (CRM 061)	Mo	5.4	ug/g	1	IENA
	W	174	ug/g	1	IENA
NBS 8032 Calcareous Loam Soil-CRM 141	Al	5.4	%	1	ATNA
	Ba	190	ug/g	1	ATNA
	Ca	12.2	%	1	ATNA
	Cl	160	ug/g	1	ATNA

TABLE C-II (cont)

Material	Constituent	Mean ± Std Dev	Units	N [a]	Technique [b]
NBS 8032 Calcareous Loam Soil-CRM 141 (cont)	Dy	3.7	ug/g	1	ATNA
	Ga	< 30	ug/g	1	ATNA
	In	< 110	ng/g	1	ATNA
	K	1.33	%	1	ATNA
	Mg	8100	ug/g	1	ATNA
	Mn	570	ug/g	1	ATNA
	Na	3010	ug/g	1	ATNA
	Sm	4.9	ug/g	1	ATNA
	Sr	550	ug/g	1	ATNA
	Ti	2700	ug/g	1	ATNA
	V	79	ug/g	1	ATNA
	W	< 120	ug/g	1	ATNA
NBS 8033 Light Sandy Soil (CRM 142)	Al	4.9	%	1	ATNA
	Ba	460	ug/g	1	ATNA
	Ca	3.7	%	1	ATNA
	Cl	80	ug/g	1	ATNA
	Dy	5.5	ug/g	1	ATNA
	Ga	< 40	ug/g	1	ATNA
	In	< 110	ng/g	1	ATNA
	K	1.88	%	1	ATNA
	Mg	6800	ug/g	1	ATNA
	Mn	610	ug/g	1	ATNA
	Na	6900	ug/g	1	ATNA
	Sm	5.1	ug/g	1	ATNA
	Sr	< 200	ug/g	1	ATNA
	Ti	3600	ug/g	1	ATNA
	V	55	ug/g	1	ATNA
	W	< 100	ug/g	1	ATNA
NBS 8034 Sewage Sludge (CRM 144)	Ag	14.7 ± 0.9	ug/g	13	FAA
	As	4.7	ug/g	2	ETVAA
	Cr	495 ± 6	ug/g	9	FAA
	Hg	1.23 ± 0.03	ug/g	3	CVAA
	Pb	510 ± 32	ug/g	16	FAA
	Se	1.12	ug/g	2	ETVAA
NBS 8035 Sewage Sludge (CRM 146)	Ag	198	ug/g	2	FAA
	Cd	72 ± 2	ug/g	12	FAA
	Cr	761 ± 4	ug/g	10	FAA
	Hg	11.6	ug/g	2	CVAA
	Pb	1450 ± 150	ug/g	18	FAA

[a] Total number of analyses included in the mean.
[b] Analytical technique codes:
AENA = Automated Instrumental Epithermal Neutron Activation
ATNA = Automated Instrumental Thermal Neutron Activation
CB = Conductivity Bridge
CEA = Combustion Elemental Analyzer
CVAA = Cold Vapor Atomic Absorption Spectrophotometry
DISE = Diffusion Ion Selective Electrode
DNA = Delayed-Neutron Assay
ETVAA = Electrothermal Vaporization Atomic Absorption
FAA = Flame Atomic Absorption Spectrophotometry
G = Gamma Spectroscopy - Ge(Li) or HPGE
GASEV = Gas Evolution Gravimetry
ICPAE = Inductively Coupled Plasma Atomic Emission Spectrometry
ICPMS = Inductively Coupled Plasma Mass Spectrometry
IENA = Instrumental Epithermal Neutron Activation
ISE = Ion Selective Electrodes
ITNA = Instrumental Thermal Neutron Activation

TABLE C-III

SUMMARY OF ELEMENTAL DETERMINATIONS ON CCRMP REFERENCE MATERIALS BY HSE-9

Material	Constituent	Mean ± Std Dev	Units	N [a]	Technique [b]
CCRMP BL-1 Uranium Ore	Ra-226	68.6	pCi/g	1	G
CCRMP BL-4 Uranium Ore	Ra-226	584	pCi/g	1	G
CCRMP CLV-1 Vegetative Radionuclide	Cs-137	2.48 ± 0.17	pCi/g	10	G
CCRMP CLV-2 Vegetative Radionuclide	Cs-137	0.96 ± 0.11	pCi/g	6	G
	Ra-226	0.97	pCi/g	1	G
	U	4.14	ug/g	2	DNA
CCRMP CUP-1 Uranium Ore	U	1264	ug/g	1	IENA
CCRMP DH-1 Thorium-Uranium Ore	Ra-226	604	pCi/g	2	G
CCRMP MRG-1 Gabbro	Al	4.44 ± 0.16	%	12	ATNA
	Ba	92	ug/g	1	ITNA
	Ca	10.5 ± 0.4	%	12	ATNA
	Ce	32	ug/g	1	ITNA
	Cl	170 ± 50	ug/g	12	ATNA
	Co	86	ug/g	1	ITNA
	Cr	455	ug/g	1	ITNA
	Cs	1060	ng/g	1	ITNA
	Dy	2.8 ± 0.4	ug/g	12	ATNA
	Eu	1.7	ug/g	1	ITNA
	Fe	12.2	%	1	ITNA
	Hf	4.0	ug/g	1	ITNA
	In	< 140	ng/g	1	ATNA
	K	< 5000	ug/g	11	ATNA
	Mg	8.10 ± 0.22	%	12	ATNA
	Mn	1380 ± 30	ug/g	12	ATNA
	Na	5180 ± 60	ug/g	11	ATNA
	Rb	11.1	ug/g	1	ITNA
	Sb	1330	ng/g	1	ITNA
	Sc	54.5	ug/g	1	ITNA
	Sm	4.24	ug/g	1	ITNA
	Ta	0.88	ug/g	1	ITNA
	Tb	690	ng/g	1	ITNA
	Th	760	ng/g	1	ITNA
	Ti	2.15 ± 0.06	%	12	ATNA
	V	543 ± 17	ug/g	12	ATNA
	Yb	1.01	ug/g	1	ITNA
CCRMP SO-1 Regosolic Soil	Ag	1.10	ug/g	1	FAA
	Al	9.34 ± 0.51	%	28	ATNA
	As	4.0	ug/g	1	FAA
	Ba	890 ± 80	ug/g	19	ATNA
		830 ± 130	ug/g	28	ICPMS
		870 ± 30	ug/g	4	ITNA
	Be	1.6 ± 1.0	ug/g	36	ICPMS
	Ca	1.78 ± 0.14	%	27	ATNA
	Ce	110 ± 2	ug/g	4	ITNA
	Cl	160 ± 40	ug/g	18	ATNA
	Co	28.7 ± 1.4	ug/g	4	ITNA
	CO2	4600 ± 400	ug/g	4	GASEV
	Cr	184	ug/g	1	FAA
		175 ± 3	ug/g	4	ITNA
	Cs	5.0 ± 0.3	ug/g	4	ITNA
	Cu	< 300	ug/g	6	ATNA
		57 ± 12	ug/g	31	ICPMS
	Dy	4.5 ± 0.4	ug/g	19	ATNA
	Eu	1.52 ± 0.08	ug/g	5	ATNA
		1.64 ± 0.11	ug/g	4	ITNA
	F	1090 ± 130	ug/g	7	ISE
	Fe	5.76 ± 0.10	%	4	ITNA
	Ga	< 60	ug/g	5	ATNA
	Hf	2.62 ± 0.18	ug/g	4	ITNA
	I	< 20	ug/g	5	ATNA

TABLE C-III (cont)

Material	Constituent	Mean ± Std Dev	Units	N [a]	Technique [b]
CCRMP SO-1 Regosolic Soil (cont)	In	< 150	ng/g	18	ATNA
	K	2.57 ± 0.25	%	19	ATNA
	Li	42 ± 18	ug/g	37	ICPMS
	Mg	2.25 ± 0.34	%	28	ATNA
	Mn	930 ± 30	ug/g	27	ATNA
	Na	1.98 ± 0.06	%	29	ATNA
	Ni	88 ± 24	ug/g	36	ICPMS
	Pb	11	ug/g	1	FAA
		20 ± 3	ug/g	37	ICPMS
	Rb	123 ± 6	ug/g	3	ITNA
	S	85 ± 9	ug/g	7	IC
	Sb	360 ± 120	ng/g	4	ITNA
	Sc	17.2 ± 0.7	ug/g	4	ITNA
	Si	25.2 ± 1.9	%	4	AENA
	Sm	8.0	ug/g	2	AENA
		8.0 ± 0.6	ug/g	4	ITNA
	Sr	< 350	ug/g	10	ATNA
	Ta	780 ± 130	ng/g	4	ITNA
	Tb	800	ng/g	2	ITNA
	Th	11.4 ± 1.6	ug/g	15	ICPMS
		11.8 ± 0.4	ug/g	4	ITNA
	Ti	4700 ± 400	ug/g	19	ATNA
	U	1.74 ± 0.05	ug/g	5	ATNA
		1.72	ug/g	2	DNA
		1.66 ± 0.23	ug/g	29	ICPMS
	U-235/238	0.0074	ratio	1	ICPMS
	V	131 ± 9	ug/g	28	ATNA
	W	< 99	ug/g	4	ATNA
	Yb	2.24 ± 0.13	ug/g	4	ITNA
	Zn	148 ± 10	ug/g	4	ITNA
CCRMP SO-2 Podzolic Soil	Al	7.78 ± 0.27	%	27	ATNA
	Ba	1010 ± 80	ug/g	19	ATNA
		1040 ± 50	ug/g	3	ITNA
	Be	2.26	ug/g	1	ICPMS
	Ca	1.89 ± 0.15	%	28	ATNA
	Ce	119 ± 3	ug/g	3	ITNA
	Cl	120 ± 30	ug/g	15	ATNA
	Co	7.2 ± 0.5	ug/g	3	ITNA
	CO2	1.07 ± 0.15	%	4	GASEV
	Cr	15.0 ± 0.2	ug/g	3	ITNA
	Cs	680 ± 180	ng/g	3	ITNA
	Cu	< 300	ug/g	9	ATNA
	Dy	8.2 ± 0.4	ug/g	19	ATNA
	Eu	3.0 ± 0.2	ug/g	5	ATNA
		3.38 ± 0.06	ug/g	3	ITNA
	Fe	5.47 ± 0.03	%	3	ITNA
	Ga	< 60	ug/g	5	ATNA
	Hf	19.2 ± 0.8	ug/g	3	ITNA
	Hg	80	ng/g	1	CVGFA
	I	< 20	ug/g	5	ATNA
	In	< 150	ng/g	19	ATNA
	K	2.28 ± 0.19	%	19	ATNA
	Mg	6100 ± 1300	ug/g	14	ATNA
	Mn	735 ± 24	ug/g	28	ATNA
	Na	1.80 ± 0.06	%	28	ATNA
	Pb	28.7	ug/g	1	ICPMS
	Rb	73 ± 2	ug/g	3	ITNA
	S	268 ± 20	ug/g	6	IC
	Sb	250 ± 120	ng/g	3	ITNA
	Sc	11.5 ± 0.2	ug/g	3	ITNA
	Si	24.0 ± 2.9	%	7	AENA
	Sm	12 ± 3	ug/g	10	ATNA
		11.6 ± 0.7	ug/g	3	ITNA
	Sr	< 400	ug/g	10	ATNA
	Ta	1.14 ± 0.17	ug/g	3	ITNA
	Tb	1.62	ug/g	2	ITNA
	Th	3.72 ± 0.23	ug/g	3	ITNA
	Ti	7900 ± 400	ug/g	18	ATNA

TABLE C-III (cont)

Material	Constituent	Mean ± Std Dev	Units	N [a]	Technique [b]
CCRMP SO-2 Podzolic Soil (cont)	U	0.94 ± 0.05	ug/g	5	ATNA
	V	56 ± 5	ug/g	28	ATNA
	W	< 99	ug/g	5	ATNA
	Yb	3.74 ± 0.27	ug/g	3	ITNA
	Zn	126 ± 8	ug/g	3	ITNA
CCRMP SO-3 Calcareous C Horizon Soil	Al	3.06 ± 0.17	%	29	ATNA
	Ba	290 ± 60	ug/g	20	ATNA
	Ca	15.2 ± 0.6	ug/g	29	ATNA
	Ce	38.1	ug/g	1	ITNA
	Cl	340 ± 70	ug/g	20	ATNA
	Co	5.8	ug/g	1	ITNA
	CO2	25.3 ± 0.8	%	10	GASEV
	Cr	28	ug/g	1	ITNA
	Cs	0.94	ug/g	1	ITNA
	Cu	< 200	ug/g	14	ATNA
	Dy	2.76 ± 0.27	ug/g	20	ATNA
	Eu	860 ± 100	ng/g	5	ATNA
	F	380 ± 30	ug/g	12	ISE
	Fe	1.60	%	1	ITNA
	Ga	< 40	ug/g	4	ATNA
	Hf	4.9	ug/g	1	ITNA
	I	< 15	ug/g	6	ATNA
	In	< 150	ng/g	21	ATNA
	K	1.15 ± 0.17	%	20	ATNA
	Mg	5.0 ± 0.4	%	20	ATNA
	Mn	564 ± 19	ug/g	29	ATNA
	Na	7220 ± 230	ug/g	29	ATNA
	Rb	41	ug/g	1	ITNA
	S	115 ± 2	ug/g	3	IC
	Sb	494	ng/g	1	ITNA
	Sc	4.8	ug/g	1	ITNA
	Si	15.6 ± 1.3	%	8	AENA
	Sm	< 3.0	ug/g	10	ATNA
		3.89	ug/g	1	ITNA
	Sr	< 300	ug/g	10	ATNA
	Ta	473	ng/g	1	ITNA
	Tb	451	ng/g	1	ITNA
	Th	3.81	ug/g	1	ITNA
	Ti	1850 ± 210	ug/g	20	ATNA
	U	1.13 ± 0.10	ug/g	7	ATNA
	V	34 ± 4	ug/g	29	ATNA
	W	< 99	ug/g	3	ATNA
	Yb	1.63	ug/g	1	ITNA
	Zn	51	ug/g	1	ITNA
CCRMP SO-4 Chernozemic A Horizon Soil	Al	5.42 ± 0.33	%	30	ATNA
	Ba	720 ± 90	ug/g	21	ATNA
		790 ± 50	ug/g	3	ITNA
	Ca	1.09 ± 0.11	%	30	ATNA
	Ce	55 ± 2	ug/g	3	ITNA
	Cl	50 ± 25	ug/g	15	ATNA
	Co	9.78 ± 0.21	ug/g	3	ITNA
	CO2	5500 ± 1000	ug/g	4	GASEV
	Cr	69.1 ± 0.6	ug/g	3	ITNA
	Cs	3.00 ± 0.19	ug/g	3	ITNA
	Cu	< 200	ug/g	8	ATNA
	Dy	3.6 ± 0.5	ug/g	21	ATNA
	Eu	0.91 ± 0.08	ug/g	6	ATNA
		1.02 ± 0.03	ug/g	3	ITNA
	F	306	ug/g	2	DISE
	Fe	2.36 ± 0.04	%	3	ITNA
	Ga	< 45	ug/g	6	ATNA
	Hf	8.3 ± 0.8	ug/g	3	ITNA
	I	< 15	ug/g	6	ATNA
	In	< 130	ng/g	21	ATNA
	K	1.59 ± 0.14	%	21	ATNA
	Mg	6200 ± 1300	ug/g	27	ATNA
	Mn	616 ± 21	ug/g	30	ATNA

TABLE C-III (cont)

Material	Constituent	Mean ± Std Dev	Units	N [a]	Technique [b]
CCRMP SO-4 Chernozemic A Horizon Soil (cont)	Na	0.96 ± 0.03	%	30	ATNA
	Rb	71 ± 2	ug/g	3	ITNA
	S	456 ± 18	ug/g	7	IC
	Sb	670 ± 100	ng/g	3	ITNA
	Sc	8.4 ± 0.2	ug/g	3	ITNA
	Si	31.2 ± 2.6	%	5	AENA
	Sm	4.8	ug/g	2	ATNA
		5.2 ± 1.1	ug/g	3	ITNA
	Sr	< 200	ug/g	11	ATNA
	Ta	730 ± 170	ng/g	3	ITNA
	Th	8.0 ± 0.4	ug/g	3	ITNA
	Ti	3100 ± 300	ug/g	21	ATNA
	U	2.37 ± 0.10	ug/g	6	ATNA
		2.38 ± 0.02	ug/g	3	DNA
	U-235/238	0.0075	ratio	1	ICPMS
	V	82 ± 5	ug/g	34	ATNA
	W	< 150	ug/g	6	ATNA
	Yb	2.25 ± 0.11	ug/g	3	ITNA
	Zn	77 ± 32	ug/g	4	ITNA
CCRMP SY-2 Syenite	U	272 ± 5	ug/g	3	DNA
CCRMP UTS-3, Uranium Tailings Ore	U	524 ± 3	ug/g	3	DNA
CCRMP UTS-4, Uranium Tailings Ore	U	952 ± 6	ug/g	3	DNA
		1073	ug/g	1	IENA

[a] Total number of analyses included in the mean.
[b] Analytical technique codes:
AENA = Automated Instrumental Epithermal Neutron Activation
ATNA = Automated Instrumental Thermal Neutron Activation
CVGFA = Cold Vapor Gold Film Analyzer
DISE = Diffusion Ion Selective Electrode
DNA = Delayed-Neutron Assay
FAA = Flame Atomic Absorption Spectrophotometry
G = Gamma Spectroscopy - Ge(Li) or HPGE
GASEV = Gas Evolution Gravimetry
IC = Ion Chromatography
ICPMS = Inductively Coupled Plasma Mass Spectrometry
ISE = Ion Selective Electrodes
IENA = Instrumental Epithermal Neutron Activation
ITNA = Instrumental Thermal Neutron Activation

TABLE C-IV

SUMMARY OF ELEMENTAL DETERMINATIONS ON USGS REFERENCE MATERIALS BY HSE-9

Material	Constituent	Mean ± Std Dev	Units	N [a]	Technique [b]
USGS AGV-1 Andesite	H2O+	5970 ± 400	ug/g	3	COUL
	H2O-	1.15 ± 0.01	%	3	COUL
USGS BIR-1 Basalt	H2O+	1100 ± 100	ug/g	3	COUL
	H2O-	730 ± 210	ug/g	3	COUL
USGS DNC-1 Diabase	F	125	ug/g	1	DISE
USGS DTS-1	Si	18.4 ± 1.4	%	8	AENA
USGS G-2 Granite	H2O+	4930 ± 230	ug/g	3	COUL
	H2O-	1670 ± 60	ug/g	3	COUL
USGS GXR-1 Jasperoid	Al	3.40	%	2	ATNA
	Ba	760	ug/g	2	ATNA
		810	ug/g	2	ITNA
	Ca	7600 ± 3100	ug/g	3	ATNA
	Cl	150	ug/g	2	ATNA
	Cu	1040	ug/g	2	ATNA
		1050	ug/g	2	ITNA
	Dy	4.2	ug/g	2	ATNA
	Eu	< 900	ng/g	1	ATNA
	Ga	< 50	ug/g	1	ATNA
	I	< 30	ug/g	1	ATNA
	In	0.98	ug/g	2	ATNA
	K	< 6000	ug/g	2	ATNA
	Mg	< 3000	ug/g	2	ATNA
	Mn	1150	ug/g	2	ATNA
	Na	480	ug/g	2	ATNA
	Si	20.8	%	1	AENA
	Sm	< 3.0	ug/g	2	ATNA
	Sr	< 300	ug/g	2	ATNA
	Ti	< 3000	ug/g	2	ATNA
	U	33.9	ug/g	1	ATNA
	V	84	ug/g	2	ATNA
	W	180	ug/g	1	ATNA
USGS GXR-2 Soil	U	3.05 ± 0.08	ug/g	3	DNA
USGS GXR-4 Copper Mill Heads	U	6.35 ± 0.06	ug/g	5	DNA
	U-235/238	0.0075	ratio	1	ICPMS
USGS PCC-1 Peridotite	H2O+	4.78 ± 0.09	%	5	COUL
	H2O-	4900 ± 850	ug/g	5	COUL
	Si	19.7 ± 0.8	%	8	AENA
USGS QLO-1 Quartz Latite	Si	31.0 ± 2.7	%	6	AENA
USGS RGM-1 Rhyolite	H2O+	1.00 ± 0.03	%	3	COUL
	H2O-	1170 ± 60	ug/g	3	COUL
	Si	30.0 ± 1.7	%	8	AENA
USGS SCo-1 Cody Shale	Si	28.3 ± 2.7	%	7	AENA
USGS STM-1 Syenite	Si	28.2 ± 2.1	%	16	AENA
USGS W-2 Diabase	H2O+	5430 ± 120	ug/g	3	COUL
	H2O-	2130 ± 210	ug/g	3	COUL

[a] Total number of analyses included in the mean.
[b] Analytical technique codes:
AENA = Automated Instrumental Epithermal Neutron Activation
ATNA = Automated Instrumental Thermal Neutron Activation
COUL = Coulometry
DISE = Diffusion Ion Selective Electrode
DNA = Delayed-Neutron Assay
ICPMS = Inductively Coupled Plasma Mass Spectrometry
ITNA = Instrumental Thermal Neutron Activation

KEY TO TABLE C-V

****

EPA Beta Performance
Evaluation in Water, May 1988[a]

****

Beta[b] 87EPA 01[c] PC[d]

CV = 35. ± 5. pCi/L[e] [ ][f]

Result	Uncer.	Date[g]
23.	2.	6/03
25.	3.	6/03
27.	3.	6/03

Co-60 87EPA 01 G

CV = 10. ± 5. pCi/L

Result	Uncer.	Date
7.2	3.	5/10
6.3	3.	5/10
8.0	3.	5/10

---

[a]Quality assurance material name.
[b]Analyte.
[c]Reference code.
[d]Analytical technique.
[e]Certified value.
[f]Contract laboratory code.
[g]Result, uncertainty, and date analyzed.

Uncertainties quoted in this table are those calculated and reported by the analyst. At present there is no uniform policy concerning the calculation of uncertainties in HSE-9. This need is being addressed.

KEY (cont)

Analytical technique codes:

AAC = Flameless AA with Chemical Separation
ACOLR = Automated Colorimetry
ASP = Alpha Scintillation Phosphor
ATNA = Automated Instrumental Thermal Neutron Activation
CALC = Calculation
CALOR = Calorimetry
CB = Conductivity Bridge
CEA = Combustion Elemental Analyzer
COLOR = Spectrophotometric/Colorimetric
CVAA = Cold Vapor Atomic Absorption Spectrophotometry
CVGFA = Cold Vapor Gold Film Analyzer
DNA = Delayed Neutron Assay
ETVAA = Electrothermal Vaporization Atomic Absorption
FAA = Flame Atomic Absorption Spectrophotometry
FAAC = Flame AA with Chemical Separation
FIA = Flow Injection Analysis
FP = Flash Point
G = Gamma Spectroscopy - Ge(Li) or HPGE
GCEC = Gas Chromatography/Electron Capture
GCFI = Gas Chromatography/Flame Ionization
GCMS = Gas Chromatography/Mass Spectrometry
GE = Glass Electrode
GELI = Gamma-Ray Spectrometry with Lithium-Drifted Germanium Detectors
GRAV = Gravimetry
IC = Ion Chromatography
ICPES = Inductively Coupled Plasma Atomic Emission Spectormetry
ICPMS = Inductively Coupled Plasma Mass Spectrometry
IENA = Instrumental Epithermal Neutron Activation
ISE = Ion Selective Electrode
ITNA = Instrumental Thermal Neutron Activation
LS = Liquid Scintillation
PC = Proportional Counting
PTGC = Purge and Trap/Gas Chromatography
PTITR = Potentiometric Titration
RAS = Radiochemical Alpha Spectrometry
TCGS = Thermal Neutron Capture Prompt Gamma-Ray Spectrometry
TITR = Titration.

TABLE C-V

INDIVIDUAL CONSTITUENT CONCENTRATIONS IN QUALITY ASSURANCE MATERIALS MEASURED BY HSE-9 IN 1988

****

CCRMP BL-1 Uranium Ore

****

Ra-226 77ING 01 G

CV = 75. ± 4. pCi/g

Result	± Uncer.	Date
70.	10.	1/14

****

CCRMP BL-4 Uranium Ore

****

Ra-226 77ING 01 G

CV = 566. ± 12. pCi/g

Result	± Uncer.	Date
580.	90.	3/15

****

CCRMP CLV-1
Vegetative Radionuclide

****

Cs-137 86DAL 01 G

CV = 3.0 pCi/g

Result	± Uncer.	Date
2.5	0.4	2/04
2.3	0.4	2/04
2.7	0.5	2/05
2.3	0.4	2/05
2.6	0.4	2/18
2.4	0.4	2/18
2.4	0.4	2/18
2.8	0.5	2/18
2.4	0.4	2/19
2.4	0.4	2/19

****

CCRMP CLV-2
Vegetative Radionuclide

****

Cs-137 86DAL 01 G

CV = 0.92 pCi/g

Result	± Uncer.	Date
1.0	0.2	2/04
0.8	0.2	2/04
0.9	0.2	2/05
1.0	0.2	2/05
0.9	0.2	2/18
1.1	0.2	5/18

Ra-226 86DAL 01 G

CV = 1.0 ± 0.2 pCi/g

Result	± Uncer.	Date
1.0	0.3	2/02

U 86DAL 01 DNA

CV = 3.6 ± 0.6 ug/g

Result	± Uncer.	Date
4.2	0.4	1/29
4.1	0.4	1/29

****

CCRMP CUP-1 Uranium Ore

****

U 86DAL 02 IENA

CV = 1280. ± 20. ug/g

Result	± Uncer.	Date
1260.	70.	3/24

****

CCRMP DH-1 Thorium-Uranium Ore

****

Ra-226 77ING 01 G

CV = 578. ± 12. pCi/g

Result	± Uncer.	Date
600.	90.	1/14
600.	90.	3/15

****

CCRMP MRG-1 Gabbro

****

Al 81GLA 06 ATNA

CV = 4.5 ± 0.14 %

Result	± Uncer.	Date
4.6	0.2	2/08
4.5	0.2	2/08
4.7	0.2	2/08
4.4	0.2	2/08
4.6	0.2	2/08
4.2	0.2	2/08
4.6	0.5	2/08
4.3	0.2	2/08
4.3	0.2	2/08
4.4	0.2	2/08

Al (cont)

4.4	0.2	2/08
4.3	0.2	2/08

Ba 81GLA 06 ITNA

CV = 68. ± 30. ug/g

Result	± Uncer.	Date
90.	60.	8/28

Ca 81GLA 06 ATNA

CV = 10.48 ± 0.22 %

Result	± Uncer.	Date
10.0	0.5	2/08
10.3	0.5	2/08
10.2	0.5	2/08
10.0	0.5	2/08
10.4	0.5	2/08
10.2	0.5	2/08
10.7	0.6	2/08
11.2	0.6	2/08
10.8	0.5	2/08
10.2	0.5	2/08
10.7	0.5	2/08
11.3	0.6	2/08

Ce 81GLA 06 ITNA

CV = 28. ± 6. ug/g

Result	± Uncer.	Date
32.	3.	8/30

Cl 81GLA 06 ATNA

CV = 150. ± 40. ug/g

Result	± Uncer.	Date
250.	30.	2/08
140.	30.	2/08
150.	30.	2/08
100.	20.	2/08
210.	30.	2/08
220.	40.	2/08
180.	30.	2/08
200.	50.	2/08
180.	30.	2/08
150.	30.	2/08
100.	30.	2/08
150.	30.	2/08

Co 81GLA 06 ITNA

CV = 86. ± 12. ug/g

Result	± Uncer.	Date
86.	9.	8/28

TABLE C-V (cont)

****

CCRMP MRG-1 Gabbro (cont)

****

Cr 81GLA 06 ITNA

CV = 430. ± 80. ug/g

Result	± Uncer.	Date
460.	30.	8/28

Cs 81GLA 06 ITNA

CV = 600. ± 300. ng/g

Result	± Uncer.	Date
1100.	500.	8/28

Dy 81GLA 06 ATNA

CV = 3.4 ± 0.9 ug/g

Result	± Uncer.	Date
3.1	0.5	2/08
3.5	0.5	2/08
2.5	0.3	2/08
3.0	0.4	2/08
2.7	0.3	2/08
2.5	0.4	2/08
2.6	0.4	2/08
2.8	0.5	2/08
2.9	0.5	2/08
2.4	0.3	2/08
2.4	0.4	2/08
3.2	0.4	2/08

Eu 81GLA 06 ITNA

CV = 1.4 ± 0.1 ug/g

Result	± Uncer.	Date
1.7	0.2	8/30

Fe 81GLA 06 ITNA

CV = 12.55 ± 0.27 %

Result	± Uncer.	Date
12.2	0.9	8/23

Hf 81GLA 06 ITNA

CV = 3.5 ± 0.5 ug/g

Result	± Uncer.	Date
4.0	0.4	8/28

In ATNA

CV = No Data Available (ug/g)

Result	± Uncer.	Date
< 140.		2/08

K 81GLA 06 ATNA

CV = 1500. ± 200. ug/g

Result	± Uncer.	Date
< 5000.		2/08
< 5000.		2/08
< 7000.		2/08
< 7000.		2/08
< 7000.		2/08
< 5000.		2/08
< 4000.		2/08
< 5000.		2/08
< 4000.		2/08
< 5000.		2/08
< 5000.		2/08

Mg 81GLA 06 ATNA

CV = 8.14 ± 0.16 %

Result	± Uncer.	Date
7.8	0.4	2/08
8.4	0.5	2/08
8.2	0.5	2/08
8.1	0.5	2/08
7.9	0.6	2/08
8.1	0.5	2/08
8.0	0.6	2/08
8.4	0.8	2/08
7.8	0.4	2/08
8.1	0.5	2/08
8.0	0.5	2/08
8.4	0.5	2/08

Mn 81GLA 06 ATNA

CV = 1300. ± 100. ug/g

Result	± Uncer.	Date
1360.	60.	2/08
1390.	60.	2/08
1370.	60.	2/08
1370.	60.	2/08
1380.	60.	2/08
1410.	60.	2/08
1430.	60.	2/08
1360.	60.	2/08
1380.	60.	2/08
1420.	60.	2/08
1340.	60.	2/08
1400.	60.	2/08

Na 81GLA 06 ATNA

CV = 5400. ± 400. ug/g

Result	± Uncer.	Date
5200.	200.	2/08
5200.	200.	2/08
5300.	200.	2/08
5100.	200.	2/08
5200.	300.	2/08
5100.	200.	2/08
5200.	200.	2/08
5100.	200.	2/08
5200.	200.	2/08
5200.	200.	2/08
5100.	200.	2/08

Rb 81GLA 06 ITNA

CV = 8.7 ± 2. ug/g

Result	± Uncer.	Date
11.	5.	8/24

Sb 86ABB 01 ITNA

CV = 400. ng/g

Result	± Uncer.	Date
1300.	400.	8/28

Sc 81GLA 06 ITNA

CV = 52. ± 7. ug/g

Result	± Uncer.	Date
54.	3.	8/22

Sm 81GLA 06 ITNA

CV = 5. ± 1. ug/g

Result	± Uncer.	Date
4.2	0.4	9/01

Ta 88GLA 02 ITNA

CV = 0.8 ± 0.04 ug/g

Result	± Uncer.	Date
0.9	0.2	8/29

Tb 81GLA 06 ITNA

CV = 500. ± 40. ng/g

Result	± Uncer.	Date
700.	200.	9/03

TABLE C-V (cont)

****

CCRMP MRG-1 Gabbro (cont)

****

Th 81GLA 06 ITNA

CV = 0.93 ± 0.2 ug/g

Result	± Uncer.	Date
0.8	0.2	8/24

Ti 81GLA 06 ATNA

CV = 2.26 ± 0.08 %

Result	± Uncer.	Date
2.1	0.1	2/08
2.2	0.1	2/08
2.1	0.1	2/08
2.1	0.1	2/08
2.1	0.3	2/08
2.2	0.1	2/08
2.1	0.3	2/08
2.2	0.1	2/08
2.2	0.1	2/08
2.2	0.1	2/08
2.1	0.1	2/08
2.1	0.3	2/08

V 81GLA 06 ATNA

CV = 510. ± 50. ug/g

Result	± Uncer.	Date
540.	20.	2/08
520.	20.	2/08
510.	20.	2/08
550.	20.	2/08
560.	20.	2/08
550.	20.	2/08
540.	20.	2/08
570.	20.	2/08
550.	20.	2/08
540.	20.	2/08
560.	20.	2/08
530.	20.	2/08

Yb 86ABB 01 ITNA

CV = 800. ng/g

Result	± Uncer.	Date
1000.	200.	8/30

****

CCRMP SO-1 Regosolic Soil

****

Ag 85GLA 01 FAA

CV = < 2. ug/g

Result	± Uncer.	Date
1.1	0.3	8/18

Al 85CAN 01 ATNA

CV = 9.38 ± 0.17 %

Result	± Uncer.	Date
9.2	0.3	2/02
8.9	0.3	2/02
9.3	0.4	2/02
9.0	0.3	2/02
9.4	0.5	2/02
8.9	0.3	2/02
9.3	0.4	2/02
8.8	0.3	2/02
8.9	0.4	2/03
9.7	0.3	2/03
9.9	0.4	2/03
9.7	0.3	2/03
8.3	0.3	2/03
8.8	0.4	2/03
9.8	0.4	2/03
8.9	0.4	2/03
9.2	0.3	2/03
9.8	0.4	2/16
9.5	0.4	3/25
9.5	0.4	4/05
9.3	0.4	4/05
9.4	0.4	4/05
9.3	0.3	10/20
9.3	0.3	10/20
11.2	0.3	10/20
9.5	0.3	10/20
9.4	0.3	10/20
9.3	0.3	10/20

As 85GLA 01 FAA

CV = 2. ± 0.3 ug/g

Result	± Uncer.	Date
4.	2.	8/18

Ba 85CAN 01 ATNA

CV = 879. ± 47. ug/g

Result	± Uncer.	Date
870.	90.	2/02
920.	100.	2/02
960.	100.	2/02
880.	90.	2/02
870.	110.	2/03

Ba (cont)

1090.	110.	2/03
870.	100.	2/03
970.	100.	2/03
730.	90.	2/03
880.	100.	2/16
910.	90.	3/25
840.	100.	4/05
910.	100.	4/05
870.	120.	4/05
850.	90.	10/20
900.	100.	10/20
1010.	100.	10/20
780.	120.	10/20
820.	100.	10/20

Ba 85CAN 01 ICPMS

CV = 879. ± 47. ug/g

Result	± Uncer.	Date
810.	80.	4/28
1190.	100.	4/28
730.	100.	4/28
880.	90.	4/28
760.	200.	4/28
760.	200.	4/28
760.	200.	4/28
850.	80.	4/28
730.	100.	4/28
730.	200.	4/28
970.	100.	4/28
730.	70.	4/28
720.	100.	4/28
760.	200.	4/28
950.	100.	4/28
920.	90.	4/28
960.	100.	4/28
760.	200.	4/28
720.	100.	4/28
680.	200.	4/28
1100.	200.	4/28
660.	200.	4/28
850.	80.	4/28
700.	100.	4/28
750.	200.	4/28
780.	200.	4/28
920.	90.	4/28
1040.	100.	9/26

Ba 85CAN 01 ITNA

CV = 879. ± 47. ug/g

Result	± Uncer.	Date
900.	100.	5/06
900.	100.	8/28
800.	100.	9/04
900.	100.	11/04

****

CCRMP SO-1
Regosolic Soil (cont)

****

Be 85GLA 01 ICPMS

CV = 1.4 ± 0.8 ug/g

Result	± Uncer.	Date
1.8	0.5	4/28
0.8	0.4	4/28
5.0	2.5	4/28
1.2	0.2	4/28
1.2	0.2	4/28
1.4	0.2	4/28
1.4	0.2	4/28
0.8	0.4	4/28
1.9	0.4	4/28
0.5	0.5	4/28
0.4	0.4	4/28
0.4	0.4	4/28
3.	2.	4/28
3.	2.	4/28
0.8	0.4	4/28
0.8	0.4	4/28
1.1	0.2	4/28
1.1	0.2	4/28
1.6	0.2	4/28
0.9	0.4	4/28
3.	1.	4/28
3.	1.	4/28
1.7	0.5	4/28
1.0	0.5	4/28
2.	1.	4/28
2.	1.	4/28
1.3	0.1	4/28
0.5	0.5	4/28
1.7	0.5	4/28
3.	1.	4/28
2.	1.	4/28
2.	1.	4/28
1.9	0.5	4/28
0.4	0.4	4/28
0.8	0.8	4/28
1.3	0.1	4/28

Ca 85CAN 01 ATNA

CV = 1.8 ± 0.07 %

Result	± Uncer.	Date
2.0	0.2	2/02
1.8	0.2	2/02
1.8	0.1	2/02
1.9	0.2	2/02
1.5	0.1	2/02
1.8	0.2	2/02
1.6	0.1	2/02
1.8	0.1	2/02
1.7	0.2	2/03
1.8	0.2	2/03
1.7	0.2	2/03
1.6	0.1	2/03
1.7	0.2	2/03
1.6	0.2	2/03

Ca (cont)

1.8	0.1	2/03
1.6	0.1	2/03
2.1	0.2	2/03
1.7	0.2	2/16
1.8	0.2	3/25
1.9	0.2	4/05
1.8	0.1	4/05
2.1	0.2	4/05
1.9	0.1	10/20
1.6	0.1	10/20
1.8	0.2	10/20
1.9	0.1	10/20
1.7	0.1	10/20

Ce 85GLA 01 ITNA

CV = 105. ± 8. ug/g

Result	± Uncer.	Date
113.	8.	5/09
109.	11.	8/30
109.	9.	9/04
111.	9.	11/07

Cl 85GLA 01 ATNA

CV = 150. ug/g

Result	± Uncer.	Date
200.	60.	2/02
130.	50.	2/02
130.	60.	2/02
100.	40.	2/02
120.	30.	2/03
180.	50.	2/03
160.	60.	2/03
< 190.		2/03
180.	50.	2/03
140.	60.	2/16
110.	50.	3/25
180.	50.	4/05
190.	60.	4/05
80.	60.	4/05
210.	50.	10/20
170.	60.	10/20
160.	60.	10/20
190.	50.	10/20
160.	50.	10/20

Co 85CAN 01 ITNA

CV = 32. ± 3. ug/g

Result	± Uncer.	Date
30.	3.	5/06
27.	3.	8/28
28.	3.	9/04
29.	4.	11/03

CO2 88CAH 01 GASEV

CV = < 4000. ug/g

Result	± Uncer.	Date
4000.	2000.	8/05
10000.	2000.	8/05
4000.	2000.	8/05
5000.	2000.	8/05
5000.	2000.	8/05

Cr 85CAN 01 FAA

CV = 160. ± 15. ug/g

Result	± Uncer.	Date
180.	40.	8/18

Cr 85CAN 01 ITNA

CV = 160. ± 15. ug/g

Result	± Uncer.	Date
180.	10.	5/04
170.	10.	8/28
170.	10.	9/04
180.	20.	11/03

Cs 85GLA 01 ITNA

CV = 5.1 ± 0.1 ug/g

Result	± Uncer.	Date
4.9	0.6	5/06
4.7	0.6	8/28
5.3	0.6	9/04
5.2	0.5	11/02

Cu 85CAN 01 ATNA

CV = 61. ± 3. ug/g

Result	± Uncer.	Date
< 300.		10/20
< 300.		12/12
< 300.		12/12
< 300.		12/12
< 300.		12/12
< 500.		12/12

Cu 85CAN 01 ICPMS

CV = 61. ± 3. ug/g

Result	± Uncer.	Date
63.	6.	4/28
50.	10.	4/28
58.	6.	4/28
50.	10.	4/28
50.	20.	4/28

TABLE C-V (cont)

****

CCRMP SO-1
Regosolic Soil (cont)

****

Cu (cont)

50.	20.	4/28
66.	7.	4/28
80.	20.	4/28
55.	6.	4/28
58.	6.	4/28
62.	6.	4/28
40.	20.	4/28
80.	20.	4/28
30.	30.	4/28
50.	10.	4/28
68.	7.	4/28
66.	7.	4/28
56.	6.	4/28
62.	6.	4/28
40.	10.	4/28
40.	10.	4/28
59.	6.	4/28
69.	7.	4/28
80.	20.	4/28
57.	6.	4/28
50.	10.	4/28
70.	10.	4/28
54.	5.	4/28
50.	10.	4/28
50.	10.	4/28
47.	6.	9/26

Dy 85GLA 01 ATNA

CV = 4.8 ug/g

Result	± Uncer.	Date
4.9	0.5	2/02
4.6	0.5	2/02
5.1	0.6	2/02
4.4	0.5	2/02
4.6	0.5	2/03
4.8	0.5	2/03
4.7	0.5	2/03
4.1	0.5	2/03
4.3	0.5	2/03
4.3	0.5	2/16
4.2	0.5	3/25
4.5	0.8	4/05
4.7	0.5	4/05
4.2	0.5	4/05
4.7	0.6	10/20
3.4	0.4	10/20
5.0	0.6	10/20
4.5	0.4	10/20
4.9	0.5	10/20

Eu 85GLA 01 ATNA

CV = 1.65 ± 0.15 ug/g

Result	± Uncer.	Date
1.4	0.2	10/20
1.6	0.3	10/20
1.5	0.4	10/20
1.5	0.3	10/20
1.6	0.3	10/20

Eu 85GLA 01 ITNA

CV = 1.65 ± 0.15 ug/g

Result	± Uncer.	Date
1.6	0.1	5/10
1.5	0.2	8/30
1.7	0.2	9/04
1.7	0.2	11/08

F 85GLA 01 ISE

CV = 800. ± 150. ug/g

Result	± Uncer.	Date
1100.	100.	2/03
1100.	100.	2/03
1000.	100.	2/03
900.	90.	8/11
1300.	100.	8/11
1100.	100.	8/11
1200.	100.	8/11

Fe 85CAN 01 ITNA

CV = 6. ± 0.13 %

Result	± Uncer.	Date
5.9	0.4	5/03
5.7	0.4	8/23
5.8	0.4	9/04
5.7	0.5	9/30

Ga 85GLA 01 ATNA

CV = 28. ± 5. ug/g

Result	± Uncer.	Date
< 60.		2/16
< 70.		3/25
< 40.		4/05
< 60.		4/05
< 70.		4/05

Hf 85GLA 01 ITNA

CV = 2.5 ± 0.3 ug/g

Result	± Uncer.	Date
2.7	0.3	5/05
2.4	0.3	8/28
2.8	0.3	9/04
2.7	0.3	11/03

I 85GLA 01 ATNA

CV = 12. ug/g

Result	± Uncer.	Date
< 20.		10/20
< 30.		10/20
14.	5.	10/20
< 20.		10/20
< 20.		10/20

In 85GLA 01 ATNA

CV = 100. ng/g

Result	± Uncer.	Date
< 160.		2/02
< 150.		2/02
< 150.		2/02
< 150.		2/02
< 300.		2/03
< 200.		2/03
< 160.		2/03
< 160.		2/03
< 200.		2/03
< 200.		2/16
< 170.		3/25
< 160.		4/05
< 300.		4/05
< 150.		4/05
< 150.		10/20
< 180.		10/20
< 300.		10/20
< 140.		10/20

K 85CAN 01 ATNA

CV = 2.68 ± 0.08 %

Result	± Uncer.	Date
2.7	0.3	2/02
2.5	0.3	2/02
2.8	0.3	2/02
2.4	0.3	2/02
3.0	0.3	2/03
2.0	0.2	2/03
2.7	0.3	2/03
2.7	0.3	2/03
2.4	0.3	2/03
2.4	0.2	2/16
2.2	0.3	3/25
2.5	0.3	4/05
2.5	0.3	4/05
2.7	0.3	4/05

****

CCRMP SO-1
Regosolic Soil (cont)

****

K (cont)

2.7	0.3	10/20
2.6	0.3	10/20
2.4	0.3	10/20
2.7	0.3	10/20
3.0	0.3	10/20

Li 85GLA 01 ICPMS

CV = 48. ± 3. ug/g

Result	± Uncer.	Date
54.	5.	4/28
20.	10.	4/28
30.	10.	4/28
38.	8.	4/28
38.	8.	4/28
46.	4.	4/28
45.	4.	4/28
40.	20.	4/28
30.	20.	4/28
20.	20.	4/28
20.	20.	4/28
34.	8.	4/28
50.	5.	4/28
30.	20.	4/28
42.	6.	4/28
42.	8.	4/28
20.	10.	4/28
40.	20.	4/28
30.	30.	4/28
20.	20.	4/28
20.	20.	4/28
62.	9.	4/28
52.	5.	4/28
60.	20.	4/28
30.	20.	4/28
50.	5.	4/28
60.	10.	4/28
30.	20.	4/28
100.	50.	4/28
46.	5.	4/28
40.	10.	4/28
48.	5.	4/28
30.	20.	4/28
70.	30.	4/28
30.	10.	4/28
100.	50.	4/28
54.	6.	9/26

Mg 85CAN 01 ATNA

CV = 2.31 ± 0.11 %

Result	± Uncer.	Date
2.5	0.2	2/02
2.5	0.2	2/02
2.2	0.3	2/02
2.4	0.2	2/02

Mg (cont)

2.2	0.2	2/02
2.3	0.2	2/02
2.1	0.2	2/02
2.4	0.3	2/02
2.4	0.2	2/03
2.7	0.3	2/03
2.4	0.3	2/03
1.5	0.2	2/03
2.5	0.2	2/03
2.1	0.4	2/03
2.5	0.2	2/03
1.9	0.3	2/03
2.4	0.2	2/03
2.8	0.4	2/03
2.1	0.2	2/16
2.3	0.2	3/25
2.4	0.2	4/05
2.8	0.3	4/05
2.5	0.2	4/05
1.6	0.1	10/20
1.6	0.1	10/20
2.1	0.2	10/20
2.0	0.2	10/20
1.8	0.2	10/20

Mn 85CAN 01 ATNA

CV = 890. ± 30. ug/g

Result	± Uncer.	Date
920.	50.	2/02
950.	50.	2/02
940.	50.	2/02
940.	40.	2/02
940.	40.	2/02
940.	40.	2/02
920.	40.	2/02
980.	50.	2/02
930.	50.	2/03
980.	40.	2/03
940.	50.	2/03
940.	50.	2/03
970.	50.	2/03
890.	40.	2/03
890.	40.	2/03
960.	40.	2/03
950.	40.	2/03
920.	40.	2/16
930.	40.	3/25
940.	40.	4/05
950.	40.	4/05
950.	40.	4/05
880.	40.	10/20
950.	40.	10/20
950.	50.	10/20
870.	40.	10/20
900.	40.	10/20

Na 85CAN 01 ATNA

CV = 1.97 ± 0.08 %

Result	± Uncer.	Date
2.00	0.10	2/02
1.93	0.07	2/02
2.03	0.07	2/02
1.94	0.07	2/02
1.93	0.07	2/02
1.95	0.07	2/02
2.00	0.07	2/02
1.94	0.07	2/02
2.01	0.08	2/03
2.08	0.07	2/03
1.96	0.10	2/03
1.96	0.08	2/03
1.82	0.06	2/03
2.08	0.08	2/03
2.01	0.09	2/03
1.99	0.07	2/03
2.00	0.07	2/03
1.83	0.07	2/03
2.00	0.07	2/16
2.00	0.07	3/25
1.96	0.07	4/05
1.95	0.07	4/05
2.02	0.07	4/05
1.95	0.07	4/05
1.91	0.07	10/20
2.10	0.07	10/20
2.02	0.07	10/20
1.96	0.07	10/20
1.95	0.07	10/20

Ni 85CAN 01 ICPMS

CV = 94. ± 7. ug/g

Result	± Uncer.	Date
110.	10.	4/28
40.	40.	4/28
70.	20.	4/28
70.	10.	4/28
91.	9.	4/28
95.	10.	4/28
80.	20.	4/28
70.	20.	4/28
70.	30.	4/28
70.	10.	4/28
98.	10.	4/28
80.	20.	4/28
90.	9.	4/28
100.	10.	4/28
80.	20.	4/28
120.	20.	4/28
110.	20.	4/28
120.	20.	4/28
97.	10.	4/28
80.	20.	4/28
120.	20.	4/28
150.	40.	4/28
90.	9.	4/28
100.	10.	4/28
80.	20.	4/28
70.	10.	4/28
90.	9.	4/28
110.	10.	4/28

TABLE C-V (cont)

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CCRMP SO-1
Regosolic Soil (cont)

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Ni (cont)

50.	30.	4/28
70.	10.	4/28
110.	10.	4/28
60.	20.	4/28
70.	30.	4/28
140.	60.	4/28
80.	20.	4/28
60.	30.	4/28

Pb 85CAN 01 FAA

CV = 21. ± 4. ug/g

Result	± Uncer.	Date
10.	10.	8/18

Pb 85CAN 01 ICPMS

CV = 21. ± 4. ug/g

Result	± Uncer.	Date
18.	2.	4/28
28.	3.	4/28
18.	2.	4/28
18.	2.	4/28
20.	2.	4/28
22.	2.	4/28
20.	2.	4/28
16.	3.	4/28
20.	2.	4/28
23.	2.	4/28
18.	2.	4/28
19.	2.	4/28
19.	2.	4/28
18.	2.	4/28
22.	2.	4/28
20.	2.	4/28
20.	2.	4/28
19.	2.	4/28
19.	2.	4/28
16.	3.	4/28
21.	2.	4/28
17.	2.	4/28
21.	2.	4/28
18.	2.	4/28
21.	2.	4/28
24.	2.	4/28
18.	2.	4/28
18.	2.	4/28
21.	2.	4/28
20.	2.	4/28
19.	2.	4/28
18.	2.	4/28
29.	3.	4/28
26.	3.	4/28
20.	2.	4/28
28.	3.	4/28
17.	2.	9/26

Rb 85CAN 01 ITNA

CV = 139. ± 12. ug/g

Result	± Uncer.	Date
130.	20.	5/06
130.	10.	9/04
120.	10.	10/31

S 85GLA 01 IC

CV = 110. ± 10. ug/g

Result	± Uncer.	Date
90.	20.	2/11
70.	20.	2/11
90.	20.	2/11
80.	20.	2/11
100.	20.	2/11
80.	20.	2/11
90.	20.	2/11

Sb 85GLA 01 ITNA

CV = 250. ± 50. ng/g

Result	± Uncer.	Date
400.	200.	5/06
500.	200.	8/28
200.	100.	9/04
300.	200.	11/02

Sc 85GLA 01 ITNA

CV = 18. ± 0.8 ug/g

Result	± Uncer.	Date
16.	2.	5/02
17.	1.	8/22
18.	1.	9/04
18.	1.	9/30

Si 85CAN 01 AENA

CV = 25.72 ± 0.22 %

Result	± Uncer.	Date
25.	1.	6/15
25.	3.	6/15
28.	2.	6/15
23.	3.	6/22

Sm 85GLA 01 ATNA

CV = 8.1 ± 0.2 ug/g

Result	± Uncer.	Date
8.	2.	2/16
8.	2.	3/25
< 4.		10/20

Sm (cont)

< 4.		10/20
< 4.		10/20
< 3.		10/20
< 4.		10/20

Sm 85GLA 01 ITNA

CV = 8.1 ± 0.2 ug/g

Result	± Uncer.	Date
8.7	0.9	5/11
7.1	0.7	9/01
8.0	0.8	9/04
7.9	1.0	11/08

Sr 85CAN 01 ATNA

CV = 328. ± 29. ug/g

Result	± Uncer.	Date
< 300.		2/16
< 300.		3/25
400.	100.	4/05
< 400.		4/05
300.	100.	4/05
< 300.		10/20
400.	100.	10/20
< 400.		10/20
< 400.		10/20
< 300.		10/20

Ta 85GLA 01 ITNA

CV = 700. ± 100. ng/g

Result	± Uncer.	Date
1000.	200.	5/09
700.	100.	8/29
700.	200.	9/04
700.	200.	11/04

Tb 85GLA 01 ITNA

CV = 890. ± 70. ng/g

Result	± Uncer.	Date
500.	200.	5/10
1100.	200.	9/03

Th 85GLA 01 ICPMS

CV = 12.3 ± 0.4 ug/g

Result	± Uncer.	Date
9.	3.	4/25
11.	2.	4/25
12.	1.	4/25
11.	1.	4/25
12.	2.	4/25

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CCRMP SO-1
Regosolic Soil (cont)

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Th (cont)

15.	3.	4/25
12.	2.	4/25
12.	1.	4/25
11.	2.	4/25
12.	1.	4/25
12.	2.	4/25
10.	3.	4/25
12.	1.	4/25
13.	1.	4/25
8.	2.	9/26

Th 85GLA 01 ITNA

CV = 12.3 ± 0.4 ug/g

Result	± Uncer.	Date
12.2	0.7	5/04
11.4	0.9	8/24
12.0	1.0	9/04
11.6	1.0	9/30

Ti 85CAN 01 ATNA

CV = 5300. ± 200. ug/g

Result	± Uncer.	Date
4500.	600.	2/02
4200.	600.	2/02
5200.	400.	2/02
4500.	600.	2/02
4400.	400.	2/03
4600.	500.	2/03
4900.	500.	2/03
5300.	500.	2/03
4300.	600.	2/03
4600.	400.	2/16
5200.	500.	3/25
5500.	500.	4/05
4600.	400.	4/05
4400.	600.	4/05
4700.	700.	10/20
4800.	500.	10/20
4000.	600.	10/20
4700.	700.	10/20
4900.	500.	10/20

U 85GLA 01 ATNA

CV = 1.7 ± 0.04 ug/g

Result	± Uncer.	Date
1.8	0.3	10/20
1.7	0.2	10/20
1.7	0.2	10/20
1.7	0.2	10/20
1.8	0.2	10/20

U 85GLA 01 DNA

CV = 1.7 ± 0.04 ug/g

Result	± Uncer.	Date
1.8	0.2	6/08
1.7	0.2	6/08

U 85GLA 01 ICPMS

CV = 1.7 ± 0.04 ug/g

Result	± Uncer.	Date
1.3	0.4	4/28
1.7	0.2	4/28
1.8	0.2	4/28
2.1	0.4	4/28
1.5	0.2	4/28
1.5	0.2	4/28
1.7	0.2	4/28
2.2	0.4	4/28
1.5	0.2	4/28
1.8	0.2	4/28
2.2	0.4	4/28
1.6	0.2	4/28
1.9	0.2	4/28
1.5	0.2	4/28
1.4	0.2	4/28
1.9	0.2	4/28
1.4	0.2	4/28
1.5	0.2	4/28
1.6	0.2	4/28
1.5	0.2	4/28
1.7	0.2	4/28
1.7	0.2	4/28
1.4	0.2	4/28
1.6	0.2	4/28
1.7	0.2	4/28
1.7	0.2	4/28
1.5	0.2	4/28
1.6	0.2	4/28
1.5	0.2	9/26

U-235/238 81H-8 03 ICPMS

CV = 0.0073 ± 0.0001 ratio

Result	± Uncer.	Date
0.0074	0.0007	6/01

V 85CAN 01 ATNA

CV = 139. ± 8. ug/g

Result	± Uncer.	Date
134.	9.	2/02
133.	6.	2/02
125.	8.	2/02
126.	6.	2/02
122.	9.	2/02
124.	6.	2/02
129.	6.	2/02
125.	8.	2/02
157.	12.	2/03

V (cont)

136.	7.	2/03
132.	7.	2/03
139.	7.	2/03
122.	6.	2/03
117.	9.	2/03
148.	11.	2/03
138.	10.	2/03
123.	8.	2/03
131.	6.	2/03
137.	7.	2/16
130.	7.	3/25
133.	7.	4/05
128.	6.	4/05
130.	6.	4/05
132.	6.	10/20
128.	8.	10/20
147.	6.	10/20
125.	6.	10/20
119.	5.	10/20

W 85GLA 01 ATNA

CV = 0.7 ug/g

Result	± Uncer.	Date
< 99.		2/16
< 99.		3/25
< 99.		4/05
< 99.		4/05
< 99.		4/05

Yb 85GLA 01 ITNA

CV = 2.3 ± 0.2 ug/g

Result	± Uncer.	Date
2.3	0.4	5/10
2.1	0.3	8/30
2.2	0.3	9/04
2.4	0.3	11/08

Zn 85CAN 01 ITNA

CV = 146. ± 5. ug/g

Result	± Uncer.	Date
160.	20.	5/09
140.	20.	9/01
140.	20.	9/04
150.	30.	11/08

TABLE C-V (cont)

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CCRMP SO-2 Podzolic Soil

****

Al 85CAN 01 ATNA

CV = 8.07 ± 0.18 %

Result	± Uncer.	Date
8.0	0.3	2/02
7.6	0.3	2/02
8.1	0.3	2/02
7.8	0.3	2/02
7.6	0.3	2/02
7.7	0.3	2/02
8.1	0.3	2/02
7.5	0.3	2/02
7.6	0.3	2/03
7.7	0.3	2/03
7.9	0.3	2/03
7.4	0.3	2/03
7.5	0.3	2/03
7.4	0.3	2/03
7.8	0.3	2/03
7.7	0.3	2/03
7.1	0.2	2/03
7.6	0.3	2/03
8.0	0.3	2/16
8.2	0.4	3/25
8.0	0.3	4/05
8.1	0.3	4/19
7.9	0.3	4/19
8.0	0.2	10/20
7.8	0.2	10/20
8.0	0.2	10/20
8.1	0.2	10/20

Ba 85CAN 01 ATNA

CV = 966. ± 67. ug/g

Result	± Uncer.	Date
1000.	100.	2/02
1000.	100.	2/02
1000.	100.	2/02
1200.	100.	2/02
1100.	100.	2/03
890.	90.	2/03
1000.	100.	2/03
1000.	100.	2/03
1100.	100.	2/03
1100.	100.	2/16
1000.	100.	3/25
1000.	100.	4/05
960.	90.	4/19
1000.	100.	4/19
1000.	90.	10/20
960.	90.	10/20
1000.	100.	10/20
790.	90.	10/20
1000.	100.	10/20

Ba 85CAN 01 ITNA

CV = 966. ± 67. ug/g

Result	± Uncer.	Date
1100.	100.	5/06
1000.	100.	8/28
1000.	100.	11/04

Be 85GLA 01 ICPMS

CV = 1.7 ± 0.4 ug/g

Result	± Uncer.	Date
2.3	0.2	7/06

Ca 85CAN 01 ATNA

CV = 1.96 ± 0.1 %

Result	± Uncer.	Date
2.0	0.2	2/02
1.8	0.2	2/02
1.9	0.2	2/02
2.1	0.2	2/02
1.9	0.2	2/02
2.0	0.2	2/02
1.8	0.2	2/02
1.8	0.2	2/02
1.8	0.2	2/03
1.9	0.2	2/03
2.0	0.2	2/03
2.0	0.2	2/03
1.8	0.2	2/03
2.1	0.4	2/03
1.7	0.1	2/03
1.8	0.2	2/03
1.9	0.2	2/03
1.8	0.1	2/03
1.8	0.1	2/16
1.8	0.2	3/25
1.7	0.2	4/05
2.0	0.2	4/19
1.8	0.1	4/19
2.1	0.2	10/20
2.1	0.2	10/20
1.8	0.1	10/20
1.7	0.2	10/20
2.2	0.2	10/20

Ce 85GLA 01 ITNA

CV = 114. ± 3. ug/g

Result	± Uncer.	Date
118.	8.	5/09
117.	12.	8/30
123.	10.	11/07

Cl 85GLA 01 ATNA

CV = 84. ug/g

Result	± Uncer.	Date
90.	40.	2/02
100.	40.	2/02
60.	40.	2/02
< 120.		2/02
< 190.		2/03
< 120.		2/03
< 150.		2/03
90.	70.	2/03
110.	60.	2/03
100.	30.	2/16
100.	60.	3/25
150.	50.	4/05
160.	50.	4/19
130.	50.	4/19
170.	50.	10/20
110.	70.	10/20
130.	50.	10/20
160.	60.	10/20
120.	60.	10/20

Co 85CAN 01 ITNA

CV = 9. ± 2. ug/g

Result	± Uncer.	Date
7.2	0.8	5/06
7.7	0.8	8/28
6.7	1.1	11/03

CO2 88CAH 01 GASEV

CV = < 4000. ug/g

Result	± Uncer.	Date
22000.	2000.	8/05
9000.	2000.	8/05
10000.	2000.	8/05
12000.	2000.	8/05
12000.	2000.	8/05

Cr 85CAN 01 ITNA

CV = 16. ± 2. ug/g

Result	± Uncer.	Date
15.	2.	5/04
15.	2.	8/28
15.	2.	11/03

Cs 85GLA 01 ITNA

CV = 420. ± 30. ng/g

Result	± Uncer.	Date
500.	300.	5/06
700.	300.	8/28
900.	300.	11/02

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CCRMP SO-2
Podzolic Soil (cont)

****

Cu 85CAN 01 ATNA

CV = 7. ± 1. ug/g

Result	± Uncer.	Date
< 300.		10/20
< 300.		10/20
< 400.		10/20
< 300.		10/20
< 300.		12/12
< 300.		12/12
< 400.		12/12
< 300.		12/12
< 300.		12/12

Dy 85GLA 01 ATNA

CV = 9.2 ± 2. ug/g

Result	± Uncer.	Date
8.3	0.8	2/02
8.2	0.7	2/02
8.7	0.8	2/02
8.2	0.7	2/02
8.6	0.8	2/03
8.3	0.7	2/03
8.5	1.0	2/03
8.0	1.0	2/03
7.1	0.6	2/03
8.0	0.7	2/16
7.6	0.7	3/25
8.7	0.9	4/05
8.1	0.7	4/19
7.8	0.9	4/19
8.6	0.8	10/20
8.7	0.5	10/20
8.2	0.7	10/20
8.6	0.7	10/20
7.5	0.5	10/20

Eu 85GLA 01 ATNA

CV = 3.3 ± 0.2 ug/g

Result	± Uncer.	Date
3.2	0.4	10/20
2.8	0.4	10/20
2.7	0.3	10/20
3.2	0.4	10/20
3.1	0.5	10/20

Eu 85GLA 01 ITNA

CV = 3.3 ± 0.2 ug/g

Result	± Uncer.	Date
3.45	0.2	5/10
3.33	0.4	8/30
3.35	0.3	11/08

Fe 85CAN 01 ITNA

CV = 5.56 ± 0.16 %

Result	± Uncer.	Date
5.5	0.3	5/03
5.5	0.4	8/23
5.4	0.4	9/30

Ga 85GLA 01 ATNA

CV = 25. ± 5. ug/g

Result	± Uncer.	Date
< 60.		2/16
< 60.		3/25
< 60.		4/05
< 44.		4/19
< 59.		4/19

Hf 85GLA 01 ITNA

CV = 17.4 ± 1.3 ug/g

Result	± Uncer.	Date
19.	1.	5/05
18.	1.	8/28
20.	2.	11/03

Hg 85CAN 01 CVGFA

CV = 82. ± 9. ng/g

Result	± Uncer.	Date
80.	10.	9/06

I 85GLA 01 ATNA

CV = 17. ug/g

Result	± Uncer.	Date
15.	4.	10/20
< 20.		10/20
< 20.		10/20
< 30.		10/20
< 20.		10/20

In 85GLA 01 ATNA

CV = 300. ng/g

Result	± Uncer.	Date
< 150.		2/02
< 150.		2/02
< 200.		2/02
< 150.		2/02
< 200.		2/03
< 150.		2/03
< 180.		2/03
< 170.		2/03
< 170.		2/03
< 150.		2/16
< 200.		3/25
< 180.		4/05
< 150.		4/19
< 150.		4/19
< 160.		10/20
< 300.		10/20
< 180.		10/20
< 170.		10/20
< 160.		10/20

K 85CAN 01 ATNA

CV = 2.45 ± 0.04 %

Result	± Uncer.	Date
2.5	0.2	2/02
2.3	0.2	2/02
2.2	0.2	2/02
2.5	0.2	2/02
2.4	0.3	2/03
2.4	0.3	2/03
2.1	0.2	2/03
2.2	0.2	2/03
2.1	0.2	2/03
2.2	0.2	2/16
2.6	0.3	3/25
2.2	0.2	4/05
2.4	0.3	4/19
2.2	0.2	4/19
2.5	0.3	10/20
1.8	0.3	10/20
2.2	0.3	10/20
2.3	0.2	10/20
2.2	0.2	10/20

Mg 85CAN 01 ATNA

CV = 5400. ± 300. ug/g

Result	± Uncer.	Date
< 6000.		2/02
< 8000.		2/02
< 4000.		2/02
8000.	2000.	2/02
5700.	1000.	2/02
< 6000.		2/02
6200.	1500.	2/02
8000.	2000.	2/02
< 4000.		2/03
6000.	2000.	2/03
< 6000.		2/03

TABLE C-V (cont)

****

CCRMP SO-2
Podzolic Soil (cont)

****

Mg (cont)

< 4000.		2/03
< 6000.		2/03
5500.	1500.	2/03
< 8000.		2/03
7600.	2000.	2/03
8100.	2000.	2/03
< 6000.		2/03
5400.	1000.	2/16
< 6000.		3/25
< 4000.		4/05
5600.	1500.	4/19
4400.	1000.	4/19
4800.	1500.	10/20
4400.	1000.	10/20
5700.	1500.	10/20
< 3000.		10/20
< 5000.		10/20

Mn 85CAN 01 ATNA

CV = 720. ± 20. ug/g

Result	± Uncer.	Date
740.	30.	2/02
720.	40.	2/02
720.	40.	2/02
750.	30.	2/02
730.	40.	2/02
750.	30.	2/02
770.	40.	2/02
760.	30.	2/02
690.	30.	2/03
740.	40.	2/03
760.	30.	2/03
750.	30.	2/03
710.	30.	2/03
730.	40.	2/03
720.	30.	2/03
750.	40.	2/03
690.	30.	2/03
730.	30.	2/03
760.	30.	2/16
770.	40.	3/25
760.	30.	4/05
685.	31.	4/19
690.	31.	4/19
740.	30.	10/20
740.	40.	10/20
730.	40.	10/20
740.	30.	10/20
750.	30.	10/20

Na 85CAN 01 ATNA

CV = 1.9 ± 0.05 %

Result	± Uncer.	Date
1.83	0.07	2/02
1.78	0.07	2/02
1.85	0.07	2/02
1.79	0.07	2/02
1.77	0.07	2/02
1.79	0.07	2/02
1.72	0.07	2/02
1.74	0.06	2/02
1.71	0.06	2/03
1.76	0.06	2/03
1.77	0.06	2/03
1.82	0.06	2/03
1.81	0.06	2/03
1.69	0.08	2/03
1.80	0.07	2/03
1.80	0.06	2/03
1.72	0.07	2/03
1.84	0.07	2/03
1.80	0.07	2/16
1.87	0.06	3/25
1.84	0.06	4/05
1.77	0.06	4/19
1.92	0.07	4/19
1.82	0.09	10/20
1.84	0.06	10/20
1.84	0.07	10/20
1.91	0.07	10/20
1.75	0.06	10/20

Pb 85CAN 01 ICPMS

CV = 21. ± 4. ug/g

Result	± Uncer.	Date
29.	3.	7/06

Rb 85CAN 01 ITNA

CV = 78. ± 6. ug/g

Result	± Uncer.	Date
72.	9.	5/06
76.	10.	8/24
72.	10.	10/31

S 85GLA 01 IC

CV = 410. ± 80. ug/g

Result	± Uncer.	Date
290.	30.	2/11
280.	30.	2/11
240.	20.	2/11
270.	30.	2/11
270.	30.	2/11
240.	20.	2/11

Sb 85GLA 01 ITNA

CV = 110. ± 20. ng/g

Result	± Uncer.	Date
300.	200.	5/06
100.	100.	8/28
400.	200.	11/02

Sc 85GLA 01 ITNA

CV = 11.4 ± 0.4 ug/g

Result	± Uncer.	Date
12.	1.	5/02
11.3	0.6	8/22
11.6	0.8	9/30

Si 85CAN 01 AENA

CV = 24.99 ± 0.23 %

Result	± Uncer.	Date
21.	1.	6/15
27.	2.	6/15
19.	2.	6/15
24.	2.	6/15
26.	2.	6/22
25.	2.	6/22
26.	2.	6/22

Sm 85GLA 01 ATNA

CV = 11.2 ± 0.9 ug/g

Result	± Uncer.	Date
11.	2.	2/16
8.	2.	3/25
11.	2.	4/05
20.	3.	4/19
10.	2.	4/19
12.	2.	10/20
11.	2.	10/20
11.	2.	10/20
15.	2.	10/20
12.	2.	10/20

Sm 85GLA 01 ITNA

CV = 11.2 ± 0.9 ug/g

Result	± Uncer.	Date
11.	1.	5/11
11.	1	9/01
12.	2.	11/08

TABLE C-V (cont)

****

CCRMP SO-2
Podzolic Soil (cont)

****

Sr 85CAN 01 ATNA

CV = 340. ± 50. ug/g

Result	± Uncer.	Date
< 300.		2/16
< 300.		3/25
< 200.		4/05
300.	100.	4/19
< 300.		4/19
400.	150.	10/20
< 300.		10/20
< 300.		10/20
< 400.		10/20
< 300.		10/20

Ta 85GLA 01 ITNA

CV = 1.2 ± 0.1 ug/g

Result	± Uncer.	Date
1.3	0.3	5/09
1.1	0.2	8/29
1.0	0.2	11/04

Tb 85GLA 01 ITNA

CV = 1.6 ± 0.2 ug/g

Result	± Uncer.	Date
1.4	0.3	5/10
1.8	0.3	9/03

Th 85GLA 01 ITNA

CV = 4.1 ± 0.3 ug/g

Result	± Uncer.	Date
3.5	0.2	5/04
3.8	0.3	8/24
3.9	0.4	9/30

Ti 85CAN 01 ATNA

CV = 8600. ± 200. ug/g

Result	± Uncer.	Date
8000.	500.	2/02
7700.	500.	2/02
8100.	500.	2/02
7700.	500.	2/02
7900.	500.	2/03
7800.	500.	2/03
7700.	500.	2/03
8100.	500.	2/03

Ti (cont)

7500.	500.	2/03
6900.	400.	2/16
7700.	600.	3/25
8200.	500.	4/05
8200.	500.	4/19
7700.	1000.	4/19
8000.	600.	10/20
< 4000.		10/20
8600.	600.	10/20
8000.	500.	10/20
7800.	500.	10/20

U 85GLA 01 ATNA

CV = 0.96 ± 0.02 ug/g

Result	± Uncer.	Date
0.9	0.2	10/20
0.9	0.2	10/20
0.9	0.2	10/20
1.0	0.2	10/20
1.0	0.2	10/20

V 85CAN 01 ATNA

CV = 64. ± 10. ug/g

Result	± Uncer.	Date
51.	3.	2/02
50.	9.	2/02
54.	4.	2/02
64.	9.	2/02
55.	3.	2/02
51.	7.	2/02
53.	3.	2/02
53.	7.	2/02
66.	7.	2/03
49.	3.	2/03
57.	7.	2/03
50.	3.	2/03
52.	3.	2/03
64.	9.	2/03
59.	7.	2/03
57.	4.	2/03
65.	8.	2/03
61.	4.	2/03
53.	5.	2/16
58.	4.	3/25
56.	4.	4/05
52.	4.	4/19
60.	4.	4/19
55.	3.	10/20
60.	4.	10/20
60.	5.	10/20
54.	3.	10/20
57.	4.	10/20

W 85GLA 01 ATNA

CV = 0.4 ug/g

Result	± Uncer.	Date
< 99.		2/16
< 99.		3/25
< 99.		4/05
< 99.		4/19
< 99.		4/19

Yb 85GLA 01 ITNA

CV = 3.6 ± 0.4 ug/g

Result	± Uncer.	Date
3.9	0.4	5/10
3.9	0.4	8/30
3.4	0.4	11/08

Zn 85CAN 01 ITNA

CV = 124. ± 5. ug/g

Result	± Uncer.	Date
120.	10.	5/09
140.	20.	9/01
120.	20.	11/08

****

CCRMP SO-3 Calcareous
C Horizon Soil

****

Al 85CAN 01 ATNA

CV = 3.06 ± 0.11 %

Result	± Uncer.	Date
2.9	0.2	2/02
3.2	0.2	2/02
2.9	0.1	2/02
3.0	0.1	2/02
3.1	0.2	2/02
3.0	0.1	2/02
3.0	0.2	2/02
3.0	0.1	2/02
2.8	0.1	2/03
2.9	0.1	2/03
3.1	0.2	2/03
3.2	0.1	2/03
3.2	0.1	2/03
3.1	0.1	2/03
3.2	0.2	2/03
2.8	0.1	2/03
2.9	0.1	2/03
2.8	0.1	2/03
3.0	0.2	2/16
3.0	0.2	3/25
3.3	0.2	4/19
3.2	0.2	4/19
3.1	0.1	10/20
3.1	0.1	10/20

TABLE C-V (cont)

****

CCRMP SO-3 Calcareous
C Horizon Soil (cont)

****

Al (cont)

3.7	0.1	10/20
3.1	0.1	10/20
3.1	0.1	10/20
3.1	0.1	10/20
3.1	0.1	10/20

Ba 85CAN 01 ATNA

CV = 300. ± 40. ug/g

Result	± Uncer.	Date
290.	70.	2/02
230.	70.	2/02
390.	80.	2/02
240.	70.	2/02
220.	50.	2/03
210.	40.	2/03
260.	70.	2/03
260.	50.	2/03
310.	60.	2/03
360.	80.	2/16
280.	60.	3/25
280.	60.	4/19
360.	50.	4/19
330.	70.	10/20
380.	70.	10/20
220.	70.	10/20
270.	50.	10/20
280.	60.	10/20
370.	80.	10/20

Ba 85CAN 01 ITNA

CV = 300. ± 40. ug/g

Result	± Uncer.	Date
330.	50.	5/06

Ca 85CAN 01 ATNA

CV = 14.63 ± 0.4 %

Result	± Uncer.	Date
15.3	0.8	2/02
16.5	0.8	2/02
15.3	0.7	2/02
14.5	0.7	2/02
15.3	0.8	2/02
15.4	0.8	2/02
15.1	0.8	2/02
15.2	0.8	2/02
14.4	0.7	2/03
15.0	0.1	2/03
15.2	0.7	2/03
14.4	0.7	2/03
13.9	0.7	2/03

Ca (cont)

15.1	0.1	2/03
15.2	0.7	2/03
14.8	0.7	2/03
16.0	0.8	2/03
15.9	0.8	2/03
14.8	0.7	2/16
15.0	0.7	3/25
15.4	0.7	4/19
15.8	0.8	4/19
15.1	0.7	10/20
15.0	0.7	10/20
16.5	1.5	10/20
15.2	0.7	10/20
14.4	0.7	10/20
16.6	0.8	10/20
14.7	1.2	10/20

Ce 85GLA 01 ITNA

CV = 34. ± 2. ug/g

Result	± Uncer.	Date
38.	3.	5/09

Cl 85GLA 01 ATNA

CV = 210. ug/g

Result	± Uncer.	Date
320.	40.	2/02
230.	40.	2/02
300.	40.	2/02
230.	60.	2/02
380.	50.	2/03
310.	40.	2/03
370.	40.	2/03
410.	40.	2/03
240.	40.	2/03
340.	50.	2/16
430.	100.	3/25
400.	60.	4/19
470.	60.	4/19
380.	60.	10/20
420.	70.	10/20
270.	50.	10/20
370.	60.	10/20
280.	50.	10/20
310.	50.	10/20
350.	50.	10/20

Co 85GLA 01 ITNA

CV = 5.6 ± 1. ug/g

Result	± Uncer.	Date
5.8	0.7	5/06

CO2 88GLA 02 GASEV

CV = 24.4 ± 0.6 %

Result	± Uncer.	Date
24.	2.	8/04
25.	2.	8/04
25.	2.	8/04
25.	2.	8/04
25.	2.	8/04
24.	2.	8/04
26.	2.	8/04
26.	2.	8/04
26.	2.	8/04
26.	2.	8/04

Cr 85CAN 01 ITNA

CV = 26. ± 3. ug/g

Result	± Uncer.	Date
28.	2.	5/04

Cs 85GLA 01 ITNA

CV = 1.1 ± 0.1 ug/g

Result	± Uncer.	Date
0.95	0.2	5/06

Cu 85CAN 01 ATNA

CV = 17. ± 1. ug/g

Result	± Uncer.	Date
< 160.		10/20
< 300.		10/20
< 160.		10/20
< 300.		10/20
< 170.		10/20
< 300.		10/20
< 160.		10/20
< 300.		12/12
< 300.		12/12
< 160.		12/12
< 170.		12/12
< 160.		12/12
< 160.		12/12
< 300.		12/12

Dy 85GLA 01 ATNA

CV = 2.8 ug/g

Result	± Uncer.	Date
2.9	0.4	2/02
2.5	0.4	2/02
2.6	0.3	2/02
2.8	0.4	2/02
3.0	0.4	2/03
2.9	0.4	2/03
3.4	0.4	2/03

TABLE C-V (cont)

****

CCRMP SO-3 Calcareous
C Horizon Soil (cont)

****

Dy (cont)

3.0	0.3	2/03
2.6	0.3	2/03
2.7	0.3	2/16
3.0	0.3	3/25
2.8	0.3	4/19
2.5	0.3	4/19
2.9	0.3	10/20
2.8	0.4	10/20
2.6	0.3	10/20
3.0	0.4	10/20
2.4	0.4	10/20
2.5	0.3	10/20
2.2	0.3	10/20

Eu 85GLA 01 ATNA

CV = 800. ± 100. ng/g

Result	± Uncer.	Date
< 800.		10/20
< 1000.		10/20
1000.	200.	10/20
900.	200.	10/20
900.	200.	10/20
770.	200.	10/20
< 1000.		10/20

Eu 85GLA 01 ITNA

CV = 800. ± 100. ng/g

Result	± Uncer.	Date
750.	80.	5/10

F 85GLA 01 ISE

CV = 320. ± 40. ug/g

Result	± Uncer.	Date
380.	40.	8/11
350.	40.	8/11
420.	40.	8/11
390.	40.	8/11
370.	40.	8/11
400.	40.	8/11
420.	40.	8/11
390.	40.	8/11
380.	40.	8/11
400.	40.	8/11
370.	40.	8/11
300.	30.	8/11

Fe 85CAN 01 ITNA

CV = 1.51 ± 0.06 %

Result	± Uncer.	Date
1.6	0.1	5/03

Ga 85GLA 01 ATNA

CV = 10. ± 4. ug/g

Result	± Uncer.	Date
< 40.		2/16
< 50.		3/25
< 50.		4/19
< 30.		4/19

Hf 85GLA 01 ITNA

CV = 4.3 ± 0.2 ug/g

Result	± Uncer.	Date
4.9	0.4	5/05

I 85GLA 01 ATNA

CV = 1. ug/g

Result	± Uncer.	Date
< 20.		10/20
< 20.		10/20
< 20.		10/20
< 20.		10/20
< 20.		10/20
< 20.		10/20

In 85GLA 01 ATNA

CV = 100. ng/g

Result	± Uncer.	Date
< 130.		2/02
< 180.		2/02
< 170.		2/02
< 180.		2/02
< 100.		2/03
< 130.		2/03
< 180.		2/03
< 100.		2/03
< 110.		2/03
< 130.		2/16
< 140.		3/25
< 110.		4/19
< 130.		4/19
< 190.		10/20
< 190.		10/20
< 100.		10/20
< 130.		10/20
< 130.		10/20
< 130.		10/20
< 190.		10/20
< 190.		10/20

K 85CAN 01 ATNA

CV = 1.16 ± 0.05 %

Result	± Uncer.	Date
1.4	0.2	2/02
1.0	0.1	2/02
1.2	0.2	2/02
1.4	0.2	2/02
1.2	0.2	2/03
1.3	0.2	2/03
1.0	0.1	2/03
1.0	0.1	2/03
1.2	0.2	2/03
1.2	0.1	2/16
1.4	0.2	3/25
1.0	0.1	4/19
1.2	0.2	4/19
1.2	0.2	10/20
1.1	0.2	10/20
1.3	0.2	10/20
0.7	0.2	10/20
1.2	0.1	10/20
1.1	0.2	10/20
1.0	0.2	10/20

Mg 85CAN 01 ATNA

CV = 4.98 ± 0.1 %

Result	± Uncer.	Date
5.4	0.3	2/02
5.3	0.4	2/02
5.2	0.4	2/02
5.5	0.3	2/02
5.0	0.3	2/02
4.9	0.3	2/02
5.1	0.3	2/02
5.3	0.3	2/02
5.1	0.3	2/03
5.2	0.3	2/03
5.1	0.3	2/03
5.0	0.3	2/03
4.9	0.3	2/03
5.2	0.3	2/03
5.1	0.3	2/03
4.7	0.3	2/03
5.2	0.3	2/03
5.5	0.3	2/03
5.0	0.5	2/16
5.0	0.3	3/25
5.1	0.3	4/19
5.3	0.3	4/19
4.6	0.3	10/20
4.3	0.3	10/20
4.6	0.3	10/20
4.7	0.3	10/20
4.1	0.3	10/20
4.9	0.3	10/20
4.0	0.2	10/20

TABLE C-V (cont)

****

CCRMP SO-3 Calcareous
C Horizon Soil (cont)

****

Mn 85CAN 01 ATNA

CV = 520. ± 20. ug/g

Result	± Uncer.	Date
560.	30.	2/02
570.	30.	2/02
580.	30.	2/02
590.	30.	2/02
550.	20.	2/02
600.	30.	2/02
580.	30.	2/02
590.	30.	2/02
550.	20.	2/03
560.	30.	2/03
560.	30.	2/03
590.	30.	2/03
570.	30.	2/03
550.	30.	2/03
540.	30.	2/03
570.	30.	2/03
550.	30.	2/03
560.	30.	2/03
550.	20.	2/16
560.	30.	3/25
520.	20.	4/19
530.	20.	4/19
570.	30.	10/20
580.	30.	10/20
580.	30.	10/20
560.	30.	10/20
540.	20.	10/20
580.	30.	10/20
570.	30.	10/20

Na 85CAN 01 ATNA

CV = 7400. ± 400. ug/g

Result	± Uncer.	Date
7200.	300.	2/02
7400.	300.	2/02
7200.	300.	2/02
7000.	300.	2/02
7100.	300.	2/02
7400.	300.	2/02
7100.	300.	2/02
7300.	300.	2/02
7300.	300.	2/03
7400.	300.	2/03
6700.	300.	2/03
7400.	300.	2/03
7000.	200.	2/03
6900.	300.	2/03
6900.	300.	2/03
7200.	300.	2/03
7300.	500.	2/03
7000.	200.	2/03
7100.	300.	2/16
7400.	300.	3/25
7200.	200.	4/19

Na (cont)

7500.	300.	4/19
7100.	200.	10/20
7700.	300.	10/20
7700.	300.	10/20
7100.	300.	10/20
7200.	300.	10/20
7500.	300.	10/20
7200.	300.	10/20

Rb 85CAN 01 ITNA

CV = 39. ± 3. ug/g

Result	± Uncer.	Date
41.	6.	5/06

S 85GLA 01 IC

CV = 167. ug/g

Result	± Uncer.	Date
120.	20.	2/11
110.	20.	2/11
110.	20.	2/11

Sb 85GLA 01 ITNA

CV = 310. ± 13. ng/g

Result	± Uncer.	Date
490.	150.	5/06

Sc 85GLA 01 ITNA

CV = 5.2 ± 0.3 ug/g

Result	± Uncer.	Date
4.8	0.5	5/02

Si 85CAN 01 AENA

CV = 15.86 ± 0.19 %

Result	± Uncer.	Date
16.3	1.1	6/15
14.4	1.6	6/15
16.5	1.1	6/15
15.1	1.7	6/15
13.	3.	6/15
16.5	1.8	6/22
16.9	1.1	6/22
16.1	1.8	6/22

Sm 85GLA 01 ATNA

CV = 3.5 ± 0.2 ug/g

Result	± Uncer.	Date
4.5	1.	2/16
< 2.		3/25
< 3.		4/19
< 2.		4/19
< 2.		10/20
< 3.		10/20
< 2.		10/20
< 2.		10/20
< 3.		10/20
< 3.		10/20
< 3.		10/20

Sm 85GLA 01 ITNA

CV = 3.5 ± 0.2 ug/g

Result	± Uncer.	Date
3.9	0.4	5/11

Sr 85CAN 01 ATNA

CV = 220. ± 30. ug/g

Result	± Uncer.	Date
< 190.		2/16
< 200.		3/25
< 200.		4/19
< 210.		4/19
< 200.		10/20
290.	90.	10/20
< 300.		10/20
< 300.		10/20
< 300.		10/20
< 300.		10/20

Ta 85GLA 01 ITNA

CV = 430. ± 60. ng/g

Result	± Uncer.	Date
470.	100.	5/09

Tb 85GLA 01 ITNA

CV = 490. ± 10. ng/g

Result	± Uncer.	Date
450.	150.	5/10

Th 85GLA 01 ITNA

CV = 4. ± 0.13 ug/g

Result	± Uncer.	Date
3.8	0.2	5/04

****

CCRMP SO-3 Calcareous
C Horizon Soil (cont)

****

Ti 85CAN 01 ATNA

CV = 2000. ± 200. ug/g

Result	± Uncer.	Date
2000.	300.	2/02
1900.	200.	2/02
1900.	200.	2/02
1600.	200.	2/02
1900.	300.	2/03
1700.	200.	2/03
2000.	300.	2/03
2100.	200.	2/03
1600.	200.	2/03
2100.	200.	2/16
1900.	200.	3/25
1700.	300.	4/19
1600.	200.	4/19
2000.	200.	10/20
1400.	200.	10/20
1600.	200.	10/20
2000.	300.	10/20
2000.	200.	10/20
2100.	300.	10/20
1800.	300.	10/20

U 85GLA 01 ATNA

CV = 1.1 ± 0.2 ug/g

Result	± Uncer.	Date
1.1	0.2	10/20
1.1	0.2	10/20
1.3	0.2	10/20
1.0	0.2	10/20
1.1	0.2	10/20
1.1	0.2	10/20
1.2	0.2	10/20

V 85CAN 01 ATNA

CV = 38. ± 6. ug/g

Result	± Uncer.	Date
29.	4.	2/02
38.	6.	2/02
26.	6.	2/02
40.	7.	2/02
34.	2.	2/02
34.	2.	2/02
37.	2.	2/02
34.	2.	2/02
37.	5.	2/03
31.	2.	2/03
36.	7.	2/03
31.	2.	2/03
29.	4.	2/03
33.	3.	2/03
34.	2.	2/03

V (cont)

28.	4.	2/03
38.	2.	2/03
37.	4.	2/03
36.	2.	2/16
34.	2.	3/25
33.	2.	4/19
37.	2.	4/19
38.	2.	10/20
31.	3.	10/20
35.	2.	10/20
32.	2.	10/20
34.	2.	10/20
29.	2.	10/20
39.	3.	10/20

W 85GLA 01 ATNA

CV = 0.6 ug/g

Result	± Uncer.	Date
< 99.		2/16
< 99.		3/25
< 99.		4/19

Yb 85GLA 01 ITNA

CV = 1.78 ug/g

Result	± Uncer.	Date
1.6	0.2	5/10

Zn 85CAN 01 ITNA

CV = 52. ± 3. ug/g

Result	± Uncer.	Date
51.	8.	5/09

****

CCRMP SO-4 Chernozemic
A Horizon Soil

****

Al 85CAN 01 ATNA

CV = 5.46 ± 0.15 %

Result	± Uncer.	Date
5.0	0.2	2/02
5.2	0.2	2/02
5.3	0.2	2/02
5.4	0.2	2/02
5.6	0.2	2/02
5.1	0.2	2/02
5.2	0.2	2/02
5.6	0.2	2/02
5.4	0.2	2/03
5.2	0.2	2/03
5.0	0.2	2/03
5.5	0.2	2/03

Al (cont)

5.8	0.2	2/03
5.2	0.2	2/03
5.5	0.2	2/03
5.3	0.2	2/03
5.3	0.2	2/03
5.2	0.2	2/03
5.3	0.2	3/03
5.4	0.2	4/18
5.2	0.2	5/25
5.5	0.2	5/25
4.9	0.2	5/25
5.8	0.2	5/25
5.5	0.2	10/20
6.4	0.2	10/20
5.5	0.2	10/20
5.4	0.2	10/20
6.4	0.2	10/20
5.5	0.2	10/20

Ba 85GLA 01 ATNA

CV = 730. ± 70. ug/g

Result	± Uncer.	Date
730.	70.	2/02
730.	70.	2/02
730.	70.	2/02
720.	70.	2/02
680.	70.	2/03
790.	80.	2/03
750.	90.	2/03
880.	90.	2/03
870.	90.	2/03
810.	80.	3/03
720.	80.	4/18
630.	80.	5/25
580.	60.	5/25
650.	60.	5/25
500.	70.	5/25
730.	80.	10/20
800.	80.	10/20
690.	70.	10/20
690.	70.	10/20
700.	80.	10/20
740.	80.	10/20

Ba 85GLA 01 ITNA

CV = 730. ± 70. ug/g

Result	± Uncer.	Date
770.	90.	8/28
760.	100.	9/04
850.	100.	11/04

Ca 85CAN 01 ATNA

CV = 1.11 ± 0.05 %

Result	± Uncer.	Date
1.0	0.1	2/02
1.2	0.1	2/02
0.9	0.1	2/02

TABLE C-V (cont)

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CCRMP SO-4 Chernozemic
A Horizon Soil (cont)

****

Ca (cont)

1.0	0.1	2/02
1.1	0.1	2/02
1.2	0.1	2/02
1.3	0.1	2/02
1.1	0.1	2/02
1.1	0.1	2/03
1.1	0.1	2/03
1.1	0.1	2/03
1.0	0.1	2/03
1.0	0.1	2/03
1.1	0.1	2/03
1.0	0.1	2/03
1.0	0.1	2/03
1.2	0.1	2/03
1.0	0.1	2/03
1.2	0.1	3/03
1.4	0.1	4/18
1.3	0.1	5/25
0.9	0.1	5/25
1.2	0.1	5/25
1.0	0.1	5/25
1.2	0.1	10/20
1.0	0.1	10/20
1.1	0.1	10/20
1.0	0.1	10/20
1.0	0.1	10/20
1.1	0.1	10/20

Ce 85GLA 01 ITNA

CV = 53. ± 0.9 ug/g

Result	± Uncer.	Date
55.	6.	8/30
54.	4.	9/04
57.	5.	11/07

Cl 85GLA 01 ATNA

CV = 30. ug/g

Result	± Uncer.	Date
< 110.		2/02
10.	20.	2/02
50.	30.	2/02
< 110.		2/02
20.	20.	2/03
< 80.		2/03
< 90.		2/03
30.	20.	2/03
40.	30.	2/03
40.	40.	3/08
80.	40.	4/18
90.	60.	5/25
< 140.		5/25
10.	30.	5/25
55.	30.	5/25
70.	30.	10/20

Cl (cont)

60.	40.	10/20
80.	50.	10/20
60.	40.	10/20
< 100.		10/20
40.	40.	10/20

Co 85GLA 01 ITNA

CV = 9.9 ± 1. ug/g

Result	± Uncer.	Date
10.	1.	8/28
10.	1.	9/04
10.	2.	11/03

CO2 88CAH 01 GASEV

CV = < 4000. ug/g

Result	± Uncer.	Date
4000.	2000.	8/05
7000.	2000.	8/05
16000.	2000.	8/05
6000.	2000.	8/05
5000.	2000.	8/05

Cr 85CAN 01 ITNA

CV = 61. ± 6. ug/g

Result	± Uncer.	Date
69.	5.	8/28
69.	6.	9/04
70.	7.	11/03

Cs 85GLA 01 ITNA

CV = 2.9 ± 0.2 ug/g

Result	± Uncer.	Date
3.0	0.4	8/28
3.2	0.4	9/04
2.8	0.3	11/02

Cu 85CAN 01 ATNA

CV = 22. ± 1. ug/g

Result	± Uncer.	Date
< 190.		10/20
< 200.		10/20
< 200.		12/12
< 300.		12/12
< 200.		12/12
< 190.		12/12
< 200.		12/12
< 190.		12/12

Dy 85GLA 01 ATNA

CV = 3.8 ug/g

Result	± Uncer.	Date
3.8	0.4	2/02
3.4	0.4	2/02
3.5	0.3	2/02
3.8	0.4	2/02
3.0	0.3	2/03
4.3	0.5	2/03
3.7	0.4	2/03
3.5	0.3	2/03
3.7	0.4	2/03
4.1	0.4	3/03
3.8	0.4	4/18
2.4	0.3	5/25
3.0	0.2	5/25
3.0	0.3	5/25
3.4	0.3	5/25
3.8	0.3	10/20
3.5	0.3	10/20
4.1	0.4	10/20
3.7	0.3	10/20
4.4	0.3	10/20
3.8	0.3	10/20

Eu 85GLA 01 ATNA

CV = 0.99 ± 0.08 ug/g

Result	± Uncer.	Date
0.9	0.2	10/20
1.0	0.2	10/20
0.8	0.1	10/20
1.0	0.2	10/20
0.9	0.3	10/20
0.9	0.3	10/20

Eu 85GLA 01 ITNA

CV = 0.99 ± 0.08 ug/g

Result	± Uncer.	Date
1.0	0.1	8/30
1.0	0.1	9/04
1.0	0.1	11/08

F 85GLA 01 DISE

CV = 300. ± 10. ug/g

Result	± Uncer.	Date
300.	30.	8/11
310.	30.	8/11

TABLE C-V (cont)

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CCRMP SO-4 Chernozemic
A Horizon Soil (cont)

****

Fe 85CAN 01 ITNA

CV = 2.37 ± 0.07 %

Result	± Uncer.	Date
2.3	0.2	8/23
2.4	0.2	9/04
2.4	0.2	9/30

Ga 85GLA 01 ATNA

CV = 13. ± 4. ug/g

Result	± Uncer.	Date
< 30.		3/03
< 40.		4/18
< 40.		5/25
< 50.		5/25
< 30.		5/25
< 60.		5/25

Hf 85GLA 01 ITNA

CV = 8.1 ± 0.3 ug/g

Result	± Uncer.	Date
7.8	0.6	8/28
8.0	0.8	9/04
9.2	0.8	11/03

I 85GLA 01 ATNA

CV = 3. ug/g

Result	± Uncer.	Date
< 15.		10/20
< 15.		10/20
< 15.		10/20
< 15.		10/20
< 20.		10/20
< 15.		10/20

In 85GLA 01 ATNA

CV = 100. ng/g

Result	± Uncer.	Date
< 130.		2/02
< 140.		2/02
< 110.		2/02
< 130.		2/02
< 110.		2/03
< 120.		2/03
< 110.		2/03
< 110.		2/03

In (cont)

< 110.		2/03
< 100.		3/03
< 140.		4/18
< 130.		5/25
< 190.		5/25
< 120.		5/25
< 140.		5/25
< 130.		10/20
< 200.		10/20
< 130.		10/20
< 140.		10/20
< 140.		10/20
< 100.		10/20

K 85CAN 01 ATNA

CV = 1.73 ± 0.03 %

Result	± Uncer.	Date
1.4	0.2	2/02
1.7	0.2	2/02
1.8	0.2	2/02
1.4	0.2	2/02
1.4	0.2	2/03
1.8	0.2	2/03
1.5	0.2	2/03
1.6	0.2	2/03
1.8	0.2	2/03
1.6	0.2	3/03
1.7	0.2	4/18
1.6	0.2	5/25
1.5	0.2	5/25
1.4	0.2	5/25
1.4	0.2	5/25
1.6	0.2	10/20
1.8	0.2	10/20
1.7	0.2	10/20
1.6	0.2	10/20
1.5	0.2	10/20
1.6	0.2	10/20

Mg 85CAN 01 ATNA

CV = 5600. ± 400. ug/g

Result	± Uncer.	Date
8000.	2000.	2/02
5000.	1000.	2/02
6000.	1000.	2/02
6000.	2000.	2/02
6000.	2000.	2/02
7000.	1000.	2/02
5000.	1000.	2/02
< 4000.		2/02
< 4000.		2/03
5000.	1000.	2/03
5000.	2000.	2/03
8000.	2000.	2/03
6000.	1000.	2/03
8000.	2000.	2/03
6000.	1000.	2/03
6000.	1000.	2/03
7000.	1000.	2/03
11000.	2000.	2/03
5000.	1000.	3/03

Mg (cont)

5000.	1000.	4/18
6000.	1000.	5/25
6000.	1000.	5/25
< 4000.		5/25
7000.	1000.	5/25
6000.	1000.	10/20
6000.	1000.	10/20
7000.	2000.	10/20
6000.	1000.	10/20
6000.	1000.	10/20
4000.	1000.	10/20

Mn 85CAN 01 ATNA

CV = 600. ± 20. ug/g

Result	± Uncer.	Date
610.	30.	2/02
620.	30.	2/02
620.	30.	2/02
620.	30.	2/02
610.	30.	2/02
580.	30.	2/02
620.	30.	2/02
620.	30.	2/02
640.	30.	2/03
630.	30.	2/03
630.	30.	2/03
620.	30.	2/03
610.	30.	2/03
630.	30.	2/03
640.	30.	2/03
630.	30.	2/03
630.	30.	2/03
630.	30.	2/03
630.	30.	3/03
600.	30.	4/18
580.	30.	5/25
590.	30.	5/25
570.	30.	5/25
580.	30.	5/25
620.	30.	10/20
630.	30.	10/20
590.	30.	10/20
650.	30.	10/20
620.	30.	10/20
630.	30.	10/20

Na 85CAN 01 ATNA

CV = 1. ± 0.02 %

Result	± Uncer.	Date
0.95	0.03	2/02
0.93	0.04	2/02
1.00	0.04	2/02
0.97	0.03	2/02
0.96	0.03	2/02
0.91	0.04	2/02
0.94	0.04	2/02
0.90	0.04	2/02
0.95	0.04	2/03
0.93	0.04	2/03
0.96	0.03	2/03
0.97	0.03	2/03

TABLE C-V (cont)

****

CCRMP SO-4 Chernozemic
A Horizon Soil (cont)

****

Na (cont)

0.95	0.04	2/03
0.96	0.04	2/03
0.97	0.03	2/03
0.93	0.04	2/03
0.97	0.03	2/03
0.95	0.03	2/03
0.98	0.03	3/03
1.01	0.04	4/18
0.98	0.03	5/25
0.98	0.03	5/25
1.00	0.03	5/25
0.98	0.03	5/25
0.95	0.03	10/20
0.94	0.03	10/20
0.94	0.03	10/20
1.03	0.04	10/20
0.99	0.03	10/20
0.96	0.03	10/20

Rb 85GLA 01 ITNA

CV = 72. ± 7. ug/g

Result	± Uncer.	Date
73.	9.	8/24
71.	8.	9/04
68.	9.	10/31

S 85GLA 01 IC

CV = 600. ± 100. ug/g

Result	± Uncer.	Date
450.	40.	2/11
450.	40.	2/11
460.	50.	2/11
440.	40.	2/11
450.	40.	2/11
450.	40.	2/11
500.	50.	2/11

Sb 85GLA 01 ITNA

CV = 700. ± 20. ng/g

Result	± Uncer.	Date
600.	100.	8/28
700.	200.	9/04
700.	200.	11/02

Sc 85GLA 01 ITNA

CV = 8.5 ± 0.5 ug/g

Result	± Uncer.	Date
8.2	0.4	8/22
8.5	0.6	9/04
8.6	0.6	9/30

Si 85CAN 01 AENA

CV = 31.97 ± 0.24 %

Result	± Uncer.	Date
32.	3.	6/22
27.	2.	6/22
34.	3.	6/22
31.	2.	6/22
32.	3.	6/22

Sm 85GLA 01 ATNA

CV = 4.7 ± 0.2 ug/g

Result	± Uncer.	Date
< 3.		3/08
< 2.		4/18
< 2.		5/25
< 2.		5/25
< 2.		5/25
< 2.		5/25
5.	1.	10/20
< 3.		10/20
5.	1.	10/20
< 3.		10/20
< 2.		10/20
< 2.		10/20

Sm 85GLA 01 ITNA

CV = 4.7 ± 0.2 ug/g

Result	± Uncer.	Date
4.0	0.4	9/01
5.3	0.6	9/04
6.3	1.0	11/08

Sr 85CAN 01 ATNA

CV = 170. ± 20. ug/g

Result	± Uncer.	Date
< 190.		3/03
< 200.		4/18
< 200.		5/25
< 280.		5/25
< 240.		5/25
< 200.		5/25
< 200.		10/20
< 300.		10/20
< 200.		10/20
< 190.		10/20
< 200.		10/20

Ta 85GLA 01 ITNA

CV = 620. ± 100. ng/g

Result	± Uncer.	Date
500.	100.	8/29
900.	100.	9/04
800.	200.	11/04

Th 85GLA 01 ITNA

CV = 8.5 ± 0.7 ug/g

Result	± Uncer.	Date
7.5	0.6	8/24
8.0	0.7	9/04
8.4	0.7	9/30

Ti 85CAN 01 ATNA

CV = 3400. ± 200. ug/g

Result	± Uncer.	Date
3200.	300.	2/02
3100.	300.	2/02
2900.	200.	2/02
3000.	400.	2/02
3200.	300.	2/03
3000.	400.	2/03
3300.	500.	2/03
3200.	300.	2/03
3200.	300.	2/03
3200.	400.	3/03
3400.	300.	4/18
3000.	400.	5/25
2000.	300.	5/25
3700.	300.	5/25
3200.	300.	5/25
3300.	300.	10/20
3200.	300.	10/20
2900.	400.	10/20
3200.	300.	10/20
3000.	300.	10/20
3400.	300.	10/20

U 85GLA 01 ATNA

CV = 2.4 ± 0.2 ug/g

Result	± Uncer.	Date
2.4	0.2	10/20
2.5	0.2	10/20
2.4	0.2	10/20
2.3	0.2	10/20
2.2	0.2	10/20
2.4	0.2	10/20

TABLE C-V (cont)

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CCRMP SO-4 Chernozemic
A Horizon Soil (cont)

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U 85GLA 01 DNA

CV = 2.4 ± 0.2 ug/g

Result	± Uncer.	Date
2.4	0.2	6/08
2.4	0.2	6/08
2.4	0.2	6/08

U-235/238 81H-8 03 ICPMS

CV = 0.0073 ± 0.0001 ratio

Result	± Uncer.	Date
0.0075	0.0003	4/12

V 85GLA 01 ATNA

CV = 84. ± 3. ug/g

Result	± Uncer.	Date
88.	4.	2/02
79.	7.	2/02
77.	4.	2/02
77.	7.	2/02
78.	4.	2/02
88.	6.	2/02
82.	6.	2/02
84.	4.	2/02
83.	4.	2/03
79.	4.	2/03
88.	6.	2/03
75.	7.	2/03
81.	6.	2/03
77.	6.	2/03
92.	6.	2/03
83.	4.	2/03
83.	4.	2/03
82.	4.	2/03
87.	4.	3/03
84.	4.	4/18
73.	5.	5/25
80.	3.	5/25
89.	7.	5/25
79.	3.	5/25
78.	4.	5/25
82.	9.	5/25
84.	6.	5/25
83.	6.	5/25
89.	4.	10/20
92.	4.	10/20
79.	3.	10/20
91.	6.	10/20
78.	4.	10/20
78.	4.	10/20

W 85GLA 01 ATNA

CV = 1. ug/g

Result	± Uncer.	Date
< 110.		3/03
< 120.		4/18
< 190.		5/25
< 150.		5/25
< 140.		5/25
< 160.		5/25

Yb 85GLA 01 ITNA

CV = 2.31 ± 0.02 ug/g

Result	± Uncer.	Date
2.1	0.2	8/30
2.3	0.3	9/04
2.4	0.3	11/08

Zn 85CAN 01 ITNA

CV = 94. ± 3. ug/g

Result	± Uncer.	Date
110.	20.	9/01
100.	20.	9/04
50.	10.	11/08
40.	10.	11/08

****

CCRMP SY-2 Syenite

****

U 81GLA 06 DNA

CV = 280. ± 25. ug/g

Result	± Uncer.	Date
280.	20.	3/10
270.	20.	3/10
270.	20.	3/10

****

CCRMP UTS-3
Uranium Tailings Ore

****

U 84SMI 01 DNA

CV = 513. ± 9. ug/g

Result	± Uncer.	Date
520.	30.	2/06
530.	30.	2/06
520.	30.	2/06

****

CCRMP UTS-4
Uranium Tailings Ore

****

U 84SMI 01 DNA

CV = 1010. ± 19. ug/g

Result	± Uncer.	Date
946.	50.	2/06
952.	50.	2/06
957.	50.	2/06

U 84SMI 01 IENA

CV = 1010. ± 19. ug/g

Result	± Uncer.	Date
1070.	60.	3/24

****

CRPG MA-N Granite

****

U-235/238 88GLA 02 ICPMS

CV = 0.0072 ± 0.0001 ratio

Result	± Uncer.	Date
0.0073	0.0007	1/14

****

CRPG, GIT-IWG AC-E Granite

****

Al 87GOV 01 ATNA

CV = 7.78 %

Result	± Uncer.	Date
7.9	0.3	3/08
7.6	0.3	6/06
7.6	0.4	6/06
7.6	0.4	6/06
7.6	0.3	6/06
7.8	0.3	6/06
7.8	0.3	6/06

Ba 87GOV 01 ATNA

CV = 55. ug/g

Result	± Uncer.	Date
< 5000.		3/08
< 3400.		6/06
< 3400.		6/06
< 4400.		6/06

TABLE C-V (cont)

****

CRPG, GIT-IWG AC-E Granite (cont)

****

Ba (cont)

< 5700.	6/06
< 5700.	6/06
< 4400.	6/06

Ba 87GOV 01 ITNA

CV = 55. ug/g

Result	± Uncer.	Date
120.	20.	7/07
110.	20.	9/04
90.	20.	9/27
80.	20.	9/27
90.	20.	9/28
100.	30.	11/04

Ca 87GOV 01 ATNA

CV = 2400. ug/g

Result	± Uncer.	Date
2800.	600.	3/08
< 2700.		6/06
< 3600.		6/06
< 3600.		6/06
< 2700.		6/06
< 2500.		6/06
< 2500.		6/06

Ce 87GOV 01 ITNA

CV = 154. ug/g

Result	± Uncer.	Date
170.	10.	7/07
170.	10.	9/04
170.	10.	9/27
170.	10.	9/27
170.	20.	9/28
170.	20.	11/07

Cl 87GOV 01 ATNA

CV = 180. ug/g

Result	± Uncer.	Date
300.	70.	3/08
340.	70.	6/06
340.	70.	6/06
130.	50.	6/06
130.	50.	6/06
< 260.		6/06
< 260.		6/06

Co 87GOV 01 ITNA

CV = 200. ng/g

Result	± Uncer.	Date
300.	150.	7/12
300.	150.	9/04
< 360.		9/27
700.	150.	9/27

Cs 87GOV 01 ITNA

CV = 3. ug/g

Result	± Uncer.	Date
3.0	0.4	7/12
3.2	0.4	9/04
3.0	0.3	9/27
3.1	0.3	9/27
2.9	0.3	9/28
3.1	0.3	11/02

Dy 87GOV 01 ATNA

CV = 29. ug/g

Result	± Uncer.	Date
30.	2.	3/08
26.	1.	6/06
26.	1.	6/06
26.	1.	6/06
27.	1.	6/06
26.	1.	6/06
27.	1.	6/06

Eu 87GOV 01 ITNA

CV = 2. ug/g

Result	± Uncer.	Date
2.1	0.2	7/07
2.0	0.2	9/04
2.1	0.2	9/27
2.0	0.2	9/27
1.9	0.2	9/28
2.1	0.2	11/08

Fe 87GOV 01 ITNA

CV = 1.77 %

Result	± Uncer.	Date
1.9	0.1	7/13
1.8	0.1	9/04
1.8	0.2	9/27
1.8	0.1	9/27
1.8	0.2	9/27
1.8	0.1	9/30

Ga 87GOV 01 ATNA

CV = 39. ug/g

Result	± Uncer.	Date
< 70.		3/08
< 67.		6/06
< 67.		6/06
< 70.		6/06
< 90.		6/06
< 90.		6/06
< 70.		6/06

Hf 87GOV 01 ITNA

CV = 27.9 ug/g

Result	± Uncer.	Date
29.	2.	7/12
28.	3.	9/04
31.	3.	9/27
28.	2.	9/27
31.	3.	9/28
30.	2.	11/03

In ATNA

CV = No Data Available, ug/g

Result	± Uncer.	Date
< 200.		3/08
< 290.		6/06
< 210.		6/06
< 290.		6/06
< 210.		6/06
< 210.		6/06
< 210.		6/06

K 87GOV 01 ATNA

CV = 3.73 %

Result	± Uncer.	Date
3.4	0.3	3/08
3.7	0.3	6/06
3.3	0.3	6/06
3.3	0.3	6/06
3.6	0.3	6/06
3.6	0.3	6/06
3.7	0.3	6/06

La 87GOV 01 ITNA

CV = 59. ug/g

Result	± Uncer.	Date
61.	4.	7/07

TABLE C-V (cont)

****

CRPG, GIT-IWG AC-E Granite (cont)

****

Mg 87GOV 01 ATNA

CV = 180. ug/g

Result	± Uncer.	Date
< 5000.		3/08
< 7400.		6/06
< 5300.		6/06
< 5300.		6/06
< 5200.		6/06
< 7400.		6/06
< 5200.		6/06

Mn 87GOV 01 ATNA

CV = 450. ug/g

Result	± Uncer.	Date
450.	20.	3/08
440.	20.	6/06
440.	20.	6/06
430.	20.	6/06
430.	20.	6/06
440.	20.	6/06
440.	20.	6/06

Na 87GOV 01 ATNA

CV = 4.85 %

Result	± Uncer.	Date
4.9	0.2	3/08
4.8	0.2	6/06
5.0	0.2	6/06
5.0	0.2	6/06
5.0	0.2	6/06
5.0	0.2	6/06
4.8	0.2	6/06

Rb 87GOV 01 ITNA

CV = 152. ug/g

Result	± Uncer.	Date
140.	10.	7/12
140.	15.	9/04
140.	15.	9/27
140.	15.	9/27
140.	15.	9/27
140.	15.	10/31

Sb 87GOV 01 ITNA

CV = 400. ng/g

Result	± Uncer.	Date
450.	100.	7/13
400.	100.	9/04
650.	150.	9/27
500.	100.	9/27
450.	100.	9/28
450.	100.	11/02

Sc 87GOV 01 ITNA

CV = 110. ng/g

Result	± Uncer.	Date
120.	10.	7/13
120.	10.	9/04
120.	10.	9/27
120.	10.	9/27
120.	10.	9/27
120.	10.	9/30

Sm 87GOV 01 ATNA

CV = 24.2 ug/g

Result	± Uncer.	Date
22.	3.	3/08
24.	2.	6/06
24.	2.	6/06
24.	2.	6/06
24.	2.	6/06
23.	2.	6/06
23.	2.	6/06

Sm 87GOV 01 ITNA

CV = 24.2 ug/g

Result	± Uncer.	Date
25.	2.	6/06
19.	2.	9/04
18.	2.	9/18
18.	2.	9/27
20.	2.	9/27
20.	2.	9/28

Sr 87GOV 01 ATNA

CV = 3. ug/g

Result	± Uncer.	Date
< 200.		3/08
< 340.		6/06
< 250.		6/06
< 290.		6/06
< 290.		6/06
< 250.		6/06
< 340.		6/06

Ta 87GOV 01 ITNA

CV = 6.4 ug/g

Result	± Uncer.	Date
6.0	0.9	7/07
5.8	0.6	9/04
7.0	1.1	9/27
6.2	0.9	9/27
6.6	1.0	9/28
6.6	1.0	11/04

Tb 87GOV 01 ITNA

CV = 4.8 ug/g

Result	± Uncer.	Date
5.6	0.8	7/07
4.4	0.4	9/05

Th 87GOV 01 ITNA

CV = 18.5 ug/g

Result	± Uncer.	Date
19.	1.	7/13
19.	2.	9/04
19.	2.	9/27
19.	2.	9/27
18.	1.	9/27
19.	2.	9/30

Ti 87GOV 01 ATNA

CV = 660. ug/g

Result	± Uncer.	Date
< 4000.		3/08
< 4900.		6/06
< 3800.		6/06
< 3800.		6/06
< 4900.		6/06
< 4100.		6/06
< 4100.		6/06

V 87GOV 01 ATNA

CV = 3. ug/g

Result	± Uncer.	Date
< 6.0		3/08
< 8.6		6/06
< 5.9		6/06
< 5.9		6/06
< 6.1		6/06
< 8.6		6/06
< 6.1		6/06

****

CRPG, GIT-IWG AC-E Granite (cont)

****

W 87GOV 01 ATNA

CV = 1.5 ug/g

Result	± Uncer.	Date
< 150.		3/08
< 200.		6/06
< 240.		6/06
< 240.		6/06
< 200.		6/06
< 200.		6/06
< 200.		6/06

Yb 87GOV 01 ITNA

CV = 17.4 ug/g

Result	± Uncer.	Date
17.	2.	7/07
16.	2.	9/04
16.	2.	9/18
17.	2.	9/27
18.	2.	9/28
17.	2.	11/08

Zn 87GOV 01 ITNA

CV = 224. ug/g

Result	± Uncer.	Date
230.	30.	9/04
220.	30.	9/27
200.	30.	9/27
210.	30.	9/28
70.	10.	11/08

****

DOE Be on Filter Media Intercomparison: Round 1

****

Be 88DOE 01 FAAC

CV = 0.57 ± 0.03 ug/filter

Result	± Uncer.	Date
0.6	0.1	4/07

CV = 1.7 ± 0.1 ug/filter

Result	± Uncer.	Date
1.8	0.1	4/07

Be (cont)

CV = 2.27 ± 0.1 ug/filter

Result	± Uncer.	Date
2.3	0.1	4/07

CV = 2.83 ± 0.1 ug/filter

Result	± Uncer.	Date
2.8	0.1	4/07

CV = 3.96 ± 0.2 ug/filter

Result	± Uncer.	Date
4.0	0.2	4/07

CV = 4.53 ± 0.2 ug/filter

Result	± Uncer.	Date
4.6	0.2	4/07

CV = 5.1 ± 0.2 ug/filter

Result	± Uncer.	Date
5.1	0.2	4/07

CV = 5.66 ± 0.3 ug/filter

Result	± Uncer.	Date
6.0	0.3	4/07

CV = 7.36 ± 0.4 ug/filter

Result	± Uncer.	Date
7.6	0.3	4/07

CV = 8.5 ± 0.4 ug/filter

Result	± Uncer.	Date
9.0	0.4	4/07

CV = 9.06 ± 0.4 ug/filter

Result	± Uncer.	Date
9.3	0.4	4/07
9.9	0.4	4/07

****

DOE Be on Filter Media Intercomparison: Round 2

****

Be 88DOE 01 FAAC

CV = 1.0 ± 0.1 ug/filter

Result	± Uncer.	Date
1.0	0.1	6/27
1.0	0.1	6/27
1.0	0.1	6/27
0.9	0.1	6/27

CV = 3.0 ± 0.2 ug/filter

Result	± Uncer.	Date
2.9	0.2	6/27
2.9	0.2	6/27
2.9	0.2	6/27
2.9	0.2	6/27

CV = 9.0 ± 0.5 ug/filter

Result	± Uncer.	Date
8.7	0.4	6/27
8.7	0.4	6/27
8.7	0.4	6/27
8.7	0.4	6/27

****

DOE Be on Filter Media Intercomparison: Round 3

****

Be 88DOE 01 FAAC

CV = 1.5 ± 0.2 ug/filter

Result	± Uncer.	Date
1.5	0.1	8/08
1.5	0.1	8/08
1.4	0.1	8/08
1.5	0.1	8/08

CV = 5.5 ± 0.6 ug/filter

Result	± Uncer.	Date
5.5	0.2	8/08
5.5	0.2	8/08
5.6	0.2	8/08
5.5	0.2	8/08

CV = 10. ± 1. ug/filter

Result	± Uncer.	Date
10.3	0.4	8/08
10.2	0.4	8/08
10.1	0.4	8/08
10.3	0.4	8/08

TABLE C-V (cont)

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DOE Be on Filter Media
Intercomparison: Round 4

****

Be 88DOE 01 FAAC

CV = 0.6 ± 0.03 ug/filter

Result	± Uncer.	Date
0.3	0.1	12/19
0.6	0.1	12/19
0.4	0.1	12/19
0.7	0.1	12/19

CV = 4.0 ± 0.2 ug/filter

Result	± Uncer.	Date
4.0	0.4	12/19
3.8	0.4	12/19
4.1	0.4	12/19
4.4	0.4	12/19

CV = 7.5 ± 0.4 ug/filter

Result	± Uncer.	Date
7.2	0.8	12/19
7.6	0.8	12/19
7.5	0.8	12/19
7.9	0.8	12/19

CV = 10. ± 1. ug/filter

Result	± Uncer.	Date
11.	1.	12/19
11.	1.	12/19
10.	1.	12/19

****

EML Radionuclides in Soil
April 1980

****

Cs-137 80EML 01 G

CV = 0.72 ± 0.07 pCi/g

Result	± Uncer.	Date
0.80	0.15	5/18

****

EML Radionuclides in Soil
May 1988

****

Am-241 88EML 01 RAS

CV = 0.0067 ± 0.0003 pCi/g

Result	± Uncer.	Date
0.008	0.006	5/24
0.004	0.004	5/24

Cs-137 88EML 01 G

CV = 0.4 ± 0.016 pCi/g

Result	± Uncer.	Date
0.36	0.07	5/17
0.46	0.08	5/17
0.49	0.08	5/17

K-40 88EML 01 G

CV = 0.6 ± 0.07 pCi/g

Result	± Uncer.	Date
7.8	1.5	5/18
8.8	1.5	5/18
7.3	1.5	5/18

Pu-238 88EML 01 RAS

CV = Blank (pCi/g)

Result	± Uncer.	Date
0.0056	0.0015	4/26
0.0059	0.0015	4/26
0.0049	0.0015	4/26

Pu-239 88EML 01 RAS

CV = 0.41 ± 0.09 pCi/g

Result	± Uncer.	Date
0.094	0.007	4/26
0.047	0.004	4/26
0.047	0.004	4/26

Sr-90 88EML 01 PC

CV = 0.146 ± 0.006 pCi/g

Result	± Uncer.	Date
- 0.09	0.09	5/17
- 0.04	0.09	5/17
- 0.23	0.08	5/17

U 88EML 01 DNA

CV = 1.97 ± 0.06 ug/g

Result	± Uncer.	Date
2.1	0.2	4/18
2.0	0.2	4/18
1.9	0.2	4/18

****

EML Radionuclides in Soil
Nov. 1988

****

Am-241 88EML 01 RAS

CV = 0.27 ± 0.03 pCi/g

Result	± Uncer.	Date
0.24	0.01	12/31
0.22	0.01	12/31
0.26	0.01	12/31

Cs-137 88EML 01 G

CV = 0.91 ± 0.046 pCi/g

Result	± Uncer.	Date
0.74	0.1	10/25
0.72	0.1	10/25
0.83	0.1	10/25

Pu-239 88EML 01 RAS

CV = 0.38 ± 0.008 pCi/g

Result	± Uncer.	Date
0.37	0.02	11/22
0.37	0.02	11/22
0.38	0.02	11/22

U 88EML 01 G

CV = 2.29 ± 0.05 ug/g

Result	± Uncer.	Date
2.3	0.2	10/13
2.2	0.2	10/13
2.3	0.2	10/13

TABLE C-V (cont)

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EML Radionuclides
in Vegetation, Nov. 1984

****

Cs-137 84EML 01 G

CV = 158. ± 3. pCi/g

Result	± Uncer.	Date
150.	20.	2/04
150.	20.	2/04
150.	20.	2/05
150.	20.	2/18
150.	20.	2/18
150.	20.	2/18
160.	20.	2/19
150.	20.	2/19
150.	20.	10/26

****

EML Radionuclides
in Vegetation, May 1986

****

U 86EML 01 DNA

CV = 35. ± 14. ng/g

Result	± Uncer.	Date
40.	4.	10/26
36.	4.	10/26
40.	4.	10/26

****

EML Radionuclides
in Vegetation, May 1988

****

Am-241 88EML 01 RAS

CV = 0.046 ± 0.0018 pCi/g

Result	± Uncer.	Date
0.034	0.004	5/24
0.044	0.005	5/24
0.054	0.006	5/24

Cs-137 88EML 01 G

CV = 4.62 ± 0.18 pCi/g

Result	± Uncer.	Date
7.	1.	5/18
7.	1.	5/18
7.	1.	5/18

Pu-239 88EML 01 RAS

CV = 0.045 ± 0.0009 pCi/g

Result	± Uncer.	Date
0.044	0.005	5/23
0.062	0.005	5/23
0.058	0.006	5/23

Sr-90 88EML 01 PC

CV = 10.9 ± 0.9 pCi/g

Result	± Uncer.	Date
6.4	0.2	5/17
5.8	0.2	5/17
5.1	0.2	5/17

U 88EML 01 DNA

CV = 0.104 ± 0.018 ug/g

Result	± Uncer.	Date
0.048	0.005	4/22
0.084	0.009	4/22
0.130	0.015	4/22

****

EML Radionuclides
in Vegetation, Nov. 1988

****

Am-241 88EML 01 RAS

CV = 0.015 ± 0.002 pCi/g

Result	± Uncer.	Date
0.013	0.002	12/05
0.014	0.002	12/05
0.015	0.002	12/05

Cs-137 88EML 01 G

CV = 1.52 ± 0.02 pCi/g

Result	± Uncer.	Date
1.6	0.2	10/26
1.6	0.2	10/26
1.6	0.3	10/26

Pu-239 88EML 01 RAS

CV = 0.021 ± 0.002 pCi/g

Result	B± Uncer.	Date
0.018	0.002	11/21
0.016	0.002	11/21
0.018	0.002	11/21

U DNA

CV = No Data Available (pCi/g)

Result	± Uncer.	Date
0.077	0.007	10/26
0.059	0.006	10/26
0.071	0.007	10/26

****

EML Radionuclides in Water
Apr. 1980

****

Cs-137 80EML 01 G

CV = 1020. ± 50. pCi/L

Result	± Uncer.	Date
1100.	200.	1/28
1100.	200.	1/28
1100.	200.	1/28
1100.	200.	1/28
1100.	200.	1/28
1100.	200.	1/28
1100.	200.	1/29
1100.	200.	1/29
1100.	200.	1/29
1100.	200.	1/29
900.	200.	4/21
1100.	200.	4/21
1200.	200.	4/21
1100.	200.	4/21
1100.	200.	4/21
1000.	200.	4/21
1000.	200.	5/05
900.	200.	5/05
1200.	200.	5/05
1200.	200.	5/05
1000.	200.	5/05
1200.	200.	5/05
1000.	200.	5/05
1200.	200.	5/05
1100.	200.	5/05
1100.	200.	5/05
1100.	200.	5/18
1000.	200.	5/18
1100.	200.	6/01
1100.	200.	6/01
1100.	200.	6/28
800.	200.	7/12
1200.	200.	10/24
1000.	200.	10/24
1100.	200.	10/24
1000.	200.	10/24
1200.	200.	10/24
1100.	200.	10/24
1100.	200.	10/24
1000.	200.	10/25
1100.	200.	10/25
900.	200.	11/17
1100.	200.	11/17
1100.	200.	11/17

TABLE C-V (cont)

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EML Radionuclides in Water
May 1988

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Am-241 88EML 01 RAS

CV = 4.1 ± 0.2 pCi/L

Result	± Uncer.	Date
3.8	0.2	5/24

Co-57 88EML 01 G

CV = 2.05 ± 0.18 pCi/mL

Result	± Uncer.	Date
2.0	0.3	5/18
2.0	0.3	5/18
1.9	0.3	5/18

Co-60 88EML 01 G

CV = 2.03 ± 0.18 pCi/mL

Result	± Uncer.	Date
2.0	0.3	5/18
2.0	0.3	5/18
2.0	0.3	5/18

Cs-134 88EML 01 G

CV = 3.56 ± 0.28 pCi/mL

Result	± Uncer.	Date
3.4	0.5	5/18
3.5	0.5	5/18
3.4	0.5	5/18

Cs-137 88EML 01 G

CV = 1.84 ± 0.09 pCi/mL

Result	± Uncer.	Date
1.8	0.3	5/18
1.7	0.3	5/18
1.8	0.3	5/18

H-3 88EML 01 LS

CV = 20.7 ± 0.6 pCi/mL

Result	± Uncer.	Date
19.	2.	5/31
19.	2.	5/31
19.	2.	5/31

Mn-54 88EML 01 G

CV = 6.8 ± 0.34 pCi/mL

Result	± Uncer.	Date
7.	1.	5/18
7.	1.	5/18
7.	1.	5/18

Pu-238 88EML 01 RAS

CV = Blank (pCi/L)

Result	± Uncer.	Date
0.09	0.04	4/26
0.36	0.09	4/26
0.13	0.02	4/26
0.02	0.03	4/26

Pu-239 88EML 01 RAS

CV = 24.3 ± 2. pCi/L

Result	± Uncer.	Date
17.	1.	4/26
16.	1.	4/26
15.	1.	4/26
17.	1.	4/26

Sr-90 88EML 01 PC

CV = 530. ± 5. pCi/L

Result	± Uncer.	Date
450.	8.	5/17
452.	6.	5/17
450.	5.	5/17

U 88EML 01 ICPMS

CV = 8.5 ± 0.4 pCi/L

Result	± Uncer.	Date
10.	1.	3/28
10.	1.	3/28
10.	1.	3/28

****

EML Radionuclides in Water
Nov. 1988

****

Am-241 88EML 01 RAS

CV = 16. ± 2. pCi/L

Result	± Uncer.	Date
14.	1.	12/05
14.	1.	12/05
13.	1.	12/05

Co-57 88EML 01 G

CV = 3360. ± 30. pCi/L

Result	± Uncer.	Date
3800.	600.	10/27
3800.	600.	10/27
3800.	600.	10/27

Co-60 88EML 01 G

CV = 3680. ± 70. pCi/L

Result	± Uncer.	Date
4000.	600.	10/27
4000.	600.	10/27
3900.	600.	10/27

Cs-134 88EML 01 G

CV = 970. ± 39. pCi/L

Result	± Uncer.	Date
1200.	200.	10/27
1200.	200.	10/27
1200.	200.	10/27

Cs-137 88EML 01 G

CV = 1950. ± 40. pCi/L

Result	± Uncer.	Date
2100.	300.	10/27
2000.	300.	10/27
2100.	300.	10/27

H-3 88EML 01 LS

CV = 10600. ± 400. pCi/L

Result	± Uncer.	Date
11000.	1000.	10/17
11000.	1000.	10/17
10000.	1000.	10/17

Mn-54 88EML 01 G

CV = 1520. ± 60. pCi/L

Result	± Uncer.	Date
1600.	200.	10/27
1600.	200.	10/27
1600.	200.	10/27

TABLE C-V (cont)

****

EML Radionuclides in Water
Nov. 1988 (cont)

****

Pu-239 88EML 01 RAS

CV = 5.4 ± 0.4 pCi/L

Result	± Uncer.	Date
5.0	0.4	12/05
4.8	0.4	12/05
4.5	0.3	12/05

U 88EML 01 ICPMS

CV = 12.3 ± 0.4 ug/L

Result	± Uncer.	Date
14.	1.	10/28
14.	1.	10/28
14.	1.	10/28

****

EML Radionuclides
on Air Filter, May 1988

****

Am-241 88EML 01 RAS

CV = 3.02 ± 0.21 pCi/filter

Result	± Uncer.	Date
2.5	0.2	5/24
3.2	0.2	5/24

Be-7 88EML 01 G

CV = 4730. ± 95. pCi/filter

Result	± Uncer.	Date
4400.	700.	5/18
4600.	700.	5/18

Co-57 88EML 01 G

CV = 162. ± 5. pCi/filter

Result	± Uncer.	Date
180.	30.	5/18
180.	30.	5/18

Co-60 88EML 01 G

CV = 282. ± 11. pCi/filter

Result	± Uncer.	Date
380.	60.	5/18
360.	60.	5/18

Cs-134 88EML 01 G

CV = 381. ± 11. pCi/filter

Result	± Uncer.	Date
410.	60.	5/18
410.	60.	5/18

Cs-137 88EML 01 G

CV = 211. ± 8. pCi/filter

Result	± Uncer.	Date
220.	40.	5/18
210.	30.	5/18

Mn-54 88EML 01 G

CV = 363. ± 11. pCi/filter

Result	± Uncer.	Date
370.	60.	5/18
360.	60.	5/18

Pu-238 88EML 01 RAS

CV = Blank (pCi/filter)

Result	± Uncer.	Date
0.01	0.01	4/26
< 0.02		4/26

Pu-239 88EML 01 RAS

CV = 2.52 ± 0.08 pCi/filter

Result	± Uncer.	Date
2.4	0.2	4/26
2.4	0.2	4/26

Sr-90 88EML 01 PC

CV = 4.91 ± 0.39 pCi/filter

Result	± Uncer.	Date
2.4	0.7	5/17
2.8	0.7	5/17

U 88EML 01 ICPMS

CV = 7.32 ± 0.29 ug/filter

Result	± Uncer.	Date
100.	10.	3/22
100.	10.	3/22
90.	9.	3/22
10.	1.	12/31
10.	1.	12/31
9.	1.	12/31

The first three results were miscalculated; the new values are shown below the old values and show better agreement with the certified values.

****

EML Radionuclides
on Air Filter, Nov. 1988

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Am-241 88EML 01 RAS

CV = 5.78 ± 0.29 pCi/filter

Result	± Uncer.	Date
5.7	0.2	11/10
5.7	0.2	11/10

Be-7 88EML 01 G

CV = 2160. ± 90. pCi/filter

Result	± Uncer.	Date
1900.	300.	11/08
1800.	300.	11/08
2100.	300.	11/08

Co-57 88EML 01 G

CV = 394. ± 8. pCi/filter

Result	± Uncer.	Date
380.	60.	11/08
360.	60.	11/08
380.	60.	11/08

Co-60 88EML 01 G

CV = 374. ± 8. pCi/filter

Result	± Uncer.	Date
470.	70.	11/08
510.	80.	11/08
510.	80	11/08

****

EML Radionuclides on
Air Filter, Nov. 1988 (cont)

****

Cs-134 88EML 01 G

CV = 191. ± 4. pCi/filter

Result	± Uncer.	Date
180.	30.	11/08
200.	30.	11/08
220.	40.	11/08

Cs-137 88EML 01 G

CV = 245. ± 5. pCi/filter

Result	± Uncer.	Date
220.	40.	11/08
230.	40.	11/08
240.	40.	11/08

Mn-54 88EML 01 G

CV = 185. ± 4. pCi/filter

Result	± Uncer.	Date
190.	30.	11/08
210.	30.	11/08
170.	30.	11/08

U 88EML 01 ICPMS

CV = 7.1 ± 0.14 ug/filter

Result	± Uncer.	Date
6.8	0.7	10/28
6.6	0.7	10/28
6.6	0.7	10/28
6.8	0.7	10/28

****

EPA Air Filter Intercomparison
Apr. 1987

****

Alpha 87EPA 01 PC

CV = 14. ± 5. pCi/filter

Result	± Uncer.	Date
13.	3.	1/13
12.	3.	1/13
12.	3.	1/13
12.	3.	1/29
12.	3.	1/29
12.	3.	1/29
12.	3.	4/11

Alpha (cont)

12.	3.	4/11
13.	3.	4/26
12.	3.	4/26
13.	3.	4/26
13.	3.	6/16
12.	3.	6/16
13.	3.	6/16

Beta 87EPA 01 PC

CV = 43. ± 5. pCi/filter

Result	± Uncer.	Date
41.	5.	1/13
41.	5.	1/13
41.	5.	1/13
41.	5.	1/29
41.	5.	1/29
40.	5.	1/29
40.	5.	4/11
43.	6.	4/11
42.	5.	4/11
40.	5.	4/26
42.	5.	4/26
41.	5.	4/26
40.	5.	6/16
39.	5.	6/16
40.	5.	6/16

****

EPA Air Filter Intercomparison
Aug. 1987

****

Alpha 87EPA 01 PC

CV = 10. ± 5. pCi/filter

Result	± Uncer.	Date
9.	2.	4/12
10.	2.	4/12
9.	2.	4/12
10.	2.	4/12
9.	2.	8/04
9.	1.	8/04
9.	2.	8/04

Beta 87EPA 01 PC

CV = 30. ± 5. pCi/filter

Result	± Uncer.	Date
26.	3.	4/12
27.	3.	4/12
27.	4.	4/12
27.	3.	8/04
27.	4.	8/04
26.	3.	8/04

****

EPA Air Filter Intercomparison
Apr. 1988

****

Alpha 88EPA 01 PC

CV = 20. ± 5. pCi/filter

Result	± Uncer.	Date
17.	4.	4/12
19.	4.	4/12
18.	4.	4/12
18.	4.	8/30
19.	4.	8/30
18.	4.	8/30
18.	4.	9/29
18.	4.	9/29
19.	4.	9/29
18.	4.	10/21
18.	4.	10/21
19.	4.	10/21

Beta 88EPA 01 PC

CV = 50. ± 5. pCi/filter

Result	± Uncer.	Date
46.	6.	4/12
47.	6.	4/12
45.	6.	4/12
45.	6.	8/30
44.	6.	8/30
46.	6.	8/30
45.	6.	9/29
45.	6.	9/29
43.	6.	9/29
45.	6.	10/21
44.	6.	10/21
41.	5.	10/21

Cs-137 88EPA 01 G

CV = 16. ± 5. pCi/filter

Result	± Uncer.	Date
17.	3.	10/25
18.	3.	10/25

TABLE C-V (cont)

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EPA Air Filter Intercomparison
Aug. 1988

****

Alpha 88EPA 01 PC

CV = 8. ± 5. pCi/filter

Result	± Uncer.	Date
7.	2.	9/29
7.	2.	9/29
7.	2.	9/29

Beta 88EPA 01 PC

CV = 29. ± 5. pCi/filter

Result	± Uncer.	Date
26.	3.	9/29
26.	3.	9/29
26.	3.	9/29

Cs-137 88EPA 01 G

CV = 12. ± 5. pCi/filter

Result	± Uncer.	Date
11.	2.	10/25
11.	2.	10/25
12.	2.	10/25

****

EPA Alpha Performance
Evaluation in Water, Apr. 1988

****

Alpha 88EPA 01 PC

CV = 46. ± 11. pCi/L

Result	± Uncer.	Date
70.	10.	5/18
70.	10.	5/18
70.	10.	5/18

The alpha and beta values appear to be switched, perhaps due to an interchange of the two samples in the laboratory during testing.

Ra-226 88EPA 01 PC

CV = 6.4 ± 0.96 pCi/L

Result	± Uncer.	Date
6.1	0.6	6/07
6.1	0.6	6/07
6.2	0.6	6/07
6.8	0.7	8/09

Ra-226 88EPA 01 RAS

CV = 6.4 ± 0.96 pCi/L

Result	± Uncer.	Date
6.5	0.6	8/09
6.6	0.7	12/08
5.9	0.6	12/08
6.6	0.7	12/14

U 88EPA 01 ICPMS

CV = 6. ± 6. pCi/L

Result	± Uncer.	Date
7.7	0.8	5/02
7.5	0.8	5/02
7.3	0.7	5/02

****

EPA Alpha Performance
Evaluation in Water, Oct. 1988

****

Alpha 88EPA 01 PC

CV = 41. ± 10. pCi/L

Result	± Uncer.	Date
50.	10.	11/17
40.	9.	11/17
60.	10.	11/17

Ra-226 88EPA 01 RAS

CV = 5. ± 0.8 pCi/L

Result	± Uncer.	Date
5.4	0.5	12/14
5.2	0.5	12/14
5.6	0.6	12/14

U 88EPA 01 ICPMS

CV = 5. ± 6. pCi/L

Result	± Uncer.	Date
9.6	1.	12/06
9.8	1.	12/06
9.5	1.	12/06

****

EPA Beta Performance
Evaluation in Water, Apr. 1988

****

Beta 88EPA 01 PC

CV = 57. ± 5. pCi/L

Result	± Uncer.	Date
44.	4.	5/18
47.	5.	5/18
41.	4.	5/18

The alpha and beta values appear to be switched, perhaps due to an interchange of the two samples in the laboratory during testing.

Co-60 88EPA 01 G

CV = 50. ± 5. pCi/L

Result	± Uncer.	Date
60.	15.	5/17
60.	15.	5/17
50.	15.	5/17

Cs-134 88EPA 01 G

CV = 7. ± 5. pCi/L

Result	± Uncer.	Date
14.	10.	5/17
3.	10.	5/17
10.	10.	5/17

Cs-137 88EPA 01 G

CV = 7. ± 5. pCi/L

Result	± Uncer.	Date
20.	9.	5/17
20.	9.	5/17
30.	10.	5/17

Sr-90 88EPA 01 RAS

CV = 5. ± 1.5 pCi/L

Result	± Uncer.	Date
3.7	0.4	6/08
3.3	0.4	6/08
4.3	0.4	6/08

TABLE C-V (cont)

****

EPA Beta Performance Evaluation in Water, Oct. 1988

****

Beta 88EPA 01 PC

CV = 54. ± 5. pCi/L

Result	± Uncer.	Date
43.	4.	11/17
47.	5.	11/17
48.	5.	11/17

Cs-134 88EPA 01 G

CV = 15. ± 5. pCi/L

Result	± Uncer.	Date
12.	9.	11/30
9.	9.	11/30

Cs-137 88EPA 01 G

CV = 15. ± 5. pCi/L

Result	± Uncer.	Date
20.	9.	11/30
25.	9.	11/30
25.	10.	11/30

****

EPA Gross Alpha/Beta in Water Jan. 1988

****

Alpha 88EPA 01 PC

CV = 4. ± 5. pCi/L

Result	± Uncer.	Date
7.	2.	2/16
5.	1.	2/16
7.	2.	2/16

Beta 88EPA 01 PC

CV = 8. ± 5. pCi/L

Result	± Uncer.	Date
9.	1.	2/16
11.	1.	2/16
10.	1.	2/16

****

EPA Gross Alpha/Beta in Water Mar. 1988

****

Alpha 88EPA 01 PC

CV = 6. ± 5. pCi/L

Result	± Uncer.	Date
6.	1.	4/11
8.	2.	4/11
8.	2.	4/11

Beta 88EPA 01 PC

CV = 13. ± 5. pCi/L

Result	± Uncer.	Date
15.	2.	4/11
12.	1.	4/11
14.	1.	4/11

****

EPA Gross Alpha/Beta in Water May 1988

****

Alpha 88EPA 01 PC

CV = 11. ± 5. pCi/L

Result	± Uncer.	Date
12.	3.	6/10
13.	3.	6/10
13.	3.	6/10
12.	3.	6/10
8.	2.	6/10
10.	2.	6/10

Beta 88EPA 01 PC

CV = 11. ± 5. pCi/L

Result	± Uncer.	Date
11.	1.	6/10
14.	1.	6/10
12.	1.	6/10
11.	1.	8/11
10.	1.	8/11
11.	1.	8/11
9.	1.	10/04
12.	1.	10/04
9.	1.	10/04
9.	1.	10/06
9.	1.	10/06
11.	1.	10/06
9.	1.	10/18
9.	1.	10/18

Beta (cont)

8.	1.	10/18
11.	1.	11/17
10.	1.	11/17
9.	1.	11/17
10.	1.	11/23
10.	1.	11/23
9.	1.	11/23
9.	1.	12/22
9.	1.	12/22
10.	1.	12/22

****

EPA Gross Alpha/Beta in Water July 1988

****

Alpha 88EPA 01 PC

CV = 15. ± 5. pCi/L

Result	± Uncer.	Date
13.	3.	8/11
17.	4.	8/11
14.	3.	8/11

Beta 88EPA 01 PC

CV = 4. ± 5. pCi/L

Result	± Uncer.	Date
4.4	0.6	8/11
4.2	0.6	8/11
3.8	0.5	8/11

****

EPA Gross Alpha/Beta in Water Sept. 1988

****

Alpha 88EPA 01 PC

CV = 8. ± 5. pCi/L

Result	± Uncer.	Date
10.	2.	10/06
10.	2.	10/06
11.	3.	10/06

Beta 88EPA 01 PC

CV = 11. ± 5. pCi/L

Result	± Uncer.	Date
10.	1.	10/06
10.	1.	10/06
10.	1.	10/06

TABLE C-V (cont)

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EPA Gross Alpha/Beta in Water
Nov. 1988

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Alpha 88EPA 01 PC

CV = 9. ± 5. pCi/L

Result	± Uncer.	Date
10.	2.	12/22
9.	2.	12/22
10.	2.	12/22

Beta 88EPA 01 PC

CV = 9. ± 5. pCi/L

Result	± Uncer.	Date
7.1	0.8	12/22
8.5	1.0	12/22
7.0	0.8	12/22

****

EPA Gross Alpha/Beta in Water

****

Alpha 88EPA 01 PC

CV = 5. ± 5. pCi/L

Result	± Uncer.	Date
6.	1.	1/27
7.	2.	1/27
5.	1.	1/27
8.	2.	2/16
6.	1.	2/16
7.	2.	2/16

CV = 7. ± 5. pCi/L

Result	± Uncer.	Date
7.	2.	1/11
6.	2.	1/11
6.	2.	1/11
6.	2.	1/11
7.	2.	1/11
8.	2.	1/11
6.	1.	3/24
7.	2.	4/19
6.	1.	4/19
6.	1.	4/19

CV = 11. ± 5. pCi/L

Result	± Uncer.	Date
14.	3.	1/11
12.	3.	1/11
14.	3.	1/11
12.	3.	1/11

Alpha (cont)

13.	3.	1/11
11.	2.	1/11
13.	3.	1/27
12.	3.	1/27
13.	3.	1/27
12.	3.	2/16
13.	3.	2/16
14.	3.	2/16
15.	3.	2/22
12.	3.	2/22
14.	3.	2/22
11.	2.	3/24
10.	2.	3/24
14.	3.	3/24
16.	3.	4/11
10.	2.	4/11
13.	3.	4/11
14.	3.	5/18
11.	2.	5/18
12.	3.	5/18
15.	3.	6/15
11.	2.	6/15
10.	2.	6/15
12.	3.	7/27
14.	3.	7/27
10.	2.	7/27
12.	3.	8/03
10.	2.	8/03
15.	3.	8/03
11.	2.	8/11
7.	2.	8/11
9.	2.	8/11
8.	2.	10/04
8.	2.	10/04
9.	2.	10/04
8.	2.	10/06
9.	2.	10/06
10.	1.	10/06
10.	2.	10/06
9.	2.	10/06
9.	2.	10/06
8.	2.	10/18
9.	2.	10/18
8.	2.	10/18
8.	2.	11/17
10.	2.	11/17
9.	2.	11/17
9.	2.	11/23
9.	2.	11/23
11.	2.	11/23
10.	2.	12/22
10.	2.	12/22
13.	3.	12/22

Beta 88EPA 01 PC

CV = 5. ± 5. pCi/L

Result	± Uncer.	Date
4.7	0.6	1/27
7.0	0.8	1/27
5.4	0.7	1/27
7.0	0.8	2/16
6.3	0.8	2/16
5.8	0.7	2/16

Beta (cont)

CV = 10. ± 5. pCi/L

Result	± Uncer.	Date
11.	1.	1/11
11.	1.	1/11
9.	1.	1/11
10.	1.	1/11
9.	1.	1/11
10.	1.	1/11
9.	1.	1/27
10.	1.	1/27
9.	1.	1/27
10.	1.	2/16
10.	1.	2/16
9.	1.	2/16
10.	1.	2/22
9.	1.	2/22
9.	1.	2/22
11.	1.	3/24
9.	1.	3/24
9.	1.	3/24
9.	1.	4/11
10.	1.	4/11
9.	1.	4/11
11.	1.	5/18
10.	1.	5/18
9.	1.	5/18
11.	1.	6/10
9.	1.	6/10
9.	1.	6/10
11.	1.	6/15
9.	1.	6/15
10.	1.	6/15
10.	5.	7/27
9.	1.	7/27
9.	1.	7/27
10.	1.	8/03
9.	1.	8/03
9.	1.	8/03
11.	1.	10/06
11.	1.	10/06
11.	1.	10/06

CV = 19. ± 5. pCi/L

Result	± Uncer.	Date
18.	2.	1/11
18.	2.	1/11
17.	2.	1/11
18.	2.	1/11
18.	2.	1/11
18.	2.	1/11
19.	5.	3/24
17.	2.	4/19
19.	2.	4/19
17.	2.	4/19

TABLE C-V (cont)

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EPA Cyanide in Water

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CN 82EPA 01 ACOLR

CV = 224. ± 29. ug/L

Result	± Uncer.	Date
180.	20.	1/12
180.	20.	1/12
170.	20.	1/12
180.	20.	1/12
170.	20.	1/28
180.	20.	1/28
190.	20.	2/25
180.	20.	2/25
170.	20.	2/25
180.	20.	3/02
180.	20.	3/02
180.	20.	3/09
180.	20.	3/09
170.	20.	3/22
170.	20.	3/22
190.	20.	4/06
190.	20.	4/06
190.	20.	4/14
190.	20.	4/14
190.	20.	4/14
190.	20.	4/27
190.	20.	4/27
200.	20.	5/27
200.	20.	5/27
200.	20.	6/02
180.	20.	6/13
180.	20.	6/13
190.	20.	6/27
190.	20.	6/27
190.	20.	7/21
180.	20.	7/21
180.	20.	7/22
190.	20.	8/03
190.	20.	8/03
200.	20.	8/17
190.	20.	8/17
160.	20.	9/07
160.	20.	9/07
190.	20.	9/22
190.	20.	9/22
180.	20.	10/06
210.	20.	10/06
180.	20.	10/06
190.	20.	10/06
190.	20.	10/13
180.	20.	10/26
190.	20.	10/26
190.	20.	11/29
200.	20.	11/29
190.	20.	12/21
190.	20.	12/21

CV = 500. ± 79. ug/L

Result	± Uncer.	Date
420.	40.	1/28
420.	40.	1/28
420.	40.	1/28

CN (cont)

440.	40.	1/28
450.	50.	2/25
460.	50.	2/25
510.	50.	2/25
470.	50.	3/09
470.	50.	3/09
490.	50.	3/09
470.	50.	3/09
470.	50.	3/09
450.	50.	3/18
450.	50.	3/18
450.	40.	3/18
450.	40.	3/22
450.	40.	3/22
450.	40.	3/22
470.	50.	4/06
460.	50.	4/06
460.	50.	4/14
460.	50.	4/14
460.	50.	4/14
470.	50.	4/27
470.	50.	4/27
470.	50.	5/27
480.	50.	5/27
480.	50.	6/02
450.	40.	6/13
440.	40.	6/13
470.	50.	6/27
470.	50.	6/27
470.	50.	7/01
460.	50.	7/21
470.	50.	7/21
460.	50.	7/22
450.	50.	8/03
410.	40.	8/03
450.	50.	8/03
460.	50.	8/17
460.	50.	8/17
490.	50.	8/17
450.	40.	9/07
440.	40.	9/07
450.	40.	9/09
510.	50.	9/22
470.	50.	9/22
510.	50.	10/13
440.	40.	10/26
440.	40.	10/26
470.	50.	11/29
480.	50.	11/29
470.	50.	12/21
470.	50.	12/21

CN 82EPA 01 COLOR

CV = 224. ± 29. ug/L

Result	± Uncer.	Date
180.	20.	3/09

CV = 500. ± 79. ug/L

Result	± Uncer.	Date
490.	50.	3/09

CN 86EPA 01 FIA

CV = 500. ± 79. ug/L

Result	± Uncer.	Date
460.	50.	7/25

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EPA Demand Analyses in Water

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Chemical Oxygen Demand
87EPA 02 TITR

CV = 104.5 ± 17. mg/L

Result	± Uncer.	Date
110.	20.	10/06
110.	20.	10/06
100.	20.	10/21
100.	20.	10/21
100.	20.	11/01
100.	20.	11/01
90.	20.	11/16
90.	20.	11/16
90.	20.	12/02
90.	20.	12/02
80.	20.	12/09
90.	20.	12/22
90.	20.	12/22

CV = 218. ± 18. mg/L

Result	± Uncer.	Date
230.	50.	1/28
230.	50.	1/28
230.	50.	1/29
230.	50.	2/12
230.	50.	2/12
230.	40.	3/01
210.	40.	3/01
230.	40.	3/02
220.	40.	3/24
220.	40.	3/24
230.	50.	4/06
230.	50.	4/06
240.	50.	4/14
230.	50.	4/22
220.	40.	4/29
220.	40.	5/20
220.	40.	5/20
230.	50.	5/27
230.	50.	5/27
240.	50.	7/11
230.	50.	7/11
240.	50.	7/11
230.	50.	7/29
230.	50.	7/29
230.	40.	8/17
230.	40.	8/17
210.	40.	9/06
210.	40.	9/06
210.	40.	9/06
210.	40.	9/06

****

EPA Demand Analyses in Water (cont)

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Chemical Oxygen Demand (cont)

220.	40.	9/07
210.	40.	9/16
210.	40.	9/16
230.	20.	9/30

****

EPA Drinking Water Study 22

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Ag 88EPA 02 ETVAA

CV = 5.38 ± 1.6 ug/L

Result	± Uncer.	Date
5.4	0.5	5/12

As 88EPA 02 ETVAA

CV = 5.33 ± 2. ug/L

Result	± Uncer.	Date
5.5	0.6	5/05
5.5	0.6	6/23

CV = 28.4 ± 5. ug/L

Result	± Uncer.	Date
29.	3.	5/12

Ba 88EPA 02 ETVAA

CV = 567. ± 74. ug/L

Result	± Uncer.	Date
520.	50.	6/23

Ba 88EPA 02 ICPMS

CV = 86.7 ± 19. ug/L

Result	± Uncer.	Date
88.	9.	5/01

Cd 88EPA 02 ETVAA

CV = 3.36 ± 0.8 ug/L

Result	± Uncer.	Date
3.9	0.4	5/12

Cd (cont)

CV = 42. ± 7. ug/L

Result	± Uncer.	Date
40.	4.	5/12

Cr 88EPA 02 ETVAA

CV = 39.4 ± 6. ug/L

Result	± Uncer.	Date
37.	7.	4/19

CV = 118. ± 15. ug/L

Result	± Uncer.	Date
120.	10.	5/12

Cu 88EPA 02 ETVAA

CV = 22. ± 4. ug/L

Result	± Uncer.	Date
22.	2.	6/23

CV = 1320. ± 90. ug/L

Result	± Uncer.	Date
1300.	100.	4/19

F 88EPA 02 IC

CV = 0.701 ± 0.07 mg/L

Result	± Uncer.	Date
0.8	0.1	9/21

CV = 1.46 ± 0.15 mg/L

Result	± Uncer.	Date
1.5	0.2	9/21

F 88EPA 02 ISE

CV = 0.701 ± 0.07 mg/L

Result	± Uncer.	Date
0.7	0.1	5/03
0.8	0.2	10/31
0.8	0.2	10/31

CV = 1.46 ± 0.15 mg/L

Result	± Uncer.	Date
1.4	0.2	5/03

Hg 88EPA 02 CVAA

CV = 1. ± 0.3 ug/L

Result	± Uncer.	Date
0.9	0.2	5/02

CV = 7.5 ± 1.8 ug/L

Result	± Uncer.	Date
7.	1.	5/02

NO2-N 88EPA 02 IC

CV = 0.104 ± 0.02 mg/L

Result	± Uncer.	Date
0.11	0.02	5/03
0.11	0.02	9/21
0.10	0.05	10/31
0.10	0.05	10/31

CV = 1. ± 0.1 mg/L

Result	± Uncer.	Date
1.0	0.1	5/03
1.0	0.1	9/21

NO3-N 88EPA 02 FIA

CV = 1.5 ± 0.2 mg/L

Result	± Uncer.	Date
1.5	0.2	5/03

CV = 6.02 ± 1.2 mg/L

Result	± Uncer.	Date
6.1	0.6	5/03

NO3-N 88EPA 02 IC

CV = 1.5 ± 0.2 mg/L

Result	± Uncer.	Date
1.5	0.2	9/21
1.7	0.2	10/31
1.6	0.2	10/31
1.6	0.2	12/21
1.7	0.2	12/21
1.7	0.2	12/21

CV = 6.02 ± 1.2 mg/L

Result	± Uncer.	Date
6.2	0.6	9/21
6.6	0.7	12/21
6.1	0.6	12/21

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EPA Drinking Water Study 22
(cont)

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Pb 88EPA 02 ETVAA

CV = 5.28 ± 2. ug/L

Result	± Uncer.	Date
4.5	0.5	5/12

CV = 66. ± 10. ug/L

Result	± Uncer.	Date
64.	6.	5/12

Se 88EPA 02 ETVAA

CV = 26.6 ± 6. ug/L

Result	± Uncer.	Date
26.	3.	5/05

CV = 76. ± 16. ug/L

Result	± Uncer.	Date
76.	8.	5/12

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EPA Drinking Water Study 23

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Ag 88EPA 02 ICPMS

CV = 3.4 ± 1.2 ug/L

Result	± Uncer.	Date
1.4	1.	11/04
1.7	1.	11/04
1.4	1.	11/04
1.8	1.	11/04
1.8	1.	11/04
1.7	1.	11/04
3.7	1.	12/22
3.7	1.	12/22
4.2	1.	12/22
3.2	1.	12/22
4.2	1.	12/22
3.2	1.	12/22
4.2	1.	12/22

CV = 26.9 ± 3.9 ug/L

Result	± Uncer.	Date
26.	3.	11/04
29.	3.	11/04
28.	3.	11/04
26.	3.	11/04
29.	3.	11/04

Ag (cont)

28.	3.	11/04
26.	3.	11/04
23.	5.	11/14
27.	5.	11/14
26.	5.	11/14
23.	5.	11/14
27.	5.	11/14
26.	5.	11/14

As 88EPA 02 ICPMS

CV = 3.56 ± 1.06 ug/L

Result	± Uncer.	Date
< 1.		11/04
< 1.		11/04
< 1.		11/04
2.	1.	12/22
2.	1.	12/22
2.	1.	12/22
2.	1.	12/22
2.	1.	12/22
2.	1.	12/22

CV = 60.5 ± 9.5 ug/L

Result	± Uncer.	Date
68.	7.	11/04
64.	6.	11/04
64.	6.	11/04
68.	7.	11/04
68.	7.	11/04
64.	6.	11/04
60.	6.	11/14
60.	6.	11/14
59.	6.	11/14
59.	6.	11/14
59.	6.	11/14
60.	6.	11/14
60.	6.	11/14

Ba 88EPA 02 ICPMS

CV = 53.3 ± 12.2 ug/L

Result	± Uncer.	Date
54.	5.	11/04
59.	6.	11/04
59.	6.	11/04
57.	6.	11/04
57.	6.	11/04
54.	5.	11/04
50.	5.	12/22
52.	5.	12/22
56.	5.	12/22
50.	5.	12/22
56.	6.	12/22
50.	5.	12/22
56.	5.	12/22
56.	6.	12/22
52.	5.	12/22
53.	5.	12/22
53.	5.	12/22
52.	5.	12/22
53.	5.	12/22

CV = 120. ± 19. ug/L

Result	± Uncer.	Date
140.	10.	11/04
150.	20.	11/04
130.	10.	11/04
140.	10.	11/04
150.	20.	11/04
140.	10.	11/04
140.	10.	11/04
130.	10.	11/04
110.	10.	11/14
120.	10.	11/14
110.	10.	11/14
120.	10.	11/14
120.	10.	11/14
110.	10.	11/14
110.	10.	11/14
120.	10.	11/14
120.	10.	11/14
120.	10.	11/14
110.	10.	11/14

Cd 88EPA 02 ICPMS

CV = 6.05 ± 1.1 ug/L

Result	± Uncer.	Date
3.	1.	11/04
2.	1.	11/04
3.	1.	11/04
2.	1.	11/04
3.	1.	11/04
3.	1.	11/04
4.	5.	11/14
4.	5.	11/14
3.	5.	11/14
3.	5.	11/14
3.	5.	11/14
4.	5.	11/14
4.	5.	11/14
3.	5.	11/14
3.	5.	11/14
4.	5.	11/14
4.	5.	11/14

CV = 33.6 ± 6.7 ug/L

Result	± Uncer.	Date
34.	3.	11/04
34.	3.	11/04
33.	3.	11/04
33.	3.	11/04
33.	3.	11/04
33.	3.	11/04
32.	3.	12/22
36.	4.	12/22
37.	4.	12/22
33.	3.	12/22
33.	3.	12/22
35.	4.	12/22
38.	4.	12/22
32.	3.	12/22
33.	3.	12/22
33.	3.	12/22
38.	4.	12/22
35.	4.	12/22

TABLE C-V (cont)

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EPA Drinking Water Study 23
(cont)

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Cd (cont)

33.	3.	12/22
36.	4.	12/22
37.	4.	12/22

Cr 88EPA 02 ICPMS

CV = 19.7 ± 4.4 ug/L

Result	± Uncer.	Date
17.	2.	11/04
20.	2.	11/04
17.	2.	11/04
16.	2.	11/04
16.	2.	11/04
20.	2.	11/04
20.	2.	11/04
16.	2.	11/04
15.	5.	11/14
15.	5.	11/14
15.	5.	11/14
15.	5.	11/14
15.	5.	11/14
15.	5.	11/14

CV = 53.2 ± 7.3 ug/L

Result	± Uncer.	Date
54.	5.	11/04
55.	6.	11/04
55.	6.	11/04
54.	5.	11/04
53.	5.	11/04
52.	5.	11/04
52.	5.	11/04
53.	5.	11/04
50.	5.	12/22
52.	5.	12/22
47.	5.	12/22
50.	5.	12/22
47.	5.	12/22
52.	5.	12/22
46.	5.	12/22
46.	5.	12/22

Cu 88EPA 02 ICPMS

CV = 44. ± 5.7 ug/L

Result	± Uncer.	Date
42.	4.	11/04
44.	4.	11/04
47.	5.	11/04
44.	4.	11/04
47.	5.	11/04
42.	4.	11/04
42.	4.	11/04
39.	5.	11/14

Cu (cont)

40.	5.	11/14
39.	5.	11/14
40.	5.	11/14
39.	5.	11/14
39.	5.	11/14

CV = 660. ± 52. ug/L

Result	± Uncer.	Date
760.	80.	11/04
770.	80.	11/04
770.	80.	11/04
790.	80.	11/04
760.	80.	11/04
790.	80.	11/04
670.	70.	12/22
660.	70.	12/22
710.	70.	12/22
750.	80.	12/22
710.	70.	12/22
670.	70.	12/22
750.	80.	12/22
660.	70.	12/22

F 88EPA 02 IC

CV = 0.196 ± 0.036 mg/L

Result	± Uncer.	Date
0.2	0.1	10/27

CV = 1.3 ± 0.13 mg/L

Result	± Uncer.	Date
1.3	0.2	10/27

Hardness 88EPA 02 TITR

CV = 141. ± 11. mg/L

Result	± Uncer.	Date
130.	10.	10/27

Hg 88EPA 02 ICPMS

CV = 2.8 ± 0.6 ug/L

Result	± Uncer.	Date
17.	2.	11/04
13.	1.	11/04
17.	2.	11/04
13.	1.	11/04
12.	1.	11/04
13.	1.	11/04
12.	1.	11/04

Hg (cont)

CV = 4. ± 0.9 ug/L

Result	± Uncer.	Date
12.	2.	11/04
11.	2.	11/04
15.	3.	11/04
15.	3.	11/04
12.	2.	11/04
11.	2.	11/04
11.	2.	11/04

Na 88EPA 02 FAA

CV = 21.6 ± 0.3 mg/L

Result	± Uncer.	Date
22.	1.	10/31

NO2-N 88EPA 02 IC

CV = 0.197 ± 0.033 mg/L

Result	± Uncer.	Date
0.2	0.1	10/27

CV = 0.8 ± 0.11 mg/L

Result	± Uncer.	Date
0.8	0.1	10/27

NO3-N 88EPA 02 IC

CV = 0.492 ± 0.235 mg/L

Result	± Uncer.	Date
0.5	0.1	10/27

CV = 4. ± 1.1 mg/L

Result	± Uncer.	Date
4.2	0.4	10/27

Pb 88EPA 02 ICPMS

CV = 8.8 ± 2.8 ug/L

Result	± Uncer.	Date
6.	1.	11/04
7.	1.	11/04
7.	1.	11/04
6.	1.	11/04
6.	1.	11/04
6.	1.	11/04
7.	5.	11/14
8.	5.	11/14
8.	5.	11/14
9.	5.	11/14
9.	5.	11/14

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EPA Drinking Water Study 23
(cont)

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Pb (cont)

9.	5.	11/14
9.	5.	11/14
7.	5.	11/14

CV = 51. ± 7.1 ug/L

Result	± Uncer.	Date
53.	5.	11/04
54.	5.	11/04
54.	5.	11/04
54.	5.	11/04
53.	5.	11/04
54.	5.	11/04
48.	5.	12/22
53.	5.	12/22
53.	5.	12/22
48.	5.	12/22
48.	5.	12/22
54.	5.	12/22
54.	5.	12/22
48.	5.	12/22

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pH 88EPA 02 ISE

CV = 8.15 ± 0.2 units

Result	± Uncer.	Date
9.0	0.1	10/27

Se 88EPA 02 ICPMS

CV = 19. ± 4.4 ug/L

Result	± Uncer.	Date
17.	2.	11/04
23.	2.	11/04
24.	2.	11/04
17.	2.	11/04
22.	2.	11/04
23.	2.	11/04
22.	2.	11/04
24.	2.	11/04
15.	10.	11/14
16.	10.	11/14
20.	10.	11/14
20.	10.	11/14
16.	10.	11/14
15.	10.	11/14

CV = 57. ± 11.4 ug/L

Result	± Uncer.	Date
55.	6.	11/04
52.	6.	11/04
55.	6.	11/04
56.	6.	11/04

Se (cont)

56.	6.	11/04
52.	6.	11/04
54.	5.	12/22
57.	6.	12/22
50.	5.	12/22
57.	6.	12/22
50.	5.	12/22
54.	5.	12/22

Total Alkalinity
88EPA 02 TITR

CV = 47.1 ± 4.4 mg/L

Result	± Uncer.	Date
51.	5.	10/27

Total Dissolved Solids
88EPA 02 GRAV

CV = 278. ± 126. mg/L

Result	± Uncer.	Date
280.	30.	10/31

Turbidity 88EPA 02 COLOR

CV = Blank (mg/L)

Result	± Uncer.	Date
1.0	0.2	10/24
1.0	0.2	10/24

Zn ICPMS

CV = Blank (mg/L)

Result	± Uncer.	Date
< 1.		11/04
< 1.		11/04
< 1.		11/04

****

EPA EP Toxicity Metals
in Water

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Ag 86EPA 02 FAA

CV = 5. ± 0.28 mg/L

Result	± Uncer.	Date
5.1	0.5	12/06

Ag 86EPA 02 ICPMS

CV = 5. ± 0.28 mg/L

Result	± Uncer.	Date
5.1	0.5	3/01
5.0	0.5	3/01

As 86EPA 02 ICPMS

CV = 5. ± 0.7 mg/L

Result	± Uncer.	Date
5.0	0.5	2/03
5.0	0.5	2/03
4.9	0.5	2/23

As 86EPA 02 IENA

CV = 5. ± 0.7 mg/L

Result	± Uncer.	Date
4.7	0.5	3/04

Ba 86EPA 02 ICPMS

CV = 100. ± 10.2 mg/L

Result	± Uncer.	Date
110.	20.	3/01
120.	20.	3/01

Cd 86EPA 02 FAA

CV = 1. ± 0.03 mg/L

Result	± Uncer.	Date
1.0	0.1	12/12
1.0	0.1	12/12

Cd 86EPA 02 ICPES

CV = 1. ± 0.03 mg/L

Result	± Uncer.	Date
1.2	0.1	12/13
1.1	0.1	12/13
0.9	0.1	12/13

Cd 86EPA 02 ICPMS

CV = 1. ± 0.03 mg/L

Result	± Uncer.	Date
1.1	0.1	2/03
1.1	0.1	2/03
1.0	0.1	2/22
1.1	0.1	2/23

TABLE C-V (cont)

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EPA EP Toxicity Metals in Water (cont)

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Cd (cont)

1.1	0.1	2/23
1.1	0.1	2/26
1.1	0.1	2/26
0.9	0.1	3/01
0.9	0.1	3/01

Cr 86EPA 02 FAA

CV = 5. ± 0.42 mg/L

Result	± Uncer.	Date
5.5	0.5	9/07
5.3	0.5	9/07
5.6	0.5	9/07
4.6	0.5	9/07

Cr 86EPA 02 ICPMS

CV = 5. ± 0.42 mg/L

Result	± Uncer.	Date
5.5	0.6	2/03
5.7	0.6	2/03
4.5	0.5	2/22
4.7	0.5	2/22
5.4	0.5	2/23
5.0	0.5	2/23
4.7	0.5	2/23
5.4	0.5	2/23
4.3	0.5	2/26
4.8	0.5	2/26
4.7	0.5	3/01

Hg 86EPA 02 ICPMS

CV = 200. ± 40. ug/L

Result	± Uncer.	Date
160.	20.	2/26
190.	20.	3/01

Pb 86EPA 02 FAA

CV = 5. ± 0.44 mg/L

Result	± Uncer.	Date
5.2	0.5	9/13
5.4	0.5	9/13
5.4	0.5	9/14
5.2	0.5	9/14
5.2	0.5	9/20
5.3	0.5	9/20
5.0	0.5	9/20
5.4	0.5	9/20

Pb (cont)

5.6	0.5	9/20
5.4	0.5	9/20
5.7	0.6	9/20
5.2	0.5	9/20
5.0	0.5	9/20
5.2	0.5	9/20
5.0	0.5	9/20
5.7	0.5	9/20
5.5	0.5	9/20
5.1	0.5	9/20
5.1	0.5	9/20
5.6	0.5	9/20
5.1	0.5	9/20
5.5	0.5	9/20
5.4	0.5	9/20
5.0	0.5	9/20
6.0	0.6	9/20
5.4	0.5	9/20
4.6	0.5	9/20
5.2	0.5	9/20
5.6	0.5	9/20
4.8	0.5	9/20
5.3	0.5	9/20

Pb 86EPA 02 ICPES

CV = 5. ± 0.44 mg/L

Result	± Uncer.	Date
5.6	0.6	12/20

Pb 86EPA 02 ICPMS

CV = 5. ± 0.44 mg/L

Result	± Uncer.	Date
5.7	0.6	2/03
5.5	0.5	2/03
5.2	0.5	2/22
5.1	0.5	2/22
4.7	0.5	3/01
5.0	0.5	3/01

Se 86EPA 02 ICPMS

CV = 0.99 ± 0.15 mg/L

Result	± Uncer.	Date
0.9	0.1	2/03
1.1	0.1	2/03
1.3	0.2	2/23

****

EPA Mineral Analyses in Water

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Ca 84EPA 02 ETVAA

CV = 5.3 ± 0.4 mg/L

Result	± Uncer.	Date
5.3	0.5	11/03
5.2	0.5	11/03
5.1	0.5	11/03
5.3	0.5	11/03
3.5	0.3	11/03

Ca 85EPA 02 FAA

CV = 20. ± 1.2 mg/L

Result	± Uncer.	Date
20.	2.	2/16
21.	2.	2/16
20.	2.	2/18
19.	2.	2/19
20.	2.	4/08
19.	1.	5/23
20.	1.	5/23
20.	2.	11/15
20.	2.	11/15
20.	2.	11/18

CV = 40.6 ± 2. mg/L

Result	± Uncer.	Date
41.	4.	3/15
39.	4.	3/15
42.	4.	4/08
42.	4.	4/08
37.	4.	9/21
39.	4.	9/21
38.	4.	9/21
36.	4.	9/21

Ca 85EPA 02 IC

CV = 20. ± 1.2 mg/L

Result	± Uncer.	Date
20.	2.	10/04
21.	2.	11/10

Ca 84EPA 02 ICPES

CV = 5.3 ± 0.4 mg/L

Result	± Uncer.	Date
5.2	0.5	12/22
5.4	0.5	12/22
4.6	0.5	12/22

TABLE C-V (cont)

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EPA Mineral Analyses in Water
(cont)

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Cl 85EPA 02 FIA

CV = 51.7 ± 3.2 mg/L

Result	± Uncer.	Date
53.	5.	1/28
53.	5.	1/28
53.	5.	2/24
57.	6.	2/24
55.	6.	2/24
55.	6.	2/24
54.	5.	2/26
53.	5.	4/06
52.	5.	4/06
52.	5.	4/06
52.	5.	4/06
52.	5.	4/28
52.	5.	4/28
52.	5.	5/25
52.	5.	5/25
51.	5.	7/29
53.	5.	7/29
51.	5.	8/31
51.	5.	8/31
51.	5.	10/06
51.	5.	10/06
51.	5.	10/31
52.	5.	10/31
53.	5.	11/28
53.	5.	11/28

CV = 52.1 ± 1.8 mg/L

Result	± Uncer.	Date
51.	5.	12/22
50.	5.	12/22

Cl 85EPA 02 IC

CV = 51.7 ± 3.2 mg/L

Result	± Uncer.	Date
54.	5.	2/25
54.	5.	3/01
49.	5.	5/16
54.	5.	8/05
51.	5.	11/16

CV = 52.1 ± 1.8 mg/L

Result	± Uncer.	Date
51.	5.	5/25
50.	5.	5/25
52.	5.	6/02
56.	6.	7/07
49.	5.	7/28
46.	5.	8/11
48.	4.	8/11
50.	5.	9/07

Cl (cont)

55.	6.	9/21
50.	5.	10/27
44.	4.	10/27
54.	5.	11/16
50.	5.	11/16
50.	5.	11/16

CV = 80.8 ± 2.5 mg/L

Result	± Uncer.	Date
82.	8.	6/22

Conductivity 85EPA 02 CB

CV = 276. ± 12. uS/cm

Result	± Uncer.	Date
270.	30.	11/16
280.	30.	11/16
280.	30.	11/16
270.	30.	11/16

F 85EPA 02 DISE

CV = 1. ± 0.05 mg/L

Result	± Uncer.	Date
1.1	0.1	2/10

F 85EPA 02 IC

CV = 1. ± 0.05 mg/L

Result	± Uncer.	Date
1.1	0.1	2/25
0.9	0.1	5/16
1.1	0.2	5/25
1.0	0.1	5/25
1.1	0.2	6/02
1.0	0.1	6/22
1.2	0.2	7/07
1.3	0.2	7/28
1.1	0.2	8/11
1.1	0.2	9/07
1.1	0.1	9/09
1.2	0.1	9/09
1.2	0.1	9/09
1.1	0.2	9/21
1.1	0.2	11/16
1.1	0.2	11/16

CV = 1.3 ± 0.1 mg/L

Result	± Uncer.	Date
1.3	0.1	3/09
1.2	0.1	6/02
1.2	0.2	6/03
1.4	0.1	8/05
1.4	0.1	8/05

F 85EPA 02 ISE

CV = 1. ± 0.05 mg/L

Result	± Uncer.	Date
1.0	0.1	1/28
1.0	0.1	3/04
1.0	0.1	3/31
1.1	0.2	4/18
1.1	0.2	4/18
1.0	0.1	4/26
1.0	0.1	6/01
1.1	0.1	6/09
1.1	0.1	7/01
1.0	0.1	7/28
1.0	0.2	8/01
1.0	0.1	9/02
1.0	0.1	10/04
1.0	0.1	10/27
1.0	0.2	10/31
1.1	0.1	12/01
1.0	0.1	12/02
1.0	0.1	12/06
1.0	0.1	12/12
1.0	0.1	12/22

CV = 1.3 ± 0.1 mg/L

Result	± Uncer.	Date
1.3	0.1	5/02

Hardness 84EPA 02 CALC

CV = 21. ± 2. mg/L

Result	± Uncer.	Date
20.	2.	1/23
17.	2.	1/23
20.	2.	1/23
20.	2.	1/23

Hardness 87EPA 02 TITR

CV = 72.2 ± 2.5 mg/L

Result	± Uncer.	Date
72.	7.	8/11
70.	7.	10/31
74.	7.	11/15
69.	4.	11/16

K 84EPA 02 ETVAA

CV = 2.1 ± 0.2 mg/L

Result	± Uncer.	Date
2.1	0.2	11/03
2.0	0.2	11/03
2.0	0.2	11/03
2.0	0.2	11/03

TABLE C-V (cont)

****

EPA Mineral Analyses in Water
(cont)

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K 84EPA 02 FAA

CV = 2.1 ± 0.2 mg/L

Result	± Uncer.	Date
2.0	0.2	6/08
2.5	0.3	6/08
2.0	0.2	6/08

CV = 5. ± 0.4 mg/L

Result	± Uncer.	Date
5.	1.	2/19
5.	1.	6/27
5.	1.	6/27
5.	1.	6/27
5.	1.	6/27
5.	1.	6/27
5.	1.	6/27

CV = 9.8 ± 0.7 mg/L

Result	± Uncer.	Date
10.	1.0	3/15
10.	1.0	3/15
9.	0.9	9/21
9.	0.9	9/21
9.	0.9	9/21

K 85EPA 02 IC

CV = 5. ± 0.4 mg/L

Result	± Uncer.	Date
2.9	0.3	10/04
5.0	0.5	11/04

K 84EPA 02 ICPES

CV = 2.1 ± 0.2 mg/L

Result	± Uncer.	Date
1.2	0.6	12/22
1.6	0.8	12/22
1.2	0.6	12/22

Mg 84EPA 02 ETVAA

CV = 1.8 ± 0.2 mg/L

Result	± Uncer.	Date
1.8	0.2	11/03
1.8	0.2	11/03
1.8	0.2	11/03

Mg 85EPA 02 FAA

CV = 5. ± 0.4 mg/L

Result	± Uncer.	Date
4.7	0.5	2/18
4.7	0.5	2/18
4.6	0.5	2/19
4.5	0.4	2/19
5.	2.	11/15
5.	2.	11/15
5.	2.	11/16
5.	2.	11/16

CV = 8.4 ± 0.6 mg/L

Result	± Uncer.	Date
7.6	0.8	3/15
8.1	0.8	3/15
8.0	0.8	9/21
8.0	0.8	9/21
7.9	0.8	9/21
7.8	0.8	9/21

Mg 85EPA 02 IC

CV = 5. ± 0.4 mg/L

Result	± Uncer.	Date
4.6	0.4	10/04
4.7	0.5	11/10

Mg 84EPA 02 ICPES

CV = 1.8 ± 0.2 mg/L

Result	± Uncer.	Date
1.4	0.2	12/22
1.7	0.2	12/22
1.6	0.2	12/22

CV = 5. ± 0.4 mg/L

Result	± Uncer.	Date
5.3	0.5	8/05

Na 84EPA 02 ETVAA

CV = 8.2 ± 0.5 mg/L

Result	± Uncer.	Date
8.4	0.8	11/03
8.8	0.9	11/03
8.5	0.8	11/03
8.4	0.8	11/03
8.2	0.8	11/03

Na 84EPA 02 FAA

CV = 8.2 ± 0.5 mg/L

Result	± Uncer.	Date
7.3	0.7	6/08
7.9	0.7	6/08

CV = 20. ± 1.1 mg/L

Result	± Uncer.	Date
21.	2.	1/06
21.	2.	1/06
20.	1.	6/01
20.	1.	6/01
20.	2.	6/02
20.	1.	6/06
20.	1.	6/06
20.	1.	6/13
20.	1.	6/13
19.	1.	10/31

CV = 46.5 ± 2. mg/L

Result	± Uncer.	Date
41.	4.	3/15
43.	4.	3/15
47.	5.	9/21
46.	4.	9/21
44.	4.	9/21

Na 85EPA 02 IC

CV = 20. ± 1.1 mg/L

Result	± Uncer.	Date
10.	1.	10/04
21.	2.	11/04

Na 84EPA 02 ICPES

CV = 8.2 ± 0.5 mg/L

Result	± Uncer.	Date
6.9	0.7	12/22
8.1	0.8	12/22
8.4	0.8	12/22

CV = 20. ± 1.1 mg/L

Result	± Uncer.	Date
22.	1.	8/19
21.	1.	8/19
22.	1.	8/19
21.	1.	8/19

Na 84EPA 02 FAA

CV = 8.2 ± 0.5 mg/L

Result	± Uncer.	Date
8.6	0.9	1/06

TABLE C-V (cont)

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EPA Mineral Analyses in Water (cont)

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Na (cont)

CV = 20. ± 1.1 mg/L

Result	± Uncer.	Date
21.	2.	1/06

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pH 82EPA 01 GE

CV = 5.7 ± 0.06 units

Result	± Uncer.	Date
5.7	0.1	1/11
5.8	0.1	3/01
5.8	0.1	3/01
5.9	0.1	9/08

CV = 7.8 ± 0.08 units

Result	± Uncer.	Date
7.8	0.1	5/25
7.7	0.1	6/02
7.7	0.1	7/07
7.8	0.1	7/28
7.7	0.1	9/07
7.8	0.1	9/08
7.7	0.1	9/21
7.7	0.1	10/31
7.7	0.1	11/16

SO4 85EPA 02 FIA

CV = 20. ± 1.7 mg/L

Result	± Uncer.	Date
21.	2.	1/29
21.	2.	1/29
21.	2.	2/24
21.	2.	2/24
17.	2.	4/12
17.	2.	4/12
18.	2.	4/26
19.	2.	4/26
18.	2.	5/26
18.	2.	5/26
19.	2.	6/24
20.	2.	6/24
20.	2.	7/29
20.	2.	7/29
18.	2.	9/08
20.	2.	10/06
18.	2.	10/31
19.	2.	10/31
24.	2.	11/28
19.	2.	12/22
18.	2.	12/22
18.	2.	12/22
19.	2.	12/22

SO4 85EPA 02 IC

CV = 20. ± 1.7 mg/L

Result	± Uncer.	Date
20.	2.	2/25
20.	2.	3/01
21.	2.	3/21
21.	2.	3/21
16.	2.	5/16
20.	2.	5/25
20.	2.	5/25
20.	2.	6/02
21.	2.	7/01
21.	2.	7/01
22.	2.	7/07
19.	2.	7/28
22.	2.	8/04
19.	2.	8/11
19.	2.	8/11
20.	2.	9/07
20.	2.	9/21
20.	2.	10/27
21.	2.	10/27
20.	2.	10/27
21.	2.	11/16
20.	2.	11/16
20.	2.	11/16
21.	2.	11/16

CV = 95.3 ± 5. mg/L

Result	± Uncer.	Date
87.	9.	2/22
84.	8.	6/22

Total Alkalinity 85EPA 02 TITR

CV = 24.2 ± 1.7 mg/L

Result	± Uncer.	Date
23.	2.	2/05
25.	2.	2/24
25.	2.	4/29
22.	2.	5/25
24.	2.	7/07
24.	2.	7/28
24.	2.	8/11
23.	2.	8/29
26.	3.	8/29
24.	2.	9/07
23.	2.	10/13
23.	2.	10/24
23.	2.	11/02
26.	3.	11/16
23.	2.	12/06
25.	2.	12/06
23.	2.	12/06
23.	2.	12/06
26.	3.	12/22

Total Alkalinity (cont)

CV = 27.3 ± 1.6 mg/L

Result	± Uncer.	Date
26.	3.	8/11
27.	3.	9/21
30.	3.	10/31
28.	2.	11/01
24.	2.	11/16
27.	1.	11/16
26.	3.	12/06
26.	3.	12/06

Total Dissolved Solids 87EPA 02 GRAV

CV = 140. ± 20. mg/L

Result	± Uncer.	Date
150.	20.	8/11
150.	20.	10/31
150.	20.	10/31
150.	20.	10/31
160.	20.	11/16
150.	20.	11/16

****

EPA Municipal Digested Sludge: Dry

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Ag ??EPA 05 FAA

CV = 81. ± 20. ug/g

Result	± Uncer.	Date
70.	15.	8/23
60.	10.	8/23
60.	10.	8/23
70.	15.	8/23
70.	15.	8/23
70.	15.	8/23
80.	15.	8/23

Cd ??EPA 05 FAA

CV = 20.8 ± 4. ug/g

Result	± Uncer.	Date
17.	3.	8/23
17.	3.	8/23
17.	3.	8/23
17.	3.	8/23
17.	3.	8/23
17.	3.	8/23

TABLE C-V (cont)

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EPA Municipal Digested Sludge: Dry (cont)

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Cr 88WIL 01 FAA

CV = 210. ± 8. ug/g

Result	± Uncer.	Date
230.	46.	8/23
230.	46.	8/23
230.	46.	8/23
230.	46.	8/23
230.	46.	8/23
230.	50.	8/23

Hg ??EPA 05 CVAA

CV = 16. ± 5. ug/g

Result	± Uncer.	Date
12.	2.	9/07
14.	3.	9/07
12.	2.	9/07

Pb ??EPA 05 FAA

CV = 519. ± 100. ug/g

Result	± Uncer.	Date
660.	20.	8/23
670.	20.	8/23
660.	20.	8/23
670.	20.	8/23
600.	100.	8/23
600.	100.	8/23
600.	100.	8/23
600.	100.	8/23

Se 88WIL 01 ETVAA

CV = 4.8 ± 0.8 ug/g

Result	± Uncer.	Date
3.4	0.7	8/23
3.4	0.7	8/23

****

EPA Nitrate/Fluoride in Water

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F 78EPA 01 IC

CV = 2.75 ± 0.2 mg/L

Result	± Uncer.	Date
3.0	0.3	2/25
2.8	0.3	4/13

F (cont)

2.7	0.3	5/03
2.8	0.3	5/25
2.8	0.3	7/28
2.6	0.3	8/11
2.8	0.3	9/07
2.8	0.3	9/09
2.7	0.3	9/21
2.9	0.3	10/27
2.8	0.3	11/16
2.8	0.3	11/16

NO3-N 78EPA 01 IC

CV = 10.3 ± 0.4 mg/L

Result	± Uncer.	Date
11.	1.	2/25
10.	1.	4/13
10.	1.	5/03
10.	1.	5/25
10.	1.	7/28
10.	1.	9/21
11.	1.	10/27
11.	1.	10/27
10.	1.	11/15
10.	1.	11/16
10.	1.	11/16
9.	1.	11/17
8.	1.	11/17
10.	1.	12/21
11.	1.	12/21

****

EPA Nutrients in Water

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NH3-N 81EPA 01 ACOLR

CV = 1.90 ± 0.11 mg/L

Result	± Uncer.	Date
1.8	0.2	1/27
1.8	0.2	1/27
1.9	0.2	1/27
1.8	0.2	1/27
1.9	0.2	2/26
1.9	0.2	2/26
1.9	0.2	2/26
1.9	0.2	2/26
2.1	0.2	3/10
1.9	0.2	3/10
1.9	0.2	3/10

CV = 2. ± 0.1 mg/L

Result	± Uncer.	Date
2.2	0.2	1/27
2.0	0.2	1/27
2.0	0.2	1/27
2.0	0.2	1/27
2.0	0.2	2/26
2.1	0.2	2/26
2.0	0.2	3/10

NH3-N (cont)

2.0	0.2	3/10
2.0	0.2	3/10
2.0	0.2	3/21
2.0	0.2	3/21
2.0	0.2	3/21
2.0	0.2	3/21

NH3-N 81EPA 01 FIA

CV = 1.90 ± 0.11 mg/L

Result	± Uncer.	Date
1.8	0.2	4/08
1.8	0.2	4/08
1.9	0.2	4/20
1.9	0.2	4/20
1.8	0.2	4/27
1.8	0.2	4/27
1.9	0.2	5/17
1.9	0.2	5/17
1.8	0.2	5/25
1.9	0.2	5/25
1.9	0.2	6/06
1.9	0.2	6/06
1.9	0.2	6/06
1.8	0.2	6/23
1.8	0.2	6/23
1.9	0.2	6/28
1.8	0.2	6/28
1.9	0.2	7/01
1.9	0.2	7/20
1.9	0.2	7/20
1.9	0.2	7/20
2.2	0.2	7/29
2.1	0.2	7/29
2.1	0.2	9/09
2.0	0.2	9/09
1.9	0.2	9/09
2.1	0.2	9/09
1.8	0.2	9/29
1.8	0.2	9/29
1.9	0.2	10/27
1.9	0.2	10/27
1.9	0.2	11/28
1.9	0.2	11/28

CV = 2.0 ± 0.1 mg/L

Result	± Uncer.	Date
2.0	0.2	2/26
2.0	0.2	4/08
2.0	0.2	4/08
2.0	0.2	4/20
2.0	0.2	4/20
2.0	0.2	4/27
2.0	0.2	4/27
2.1	0.2	5/17
2.1	0.2	5/17
2.1	0.2	5/25
2.1	0.2	5/25
2.1	0.2	5/25
2.1	0.2	6/06
2.1	0.2	6/06
2.1	0.2	6/23
2.1	0.2	6/23
2.1	0.2	6/28

TABLE C-V (cont)

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EPA Nutrients in Water
(cont)

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NH3-N (cont)

2.1	0.2	6/28
2.2	0.2	7/20
2.2	0.2	7/20
2.2	0.2	7/20
1.8	0.2	7/29
1.8	0.2	7/29
2.2	0.2	9/09
1.9	0.2	9/29
1.8	0.2	9/29
1.9	0.2	10/13
2.1	0.2	10/27
2.1	0.2	10/27
2.0	0.2	10/27
2.0	0.2	10/27
2.1	0.2	11/28
2.0	0.2	11/28
2.1	0.2	11/28
1.9	0.2	12/21
1.9	0.2	12/21

NO3-N 81EPA 01 FIA

CV = 1.43 ± 0.06 mg/L

Result	± Uncer.	Date
1.5	0.2	1/20
1.5	0.2	1/20
1.5	0.2	1/20
1.4	0.1	1/20
1.4	0.1	1/20
1.4	0.1	1/29
1.4	0.1	1/29
1.4	0.1	3/01
1.4	0.1	3/01
1.4	0.1	4/12
1.3	0.1	4/12
1.3	0.1	4/12
1.4	0.1	5/26
1.4	0.1	5/26
1.4	0.1	6/02
1.4	0.1	6/24
1.4	0.1	6/24
1.5	0.2	7/29
1.5	0.2	7/29
1.5	0.2	8/01
1.5	0.2	8/01
1.5	0.2	8/01
1.5	0.2	8/01
1.5	0.2	9/13
1.5	0.2	10/05
1.5	0.2	10/05
1.4	0.1	10/31
1.4	0.1	10/31
1.4	0.1	12/12
1.4	0.1	12/12

NO3-N (cont)

CV = 2. ± 0.08 mg/L

Result	± Uncer.	Date
2.0	0.2	1/20
2.0	0.2	1/20
2.0	0.2	1/20
2.0	0.2	1/20
2.0	0.2	1/29
2.0	0.2	1/29
1.9	0.2	3/01
1.9	0.2	3/01
2.0	0.2	4/12
2.0	0.2	4/12
2.0	0.2	5/26
2.0	0.2	5/26
2.0	0.2	6/02
2.0	0.2	6/24
2.0	0.2	6/24
2.0	0.2	7/29
2.0	0.2	7/29
1.9	0.2	10/05
1.9	0.2	10/05
1.9	0.2	10/31
1.9	0.2	10/31
1.8	0.2	12/12
1.9	0.2	12/12
2.0	0.2	12/22
2.0	0.2	12/22

NO3-N 84EPA 02 IC

CV = 1.6 ± 0.1 mg/L

Result	± Uncer.	Date
1.6	0.2	11/15
1.7	0.2	12/21
1.7	0.2	12/21

P 81EPA 01 ACOLR

CV = 1.04 ± 0.06 mg/L

Result	± Uncer.	Date
1.0	0.2	1/29
1.0	0.2	1/29
1.0	0.2	1/29
1.0	0.2	1/29
1.0	0.2	2/29
1.0	0.2	4/29
1.0	0.2	4/29
0.9	0.2	5/11

CV = 1.5 ± 0.07 mg/L

Result	± Uncer.	Date
1.5	0.3	7/14
1.5	0.3	7/14
1.5	0.3	8/03
1.5	0.3	8/03
1.4	0.3	8/11
1.5	0.3	8/11
1.4	0.3	9/07
1.4	0.3	9/07

P (cont)

1.4	0.3	10/03
1.4	0.3	10/03
1.4	0.3	10/20
1.4	0.3	10/20
1.4	0.1	10/31
1.4	0.1	10/31
1.4	0.3	11/04
1.4	0.3	11/04
1.6	0.3	12/22
1.6	0.3	12/22

CV = 50. ± 10. ug/L

Result	± Uncer.	Date
50.	20.	3/21
50.	20.	3/21
50.	20.	4/11
50.	20.	4/11
50.	20.	4/19
50.	20.	4/19

CV = 140. ± 40. ug/L

Result	± Uncer.	Date
120.	20.	1/29
120.	20.	1/29
100.	20.	2/29
100.	20.	2/29
150.	30.	3/21
150.	30.	4/11
140.	30.	4/11
160.	30.	4/19
160.	30.	4/19
130.	30.	4/29
110.	20.	4/29
140.	30.	5/11
140.	30.	5/11
140.	30.	6/02
130.	30.	6/02
120.	20.	6/02
140.	30.	6/02
130.	20.	6/15
130.	20.	6/15
150.	20.	6/29
130.	20.	6/29
180.	30.	7/14
180.	30.	7/14
120.	20.	8/03
120.	20.	8/03
150.	30.	8/11
140.	30.	8/11
170.	30.	9/07
170.	30.	9/07
180.	40.	10/03
180.	40.	10/03
180.	30.	10/20
160.	30.	10/20
130.	20.	10/31
140.	20.	10/31
90.	20.	11/04

TABLE C-V (cont)

****

EPA Nutrients in Water
(cont)

****

P 86EPA 02 FIA

CV = 1.5 ± 0.07 mg/L

Result	± Uncer.	Date
1.4	0.3	12/05

CV = 140. ± 40. ug/L

Result	± Uncer.	Date
120.	20.	12/05
130.	20.	12/05

PO4-P 84EPA 02 IC

CV = 270. ± 10. ug/L

Result	± Uncer.	Date
230.	20.	9/09
230.	20.	9/09
270.	30.	9/21
270.	30.	9/21
250.	20.	10/27
270.	30.	10/27
250.	20.	11/16
260.	30.	11/16

****

EPA Plutonium in Water
Aug. 1988

****

Pu-239 88EPA 01 RAS

CV = 10.2 ± 1. pCi/L

Result	± Uncer.	Date
9.6	0.3	9/07
9.6	0.3	9/07
9.7	0.3	9/07
11.	1.	9/30
14.	1.	9/30
10.	1.	9/30
10.	1.	10/01
10.	1.	10/01
10.	1.	10/01

****

EPA Radionuclides in Food
Jan. 1988

****

Cs-137 88EPA 01 G

CV = 91. ± 5. pCi/kg

Result	± Uncer.	Date
90.	10.	2/19
80.	10.	2/19
90.	10.	2/19

I-131 88EPA 01 G

CV = 102. ± 10.2 pCi/kg

Result	± Uncer.	Date
100.	20.	2/19
110.	20.	2/19
120.	20.	2/19

Sr-90 88EPA 01 PC

CV = 55. ± 2.75 pCi/kg

Result	± Uncer.	Date
52.	1.	3/28
41.	1.	3/28
49.	1.	3/28

****

EPA Radionuclides in Food
July 1988

****

Cs-137 88EPA 01 G

CV = 49. ± 5. pCi/L

Result	± Uncer.	Date
42.	7.	9/01
44.	7.	9/01
48.	8.	9/01

I-131 88EPA 01 G

CV = 107. ± 11. pCi/L

Result	± Uncer.	Date
90.	10.	9/01
110.	20.	9/01
100.	20.	9/01

****

EPA Radionuclides in Milk
June 1988

****

Cs-137 88EPA 01 G

CV = 51. ± 5. pCi/L

Result	± Uncer.	Date
32.	6.	7/08
33.	6.	7/08
28.	5.	7/08

I-131 88EPA 01 G

CV = 94. ± 9. pCi/L

Result	± Uncer.	Date
80.	15.	7/08
70.	10.	7/08
75.	15.	7/08

****

EPA Radionuclides in Milk
Nov. 1988

****

Cs-137 88EPA 01 G

CV = 50. ± 5. pCi/L

Result	± Uncer.	Date
41.	7.	11/29
46.	8.	11/29
42.	7.	11/29

I-131 88EPA 01 G

CV = 91. ± 9. pCi/L

Result	± Uncer.	Date
65.	15.	11/29
75.	15.	11/29
85.	15.	11/29

****

EPA Radionuclides in Water
Feb. 1988

****

Co-60 88EPA 01 NAI

CV = 69. ± 5. pCi/L

Result	± Uncer.	Date
75.	15.	3/11
80.	15.	3/11
50.	15.	3/11

****

EPA Radionuclides in Water
Feb. 1988 (cont)

****

Cs-134 88EPA 01 NAI

CV = 64. ± 5. pCi/L

Result	± Uncer.	Date
65.	15.	3/11
65.	15.	3/11
70.	15.	3/11

Cs-137 88EPA 01 NAI

CV = 94. ± 5. pCi/L

Result	± Uncer.	Date
85.	15.	3/11
100.	15.	3/11
100.	15.	3/11

Ru-106 88EPA 01 NAI

CV = 105. ± 10.5 pCi/L

Result	± Uncer.	Date
80.	70.	3/11
50.	50.	3/11
80.	40.	3/11

Zn-65 88EPA 01 NAI

CV = 94. ± 9.4 pCi/L

Result	± Uncer.	Date
90.	20.	3/11
100.	20.	3/11
110.	20.	3/11

****

EPA Radionuclides in Water
June 1988

****

Co-60 88EPA 01 G

CV = 15. ± 5. pCi/L

Result	± Uncer.	Date
80.	15.	7/01
100.	20.	7/01
80.	15.	7/01
15.	30.	11/08

Cs-134 88EPA 01 G

CV = 20. ± 5. pCi/L

Result	± Uncer.	Date
10.	10.	7/01
6.	9.	7/01
4.	7.	7/01
30.	20.	11/08

Cs-137 88EPA 01 G

CV = 25. ± 5. pCi/L

Result	± Uncer.	Date
12.	10.	7/01
20.	10.	7/01
20.	10.	7/01
30.	20.	11/08

Ru-106 88EPA 01 G

CV = 195. ± 20. pCi/L

Result	± Uncer.	Date
130.	70.	7/01
180.	60.	7/01
160.	60.	7/01
220.	150.	11/08

Zn-65 88EPA 01 G

CV = 101. ± 10. pCi/L

Result	± Uncer.	Date
170.	30.	7/01
170.	30.	7/01
170.	30.	7/01
110.	60.	11/08

****

EPA Radionuclides in Water
Oct. 1988

****

Co-60 88EPA 01 G

CV = 25. ± 5. pCi/L

Result	± Uncer.	Date
20.	10.	11/07
30.	10.	11/07
20.	10.	11/07

Cs-134 88EPA 01 G

CV = 25. ± 5. pCi/L

Result	± Uncer.	Date
30.	10.	11/07
40.	10.	11/07
30.	10.	11/07

Cs-137 88EPA 01 G

CV = 15. ± 5. pCi/L

Result	± Uncer.	Date
12.	7.	11/07
16.	8.	11/07
13.	10.	11/07

Ru-106 88EPA 01 G

CV = 152. ± 15. pCi/L

Result	± Uncer.	Date
- 10.	60.	11/07
- 90.	60.	11/07
- 40.	60.	11/07

An investigation of the above values determined that an incorrect background value may have been used for the calculations.

Zn-65 88EPA 01 G

CV = 151. ± 15. pCi/L

Result	± Uncer.	Date
160.	30.	11/07
170.	30.	11/07
150.	30.	11/07

****

EPA Radium in Water, Dec. 1987

****

Ra-226 87EPA 01 PC

CV = 4.8 ± 0.72 pCi/L

Result	± Uncer.	Date
4.5	0.4	4/12
4.5	0.4	4/12
4.5	0.4	7/05
4.6	0.5	8/02
4.6	0.5	8/02
4.6	0.5	8/02

TABLE C-V (cont)

****

EPA Radium in Water, Mar. 1988

****

Ra-226 88EPA 01 PC

CV = 7.6 ± 1.14 pCi/L

Result	± Uncer.	Date
7.4	0.7	4/25
7.8	0.8	4/25
7.3	0.7	4/25
7.7	0.8	8/09
7.2	0.7	8/09
7.5	0.8	8/09
6.9	0.7	9/15
7.0	0.7	9/15

****

EPA Radium in Water, June 1988

****

Ra-226 88EPA 01 PC

CV = 10. ± 1.51 pCi/L

Result	± Uncer.	Date
9.5	1.0	8/02
9.7	1.0	8/02
9.4	0.9	8/02

****

EPA Radium in Water, Sept. 1988

****

Ra-226 88EPA 01 PC

CV = 8.4 ± 1.3 pCi/L

Result	± Uncer.	Date
8.5	0.9	10/27
8.4	0.8	10/27
8.6	0.9	10/27

****

EPA Radium in Water, Dec. 1988

****

Ra-226 88EPA 01 PC

CV = 3.5 ± 0.5 pCi/L

Result	± Uncer.	Date
3.5	0.4	12/31
3.2	0.3	12/31
3.4	0.3	12/31

****

EPA Residual Chlorine in Water

****

CL2 86EPA 02 PTITR

CV = 1. ± 0.147 mg/L

Result	± Uncer.	Date
0.7	0.1	10/28
1.0	0.2	11/04
0.9	0.2	11/09
0.9	0.2	11/28
0.8	0.2	11/28
1.0	0.2	12/02

****

EPA Residue in Water

****

Total Dissolved Solids
86EPA 02 GRAV

CV = 283. ± 27. mg/L

Result	± Uncer.	Date
300.	30.	9/13
290.	30.	9/13

CV = 403. ± 33. mg/L

Result	± Uncer.	Date
320.	30.	2/02
320.	30.	2/25
310.	30.	3/31

Total Suspended Solids
86EPA 02 GRAV

CV = 274. ± 14. mg/L

Result	± Uncer.	Date
240.	20.	6/29
230.	20.	7/08
290.	30.	7/11
220.	20.	7/15
210.	20.	7/22
230.	20.	7/26
230.	20.	7/27
280.	30.	8/05
230.	20.	8/19
270.	30.	8/26
240.	20.	8/30
270.	30.	9/02
290.	30.	9/13
250.	20.	9/20
250.	20.	9/27
240.	20.	9/30
280.	30.	10/03
250.	20.	10/07
260.	30.	10/12
240.	20.	10/14

Total Suspended Solids (cont)

260.	30.	10/25
260.	30.	10/28
240.	20.	11/04
260.	30.	11/10
270.	30.	11/18
240.	20.	11/23
240.	20.	12/01
270.	30.	12/02
260.	30.	12/09
240.	20.	12/16
260.	30.	12/20
260.	20.	12/23

CV = 550. ± 27. mg/L

Result	± Uncer.	Date
520.	50.	4/20
520.	50.	4/20
520.	50.	4/26
520.	50.	4/28
530.	50.	5/04
510.	50.	5/10
520.	50.	5/13
540.	50.	5/20
450.	40.	5/25
500.	50.	6/03
490.	50.	6/09
460.	50.	6/17
600.	60.	6/21

****

EPA Strontium in Water
Jan. 1988

****

Sr-90 88EPA 01 PC

CV = 15. ± 1.5 pCi/L

Result	± Uncer.	Date
13.8	0.3	2/23
12.6	0.3	2/23
13.6	0.6	2/23

****

EPA Strontium in Water
May 1988

****

Sr-90 88EPA 01 RAS

CV = 20. ± 1.5 pCi/L

Result	± Uncer.	Date
15.2	0.3	6/08
14.4	0.6	6/08
16.0	0.4	6/08

TABLE C-V (cont)

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EPA Study 8 (NPDES)

****

CL2 PTITR

CV = 0.399 ± 0.074 mg/L

Result	± Uncer.	Date
0.35	0.07	4/13

CN 88EPA 01 ACOLR

CV = 0.155 ± 0.05 mg/L

Result	± Uncer.	Date
0.12	0.01	3/18
0.12	0.01	3/18
0.12	0.01	4/13
0.12	0.01	4/13
0.13	0.01	4/13
0.13	0.01	4/13
0.13	0.01	4/13
0.12	0.01	4/13
0.13	0.01	4/13
0.13	0.01	4/13

Chemical Oxygen Demand
88EPA 01 TITR

CV = 105. ± 15. mg/L

Result	± Uncer.	Date
100.	20.	4/13
100.	20.	4/13
100.	20.	4/13
100.	20.	4/13

NH3-N 88EPA 01 ACOLR

CV = 10.3 ± 1.4 mg/L

Result	± Uncer.	Date
9.0	0.9	4/13
9.0	0.9	4/13
10.8	1.1	4/13
10.8	1.1	4/13

P 88EPA 01 ACOLR

CV = 4.4 ± 0.6 mg/L

Result	± Uncer.	Date
3.4	0.7	4/13
3.3	0.7	4/13
3.5	0.7	4/13
3.3	0.7	4/13
4.0	0.8	9/19
3.9	0.8	9/19
4.0	0.8	9/19
4.0	0.8	9/19
3.9	0.8	9/19
3.9	0.8	9/19
3.9	0.8	9/19

The first set of data were out of control and were rerun; the second set was in control. However, the first set was erroneously reported to EPA.

---

pH 88EPA 01 GE

CV = 6.3 ± 0.1 units

Result	± Uncer.	Date
6.3	0.1	3/14
6.3	0.1	3/14
6.3	0.1	4/13

Total Suspended Solids
88EPA 01 GRAV

CV = 34.8 ± 8. mg/L

Result	± Uncer.	Date
34.	3.	4/13

****

EPA Trace Metals in Water

****

Ag 86EPA 02 ETVAA

CV = 10. ± 1.18 ug/L

Result	± Uncer.	Date
10.	2.	2/17
11.	2.	2/17
11.	2.	2/17
9.	2.	6/07
9.	2.	6/07

Ag 83EPA 02 FAA

CV = 0.99 ± 0.1 mg/L

Result	± Uncer.	Date
1.0	0.5	12/09

Ag (cont)

CV = 10. ± 1.18 ug/L

Result	± Uncer.	Date
10.	1.	3/04
10.	1.	3/04
10.	1.	3/04
11.	1.	3/22
9.	1.	3/22
10.	1.	4/18
10.	1.	4/18
10.	1.	4/18
11.	1.	5/25
11.	1.	5/26
10.	3.	6/07
10.	3.	6/07
9.	3.	6/07
10.	3.	6/24
11.	3.	6/24
11.	3.	6/24
10.	3.	6/24
10.	1.	7/11
10	1.	7/11
10.	1.	7/11
10.	1.	7/11
10.	1.	7/12
10.	1.	7/29
10.	1.	7/29
10.	1.	7/29
10.	1.	7/29
10.	1.	8/17
11.	1.	8/17
10.	1.	8/17
10.	1.	8/18
10.	3.	9/01
10.	3.	9/01
10.	3.	9/01
10.	3.	9/01
10.	1.	9/01

CV = 46. ± 4.3 ug/L

Result	± Uncer.	Date
49.	5.	9/01
49.	5.	9/01
49.	5.	9/01
49.	5.	9/09
46.	5.	10/12
50.	5.	10/12
46.	5.	11/03
47.	5.	11/03
48.	5.	11/03
49.	5.	11/03
47.	5.	11/03

Ag 83EPA 01 ICPMS

CV = 4.9 ± 0.5 ug/L

Result	± Uncer.	Date
5.0	0.5	3/28
5.0	0.5	3/28
4.8	0.5	3/28

TABLE C-V (cont)

****

EPA Trace Metals in Water
(cont)

****

Ag (cont)

CV = 10. ± 1.18 ug/L

Result	± Uncer.	Date
10.	1.	2/04
10.	1.	2/22
10.	1.	2/23
12.	2.	2/23
10.	1.	2/23
12.	2.	2/23

CV = 24. ug/L

Result	± Uncer.	Date
30.	3.	1/26

Al 84EPA 02 FAA

CV = 110. ± 20. ug/L

Result	± Uncer.	Date
100.	10.	6/24
80.	20.	6/24
90.	20.	6/24

CV = 500. ± 40. ug/L

Result	± Uncer.	Date
590.	10.	6/24
590.	50.	6/24
500.	5.	6/24
590.	4.	6/24

CV = 729. ± 64. ug/L

Result	± Uncer.	Date
870.	10.	6/24
700.	10.	6/24
620.	60.	6/24

As 83EPA 02 FAA

CV = 1. ± 0.1 mg/L

Result	± Uncer.	Date
0.93	0.08	8/22

As 75EPA 02 ETVAA

CV = 22. ± 2. ug/L

Result	± Uncer.	Date
22.	4.	3/15
21.	4.	3/15
23.	5.	3/15
24.	2.	5/25
24.	2.	5/25
24.	2.	5/25
24.	2.	5/25
24.	2.	5/26
24.	2.	5/26
22.	2.	6/03
24.	5.	6/07
22.	4.	6/07
24.	5.	6/07
24.	5.	6/07
25.	5.	6/07
25.	5.	6/07

CV = 27. ± 3. ug/L

Result	± Uncer.	Date
26.	5.	4/18
32.	6.	6/24
28.	6.	6/24
28.	6.	6/24
28.	6.	7/12
27.	5.	7/18
27.	5.	7/18
26.	5.	7/18
27.	5.	7/24
28.	5.	8/17
29.	6.	8/18
28.	6.	8/30
28.	6.	8/30
29.	6.	10/12
28.	6.	10/12
32.	6.	10/12
25.	2.	11/15
25.	2.	11/15

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
95.	10.	11/15

CV = 240. ± 30. ug/L

Result	± Uncer.	Date
210.	20.	8/12

As 83EPA 02 FAA

CV = 1. ± 0.1 mg/L

Result	± Uncer.	Date
0.9	0.1	8/30
1.0	0.1	9/16
1.1	0.5	10/28
1.1	0.5	12/19
1.0	0.5	12/19
2.9	0.5	12/19

As (cont)

0.9	0.5	12/19
1.1	0.5	12/19

CV = 240. ± 30. ug/L

Result	± Uncer.	Date
200.	20.	8/12
260.	20.	8/22
300.	100.	8/30

As 78EPA 01 ICPMS

CV = 22. ug/L

Result	± Uncer.	Date
25.	2.	1/04
24.	2.	1/04
25.	2.	1/05
23.	0.1	1/26
24.	0.3	2/01
23.	1.	2/02
23.	2.	2/03
27.	3.	2/22

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
100.	10.	3/16
100.	10.	3/28
100.	10.	3/28
120.	20.	11/04
120.	20.	11/04
100.	10.	11/14
100.	10.	11/14
100.	10.	12/23
110.	10.	12/23

CV = 200. ± 22. ug/L

Result	± Uncer.	Date
210.	20.	2/03
200.	20.	2/03
200.	20.	2/19
190.	20.	2/19
190.	20.	2/19
190.	20.	2/19
190.	20.	2/19
200.	20.	2/19
220.	20.	2/22
200.	20.	2/23
200.	20.	2/23
200.	20.	2/26
200.	20.	2/26
200.	20.	2/26
200.	20.	2/26
180.	20.	3/01
190.	20.	3/01
180.	20.	3/02
190.	20.	3/02
180.	20.	3/08
180.	20.	3/08
170.	20.	3/28
180.	20.	4/13
190.	20.	4/13

TABLE C-V (cont)

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EPA Trace Metals in Water
(cont)

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As (cont)

180.	20.	4/15
220.	20.	4/15
100.	50.	4/28
210.	20.	5/11
180.	20.	5/11
210.	20.	5/11
200.	20.	5/26
200.	20.	5/26
200.	20.	5/26
170.	20.	6/02
200.	20.	6/02
210.	20.	7/01
210.	20.	7/01
220.	20.	7/01
220.	20.	7/01

CV = 240. ± 30. ug/L

Result	± Uncer.	Date
260.	30.	1/04
250.	20.	1/04
240.	20.	1/05
230.	10.	1/26
230.	10.	1/26
250.	10.	2/01
240.	3.	2/02
250.	20.	2/03
300.	10.	2/22
260.	30.	3/07
280.	30.	6/23
270.	30.	6/23
290.	30.	6/28
250.	10.	7/07
240.	5.	7/19
290.	60.	8/11
230.	20.	8/29
190.	50.	8/29
250.	20.	8/31
260.	30.	8/31
290.	30.	9/22
270.	30.	10/13
240.	20.	12/15

CV = 470. ± 52. ug/L

Result	± Uncer.	Date
480.	50.	1/08
480.	50.	1/08

Ba 83EPA 02 ETVAA

CV = 1.2 ± 0.08 mg/L

Result	± Uncer.	Date
1.1	0.1	11/15
1.2	0.1	11/15
1.1	0.1	11/15

Ba 83EPA 02 FAA

CV = 1.2 ± 0.08 mg/L

Result	± Uncer.	Date
1.2	0.1	3/15
1.1	0.1	3/15
1.2	0.1	3/15
1.2	0.1	3/22
1.2	0.1	3/22
1.2	0.1	3/22
1.2	0.1	4/18
1.3	0.3	5/25
1.3	0.1	5/26
1.3	0.1	6/07
1.3	0.1	6/07
1.4	0.1	6/07
1.3	0.1	6/07
1.2	0.1	6/24
1.2	0.1	6/24
1.2	0.1	6/24
1.2	0.1	6/24
1.3	0.1	6/24
1.3	0.1	6/24
1.2	0.1	7/12
1.2	0.1	7/16
1.2	0.1	7/18
1.2	0.1	7/18
1.2	0.1	7/18
1.2	0.1	7/18
1.1	0.1	7/29
1.2	0.1	7/29
1.2	0.1	7/29
1.2	0.1	8/17
1.2	0.1	8/18
1.2	0.1	8/30
1.2	0.1	8/30
1.3	0.1	9/12
1.1	0.1	9/12
1.2	0.1	9/12
1.2	0.1	9/12
1.2	0.1	9/12
1.2	0.1	10/12
1.2	0.1	10/12
1.2	0.1	10/12
1.2	0.1	11/01
1.1	0.1	11/01
1.2	0.1	11/01
1.1	0.1	11/01
1.6	1.2	11/15
1.2	0.1	11/29
1.2	0.1	11/29
1.2	0.1	11/29

CV = 192. ± 20. ug/L

Result	± Uncer.	Date
180.	20.	3/16

Ba 83EPA 02 ICPMS

CV = 1.2 ± 0.08 mg/L

Result	± Uncer.	Date
1.4	0.4	2/22

Ba (cont)

CV = 5. ± 0.35 mg/L

Result	± Uncer.	Date
4.8	0.5	3/28
4.5	0.4	3/28
4.9	0.5	3/28
4.7	0.5	3/28

CV = 142. ug/L

Result	± Uncer.	Date
170.	20.	1/04
180.	20.	1/04
160.	20.	1/05
180.	10.	1/19
160.	20.	1/26
170.	10.	2/01
170.	5.	2/02
170.	10.	2/02

Be 83EPA 02 FAA

CV = 0.96 ± 0.1 mg/L

Result	± Uncer.	Date
1.0	0.1	10/13
1.0	0.1	10/24

CV = 100. ± 6.38 ug/L

Result	± Uncer.	Date
112.	10.	3/15
111.	10.	3/15
109.	20.	3/15
107.	11.	9/20
101.	10.	9/20
97.	10.	9/20
109.	11.	9/20
89.	9.	9/20
95.	10.	9/20
92.	9.	9/20
99.	10.	9/20
96.	10.	9/20
101.	10.	9/20
96.	10.	9/20
89.	9.	9/20
91.	9.	9/20
88.	9.	9/20
100.	10.	9/20
108.	11.	9/20
98.	10.	9/20
90.	9.	9/20
94.	9.	9/20
100.	10.	9/20
112.	11.	9/20
113.	11.	9/20
86.	9.	9/20
100.	10.	9/20

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EPA Trace Metals in Water
(cont)

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Be 88EPA 01 ICPMS

CV = 100. ± 5. ug/L

Result	± Uncer.	Date
110.	10.	12/23
100.	10.	12/23

CV = 200. ± 12.76 ug/L

Result	± Uncer.	Date
210.	20.	1/20
190.	20.	1/20
190.	20.	1/27
210.	20.	1/27
220.	20.	2/19
210.	20.	2/19
200.	20.	2/19
200.	20.	2/19
220.	20.	2/23
210.	20.	2/23
220.	20.	2/26
220.	20.	2/26
220.	20.	2/26
190.	20.	2/26
220.	20.	3/02
200.	20.	3/24
170.	20.	3/24
190.	20.	3/28
180.	20.	4/05
190.	20.	4/06
220.	20.	4/06
170.	20.	4/13
220.	20.	7/01
220.	20.	7/01
220.	20.	7/01
200.	20.	7/01
320.	30.	7/08
160.	30.	7/08

CV = 235. ± 13. ug/L

Result	± Uncer.	Date
270.	30.	1/04
280.	30.	1/04
280.	30.	1/05
270.	8.	1/26
290.	10.	2/01
270.	7.	2/03
240.	20.	6/23
280.	30.	6/23
224.	20.	6/27
260.	30.	6/27
220.	20.	7/06
290.	50.	7/08
320.	90.	8/26
300.	80.	8/26
260.	70.	8/29
240.	60.	8/29
210.	20.	9/22

Cd 75EPA 02 ETVAA

CV = 2.5 ± 0.3 ug/L

Result	± Uncer.	Date
2.5	0.5	3/15
2.5	0.5	3/15
2.6	0.5	3/15
2.7	0.5	3/15
2.7	0.5	3/15
2.3	0.3	6/03

CV = 9. ± 1. ug/L

Result	± Uncer.	Date
10.	2.	4/18
10.	2.	4/18
9.	2.	6/07
9.	2.	6/07
7.	1.	6/07
9.	2.	6/07
9.	2.	6/07
7.	1.	6/07
9.	2.	6/07
9.	2.	6/07
10.	2.	6/24
9.	2.	7/11
9.	2.	7/11
9.	2.	7/11
9.	2.	7/11
9.	2.	7/11
9.	2.	7/12
9.	2.	7/16
9.	2.	7/16
8.	2.	7/18
10.	2.	7/18
12.	2.	7/18
7.	2.	9/19
8.	2.	9/19
9.	2.	11/03
9.	2.	11/03
11.	1.	11/15
12.	1.	11/15

CV = 25. ± 2. ug/L

Result	± Uncer.	Date
25.	2.	5/26
25.	3.	6/07
24.	5.	6/07

Cd 83EPA 02 FAA

CV = 0.94 ± 0.09 mg/L

Result	± Uncer.	Date
0.8	0.1	8/26
0.8	0.1	9/07
0.8	0.1	9/07
0.9	0.1	9/19
1.0	0.1	10/26

Cd (cont)

CV = 9. ± 1. ug/L

Result	± Uncer.	Date
10.	2.	6/24
10.	1.	11/15
9.	1.	11/15
10.	1.	11/15
9.	1.	11/15

CV = 25. ± 2. ug/L

Result	± Uncer.	Date
25.	5.	8/02
25.	5.	8/02
26.	5.	8/02
25.	3.	8/17
26.	3.	9/07
25.	3.	9/07
25.	3.	9/09
25.	2.	10/12
24.	2.	10/12
26.	3.	10/12
26.	3.	11/01
25.	2.	11/01
24.	2.	11/01
24.	2.	11/01
26.	3.	11/01
26.	3.	11/01
25.	2.	11/01
25.	2.	11/15
26.	3.	11/15
24.	2.	11/15
26.	3.	11/15

CV = 39. ± 3. ug/L

Result	± Uncer.	Date
40.	4.	3/22
41.	4.	3/22
39.	4.	3/22

Cd 78EPA 01 ICPMS

CV = 2.9 ug/L

Result	± Uncer.	Date
3.2	0.3	1/04
2.6	0.3	1/04
2.4	0.2	1/05
3.4	0.8	1/19
2.7	0.1	2/03

CV = 25. ± 1.97 ug/L

Result	± Uncer.	Date
23.	10.	3/16
33.	7.	3/28
29.	6.	3/28
31.	6.	3/28
29.	6.	3/28
24.	2.	11/04
24.	2.	11/04
22.	5.	11/14

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EPA Trace Metals in Water
(cont)

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Cd (cont)

23.	5.	11/14
23.	5.	11/14
21.	5.	11/14
24.	2.	12/23
24.	2.	12/23

CV = 39. ± 3. ug/L

Result	± Uncer.	Date
39.	4.	1/04
43.	4.	1/05
46.	2.	2/03
48.	5.	6/23
42.	4.	6/23
42.	8.	6/28
36.	0.1	6/28
34.	4.	7/07
31.	8.	7/08
45.	6.	7/18
51.	15.	8/11
33.	7.	8/29
42.	4.	8/31
39.	4.	8/31
39.	4.	8/31
33.	3.	10/13

CV = 50. ± 3.94 ug/L

Result	± Uncer.	Date
56.	6.	2/02
56.	6.	2/03
54.	5.	2/03
50.	5.	2/19
47.	5.	2/19
52.	5.	2/19
47.	5.	2/19
47.	5.	2/19
47.	5.	2/19
48.	5.	2/19
48.	5.	2/19
52.	5.	2/22
53.	5.	2/23
53.	5.	2/23
53.	5.	2/23
53.	5.	2/26
54.	5.	2/26
53.	5.	2/26
54.	5.	2/26
47.	5.	3/02
55.	5.	3/02
49.	5.	3/08
48.	5.	3/08
48.	5.	3/28
53.	5.	4/13
50.	5.	4/13
53.	5.	4/15
47.	5.	4/15
51.	5.	5/11
50.	5.	5/11
47.	5.	5/11

Cd (cont)

51.	5.	5/26
52.	5.	5/26
49.	5.	5/26
49.	5.	6/02
44.	4.	6/02
51.	5.	7/01
53.	5.	7/01
53.	5.	7/01
53.	5.	7/01
52.	5.	7/08

CV = 78. ± 6. ug/L

Result	± Uncer.	Date
84.	8.	1/08
83.	8.	1/08

Co 88EPA 01 FAA

CV = 100. ± 6. ug/L

Result	± Uncer.	Date
110.	10.	6/27
100.	7.	6/27

Co 88GAU 03 ICPMS

CV = 200. ± 13.5 ug/L

Result	± Uncer.	Date
210.	20.	3/02
180.	20.	3/02
190.	20.	3/28

CV = 261. ± 15. ug/L

Result	± Uncer.	Date
300.	30.	1/04
310.	30.	1/04
300.	30.	1/04
280.	30.	1/05
280.	4.	8/29
210.	60.	8/29
240.	20.	8/31
290.	30.	8/31
302.	30.	10/13

Cr 84EPA 02 ETVAA

CV = 7. ± 1. ug/L

Result	± Uncer.	Date
8.	1.	7/18
6.	1.	11/03
9.	2.	11/03
8.	2.	11/03
7.	1.	11/03

Cr (cont)

CV = 10. ± 1. ug/L

Result	± Uncer.	Date
8.	2.	3/15
13.	3.	3/15
7.	1.	3/15
10.	2.	3/15
10.	2.	3/15
10.	2.	3/15
9.	2.	3/15
9.	2.	6/07
9.	2.	6/07
10.	2.	6/07

CV = 100. ± 8. ug/L

Result	± Uncer.	Date
110.	10.	6/07
100.	10.	7/11
100.	10.	7/11
100.	20.	7/11
100.	10.	7/11
100.	10.	7/11
100.	20.	7/12
120.	23.	7/13
100.	20.	7/13
100.	20.	7/13
100.	20.	7/16
120.	20.	9/19

CV = 261. ± 24. ug/L

Result	± Uncer.	Date
270.	30.	11/15
260.	30.	11/15

Cr 83EPA 02 FAA

CV = 1.03 ± 0.1 mg/L

Result	± Uncer.	Date
1.0	0.1	8/05
0.9	0.5	9/06
0.7	0.5	10/26
0.9	0.5	12/19

CV = 100. ± 10.2 ug/L

Result	± Uncer.	Date
100.	10.	6/24
100.	10.	6/24
100.	10.	6/24
120.	10.	6/24
100.	10.	6/24
120.	10.	6/24
100.	10.	7/29
100.	10.	7/29
100.	10.	7/29
100.	10.	7/29
100.	10.	8/02
110.	10.	8/02
100.	10.	8/02
90.	10.	8/02

TABLE C-V (cont)

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EPA Trace Metals in Water
(cont)

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Cr (cont)

100.	10.	8/02
100.	10.	8/02
100.	10.	8/02
120.	10.	8/02
100.	10.	8/02
110.	10.	8/02
100.	10.	8/02
100.	10.	8/17
100.	50.	8/23
90.	50.	8/23
90.	50.	8/23
110.	10.	9/01
110.	10.	9/01
110.	10.	9/01
100.	10.	9/01
100.	10.	9/01
120.	50.	9/07
110.	50.	9/07
110.	50.	9/07
120.	50.	9/07
110.	10.	9/09
100.	10.	10/12
100.	10.	10/12
100.	10.	10/12
100.	10.	11/01

CV = 261. ± 24. ug/L

Result	± Uncer.	Date
250.	20.	3/22
260.	30.	3/22
260.	30.	3/22
280.	30.	4/18
280.	30.	4/18
250.	20.	8/31

Cr 78EPA 01 ICPMS

CV = 11. ug/L

Result	± Uncer.	Date
11.	1.	1/04
11.	1.	1/04
11.	1.	1/04
12.	1.	1/05
9.	5.	1/15
12.	2.	1/26
12.	1.	2/01
11.	1.	2/02

CV = 100. ± 10.2 ug/L

Result	± Uncer.	Date
90.	10.	3/16
100.	10.	3/28
90.	18.	3/28
90.	18.	3/28
90.	9.	3/28

Cr (cont)

120.	12.	11/04
120.	12.	11/04
120.	10.	11/14
120.	10.	11/14
100.	10.	12/23
90.	9.	12/23
90.	9.	12/23
90.	9.	12/23

CV = 200. ± 20.4 ug/L

Result	± Uncer.	Date
220.	20.	2/03
220.	20.	2/03
190.	20.	2/19
180.	20.	2/19
200.	20.	2/19
190.	20.	2/19
210.	20.	2/19
190.	20.	2/19
210.	20.	2/19
190.	20.	2/19
200.	20.	2/19
180.	20.	2/19
190.	20.	2/22
200.	20.	2/23
220.	20.	2/23
200.	20.	2/23
180.	20.	2/26
180.	20.	2/26
190.	20.	2/26
200.	20.	2/26
200.	20.	3/01
180.	20.	3/01
220.	20.	3/02
180.	20.	3/08
180.	20.	3/08
190.	20.	3/28
180.	20.	4/13
230.	20.	4/15
180.	20.	4/15
180.	20.	5/11
210.	20.	5/11
210.	20.	5/11
200.	20.	6/02
170.	20.	6/02
200.	20.	7/01
200.	20.	7/01
200.	20.	7/01
200.	20.	7/01
200.	20.	7/01
200.	20.	7/01
200.	20.	7/01
200.	20.	7/01

CV = 261. ± 24. ug/L

Result	± Uncer.	Date
260.	30.	1/04
260.	30.	1/04
260.	30.	1/05
310.	20.	1/15
240.	20.	1/26
240.	20.	2/01
240.	10.	2/02
280.	30.	3/07
280.	30.	6/23

Cr (cont)

270.	30.	6/23
280.	30.	6/27
320.	30.	6/27
250.	10.	7/06
250.	10.	8/29
210.	80.	8/29
260.	30.	8/31
260.	30.	8/31
340.	30.	10/13

CV = 522. ± 48. ug/L

Result	± Uncer.	Date
530.	50.	1/08
520.	50.	1/08

Cu 83EPA 02 FAA

CV = 1.03 ± 0.1 mg/L

Result	± Uncer.	Date
1.1	0.5	9/01

CV = 100. ± 6.2 ug/L

Result	± Uncer.	Date
100.	10.	6/07
100.	10.	6/07
110.	20.	6/07
100.	10.	6/27
100.	10.	7/18
100.	10.	7/18
100.	10.	7/18
110.	10.	7/18
100.	10.	7/28
100.	10.	7/28
110.	10.	7/28
100.	10.	7/28
100.	10.	7/28
100.	10.	7/29
110.	10.	7/29
100.	10.	7/29
110.	10.	8/02
100.	10.	8/02
100.	10.	8/02
100.	10.	8/02
100.	10.	8/02
100.	10.	8/02
100.	10.	8/02
100.	10.	8/02
90.	10.	9/13
100.	10.	9/13
100.	20.	9/13
100.	10.	9/13
110.	20.	9/13
100.	20.	9/13
100.	20.	9/13
90.	10.	9/13
100.	10.	11/03
100.	10.	11/03
100.	10.	11/03
100.	10.	11/03

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EPA Trace Metals in Water
(cont)

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Cu (cont)

CV = 339. ± 17. ug/L

Result	± Uncer.	Date
330.	30.	7/12
340.	30.	7/12
340.	30.	7/12
340.	30.	7/12
340.	30.	9/19
330.	30.	9/19
350.	40.	11/15
330.	30.	11/15
330.	30.	11/15
330.	30.	11/15

Cu 88EPA 01 ICPMS

CV = 100. ± 5. ug/L

Result	± Uncer.	Date
110.	10.	11/14
110.	10.	11/14
90.	10.	12/23
90.	9.	12/23

CV = 200. ± 12.4 ug/L

Result	± Uncer.	Date
190.	20.	2/23
190.	20.	2/23
200.	20.	3/02
180.	20.	3/02
180.	20.	3/28
180.	20.	7/11
180.	20.	7/11

CV = 339. ± 17. ug/L

Result	± Uncer.	Date
330.	30.	1/04
330.	30.	1/04
310.	20.	1/26
320.	20.	2/01
310.	2.	2/02
300.	7.	2/02
320.	30.	2/22
350.	30.	3/07
350.	40.	6/23
320.	30.	6/23
390.	40.	6/27
350.	10.	6/27
310.	40.	7/07
280.	60.	7/11
280.	50.	7/11
330.	7.	7/19
350.	20.	8/11
250.	80.	8/29
330.	2.	8/29

Cu (cont)

340.	30.	8/31
360.	40.	8/31
350.	40.	10/13
280.	30.	12/15

Fe 84EPA 02 ETVAA

CV = 797. ± 47. ug/L

Result	± Uncer.	Date
840.	80.	1/26
940.	90.	2/09
880.	90.	2/10

Fe 83EPA 02 FAA

CV = 1.02 ± 0.1 mg/L

Result	± Uncer.	Date
1.1	0.5	8/11
1.0	0.1	8/11

CV = 100. ± 8.78 ug/L

Result	± Uncer.	Date
100.	10.	6/07
100.	10.	6/07
100.	20.	6/07
100.	20.	7/28
100.	20.	7/28
90.	20.	7/28
100.	20.	8/02
90.	20.	8/02
100.	20.	8/02
100.	20.	8/02
110.	20.	8/02
110.	20.	8/02
110.	20.	9/07
110.	10.	9/19
90.	10.	11/03
100.	10.	11/03
100.	10.	11/03
100.	10.	11/03

CV = 797. ± 47. ug/L

Result	± Uncer.	Date
860.	90.	1/21
840.	80.	1/21
860.	90.	1/22
880.	90.	1/22
900.	90.	1/22
870.	90.	1/22
850.	80.	1/22
820.	80.	1/22
760.	80.	2/01
860.	90.	2/01
810.	80.	7/12
800.	80.	7/12
800.	80.	7/12
1000.	90.	8/11
900.	90.	8/11
900.	500.	8/11

Fe (cont)

700.	70.	9/19
750.	80.	9/19
810.	80.	11/15
760.	80.	11/15
770.	80.	11/15

Fe 84EPA 02 ICPES

CV = 21. ± 3. ug/L

Result	± Uncer.	Date
22.	2.	12/23
23.	2.	12/23
19.	2.	12/23
23.	2.	12/23

CV = 797. ± 47. ug/L

Result	± Uncer.	Date
780.	80.	12/23

Fe 88GAU 03 ICPMS

CV = 200. ± 17.56 ug/L

Result	± Uncer.	Date
180.	20.	3/02
180.	20.	3/28

CV = 797. ± 47. ug/L

Result	± Uncer.	Date
960.	100.	3/04
960.	100.	3/04

Hg 88EPA 01 CVAA

CV = 5. ± 0.6 ug/L

Result	± Uncer.	Date
5.1	0.1	11/01

CV = 16. ± 1.7 ug/L

Result	± Uncer.	Date
16.	2.	3/11
17.	2.	3/11
17.	2.	3/15
16.	2.	3/15
16.	2.	3/15
16.	2.	3/16
14.	2.	3/17
16.	2.	3/31
16.	2.	3/31
15.	2.	3/31
17.	2.	3/31
16.	2.	3/31
16.	2.	4/08
18.	2.	4/08
16.	2.	4/08

TABLE C-V (cont)

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EPA Trace Metals in Water
(cont)

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Hg (cont)

17.	2.	5/02
17.	2.	5/02
16.	1.	7/29
12.	10.	9/01
14.	1.	9/07
17.	10.	9/07
16.	0.1	10/25
15.	1.	12/12
17.	2.	12/22

Hg 84EPA 02 ICPMS

CV = 9. ± 1. ug/L

Result	± Uncer.	Date
11.	2.	7/07

CV = 10. ± 1.52 ug/L

Result	± Uncer.	Date
12.	1.	1/20
12.	2.	1/27
8.	2.	2/19
7.	3.	2/19
12.	2.	2/22
13.	2.	2/23
8.	2.	2/26
8.	2.	2/26
8.	2.	2/26
8.	2.	3/08
9.	1.	3/08
10.	1.	3/28
9.	1.	4/13
11.	1.	4/15
11.	1.	4/15
11.	2.	5/11
13.	2.	5/11
12.	2.	5/11
9.	1.	5/26
8.	1.	5/26
8.	1.	5/26
11.	1.	6/02
9.	1.	6/02
8.	1.	6/22
7.	1.	6/22
14.	2.	7/01
12.	2.	7/01
10.	1.	7/01
9.	1.	7/01

CV = 17.46 ± 2. ug/L

Result	± Uncer.	Date
20.	5.	1/08
22.	5.	1/08

Mn 83EPA 02 FAA

CV = 1.02 ± 0.1 mg/L

Result	± Uncer.	Date
1.1	0.5	9/01

Mn 88GAU 03 ICPMS

CV = 200. ± 11.58 ug/L

Result	± Uncer.	Date
200.	20.	2/22
190.	20.	2/23
180.	20.	2/23
180.	20.	2/23
210.	20.	3/02
190.	20.	3/02
190.	20.	3/28
160.	20.	6/02
200.	20.	6/02

CV = 348. ± 21. ug/L

Result	± Uncer.	Date
370.	40.	1/04
370.	40.	1/04
360.	40.	1/05
400.	10.	1/15
320.	30.	1/26
340.	2.	2/02
350.	40.	3/04
370.	40.	6/23
350.	30.	6/23
420.	40.	6/27
360.	40.	6/27
330.	10.	7/06
380.	40.	8/11
290.	100.	8/29
330.	20.	8/29
370.	40.	8/31
350.	40.	8/31
430.	40.	10/13
410.	60.	12/15

Mo 83EPA 02 ICPMS

CV = 1.7 ± 0.2 mg/L

Result	± Uncer.	Date
2.0	0.2	2/23
2.2	0.2	2/23

Ni 86EPA 02 ETVAA

CV = 100. ± 7.89 ug/L

Result	± Uncer.	Date
98.	9.	5/25

Ni 86EPA 02 FAA

CV = 100. ± 7.89 ug/L

Result	± Uncer.	Date
110.	10.	3/15
100.	10.	3/15
100.	10.	3/15
110.	40.	4/18
110.	40.	4/18
90.	40.	4/18
100.	40.	4/18
110.	40.	4/18
100.	10.	5/26
100.	10.	6/07
90.	10.	6/07
90.	10.	6/07
100.	10.	6/07
100.	10.	7/12
100.	10.	7/18
90.	10.	7/18
110.	10.	7/18
110.	40.	7/28
100.	40.	7/28
100.	40.	7/28
100.	40.	7/28
100.	40.	7/28
100.	40.	7/28
100.	40.	11/02
100.	40.	11/02
110.	40.	11/02
100.	40.	11/02
100.	40.	11/02

CV = 207. ± 15. ug/L

Result	± Uncer.	Date
210.	20.	3/22
210.	20.	3/22
210.	20.	3/22

Ni 86EPA 02 ICPMS

CV = 100. ± 7.89 ug/L

Result	± Uncer.	Date
90.	10.	3/16
100.	10.	3/28
100.	10.	3/28
100.	10.	3/28
100.	10.	3/28
110.	10.	11/14
110.	10.	11/14
120.	10.	11/14
80.	10.	12/23

CV = 200. ± 15.78 ug/L

Result	± Uncer.	Date
220.	20.	2/22
200.	20.	2/23
200.	20.	2/23
210.	20.	3/02
180.	20.	3/08
190.	20.	3/08
190.	20.	3/08

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EPA Trace Metals in Water
(cont)

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Ni (cont)

190.	20.	3/28
170.	20.	4/15
240.	20.	4/15
200.	20.	5/26
200.	20.	5/26
190.	20.	5/26
220.	20.	6/02
170.	20.	6/02

CV = 207. ± 15. ug/L

Result	± Uncer.	Date
210	20.	1/04
190.	20.	1/04
280.	30.	1/05
210.	11.	1/26
200.	9.	2/01
220.	3.	2/02
190.	40.	2/03
350.	40.	3/04
240.	20.	3/04
240.	20.	3/04
190.	20.	7/07
190	20.	7/19

Pb 75EPA 02 ETVAA

CV = 24. ± 2. ug/L

Result	± Uncer.	Date
20.	5.	3/15
23.	5.	3/15
24.	5.	3/15
22.	4.	3/15
23.	5.	3/15
23.	5.	3/15
24.	2.	5/19
24.	2.	5/19
21.	4.	5/26
22.	2.	6/02
26.	3.	6/02
48.	10.	6/07
42.	8.	6/07
26.	5.	6/07
45.	8.	6/07
41.	8.	6/07
22.	4.	6/07
24.	2.	6/09
24.	2.	6/09
24.	2.	6/09

CV = 43. ± 4. ug/L

Result	± Uncer.	Date
42.	8.	4/18
44.	9.	4/18
36.	8.	4/18
42.	8.	6/07

Pb (cont)

41.	8.	6/07
45.	9.	6/07
60.	6.	6/09
46.	9.	6/24
46.	9.	6/24
49.	10.	7/11
41.	8.	7/11
43.	9.	7/11
43.	9.	7/11
43.	9.	7/11
44.	9.	7/11
44.	9.	7/12
43.	9.	7/14
40.	8.	7/14
43.	9.	7/16
54.	11.	7/18
46.	9.	7/18
47.	9.	7/18
46.	9.	7/18
41.	8.	7/18
42.	8.	9/19
39.	8.	9/19
43.	9.	11/03
43.	9.	11/03
40.	4.	11/15
42.	4.	11/15

CV = 100. ± 8. ug/L

Result	± Uncer.	Date
100.	10.	5/25
100.	10.	5/26
100.	20.	6/07
100.	20.	6/07

Pb 83EPA 02 FAA

CV = 1.01 ± 0.1 mg/L

Result	± Uncer.	Date
1.1	0.5	9/01
1.1	0.5	9/07
1.1	0.1	9/14
1.0	0.5	10/24

CV = 43. ± 4. ug/L

Result	± Uncer.	Date
50.	10.	6/24
40.	40.	11/15
40.	40.	11/15
40.	40.	11/15

CV = 100. ± 8.4 ug/L

Result	± Uncer.	Date
90.	50.	7/29
90.	50.	7/29
90.	20.	8/02
90.	20.	8/02
100.	50.	8/17
100.	10.	9/09
100.	100.	10/12
110.	100.	10/12

Pb (cont)

120.	100.	11/02
120.	100.	11/02
90.	100.	11/02
100.	100.	11/15
90.	100.	11/15
100.	100.	11/15
90.	100.	11/15

CV = 435. ± 31. ug/L

Result	± Uncer.	Date
450.	40.	3/22
440.	40.	3/22
430.	40.	3/22
450.	20.	8/02
440.	20.	8/02
410.	20.	8/02
430.	20.	8/02
420.	20.	8/02

Pb 78EPA 01 ICPMS

CV = 22. ug/L

Result	± Uncer.	Date
24.	2.	1/04
26.	3.	1/04
23.	2.	1/04
24.	2.	1/05
24.	1.	1/19
20.	2.	1/26
23.	2.	2/01
23.	2.	2/01
23.	2.	2/02
24.	1.	2/22

CV = 26. ± 4. ug/L

Result	± Uncer.	Date
23.	2.3	5/06

CV = 100. ± 8.4 ug/L

Result	± Uncer.	Date
110.	10.	3/16
100.	10.	3/28
100.	10.	3/28
90.	10.	3/28
110.	10.	3/28
110.	10.	11/04
110.	10.	11/04
110.	10.	11/14
110.	10.	11/14
100.	10.	12/23
100.	10.	12/23

CV = 200. ± 16.8 ug/L

Result	± Uncer.	Date
230.	20.	1/20
230.	20.	1/27
220.	20.	2/03
210.	20.	2/03

TABLE C-V (cont)

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EPA Trace Metals in Water
(cont)

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Pb (cont)

240.	20.	2/19
190.	20.	2/19
180.	20.	2/19
190.	20.	2/19
170.	20.	2/19
200.	20.	2/19
190.	20.	2/19
210.	20.	2/19
220.	20.	2/22
190.	20.	2/23
200.	20.	2/23
250.	20.	2/26
240.	20.	2/26
230.	20.	2/26
180.	20.	3/01
200.	20.	3/01
180.	20.	3/02
220.	20.	3/02
220.	20.	3/08
220.	20.	3/08
170.	20.	3/24
220.	20.	3/24
200.	20.	3/28
200.	20.	4/05
210.	20.	4/05
160.	20.	4/06
170.	20.	4/06
240.	20.	4/13
200.	20.	4/13
210.	20.	4/13
200.	20.	4/14
200.	20.	4/14
200.	20.	4/15
200.	20.	4/15
200.	20.	5/11
200.	20.	5/11
200.	20.	5/11
220.	20.	5/26
220.	20.	5/26
220.	20.	5/26
200.	20.	6/02
200.	20.	6/02
220.	20.	7/01
220.	20.	7/01
220.	20.	7/01
210.	20.	7/01
230.	20.	7/01
220.	20.	7/01
210.	20.	7/01
220.	20.	7/01
210.	20.	7/01
230.	20.	7/01
220.	20.	7/01
210.	20.	7/01
200.	20.	7/11

Pb (cont)

CV = 435. ± 31. ug/L

Result	± Uncer.	Date
420.	40.	1/04
490.	50.	1/04
410.	40.	1/04
370.	40.	1/05
480.	10.	1/19
420.	8.	1/26
530.	40.	2/01
560.	40.	2/02
430.	40.	3/04
400.	40.	5/06
460.	50.	6/24
430.	1.	6/24
410.	40.	6/28
460.	30.	6/28
530.	90.	7/07
510.	70.	7/11
440.	40.	8/11
440.	40.	8/19
420.	40.	8/19
310.	60.	8/26
560.	110.	8/26
440.	40.	8/31
420.	40.	8/31
380.	40.	9/22
360.	40.	10/13
440.	40.	12/16

CV = 870. ± 62. ug/L

Result	± Uncer.	Date
970.	100.	1/08
920.	90.	1/08

Sb 83EPA 02 FAA

CV = 0.99 ± 0.1 mg/L

Result	± Uncer.	Date
0.7	0.1	9/12
1.1	0.1	12/09

Sb 86EPA 02 ICPMS

CV = 20. ± 4. ug/L

Result	± Uncer.	Date
19.	2.	2/22
22.	2.	2/23
19.	2.	2/23
19.	2.	2/23
20.	2.	2/23
18.	2.	6/21
20.	2.	6/21

Se 75EPA 02 ETVAA

CV = 6. ± 1. ug/L

Result	± Uncer.	Date
6.	2.	2/17
6.	2.	2/17
6.	2.	2/17
6.	2.	2/17
6.	2.	2/17
7.	2.	2/17
6.	2.	2/17
6.	2.	2/17
6.	1.	3/14
6.	1.	3/15
5.	1.	3/15
7.	1.	3/15
5.	1.	3/15
6.	1.	5/25
6.	1.	5/25
6.	1.	5/25
6.	1.	5/25
6.	1.	5/26
6.	1.	5/26
6.	1.	6/07
7.	1.	6/07
6.	1.	6/07
6.	1.	6/07
7.	1.	6/07
6.	1.	6/07
7.	1.	7/12

CV = 11. ± 2. ug/L

Result	± Uncer.	Date
11.	2.	4/18
10.	2.	6/24
8.	2.	6/24
10.	2.	6/24
10.	2.	7/12
10.	2.	7/18
8.	2.	7/18
10.	2.	7/18
10.	2.	7/24
11.	2.	8/17
11.	2.	8/18
11.	2.	8/29
12.	1.	9/26
11.	1.	9/26
13.	1.	9/26
10.	1.	9/26
13.	1.	9/26
13.	1.	9/26
12.	1.	9/26
12.	1.	9/26
14.	3.	9/26
13.	1.	9/26
11.	1.	9/26
13.	1.	9/26
12.	1.	9/26
11.	2.	10/07
10.	2.	10/07
11.	2.	10/12
10.	2.	10/12
11.	2.	10/12
9.	1.	11/15
9.	1.	11/15

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EPA Trace Metals in Water
(cont)

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Se (cont)

CV = 25. ± 3. ug/L

Result	± Uncer.	Date
25.	2.	5/25
25.	5.	9/09
26.	6.	9/09
22.	2.	11/15

CV = 50. ± 5. ug/L

Result	± Uncer.	Date
48.	5.	9/06
54.	6.	9/06
42.	5.	9/06

Se 83EPA 02 FAA

CV = 0.99 ± 0.1 mg/L

Result	± Uncer.	Date
0.9	0.1	8/30
1.0	0.1	9/20
0.9	0.1	11/08
1.1	0.1	12/12

Se 84EPA 02 ICPES

CV = 11. ± 2. ug/L

Result	± Uncer.	Date
12.	1.	12/23
10.	1.	12/23
10.	1.	12/23
11.	1.	12/23

CV = 50. ± 5. ug/L

Result	± Uncer.	Date
570.	60.	12/23

Se 86EPA 02 ICPMS

CV = 25. ± 2. ug/L

Result	± Uncer.	Date
30.	10.	3/16
32.	6.	3/28
37.	8.	3/28
27.	3.	11/04
20.	10.	11/14
27.	3.	12/23
25.	2.	12/23

CV = 50. ± 8.12 ug/L

Result	± Uncer.	Date
47.	5.	2/03
40.	10.	2/19
40.	10.	2/19
50.	5.	2/22
49.	5.	2/23
40.	10.	2/26
45.	5.	2/26
40.	10.	2/26
< 100.		3/01
51.	5.	3/02
48.	5.	3/08
44.	5.	3/08
39.	4.	3/28
45.	5.	4/13
45.	5.	5/11
49.	5.	5/11
38.	5.	5/11
47.	5.	5/26
52.	5.	5/26
46.	5.	6/02
41.	5.	6/02
40.	5.	7/01
54.	5.	7/01
57.	6.	7/01
44.	5.	7/01
51.	5.	8/31

CV = 100.4 ± 10. ug/L

Result	± Uncer.	Date
89.	9.	1/08
86.	9.	1/08

Tl 86EPA 02 ETVAA

CV = 20. ± 3.36 ug/L

Result	± Uncer.	Date
20.	4.	7/12
20.	4.	7/18
20.	4.	7/18

Tl 83EPA 02 FAA

CV = 1.01 ± 0.1 mg/L

Result	± Uncer.	Date
1.0	0.1	8/30

Tl 81EPA 01 ICPMS

CV = 6.3 ± 0.8 ug/L

Result	± Uncer.	Date
5.	10.	3/16
5.6	0.6	3/28
6.1	0.6	3/28
6.0	0.6	3/28
5.7	0.6	3/28

CV = 20. ± 3.36 ug/L

Result	± Uncer.	Date
21.	2.	2/23
19.	2.	2/23
19.	2.	2/23

V 86EPA 02 FAA

CV = 250. ± 21.4 ug/L

Result	± Uncer.	Date
250.	20.	6/27
240.	5.	6/27
300.	200.	8/26
300.	200.	8/26
200.	200.	8/26
200.	200.	8/26
200.	200.	8/26

V 84EPA 02 ICPMS

CV = 846. ± 69. ug/L

Result	± Uncer.	Date
1000.	100.	1/04
1000.	100.	1/04
1000.	100.	1/05

Zn 86EPA 02 FAA

CV = 100. ± 7.36 ug/L

Result	± Uncer.	Date
110.	10.	6/07
100.	10.	6/07
110.	20.	6/07
110.	10.	6/07
100.	10.	6/07
100.	10.	6/07
100.	10.	6/07
100.	10.	7/28
100.	10.	7/28
100.	10.	7/28
90.	10.	9/07
100.	10.	9/13
100.	10.	9/13
100.	10.	9/13
100.	10.	9/13
100.	10.	9/13
90.	10.	9/19
110.	10.	11/03
110.	10.	11/03
110.	10.	11/03
110.	10.	11/03
100.	10.	11/03

CV = 418. ± 17. ug/L

Result	± Uncer.	Date
440.	40.	7/12
430.	40.	7/12
416.	40.	9/19

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EPA Trace Metals in Water
(cont)

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Zn (cont)

420.	40.	9/19
420.	40.	11/15
430.	40.	11/15
430.	40.	11/15
430.	40.	11/15

Zn 86EPA 02 ICPMS

CV = 100. ± 7.36 ug/L

Result	± Uncer.	Date
100.	10.	3/16
100.	10.	3/28
110.	10.	3/28
100.	10.	3/28
100.	10.	3/28
120.	10.	11/04
120.	10.	11/04
90.	10.	11/14
90.	10.	11/14
100.	10.	12/23
100.	10.	12/23

CV = 200. ± 14.72 ug/L

Result	± Uncer.	Date
200.	20.	3/02
210.	20.	3/02
190.	20.	3/28
190.	20.	4/15
240.	20.	4/15
210.	20.	6/02
180.	20.	6/02
190.	20.	7/01
190.	20.	7/01
200.	20.	7/01
190.	20.	7/01
190.	20.	7/01
190.	20.	7/01
190.	20.	7/01
200.	20.	7/01
210.	20.	7/08

CV = 418. ± 17. ug/L

Result	± Uncer.	Date
430.	40.	1/04
440.	40.	1/04
380.	40.	1/05
430.	50.	1/15
410.	10.	1/26
450.	20.	2/02
430.	20.	2/02
410.	10.	2/02
410.	40.	3/07
360.	40.	6/23
430.	20.	6/23
420.	40.	6/28

Zn (cont)

430.	40.	6/28
400.	10.	7/07
430.	10.	7/08
430.	40.	8/11
460.	10.	8/29
300.	100.	8/29
460.	50.	8/31
440.	40.	8/31
370.	40.	12/15

****

EPA Tritium in Water Blank
Feb. 1988

****

H-3 88EPA 01 LS

CV = Blank (pCi/L)

Result	± Uncer.	Date
- 100.	300.	2/24
< 300.		2/24
- 600.	300.	2/24

****

EPA Tritium in Water Blank
June 1988

****

H-3 88EPA 01 LS

CV = Blank (pCi/L)

Result	± Uncer.	Date
- 100.	300.	7/01
- 300.	300.	7/01
- 300.	300.	7/01

****

EPA Tritium in Water Blank
Oct. 1988

****

H-3 88EPA 01 LS

CV = Blank (pCi/L)

Result	± Uncer.	Date
< 300.		11/07
< 300.		11/07
< 300.		11/07

****

EPA Tritium in Water, Oct.1987

****

H-3 87EPA 01 LS

CV = 4492. ± 449.2 pCi/L

Result	± Uncer.	Date
4700.	600.	1/11
5100.	600.	1/11
4200.	600.	1/11

****

EPA Tritium in Water, Feb.1988

****

H-3 88EPA 01 LS

CV = 3327. ± 362. pCi/L

Result	± Uncer.	Date
4100.	600.	2/24
3500.	500.	2/24
4000.	600.	2/24

****

EPA Tritium in Water
June 1988

****

H-3 88EPA 01 LS

CV = 5565. ± 557. pCi/L

Result	± Uncer.	Date
5200.	600.	7/01
5500.	700.	7/01
5800.	700.	7/01

****

EPA Tritium in Water, Oct.1988

****

H-3 88EPA 01 LS

CV = 2067. ± 367. pCi/L

Result	± Uncer.	Date
2100.	400.	11/07
2600.	400.	11/07
1500.	300.	11/07

TABLE C-V (cont)

****

EPA Turbidity in Water

****

Turbidity 78EPA 01 COLOR

CV = 4.27 ± 0.31 NTU

Result	± Uncer.	Date
4.3	0.9	10/24
4.3	0.9	10/24
4.5	0.9	10/24
4.5	0.9	10/24
4.5	0.9	10/24

****

EPA Uranium in Water

****

U 88GAU 04 ICPMS

CV = 20. ± 9. ug/L

Result	± Uncer.	Date
21.	2.	3/09
19.	2.	3/09
23.	2.	3/21
21.	2.	3/21
24.	2.	3/21
20.	2.	3/21
20.	2.	3/21
22.	2.	3/21
19.	2.	3/22
18.	2.	3/22
19.	2.	3/25
22.	2.	3/25
21.	2.	3/28
24.	2.	3/28
21.	2.	4/29
20.	2.	4/29
21.	2.	4/29
23.	2.	5/02
25.	3.	5/02
28.	3.	5/02
22.	2.	5/02
19.	2.	5/09
20.	2.	5/09
21.	2.	5/09
20.	2.	5/09
20.	2.	5/09
19.	2.	5/09
21.	2.	5/09
22.	2.	5/31
28.	3.	5/31
26.	3.	5/31
19.	2.	5/31
25.	5.	6/02
19.	2.	6/02
18.	2.	6/02
18.	2.	6/02
18.	2.	6/02
18.	4.	6/02
20.	2.	6/02
17.	3.	6/02
16.	3.	6/02

U (cont)

18.	2.	6/02
19.	2.	6/03
20.	2.	6/03
19.	2.	6/03
19.	2.	6/03
19.	2.	6/07
19.	2.	6/07
19.	2.	6/07
19.	2.	6/07
18.	2.	6/23
21.	2.	6/23
20.	2.	6/23
20.	2.	6/23
20.	2.	6/23
19.	2.	6/23
19.	2.	6/23
18.	2.	6/23
19.	2.	6/23
18.	2.	6/23
19.	2.	6/23
23.	2.	6/23
21.	2.	6/28
18.	2.	6/28
19.	2.	8/05
21.	2.	8/05
21.	2.	8/31
21.	2.	8/31
19.	2.	8/31
22.	2.	8/31
21.	2.	8/31
21.	2.	9/23
22.	2.	9/23
21.	2.	9/23
22.	2.	9/23
22.	2.	9/23
21.	2.	9/23
22.	2.	9/23
21.	2.	9/23
17.	2.	9/26
21.	2.	10/19
22.	2.	10/19
21.	2.	10/19
22.	2.	10/19
27.	3.	10/19
20.	2.	10/19
21.	2.	10/19
21.	2.	10/19
20.	2.	10/19
19.	2.	10/19
21.	2.	10/19
20.	2.	10/19
20.	2.	10/19
21.	2.	10/20
21.	2.	10/20
21.	2.	10/20
19.	2.	10/20
20.	2.	10/20
20.	2.	10/25
20.	2.	10/25
20.	2.	10/25
20.	2.	10/25
19.	2.	10/25
20.	2.	10/28
24.	1.	10/28
24.	2.	10/28
20.	1.	10/28
21.	2.	10/28
20.	2.	10/28
24.	2.	10/28

U (cont)

20.	1.	10/28
23.	1.	10/28
23.	2.	10/28
24.	1.	10/28
20.	1.	10/28
21.	1.	10/28
23.	1.	10/28
20.	1.	10/28
24.	1.	10/28
24.	1.	10/28
20.	2.	10/28
21.	1.	10/28
21.	2.	10/28
23.	2.	10/28
24.	2.	10/28
24.	2.	10/28
20.	2.	10/28
23.	2.	10/31
20.	2.	10/31
21.	2.	10/31
20.	2.	10/31
24.	2.	10/31
24.	2.	10/31
22.	2.	11/10
22.	2.	11/10
21.	2.	11/10
21.	2.	11/10
12.	1.	11/17
21.	2.	11/23
20.	2.	11/23
18.	2.	11/23
20.	2.	11/23
21.	2.	11/23
21.	2.	11/23
20.	2.	12/06
21.	2.	12/06
20.	2.	12/06
21.	2.	12/06
20.	2.	12/06
21.	2.	12/06
20.	2.	12/06
20.	2.	12/06
21.	2.	12/06
21.	2.	12/06
20.	2.	12/06
20.	2.	12/06
20.	2.	12/06
21.	2.	12/08
23.	2.	12/08
21.	2.	12/08
21.	2.	12/08
14.	1.	12/08
23.	2.	12/08
20.	2.	12/09
20.	2.	12/09
20.	2.	12/09
20.	2.	12/09
18.	2.	12/09
21.	2.	12/09
20.	2.	12/09
20.	2.	12/12
23.	2.	12/12
24.	2.	12/12
20.	2.	12/12
24.	2.	12/12
20.	2.	12/12
20.	2.	12/13
22.	2.	12/13
21.	2.	12/13

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EPA Uranium in Water
(cont)

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U (cont)

21.	2.	12/13
22.	2.	12/13
22.	2.	12/13
21.	2.	12/14
21.	2.	12/14
21.	2.	12/14
21.	2.	12/14
22.	2.	12/14
22.	2.	12/14
21.	2.	12/19
22.	2.	12/19
21.	2.	12/19
20.	2.	12/20
20.	2.	12/20
20.	2.	12/20
20.	2.	12/20
20.	2.	12/20
21.	2.	12/20
21.	2.	12/20
20.	2.	12/20
20.	2.	12/20
20.	2.	12/20
21.	2.	12/20
21.	2.	12/20
25.	2.	12/20
25.	2.	12/20
19.	2.	12/21
19.	2.	12/23
19.	2.	12/23

U-235/238 88GAU 04 ICPMS

CV = 0.0073 ± 0.0001 ratio

Result	± Uncer.	Date
0.0078	0.0007	12/06
0.0073	0.0007	12/06
0.0065	0.0007	12/06
0.0073	0.0007	12/06
0.0069	0.0007	12/06
0.0065	0.0007	12/06
0.0069	0.0007	12/06
0.0065	0.0007	12/06
0.0073	0.0007	12/06
0.0068	0.0007	12/08
0.0084	0.0008	12/08
0.0083	0.0008	12/09
0.0085	0.0009	12/09
0.0074	0.0007	12/09
0.0074	0.0007	12/12
0.0059	0.0006	12/12
0.0060	0.0006	12/12
0.0080	0.0008	12/12
0.0063	0.0006	12/12
0.0066	0.0007	12/12
0.0073	0.0007	12/13
0.0069	0.0007	12/13
0.0067	0.0007	12/13
0.0070	0.0007	12/13
0.0070	0.0007	12/13

U-235/238 (cont)

0.0072	0.0007	12/13
0.0063	0.0006	12/14
0.0072	0.0007	12/14
0.0075	0.0008	12/14
0.0082	0.0008	12/14
0.0075	0.0008	12/14
0.0074	0.0007	12/14
0.0077	0.0008	12/19
0.0085	0.0009	12/19
0.0088	0.0009	12/19
0.0076	0.0008	12/19
0.0067	0.0007	12/19
0.0069	0.0007	12/19
0.0069	0.0007	12/20
0.0073	0.0007	12/20
0.0078	0.0008	12/20
0.0069	0.0007	12/20
0.0082	0.0008	12/20
0.0078	0.0008	12/20
0.0067	0.0007	12/20
0.0070	0.0007	12/20
0.0076	0.0008	12/20
0.0074	0.0007	12/20
0.0068	0.0007	12/20
0.0077	0.0008	12/20

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EPA Uranium in Water
Sept. 1984

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Th 88BEL 01 ICPMS

CV = 100. ± 5. ug/L

Result	± Uncer.	Date
100.	10.	2/19
120.	10.	2/19

U 84EPA 01 ICPMS

CV = 31. ± 6. ug/L

Result	± Uncer.	Date
32.	3.	1/13
27.	3.	1/20
27.	3.	1/27
28.	3.	2/19
28.	3.	2/19
26.	3.	2/19
32.	3.	2/19
26.	3.	2/19
29.	3.	2/19
27.	3.	2/19
36.	4.	2/19
31.	3.	2/19
37.	4.	2/25
33.	3.	2/25
34.	3.	2/26
27.	3.	2/26
25.	3.	2/26
28.	3.	2/26
34.	3.	3/04
35.	4.	3/07
34.	3.	3/09

****

EPA Uranium in Water, Feb.1987

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U 87EPA 01 DNA

CV = 8. ± 6. pCi/L

Result	± Uncer.	Date
8.1	0.8	1/04
8.3	0.8	1/04
9.0	0.9	1/19
9.3	0.9	1/19
8.4	0.8	2/01
8.6	0.9	2/01
8.7	0.9	2/16
7.7	0.8	2/29
7.2	0.7	2/29
6.2	0.6	3/14
7.0	0.7	3/14
8.1	0.8	3/28
7.2	0.7	3/28
7.2	0.7	4/25
6.9	0.7	4/25
8.0	0.8	5/02
7.9	0.8	5/02
6.9	0.7	5/09
7.2	0.7	5/09
7.4	0.7	6/06
8.8	0.9	6/06
7.2	0.7	6/08
6.7	0.7	6/08
9.0	0.9	6/20
7.5	0.8	6/20
9.0	0.9	7/07
7.5	0.8	7/07
8.5	0.9	8/19
8.0	0.8	8/19

****

EPA Uranium in Water, Aug.1987

****

U 87EPA 01 DNA

CV = 13. ± 6. pCi/L

Result	± Uncer.	Date
14.	1.	1/04
14.	1.	1/04
14.	1.	1/19
14.	1.	1/19
13.	1.	2/01
13.	1.	2/01
11.	1.	2/16
12.	1.	2/29
11.	1.	2/29
13.	1.	3/14
12.	1.	3/14
12.	1.	3/28
12.	1.	3/28
12.	1.	4/25
13.	1.	4/25
11.	1.	5/02
11.	1.	5/02

TABLE C-V (cont)

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EPA Uranium in Water, Aug.1987
(cont)

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U (cont)

11.	1.	5/09
12.	1.	5/09
12.	1.	6/06
12.	1.	6/06
13.	1.	6/08
13.	1.	6/08
14.	1.	6/20
14.	1.	6/20
6.	1.	7/07
6.	1.	7/07
13.	1.	7/18
13.	1.	7/18
13.	1.	8/19
13.	1.	8/19
12.	1.	8/29
12.	1.	8/29
13.	1.	9/01
12.	1.	9/01
11.	1.	9/14
11.	1.	9/14
13.	1.	9/26
12.	1.	9/26
11.	1.	10/11
12.	1.	10/11
11.	1.	11/07
11.	1.	11/07
11.	1.	12/06
11.	1.	12/06

U 87EPA 01 ICPMS

CV = 13. ± 6. pCi/L

Result	± Uncer.	Date
13.	2.	2/25

****

EPA Uranium in Water
Feb. 1988

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U 88EPA 01 DNA

CV = 3. ± 6. pCi/L

Result	± Uncer.	Date
3.7	0.4	2/16
2.7	0.3	2/16
3.5	0.4	2/16

U 88EPA 01 ICPMS

CV = 3. ± 6. pCi/L

Result	± Uncer.	Date
3.0	0.3	2/25
2.9	0.3	2/25
3.1	0.3	2/25

****

EPA Uranium in Water, Aug.1988

****

U 88EPA 01 DNA

CV = 6. ± 6. pCi/L

Result	± Uncer.	Date
6.1	0.6	8/29
5.4	0.5	8/29
5.3	0.5	8/29
6.2	0.6	9/14
5.2	0.5	9/14
5.6	0.6	9/26
6.0	0.6	9/26
5.3	0.5	10/11
5.3	0.5	10/11
5.1	0.5	12/06

U 88EPA 01 ICPMS

CV = 6. ± 6. pCi/L

Result	± Uncer.	Date
6.9	0.7	8/31
6.4	0.6	8/31
6.7	0.7	8/31
6.2	0.6	8/31
6.0	0.6	8/31
6.1	0.6	8/31

****

EPA Water Pollution Study 21

****

Ag 88EPA 01 ETVAA

CV = 0.95 ± 0.6 ug/L

Result	± Uncer.	Date
0.9	0.1	9/19
0.9	0.1	9/19
0.9	0.1	9/19

CV = 11.7 ± 2.5 ug/L

Result	± Uncer.	Date
12.	2.	9/19
12.	2.	9/19
12.	2.	9/19
12.	2.	9/19

Ag 88EPA 01 FAA

CV = 0.95 ± 0.6 ug/L

Result	± Uncer.	Date
< 3.		9/01
< 3.		9/01
< 3.		9/01
5.	3.	9/01
< 3.		9/01
< 3.		9/01

CV = 11.7 ± 2.5 ug/L

Result	± Uncer.	Date
11.	3.	9/01
9.	3.	9/01
11.	3.	9/01
11.	3.	9/01
10.	3.	9/01
10.	3.	9/01

Al 88EPA 02 FAA

CV = 234. ± 51. ug/L

Result	± Uncer.	Date
200.	100.	8/26
200.	100.	8/26
200.	100.	8/26
200.	100.	8/26
200.	100.	8/26
200.	100.	8/26
200.	100.	8/26
200.	100.	8/26
200.	100.	8/26
200.	100.	8/26
200.	100.	8/26
200.	100.	8/26
200.	100.	8/26
200.	100.	8/26
200.	100.	8/26
200.	100.	8/26

CV = 624. ± 96. ug/L

Result	± Uncer.	Date
600.	100.	8/26
600.	100.	8/26
500.	100.	8/26
500.	100.	8/26
600.	100.	8/26
600.	100.	8/26
600.	100.	8/26
600.	100.	8/26
600.	100.	8/26
500.	100.	8/26
500.	100.	8/26
600.	100.	8/26
500.	100.	8/26

****

EPA Water Pollution Study 21
(cont)

****

Be 88EPA 02 ETVAA

CV = 8.99 ± 2.4 ug/L

Result	± Uncer.	Date
8.	2.	9/19
9.	2.	9/19
8.	2.	9/19
8.	2.	9/19

CV = 135. ± 13. ug/L

Result	± Uncer.	Date
120.	20.	9/19
130.	30.	9/19
120.	20.	9/19
130.	30.	9/19

Ca 88EPA 02 FAA

CV = 7.24 ± 0.96 mg/L

Result	± Uncer.	Date
2.8	0.3	11/04
2.8	0.3	11/04
2.6	0.3	11/04

CV = 79.1 ± 7.9 mg/L

Result	± Uncer.	Date
73.	7.	11/04
73.	7.	11/04

Cd 88EPA 02 FAA

CV = 24. ± 3.4 ug/L

Result	± Uncer.	Date
24.	5.	9/07
23.	5.	9/07
24.	5.	9/07
24.	5.	9/07
25.	5.	9/07
24.	5.	9/07
25.	5.	9/07
24.	5.	9/07

CV = 222. ± 22. ug/L

Result	± Uncer.	Date
220.	20.	9/07
210.	20.	9/07
210.	20.	9/07
210.	20.	9/07
220.	20.	9/07

Cl 88EPA 02 FIA

CV = 65.4 ± 4.9 mg/L

Result	± Uncer.	Date
66.	7.	8/31
66.	7.	8/31

CV = 172. ± 8.5 mg/L

Result	± Uncer.	Date
170.	20.	8/31
170.	20.	8/31

CN 88EPA 02 ACOLR

CV = 0.15 ± 0.042 mg/L

Result	± Uncer.	Date
0.16	0.02	9/07
0.16	0.02	9/07

CV = 0.225 ± 0.063 mg/L

Result	± Uncer.	Date
0.20	0.02	9/07
0.20	0.02	9/07

Chemical Oxygen Demand
88EPA 02 TITR

CV = 43.5 ± 9.9 mg/L

Result	± Uncer.	Date
40.	10.	9/06
40.	10.	9/06
50.	10.	9/07

CV = 229. ± 27. mg/L

Result	± Uncer.	Date
220.	40.	9/06
220.	40.	9/06
220.	40.	9/07

Conductivity 88EPA 02 CB

CV = 642. ± 43. uS/cm

Result	± Uncer.	Date
630.	30.	9/01

CV = 670. ± 53. uS/cm

Result	± Uncer.	Date
660.	30.	9/01

Cr 88EPA 02 FAA

CV = 41.7 ± 7.8 ug/L

Result	± Uncer.	Date
60.	10.	9/07
40.	10.	9/07
40.	10.	9/07
40.	10.	9/07
50.	10.	9/07
40.	10.	9/07
50.	10.	9/07
40.	10.	9/07
40.	10.	9/07
60.	10.	9/07
70.	10.	9/07
40.	10.	9/07
40.	10.	9/07
40.	10.	9/07

CV = 125. ± 20. ug/L

Result	± Uncer.	Date
120.	50.	9/07
140.	50.	9/07
120.	50.	9/07
120.	50.	9/07
150.	50.	9/07
130.	50.	9/07
150.	50.	9/07
140.	50.	9/07
140.	50.	9/07
130.	50.	9/07
130.	50.	9/07
140.	50.	9/07
140.	50.	9/07

Cu 88EPA 02 FAA

CV = 8. ± 3.8 ug/L

Result	± Uncer.	Date
10.	10.	9/13
10.	10.	9/13
10.	10.	9/13
10.	10.	9/13
10.	10.	9/13
10.	10.	9/13
10.	10.	9/13
10.	10.	9/13
10.	10.	9/13
10.	10.	9/13
10.	10.	9/13
10.	10.	9/13
10.	10.	9/13
10.	10.	9/13
10.	10.	9/13
10.	10.	9/13
10.	10.	9/13
10.	10.	9/13
10.	10.	9/13
10.	10.	9/13
20.	10.	9/13
20.	10.	9/13
10.	10.	9/13
10.	10.	9/13
20.	10.	9/13
10.	10.	9/13
10.	10.	9/13

TABLE C-V (cont)

****

EPA Water Pollution Study 21
(cont)

****

Cu (cont)

10.	10.	9/13
10.	10.	9/13
10.	10.	9/13
10.	10.	9/13
20.	10.	9/13
10.	10.	9/13
10.	10.	9/13
7.	2.	9/13

CV = 96. ± 11. ug/L

Result	± Uncer.	Date
100.	10.	9/13
100.	10.	9/13
90.	10.	9/13
100.	10.	9/13
90.	10.	9/13
90.	10.	9/13
90.	10.	9/13
100.	10.	9/13
100.	10.	9/13
90.	10.	9/13
100.	10.	9/13
100.	10.	9/13
100.	10.	9/13

F 88EPA 02 ISE

CV = 0.32 ± 0.06 mg/L

Result	± Uncer.	Date
0.30	0.03	9/02

CV = 3.7 ± 0.4 mg/L

Result	± Uncer.	Date
3.2	0.3	9/02

Fe 88EPA 02 FAA

CV = 42. ± 13. ug/L

Result	± Uncer.	Date
40.	40.	9/13
50.	40.	9/13
40.	40.	9/13
50.	40.	9/13
50.	40.	9/13
40.	40.	9/13
50.	40.	9/13
40.	40.	9/13
40.	40.	9/13
40.	40.	9/13
40.	40.	9/13
40.	40.	9/13
40.	40.	9/13

Fe (cont)

40.	40.	9/13
40.	40.	9/13
40.	40.	9/13
40.	20.	9/13
40.	40.	9/13
40.	40.	9/13
40.	40.	9/13
40.	40.	9/13

CV = 210. ± 26. ug/L

Result	± Uncer.	Date
230.	40.	9/13
210.	40.	9/13
230.	40.	9/13
210.	40.	9/13
210.	40.	9/13
240.	40.	9/13
240.	40.	9/13
230.	40.	9/13
230.	40.	9/13
180.	20.	9/13
230.	40.	9/13
230.	40.	9/13

Hardness 88EPA 02 CALC

CV = 92.2 ± 5.2 mg/L

Result	± Uncer.	Date
37.	4.	9/16

CV = 235. ± 12. mg/L

Result	± Uncer.	Date
220.	20.	9/16

Hg 88EPA 02 CVAA

CV = 1.47 ± 0.45 ug/L

Result	± Uncer.	Date
1.2	0.2	9/07
1.1	0.2	9/07
1.4	0.2	10/13
1.3	0.2	10/13

CV = 10.7 ± 1.9 ug/L

Result	± Uncer.	Date
12.	1.	9/07
13.	1.	9/07
10.	2.	10/13
10.	2.	10/13

K 88EPA 02 FAA

CV = 11. ± 1.4 mg/L

Result	± Uncer.	Date
10.	1.	11/04
10.	1.	11/04

CV = 21.5 ± 2.3 mg/L

Result	± Uncer.	Date
20.	2.	11/04
20.	2.	11/04

Mg 88EPA 02 FAA

CV = 9.1 ± 1.04 mg/L

Result	± Uncer.	Date
8.7	0.9	11/04
9.2	0.9	11/04

CV = 18. ± 1.9 mg/L

Result	± Uncer.	Date
7.4	0.7	11/04
7.4	0.7	11/04

Na 88EPA 02 FAA

CV = 11. ± 1.2 mg/L

Result	± Uncer.	Date
10.	1.	11/04
10.	1.	11/04

CV = 95. ± 8.2 mg/L

Result	± Uncer.	Date
90.	9.	11/04
90.	9.	11/04

NH3-N 88EPA 02 FIA

CV = 0.27 ± 0.163 mg/L

Result	± Uncer.	Date
0.30	0.04	9/09
0.30	0.04	9/09

CV = 1.2 ± 0.027 mg/L

Result	± Uncer.	Date
1.47	0.04	9/09

TABLE C-V (cont)

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EPA Water Pollution Study 21
(cont)

****

Ni 88EPA 02 FAA

CV = 140. ± 16. ug/L

Result	± Uncer.	Date
140.	40.	9/01
130.	40.	9/01
130.	40.	9/01
140.	40.	9/01
140.	40.	9/01
140.	40.	9/01
140.	40.	9/01
150.	40.	9/01
130.	40.	9/01
150.	40.	9/01
140.	40.	9/01
140.	40.	9/01
130.	40.	9/01

CV = 350. ± 34. ug/L

Result	± Uncer.	Date
330.	40.	9/01
340.	40.	9/01
350.	40.	9/01
350.	40.	9/01
320.	40.	9/01
330.	40.	9/01
340.	40.	9/01
340.	40.	9/01
350.	40.	9/01
360.	40.	9/01
330.	40.	9/01
340.	40.	9/01

NO3-N 88EPA 02 FIA

CV = 0.25 ± 0.065 mg/L

Result	± Uncer.	Date
0.20	0.04	9/12
0.20	0.04	9/12
0.20	0.04	9/12

CV = 1.9 ± 0.29 mg/L

Result	± Uncer.	Date
1.52	0.04	9/12
1.50	0.04	9/12
1.52	0.04	9/12
1.50	0.04	9/12

Oil/Grease 88EPA 02 GRAV

CV = 5.2 ± 2.9 mg/L

Result	± Uncer.	Date
5.3	0.5	8/22
5.3	0.5	8/22

CV = 29.5 ± 7.5 mg/L

Result	± Uncer.	Date
30.	3.	8/22
30.	3.	8/22

P 88EPA 02 ACOLR

CV = 0.15 ± 0.046 mg/L

Result	± Uncer.	Date
0.13	0.03	9/07
0.13	0.03	9/07

CV = 3.5 ± 0.56 mg/L

Result	± Uncer.	Date
2.7	0.5	9/07

Pb 88EPA 02 FAA

CV = 21. ± 5.4 ug/L

Result	± Uncer.	Date
20.	10.	9/07
20.	10.	9/07
30.	10.	9/07
20.	10.	9/07
20.	10.	9/07
20.	10.	9/07
30.	10.	9/07
20.	10.	9/07
10.	10.	9/07

CV = 126. ± 19. ug/L

Result	± Uncer.	Date
100.	100.	9/07
100.	100.	9/07
100.	100.	9/07
100.	100.	9/07
100.	100.	9/07
100.	100.	9/07
100.	100.	9/07
100.	100.	9/07
100.	100.	9/07
100.	100.	9/07
100.	100.	9/07

pH 88EPA 02 GE

CV = 5.61 ± 0.1 units

Result	± Uncer.	Date
5.8	0.1	8/30

CV = 8.35 ± 0.2 units

Result	± Uncer.	Date
8.8	0.1	8/30

SO4 88EPA 02 FIA

CV = 15.1 ± 2.6 mg/L

Result	± Uncer.	Date
14.	1.	9/08
14.	1.	9/08

CV = 116. ± 14. mg/L

Result	± Uncer.	Date
110.	10.	9/08
110.	10.	9/08

Total Alkalinity
88EPA 02 TITR

CV = 13.9 ± 2.6 mg/L

Result	± Uncer.	Date
16.	2.	8/29
16.	2.	8/29
17.	2.	9/07
17.	2.	9/07

CV = 104. ± 6. mg/L

Result	± Uncer.	Date
100.	10.	8/29
110.	10.	8/29
100.	10.	9/07
100.	10.	9/07

Total Dissolved Solids
88EPA 02 GRAV

CV = 370. ± 180. mg/L

Result	± Uncer.	Date
500.	50.	8/31
440.	40.	9/16
440.	40.	9/16

CV = 377. ± 62. mg/L

Result	± Uncer.	Date
400.	40.	8/31

****

EPA Water Pollution Study 21
(cont)

****

Tl 88EPA 01 ETVAA

CV = 8. ± 2.2 ug/L

Result	± Uncer.	Date
8.	1.	9/19
7.	1.	9/19
7.	1.	9/19

CV = 72. ± 16. ug/L

Result	± Uncer.	Date
70.	10.	9/19
70.	10.	9/19
70.	10.	9/19

Total Organic Carbon
88EPA 02 IR

CV = 17.2 ± 2.1 mg/L

Result	± Uncer.	Date
16.	2.	8/30

CV = 90.5 ± 12.7 mg/L

Result	± Uncer.	Date
81.	8.	8/30

Total Suspended Solids
88EPA 02 GRAV

CV = 43. ± 3.4 mg/L

Result	± Uncer.	Date
41.	4.	8/30
41.	4.	8/30

CV = 81.1 ± 3.7 mg/L

Result	± Uncer.	Date
72.	7.	8/30
72.	7.	8/30

V 88EPA 02 FAA

CV = 43.1 ± 6. ug/L

Result	± Uncer.	Date
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26

V (cont)

Result	± Uncer.	Date
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26

CV = 124. ± 12. mg/L

Result	± Uncer.	Date
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26
< 200.		8/26

Zn 88EPA 02 FAA

CV = 63.3 ± 8. ug/L

Result	± Uncer.	Date
67.	7.	9/13
64.	7.	9/13
64.	7.	9/13
64.	7.	9/13
68.	7.	9/13
69.	7.	9/13
64.	7.	9/13
69.	7.	9/13
64.	7.	9/13
64.	7.	9/13
69.	7.	9/13
64.	7.	9/13
69.	7.	9/13
64.	7.	9/13
64.	7.	9/13
69.	7.	9/13
64.	7.	9/13
68.	7.	9/13
64.	7.	9/13
64.	7.	9/13
64.	7.	9/13
62.	6.	9/15
65.	7.	9/15

Zn (cont)

CV = 190. ± 19. ug/L

Result	± Uncer.	Date
190.	20.	9/13
200.	20.	9/13
200.	20.	9/13
180.	20.	9/13
180.	20.	9/13
190.	20.	9/13
200.	20.	9/13
200.	20.	9/13
200.	20.	9/13
200.	20.	9/13
180.	20.	9/13
180.	20.	9/13
180.	20.	9/15
190.	20.	9/15

****

EPA-NBS Mancos Shale

****

Ra-226 76EPA 02 G

CV = 1.6 ± 0.2 pCi/g

Result	± Uncer.	Date
1.7	0.3	3/15

****

GSJ JA-3 Andesite

****

U 87AND 01 DNA

CV = 1.4 ug/g

Result	± Uncer.	Date
1.0	0.1	2/06
1.0	0.1	2/06

****

GSJ JB-2 Basalt

****

F 87AND 01 DISE

CV = 101. ug/g

Result	± Uncer.	Date
130.	10.	8/11

TABLE C-V (cont)

****

GSJ JF-2 Feldspar

****

U 87AND 01 DNA

CV = 200. ng/g

Result	± Uncer.	Date
100.	10.	2/06
60.	30.	2/06
50.	20.	2/06
60.	30.	2/06
60.	30.	3/23
60.	40.	3/23

****

HSE-9 EP Toxicity Metals in 3% HNO3

****

Ag 86GAU 02 ICPMS

CV = 250. ± 30. ug/L

Result	± Uncer.	Date
300.	30.	1/08

As 87GAU 02 FAA

CV = 250. ± 30. ug/L

Result	± Uncer.	Date
300.	100.	9/16

****

HSE-9 Flash Point of 1-Hexanol

****

Flashpoint 86WIL 01 FP

CV = 145. degrees F.

Result	± Uncer.	Date
144.	4.	2/12
145.	4.	2/17
146.	4.	2/29
145.	4.	4/08
146.	4.	4/08
143.	4.	4/13
144.	4.	5/17
148.	4.	5/18
148.	4.	5/18
148.	4.	5/18
148.	4.	5/18
145.	4.	6/07
145.	4.	6/07
148.	4.	6/23
144.	4.	6/30
145.	4.	7/25

Flashpoint (cont)

145.	4.	7/25
146.	4.	8/03
146.	4.	8/03
143.	4.	8/05
143.	4.	8/08
146.	4.	8/16
146.	4.	8/17
145.	4.	8/29

****

HSE-9 Gross Alpha/Beta in Water

****

Alpha 87GAU 01 PC

CV = 45. ± 3. nCi/L

Result	± Uncer.	Date
47.	2.	1/08
46.	1.	1/11
46.	2.	1/11
47.	2.	1/12
46.	1.	1/12
45.	2.	1/13
47.	2.	1/14
46.	1.	1/14
47.	2.	1/15
47.	1.	1/15
46.	2.	1/19
46.	1.	1/19
45.	2.	1/20
45.	1.	1/21
46.	1.	1/21
48.	2.	1/21
46.	2.	1/22
46.	2.	1/26
45.	1.	1/26
44.	1.	1/26
46.	2.	1/26
45.	1.	1/27
45.	2.	1/27
46.	1.	1/28
46.	2.	1/28
44.	2.	1/29
45.	1.	2/02
44.	2.	2/03
44.	2.	2/03
44.	2.	2/04
44.	2.	2/05
45.	2.	2/09
46.	2.	2/09
46.	2.	2/10
46.	2.	2/11
45.	2.	2/12
47.	2.	2/17
47.	2.	2/17
46.	2.	2/18
47.	2.	2/19
45.	2.	2/23
46.	2.	2/23
47.	2.	2/24
46.	2.	2/25
46.	2.	2/26
45.	2.	3/01
47.	2.	3/01

Alpha (cont)

48.	2.	3/02
48.	2.	3/03
47.	2.	3/04
46.	2.	3/08
45.	2.	3/08
47.	2.	3/09
46.	2.	3/10
48.	2.	3/14
45.	2.	3/15
48.	2.	3/15
46.	2.	3/16
46.	2.	3/17
46.	2.	3/18
45.	2.	3/18
45.	2.	3/21
46.	2.	3/23
45.	2.	3/23
48.	2.	3/24
47.	2.	3/25
46.	2.	3/29
48.	2.	3/29
46.	2.	3/30
46.	2.	3/31
46.	2.	4/01
48.	2.	4/04
48.	2.	4/05
47.	2.	4/06
47.	2.	4/07
47.	2.	4/08
45.	2.	4/11
48.	2.	4/12
47.	2.	4/13
46.	2.	4/14
48.	2.	4/15
48.	2.	4/18
46.	1.	4/18
47.	1.	4/18
46.	1.	4/19
47.	2.	4/19
46.	2.	4/20
46.	1.	4/20
47.	2.	4/21
45.	1.	4/22
47.	2.	4/22
47.	2.	4/26
44.	1.	4/26
46.	2.	4/26
44.	1.	4/26
46.	2.	4/27
44.	1.	4/27
44.	1.	4/28
45.	2.	4/28
47.	2.	4/29
43.	1.	5/02
47.	2.	5/02
44.	1.	5/03
46.	2.	5/03
46.	2.	5/04
44.	1.	5/04
46.	2.	5/05
45.	1.	5/05
48.	2.	5/06
47.	2.	5/09
43.	1.	5/09
43.	1.	5/10
44.	1.	5/10
45.	2.	5/10
44.	1.	5/11
45.	2.	5/11

TABLE C-V (cont)

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HSE-9 Gross Alpha/Beta
in Water (cont)

****

Alpha (cont)

43.	1.	5/12
45.	2.	5/12
43.	1.	5/13
45.	2.	5/13
45.	2.	5/16
44.	1.	5/16
44.	1.	5/17
46.	2.	5/17
44.	2.	5/18
44.	1.	5/18
45.	2.	5/19
45.	1.	5/19
45.	2.	5/20
45.	2.	5/24
46.	1.	5/24
47.	2.	5/24
45.	1.	5/24
47.	2.	5/25
44.	1.	5/25
46.	2.	5/26
43.	1.	5/26
48.	2.	5/27
46.	2.	5/31
43.	1.	6/01
46.	2.	6/01
44.	1.	6/01
48.	2.	6/02
44.	1.	6/02
47.	2.	6/03
45.	1.	6/03
44.	1.	6/06
45.	2.	6/06
44.	1.	6/07
45.	2.	6/07
44.	1.	6/08
47.	2.	6/08
45.	1.	6/09
46.	2.	6/09
43.	1.	6/13
48.	2.	6/13
44.	1.	6/13
46.	2.	6/13
44.	1.	6/14
47.	2.	6/14
46.	1.	6/15
43.	1.	6/16
46.	2.	6/16
45.	2.	6/17
44.	1.	6/17
48.	2.	6/21
44.	1.	6/21
43.	1.	6/21
46.	2.	6/21
48.	2.	6/22
45.	1.	6/22
46.	2.	6/23
45.	1.	6/23
44.	1.	6/24
45.	2.	6/24
46.	2.	6/27
47.	1.	6/27
46.	2.	6/28

Alpha (cont)

46.	1.	6/28
46.	1.	6/29
46.	2.	6/29
45.	2.	7/01
45.	1.	7/01
45.	2.	7/05
45.	1.	7/05
45.	2.	7/06
46.	2.	7/07
45.	2.	7/07
45.	2.	7/08
45.	1.	7/08
46.	2.	7/11
44.	1.	7/11
46.	2.	7/12
48.	2.	7/13
44.	1.	7/13
45.	1.	7/14
48.	2.	7/14
46.	2.	7/18
45.	1.	7/18
45.	1.	7/18
47.	2.	7/18
44.	1.	7/19
46.	2.	7/19
45.	1.	7/20
46.	2.	7/20
46.	2.	7/21
44.	1.	7/21
44.	1.	7/22
46.	2.	7/22
43.	1.	7/25
43.	2.	7/25
44.	1.	7/26
46.	2.	7/26
45.	2.	7/27
45.	2.	7/28
43.	1.	7/28
44.	1.	7/28
45.	2.	8/01
44.	1.	8/01
43.	1.	8/01
45.	2.	8/01
44.	1.	8/02
48.	2.	8/02
45.	2.	8/03
45.	2.	8/04
43.	1.	8/04
43.	1.	8/05
46.	2.	8/05
45.	2.	8/08
45.	1.	8/08
44.	1.	8/10
45.	2.	8/11
46.	2.	8/11
45.	1.	8/11
46.	2.	8/15
46.	1.	8/16
45.	1.	8/16
46.	2.	8/16
44.	2.	8/17
44.	1.	8/17
46.	2.	8/18
46.	1.	8/18
46.	1.	8/19
45.	2.	8/19
45.	2.	8/22
44.	1.	8/23
46.	2.	8/23

Alpha (cont)

44.	1.	8/23
44.	2.	8/24
44.	1.	8/24
44.	2.	8/25
45.	1.	8/25
44.	1.	8/26
44.	2.	8/26
44.	1.	8/30
45.	2.	8/30
46.	2.	8/30
45.	1.	8/30
46.	1.	8/31
46.	2.	8/31
46.	1.	9/01
46.	2.	9/01
45.	2.	9/02
45.	1.	9/02
45.	2.	9/07
45.	2.	9/07
44.	1.	9/07
45.	1.	9/07
45.	2.	9/08
45.	1.	9/09
45.	1.	9/09
47.	2.	9/09
45.	2.	9/12
44.	1.	9/12
47.	2.	9/13
43.	1.	9/13
46.	1.	9/14
45.	2.	9/14
44.	1.	9/15
46.	2.	9/15
44.	1.	9/16
43.	2.	9/16
44.	1.	9/20
45.	2.	9/20
45.	1.	9/20
44.	2.	9/20
44.	2.	9/21
44.	1.	9/21
44.	2.	9/22
44.	1.	9/22
44.	2.	9/23
45.	1.	9/23
45.	1.	9/26
44.	2.	9/26
44.	1.	9/27
47.	2.	9/27
46.	1.	9/28
45.	2.	9/28
43.	2.	9/29
45.	1.	9/29
45.	1.	9/30
46.	2.	9/30
43.	1.	10/03
47.	2.	10/03
44.	1.	10/04
46.	2.	10/04
47.	2.	10/05
48.	2.	10/06
45.	1.	10/06
44.	1.	10/07
47.	2.	10/07
42.	1.	10/11
45.	2.	10/11
47.	2.	10/12
43.	1.	10/13
48.	2.	10/13
44.	1.	10/14

TABLE C-V (cont)

****

HSE-9 Gross Alpha/Beta
in Water (cont)

****

Alpha (cont)

47.	2.	10/14
47.	2.	10/17
45.	1.	10/17
48.	2.	10/18
45.	1.	10/18
45.	1.	10/19
48.	2.	10/19
45.	1.	10/20
46.	2.	10/20
45.	2.	10/21
46.	2.	10/24
43.	1.	10/25
44.	2.	10/25
42.	1.	10/25
47.	2.	10/26
47.	2.	10/27
43.	1.	10/27
43.	1.	10/28
43.	1.	10/28
45.	2.	10/28
45.	2.	10/31
45.	2.	11/01
44.	1.	11/01
42.	1.	11/01
44.	2.	11/02
44.	1.	11/03
47.	2.	11/03
47.	2.	11/04
42.	1.	11/04
46.	2.	11/07
44.	1.	11/07
43.	1.	11/08
46.	2.	11/08
45.	2.	11/09
45.	1.	11/09
44.	2.	11/10
44.	1.	11/10
46.	2.	11/14
45.	1.	11/14
44.	1.	11/15
46.	2.	11/15
45.	1.	11/16
44.	2.	11/16
44.	1.	11/17
47.	2.	11/17
47.	2.	11/18
45.	2.	11/21
43.	1.	11/21
45.	2.	11/22
42.	1.	11/22
46.	2.	11/23
45.	2.	11/28
44.	1.	11/28
44.	1.	11/28
44.	1.	11/29
48.	2.	11/29
43.	1.	12/01
43.	1.	12/01
45.	2.	12/01
44.	2.	12/01
47.	2.	12/02
42.	1.	12/02

Alpha (cont)

43.	1.	12/05
47.	2.	12/05
48.	2.	12/06
44.	1.	12/06
47.	2.	12/07
45.	1.	12/09
44.	1.	12/09
44.	1.	12/12
49.	2.	12/12
44.	2.	12/13
45.	1.	12/13
43.	2.	12/14
44.	1.	12/14
45.	1.	12/14
45.	2.	12/15
46.	2.	12/15
45.	1.	12/15
44.	1.	12/16

Beta 87GAU 01 PC

CV = 41. ± 2. nCi/L

Result	± Uncer.	Date
41.	1.	1/08
43.	1.	1/11
42.	1.	1/11
41.	1.	1/12
41.	1.	1/12
41.	1.	1/13
42.	1.	1/14
41.	1.	1/14
41.	1.	1/15
41.	1.	1/15
42.	1.	1/19
40.	1.	1/19
40.	1.	1/20
42.	1.	1/21
41.	1.	1/21
42.	1.	1/21
40.	1.	1/22
42.	1.	1/26
41.	1.	1/26
41.	1.	1/26
42.	1.	1/26
41.	1.	1/27
41.	1.	1/27
42.	1.	1/28
41.	1.	1/28
42.	1.	1/29
42.	1.	2/02
41.	1.	2/03
41.	1.	2/03
41.	1.	2/04
43.	1.	2/05
42.	1.	2/09
41.	1.	2/09
42.	1.	2/10
40.	1.	2/11
43.	1.	2/12
41.	1.	2/17
41.	1.	2/17
43.	1.	2/18
42.	1.	2/19
43.	1.	2/23
43.	1.	2/23
43.	1.	2/24

Beta (cont)

43.	1.	2/25
43.	1.	2/26
42.	1.	3/01
41.	1.	3/01
40.	1.	3/02
41.	1.	3/03
42.	1.	3/04
41.	1.	3/08
43.	1.	3/08
41.	1.	3/09
42.	1.	3/10
41.	1.	3/14
44.	1.	3/15
42.	1.	3/15
43.	1.	3/16
42.	1.	3/17
42.	1.	3/18
42.	1.	3/18
42.	1.	3/21
43.	1.	3/23
42.	1.	3/24
43.	1.	3/29
40.	1.	3/29
40.	1.	3/30
40.	1.	3/31
41.	1.	4/01
41.	1.	4/04
40.	1.	4/05
42.	1.	4/06
40.	1.	4/07
41.	1.	4/08
41.	1.	4/11
41.	1.	4/12
41.	1.	4/13
42.	1.	4/14
41.	1.	4/15
40.	1.	4/18
41.	1.	4/18
40.	1.	4/18
41.	1.	4/19
40.	1.	4/19
42.	1.	4/20
41.	1.	4/20
42.	1.	4/21
41.	1.	4/22
41.	1.	4/22
40.	1.	4/26
38.	1.	4/26
40.	1.	4/26
38.	1.	4/26
39.	1.	4/27
38.	1.	4/27
38.	1.	4/28
39.	1.	4/28
39.	1.	4/29
41.	1.	5/02
39.	1.	5/02
41.	1.	5/03
39.	1.	5/03
40.	1.	5/04
42.	1.	5/04
41.	1.	5/05
41.	1.	5/05
41.	1.	5/06
41.	1.	5/09
40.	1.	5/09
39.	1.	5/10
40.	1.	5/10
40.	1.	5/10

TABLE C-V (cont)

****

HSE-9 Gross Alpha/Beta
in Water (cont)

****

Beta (cont)

41.	1.	5/11
39.	1.	5/11
39.	1.	5/12
39.	1.	5/12
38.	1.	5/13
39.	1.	5/13
41.	1.	5/16
39.	1.	5/16
40.	1.	5/17
39.	1.	5/17
40.	1.	5/18
42.	1.	5/18
41.	1.	5/19
42.	1.	5/19
40.	1.	5/20
40.	1.	5/24
41.	1.	5/24
39.	1.	5/24
38.	1.	5/24
40.	1.	5/25
39.	1.	5/25
39.	1.	5/26
40.	1.	5/26
39.	1.	5/27
39.	1.	5/31
40.	1.	6/01
40.	1.	6/01
40.	1.	6/01
40.	1.	6/02
41.	1.	6/02
41.	1.	6/03
39.	1.	6/03
40.	1.	6/06
40.	1.	6/06
40.	1.	6/07
39.	1.	6/07
42.	1.	6/08
40.	1.	6/08
41.	1.	6/09
40.	1.	6/09
40.	1.	6/13
40.	1.	6/13
41.	1.	6/13
40.	1.	6/13
40.	1.	6/14
40.	1.	6/14
41.	1.	6/15
40.	1.	6/16
40.	1.	6/16
40.	1.	6/17
39.	1.	6/17
40.	1.	6/21
42.	1.	6/21
41.	1.	6/21
~~39.~~	~~1.~~	~~6/21~~
39.	1.	6/22
41.	1.	6/22
38.	1.	6/23
42.	1.	6/23
39.	1.	6/24
41.	1.	6/24
41.	1.	6/27

Beta (cont)

41.	1.	6/27
41.	1.	6/28
41.	1.	6/28
41.	1.	6/29
40.	1.	6/29
40.	1.	7/01
40.	1.	7/01
41.	1.	7/05
41.	1.	7/05
42.	1.	7/06
42.	1.	7/07
41.	1.	7/07
41.	1.	7/08
41.	1.	7/08
40.	1.	7/11
41.	1.	7/11
41.	1.	7/12
41.	1.	7/13
40.	1.	7/13
41.	1.	7/14
40.	1.	7/14
41.	1.	7/18
41.	1.	7/18
40.	1.	7/18
41.	1.	7/18
41.	1.	7/19
41.	1.	7/19
41.	1.	7/20
41.	1.	7/20
42.	1.	7/21
40.	1.	7/21
42.	1.	7/22
41.	1.	7/22
39.	1.	7/25
40.	1.	7/25
38.	1.	7/26
38.	1.	7/26
39.	1.	7/27
39.	1.	7/28
39.	1.	7/28
40.	1.	7/28
41.	1.	8/01
42.	1.	8/01
42.	1.	8/01
41.	1.	8/01
42.	1.	8/02
41.	1.	8/02
42.	1.	8/03
41.	1.	8/04
42.	1.	8/04
40.	1.	8/05
40.	1.	8/05
42.	1.	8/08
40.	1.	8/08
39.	1.	8/10
40.	1.	8/11
42.	1.	8/11
42.	1.	8/11
42.	1.	8/15
41.	1.	8/16
42.	1.	8/16
~~42.~~	~~1.~~	~~8/16~~
41.	1.	8/17
41.	2.	8/17
44.	1.	8/18
41.	1.	8/18
41.	1.	8/19
40.	1.	8/19
40.	1.	8/22

Beta (cont)

40.	1.	8/23
40.	1.	8/23
40.	1.	8/23
40.	1.	8/24
40.	1.	8/24
40.	1.	8/25
41.	1.	8/25
40.	1.	8/26
40.	1.	8/26
39.	1.	8/30
41.	1.	8/30
41.	1.	8/30
40.	1.	8/30
42.	1.	8/31
40.	1.	8/31
38.	1.	9/01
41.	1.	9/01
40.	1.	9/02
42.	1.	9/02
40.	1.	9/07
42.	1.	9/07
42.	1.	9/07
41.	1.	9/07
41.	1.	9/08
41.	1.	9/09
41.	1.	9/09
40.	1.	9/09
40.	1.	9/12
40.	1.	9/12
40.	1.	9/13
41.	1.	9/13
42.	1.	9/14
42.	1.	9/14
40.	1.	9/15
42.	1.	9/15
40.	1.	9/16
41.	1.	9/16
41.	1.	9/20
42.	1.	9/20
41.	1.	9/20
41.	1.	9/20
40.	1.	9/21
40.	1.	9/21
41.	1.	9/22
42.	1.	9/22
42.	1.	9/23
41.	1.	9/23
41.	1.	9/26
41.	1.	9/26
41.	1.	9/27
42.	1.	9/27
41.	1.	9/28
41.	1.	9/28
40.	1.	9/29
41.	1.	9/29
41.	1.	9/30
41.	1.	9/30
41.	1.	10/03
42.	1.	10/03
42.	1.	10/04
41.	1.	10/04
~~41.~~	~~1.~~	~~10/05~~
41.	1.	10/06
42.	1.	10/06
41.	1.	10/07
39.	1.	10/07
41.	1.	10/11
40.	1.	10/11
41.	1.	10/12

TABLE C-V (cont)

****

HSE-9 Gross Alpha/Beta in Water (cont)

****

Beta (cont)

39.	1.	10/13
41.	1.	10/13
42.	1.	10/14
39.	1.	10/14
41.	1.	10/17
40.	1.	10/17
42.	1.	10/18
39.	1.	10/18
40.	1.	10/19
41.	1.	10/19
40.	1.	10/20
42.	1.	10/20
41.	1.	10/21
41.	1.	10/24
40.	1.	10/25
41.	1.	10/25
40.	1.	10/25
41.	1.	10/26
39.	1.	10/26
41.	1.	10/27
40.	1.	10/27
40.	1.	10/28
39.	1.	10/28
42.	1.	10/31
41.	1.	10/31
43.	1.	11/01
41.	1.	11/01
43.	1.	11/02
42.	1.	11/03
43.	1.	11/03
42.	1.	11/04
41.	1.	11/04
41.	1.	11/07
41.	1.	11/07
43.	1.	11/08
41.	1.	11/08
42.	1.	11/09
43.	1.	11/09
40.	1.	11/10
41.	1.	11/10
41.	1.	11/14
39.	1.	11/14
43.	1.	11/15
39.	1.	11/15
43.	1.	11/16
40.	2.	11/16
39.	1.	11/17
43.	1.	11/17
41.	1.	11/18
39.	1.	11/21
41.	1.	11/21
41.	1.	11/22
40.	1.	11/22
42.	1.	11/23
43.	1.	11/28
42.	1.	11/28
40.	1.	11/28
40.	1.	11/29
41.	1.	11/29
40.	1.	12/01
39.	1.	12/01
40.	1.	12/01

Beta (cont)

41.	1.	12/01
40.	1.	12/02
43.	1.	12/02
42.	1.	12/05
44.	1.	12/05
41.	1.	12/06
41.	1.	12/06
42.	1.	12/07
40.	1.	12/09
41.	1.	12/09
41.	1.	12/12
42.	1.	12/13
42.	1.	12/13
41.	1.	12/14
42.	1.	12/14
41.	1.	12/14
42.	1.	12/15
42.	1.	12/15
43.	1.	12/15
41.	1.	12/16

****

HSE-9 Gross Gamma in Soil

****

Gamma 85GAU 01 G

CV = 219. ± 11. pCi/g

Result	± Uncer.	Date
220.	20.	1/11
220.	20.	1/11
220.	20.	1/11
220.	20.	1/11
220.	20.	1/11
220.	20.	1/11
230.	20.	1/12
220.	20.	1/12
230.	20.	1/14
230.	20.	1/14
230.	20.	1/14
220.	20.	1/20
220.	20.	1/20
230.	20.	1/20
230.	20.	1/26
230.	20.	1/26
230.	20.	1/26
230.	20.	1/29
230.	20.	1/29
230.	20.	1/29
230.	20.	1/29
220.	20.	1/29
220.	20.	1/29
230.	20.	2/25
220.	20.	2/25
220.	20.	2/25
230.	20.	2/25
230.	20.	4/18
230.	20.	4/18
220.	20.	6/23
220.	20.	6/23
220.	20.	6/23
230.	20.	6/23
230.	20.	6/23
230.	20.	6/23
230.	20.	6/24

Gamma (cont)

230.	20.	6/24
230.	20.	6/24
230.	20.	7/08
230.	20.	7/08
220.	20.	7/08
230.	20.	7/08
230.	20.	7/08
230.	20.	7/08
240.	20.	8/30
230.	20.	8/30
230.	20.	8/30
240.	20.	9/09
230.	20.	9/09
230.	20.	9/09

****

HSE-9 Gross Gamma in Water

****

Gamma 85GAU 01 G

CV = 1360. ± 68. pCi/L

Result	± Uncer.	Date
1700.	300.	1/12
1500.	300.	1/12
1300.	200.	1/12
1200.	200.	1/29
1200.	200.	1/29
1200.	200.	2/09
1500.	200.	2/09
1600.	200.	3/15
1700.	300.	3/15
1300.	200.	3/15
1500.	200.	3/23
1500.	200.	3/23
1400.	200.	4/12
1600.	200.	4/12
1400.	200.	4/12
1500.	200.	5/06
1700.	200.	5/06
1600.	200.	5/06
1600.	200.	5/25
1500.	200.	5/25
1800.	200.	5/25
1800.	300.	6/08
1500.	200.	6/08
1400.	200.	6/09
1400.	200.	6/09
1300.	200.	6/20
1200.	200.	6/20
1300.	200.	6/20
1600.	200.	7/08
1500.	200.	7/08
1500.	200.	7/08
1500.	200.	7/08
1700.	200.	7/08
1500.	200.	7/27
1400.	200.	7/27
1500.	200.	7/27
1300.	200.	7/27
1600.	200.	7/27
1500.	200.	7/27
1500.	200.	8/04
1500.	200.	8/04
1200.	200.	8/31

****

HSE-9 Gross Gamma in Water
(cont)

****

Gamma (cont)

1500.	200.	8/31
1300.	200.	9/09
1400.	200.	9/09
1500.	200.	11/14
1100.	200.	11/14
1300.	200.	11/14
1600.	200.	11/15
1600.	200.	11/15
1500.	200.	11/15
1700.	200.	11/15
1300.	200.	11/15

****

HSE-9 Heat of Combustion:
Benzoic Acid

****

Heat of Combustion
86WIL 01 CALOR

CV = 11370. ± 100. btu/lb

Result	± Uncer.	Date
11300.	30.	7/05
11000.	300.	8/05
11460.	30.	8/05
11530.	30.	8/17
11480.	30.	9/09
11480.	30.	9/09

****

HSE-9 Organic Carbon in Water

****

Total Organic Carbon
88GAU 01 IR

CV = 1000. ± 100. mg/L

Result	± Uncer.	Date
950.	100.	5/17
920.	90.	8/30
920.	90.	8/30
960.	100.	8/30
960.	100.	12/20
890.	90.	12/20
940.	90.	12/20
1070.	100.	12/22

****

HSE-9 Radionuclides
in Liver Tissue

****

Pu-238 87GAU 01 RAS

CV = 0.308 ± 0.03 pCi/sample

Result	± Uncer.	Date
0.34	0.03	1/15
0.26	0.02	1/15
0.30	0.02	1/15
0.30	0.02	2/15
0.30	0.02	2/15
0.31	0.02	2/15
0.30	0.02	3/15
0.26	0.02	3/15
0.33	0.02	3/15
0.31	0.02	4/14
0.30	0.02	4/14
0.27	0.02	4/14
0.31	0.02	5/15
0.32	0.02	5/15
0.28	0.02	5/15

Pu-239 87GAU 03 RAS

CV = 0.1113 ± 0.011 pCi/sample

Result	± Uncer.	Date
0.11	0.01	2/15
0.11	0.01	5/15

CV = 0.1114 ± 0.011 pCi/sample

Result	± Uncer.	Date
0.09	0.01	3/15

CV = 0.1115 ± 0.011 pCi/sample

Result	± Uncer.	Date
0.11	0.08	1/15
0.15	0.01	2/15
0.10	0.01	4/14
0.11	0.01	5/15

CV = 0.1116 ± 0.011 pCi/sample

Result	± Uncer.	Date
0.12	0.01	1/15
0.12	0.01	2/15
0.07	0.01	3/15
0.13	0.01	3/15
0.12	0.02	4/14
0.11	0.01	5/15

CV = 0.1117 ± 0.011 pCi/sample

Result	± Uncer.	Date
0.12	0.01	4/14

Pu-239 (cont)

CV = 0.1118 ± 0.011 pCi/sample

Result	± Uncer.	Date
0.12	0.02	1/15

****

HSE-9 Radionuclides in Tissue

****

Pu-238 87GAU 01 RAS

CV = 0.231 ± 0.02 pCi/sample

Result	± Uncer.	Date
0.27	0.02	6/15
0.23	0.02	6/15
0.22	0.02	6/15

Pu-239 87GAU 03 RAS

CV = 0.1114 ± 0.11 pCi/sample

Result	± Uncer.	Date
0.13	0.02	6/15
0.11	0.01	7/01
0.13	0.01	7/01
0.12	0.01	7/01

CV = 0.1115 ± 0.11 pCi/sample

Result	± Uncer.	Date
0.10	0.01	6/15
0.13	0.01	6/15

****

HSE-9 Radionuclides in Urine

****

Am-241 88GAU 01 RAS

CV = 0.24 ± 0.01 pCi/sample

Result	± Uncer.	Date
0.25	0.03	10/31
0.25	0.03	10/31

CV = 0.48 ± 0.02 pCi/sample

Result	± Uncer.	Date
0.42	0.05	3/18

CV = 0.58 ± 0.03 pCi/sample

Result	± Uncer.	Date
0.56	0.06	6/20

TABLE C-V (cont)

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HSE-9 Radionuclides in Urine
(cont)

****

Am-241 (cont)

CV = 0.96 ± 0.05 pCi/sample

Result	± Uncer.	Date
1.0	0.1	1/12

H-3 88GAU 01 LS

CV = Blank (uCi/L)

Result	± Uncer.	Date
< 0.1		1/04
< 0.1		1/19
< 0.1		2/01
< 0.1		2/05
< 0.1		2/16
< 0.1		2/24
< 0.1		3/01
< 0.1		3/07
< 0.1		3/14
< 0.1		3/14
< 0.1		3/31
< 0.1		4/05
< 0.1		4/08
< 0.1		4/19
< 0.1		4/20
< 0.1		5/02
< 0.1		5/10
< 0.1		5/16
< 0.1		5/27
< 0.1		6/07
< 0.1		6/07
< 0.1		6/20
< 0.1		6/20
< 0.1		7/12
< 0.1		7/13
< 0.1		7/27
< 0.1		8/01
< 0.1		8/15
< 0.1		8/15
< 0.1		8/24
< 0.1		8/30
< 0.1		9/14
< 0.1		9/14
< 0.1		9/22
< 0.1		9/22
< 0.1		9/28
< 0.1		9/28
< 0.1		10/12
< 0.1		10/12
< 0.1		10/24
< 0.1		10/24
< 0.1		10/26
< 0.1		11/07
< 0.1		11/07
< 0.1		11/29
< 0.1		11/29
< 0.1		11/29
< 0.1		11/29
< 0.1		12/05
< 0.1		12/05

H-3 (cont)

CV = 0.13 ± 0.01 uCi/L

Result	± Uncer.	Date
0.1	0.1	1/04
0.1	0.1	1/19
< 0.1		2/01
< 0.1		2/05
< 0.1		2/16
0.2	0.1	2/24
0.1	0.1	3/01
0.1	0.1	3/07
0.1	0.1	3/14
0.1	0.1	3/14
0.1	0.1	3/31
0.1	0.1	4/05
0.1	0.1	4/08
0.1	0.1	4/19
0.1	0.1	4/20
0.1	0.1	5/02
0.1	0.1	5/10
0.1	0.1	5/16
0.1	0.1	5/27

CV = 0.51 ± 0.03 uCi/L

Result	± Uncer.	Date
0.6	0.1	7/12
0.6	0.1	7/13
0.5	0.1	7/27
0.5	0.1	8/01
0.5	0.1	8/15
0.5	0.1	8/15
0.5	0.1	8/24
0.5	0.1	8/30
0.5	0.1	9/14
0.5	0.1	9/14
0.6	0.1	9/22
0.6	0.1	9/22
0.6	0.1	9/28
0.5	0.1	10/12
0.5	0.1	10/12
0.5	0.1	10/24
0.5	0.1	10/24
0.6	0.1	10/26
0.5	0.1	11/07
0.5	0.1	11/07
0.6	0.1	11/29
0.6	0.1	11/29
0.6	0.1	11/29
0.5	0.1	12/05
0.5	0.1	12/05

CV = 0.52 ± 0.03 uCi/L

Result	± Uncer.	Date
0.5	0.1	1/04
0.5	0.1	1/19
0.5	0.1	2/01
0.5	0.1	2/05
0.5	0.1	2/16
0.5	0.1	2/24
0.5	0.1	3/01
0.6	0.1	3/07
0.6	0.1	3/14
0.5	0.1	3/14
0.5	0.1	3/31

H-3 (cont)

0.5	0.1	4/05
0.5	0.1	4/08
0.5	0.1	4/19
0.5	0.1	4/20
0.6	0.1	5/02
0.5	0.1	5/10
0.5	0.1	5/16
0.6	0.1	5/27
0.5	0.1	6/07
0.6	0.1	6/20
0.6	0.1	6/29

CV = 0.85 ± 0.04 uCi/L

Result	± Uncer.	Date
0.9	0.1	7/12
1.0	0.1	7/13
0.9	0.1	7/27
0.9	0.1	8/01
1.0	0.1	8/15
0.9	0.1	8/15
0.9	0.1	8/24
0.9	0.1	8/30
0.9	0.1	9/14
0.9	0.1	9/14
1.0	0.1	9/22
1.0	0.1	9/22
0.9	0.1	9/28
0.9	0.1	9/28
0.8	0.1	10/12
0.9	0.1	10/24
1.0	0.1	10/26
1.0	0.1	10/26
0.9	0.1	11/07
0.9	0.1	11/07
0.9	0.1	11/29
0.9	0.1	11/29
0.9	0.1	11/29
1.0	0.1	12/05
1.0	0.1	12/05

CV = 0.87 ± 0.04 uCi/L

Result	± Uncer.	Date
0.9	0.1	1/04
0.8	0.1	1/19
0.8	0.1	2/01
0.9	0.1	2/05
0.9	0.1	2/16
0.9	0.1	2/24
0.9	0.1	3/01
0.9	0.1	3/07
0.9	0.1	3/14
0.8	0.1	3/14
1.0	0.1	3/31
0.9	0.1	4/05
0.9	0.1	4/08
0.9	0.1	4/19
0.9	0.1	4/20
0.9	0.1	5/02
1.0	0.1	5/10
0.8	0.1	5/16
1.0	0.1	5/27
0.9	0.1	6/07
0.9	0.1	6/20
1.0	0.1	6/29

****

HSE-9 Radionuclides in Urine
(cont)

****

H-3 (cont)

CV = 4.93 ± 0.25 uCi/L

Result	± Uncer.	Date
5.8	0.4	7/12
6.0	0.6	7/13
5.9	0.4	7/27
5.7	0.4	8/01
5.5	0.4	8/15
5.6	0.4	8/15
5.4	0.4	8/24
5.6	0.4	8/30
5.3	0.4	9/14
5.9	0.5	9/22
6.0	0.4	9/28
5.3	0.4	10/12
5.2	0.4	10/24
6.6	0.5	10/26
5.3	0.4	11/07
5.3	0.4	11/29
5.6	0.3	11/29
5.6	0.3	11/29
6.0	0.4	12/05

CV = 5.07 ± 0.25 uCi/L

Result	± Uncer.	Date
5.1	0.5	1/04
5.1	0.5	1/19
5.0	0.5	2/01
5.6	0.4	2/05
5.4	0.4	2/16
5.8	0.4	2/24
5.7	0.4	3/01
5.3	0.4	3/07
5.3	0.4	3/14
5.3	0.4	3/14
5.5	0.3	3/31
5.5	0.6	4/05
5.1	0.4	4/08
5.0	0.3	4/19
5.2	0.2	4/20
5.4	0.4	5/02
5.8	0.6	5/10
6.1	0.4	5/16
6.1	0.6	5/27
4.9	0.3	6/07
5.6	0.6	6/20
5.9	0.6	6/29

CV = 9.86 ± 0.49 uCi/L

Result	± Uncer.	Date
11.6	0.6	7/12
11.1	1.1	7/13
12.0	0.5	7/27
11.5	0.7	8/01
10.9	0.7	8/15
11.7	0.7	8/15
10.8	0.6	8/24

H-3 (cont)

11.5	0.7	8/30
10.7	0.6	9/14
10.2	0.7	9/22
11.4	0.7	9/28
10.3	0.6	10/12
10.9	0.6	10/24
12.9	0.5	10/26
10.9	0.6	11/07
10.9	0.6	11/07
11.1	0.6	11/29
11.3	0.7	11/29
11.2	0.7	12/05

CV = 10.14 ± 0.51 uCi/L

Result	± Uncer.	Date
11.	1.	1/04
10.4	0.5	1/19
10.	1.	2/01
11.4	0.7	2/05
11.5	0.7	2/16
11.7	0.7	2/24
12.1	0.5	3/01
11.1	0.7	3/07
10.5	0.6	3/14
10.5	0.5	4/05
10.5	0.6	4/08
11.	1.	4/19
10.7	0.6	4/20
10.9	0.6	5/02
11.	1.	5/10
10.4	0.6	5/16
12.	1.	5/27
10.2	0.7	6/07
11.	1.	6/20
11.9	0.7	6/29

The trend of high tritium values shown over the past year are attributed to the analyst's erroneous preparation of the calibration curve.

Pu-238 88GAU 01 RAS

CV = 0.06 ± 0.003 pCi/sample

Result	± Uncer.	Date
0.07	0.01	2/01
0.06	0.01	2/05
0.05	0.01	3/07
0.05	0.01	4/15
0.06	0.01	6/29
0.04	0.01	6/29
0.06	0.01	7/25
0.05	0.01	7/27
0.06	0.01	8/15
0.07	0.01	10/03
0.08	0.01	10/03
0.08	0.01	10/03
0.07	0.01	10/03
0.07	0.01	11/16
0.07	0.01	11/16
0.08	0.01	12/06
0.05	0.01	12/06

Pu-238 (cont)

0.05	0.01	12/06
0.08	0.01	12/06
0.05	0.01	12/15
0.06	0.01	12/15

CV = 0.12 ± 0.006 pCi/sample

Result	± Uncer.	Date
0.13	0.01	1/15
0.13	0.01	2/23
0.12	0.01	3/07
0.11	0.01	3/11
0.12	0.01	6/14
0.11	0.01	7/12
0.11	0.01	7/19
0.12	0.01	8/05
0.12	0.01	8/15
0.12	0.01	9/20
0.12	0.01	9/20
0.10	0.01	10/27
0.13	0.01	11/15
0.13	0.01	11/15
0.12	0.01	11/16
0.12	0.01	11/16
0.11	0.01	12/06
0.11	0.01	12/06
0.11	0.01	12/20
0.11	0.01	12/20
0.11	0.01	12/20
0.12	0.01	12/30

CV = 0.19 ± 0.01 pCi/sample

Result	± Uncer.	Date
0.19	0.01	1/29
0.19	0.01	1/29
0.16	0.01	2/05
0.18	0.01	4/15
0.20	0.01	5/25
0.17	0.01	6/14
0.18	0.01	7/07
0.20	0.01	7/19
0.19	0.01	7/19
0.21	0.01	8/15
0.20	0.01	9/20
0.20	0.01	9/20
0.19	0.01	10/03
0.19	0.01	10/03
0.24	0.02	11/15
0.24	0.02	11/15
0.22	0.01	12/15
0.18	0.01	12/20
0.18	0.01	12/20
0.18	0.01	12/20
0.18	0.01	12/20
0.18	0.01	12/20
0.18	0.01	12/20

CV = 0.39 ± 0.02 pCi/sample

Result	± Uncer.	Date
0.35	0.04	1/15
0.36	0.04	1/25
0.21	0.01	3/07
0.38	0.04	3/18
0.38	0.04	3/31

TABLE C-V (cont)

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HSE-9 Radionuclides in Urine
(cont)

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Pu-238 (cont)

0.34	0.03	4/27
0.37	0.04	6/29
0.35	0.04	7/07
0.39	0.04	7/12
0.40	0.04	7/19
0.43	0.04	8/05
0.42	0.04	10/03
0.42	0.04	10/03
0.44	0.04	10/27
0.44	0.04	10/27
0.43	0.04	11/15
0.43	0.04	11/15
0.41	0.04	12/20
0.34	0.03	12/20
0.41	0.04	12/20
0.34	0.03	12/20
0.41	0.04	12/20
0.34	0.03	12/20
0.43	0.04	12/30

Recoveries of Pu-238 were high during the last two quarters due to a concentrated standard. With fresh standard recoveries returned to expected levels.

Pu-239 88GAU 01 RAS

CV = 0.06 ± 0.003 pCi/sample

Result	± Uncer.	Date
0.07	0.01	1/25
0.07	0.01	3/07
0.06	0.01	3/11
0.07	0.01	4/15
0.07	0.01	4/27
0.05	0.01	5/25
0.13	0.01	6/29
0.07	0.01	6/29
0.06	0.01	7/07
0.07	0.01	7/25
0.04	0.01	7/27
0.05	0.01	8/19
0.06	0.01	9/07
0.05	0.01	10/27
0.04	0.01	10/27
0.08	0.01	11/16
0.04	0.01	11/16
0.07	0.01	12/20
0.07	0.01	12/20
0.44	0.05	12/30

CV = 0.15 ± 0.007 pCi/sample

Result	± Uncer.	Date
0.14	0.01	3/07
0.14	0.01	3/31
0.14	0.01	4/15
0.15	0.01	4/15

Pu-239 (cont)

0.15	0.01	6/29
0.16	0.01	7/07
0.14	0.01	7/19
0.16	0.01	8/15
0.13	0.01	9/07
0.15	0.01	9/20
0.15	0.01	11/15
0.14	0.01	12/15

CV = 0.22 ± 0.01 pCi/sample

Result	± Uncer.	Date
0.22	0.02	2/05
0.17	0.02	2/12
0.20	0.02	2/23
0.21	0.02	2/23
0.21	0.02	3/07
0.21	0.02	3/18
0.21	0.02	5/25
0.19	0.02	5/27
0.23	0.02	7/25
0.23	0.02	7/29
0.24	0.02	8/05
0.26	0.03	9/07
0.17	0.02	9/07
0.27	0.03	9/07
0.23	0.02	10/27
0.21	0.02	12/06
0.21	0.01	12/20
0.21	0.02	12/20
0.22	0.02	12/30

CV = 0.44 ± 0.02 pCi/sample

Result	± Uncer.	Date
0.48	0.05	1/15
0.44	0.05	1/25
0.47	0.05	3/18
0.41	0.05	3/31
0.46	0.05	4/27
0.49	0.05	6/14
0.43	0.05	7/12
0.45	0.05	7/29
0.52	0.06	7/29
0.46	0.05	8/05
0.48	0.05	9/07
0.43	0.05	10/03
0.41	0.08	12/06
0.40	0.04	12/06
0.45	0.05	12/06

U 88GAU 01 ICPMS

CV = 50. ± 5. ug/L

Result	± Uncer.	Date
44.	5.	2/18
45.	5.	2/18
53.	5.	3/31
52.	5.	3/31
52.	5.	3/31
51.	5.	3/31
55.	5.	5/12
50.	5.	5/12
52.	5.	5/12

U (cont)

53.	5.	5/12
52.	5.	5/12
53.	5.	5/12

U-235 88GAU 03 DNA

CV = < 4. pCi/L

Result	± Uncer.	Date
< 4.		1/04
< 4.		1/19
< 4.		2/01
< 4.		2/16
< 4.		2/29
< 4.		3/14
< 4.		4/11
< 4.		4/25
< 4.		5/02
< 4.		5/09
< 4.		6/06
< 4.		6/08
< 4.		6/20
< 4.		7/07
< 4.		7/18
< 4.		8/19
< 4.		8/29
< 4.		9/01
< 4.		9/14
< 4.		9/26
< 4.		10/11
< 4.		10/24
< 4.		11/07
< 4.		11/21
< 4.		12/06
< 4.		12/19

CV = 5.14 ± 0.26 pCi/L

Result	± Uncer.	Date
4.0	0.4	2/01
4.7	0.4	2/16
4.0	0.4	2/29
4.2	0.4	5/09
4.0	0.4	6/08
4.4	0.4	7/07
4.9	0.6	7/18
4.0	0.4	11/07
5.3	0.5	11/07
5.6	0.6	11/07
5.3	0.5	11/21
5.8	0.6	12/06
6.0	0.5	12/19

CV = 7.71 ± 0.39 pCi/L

Result	± Uncer.	Date
6.5	0.8	3/14
6.6	0.8	3/28
5.3	0.6	4/11
6.1	0.7	4/25
6.0	0.7	5/02
7.2	0.9	6/06
7.0	0.8	6/20
7.6	0.9	8/19
7.2	0.9	8/29
7.3	0.9	9/01

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HSE-9 Radionuclides in Urine
(cont)

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U-235 (cont)

CV = 10.28 ± 0.51 pCi/L

Result	± Uncer.	Date
10.1	0.7	1/04
8.9	0.6	1/19
10.6	0.7	2/01
9.3	0.6	2/16
8.4	0.6	2/29
7.7	0.5	4/11
8.9	0.6	4/25
8.3	0.6	5/02
10.1	0.7	6/06
10.5	0.7	6/20
8.5	0.6	7/07
9.0	0.7	7/18
11.1	0.9	11/07
11.6	0.8	11/21
11.0	1.0	12/06
12.4	0.9	12/19

CV = 15.42 ± 0.77 pCi/L

Result	± Uncer.	Date
13.	1.	1/04
13.	1.	1/19
13.	1.	3/14
12.	1.	3/28
13.	1.	5/09
15.	1.	6/08
16.	1.	8/19
15.	1.	8/29
14.	1.	9/01
15.	1.	9/14
15.	1.	9/26
13.	1.	10/11
16.	1.	10/24

CV = 20.56 ± 1.03 pCi/L

Result	± Uncer.	Date
20.	2.	2/01
19.	2.	2/16
17.	2.	2/29
16.	2.	4/11
17.	2.	4/25
18.	2.	5/02
19.	2.	6/06
24.	2.	6/20
20.	1.	8/19
19.	1.	8/29
20.	2.	9/01
20.	1.	9/14
20.	2.	9/26
18.	2.	10/11
20.	2.	10/24
21.	2.	11/07
22.	2.	11/21
23.	2.	12/06
24.	3.	12/19

U-235 (cont)

CV = 25.7 ± 1.29 pCi/L

Result	± Uncer.	Date
22.	3.	1/04
22.	2.	1/19
23.	3.	3/14
24.	3.	3/28
23.	2.	5/09
22.	2.	6/08
23.	3.	7/07
24.	3.	7/18
23.	3.	9/14
25.	3.	9/26
22.	2.	10/11
22.	2.	10/11
25.	1.	10/24

U-238 88GAU 01 DNA

CV = Blank (ug/L)

Result	± Uncer.	Date
< 4.		1/04
< 4.		1/19
< 4.		2/01
< 4.		2/16
< 4.		2/29
< 4.		3/14
< 4.		3/28
< 4.		4/11
< 4.		4/25
< 4.		5/09
< 4.		6/06
< 4.		6/08
< 4.		6/20
< 4.		7/07
< 4.		7/18
< 4.		8/19
< 4.		8/29
< 4.		9/01
< 4.		9/14
< 4.		9/26
< 4.		10/11
< 4.		10/24
< 4.		11/07
< 4.		11/21
< 4.		12/06
< 4.		12/19

CV = 8.48 ± 0.42 ug/L

Result	± Uncer.	Date
6.	1.	1/04
5.	1.	1/19
8.	2.	2/01
8.	2.	2/16
11.	2.	2/29
6.	1.	3/14
10.	1.	3/28
10.	2.	5/09
9.	2.	6/08
12.	2.	7/07
6.	1.	7/18
8.	2.	9/14
11.	2.	9/26

U-238 (cont)

9.	2.	11/07
8.	2.	11/21
6.	1.	12/06
9.	2.	12/19

CV = 12.72 ± 0.64 ug/L

Result	± Uncer.	Date
11.	2.	4/11
15.	3.	4/25
14.	3.	6/06
10.	2.	6/20
16.	3.	8/19
17.	4.	8/29
17.	4.	9/01
17.	3.	10/11
10.	2.	10/24
14.	2.	12/06

CV = 16.96 ± 0.85 ug/L

Result	± Uncer.	Date
15.	2.	3/14
14.	1.	3/28
13.	2.	4/11
12.	2.	4/25
15.	3.	6/06
16.	3.	6/20
17.	3.	7/07
16.	3.	7/18
18.	3.	9/14
19.	3.	9/26
19.	3.	11/07
18.	3.	11/21
18.	3.	12/19

CV = 21.2 ± 1.06 ug/L

Result	± Uncer.	Date
20.	4.	1/04
25.	5.	1/19
22.	5.	5/09
18.	4.	6/08
22.	5.	8/19
23.	5.	8/29
22.	5.	9/01
24.	5.	10/11
25.	3.	10/24

CV = 25.44 ± 1.27 ug/L

Result	± Uncer.	Date
27.	5.	1/04
25.	5.	1/19
27.	5.	2/01
22.	5.	2/16
21.	4.	2/29
23.	4.	3/14
24.	3.	3/28
22.	4.	5/09
28.	5.	6/08
24.	5.	7/07
29.	6.	7/18
23.	4.	9/14
28.	5.	9/26

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HSE-9 Radionuclides in Urine (cont)

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U-238 (cont)

28.	5.	11/07
27.	5.	11/21
26.	5.	12/06
22.	4.	12/19

CV = 33.92 ± 1.7 ug/L

Result	± Uncer.	Date
34.	4.	2/01
33.	4.	2/16
26.	3.	2/29
35.	4.	4/11
30.	4.	4/25
25.	5.	6/06
33.	4.	6/20
37.	4.	8/19
42.	5.	8/29
38.	5.	9/01
35.	4.	10/11
32.	5.	10/24

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HSE-9 Radionuclides in Vegetation Ash

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Am-241 88GAU 01 RAS

CV = Blank (pCi/sample)

Result	± Uncer.	Date
< 0.0090		8/08

CV = 0.48 ± 0.02 pCi/sample

Result	± Uncer.	Date
0.46	0.04	8/08
0.42	0.05	11/23
0.41	0.05	11/23

Pu-238 88GAU 01 RAS

CV = Blank (pCi/sample)

Result	± Uncer.	Date
2.7	0.1	5/23

CV = 2.96 ± 0.15 pCi/sample

Result	± Uncer.	Date
2.4	0.1	5/23
2.9	0.1	6/07
2.5	0.1	6/07

Pu-38 (cont)

CV = 3.45 ± 0.34 pCi/sample

Result	± Uncer.	Date
3.2	0.1	6/02
3.0	0.1	6/02

Pu-239 88GAU 01 RAS

CV = Blank (pCi/sample)

Result	± Uncer.	Date
2.0	0.1	5/23

CV = 2.18 ± 0.11 pCi/sample

Result	± Uncer.	Date
2.0	0.1	5/23
2.4	0.1	6/07
2.1	0.1	6/07

CV = 2.54 ± 0.25 pCi/sample

Result	± Uncer.	Date
2.5	0.1	6/02
2.5	0.1	6/02

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HSE-9 Radionuclides in Water

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Alpha 88GAU 03 PC

CV = 51. ± 5. nCi/L

Result	± Uncer.	Date
49.	2.	12/16
40.	1.	12/16
49.	2.	12/16
40.	1.	12/16
49.	2.	12/19
49.	2.	12/19
49.	1.	12/20
48.	2.	12/20
49.	1.	12/20
48.	2.	12/20
48.	2.	12/21
48.	2.	12/21
49.	1.	12/21
49.	1.	12/21
47.	2.	12/22
47.	2.	12/22
50.	1.	12/23
51.	2.	12/23

Am-241 85GAU 01 GELI

CV = 46. ± 7. nCi/L

Result	± Uncer.	Date
46.	7.	1/12
44.	7.	1/20
44.	7.	1/27
41.	6.	2/03
40.	6.	2/10
41.	6.	2/18
46.	15.	2/24
46.	7.	2/29
46.	7.	3/09
46.	7.	3/15
44.	7.	3/21
46.	7.	3/29
47.	7.	4/04
46.	7.	4/12
46.	7.	4/18
45.	7.	4/28
45.	7.	5/02
46.	7.	5/09
47.	7.	5/17
44.	7.	5/25
43.	7.	6/01
41.	6.	6/07
44.	7.	6/14
37.	6.	6/21
37.	6.	7/08
45.	7.	7/12
42.	6.	7/18
38.	6.	7/26
44.	7.	8/18
44.	7.	8/22
42.	6.	8/30
45.	7.	9/06
44.	7.	9/12
46.	7.	9/19
42.	6.	9/26
46.	7.	10/03
45.	7.	10/13
46.	7.	10/17
44.	7.	10/25
46.	7.	10/31
45.	7.	11/07
43.	6.	11/15
42.	6.	11/21
44.	7.	11/28
44.	6.	12/06
43.	6.	12/12
43.	6.	12/19

Am-241 86WIL 01 RAS

CV = 340. ± 30. nCi/L

Result	± Uncer.	Date
370.	40.	1/28
340.	40.	2/24
320.	40.	9/15
330.	40.	10/05
300.	30.	12/07

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HSE-9 Radionuclides in Water
(cont)

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Am-241 (cont)

CV = 380. ± 40. nCi/L

Result	± Uncer.	Date
360.	40.	3/30
320.	40.	4/28
360.	40.	6/01
380.	40.	6/22
350.	40.	7/27
370.	40.	8/31
310.	40.	10/03
310.	40.	10/03
330.	40.	10/28
330.	40.	10/28
340.	40.	11/03
340.	40.	11/03

Beta 88GAU 01 PC

CV = 66. ± 7. nCi/L

Result	± Uncer.	Date
64.	2.	12/16
66.	1.	12/16
64.	2.	12/16
66.	1.	12/16
61.	2.	12/19
65.	1.	12/19
65.	1.	12/19
61.	2.	12/19
61.	2.	12/20
64.	1.	12/20
64.	1.	12/20
61.	2.	12/20
64.	1.	12/21
64.	1.	12/21
62.	2.	12/21
62.	2.	12/21
60.	2.	12/22
60.	2.	12/22
62.	2.	12/23
65.	1.	12/23

Co-57 85GAU 01 GELI

CV = 40. ± 6. nCi/L

Result	± Uncer.	Date
39.	6.	1/12
40.	6.	1/20
43.	7.	1/27
43.	6.	2/03
41.	6.	2/10
42.	6.	2/18
47.	15.	2/24
47.	7.	2/29
51.	8.	3/09
44.	7.	3/15

Co-57 (cont)

47.	7.	3/21
45.	7.	3/29
46.	7.	4/04
48.	7.	4/12
46.	7.	4/18
45.	7.	4/28
48.	7.	5/02
50.	7.	5/09
46.	7.	5/17
47.	7.	5/25
44.	7.	6/01
47.	7.	6/07
45.	7.	6/14
37.	6.	6/21
40.	6.	7/08
46.	7.	7/12
43.	6.	7/18
46.	7.	7/26
45.	7.	8/18
42.	6.	8/22
45.	7.	8/30
48.	7.	9/06
47.	7.	9/12
50.	8.	9/19
44.	7.	9/26
50.	7.	10/03
48.	7.	10/13
48.	7.	10/17
50.	8.	10/25
49.	7.	10/31
45.	7.	11/07
41.	6.	11/15
41.	6.	11/21
46.	7.	11/28
44.	6.	12/06
32.	5.	12/12
35.	5.	12/19

Co-60 85GAU 01 GELI

CV = 25. ± 4. nCi/L

Result	± Uncer.	Date
27.	4.	1/12
27.	4.	1/20
26.	4.	1/27
26.	4.	2/03
24.	4.	2/10
21.	3.	2/18
27.	4.	2/24
24.	4.	2/29
27.	4.	3/09
24.	4.	3/15
26.	4.	3/21
28.	4.	3/29
25.	4.	4/04
22.	4.	4/12
25.	4.	4/18
26.	4.	4/28
27.	4.	5/02
25.	4.	5/09
25.	4.	5/17
26.	4.	5/25
26.	4.	6/01
25.	4.	6/07
27.	4.	6/14
21.	4.	6/21

Co-60 (cont)

19.	3.	7/08
27.	4.	7/12
27.	4.	7/18
22.	4.	7/26
25.	4.	8/18
25.	4.	8/22
26.	4.	8/30
28.	4.	9/06
28.	4.	9/12
27.	4.	9/19
27.	4.	9/26
24.	4.	10/03
27.	4.	10/13
27.	4.	10/17
26.	4.	10/25
26.	4.	10/31
23.	4.	11/07
31.	5.	11/15
27.	4.	11/21
24.	4.	11/28
28.	4.	12/06
27.	4.	12/12
27.	4.	12/19

Cs-134 85GAU 01 GELI

CV = 51. ± 8. nCi/L

Result	± Uncer.	Date
54.	8.	1/12
56.	8.	1/20
54.	8.	1/27
53.	8.	2/03
55.	8.	2/10
55.	8.	2/18
56.	8.	2/24
57.	9.	2/29
55.	8.	3/09
55.	8.	3/15
56.	8.	3/21
58.	9.	3/29
57.	9.	4/04
61.	9.	4/12
57.	9.	4/18
54.	8.	4/28
58.	8.	5/02
59.	9.	5/09
59.	8.	5/17
56.	8.	5/25
54.	8.	6/01
55.	8.	6/07
54.	8.	6/14
46.	7.	6/21
48.	7.	7/08
60.	9.	7/12
53.	8.	7/18
53.	8.	7/26
58.	9.	8/18
54.	8.	8/22
44.	7.	8/30
46.	7.	9/06
47.	7.	9/12
46.	7.	9/19
46.	7.	9/26
48.	7.	10/03
47.	7.	10/13
46.	7.	10/17

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HSE-9 Radionuclides in Water
(cont)

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Cs-134 (cont)

44.	7.	10/25
44.	7.	10/31
45.	7.	11/07
46.	7.	11/15
45.	7.	11/21
46.	7.	11/28
46.	7.	12/06
45.	6.	12/12
46.	7.	12/19

Cs-137 85GAU 01 GELI

CV = 180. ± 30. nCi/L

Result	± Uncer.	Date
190.	30.	1/12
190.	30.	1/20
190.	30.	1/27
190.	30.	2/03
190.	30.	2/10
190.	30.	2/18
190.	30.	2/24
190.	30.	2/29
200.	30.	3/09
200.	30.	3/15
190.	30.	3/21
190.	30.	3/29
190.	30.	4/04
190.	30.	4/12
190.	30.	4/18
190.	30.	4/28
190.	30.	5/02
200.	30.	5/09
200.	30.	5/17
190.	30.	5/25
190.	30.	6/01
200.	30.	6/07
190.	30.	6/14
170.	20.	6/21
170.	30.	7/08
200.	30.	7/12
180.	30.	7/18
170.	30.	7/26
190.	30.	8/18
190.	30.	8/22
190.	30.	8/30
190.	30.	9/06
190.	30.	9/12
190.	30.	9/19
190.	30.	9/26
200.	30.	10/03
190.	30.	10/13
190.	30.	10/17
180.	30.	10/25
180.	30.	10/31
180.	30.	11/07
190.	30.	11/15
190.	30.	11/21
190.	30.	11/28
190.	30.	12/06

Cs-137 (cont)

190.	30.	12/12
190.	30.	12/19

H-3 87GAU 01 LS

CV = Blank (pCi/L)

Result	± Uncer.	Date
300.	300.	1/26
- 300.	300.	2/03
200.	300.	2/09
700.	400.	2/22
- 600.	300.	2/22
400.	300.	2/22
500.	400.	2/24
700.	300.	2/24
- 500.	300.	4/25
- 100.	300.	5/20
- 400.	300.	5/31
- 200.	400.	6/16
< 300.		7/01
< 300.		7/18
- 100.	200.	8/02
- 500.	400.	8/16
< 300.		8/22
- 900.	400.	8/22
- 600.	300.	9/01
- 600.	300.	9/01
- 100.	200.	9/19
- 200.	200.	9/26
- 200.	100.	10/05
2200.	500.	10/05
800.	300.	10/17
- 400.	300.	11/07
< 400.		11/14
- 800.	400.	11/21
- 500.	200.	11/21
- 600.	300.	11/21
100.	300.	12/14
100.	300.	12/14
- 400.	300.	12/14
- 400.	200.	12/14
400.	300.	12/14
< 300.		12/14
- 600.	400.	12/14
- 100.	200.	12/14
400.	300.	12/14
< 300.		12/14
- 600.	200.	12/14
- 100.	300.	12/14
- 100.	300.	12/23

CV = 5. ± 0.2 uCi/L

Result	± Uncer.	Date
5.0	0.1	1/21
5.0	0.1	1/27
5.0	0.1	2/10
5.0	0.1	2/24
4.9	0.1	3/10
4.9	0.1	3/14
5.0	0.1	3/17
5.0	0.1	3/18
4.9	0.1	3/29
4.9	0.1	4/19
5.0	0.1	4/27

H-3 (cont)

4.9	0.1	5/26
5.0	0.1	6/21
4.9	0.1	7/06
4.9	0.1	7/11
4.9	0.1	7/22
4.9	0.1	7/26
4.9	0.1	9/06
4.9	0.1	9/15
4.9	0.1	9/16
5.0	0.1	9/27
5.0	0.1	10/05
4.9	0.1	10/25
5.0	0.1	10/28
4.9	0.1	11/07
4.9	0.1	11/09
4.9	0.1	11/22
4.9	0.1	11/28
4.9	0.1	12/02
4.8	0.1	12/16
4.9	0.1	12/20
4.9	0.1	12/20

CV = 17770. ± 900. pCi/L

Result	± Uncer.	Date
20000.	2000.	2/09
20000.	2000.	2/22
19000.	2000.	2/22
19000.	2000.	2/22
19000.	2000.	2/24
19000.	2000.	2/24
16000.	2000.	4/07
16000.	2000.	4/07
16000.	2000.	4/07
20000.	2000.	4/25
15000.	2000.	5/20
16000.	2000.	5/31
16000.	2000.	6/16
17000.	2000.	7/01
15000.	2000.	7/18
16000.	2000.	8/02
14000.	1000.	8/16
16000.	2000.	8/16
15000.	2000.	8/22
14000.	1000.	8/22
15000.	2000.	8/22
14000.	1000.	8/22
16000.	2000.	9/01
16000.	2000.	9/01
16000.	2000.	9/19
16000.	2000.	9/26
17000.	2000.	10/05
15000.	2000.	10/05
15000.	2000.	10/17
16000.	2000.	11/07
16000.	2000.	11/14
15000.	2000.	11/21
16000.	2000.	11/21
15000.	2000.	11/21
17000.	2000.	12/14
17000.	2000.	12/14
16000.	2000.	12/14
16000.	2000.	12/14
17000.	2000.	12/23

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HSE-9 Radionuclides in Water
(cont)

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H-3 (cont)

CV = 18406. ± 379. pCi/L

Result	± Uncer.	Date
18000.	2000.	1/26
18000.	2000.	2/03

Mn-54 85GAU 01 GELI

CV = 55. ± 8. nCi/L

Result	± Uncer.	Date
62.	9.	1/12
60.	9.	1/20
61.	9.	1/27
56.	8.	2/03
59.	9.	2/10
63.	9.	2/18
65.	10.	2/24
64.	10.	2/29
66.	10.	3/09
63.	9.	3/15
62.	9.	3/21
62.	9.	3/29
66.	10.	4/04
64.	10.	4/12
61.	9.	4/18
59.	9.	4/28
66.	10.	5/02
63.	9.	5/09
68.	10.	5/17
57.	8.	5/25
63.	9.	6/01
60.	8.	6/07
62.	9.	6/14
57.	9.	6/21
55.	8.	7/08
64.	10.	7/18
63.	9.	7/26
66.	10.	8/18
61.	9.	8/22
60.	9.	8/30
60.	9.	9/06
63.	9.	9/12
65.	10.	9/19
57.	9.	9/26
60.	9.	10/03
56.	8.	10/13
56.	8.	10/17
59.	9.	10/25
62.	9.	10/31
57.	9.	11/07
59.	9.	11/15
61.	9.	11/21
58.	9.	11/28
70.	11.	12/06
58.	9.	12/12
62.	9.	12/19

Na-22 85GAU 01 GELI

CV = 32. ± 5. nCi/L

Result	± Uncer.	Date
32.	5.	1/12
32.	5.	1/20
34.	5.	1/27
31.	5.	2/03
30.	5.	2/10
31.	5.	2/18
33.	5.	2/24
32.	5.	2/29
31.	5.	3/09
31.	5.	3/15
34.	5.	3/21
32.	5.	3/29
32.	5.	4/04
33.	5.	4/12
31.	5.	4/18
33.	5.	4/28
33.	5.	5/02
33.	5.	5/09
33.	5.	5/17
31.	5.	5/25
32.	5.	6/01
32.	5.	6/07
33.	5.	6/14
28.	4.	6/21
28.	4.	7/08
34.	5.	7/12
35.	5.	7/18
39.	6.	7/26
37.	6.	8/18
36.	5.	8/22
31.	5.	8/30
33.	5.	9/06
32.	5.	9/12
33.	5.	9/19
33.	5.	9/26
32.	5.	10/03
31.	5.	10/13
31.	5.	10/17
32.	5.	10/25
31.	5.	10/31
31.	5.	11/07
35.	5.	11/15
36.	5.	11/21
36.	5.	11/28
37.	5.	12/06
32.	5.	12/12
31.	5.	12/19

Pu-238 88GAU 01 RAS

CV = Blank (pCi/L)

Result	± Uncer.	Date
0.005	0.01	5/23
- 0.013	0.01	5/23
0.006	0.01	5/24
- 0.004	0.01	5/24
0.006	0.01	11/15
< 0.01		11/15

Pu-238 (cont)

CV = 1.23 ± 0.06 pCi/L

Result	± Uncer.	Date
1.29	0.10	5/23
1.26	0.10	5/23
1.09	0.09	5/24
1.11	0.08	11/15

CV = 3.29 ± 0.3 pCi/L

Result	± Uncer.	Date
3.3	0.3	3/01
3.3	0.3	3/01

CV = 110. ± 10. nCi/L

Result	± Uncer.	Date
135.	15.	1/15
135.	15.	1/22
120.	15.	1/28
130.	15.	2/01
140.	20.	2/12
140.	20.	2/24
130.	15.	2/29
110.	10.	3/10
110.	10.	3/25
110.	10.	4/15
115.	15.	4/29
105.	10.	5/05
105.	10.	5/13
115.	15.	5/27
105.	10.	6/03
110.	10.	6/13
105.	10.	7/08
110.	10.	7/13
110.	10.	7/20
110.	10.	8/19
110.	10.	8/24
110.	10.	9/09
125.	15.	9/15
110.	10.	9/21
105.	10.	10/05
105.	10.	10/20
95.	10.	11/02
115.	15.	11/04
110.	10.	11/23
125.	20.	12/07
115.	15.	12/09
10.	10.	12/22
130.	20.	12/22

CV = 125. ± 14. nCi/L

Result	± Uncer.	Date
125.	15.	3/30
125.	15.	4/27
130.	15.	6/01
115.	15.	6/22
130.	20.	7/27
120.	10.	8/31
125.	20.	10/03
125.	20.	10/03
110.	15.	11/03
110.	15.	11/03
120.	15.	11/30
120.	15.	11/30

****

HSE-9 Radionuclides in Water
(cont)

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Pu-238 (cont).

CV = 128. ± 17. nCi/L

Result	± Uncer.	Date
130.	15.	5/25

Pu-239 88GAU 01 RAS

CV = Blank (pCi/L)

Result	± Uncer.	Date
< 0.01		5/23
0.003	0.005	5/23
< 0.01		5/24
0.012	0.009	5/24
0.016	0.012	11/15
< 0.01		11/15

CV = 1.16 ± 0.06 pCi/L

Result	± Uncer.	Date
1.15	0.09	5/23
1.19	0.10	5/23
1.22	0.10	5/24
1.03	0.08	11/15

CV = 2.54 ± 0.3 pCi/L

Result	± Uncer.	Date
2.5	0.3	3/01

CV = 320. ± 30. nCi/L

Result	± Uncer.	Date
380.	40.	1/15
390.	40.	1/22
360.	40.	1/28
370.	40.	2/01
390.	40.	2/12
370.	40.	2/24
380.	40.	2/29
320.	30.	3/10
320.	30.	3/25
320.	30.	4/15
330.	40.	4/29
300.	30.	5/05
310.	30.	5/13
330.	40.	5/27
310.	30.	6/03
320.	30.	6/13
320.	30.	7/08
330.	40.	7/13
330.	40.	7/20
330.	40.	8/19
320.	30.	8/24
320.	30.	9/09
360.	40.	9/15

Pu-239 (cont)

320.	30.	9/21
310.	30.	10/05
300.	30.	10/20
310.	30.	11/02
330.	40.	11/04
320.	40.	11/23
380.	50.	12/07
330.	40.	12/09
310.	40.	12/22
320.	30.	12/22

CV = 370. ± 43. nCi/L

Result	± Uncer.	Date
370.	40.	5/25

CV = 380. ± 40. nCi/L

Result	± Uncer.	Date
360.	40.	3/30
350.	40.	4/27
360.	40.	6/01
360.	40.	6/22
360.	40.	7/27
350.	40.	8/31
350.	40.	10/03
350.	40.	10/03
330.	40.	11/03
330.	40.	11/03
360.	40.	11/30
360.	40.	11/30

Ra-226 88GAU 04 PC

CV = Blank (pCi/L)

Result	± Uncer.	Date
0.03	0.03	4/12

Sr-90 88GAU 01 PC

CV = Blank (pCi/sample)

Result	± Uncer.	Date
0.2	0.1	4/07
- 0.1	0.2	4/07

CV = 446.6 ± 44.7 pCi/sample

Result	± Uncer.	Date
448.	4.	4/07
429.	5.	4/07
427.	5.	4/07
459.	4.	4/07

U-234 89FIL 01 RAS

CV = 55. ± 6. nCi/L

Result	± Uncer.	Date
76.	10.	5/25

U-234 (cont)

CV = 61. ± 13. nCi/L

Result	± Uncer.	Date
56.	6.	1/15
69.	8.	1/28
56.	6.	2/03
63.	8.	2/24
78.	9.	2/29
56.	6.	3/25
54.	6.	5/05
56.	6.	6/06
55.	6.	7/13
57.	6.	8/24
56.	6.	9/15
58.	6.	10/05
62.	7.	11/02
54.	6.	11/23
70.	11.	12/07
56.	9.	12/22

CV = 62. ± 8. nCi/L

Result	± Uncer.	Date
71.	9.	3/30
65.	8.	4/27
60.	8.	6/22
61.	8.	7/27
57.	8.	8/31
60.	10.	10/03
60.	10.	10/03
62.	10.	10/28
62.	10.	10/28
73.	11.	11/03
73.	11.	11/03
59.	8.	11/30
59.	8.	11/30

U-235 89FIL 01 RAS

CV = 2.4 ± 0.4 nCi/L

Result	± Uncer.	Date
2.2	1.1	5/25

CV = 2.9 ± 0.7 nCi/L

Result	± Uncer.	Date
2.9	0.4	1/15
2.0	0.7	1/28
2.7	0.4	2/03
3.	1.	2/24
2.6	0.4	5/05
2.7	0.4	6/06
2.8	0.4	7/13
2.7	0.4	8/24
2.8	0.5	9/15
2.2	0.4	11/02
3.1	0.5	11/23
2.	2.	12/07
2.	2.	12/22

****

HSE-9 Radionuclides in Water
(cont)

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U-235 (cont)

CV = 3. ± 1. nCi/L

Result	± Uncer.	Date
3.	1.	3/30
3.	1.	4/27
3.	1.	6/22
3.	1.	7/27
3.	1.	8/31
2.	2.	10/03
2.	2.	10/03
4.	2.	10/28
4.	2.	10/28
4.	2.	11/03
4.	2.	11/03
4.	1.	11/30
4.	1.	11/30

****

HSE-9 Radionuclides
on Biologicals

****

Pu-239 88GAU 01 RAS

CV = 0.58 ± 0.06 pCi/sample

Result	± Uncer.	Date
0.56	0.04	11/07
0.50	0.04	11/07
0.53	0.04	11/07
0.49	0.04	11/07

****

HSE-9 Radionuclides
on Filter Media

****

Am-241 88GAU 01 RAS

CV = Blank (pCi/filter)

Result	± Uncer.	Date
< 0.005		10/05
0.04	0.02	10/05
0.01	0.01	10/05
0.04	0.02	10/05
0.02	0.01	11/10
0.01	0.01	11/10
0.01	0.01	11/10
0.01	0.01	11/10

Am-241 (cont)

CV = 0.29 ± 0.03 pCi/filter

Result	± Uncer.	Date
0.24	0.04	10/05
0.23	0.04	10/05
0.26	0.04	10/05
0.24	0.03	10/05

CV = 0.38 ± 0.04 pCi/filter

Result	± Uncer.	Date
0.35	0.03	11/10
0.35	0.03	11/10
0.37	0.03	11/10
0.36	0.03	11/10

CV = 0.45 ± 0.04 pCi/filter

Result	± Uncer.	Date
0.47	0.04	2/01
0.52	0.04	2/01
0.41	0.04	2/01
0.30	0.03	2/01

Pu-238 88GAU 01 RAS

CV = Blank (pCi/filter)

Result	± Uncer.	Date
0.009	0.006	8/03
0.002	0.005	8/03
- 0.006	0.004	8/03
0.023	0.007	8/03
0.014	0.007	11/02
0.008	0.008	11/02
- 0.002	0.003	11/02
0.002	0.002	11/02
0.007	0.004	11/02
0.002	0.002	11/02
0.006	0.007	11/02
0.003	0.008	11/02

CV = 0.39 ± 0.04 pCi/filter

Result	± Uncer.	Date
0.41	0.03	8/03
0.39	0.03	8/03
0.36	0.03	8/03
0.39	0.03	8/03

Pu-239 88GAU 01 RAS

CV = Blank (pCi/filter)

Result	± Uncer.	Date
0.006	0.005	8/03
0.010	0.007	8/03
0.036	0.009	8/03
0.037	0.010	8/03
0.006	0.004	11/02
0.007	0.004	11/02

Pu-239 (cont)

0.004	0.005	11/02
0.002	0.003	11/02

CV = 0.44 ± 0.04 pCi/filter

Result	± Uncer.	Date
0.49	0.04	2/03
0.47	0.04	2/03
0.44	0.03	2/03
0.43	0.03	8/03
0.44	0.03	8/03
0.55	0.04	8/03
0.46	0.03	8/03

CV = 0.58 ± 0.06 pCi/filter

Result	± Uncer.	Date
0.56	0.04	11/02
0.56	0.04	11/02
0.61	0.05	11/02
0.59	0.04	11/02

U 87GAU 03 DNA

CV = 247. ± 25. ng/filter

Result	± Uncer.	Date
250.	20.	2/05
230.	20.	2/05
260.	30.	2/05
250.	30.	8/23
280.	30.	8/23
270.	30.	8/23
260.	30.	10/13
260.	30.	10/13
250.	20.	10/13

CV = 1000. ± 150. ng/filter

Result	± Uncer.	Date
940.	90.	5/16
900.	90.	5/16
870.	90.	5/16

CV = 1007. ± 101. ng/filter

Result	± Uncer.	Date
900.	90.	2/05
940.	90.	2/05
910.	90.	2/05
980.	100.	8/23
970.	100.	8/23
1030.	100.	8/23
1000.	100.	10/13
970.	100.	10/13
940.	90.	10/13

TABLE C-V (cont)

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HSE-9 Radionuclides
on Filter Media (cont)

****

U (cont)

CV = 5000. ± 750. ng/filter

Result	± Uncer.	Date
4200.	400.	5/16
4400.	400.	5/16
4300.	400.	5/16
4900.	500.	10/03
4900.	500.	10/03
5000.	500.	10/03

****

HSE-9 Radionuclides on Soil

****

Am-241 87GAU 01 G

CV = 1.3 ± 0.1 pCi/g

Result	± Uncer.	Date
1.51	0.05	1/12
1.59	0.05	1/12
1.52	0.05	1/15
1.47	0.05	1/15
1.10	0.04	1/15

Pu-238 88GAU 01 RAS

CV = Blank (pCi/g)

Result	± Uncer.	Date
0.0004	0.001	4/26
0.0140	0.008	6/03
0.0142	0.010	6/14
0.0023	0.004	6/14
0.0233	0.018	8/02
< 0.0050		8/02
0.0023	0.007	8/02
- 0.0022		8/08
0.0150	0.024	9/15
- 0.0195		9/15
0.0048	0.003	11/10
0.9210	0.063	11/23
0.0195	0.011	11/23

CV = 0.04 ± 0.004 pCi/g

Result	± Uncer.	Date
0.040	0.004	4/26

CV = 0.12 ± 0.01 pCi/g

Result	± Uncer.	Date
0.115	0.008	2/03
0.098	0.006	2/03

Pu-238 (cont)

CV = 0.15 ± 0.02 pCi/g

Result	± Uncer.	Date
0.128	0.008	2/03
0.137	0.010	2/03
0.134	0.009	2/03
0.135	0.008	2/03

CV = 0.2 ± 0.02 pCi/g

Result	± Uncer.	Date
0.173	0.008	2/03
0.174	0.011	2/03
0.184	0.012	2/03
0.165	0.009	2/03

CV = 0.46 ± 0.05 pCi/g

Result	± Uncer.	Date
0.37	0.03	6/03
0.55	0.05	6/14
0.46	0.05	6/14
0.37	0.04	8/02

CV = 0.99 ± 0.01 pCi/sample

Result	± Uncer.	Date
0.92	0.08	11/23
< 0.005		11/23

CV = 1.58 ± 0.16 pCi/sample

Result	± Uncer.	Date
1.39	0.08	8/02
1.37	0.09	8/02
1.51	0.08	8/08
1.61	0.10	9/15
1.80	0.20	9/15
1.33	0.07	11/10
1.50	0.07	11/10
1.42	0.08	11/10

Pu-239 88GAU 01 RAS

CV = Blank (pCi/g)

Result	± Uncer.	Date
0.006	0.002	4/26
0.014	0.008	6/03
- 0.006		6/14
< 0.005		6/14
0.023	0.012	8/02
< 0.005		8/02
0.041	0.011	8/02
0.004	0.004	8/08
0.008	0.017	9/15
0.026	0.022	9/15
0.012	0.005	11/10
0.018	0.011	11/23
0.010	0.007	11/23

Pu-239 (cont)

CV = 0.12 ± 0.01 pCi/g

Result	± Uncer.	Date
0.123	0.009	2/03
0.140	0.008	2/03
0.126	0.008	2/03
0.119	0.008	2/03
0.121	0.007	4/26

CV = 0.14 ± 0.01 pCi/g

Result	± Uncer.	Date
0.148	0.008	2/03
0.152	0.011	2/03
0.141	0.008	2/03
0.135	0.009	2/03

CV = 0.39 ± 0.04 pCi/g

Result	± Uncer.	Date
0.28	0.02	2/03
0.27	0.01	2/03

CV = 0.73 ± 0.07 pCi/sample

Result	± Uncer.	Date
0.64	0.06	11/23

CV = 0.99 ± 0.01 pCi/sample

Result	± Uncer.	Date
0.756	0.056	11/23

CV = 1.02 ± 0.1 pCi/g

Result	± Uncer.	Date
1.03	0.06	6/03
0.94	0.07	6/14
1.04	0.08	6/14
0.83	0.07	8/02

CV = 1.16 ± 0.12 pCi/sample

Result	± Uncer.	Date
1.09	0.08	8/02
1.11	0.07	8/02
1.11	0.06	8/08
1.19	0.09	9/15
1.30	0.20	9/15
1.13	0.07	11/10
1.09	0.06	11/10
1.13	0.06	11/10

TABLE C-V (cont)

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HSE-9 Radionuclides on Soil
(cont)

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Sr-90 88GAU 01 RAS

CV = 5.58 ± 0.56 pCi/g

Result	± Uncer.	Date
5.3	0.2	6/27

CV = 11.16 ± 1.12 pCi/g

Result	± Uncer.	Date
9.8	0.3	6/27

****

HSE-9 Radionuclides
on Vegetation

****

Am-241 88GAU 01 G

CV = 0.48 ± 0.05 pCi/sample

Result	± Uncer.	Date
0.46	0.07	2/05
0.46	0.07	2/05

Pu-238 88GAU 01 RAS

CV = 2.96 ± 0.3 pCi/sample

Result	± Uncer.	Date
2.6	0.2	3/16
2.5	0.2	3/16
2.6	0.2	3/17
2.8	0.2	3/17

Pu-239 88GAU 01 RAS

CV = 2.18 ± 0.22 pCi/sample

Result	± Uncer.	Date
2.0	0.2	3/16
2.1	0.2	3/16
2.0	0.2	3/16
2.1	0.2	3/16
2.2	0.2	3/17

****

HSE-9 Trace Elements
in Bulk Liquid

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Ag 88GAU 01 FAA

CV = 0.9 ± 0.09 mg/L

Result	± Uncer.	Date
1.0	0.2	5/02

CV = 1.2 ± 0.1 mg/L

Result	± Uncer.	Date
1.2	0.2	3/02

CV = 2.2 ± 0.2 mg/L

Result	± Uncer.	Date
2.2	0.4	3/02

CV = 2.5 ± 0.2 mg/L

Result	± Uncer.	Date
1.5	0.5	9/06

CV = 3. ± 0.3 mg/L

Result	± Uncer.	Date
2.9	0.6	7/31
2.9	0.6	8/22
2.9	0.6	8/22
3.0	0.6	8/22
3.0	0.6	8/22

CV = 4. ± 0.4 mg/L

Result	± Uncer.	Date
4.0	0.8	7/11
4.2	0.8	7/12
4.0	0.8	7/12
4.0	0.8	7/12

CV = 5. ± 0.5 mg/L

Result	± Uncer.	Date
4.8	1.0	8/22
4.6	0.9	8/22
4.7	0.9	8/22
4.8	1.0	8/22

Ag 88GAU 01 ICPMS

CV = 1. ± 0.2 mg/L

Result	± Uncer.	Date
1.1	0.2	4/20
1.1	0.2	4/20
1.0	0.2	4/21
1.0	0.2	4/21

As 88GAU 02 AS

CV = 2.5 ± 0.2 mg/L

Result	± Uncer.	Date
3.2	0.2	8/11

As 88GAU 01 ETVAA

CV = 500. ± 50. ug/L

Result	± Uncer.	Date
600.	100.	7/31
500.	100.	8/24
600.	100.	8/24
600.	100.	8/24
600.	100.	8/24
600.	100.	8/24
500.	100.	8/24

CV = 510. ± 50. ug/L

Result	± Uncer.	Date
600.	100.	7/11
700.	100.	8/24

CV = 890. ± 90. ug/L

Result	± Uncer.	Date
800.	200.	3/02

CV = 1. ± 0.1 mg/L

Result	± Uncer.	Date
1.0	0.2	5/11
1.0	0.2	5/11
1.0	0.2	5/11

As 88GAU 02 FAA

CV = 510. ± 50. ug/L

Result	± Uncer.	Date
600.	100.	7/12

CV = 2.5 ± 0.2 mg/L

Result	± Uncer.	Date
3.2	0.3	8/11
3.1	0.5	8/30

As 88GAU 01 ICPMS

CV = 1. ± 0.2 mg/L

Result	± Uncer.	Date
1.3	0.2	4/20
1.1	0.2	4/21

TABLE C-V (cont)

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HSE-9 Trace Elements
in Bulk Liquid (cont)

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Ba 88GAU 01 FAA

CV = 0.9 ± 0.09 mg/L

Result	± Uncer.	Date
1.0	0.2	5/03
1.0	0.2	5/03

CV = 2.2 ± 0.2 mg/L

Result	± Uncer.	Date
2.2	0.4	3/02

CV = 2.5 ± 0.2 mg/L

Result	± Uncer.	Date
2.	1.	10/27

CV = 3. ± 0.3 mg/L

Result	± Uncer.	Date
2.8	0.6	7/31

CV = 4. ± 0.4 mg/L

Result	± Uncer.	Date
4.0	0.8	7/11
4.0	0.8	7/12
4.0	0.8	7/12

CV = 5. ± 0.5 mg/L

Result	± Uncer.	Date
4.5	0.9	8/22
4.4	0.9	8/22

CV = 14. ± 1. mg/L

Result	± Uncer.	Date
13.	3.	3/02
15.	3.	3/02

Ba 88GAU 01 ICPMS

CV = 100. ± 20. ug/L

Result	± Uncer.	Date
90.	20.	4/14

Ba (cont)

CV = 1. ± 0.2 mg/L

Result	± Uncer.	Date
1.1	0.2	4/20
1.1	0.2	4/20
1.0	0.2	4/21
0.9	0.2	4/21

Cd 88GAU 01 FAA

CV = 320. ± 30. ug/L

Result	± Uncer.	Date
300.	100.	3/02
300.	100.	3/02

CV = 0.99 ± 0.1 mg/L

Result	± Uncer.	Date
1.0	0.2	5/02

CV = 2.2 ± 0.2 mg/L

Result	± Uncer.	Date
2.2	0.4	3/02
2.2	0.4	3/02

CV = 2.5 ± 0.2 mg/L

Result	± Uncer.	Date
2.4	0.2	9/07
2.4	0.2	9/07

CV = 3. ± 0.3 mg/L

Result	± Uncer.	Date
3.1	0.6	7/31

CV = 4.2 ± 0.4 mg/L

Result	± Uncer.	Date
4.2	0.8	7/11
4.2	0.8	7/12
4.2	0.8	7/12
4.2	0.8	7/12

CV = 5.3 ± 0.5 mg/L

Result	± Uncer.	Date
4.5	0.9	8/22
4.0	0.8	8/22
3.8	0.8	8/22
4.0	0.8	8/22

Cd 88GAU 01 ICPMS

CV = 110. ± 20. ug/L

Result	± Uncer.	Date
100.	20.	4/14
100.	20.	4/14

CV = 1.1 ± 0.2 mg/L

Result	± Uncer.	Date
1.0	0.2	4/20
1.0	0.2	4/20
1.0	0.2	4/21
0.9	0.2	4/21
1.0	0.2	4/21
1.0	0.2	4/21
1.0	0.2	4/21
1.0	0.2	4/21

Cr 88GAU 01 FAA

CV = 0.9 ± 0.09 mg/L

Result	± Uncer.	Date
1.1	0.2	5/03

CV = 1.5 ± 0.2 mg/L

Result	± Uncer.	Date
1.8	0.4	3/02

CV = 1.6 ± 0.2 mg/L

Result	± Uncer.	Date
2.0	0.4	3/02

CV = 2.2 ± 0.2 mg/L

Result	± Uncer.	Date
2.4	0.5	3/02

CV = 2.5 ± 0.2 mg/L

Result	± Uncer.	Date
2.3	0.5	9/06

CV = 3.3 ± 0.3 mg/L

Result	± Uncer.	Date
2.7	0.6	7/31
2.8	0.6	8/22
2.8	0.6	8/22

CV = 4. ± 0.4 mg/L

Result	± Uncer.	Date
4.1	0.8	7/11
4.2	0.8	7/12
4.1	0.8	7/12

TABLE C-V (cont)

****

HSE-9 Trace Elements
in Bulk Liquid (cont)

****

Cr (cont)

CV = 5. ± 0.5 mg/L

Result	± Uncer.	Date
4.6	0.9	8/22
4.5	0.9	8/22

Cr 88GAU 01 ICPMS

CV = 100. ± 20. ug/L

Result	± Uncer.	Date
110.	20.	4/14

CV = 1. ± 0.2 mg/L

Result	± Uncer.	Date
0.6	0.2	4/20
1.0	0.2	4/21
1.0	0.2	4/21

Hg 87WIL 01 CVAA

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
60.	10.	3/11
290.	30.	3/11
90.	10.	3/11
80.	10.	3/11
90.	10.	3/17
80.	10.	3/17
100.	10.	3/17
80.	10.	3/17
70.	20.	3/31
80.	20.	3/31
90.	20.	3/31
100.	20.	3/31
110.	20.	3/31
70.	20.	3/31
60.	20.	4/08
60.	10.	11/18
60.	10.	11/18

CV = 500. ± 50. ug/L

Result	± Uncer.	Date
440.	90.	8/29
420.	80.	8/29

Hg (cont)

CV = 510. ± 50. ug/L

Result	± Uncer.	Date
460.	90.	7/11
470.	90.	7/13
470.	90.	7/13
460.	90.	7/13
500.	100.	7/13
460.	90.	8/29

CV = 520. ± 50. ug/L

Result	± Uncer.	Date
460.	90.	8/29

Hg 88GAU 01 ICPMS

CV = 1. ± 0.2 mg/L

Result	± Uncer.	Date
1.2	0.2	4/20
1.7	0.3	4/21
1.3	0.3	4/21
1.8	0.4	4/21
1.8	0.4	4/21
1.8	0.4	4/21
1.8	0.4	4/21

Ni 88GAU 01 FAA

CV = 0.9 ± 0.09 mg/L

Result	± Uncer.	Date
1.0	0.2	5/02

CV = 1.7 ± 0.2 mg/L

Result	± Uncer.	Date
1.8	0.4	3/02

CV = 1.9 ± 0.2 mg/L

Result	± Uncer.	Date
2.0	0.4	3/02

CV = 2.2 ± 0.2 mg/L

Result	± Uncer.	Date
2.2	0.4	3/02

CV = 2.5 ± 0.2 mg/L

Result	± Uncer.	Date
2.5	0.1	9/19

Ni 88GAU 01 ICPMS

CV = 1. ± 0.2 mg/L

Result	± Uncer.	Date
1.0	0.2	4/21

Pb 88GAU 01 FAA

CV = 0.9 ± 0.09 mg/L

Result	± Uncer.	Date
1.0	0.2	5/02

CV = 1.5 ± 0.2 mg/L

Result	± Uncer.	Date
1.8	0.4	3/02

CV = 1.6 ± 0.2 mg/L

Result	± Uncer.	Date
1.7	0.3	3/02

CV = 2.2 ± 0.2 mg/L

Result	± Uncer.	Date
2.2	0.4	3/02

CV = 2.5 ± 0.2 mg/L

Result	± Uncer.	Date
2.6	0.1	9/01
2.7	0.5	9/01
3.3	0.5	9/07
2.4	0.5	9/13
3.0	0.1	9/14

CV = 3. ± 0.3 mg/L

Result	± Uncer.	Date
3.1	0.6	7/31
2.6	0.5	8/22
2.5	0.5	8/22
2.6	0.5	8/22
2.6	0.5	8/22

CV = 4. ± 0.4 mg/L

Result	± Uncer.	Date
4.0	0.8	7/11
4.4	0.9	7/12
4.0	0.8	7/12

CV = 5. ± 0.5 mg/L

Result	± Uncer.	Date
4.2	0.8	8/22
3.6	0.7	8/22

TABLE C-V (cont)

****

HSE-9 Trace Elements
in Bulk Liquid (cont)

****

Pb 88GAU 01 ICPMS

CV = 100. ± 20. ug/L

Result	± Uncer.	Date
93.	19.	4/14

CV = 1. ± 0.2 mg/L

Result	± Uncer.	Date
1.1	0.2	4/20
1.0	0.2	4/20
0.9	0.2	4/21
1.3	0.3	4/21
1.0	0.2	4/21
0.9	0.2	4/21

Se 88GAU 01 ETVAA

CV = 200. ± 20. ug/L

Result	± Uncer.	Date
200.	40.	3/02

CV = 510. ± 50. ug/L

Result	± Uncer.	Date
400.	80.	7/11
400.	80.	7/12
420.	80.	7/31
530.	110.	8/24
520.	100.	8/24
510.	120.	8/24
510.	100.	8/24
510.	100.	8/24
520.	100.	8/24

CV = 1. ± 0.1 mg/L

Result	± Uncer.	Date
1.1	0.2	5/11

Se 88GAU 01 ICPMS

CV = 98. ± 20. ug/L

Result	± Uncer.	Date
110.	20.	4/14
110.	20.	4/14

Se (cont)

CV = 1. ± 0.2 mg/L

Result	± Uncer.	Date
0.7	0.2	4/20
0.9	0.2	4/21
0.9	0.2	4/21
1.0	0.2	4/21
1.0	0.2	4/21
0.9	0.2	4/21

Tl 88GAU 01 ETVAA

CV = 200. ± 20. ug/L

Result	± Uncer.	Date
190.	40.	3/02
210.	40.	3/02
180.	40.	3/02
210.	40.	3/02
200.	40.	3/02
200.	40.	3/02

CV = 1. ± 0.1 mg/L

Result	± Uncer.	Date
1.4	0.3	5/11
1.3	0.3	5/11

Tl 88GAU 01 ICPMS

CV = 1.2 ± 0.2 mg/L

Result	± Uncer.	Date
1.2	0.3	4/20
1.2	0.2	4/20
0.9	0.2	4/21

Zn 88GAU 01 ICPMS

CV = 100. ± 20. ug/L

Result	± Uncer.	Date
90.	20.	4/27

CV = 1. ± 0.2 mg/L

Result	± Uncer.	Date
1.0	0.2	4/21
0.9	0.2	4/21
1.0	0.2	4/21
0.9	0.2	4/21
0.9	0.2	4/27
1.0	0.2	4/27

****

HSE-9 Trace Elements in Urine

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Tl 88GAU 01 ICPMS

CV = 15. ± 2. ug/L

Result	± Uncer.	Date
14.	1.	11/28
14.	1.	11/28
14.	1.	11/28
14.	1.	11/28
14.	1.	12/13
14.	1.	12/13
14.	1.	12/13
14.	1.	12/13

CV = 23. ± 2. ug/L

Result	± Uncer.	Date
22.	2.	10/06
22.	2.	10/06
22.	2.	10/06
21.	2.	10/06
23.	2.	10/06
24.	2.	10/06
23.	2.	10/06
23.	2.	10/06
23.	2.	10/06
23.	2.	10/06
22.	2.	10/06
23.	2.	10/06
23.	2.	10/06
21.	2.	10/06
23.	2.	10/06
24.	2.	10/06

CV = 40. ± 4. ug/L

Result	± Uncer.	Date
37.	4.	11/28
37.	4.	11/28
37.	4.	11/28
37.	4.	11/28
40.	4.	12/13
40.	4.	12/13
40.	4.	12/13
40.	4.	12/13

CV = 77. ± 8. ug/L

Result	± Uncer.	Date
76.	8.	10/06
72.	7.	10/06
71.	7.	10/06
80.	8.	10/06
76.	8.	10/06
75.	8.	10/06
77.	8.	10/06
76.	8.	10/06
75.	8.	10/06
71.	7.	10/06
72.	7.	10/06
77.	8.	10/06

TABLE C-V (cont)

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HSE-9 Trace Elements in Urine (cont)

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Tl (cont)

80.	8.	10/06
76.	8.	10/06
76.	8.	10/06
76.	8.	10/06

U 88GAU 03 ICPMS

CV = 3.3 ± 0.3 ug/L

Result	± Uncer.	Date
3.5	0.3	7/19
3.5	0.3	7/19
3.2	0.3	7/19
3.4	0.3	7/19
3.3	0.3	7/19
3.9	0.4	7/19

CV = 31. ± 3. ug/L

Result	± Uncer.	Date
37.	4.	7/19
34.	3.	7/19
33.	3.	7/19
35.	4.	7/19
35.	4.	7/19
33.	3.	7/19

CV = 68. ± 7. ug/L

Result	± Uncer.	Date
69.	7.	7/19
71.	7.	7/19
75.	8.	7/19
75.	8.	7/19
78.	8.	7/19
80.	8.	7/19

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HSE-9 Trace Elements in Water

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Ag 88GAU 02 FAA

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
120.	40.	9/01
110.	40.	9/01
100.	40.	9/01
100.	10.	9/01
100.	10.	9/01
100.	10.	9/01
100.	10.	9/01
100.	40.	9/01

Ag (cont)

CV = 500. ± 50. ug/L

Result	± Uncer.	Date
490.	50.	3/04
480.	50.	3/04
480.	50.	3/04
490.	50.	3/04
500.	50.	4/18
500.	50.	4/18
500.	50.	4/18
500.	50.	6/07
490.	50.	6/07
500.	50.	6/24
500.	50.	6/24
500.	50.	6/24
500.	50.	6/24
500.	50.	7/11
500.	50.	7/11
500.	50.	7/11
500.	50.	7/11
520.	50.	7/16
520.	50.	7/18
510.	50.	7/18
500.	50.	7/29
500.	50.	7/29
500.	50.	7/29
500.	50.	7/29
500.	50.	8/17
500.	50.	8/17
500.	50.	8/17
500.	50.	9/01
500.	50.	9/01
500.	50.	9/01
500.	50.	9/01
500.	50.	9/01
500.	50.	9/01
500.	50.	9/01
500.	50.	9/01
500.	50.	10/12
490.	50.	10/12
480.	50.	10/12
480.	50.	11/03
470.	50.	11/03
470.	50.	11/03
480.	50.	11/03
480.	50.	11/03

Ag 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
110.	10.	11/04
110.	10.	11/04
110.	10.	11/04
110.	10.	11/04
100.	10.	11/14
100.	10.	11/14
100.	10.	11/14
100.	10.	11/14
< 1.		12/13
90.	10.	12/14
90.	10.	12/14
90.	10.	12/14
100.	10.	12/14
90.	10.	12/14

Ag (cont)

100.	10.	12/14
100.	10.	12/14
100.	10.	12/14

CV = 500. ± 50. ug/L

Result	± Uncer.	Date
480.	50.	2/04

As 87GAU 01 ETVAA

CV = 53.4 ± 6. ug/L

Result	± Uncer.	Date
54.	1.	2/24

As 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
110.	11.	11/04
110.	11.	11/04
110.	11.	11/04
110.	11.	11/04
100.	10.	11/14
100.	10.	11/14
100.	10.	11/14
100.	10.	11/14
70.	200.	12/13
100.	10.	12/14
100.	10.	12/14
100.	10.	12/14
100.	10.	12/14
110.	10.	12/14
100.	10.	12/14
110.	10.	12/14
100.	10.	12/14

Au ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
200.	700.	12/13

B 87GAU 02 FIA

CV = 5. ± 0.5 mg/L

Result	± Uncer.	Date
5.0	0.5	6/03
5.0	0.5	6/03
4.7	0.5	6/24
5.1	0.5	6/24
4.8	0.5	6/24
4.9	0.5	6/24

TABLE C-V (cont)

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HSE-9 Trace Elements in Water
(cont)

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B ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
< 100.		12/13

CV = 5. ± 0.5 mg/L

Result	± Uncer.	Date
4.9	0.5	2/19
5.0	0.5	2/26
4.6	0.5	2/26
4.9	0.5	2/26
5.1	0.5	2/26
5.0	0.5	3/18
6.2	0.6	3/18

Ba 88GAU 03 FAA

CV = 20. ± 2. mg/L

Result	± Uncer.	Date
20.	10.	8/25
18.	2.	9/19
20.	5.	11/08
18.	1.	11/14
21.	5.	12/19
19.	5.	12/19

Ba 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
110.	10.	11/04
110.	10.	11/04
110.	10.	11/04
110.	10.	11/04
90.	10.	11/14
100.	10.	11/14
90.	10.	11/14
100.	10.	11/14
90.	10.	11/14
100.	10.	11/14
90.	10.	11/14
100.	10.	11/14
100.	300.	12/13

Be 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
100.	10.	11/14
100.	10.	11/14

Be (cont)

Result	± Uncer.	Date
< 10.		12/13
90.	10.	12/14
110.	10.	12/14
100.	10.	12/14
110.	10.	12/14
100.	10.	12/14
90.	10.	12/14

Bi 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
< 1.		12/13

Br 88GAU 01 ATNA

CV = 5. ± 0.5 mg/L

Result	± Uncer.	Date
4.5	0.3	12/16
4.5	0.3	12/16

Br ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
< 100.		12/13

Cd 87GAU 01 ETVAA

CV = 18. ± 2. ug/L

Result	± Uncer.	Date
15.	1.	2/24

Cd 88GAU 02 FAA

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
100.	10.	9/07
100.	10.	9/07
100.	10.	9/07
100.	10.	9/07

CV = 500. ± 50. ug/L

Result	± Uncer.	Date
300.	100.	8/05
500.	100.	8/05
300.	100.	8/05
400.	100.	9/19
500.	100.	12/21

Cd 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
120.	10.	11/04
120.	10.	11/04
110.	10.	11/04
110.	10.	11/04
110.	10.	11/14
110.	10.	11/14
110.	10.	11/14
110.	10.	11/14
100.	10.	11/14
100.	10.	11/14
110.	10.	11/14
110.	10.	11/14
80.	250.	12/13

Ce ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
100.	300.	12/13

Cl 88GAU 03 ATNA

CV = 100. ± 10. mg/L

Result	± Uncer.	Date
110.	3.	12/16
110.	3.	12/16

Co 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
80.	250.	12/13

Cr 87GAU 01 ETVAA

CV = 14. ± 2. ug/L

Result	± Uncer.	Date
12.9	0.7	2/24

Cr 88WIL 02 ICPMS

CV = 100. ± 20. ug/L

Result	± Uncer.	Date
100.	10.	11/04
100.	10.	11/04
100.	10.	11/04
100.	10.	11/04
100.	10.	11/14
100.	10.	11/14
100.	10.	11/14

TABLE C-V (cont)

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HSE-9 Trace Elements in Water
(cont)

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Cr (cont)

100.	10.	11/14
90.	265.	12/13

Cr(+6) 88GAU 01 FIA

CV = 0.25 ± 0.03 mg/L

Result	± Uncer.	Date
0.25	0.02	9/19
0.25	0.02	9/19
0.25	0.02	9/19
0.25	0.02	9/19
0.25	0.02	9/21
0.26	0.03	9/21
0.25	0.02	9/21
0.25	0.02	9/21
0.26	0.03	9/21
0.25	0.02	9/21
0.26	0.03	9/27
0.26	0.03	9/27
0.26	0.03	9/27
0.26	0.03	9/27
0.26	0.03	10/06
0.26	0.03	10/06
0.26	0.03	10/06
0.26	0.03	10/06
0.25	0.02	10/14
0.25	0.02	10/14
0.25	0.02	10/14
0.25	0.02	10/14
0.25	0.02	10/14
0.25	0.02	10/14
0.25	0.02	10/14
0.25	0.02	10/14
0.25	0.02	10/18
0.25	0.02	10/18
0.25	0.02	10/18
0.25	0.02	10/18
0.28	0.02	10/25
0.25	0.02	10/25
0.26	0.03	10/25
0.28	0.03	10/25
0.25	0.02	10/25
0.25	0.02	10/25
0.26	0.03	10/25
0.25	0.02	10/25
0.25	0.02	11/04
0.25	0.02	11/04
0.25	0.02	11/04
0.25	0.02	11/04
0.25	0.02	11/08
0.25	0.02	11/09
0.24	0.02	11/09
0.24	0.02	11/09
0.25	0.02	11/09
0.26	0.03	11/16
0.25	0.02	11/16
0.25	0.02	11/16
0.28	0.03	11/16
0.26	0.03	11/16

Cr (+6) (cont)

0.28	0.03	11/16
0.25	0.02	11/16
0.25	0.02	11/16
0.25	0.02	11/16
0.25	0.02	11/16
0.24	0.02	11/21
0.25	0.02	11/21
0.25	0.02	11/21
0.24	0.02	11/21
0.25	0.02	12/01
0.25	0.02	12/01
0.24	0.02	12/01
0.25	0.02	12/01
0.25	0.02	12/01
0.24	0.02	12/01
0.24	0.02	12/08
0.26	0.03	12/08
0.26	0.03	12/08
0.24	0.02	12/08
0.26	0.03	12/13
0.23	0.02	12/13
0.23	0.02	12/13
0.26	0.03	12/13
0.23	0.02	12/19
0.23	0.02	12/19
0.02	0.02	12/19
0.02	0.02	12/19

CV = 0.26 ± 0.03 mg/L

Result	± Uncer.	Date
0.26	0.03	5/24
0.28	0.03	5/24
0.26	0.03	5/24
0.26	0.03	6/03
0.26	0.03	6/03
0.26	0.02	6/09
0.26	0.02	6/09
0.26	0.03	6/16
0.25	0.24	6/21
0.24	0.02	6/21
0.26	0.03	6/21
0.28	0.03	6/21
0.26	0.03	6/28
0.26	0.03	6/28
0.26	0.03	7/07
0.26	0.03	7/07
0.26	0.03	7/07
0.26	0.03	7/14
0.26	0.03	7/14
0.26	0.03	7/20
0.26	0.03	7/20
0.25	0.02	7/26
0.25	0.02	7/26
0.25	0.02	8/05
0.25	0.02	8/05
0.25	0.02	8/05
0.25	0.02	8/05
0.26	0.03	8/11
0.26	0.03	8/11
0.26	0.03	8/11
0.26	0.03	8/18
0.26	0.03	8/18
0.25	0.02	8/24
0.26	0.03	8/24
0.25	0.02	8/30
0.25	0.02	8/30
0.25	0.02	8/30

Cr (+6) (cont)

0.24	0.02	9/09
0.24	0.02	9/09
0.24	0.02	9/09
0.24	0.02	9/09
0.25	0.02	9/19
0.28	0.03	9/19
0.25	0.02	9/19
0.28	0.03	9/19

CV = 0.27 ± 0.03 mg/L

Result	± Uncer.	Date
0.27	0.03	1/08
0.27	0.03	1/08
0.27	0.03	1/15
0.27	0.03	1/21
0.27	0.03	1/21
0.28	0.06	1/26
0.28	0.03	2/02
0.27	0.03	2/12
0.30	0.03	2/18
0.31	0.03	2/18
0.28	0.03	2/18
0.28	0.03	2/18
0.28	0.03	2/26
0.27	0.03	2/26
0.27	0.03	2/26
0.27	0.03	2/26
0.28	0.03	2/26
0.27	0.03	3/07
0.26	0.03	3/07
0.27	0.03	3/07
0.27	0.03	3/10
0.27	0.03	3/10
0.27	0.03	3/17
0.27	0.03	3/17
0.29	0.03	3/23
0.27	0.03	3/23
0.27	0.03	3/29
0.27	0.03	3/29
0.26	0.03	4/06
0.26	0.03	4/06
0.26	0.03	4/13
0.24	0.03	4/13
0.27	0.03	4/19
0.26	0.03	4/25
0.25	0.02	4/25
0.26	0.03	5/06
0.26	0.03	5/06
0.25	0.02	5/06
0.24	0.02	5/17
0.24	0.02	5/17
0.24	0.02	5/24
0.24	0.02	5/24

Cs 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
100.	300.	12/13

TABLE C-V (cont)

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HSE-9 Trace Elements in Water (cont)

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Cu 87GAU 01 ETVAA

CV = 18. ± 2. ug/L

Result	± Uncer.	Date
16.	2.	2/24
18.	2.	2/24

Cu 88GAU 02 FAA

CV = 2. ± 0.2 mg/L

Result	± Uncer.	Date
2.1	0.5	9/01

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
100.	10.	9/13
100.	10.	9/13
100.	10.	9/13
100.	10.	9/13
100.	10.	9/13
100.	10.	9/13
100.	10.	9/13
100.	10.	9/13

Cu 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
110.	10.	11/04
110.	10.	11/04
110.	10.	11/04
110.	10.	11/04
100.	10.	11/14
100.	10.	11/14
100.	10.	11/14
100.	10.	11/14
60.	190.	12/13
60.	190.	12/13

Dy ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
< 1.		12/13

Er ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
< 1.		12/13

Eu ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
< 1.		12/13

F 88GAU 03 ATNA

CV = 100. ± 10. mg/L

Result	± Uncer.	Date
130.	8.	12/16
130.	8.	12/16

Fe 88GAU 02 FAA

CV = 2. ± 0.2 mg/L

Result	± Uncer.	Date
2.4	0.5	8/11

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
100.	40.	9/13
120.	40.	9/13
100.	40.	9/13
100.	40.	9/13
130.	40.	9/13

Fe ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
80.	250.	12/13

Ga ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
90.	260.	12/13

Gd ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
< 1.		12/13

Ge 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
50.	150.	12/13

Hf 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
100.	350.	12/13

Hg 87GAU 02 ICPMS

CV = 50. ± 5. ug/L

Result	± Uncer.	Date
52.	5.	1/08
54.	5.	1/08
58.	6.	2/03
58.	6.	2/03
58.	6.	2/03
47.	5.	2/19
49.	5.	2/19

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
< 1.		12/13

Ho ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
< 1.		12/13

I 88GAU 01 ATNA

CV = 5. ± 0.5 mg/L

Result	± Uncer.	Date
4.6	0.2	12/16
4.6	0.2	12/16

I ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
< 1.		12/13

In 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
< 1.		12/13

TABLE C-V (cont)

****

HSE-9 Trace Elements in Water (cont)

****

Ir ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
< 1.		12/13

La ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
< 1.		12/13

Li 85WIL 01 FAA

CV = 2.5 ± 0.25 mg/L

Result	± Uncer.	Date
2.5	0.2	6/03
2.5	0.3	7/13
2.5	0.3	7/13
2.5	0.3	7/13
2.5	0.3	7/13
2.5	0.3	7/13
2.5	0.3	7/13
2.5	0.3	7/13

CV = 500. ± 50. ug/L

Result	± Uncer.	Date
490.	50.	7/13
480.	50.	7/13
520.	50.	7/13
480.	50.	7/13
480.	50.	7/13
480.	50.	7/13

Li 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
< 10.		12/13

CV = 500. ± 50. ug/L

Result	± Uncer.	Date
520.	50.	3/17
600.	60.	3/17
480.	50.	9/26

Lu ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
< 1.		12/13

Mn 87GAU 01 ETVAA

CV = 26. ± 4. ug/L

Result	± Uncer.	Date
26.	1.	2/24

Mn 88GAU 02 FAA

CV = 2. ± 0.2 mg/L

Result	± Uncer.	Date
2.3	0.5	9/01

Mn 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
90.	270.	12/13

Mo 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
90.	300.	12/13

Na 88GAU 02 FAA

CV = 20. ± 2. mg/L

Result	± Uncer.	Date
20.	5.	9/19
20.	1.	10/31

CV = 46.5 ± 2.19 mg/L

Result	± Uncer.	Date
48.	5.	1/06

Na ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
< 10.		12/13

Nb ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
< 1.		12/13

Nd ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
< 1.		12/13

Ni 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
110.	10.	11/04
110.	10.	11/04
110.	10.	11/04
110.	10.	11/04
100.	10.	11/14
100.	10.	11/14
100.	10.	11/14
100.	10.	11/14
70.	200.	12/13

NO3-N 87GAU 01 IC

CV = 2. ± 0.2 mg/L

Result	± Uncer.	Date
2.0	0.2	5/02

Os ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
< 1.		12/13

Pb 87GAU 01 ETVAA

CV = 86. ± 8. ug/L

Result	± Uncer.	Date
76.	6.	2/24

Pb 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
110.	11.	11/04
110.	11.	11/04
110.	11.	11/04

TABLE C-V (cont)

****

HSE-9 Trace Elements in Water (cont)

****

Pb (cont)

110.	11.	11/04
90.	10.	11/14
100.	10.	11/14
100.	10.	11/14
90.	10.	11/14
140.	400.	12/13

Pd ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
80.6	243.	12/13

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pH 82EPA 01 ISE

CV = 5.7 ± 0.06 units

Result	± Uncer.	Date
5.9	0.1	1/11

Pr ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
< 1.		12/13

Pt 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
200.	500.	12/13

Rb ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
1.	3.	12/13

Re 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
150.	450.	12/13

Rh 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
100.	300.	12/13

Ru ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
100.	300.	12/13

S 88GAU 02 ATNA

CV = 7000. ± 700. mg/L

Result	± Uncer.	Date
6600.	400.	12/16
6600.	400.	12/16

Sb 88GAU 03 FAA

CV = 500. ± 50. ug/L

Result	± Uncer.	Date
300.	100.	9/12

Sb 88GAU 02 ICPMS

CV = 50. ± 5. ug/L

Result	± Uncer.	Date
51.	1.	7/08
52.	5.	7/25
54.	4.	8/29
51.	5.	8/31

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
90.	300.	12/13
110.	10.	12/14
110.	10.	12/14
120.	10.	12/14
100.	10.	12/14
120.	10.	12/14
110.	10.	12/14
100.	10.	12/14
110.	10.	12/14

Sc ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
80.	200.	12/13

Se 88GAU 03 FAA

CV = 500. ± 50. ug/L

Result	± Uncer.	Date
600.	100.	8/30
600.	100.	9/20

Se 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
110.	10.	11/04
110.	10.	11/04
110.	10.	11/04
110.	10.	11/04
110.	10.	11/14
100.	10.	11/14
100.	10.	11/14
110.	10.	11/14
< 10.		12/13
< 10.		12/13
100.	10.	12/14
100.	10.	12/14
100.	10.	12/14
100.	10.	12/14

SiO2 86GAU 01 COLOR

CV = < 0.5 mg/L

Result	± Uncer.	Date
< 0.5		11/16

CV = 42.8 ± 2. mg/L

Result	± Uncer.	Date
43.	4.	11/16
38.	4.	11/16

CV = 105. ± 5. mg/L

Result	± Uncer.	Date
100.	10.	11/16
100.	10.	11/16

SiO2 86WIL 01 FIA

CV = 50. ± 5. mg/L

Result	± Uncer.	Date
52.	5.	3/02
54.	5.	3/02
50.	5.	5/16
50.	5.	5/16
50.	5.	6/22
49.	5.	6/22
51.	5.	8/09
51.	5.	8/09
56.	6.	11/17
52.	5.	11/17

TABLE C-V (cont)

****

HSE-9 Trace Elements in Water
(cont)

****

SiO2 (cont)

52.	5.	11/17
55.	6.	11/17
56.	6.	11/17
52.	5.	11/17
56.	6.	11/17
56.	6.	11/17
54.	5.	11/17
52.	5.	11/17
52.	5.	11/17
52.	5.	11/17
54.	5.	11/17
54.	5.	11/17
56.	6.	11/17
54.	5.	11/17
56.	6.	11/17
56.	6.	11/17

Sm ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
< 1.		12/13

Sn 88GAU 02 ICPMS

CV = 20. ± 2. ug/L

Result	± Uncer.	Date
27.	2.	6/24
27.	5.	6/24

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
90.	300.	12/13

Sr ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
< 1.		12/13

Ta 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
< 1.		12/13

Tb ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
< 1.		12/13

Te 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
< 1.		12/13

Th 88GAU 02 ICPMS

CV = 25. ± 2.5 ug/L

Result	± Uncer.	Date
26.	3.	6/24
26.	3.	6/28
24.	2.	7/07
27.	2.	7/08
26.	3.	7/25
25.	2.	9/22
25.	2.	9/22
22.	2.	9/23
29.	3.	10/13
26.	3.	12/21
26.	3.	12/23

CV = 30. ± 3. ug/L

Result	± Uncer.	Date
26.	3.	2/23
26.	3.	2/23
33.	3.	11/10
34.	3.	11/10
33.	3.	11/10
29.	3.	11/23
32.	3.	11/23
31.	3.	11/23
39.	4.	12/08
33.	3.	12/08
34.	3.	12/08

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
200.	600.	12/13

Ti 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
60.	200.	12/13
60.	200.	12/13
110.	10.	12/14
110.	10.	12/14
120.	10.	12/14
120.	10.	12/14

Ti (cont)

110.	10.	12/14
110.	10.	12/14
110.	10.	12/14
110.	10.	12/14
110.	10.	12/14
110.	10.	12/14
110.	10.	12/14
110.	10.	12/14
110.	10.	12/14
110.	10.	12/14
110.	10.	12/14
110.	10.	12/14

Tl 88GAU 02 FAA

CV = 500. ± 50. ug/L

Result	± Uncer.	Date
400.	100.	8/30

Tl 88GAU 02 ICPMS

CV = 40. ± 4. ug/L

Result	± Uncer.	Date
38.	4.	6/14
37.	4.	6/14
35.	4.	6/22
40.	4.	6/22
40.	4.	6/24
42.	2.	6/28
38.	2.	7/07
42.	2.	7/11
42.	2.	7/11
41.	7.	8/29
38.	4.	8/31
41.	4.	9/22
45.	5.	10/13

CV = 60. ± 6. ug/L

Result	± Uncer.	Date
58.	6.	9/01
57.	6.	9/01
59.	6.	9/01
61.	6.	9/01
61.	6.	9/01
62.	6.	9/01

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
110.	10.	11/04
100.	10.	11/04
110.	10.	11/04
110.	10.	11/04
100.	10.	11/14
90.	10.	11/14
100.	10.	11/14
90.	10.	11/14
150.	450.	12/13
100.	10.	12/14
100.	10.	12/14

****

HSE-9 Trace Elements in Water (cont)

****

Tl (cont)

100.	10.	12/14
100.	10.	12/14
100.	10.	12/14
100.	10.	12/14
100.	10.	12/14
100.	10.	12/14
100.	10.	12/14
100.	10.	12/14
100.	10.	12/14
100.	10.	12/14

Tm ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
< 1.		12/13

Total Organic Halogens 88GAU 01 CALC

CV = 2. ± 0.2 mg/L

Result	± Uncer.	Date
1.9	0.1	7/28

Total Organic Halogens 88GAU 01 TITR

CV = 2. ± 0.2 mg/L

Result	± Uncer.	Date
1.6	0.2	6/17

U 88GAU 02 ICPMS

CV = 25. ± 2.5 ug/L

Result	± Uncer.	Date
24.	4.	6/24
24.	4.	6/24
24.	4.	6/24
27.	1.	6/28
24.	1.	7/06
24.	1.	7/07
28.	3.	7/08
26.	3.	7/25
22.	2.	9/23
28.	3.	10/13
26.	3.	12/15
27.	3.	12/20
25.	2.	12/21
26.	3.	12/23

U (cont)

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
< 1.		12/13

V 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
< 1.		12/13

W 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
70.	200.	12/13

Y 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
100.	300.	12/13

Yb ICPMS

CV = No Data Available (ug/L)

Result	± Uncer.	Date
< 1.		12/13

Zn 88GAU 03 FAA

CV = 20. ± 2. mg/L

Result	± Uncer.	Date
20.	1.	9/01
20.	2.	9/01
20.	1.	9/01
20.	1.	9/01

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
100.	10.	9/13
100.	10.	9/13
100.	10.	9/13
100.	10.	9/13
100.	10.	9/13
100.	10.	9/13
100.	10.	9/13
100.	10.	9/13

Zn 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
110.	10.	11/04
110.	10.	11/04
110.	10.	11/04
110.	10.	11/04
100.	10.	11/14
100.	10.	11/14
100.	10.	11/14
110.	10.	11/14
100.	10.	11/14
100.	10.	11/14
110.	10.	11/14
100.	10.	11/14
60.	200.	12/13
60.	200.	12/13

Zr 88WIL 02 ICPMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
100.	300.	12/13

****

HSE-9 Trace Elements on Filter Media

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As 86GAU 01 IENA

CV = 3. ± 0.3 ug/filter

Result	± Uncer.	Date
3.0	0.4	3/24

CV = 4. ± 0.4 ug/filter

Result	± Uncer.	Date
3.8	0.6	3/24
3.8	0.3	4/09

CV = 5. ± 0.5 ug/filter

Result	± Uncer.	Date
5.0	0.4	4/09

CV = 25. ± 1. ug/filter

Result	± Uncer.	Date
24.	2.	4/26
26.	3.	4/26

****

HSE-9 Trace Elements on Filter Media (cont)

****

Ba 88GAU 01 ICPMS

CV = 50. ± 5. ug/filter

Result	± Uncer.	Date
52.	5.	8/18
46.	5.	8/18

Ba 88GAU 02 ITNA

CV = 75. ± 8. ug/filter

Result	± Uncer.	Date
76.	8.	3/23

Be 88GAU 02 FAA

CV = 0.5 ± 0.03 ug/filter

Result	± Uncer.	Date
0.5	0.1	6/27
0.5	0.1	7/01
0.5	0.1	7/25
0.4	0.1	8/19

CV = 0.9 ± 0.05 ug/filter

Result	± Uncer.	Date
0.8	0.1	5/04
0.9	0.1	8/30
0.8	0.1	10/27

CV = 1. ± 0.05 ug/filter

Result	± Uncer.	Date
0.9	0.1	10/13
0.9	0.1	10/24

CV = 1.5 ± 0.08 ug/filter

Result	± Uncer.	Date
1.3	0.6	10/24

CV = 2. ± 0.1 ug/filter

Result	± Uncer.	Date
1.9	0.2	5/20
2.0	0.1	7/18
1.9	0.2	7/25
2.0	0.1	8/08

Be (cont)

CV = 2.2 ± 0.2 ug/filter

Result	± Uncer.	Date
2.0	0.2	12/19

CV = 4. ± 0.2 ug/filter

Result	± Uncer.	Date
3.8	0.3	6/06
3.8	0.2	7/01
4.2	0.2	7/25

CV = 7.5 ± 0.4 ug/filter

Result	± Uncer.	Date
7.2	0.3	6/27
7.8	0.3	6/27
7.2	0.3	6/27
6.8	0.2	12/05

CV = 8. ± 0.4 ug/filter

Result	± Uncer.	Date
7.7	0.4	6/13
7.7	0.4	6/13
8.0	0.3	8/08
7.4	0.4	8/19
8.5	0.2	12/05

CV = 8.2 ± 0.8 ug/filter

Result	± Uncer.	Date
8.2	0.6	11/16
8.2	0.6	11/29
8.2	0.6	11/29

CV = 9.5 ± 0.5 ug/filter

Result	± Uncer.	Date
8.7	0.3	9/12
20.	2.	11/09
9.2	0.2	12/05
10.	1.	12/19

Be 87GAU 02 FAAC

CV = 0.8 ± 0.08 ug/filter

Result	± Uncer.	Date
0.9	0.1	3/15

CV = 0.9 ± 0.09 ug/filter

Result	± Uncer.	Date
0.9	0.1	3/15
0.9	0.1	3/15
0.8	0.1	4/11
0.9	0.1	5/11
0.9	0.1	5/11

Be (cont)

CV = 1. ± 0.05 ug/filter

Result	± Uncer.	Date
1.2	0.1	4/11
1.1	0.1	4/21
0.9	0.1	5/04

CV = 1.4 ± 0.1 ug/filter

Result	± Uncer.	Date
1.2	0.1	1/14
1.2	0.1	1/14
1.4	0.1	3/15
1.4	0.1	3/15
1.4	0.1	3/15
1.4	0.1	3/15
1.4	0.1	4/07
1.4	0.1	4/07
1.4	0.1	9/01

CV = 1.5 ± 0.08 ug/filter

Result	± Uncer.	Date
1.5	0.1	4/11
1.5	0.1	4/25

CV = 2.5 ± 0.2 ug/filter

Result	± Uncer.	Date
2.2	0.2	1/14
2.5	0.2	3/15
2.5	0.2	3/15

CV = 4. ± 0.2 ug/filter

Result	± Uncer.	Date
4.6	0.4	5/24
3.7	0.2	7/01

CV = 4.5 ± 0.4 ug/filter

Result	± Uncer.	Date
4.4	0.3	4/07
4.4	0.5	4/07

CV = 4.7 ± 0.5 ug/filter

Result	± Uncer.	Date
4.1	0.4	8/30

CV = 7.5 ± 0.4 ug/filter

Result	± Uncer.	Date
7.9	0.5	7/01

CV = 8. ± 0.4 ug/filter

Result	± Uncer.	Date
8.0	0.3	8/09

TABLE C-V (cont)

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HSE-9 Trace Elements on Filter Media (cont)

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Cd 88GAU 02 FAA

CV = 5. ± 0.3 ug/filter

Result	± Uncer.	Date
4.7	0.2	7/12

CV = 5.7 ± 0.6 ug/filter

Result	± Uncer.	Date
5.0	0.2	7/12

CV = 7. ± 0.4 ug/filter

Result	± Uncer.	Date
6.6	0.2	4/21

CV = 8. ± 0.4 ug/filter

Result	± Uncer.	Date
7.6	0.4	7/12

CV = 9.5 ug/filter

Result	± Uncer.	Date
9.	1.	10/21

CV = 10. ± 1. ug/filter

Result	± Uncer.	Date
9.	1.	10/21

CV = 10.3 ± 0.5 ug/filter

Result	± Uncer.	Date
9.7	0.3	4/21

CV = 12. ± 1. ug/filter

Result	± Uncer.	Date
12.	1.	4/21
12.	1.	7/12

CV = 15. ± 0.8 ug/filter

Result	± Uncer.	Date
14.	1.	4/21
15.	1.	4/21
16.	1.	4/21

CV = 17. ± 2. ug/filter

Result	± Uncer.	Date
17.	1.	10/21

Cd (cont)

CV = 20. ± 2. ug/filter

Result	± Uncer.	Date
21.	2.	4/21

CV = 22. ± 2. ug/filter

Result	± Uncer.	Date
20.	1.	10/21

Cd 88GAU 01 FAAC

CV = 8.3 ± 0.4 ug/filter

Result	± Uncer.	Date
7.	1.	2/02

CV = 10. ± 1. ug/filter

Result	± Uncer.	Date
24.	2.	2/02

CV = 15. ± 2. ug/filter

Result	± Uncer.	Date
36.	3.	2/02

CV = 20. ± 2. ug/filter

Result	± Uncer.	Date
53.	5.	2/02

Cr 88GAU 02 ICPMS

CV = 1. ± 0.1 ug/filter

Result	± Uncer.	Date
1.0	0.1	3/08
1.0	0.1	3/08

Cu 88GAU 02 FAA

CV = 10. ± 1. ug/filter

Result	± Uncer.	Date
11.0	0.4	10/05

Cu 88GAU 02 ITNA

CV = 70. ± 7. ug/filter

Result	± Uncer.	Date
60.	10.	3/23

Ga 86GAU 01 IENA

CV = 6. ± 0.6 ug/filter

Result	± Uncer.	Date
6.0	0.6	3/24

CV = 8. ± 0.8 ug/filter

Result	± Uncer.	Date
8.	1.	3/24
8.	1.	4/09

CV = 10. ± 1. ug/filter

Result	± Uncer.	Date
10.2	0.7	4/09

Pb 87GAU 02,88GAU 01 FAA

CV = 10. ± 1. ug/filter

Result	± Uncer.	Date
9.9	0.9	4/04
11.3	0.7	7/19
9.4	1.0	10/24

CV = 20. ± 2. ug/filter

Result	± Uncer.	Date
18.	1.	4/22
20.	1.	4/22
20.	1.	7/19
21.	1.	10/24
21.	4.	10/27
20.	5.	11/16

CV = 22. ± 1. ug/filter

Result	± Uncer.	Date
21.	1.	7/12
21.	1.	7/12

CV = 23.8 ug/filter

Result	± Uncer.	Date
23.	4.	10/21

CV = 27. ± 3. ug/filter

Result	± Uncer.	Date
26.	2.	10/24
28.	2.	12/05

CV = 30. ± 3. ug/filter

Result	± Uncer.	Date
26.	4.	10/21
33.	4.	10/21

TABLE C-V (cont)

****

HSE-9 Trace Elements on Filter Media (cont)

****

Pb (cont)

CV = 40.9 ± 2.6 ug/filter

Result	± Uncer.	Date
41.	2.	4/22

CV = 59.8 ± 6. ug/filter

Result	± Uncer.	Date
58.	2.	7/12

CV = 72. ± 4. ug/filter

Result	± Uncer.	Date
68.	4.	4/22

CV = 85. ± 4. ug/filter

Result	± Uncer.	Date
95.	5.	7/12

CV = 90. ± 9. ug/filter

Result	± Uncer.	Date
87.	4.	10/21
100.	10.	10/24
91.	4.	10/27
89.	1.	12/19

Pb 87GAU 02 FAAC

CV = 10. ± 1. ug/filter

Result	± Uncer.	Date
8.4	0.7	4/07

CV = 15. ± 2. ug/filter

Result	± Uncer.	Date
26.	2.	2/02
17.	1.	4/22

CV = 25. ± 2. ug/filter

Result	± Uncer.	Date
40.	4.	2/02

CV = 26. ± 3. ug/filter

Result	± Uncer.	Date
27.	1.	4/22

Pb (cont)

CV = 80. ± 8. ug/filter

Result	± Uncer.	Date
130.	10.	2/02

CV = 81. ± 8. ug/filter

Result	± Uncer.	Date
82.	5.	4/22

CV = 91.6 ± 5. ug/filter

Result	± Uncer.	Date
93.	9.	2/02

Pb 88GAU 02 ICPMS

CV = 2. ± 0.2 ug/filter

Result	± Uncer.	Date
2.4	0.5	10/21
2.4	0.5	10/21
2.4	0.5	10/21
2.4	0.5	10/21

Sb 88GAU 02 IENA

CV = 25. ± 1. ug/filter

Result	± Uncer.	Date
26.	3.	4/26
25.	2.	4/26

Sc 87GAU 02,88GAU 02 ITNA

CV = 0.9 ± 0.09 ug/filter

Result	± Uncer.	Date
0.9	0.1	1/22

CV = 1.8 ± 0.2 ug/filter

Result	± Uncer.	Date
1.8	0.3	1/22

CV = 4.8 ± 0.5 ug/filter

Result	± Uncer.	Date
4.8	0.7	1/22

CV = 6.9 ± 0.7 ug/filter

Result	± Uncer.	Date
7.	1.	1/22

Sc (cont)

CV = 7.5 ± 0.8 ug/filter

Result	± Uncer.	Date
8.	1.	11/17

CV = 10. ± 1. ug/filter

Result	± Uncer.	Date
10.	1.	11/17
10.	2.	11/17

CV = 12. ± 1. ug/filter

Result	± Uncer.	Date
13.	2.	6/15
11.	2.	6/15
13.	2.	6/15

CV = 15. ± 2. ug/filter

Result	± Uncer.	Date
18.	3.	9/01
16.	2.	9/01
17.	2.	9/01

Se 88GAU 02 ICPMS

CV = 2. ± 0.2 ug/filter

Result	± Uncer.	Date
2.4	0.5	10/21
2.4	0.5	10/21
1.5	0.3	10/21
1.5	0.3	10/21

Tl 88GAU 02 ICPMS

CV = 20. ± 2. ug/filter

Result	± Uncer.	Date
15.	2.	8/18
17.	2.	8/18

Zn 88GAU 01 FAA

CV = 50. ± 3. ug/filter

Result	± Uncer.	Date
53.	2.	4/22

CV = 91. ± 5.2 ug/filter

Result	± Uncer.	Date
94.	4.	4/22

TABLE C-V (cont)

****

HSE-9 Trace Elements on Filter Media (cont)

****

Zn (cont)

CV = 100. ± 10. ug/filter

Result	± Uncer.	Date
100.	4.	4/22
100.	10.	10/21
100.	10.	10/21

CV = 109.7 ± 10.8 ug/filter

Result	± Uncer.	Date
110.	8.	7/12

CV = 160.8 ug/filter

Result	± Uncer.	Date
170.	10.	10/21

CV = 200. ± 10. ug/filter

Result	± Uncer.	Date
210.	20.	7/12
220.	10.	7/12
220.	20.	7/12

CV = 230. ± 20. ug/filter

Result	± Uncer.	Date
240.	20.	10/21

CV = 250. ± 30. ug/filter

Result	± Uncer.	Date
238.	9.	4/22

Zn 88GAU 01 FAAC

CV = 100. ± 10. ug/filter

Result	± Uncer.	Date
140.	10.	2/02
99.	4.	4/22

CV = 100.9 ± 5.8 ug/filter

Result	± Uncer.	Date
90.	10.	2/02

CV = 200. ± 20. ug/filter

Result	± Uncer.	Date
270.	30.	2/02
200.	20.	4/22

Zn (cont)

CV = 300. ± 30. ug/filter

Result	± Uncer.	Date
380.	30.	2/02
300.	10.	4/22

****

HSE-9 pH, Total Dissolved Solids, and Conductivity in Water

****

Conductivity 84ADA 01 CB

CV = 300. ± 30. uS/cm

Result	± Uncer.	Date
290.	10.	1/21
290.	10.	1/25
300.	20.	2/19
300.	20.	2/23
310.	20.	3/28
320.	20.	4/25
310.	20.	5/23
280.	10.	6/17
300.	20.	6/21
300.	20.	7/22
290.	20.	7/25
300.	20.	8/26
280.	10.	8/29
300.	20.	9/01
300.	20.	10/06
300.	20.	10/24
300.	20.	11/02
300.	20.	11/28
280.	10.	11/29
300.	20.	12/01
300.	20.	12/01
310.	20.	12/19

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pH 84ADA 01 GE

CV = 6.87 ± 0.06 units

Result	± Uncer.	Date
6.9	0.1	1/08
6.9	0.1	1/11
6.8	0.1	1/12
6.8	0.1	1/13
6.9	0.1	1/14
6.9	0.1	1/15
6.8	0.1	1/19
6.9	0.1	1/20
6.8	0.1	1/21
6.9	0.1	1/22
6.8	0.1	1/25
6.9	0.1	1/26
6.8	0.1	1/27
6.8	0.1	1/28
6.9	0.1	1/29
6.9	0.1	2/01
6.9	0.1	2/02
6.9	0.1	2/03

pH (cont)

6.8	0.1	2/04
6.8	0.1	2/05
6.9	0.1	2/08
6.8	0.1	2/09
6.9	0.1	2/10
6.8	0.1	2/11
6.8	0.1	2/12
6.9	0.1	2/16
6.8	0.1	2/16
6.9	0.1	2/17
6.9	0.1	2/18
6.9	0.1	2/18
6.9	0.1	2/19
6.9	0.1	2/23
6.9	0.1	2/23
6.9	0.1	2/23
6.9	0.1	2/23
6.9	0.1	2/24
6.9	0.1	2/24
6.8	0.1	2/25
6.9	0.1	2/25
6.9	0.1	2/26
6.9	0.1	2/26
6.9	0.1	2/29
6.8	0.1	2/29
6.8	0.1	3/01
6.9	0.1	3/02
6.9	0.1	3/03
6.8	0.1	3/03
6.9	0.1	3/04
6.9	0.1	3/04
6.9	0.1	3/07
6.9	0.1	3/07
6.9	0.1	3/08
6.9	0.1	3/08
6.9	0.1	3/09
6.9	0.1	3/09
6.8	0.1	3/10
6.8	0.1	3/14
6.9	0.1	3/14
6.9	0.1	3/14
6.9	0.1	3/15
6.8	0.1	3/16
6.8	0.1	3/16
6.9	0.1	3/17
6.9	0.1	3/18
6.9	0.1	3/21
6.9	0.1	3/22
7.0	0.1	3/23
7.0	0.1	3/23
6.9	0.1	3/24
6.8	0.1	3/25
6.9	0.1	3/25
6.9	0.1	3/28
6.8	0.1	3/28
6.9	0.1	3/29
6.9	0.1	3/29
6.9	0.1	3/30
6.8	0.1	3/30
6.9	0.1	3/31
6.9	0.1	3/31
6.9	0.1	4/01
6.8	0.1	4/01
6.9	0.1	4/04
6.9	0.1	4/04
6.8	0.1	4/04
6.8	0.1	4/04
6.9	0.1	4/05
6.9	0.1	4/05

TABLE C-V (cont)

****

HSE-9 pH, Total Dissolved Solids, and Conductivity in Water (cont)

****

pH (cont)

6.9	0.1	4/06
6.9	0.1	4/06
6.9	0.1	4/07
6.9	0.1	4/08
6.9	0.1	4/08
6.9	0.1	4/11
6.9	0.1	4/11
6.9	0.1	4/12
6.9	0.1	4/12
6.8	0.1	4/13
6.9	0.1	4/13
6.9	0.1	4/14
6.9	0.1	4/14
6.9	0.1	4/15
6.9	0.1	4/15
6.9	0.1	4/18
6.8	0.1	4/18
6.9	0.1	4/19
6.9	0.1	4/19
6.8	0.1	4/20
6.8	0.1	4/20
6.9	0.1	4/21
6.9	0.1	4/22
6.9	0.1	4/25
6.9	0.1	4/25
6.8	0.1	4/26
6.9	0.1	4/26
6.8	0.1	4/27
6.8	0.1	4/27
6.9	0.1	4/28
6.9	0.1	4/28
6.9	0.1	4/29
6.8	0.1	5/02
6.8	0.1	5/02
6.9	0.1	5/03
6.9	0.1	5/03
6.9	0.1	5/04
6.9	0.1	5/04
6.9	0.1	5/05
6.9	0.1	5/05
6.8	0.1	5/06
6.9	0.1	5/09
6.9	0.1	5/09
6.9	0.1	5/10
6.9	0.1	5/10
6.9	0.1	5/11
6.9	0.1	5/11
6.9	0.1	5/12
6.9	0.1	5/12
6.9	0.1	5/13
6.9	0.1	5/13
6.8	0.1	5/16
6.9	0.1	5/16
6.8	0.1	5/17
6.9	0.1	5/17
6.9	0.1	5/18
6.9	0.1	5/19
6.9	0.1	5/20
6.9	0.1	5/23
6.9	0.1	5/24
6.9	0.1	5/25

pH (cont)

6.8	0.1	5/25
6.9	0.1	5/26
6.8	0.1	5/26
6.8	0.1	5/27
6.9	0.1	5/31
6.9	0.1	6/01
6.9	0.1	6/01
6.9	0.1	6/02
6.8	0.1	6/02
6.8	0.1	6/03
6.9	0.1	6/03
6.8	0.1	6/06
6.8	0.1	6/06
6.9	0.1	6/07
6.9	0.1	6/08
6.9	0.1	6/09
6.9	0.1	6/10
6.9	0.1	6/13
6.9	0.1	6/14
6.9	0.1	6/15
6.8	0.1	6/16
6.8	0.1	6/16
6.9	0.1	6/17
6.8	0.1	6/17
6.9	0.1	6/21
6.9	0.1	6/21
6.9	0.1	6/21
6.9	0.1	6/21
6.9	0.1	6/22
6.9	0.1	6/22
6.9	0.1	6/23
6.9	0.1	6/23
6.9	0.1	6/23
6.9	0.1	6/24
6.9	0.1	6/24
6.9	0.1	6/27
6.8	0.1	6/27
6.8	0.1	6/28
6.9	0.1	6/28
6.9	0.1	6/29
6.9	0.1	6/29
6.8	0.1	6/30
6.8	0.1	7/01
6.9	0.1	7/01
6.9	0.1	7/05
6.9	0.1	7/05
6.9	0.1	7/06
6.8	0.1	7/06
6.8	0.1	7/07
6.8	0.1	7/08
6.8	0.1	7/08
6.8	0.1	7/11
6.8	0.1	7/11
6.9	0.1	7/12
6.9	0.1	7/13
6.8	0.1	7/13
6.8	0.1	7/14
6.9	0.1	7/14
6.9	0.1	7/15
6.8	0.1	7/15
6.8	0.1	7/18
6.9	0.1	7/18
6.9	0.1	7/19
6.9	0.1	7/19
6.8	0.1	7/20
6.8	0.1	7/20
6.8	0.1	7/21
6.8	0.1	7/22
6.8	0.1	7/22

pH (cont)

6.9	0.1	7/25
6.9	0.1	7/25
6.8	0.1	7/26
6.9	0.1	7/26
6.8	0.1	7/27
6.8	0.1	7/27
6.9	0.1	7/28
6.9	0.1	7/28
6.9	0.1	8/01
6.8	0.1	8/01
6.9	0.1	8/01
6.9	0.1	8/02
6.8	0.1	8/02
6.9	0.1	8/03
6.8	0.1	8/04
6.9	0.1	8/04
6.9	0.1	8/04
6.9	0.1	8/05
6.9	0.1	8/05
6.8	0.1	8/08
6.8	0.1	8/08
6.9	0.1	8/10
6.8	0.1	8/10
6.8	0.1	8/11
6.8	0.1	8/11
6.8	0.1	8/15
6.9	0.1	8/15
6.9	0.1	8/16
6.8	0.1	8/16
6.9	0.1	8/17
6.9	0.1	8/18
6.9	0.1	8/18
6.9	0.1	8/19
6.8	0.1	8/19
6.8	0.1	8/22
6.9	0.1	8/22
6.9	0.1	8/23
6.9	0.1	8/23
6.9	0.1	8/24
6.9	0.1	8/24
6.9	0.1	8/25
6.9	0.1	8/25
6.9	0.1	8/26
6.9	0.1	8/26
6.9	0.1	8/29
6.9	0.1	8/29
6.9	0.1	8/30
6.8	0.1	8/30
6.9	0.1	8/31
6.9	0.1	8/31
6.8	0.1	9/01
6.9	0.1	9/01
6.9	0.1	9/02
6.9	0.1	9/02
6.8	0.1	9/06
6.9	0.1	9/06
6.8	0.1	9/07
6.9	0.1	9/07
6.9	0.1	9/08
6.8	0.1	9/08
6.8	0.1	9/09
6.8	0.1	9/12
6.9	0.1	9/12
6.8	0.1	9/13
6.8	0.1	9/13
6.8	0.1	9/14
6.9	0.1	9/14
6.8	0.1	9/15
6.8	0.1	9/15

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HSE-9 pH, Total Dissolved Solids, and Conductivity in Water (cont)

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pH (cont)

6.8	0.1	9/16
6.9	0.1	9/19
6.9	0.1	9/19
6.8	0.1	9/20
6.8	0.1	9/20
6.8	0.1	9/21
6.9	0.1	9/22
6.9	0.1	9/23
6.9	0.1	9/26
6.9	0.1	9/27
6.9	0.1	9/28
6.8	0.1	9/28
6.8	0.1	9/29
6.9	0.1	9/30
6.9	0.1	10/03
6.9	0.1	10/04
6.9	0.1	10/05
6.9	0.1	10/06
6.9	0.1	10/07
6.9	0.1	10/07
6.8	0.1	10/11
6.9	0.1	10/11
6.9	0.1	10/12
6.9	0.1	10/13
6.8	0.1	10/14
6.9	0.1	10/14
6.9	0.1	10/17
6.8	0.1	10/17
6.9	0.1	10/18
6.9	0.1	10/19
6.8	0.1	10/20
6.9	0.1	10/21
6.9	0.1	10/24
6.8	0.1	10/24
6.9	0.1	10/25
6.8	0.1	10/25
6.9	0.1	10/26
6.9	0.1	10/26
6.8	0.1	10/27
6.9	0.1	10/27
6.9	0.1	10/28
6.8	0.1	10/28
6.8	0.1	10/31
6.8	0.1	11/01
6.9	0.1	11/02
6.9	0.1	11/03
6.9	0.1	11/03
6.8	0.1	11/04
6.9	0.1	11/07
6.9	0.1	11/08
6.9	0.1	11/09
6.9	0.1	11/09
6.9	0.1	11/10
6.9	0.1	11/10
6.8	0.1	11/14
6.9	0.1	11/14
6.9	0.1	11/15
6.9	0.1	11/16
6.9	0.1	11/16
6.8	0.1	11/17
6.9	0.1	11/17

pH (cont)

6.8	0.1	11/18
6.9	0.1	11/21
6.8	0.1	11/21
6.9	0.1	11/22
6.9	0.1	11/22
6.9	0.1	11/23
6.8	0.1	11/28
6.9	0.1	11/28
6.9	0.1	11/29
6.9	0.1	12/01
6.8	0.1	12/01
6.9	0.1	12/02
6.9	0.1	12/05
6.9	0.1	12/06
6.9	0.1	12/07
6.9	0.1	12/08
6.9	0.1	12/09
6.9	0.1	12/12
6.9	0.1	12/13
6.8	0.1	12/14
6.9	0.1	12/15
6.9	0.1	12/16
6.9	0.1	12/19
6.9	0.1	12/20
6.9	0.1	12/21
6.9	0.1	12/22
6.8	0.1	12/23

pH 84ADA 01 PAPER

CV = 6.87 ± 0.06 units

Result	± Uncer.	Date
7.	1.	7/05
7.	1.	8/02
7.	1.	8/11
7.	1.	8/11
7.	1.	8/11

Total Dissolved Solids 84ADA 01 GRAV

CV = 293. ± 20. mg/L

Result	± Uncer.	Date
280.	30.	9/13
240.	20.	12/06
270.	30.	12/13
330.	30.	12/16
260.	30.	12/21

****

NBS 278 Obsidian Rock

****

Al 81NBS 03 ATNA

CV = 7.49 ± 0.08 %

Result	± Uncer.	Date
7.0	0.3	3/08
7.8	0.3	7/15
7.4	0.3	7/15
7.4	0.3	7/15
7.7	0.2	10/20

Ba 87GLA 01 ATNA

CV = 1000. ± 90. ug/g

Result	± Uncer.	Date
1100.	100.	3/08
800.	70.	7/15
870.	80.	7/15
760.	80.	7/15
840.	80.	10/20

Ba 87GLA 01 ITNA

CV = 1000. ± 90. ug/g

Result	± Uncer.	Date
940.	100.	11/04

Ca 81NBS 03 ATNA

CV = 7030. ± 20. ug/g

Result	± Uncer.	Date
7300.	1000.	3/08
8400.	800.	7/15
8200.	800.	7/15
9100.	900.	7/15
7000.	800.	10/20

Ce 87GLA 01 ITNA

CV = 60. ± 5. ug/g

Result	± Uncer.	Date
68.	7.	11/07

Cl 87GLA 01 ATNA

CV = 622. ± 14. ug/g

Result	± Uncer.	Date
570.	80.	3/08
680.	100.	7/15

TABLE C-V (cont)

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NBS 278 Obsidian Rock (cont)

****

Cl (cont)

640.	70.	7/15
760.	80.	7/15
450.	60.	10/20

Cs 87GLA 01 ITNA

CV = 5.1 ± 0.2 ug/g

Result	± Uncer.	Date
5.6	0.5	11/02

Cu 81NBS 03 ATNA

CV = 5.9 ± 0.2 ug/g

Result	± Uncer.	Date
< 300.		10/20
< 300.		12/12

Dy 87GLA 01 ATNA

CV = 6.5 ± 0.3 ug/g

Result	± Uncer.	Date
6.2	0.6	3/08
5.2	0.5	7/15
5.3	0.5	7/15
5.0	0.5	7/15
6.3	0.4	10/20

Eu 87GLA 01 ATNA

CV = 800. ± 25. ng/g

Result	± Uncer.	Date
700.	200.	10/20

Eu 87GLA 01 ITNA

CV = 800. ± 25. ng/g

Result	± Uncer.	Date
770.	90.	11/08

Fe 81NBS 03 ITNA

CV = 1.43 ± 0.03 %

Result	± Uncer.	Date
1.5	0.1	9/30

Ga 87GLA 01 ATNA

CV = 11. ug/g

Result	± Uncer.	Date
< 60.		3/08

Hf 87GLA 01 ITNA

CV = 8.76 ± 0.14 ug/g

Result	± Uncer.	Date
8.9	0.7	11/03

I ATNA

CV = No Data Available (ug/g)

Result	± Uncer.	Date
< 18.		10/20

In 87GLA 01 ATNA

CV = 43.6 ng/g

Result	± Uncer.	Date
< 200.		3/08
< 170.		7/15
< 170.		7/15
< 160.		7/15
< 170.		10/20

K 81NBS 03 ATNA

CV = 3.45 ± 0.02 %

Result	± Uncer.	Date
3.6	0.3	3/08
3.7	0.4	7/15
3.4	0.4	7/15
3.2	0.4	7/15
3.5	0.3	10/20

Mg 81NBS 03 ATNA

CV = 1400. ug/g

Result	± Uncer.	Date
< 6000.		3/08
< 4100.		7/15
< 4000.		7/15
< 4100.		7/15
< 4000.		10/20

Mn 81NBS 03 ATNA

CV = 400. ± 15. ug/g

Result	± Uncer.	Date
430.	20.	3/08
380.	20.	7/15
380.	20.	7/15
380.	20.	7/15
410.	20.	10/20

Na 81NBS 03 ATNA

CV = 3.59 ± 0.04 %

Result	± Uncer.	Date
3.6	0.1	3/08
3.6	0.1	7/15
3.6	0.1	7/15
3.5	0.1	7/15
3.7	0.1	10/20

Rb 81NBS 03 ITNA

CV = 127.5 ± 0.3 ug/g

Result	± Uncer.	Date
130.	10.	10/31

Sb 87GLA 01 ITNA

CV = 1.72 ± 0.13 ug/g

Result	± Uncer.	Date
2.1	0.4	11/02

Sc 87GLA 01 ITNA

CV = 5.1 ± 0.5 ug/g

Result	± Uncer.	Date
5.5	0.4	9/30

Si 81NBS 03 AENA

CV = 34.11 ± 0.06 %

Result	± Uncer.	Date
36.	2.	6/15

Sm 87GLA 01 ATNA

CV = 5.8 ± 0.2 ug/g

Result	± Uncer.	Date
< 3.		3/08
< 3.		7/15
< 3.		7/15

****

NBS 278 Obsidian Rock (cont)

****

Sm (cont)

< 3.		7/15
7.	2.	10/20

Sm 87GLA 01 ITNA

CV = 5.8 ± 0.2 ug/g

Result	± Uncer.	Date
7.	1.	11/08

Sr 81NBS 03 ATNA

CV = 63.5 ± 0.1 ug/g

Result	± Uncer.	Date
< 300.		3/08
< 300.		10/20

Ta 87GLA 01 ITNA

CV = 1.28 ± 0.06 ug/g

Result	± Uncer.	Date
1.2	0.2	11/04

Th 81NBS 03 ITNA

CV = 12.4 ± 0.3 ug/g

Result	± Uncer.	Date
13.	1.	9/30

Ti 81NBS 03 ATNA

CV = 1470. ± 40. ug/g

Result	± Uncer.	Date
1600.	300.	3/08
1300.	300.	7/15
1300.	300.	7/15
1500.	300.	7/15
1000.	200.	10/20

U 81NBS 03 ATNA

CV = 4.58 ± 0.04 ug/g

Result	± Uncer.	Date
4.4	0.3	10/20

U 81NBS 03 DNA

CV = 4.58 ± 0.04 ug/g

Result	± Uncer.	Date
4.7	0.4	1/31
4.7	0.4	1/31
4.8	0.4	1/31
4.5	0.5	2/01
4.5	0.5	2/01
4.5	0.5	2/01
4.6	0.4	2/06
4.8	0.4	2/06
4.6	0.4	2/06
4.5	0.5	3/15
4.6	0.5	3/15
4.6	0.5	3/15
4.5	0.3	3/23
4.7	0.3	3/23
4.6	0.3	3/23
4.6	0.2	3/23
4.5	0.3	3/23
4.7	0.3	3/23
4.3	0.4	4/18
4.6	0.5	4/18
4.3	0.4	4/18
4.4	0.4	5/23
4.4	0.4	5/23
4.4	0.4	5/23
4.5	0.5	7/07
4.5	0.5	7/07
4.7	0.5	7/07
4.5	0.5	7/07
4.7	0.5	7/07
4.5	0.5	7/07
4.4	0.5	8/03
4.5	0.5	8/03
4.4	0.5	10/04
4.5	0.5	10/04
4.5	0.5	10/13
4.7	0.5	10/13
4.4	0.5	10/13
4.3	0.4	10/26
4.4	0.4	10/26
4.2	0.4	10/26
4.5	0.5	12/06
4.6	0.5	12/06
4.7	0.5	12/06

V 87GLA 01 ATNA

CV = 15. ± 8. ug/g

Result	± Uncer.	Date
< 8.		3/08
9.	2.	7/15
< 5.		7/15
8.	2.	7/15
< 6.		10/20

W ATNA

CV = No Data Available (ug/g)

Result	± Uncer.	Date
< 160.		3/08
< 160.		7/15
< 160.		7/15
< 160.		7/15

Yb 87GLA 01 ITNA

CV = 4.5 ± 0.6 ug/g

Result	± Uncer.	Date
4.4	0.5	11/08

Zn 87GLA 01 ITNA

CV = 54. ± 4. ug/g

Result	± Uncer.	Date
50.	10.	11/08

****

NBS 688 Basalt Rock

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Al 81NBS 04 ATNA

CV = 9.18 ± 0.05 %

Result	± Uncer.	Date
9.1	0.3	3/03
8.8	0.3	6/06
8.8	0.3	6/06
9.0	0.4	9/29
9.8	0.4	9/29
9.6	0.4	9/29
9.1	0.4	9/30
8.9	0.3	9/30
9.2	0.4	9/30
9.2	0.3	10/20

As 87GLA 01 ITNA

CV = 2.5 ug/g

Result	± Uncer.	Date
2.8	0.6	4/04
2.	2.	4/04
3.9	0.8	4/04

TABLE C-V (cont)

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NBS 688 Basalt Rock
(cont)

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Ba 87GLA 01 ATNA

CV = 197. ± 12. ug/g

Result	± Uncer.	Date
< 4000.		3/03
< 3700.		6/06
< 3700.		6/06
< 5600.		9/29
< 5500.		9/29
< 5600.		9/29
< 4200.		9/30
< 4200.		9/30
< 4100.		9/30
< 4000.		10/20

Ba 87GLA 01 ITNA

CV = 197. ± 12. ug/g

Result	± Uncer.	Date
130.	90.	4/04
200.	90.	4/04
200.	100.	4/04
240.	90.	4/04
340.	80.	4/04
130.	60.	4/04
180.	40.	7/07
220.	60.	7/13
220.	50.	8/28

Ca 87GLA 01 ATNA

CV = 8.47 ± 0.36 %

Result	± Uncer.	Date
8.1	0.4	3/03
8.0	0.4	6/06
8.0	0.4	6/06
8.8	0.5	9/29
9.5	0.5	9/29
9.4	0.5	9/29
8.6	0.4	9/30
8.3	0.4	9/30
8.8	0.4	9/30
8.3	0.4	10/20

Ce 87GLA 01 ITNA

CV = 13. ± 2. ug/g

Result	± Uncer.	Date
14.	1.	2/26
13.	1.	2/26
11.	1.	2/26
13.	1.	2/26
10.	1.	2/26

Ce (cont)

14.	1.	2/26
14.	1.	4/01
16.	1.	4/01
14.	1.	4/01
14.	1.	4/01
15.	1.	4/01
15.	1.	4/01
12.	1.	7/07
15.	1.	7/13
13.	1.	8/30

Cl 87GLA 01 ATNA

CV = 33.9 ± 2.6 ug/g

Result	± Uncer.	Date
< 50.		3/08
< 100.		6/06
< 100.		6/06
< 160.		9/29
< 160.		9/29
40.	40.	9/29
< 120.		9/30
< 120.		9/30
< 130.		9/30
< 90.		10/20

Co 87GLA 01 ITNA

CV = 49. ± 3. ug/g

Result	± Uncer.	Date
48.	2.	2/26
49.	2.	2/26
48.	2.	2/26
50.	3.	2/26
43.	2.	2/26
40.	2.	2/26
49.	3.	2/26
44.	2.	2/26
48.	2.	2/26
41.	1.	2/26
50.	3.	2/26
46.	3.	2/26
44.	4.	7/12
49.	5.	7/13
47.	5.	8/28

Cr 81NBS 04 ITNA

CV = 332. ± 9. ug/g

Result	± Uncer.	Date
290.	25.	2/26
340.	30.	2/26
290.	25.	2/26
310.	25.	2/26
340.	30.	2/26
310.	25.	2/26
320.	30.	7/13
300.	30.	7/13
320.	25.	8/28

Cs 87GLA 01 ITNA

CV = 240. ± 150. ng/g

Result	± Uncer.	Date
400.	200.	7/12
300.	100.	7/12
300.	300.	8/28

Cu 81NBS 04 ATNA

CV = 96. ug/g

Result	± Uncer.	Date
< 300.		10/20
< 300.		12/12

Dy 87GLA 01 ATNA

CV = 3.4 ± 0.2 ug/g

Result	± Uncer.	Date
2.9	0.4	3/03
< 4.2		6/06
< 4.2		6/06
2.3	0.4	9/29
2.0	0.3	9/29
1.0	0.3	9/29
2.7	0.2	9/30
2.4	0.3	9/30
< 4.8		9/30
3.3	0.4	10/20

Eu 87GLA 01 ATNA

CV = 1.01 ± 0.02 ug/g

Result	± Uncer.	Date
< 0.8		10/20

Eu 87GLA 01 ITNA

CV = 1.01 ± 0.02 ug/g

Result	± Uncer.	Date
0.99	0.05	2/26
0.99	0.05	2/26
0.90	0.04	2/26
0.90	0.04	2/26
1.02	0.06	2/26
0.83	0.04	2/26
1.04	0.07	4/04
1.01	0.07	4/04
1.04	0.07	4/04
1.08	0.06	4/04
1.03	0.06	4/04
0.96	0.06	4/04
1.	0.1	7/07
1.	0.1	7/13
1.	0.1	8/30

TABLE C-V (cont)

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NBS 688 Basalt Rock
(cont)

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Fe 81NBS 04 ITNA

CV = 7.23 ± 0.03 %

Result	± Uncer.	Date
8.2	0.6	2/26
7.6	0.4	2/26
6.7	0.4	2/26
7.8	0.5	2/26
7.0	0.4	2/26
7.2	0.4	2/26
6.9	0.4	3/02
6.6	0.3	3/02
6.8	0.4	3/02
6.7	0.4	3/02
6.8	0.3	3/02
6.8	0.4	3/02
6.7	0.3	7/13
7.2	0.4	7/13
7.1	0.5	8/23

Ga 87GLA 01 ATNA

CV = 17.4 ug/g

Result	± Uncer.	Date
< 50.		3/03
< 40.		6/06
< 40.		6/06
< 76.		9/29
< 76.		9/29
< 75.		9/29
< 53.		9/30
< 53.		9/30
< 53.		9/30

Hf 87GLA 01 ITNA

CV = 1.55 ± 0.08 ug/g

Result	± Uncer.	Date
1.4	0.2	3/02
1.6	0.3	3/02
1.3	0.3	3/02
1.8	0.4	3/02
1.6	0.4	3/02
1.6	0.3	3/02
1.9	0.3	4/01
1.4	0.2	4/01
1.7	0.3	4/01
1.8	0.3	4/01
1.7	0.3	4/01
1.6	0.2	4/01
1.7	0.2	7/12
1.6	0.2	7/12
1.5	0.2	8/28

I ATNA

CV = No Data Available (ug/g)

Result	± Uncer.	Date
< 18.		10/20

In ATNA

CV = No Data Available (ug/g)

Result	± Uncer.	Date
< 160.		3/03
< 140.		6/06
< 140.		6/06
< 220.		9/29
< 230.		9/29
< 230.		9/29
< 160.		9/30
< 160.		9/30
< 160.		9/30
< 120.		10/20

K 81NBS 04 ATNA

CV = 1550. ± 70. ug/g

Result	± Uncer.	Date
< 4000.		3/03
< 3900.		6/06
< 3900.		6/06
< 7000.		9/29
< 6800.		9/29
< 7000.		9/29
< 4400.		9/30
< 4400.		9/30
< 4400.		9/30
< 4300.		9/30
< 4000.		10/20

K 81NBS 04 ITNA

CV = 1550. ± 70. ug/g

Result	± Uncer.	Date
1500.	300.	2/26
2300.	400.	2/26
1200.	300.	2/26

La 87GLA 01 ITNA

CV = 5.3 ± 0.4 ug/g

Result	± Uncer.	Date
5.2	0.8	3/02
6.3	1.1	3/02
6.5	0.8	3/02
5.5	0.8	4/04
7.	1.	4/04
5.6	0.8	4/04
5.7	0.6	7/07

Lu 87GLA 01 ITNA

CV = 350. ± 40. ng/g

Result	± Uncer.	Date
370.	40.	4/04
420.	40.	4/04
370.	40.	4/04
330.	30.	4/04
370.	30.	4/04
360.	40.	4/04

Mg 87GLA 01 ATNA

CV = 5.26 ± 0.22 %

Result	± Uncer.	Date
4.9	0.3	3/03
4.9	0.3	6/06
4.9	0.3	6/06
5.4	0.4	9/29
4.9	0.3	9/29
5.1	0.3	9/29
5.0	0.3	9/30
5.1	0.3	9/30
4.9	0.3	9/30
3.9	0.2	10/20

Mn 81NBS 04 ATNA

CV = 1290. ± 20. ug/g

Result	± Uncer.	Date
1290.	60.	3/03
1160.	50.	6/06
1160.	50.	6/06
1240.	60.	9/29
1220.	60.	9/29
1220.	60.	9/29
1210.	50.	9/30
1200.	60.	9/30
1210.	50.	9/30
1240.	60.	10/20

Na 81NBS 04 ATNA

CV = 1.6 ± 0.02 %

Result	± Uncer.	Date
1.53	0.05	3/03
1.46	0.05	6/06
1.47	0.05	6/06
1.57	0.05	9/29
1.58	0.05	9/29
1.58	0.05	9/29
1.57	0.05	9/30
1.54	0.05	9/30
1.56	0.05	9/30
1.52	0.05	10/20

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NBS 688 Basalt Rock
(cont)

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Na 81NBS 04 ITNA

CV = 1.6 ± 0.02 %

Result	± Uncer.	Date
1.47	0.08	4/04
1.55	0.08	4/04
1.55	0.08	4/04

Sb 87GLA 01 ITNA

CV = 300. ± 200. ng/g

Result	± Uncer.	Date
400.	200.	7/13
300.	100.	7/13
400.	300.	8/28

Sc 87GLA 01 ITNA

CV = 38. ± 3. ug/g

Result	± Uncer.	Date
33.	2.	3/02
31.	2.	3/02
31.	2.	3/02
33.	2.	3/02
36.	2.	3/02
36.	2.	3/02
33.	2.	4/01
34.	2.	4/01
34.	2.	4/01
35.	2.	4/01
34.	2.	4/01
35.	2.	4/01
34.	2.	7/13
36.	2.	7/13
36.	2.	8/22

Si 81NBS 04 AENA

CV = 22.6 ± 0.05 %

Result	± Uncer.	Date
21.	1.	6/22

Sm 87GLA 01 ATNA

CV = 2.5 ± 0.2 ug/g

Result	± Uncer.	Date
< 2.0		3/08
< 3.1		6/06
< 3.1		6/06
< 2.8		9/29

Sm (cont)

Result	± Uncer.	Date
< 2.9		9/29
< 2.9		9/29
< 2.4		9/30
< 2.4		9/30
< 2.4		9/30
< 3.0		10/20

Sm 87GLA 01 ITNA

CV = 2.5 ± 0.2 ug/g

Result	± Uncer.	Date
2.1	0.2	4/04
2.1	0.1	4/04
2.2	0.1	4/04
2.4	0.2	6/06
2.2	0.2	9/01

Sr 81NBS 04 ATNA

CV = 169.2 ± 0.7 ug/g

Result	± Uncer.	Date
< 200.		3/03
< 250.		6/06
< 250.		6/06
< 350.		9/29
< 340.		9/29
< 350.		9/29
< 240.		9/30
< 240.		9/30
< 240.		9/30
< 300.		10/20

Ta 87GLA 01 ITNA

CV = 310. ± 70. ng/g

Result	± Uncer.	Date
350.	100.	3/02
120.	50.	3/02
300.	90.	3/02
210.	80.	3/02
380.	100.	3/02
380.	100.	7/07
450.	130.	7/13
460.	100.	8/29

Tb 87GLA 01 ITNA

CV = 520. ± 40. ng/g

Result	± Uncer.	Date
560.	100.	7/07

Th 81NBS 04 ITNA

CV = 330. ± 20. ng/g

Result	± Uncer.	Date
200.	150.	4/04
400.	200.	4/04
500.	150.	4/04
500.	200.	4/04
300.	150.	4/04
230.	150.	4/04
300.	50.	7/13
300.	100.	7/13
500.	150.	8/24

Ti 81NBS 04 ATNA

CV = 7010. ± 60. ug/g

Result	± Uncer.	Date
6500.	500.	3/03
6200.	800.	6/06
6200.	800.	6/06
5800.	500.	9/29
6900.	500.	9/29
7200.	500.	9/29
6700.	500.	9/30
6300.	500.	9/30
6600.	500.	9/30
5400.	700.	10/20

U 87GLA 01 ATNA

CV = 310. ± 24. ng/g

Result	± Uncer.	Date
300.	100.	10/20

V 87GLA 01 ATNA

CV = 242. ± 8. ug/g

Result	± Uncer.	Date
250.	10.	3/03
230.	10.	6/06
230.	10.	6/06
260.	10.	9/29
260.	10.	9/29
260.	10.	9/29
250.	10.	9/30
240.	10.	9/30
240.	10.	9/30
250.	10.	10/20

W ATNA

CV = No Data Available (ug/g)

Result	± Uncer.	Date
< 140.		3/03
< 170.		6/06
< 170.		6/06

TABLE C-V (cont)

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NBS 688 Basalt Rock
(cont)

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W (cont)

< 240.	9/29
< 240.	9/29
< 240.	9/29
< 180.	9/30
< 180.	9/30
< 180.	9/30

Yb 87GLA 01 ITNA

CV = 2.05 ± 0.2 ug/g

Result	± Uncer.	Date
2.2	0.2	3/02
2.2	0.2	3/02
2.8	0.3	3/02
2.1	0.2	3/02
2.5	0.2	3/02
2.1	0.3	3/02
2.3	0.3	4/04
1.7	0.3	4/04
2.0	0.4	4/04
1.5	0.3	4/04
2.2	0.3	4/04
1.9	0.3	4/04
1.9	0.2	7/07
1.6	0.2	7/13
1.8	0.3	8/30

Zn 87GLA 01 ITNA

CV = 84. ± 10. ug/g

Result	± Uncer.	Date
90.	10.	9/01

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NBS 950b U308

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U-235/238 88GLA 02 ICPMS

CV = 0.0072 ± 0.0001 ratio

Result	± Uncer.	Date
0.0069	0.0007	1/20
0.0069	0.0007	1/20
0.0069	0.0007	1/27

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NBS 960 Uranium Metal

****

U-235/238 85CUR 01 ICPMS

CV = 0.0073 ± 0.0001 ratio

Result	± Uncer.	Date
0.0073	0.0007	3/07
0.0072	0.0007	3/07
0.0071	0.0007	3/09
0.0074	0.0007	3/09
0.0073	0.0007	3/11
0.0071	0.0007	3/11
0.0069	0.0007	3/11
0.0073	0.0007	3/11
0.0070	0.0007	3/11
0.0071	0.0007	3/11
0.0075	0.0007	3/24
0.0068	0.0007	3/24
0.0069	0.0007	3/24
0.0070	0.0007	3/24
0.0074	0.0007	4/05
0.0072	0.0007	4/05
0.0071	0.0007	4/05
0.0073	0.0007	4/05
0.0073	0.0007	4/05
0.0072	0.0007	4/05
0.0073	0.0007	4/05
0.0071	0.0007	4/05
0.0074	0.0007	4/05
0.0072	0.0007	4/05
0.0068	0.0007	4/05
0.0069	0.0007	4/05
0.0072	0.0007	4/05
0.0070	0.0007	4/06
0.0071	0.0007	4/06
0.0074	0.0007	4/08
0.0065	0.0007	4/08
0.0069	0.0007	4/08
0.0062	0.0010	4/08
0.0070	0.0007	4/08
0.0072	0.0007	4/11
0.0069	0.0007	4/11
0.0073	0.0007	4/11
0.0074	0.0007	4/11
0.0072	0.0007	4/11
0.0074	0.0007	4/11
0.0074	0.0007	4/13
0.0073	0.0007	4/13
0.0073	0.0007	4/13
0.0073	0.0007	4/13
0.0072	0.0007	4/13
0.0073	0.0007	4/13
0.0073	0.0007	4/13
0.0072	0.0007	4/13
0.0074	0.0007	4/13
0.0073	0.0007	4/13
0.0070	0.0007	4/25
0.0072	0.0007	4/25
0.0070	0.0007	4/25
0.0071	0.0007	4/25
0.0071	0.0007	5/16
0.0067	0.0007	5/16
0.0068	0.0007	5/16
0.0074	0.0007	5/16
0.0073	0.0007	5/16

U-235/238 (cont)

0.0080	0.0008	5/16
0.0073	0.0007	5/16
0.0078	0.0008	5/16
0.0077	0.0008	5/16
0.0067	0.0007	5/16
0.0070	0.0007	5/16
0.0075	0.0007	5/16
0.0070	0.0007	5/16
0.0072	0.0007	5/16
0.0079	0.0008	5/16
0.0073	0.0007	5/16
0.0069	0.0007	5/16
0.0066	0.0007	5/16
0.0070	0.0007	5/16
0.0073	0.0007	5/16
0.0079	0.0008	5/16
0.0073	0.0007	5/16
0.0077	0.0008	5/16
0.0070	0.0007	5/16
0.0069	0.0007	5/16
0.0070	0.0007	5/16
0.0077	0.0008	5/18
0.0069	0.0007	5/18
0.0074	0.0007	5/18
0.0069	0.0007	5/18
0.0075	0.0008	5/18
0.0073	0.0007	5/18
0.0066	0.0007	5/18
0.0067	0.0007	5/23
0.0074	0.0007	5/24
0.0069	0.0007	5/24
0.0073	0.0007	5/24
0.0069	0.0007	5/24
0.0075	0.0008	5/24
0.0067	0.0007	5/24
0.0082	0.0008	5/24
0.0072	0.0007	5/24
0.0069	0.0007	5/24
0.0078	0.0008	5/24
0.0072	0.0007	5/24
0.0069	0.0007	5/24
0.0067	0.0007	5/24
0.0082	0.0008	5/26
0.0079	0.0008	5/26
0.0063	0.0006	6/01
0.0075	0.0008	6/01
0.0066	0.0007	6/01
0.0072	0.0007	6/01
0.0075	0.0008	6/01
0.0076	0.0008	6/01
0.0077	0.0008	6/01
0.0079	0.0008	6/07
0.0074	0.0007	6/07
0.0067	0.0007	6/07
0.0061	0.0006	6/07
0.0072	0.0007	6/07
0.0066	0.0007	6/07
0.0073	0.0007	6/07
0.0077	0.0008	6/07
0.0074	0.0007	7/08
0.0074	0.0007	7/08
0.0081	0.0008	7/08
0.0075	0.0008	7/08
0.0074	0.0007	7/20
0.0061	0.0006	7/20
0.0074	0.0007	7/20
0.0066	0.0007	7/20
0.0076	0.0008	8/01
0.0081	0.0008	8/01

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NBS 960 Uranium Metal (cont)

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U-235/238 (cont)

0.0080	0.0008	8/01
0.0078	0.0008	8/01
0.0078	0.0008	8/01
0.0094	0.0009	8/01
0.0085	0.0009	8/05
0.0085	0.0009	8/05
0.0077	0.0008	10/19
0.0071	0.0007	10/19
0.0085	0.0009	10/19
0.0074	0.0007	10/19
0.0065	0.0007	10/19
0.0087	0.0009	10/19
0.0078	0.0008	10/19
0.0071	0.0007	10/19
0.0074	0.0007	10/19
0.0076	0.0008	10/19
0.0084	0.0008	10/19
0.0081	0.0008	10/20
0.0066	0.0007	10/20
0.0072	0.0007	10/20
0.0082	0.0008	10/20
0.0064	0.0006	10/20
0.0066	0.0007	10/25
0.0072	0.0007	10/25
0.0064	0.0006	10/25
0.0082	0.0008	10/25
0.0071	0.0007	12/09
0.0081	0.0008	12/09
0.0086	0.0009	12/09
0.0075	0.0008	12/12
0.0054	0.0005	12/12
0.0061	0.0006	12/12
0.0063	0.0006	12/12
0.0080	0.0008	12/12
0.0069	0.0007	12/12
0.0072	0.0007	12/13
0.0076	0.0008	12/13
0.0072	0.0007	12/13
0.0073	0.0007	12/13
0.0071	0.0007	12/13
0.0070	0.0007	12/13
0.0073	0.0007	12/13
0.0074	0.0007	12/13
0.0082	0.0008	12/13
0.0069	0.0007	12/13
0.0063	0.0006	12/14
0.0072	0.0007	12/14
0.0075	0.0008	12/14
0.0089	0.0009	12/14
0.0071	0.0007	12/14
0.0072	0.0007	12/14
0.0078	0.0008	12/19
0.0083	0.0008	12/19
0.0067	0.0007	12/19
0.0074	0.0007	12/19
0.0076	0.0008	12/19
0.0074	0.0007	12/19
0.0069	0.0007	12/20
0.0067	0.0007	12/20
0.0067	0.0007	12/20
0.0071	0.0007	12/20
0.0067	0.0007	12/20
0.0071	0.0007	12/20

U-235/238 (cont)

0.0069	0.0007	12/20
0.0069	0.0007	12/20
0.0064	0.0006	12/20
0.0077	0.0008	12/20
0.0077	0.0008	12/20
0.0064	0.0006	12/20
0.0075	0.0008	12/20
0.0071	0.0007	12/20
0.0076	0.0008	12/20
0.0065	0.0007	12/20
0.0068	0.0007	12/21
0.0073	0.0007	12/21
0.0072	0.0007	12/21
0.0071	0.0007	12/21
0.0071	0.0007	12/21
0.0076	0.0008	12/21
0.0067	0.0007	12/21
0.0067	0.0007	12/21
0.0072	0.0007	12/21
0.0071	0.0007	12/22
0.0074	0.0007	12/22
0.0069	0.0007	12/22
0.0065	0.0007	12/22
0.0071	0.0007	12/22
0.0063	0.0006	12/22
0.0077	0.0008	12/22
0.0070	0.0007	12/22
0.0074	0.0007	12/22
0.0076	0.0008	12/22
0.0076	0.0008	12/22
0.0071	0.0007	12/22
0.0074	0.0007	12/22
0.0063	0.0006	12/22
0.0073	0.0007	12/22
0.0075	0.0008	12/22
0.0073	0.0007	12/22
0.0070	0.0007	12/22
0.0065	0.0007	12/22
0.0069	0.0007	12/22
0.0071	0.0007	12/22
0.0075	0.0008	12/22
0.0071	0.0007	12/22
0.0073	0.0007	12/22
0.0073	0.0007	12/22
0.0070	0.0007	12/22

****

NBS 1084 Wear-Metals
in Lubricating Oil, Low

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Ag 85NBS 09 FAA

CV = 101. ug/g

Result	± Uncer.	Date
90.	20.	8/22
92.	1.	8/22

Cr 85NBS 09 FAA

CV = 100. ± 3. ug/g

Result	± Uncer.	Date
100.	20.	8/22

Pb 85NBS 09 FAA

CV = 101. ug/g

Result	± Uncer.	Date
75.	15.	8/22

****

NBS 1085 Wear-Metals
in Lubricating Oil, High

****

Ag 85NBS 09 FAA

CV = 291. ug/g

Result	± Uncer.	Date
310.	60.	7/12
270.	60.	7/22
300.	60.	8/22
300.	60.	8/22

Cr 85NBS 09 FAA

CV = 298. ± 5. ug/g

Result	± Uncer.	Date
320.	60.	7/12
290.	60.	7/22
310.	60.	8/22

Pb 85NBS 09 FAA

CV = 305. ug/g

Result	± Uncer.	Date
310.	60.	7/12
290.	60.	7/22
280.	60.	8/22

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NBS 1549 Non-fat Milk Powder

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Si 84NBS 06 IENA

CV = < 50. ug/g

Result	± Uncer.	Date
- 90.	120.	10/20
< 200.		10/20
70.	120.	10/20
< 200.		10/20
< 200.		10/20
< 200.		10/20
- 20.	130.	10/20
< 200.		10/20
< 200.		10/20

TABLE C-V (cont)

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NBS 1566 Oyster Tissue

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Si 87GLA 01 IENA

CV = 1100. ug/g

Result	± Uncer.	Date
1230.	60.	10/20
1240.	60.	10/20
1480.	80.	10/20
1080.	50.	10/20
1230.	60.	10/20
1430.	70.	10/20
1600.	90.	10/20
1080.	50.	10/20
1240.	60.	10/20

U 83NBS 02 DNA

CV = 116. ± 6. ng/g

Result	± Uncer.	Date
130.	10.	1/29
130.	10.	1/29
130.	10.	1/29
110.	10.	4/22
120.	10.	4/22
120.	10.	4/22
130.	10.	11/15
120.	10.	11/15
120.	10.	11/15

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NBS 1567 Wheat Flour

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Si 89GLA 01 IENA

CV = < 100. ug/g

Result	± Uncer.	Date
140.	50.	10/20
100.	50.	10/20
140.	50.	10/20
100.	50.	10/20
120.	50.	10/20
5.	40.	10/20
120.	50.	10/20
30.	40.	10/20
120.	50.	10/20

****

NBS 1568 Rice Flour

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Si 89GLA 01 IENA

CV = 150. ± 50. ug/g

Result	± Uncer.	Date
110.	40.	10/20
140.	50.	10/20
120.	40.	10/20
110.	40.	10/20
140.	50.	10/20
120.	40.	10/20
190.	60.	10/20
160.	50.	10/20
130.	50.	10/20

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NBS 1569 Brewers Yeast

****

Si 89GLA 01 IENA

CV = 1.2 ± 0.05 %

Result	± Uncer.	Date
1.27	0.06	10/20
1.33	0.06	10/20
1.33	0.06	10/20
0.99	0.03	10/20
1.14	0.03	10/20
1.17	0.03	10/20

****

NBS 1570 Spinach

****

Si 87GLA 01 IENA

CV = 2900. ug/g

Result	± Uncer.	Date
2200.	300.	10/20
2600.	300.	10/20
3100.	300.	10/20
2900.	100.	10/20
2800.	100.	10/20
3400.	100.	10/20
2800.	100.	10/20
2900.	100.	10/20
3400.	100.	10/20

****

NBS 1571 Orchard Leaves

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Si 89GLA 01 IENA

CV = 2400. ± 300. ug/g

Result	± Uncer.	Date
2300.	100.	10/20
2300.	200.	10/20
2300.	100.	10/20
2000.	200.	10/20
2000.	200.	10/20
2500.	100.	10/20
2300.	100.	10/20
2500.	100.	10/20
2300.	100.	10/20

****

NBS 1572 Citrus Leaves

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Al 82NBS 03 ITNA

CV = 92. ± 10. ug/g

Result	± Uncer.	Date
86.	1.	11/29
84.	1.	11/29
82.	1.	11/29
86.	1.	11/29

As 82NBS 03 IENA

CV = 3.1 ± 0.3 ug/g

Result	± Uncer.	Date
3.5	0.5	1/31
3.3	0.4	1/31

Cs 87GLA 01 ITNA

CV = 93. ± 20. ng/g

Result	± Uncer.	Date
70.	70.	6/13
100.	40.	6/13

Mo 82NBS 03 IENA

CV = 170. ± 90. ng/g

Result	± Uncer.	Date
< 600.		1/04
< 800.		1/04
< 3500.		1/31
< 4300.		1/31

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NBS 1572 Citrus Leaves (cont)

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Si 87GLA 01 IENA

CV = 1900. ug/g

Result	± Uncer.	Date
1850.	80.	10/20
2600.	80.	10/20
1990.	80.	10/20
2600.	80.	10/20
1850.	80.	10/20
1800.	200.	10/20
2500.	200.	10/20
1990.	80.	10/20
2000.	200.	10/20

U 87GLA 01 DNA

CV = 40. ± 2. ng/g

Result	± Uncer.	Date
41.	4.	4/22
51.	6.	4/22

V 87GLA 01 ITNA

CV = 240. ng/g

Result	± Uncer.	Date
210.	30.	11/29
280.	40.	11/29
230.	30.	11/29
330.	40.	11/29

W 87GLA 01 IENA

CV = 8.1 ng/g

Result	± Uncer.	Date
< 300.		1/04
< 300.		1/04
< 1100.		1/31
< 1000.		1/31

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NBS 1573 Tomato Leaves

****

Cs 87GLA 01 ITNA

CV = 57. ± 8. ng/g

Result	± Uncer.	Date
80.	15.	6/13
90.	15.	6/13

F 87GLA 01 DISE

CV = 5.5 ± 0.4 ug/g

Result	± Uncer.	Date
5.8	0.6	2/10
5.5	0.6	2/10

F 87GLA 01 ISE

CV = 5.5 ± 0.4 ug/g

Result	± Uncer.	Date
4.6	0.5	4/01
4.6	0.5	4/01
5.4	0.5	4/13
5.2	0.5	4/18

Mo 87GLA 01 IENA

CV = 530. ± 90. ng/g

Result	± Uncer.	Date
< 1000.		1/04
< 800.		1/04

Si 88GLA 02 IENA

CV = 0.96 %

Result	± Uncer.	Date
1.01	0.04	10/20
1.00	0.04	10/20
1.00	0.04	10/20
1.00	0.04	10/20
1.01	0.04	10/20
1.09	0.03	10/20
1.00	0.04	10/20
1.08	0.03	10/20
1.07	0.03	10/20

U 76NBS 02 DNA

CV = 61. ± 3. ng/g

Result	± Uncer.	Date
69.	7.	4/22
66.	7.	4/22

W 87GLA 01 IENA

CV = < 40. ng/g

Result	± Uncer.	Date
< 300.		1/04
< 400.		1/04

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NBS 1575 Pine Needles

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Al 76NBS 03 ITNA

CV = 545. ± 30. ug/g

Result	± Uncer.	Date
560.	30.	11/29
560.	30.	11/29

Ca 76NBS 03 ITNA

CV = 4100. ± 200. ug/g

Result	± Uncer.	Date
3600.	300.	11/25
3800.	300.	11/25

Cl 87GLA 01 ITNA

CV = 280. ± 30. ug/g

Result	± Uncer.	Date
240.	30.	11/25
260.	30.	11/25

Cs 87GLA 01 ITNA

CV = 110. ± 10. ng/g

Result	± Uncer.	Date
100.	70.	6/13
170.	60.	6/13

K 76NBS 03 ITNA

CV = 3700. ± 200. ug/g

Result	± Uncer.	Date
5500.	1500.	11/25
6500.	1500.	11/25

Mg 87GLA 01 ITNA

CV = 1200. ± 200. ug/g

Result	± Uncer.	Date
1000.	100.	11/25
1000.	100.	11/25

TABLE C-V (cont)

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NBS 1575 Pine Needles (cont)

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Mn 76NBS 03 ITNA

CV = 675. ± 15. ug/g

Result	± Uncer.	Date
700.	40.	11/25
670.	30.	11/25

Na 87GLA 01 ITNA

CV = 50. ± 30. ug/g

Result	± Uncer.	Date
30.	30.	11/25
15.	30.	11/25

S 87GLA 01 CEA

CV = 1320. ± 110. ug/g

Result	± Uncer.	Date
1160.	60.	12/16
1190.	60.	12/16
1220.	60.	12/16
1210.	60.	12/16
1180.	60.	12/16

Si 87GLA 01 IENA

CV = 814. ug/g

Result	± Uncer.	Date
1300.	100.	10/20
1400.	100.	10/20
1300.	100.	10/20
1100.	100.	10/20
1400.	100.	10/20
1400.	200.	10/20
1300.	100.	10/20
1300.	100.	10/20
1400.	200.	10/20

V 87GLA 01 ITNA

CV = 390. ± 70. ng/g

Result	± Uncer.	Date
350.	40.	11/29
330.	40.	11/29

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NBS 1577 Bovine Liver

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Si 77NBS 03 IENA

CV = 17.5 ± 1.3 ug/g

Result	± Uncer.	Date
200.	400.	10/20
200.	400.	10/20
< 150.		10/20
< 140.		10/20
200.	400.	10/20

****

NBS 1577a Bovine Liver

****

Si 89GLA 01 IENA

CV = < 100. ug/g

Result	± Uncer.	Date
< 400.		10/20
< 150.		10/20
< 400.		10/20
< 400.		10/20
< 400.		10/20
< 400.		10/20
< 400.		10/20
< 150.		10/20
< 150.		10/20

****

NBS 1633 Trace Elements in Coal Fly Ash

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Al 87GLA 01 ATNA

CV = 12.6 ± 0.6 %

Result	± Uncer.	Date
13.3	0.5	9/30
13.1	0.5	9/30
13.4	0.5	9/30

Ba 87GLA 01 ATNA

CV = 2665. ± 160. ug/g

Result	± Uncer.	Date
2300.	200.	9/30
2300.	200.	9/30
2400.	200.	9/30

Ca 87GLA 01 ATNA

CV = 4.65 ± 0.34 %

Result	± Uncer.	Date
5.0	0.3	9/30
4.7	0.3	9/30
4.8	0.3	9/30

Cl 87GLA 01 ATNA

CV = 38. ± 10. ug/g

Result	± Uncer.	Date
130.	40.	9/30
100.	40.	9/30
150.	40.	9/30

Dy 87GLA 01 ATNA

CV = 10. ± 1. ug/g

Result	± Uncer.	Date
10.1	0.8	9/30
9.7	0.8	9/30
9.6	0.8	9/30

Eu 87GLA 01 ATNA

CV = 2.64 ± 0.19 ug/g

Result	± Uncer.	Date
2.4	0.4	9/30
2.4	0.3	9/30
2.4	0.4	9/30

Ga 87GLA 01 ATNA

CV = 42. ± 4. ug/g

Result	± Uncer.	Date
40.	10.	9/30
60.	15.	9/30
< 35.		9/30

I 87GLA 01 ATNA

CV = 2.8 ± 0.4 ug/g

Result	± Uncer.	Date
< 16.		9/30
< 16.		9/30
< 16.		9/30

****

NBS 1633 Trace Elements
in Coal Fly Ash (cont)

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In 87GLA 01 ATNA

CV = 220. ± 80. ng/g

Result	± Uncer.	Date
120.	30.	9/30
< 130.		9/30
170.	60.	9/30

K 87GLA 01 ATNA

CV = 1.69 ± 0.09 %

Result	± Uncer.	Date
1.6	0.2	9/30
2.0	0.2	9/30
1.9	0.2	9/30

Mg 87GLA 01 ATNA

CV = 1.5 ± 0.3 %

Result	± Uncer.	Date
1.3	0.1	9/30
1.3	0.1	9/30
1.4	0.1	9/30

Mn 75NBS 01 ATNA

CV = 493. ± 7. ug/g

Result	± Uncer.	Date
490.	20.	9/30
510.	20.	9/30
490.	20.	9/30

Na 87GLA 01 ATNA

CV = 3130. ± 200. ug/g

Result	± Uncer.	Date
3200.	100.	9/30
3200.	100.	9/30
3200.	100.	9/30

Sm 87GLA 01 ATNA

CV = 12.9 ± 1.5 ug/g

Result	± Uncer.	Date
13.	2.	9/30
12.	2.	9/30
12.	2.	9/30

Sr 87GLA 01 ATNA

CV = 1380. ± 100. ug/g

Result	± Uncer.	Date
1400.	150.	9/30
1300.	100.	9/30
1300.	150.	9/30

Ti 87GLA 01 ATNA

CV = 7100. ± 500. ug/g

Result	± Uncer.	Date
6500.	900.	9/30
6800.	900.	9/30
6400.	900.	9/30

V 75NBS 01 ATNA

CV = 214. ± 8. ug/g

Result	± Uncer.	Date
225.	9.	9/30
217.	8.	9/30
216.	9.	9/30

W 87GLA 01 ATNA

CV = 4.8 ± 0.6 ug/g

Result	± Uncer.	Date
< 140.		9/30
< 150.		9/30
< 140.		9/30

****

NBS 1633a Trace Elements
in Coal Fly Ash

****

As 85NBS 11 ITNA

CV = 140. ± 20. ug/g

Result	± Uncer.	Date
145.	8.	4/04
132.	7.	4/04
126.	7.	4/04

Ba 87GLA 01 ITNA

CV = 1420. ± 100. ug/g

Result	± Uncer.	Date
1300.	200.	4/04
1300.	200.	4/04
900.	100.	4/04
1200.	100.	4/04

Ba (cont)

1300.	200.	4/04
1200.	100.	4/04
1400.	100.	7/13
1600.	200.	9/27

Ce 87GLA 01 ITNA

CV = 175. ± 7. ug/g

Result	± Uncer.	Date
160.	10.	2/26
170.	10.	2/26
170.	10.	2/26
180.	10.	2/26
170.	10.	2/26
180.	10.	2/26
180.	10.	7/13
180.	10.	9/27

Co 87GLA 01 ITNA

CV = 43. ± 3. ug/g

Result	± Uncer.	Date
42.	4.	2/26
40.	4.	2/26
42.	4.	2/26
40.	4.	2/26
42.	4.	2/26
43.	4.	2/26
47.	5.	7/13
44.	4.	9/27

Cr 85NBS 11 ITNA

CV = 196. ± 6. ug/g

Result	± Uncer.	Date
210.	20.	2/26
200.	20.	2/26
180.	10.	2/26
200.	20.	2/26
190.	10.	2/26
180.	10.	2/26
180.	10.	4/01
180.	10.	4/01
180.	10.	4/01
190.	10.	4/01
190.	10.	4/01
190.	10.	4/01
200.	20.	7/13
200.	20.	9/27

Cs 87GLA 01 ITNA

CV = 10.5 ± 0.7 ug/g

Result	± Uncer.	Date
10.0	0.9	2/26
9.8	0.9	2/26
9.8	0.9	2/26

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NBS 1633a Trace Elements
in Coal Fly Ash (cont)

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Cs (cont)

10.1	0.9	4/01
9.8	0.9	4/01
9.9	0.8	4/01
11.2	0.9	4/01
10.7	0.9	4/01
10.8	0.9	4/01
11.0	0.9	7/13
10.6	1.1	9/27

Eu 87GLA 01 ITNA

CV = 3.7 ± 0.2 ug/g

Result	± Uncer.	Date
3.2	0.2	2/26
3.1	0.2	2/26
3.4	0.2	2/26
3.0	0.2	2/26
3.8	0.2	2/26
3.6	0.2	2/26
4.3	0.2	4/04
4.1	0.2	4/04
4.0	0.2	4/04
4.2	0.2	4/04
3.4	0.2	4/04
4.0	0.2	4/04
3.5	0.3	7/13
4.2	0.5	9/27

Fe 85NBS 11 ITNA

CV = 9.4 ± 0.1 %

Result	± Uncer.	Date
10.2	0.5	2/26
11.1	0.5	2/26
10.6	0.5	2/26
9.6	0.5	2/26
10.1	0.5	2/26
9.9	0.5	2/26
9.3	0.5	3/02
9.0	0.5	3/02
9.2	0.5	3/02
9.6	0.4	3/02
9.2	0.5	3/02
9.3	0.5	3/02
9.7	0.5	7/13
9.6	0.7	9/27

Hf 87GLA 01 ITNA

CV = 7.4 ± 0.3 ug/g

Result	± Uncer.	Date
6.7	0.5	3/02
7.1	0.6	3/02
7.3	0.5	3/02
6.8	0.5	3/02
6.9	0.5	3/02
7.4	0.5	3/02
6.8	0.5	4/01
6.7	0.5	4/01
7.1	0.6	4/01
7.7	0.5	4/01
7.4	0.5	4/01
6.2	0.5	4/01
7.5	0.8	7/13
7.8	0.7	9/27

K 85NBS 11 ITNA

CV = 1.88 ± 0.06 %

Result	± Uncer.	Date
1.84	0.09	2/26
1.86	0.09	2/26
1.94	0.10	2/26

La 87GLA 01 ITNA

CV = 84. ± 8. ug/g

Result	± Uncer.	Date
89.	4.	3/02
89.	4.	3/02
92.	5.	3/02

Lu 87GLA 01 ITNA

CV = 1.1 ± 0.2 ug/g

Result	± Uncer.	Date
0.93	0.06	4/04
1.28	0.08	4/04
1.14	0.08	4/04
1.06	0.08	4/04
1.18	0.08	4/04
1.14	0.08	4/04

Na 85NBS 11 ITNA

CV = 1700. ± 100. ug/g

Result	± Uncer.	Date
1800.	100.	2/26
1800.	100.	2/26
1800.	100.	2/26
1600.	100.	4/04
1700.	100.	4/04
1700.	100.	4/04

Rb 85NBS 11 ITNA

CV = 131. ± 2. ug/g

Result	± Uncer.	Date
160.	20.	3/02
160.	20.	3/02
150.	20.	3/02
170.	20.	3/02
140.	10.	3/02
140.	10.	3/02
120.	10.	7/13
120.	20.	9/27

Sb 85NBS 11 ITNA

CV = 6.8 ± 0.4 ug/g

Result	± Uncer.	Date
7.1	0.8	7/13
6.5	0.9	9/27

Sc 87GLA 01 ITNA

CV = 39. ± 3. ug/g

Result	± Uncer.	Date
36.	2.	3/02
35.	2.	3/02
36.	2.	3/02
37.	2.	3/02
35.	2.	3/02
37.	2.	3/02
37.	2.	4/01
37.	2.	4/01
37.	2.	4/01
31.	2.	4/01
37.	2.	4/01
37.	2.	4/01
40.	2.	7/13
40.	3.	9/27

Si 85NBS 11 AENA

CV = 22.8 ± 0.8 %

Result	± Uncer.	Date
22.	4.	6/01
24.	2.	6/01
22.	2.	6/01
22.	2.	6/01
24.	2.	6/01
23.	2.	6/01
24.	3.	6/01
23.	2.	6/01
24.	2.	6/01
21.	1.	6/01
24.	3.	6/01
21.	2.	6/01
22.	1.	6/01
22.	4.	6/01
22.	3.	6/01

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NBS 1633a Trace Elements in Coal Fly Ash (cont)

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Sm 87GLA 01 ITNA

CV = 17. ± 1.5 ug/g

Result	± Uncer.	Date
15.2	0.8	4/04
15.3	0.8	4/04
15.6	0.8	4/04
13.0	1.3	9/18

Ta 87GLA 01 ITNA

CV = 2. ± 0.2 ug/g

Result	± Uncer.	Date
1.7	0.3	3/02
2.3	0.5	3/02
2.2	0.4	3/02
1.8	0.4	3/02
2.7	0.5	3/02
2.1	0.4	3/02
1.9	0.3	7/13
1.8	0.4	9/27

Tb 87GLA 01 ITNA

CV = 2.5 ± 0.3 ug/g

Result	± Uncer.	Date
2.2	0.4	7/13

Th 85NBS 11 ITNA

CV = 24.7 ± 0.3 ug/g

Result	± Uncer.	Date
23.	2.	3/02
24.	2.	3/02
24.	2.	3/02
22.	2.	3/02
23.	2.	3/02
22.	2.	3/02
25.	2.	7/13
26.	2.	9/27

Yb 87GLA 01 ITNA

CV = 7.4 ± 0.7 ug/g

Result	± Uncer.	Date
10.0	1.0	3/02
10.4	1.0	3/02
9.0	0.9	3/02
9.5	1.0	3/02
9.3	0.9	3/02

Yb (cont)

11.0	1.1	3/02
7.5	0.8	7/13
7.6	0.8	9/18

Zn 85NBS 11 ITNA

CV = 220. ± 10. ug/g

Result	± Uncer.	Date
210.	30.	9/27

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NBS 1642b Mercury in Water

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Hg 82NBS 08 CVAA

CV = 1.49 ± 0.06 ug/L

Result	± Uncer.	Date
1.6	0.2	3/04
1.6	0.2	3/04
1.4	0.2	3/04
1.5	0.2	3/04
1.4	0.1	5/25
1.4	0.1	5/25
1.4	0.1	5/25
1.4	0.1	5/26
1.5	0.2	5/27
1.5	0.2	5/27
1.4	0.2	5/27
1.5	0.2	5/27
1.4	0.1	6/07
1.4	0.2	6/07
1.4	0.2	6/07
1.4	0.1	6/07
1.4	0.1	6/07
1.5	0.2	6/07
1.5	0.2	6/07
1.4	0.1	6/07
1.4	0.2	6/08
1.4	0.2	6/08
1.6	0.2	6/08
1.5	0.2	6/08
1.6	0.2	6/08
1.6	0.3	6/24
1.6	0.3	6/24
1.4	0.3	6/24
1.5	0.3	7/11
1.6	0.3	7/12
1.6	0.3	7/12
1.5	0.3	7/12
1.5	0.3	7/12
1.5	0.3	7/12
1.5	0.3	7/12
1.5	0.3	7/12
1.6	0.3	7/12
1.4	0.3	7/12
1.5	0.3	7/12
1.4	0.3	7/12
1.5	0.3	7/12
1.5	0.3	7/12
1.5	0.3	7/12
1.5	0.3	7/13

Hg (cont)

1.5	0.3	7/13
1.5	0.3	7/13
1.6	0.3	7/13
1.5	0.3	7/13
1.5	0.3	7/16
1.5	0.3	7/18
1.5	0.3	7/18
1.6	0.3	7/28
1.5	0.3	7/28
1.5	0.3	7/28
1.5	0.3	7/28
1.5	0.3	7/28
1.6	0.3	7/28
1.5	0.3	7/28
1.5	0.3	7/29
1.5	0.3	7/29
1.6	0.3	7/29
1.6	0.3	7/29
1.5	0.3	7/29
1.5	0.3	7/31
1.5	0.3	7/31
1.5	0.2	8/17
1.4	0.3	8/29
1.4	0.3	8/31
1.3	0.2	9/07
1.4	0.2	9/07
1.3	0.2	9/07
1.2	0.2	9/07
1.3	0.2	9/07
1.2	0.2	9/07
1.3	0.2	9/07
1.3	0.2	9/07
1.3	0.2	9/07
1.3	0.2	9/07
1.4	0.2	9/07
1.4	0.2	9/07
1.4	0.2	9/07
1.4	0.3	9/09
1.1	0.2	9/15
1.4	0.2	9/15
1.5	0.3	10/07
1.4	0.3	10/13
1.5	0.3	10/13
1.5	0.3	10/13
1.7	0.2	10/31

****

NBS 1643A Trace Elements in Water

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Ag 80NBS 01 ICPMS

CV = 2.8 ± 0.3 ug/L

Result	± Uncer.	Date
2.5	0.4	12/08

As 80NBS 01 ICPMS

CV = 76. ± 7. ug/L

Result	± Uncer.	Date
85.	8.	12/15
77.	8.	12/16

TABLE C-V (cont)

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NBS 1643A Trace Elements in Water (cont)

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Ba 80NBS 01 ICPMS

CV = 46. ± 2. ug/L

Result	± Uncer.	Date
46.	0.2	12/08
50.	5.	12/14

Cd 80NBS 01 ICPMS

CV = 10. ± 1. ug/L

Result	± Uncer.	Date
10.	0.1	12/08
11.	1.	12/14

Cr 80NBS 01 ICPMS

CV = 17. ± 2. ug/L

Result	± Uncer.	Date
16.	0.5	12/08
20.	2.	12/14

Cu 80NBS 01 ICPMS

CV = 18. ± 2. ug/L

Result	± Uncer.	Date
18.	2.	12/15
14.	1.	12/16

Mn 80NBS 01 ICPMS

CV = 31. ± 2. ug/L

Result	± Uncer.	Date
28.	3.	12/08
24.	4.	12/15

Na 84GLA 12 ICPMS

CV = 9.2 ± 0.4 mg/L

Result	± Uncer.	Date
8.39	0.05	12/08

Pb 80NBS 01 ICPMS

CV = 27. ± 1. ug/L

Result	± Uncer.	Date
24.	2.	5/06
28.	1.	12/08
26.	3.	12/16

Zn 80NBS 01 ICPMS

CV = 72. ± 4. ug/L

Result	± Uncer.	Date
70.	10.	12/15
67.	7.	12/16

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NBS 1643b Trace Elements in Water

****

Ag 84NBS 05 ETVAA

CV = 9.8 ± 0.8 ug/L

Result	± Uncer.	Date
11.	1.	2/26

Ag 84NBS 05 ICPMS

CV = 9.8 ± 0.8 ug/L

Result	± Uncer.	Date
6.	3.	2/19
6.	3.	2/19
12.	2.	3/02
11.	1.	3/04
10.	1.	3/08
10.	1.	3/08
8.	10.	3/16
12.	1.	3/18
10.	1.	3/28
10.	1.	6/23
11.	1.	6/28
8.	1.	7/01
8.	1.	7/01
11.	1.	7/07
11.	1.	7/07
10.	1.	8/29
11.	1.	8/29
12.	1.	8/31
10.	1.	10/13
8.	1.	10/13
10.	0.3	12/08
10.	0.1	12/08
9.	1.	12/14
9.	1.	12/14

As 84NBS 05 ETVAA

CV = 49. ug/L

Result	± Uncer.	Date
50.	5.	6/07
60.	10.	7/18
60.	10.	7/18
60.	10.	7/18
60.	10.	7/18
60.	10.	7/18
60.	10.	7/24
60.	10.	10/12
60.	10.	10/12
60.	10.	10/12
60.	10.	10/12

As 84NBS 05 ICPMS

CV = 49. ug/L

Result	± Uncer.	Date
58.	6.	1/04
58.	6.	1/04
54.	5.	1/04
56.	6.	1/04
57.	6.	1/05
59.	6.	1/05
55.	6.	1/20
56.	6.	1/26
54.	5.	1/26
58.	0.3	2/01
60.	2.	2/01
57.	2.	2/02
61.	2.	2/02
57.	2.	2/03
62.	4.	2/03
66.	7.	2/22
68.	4.	2/22
56.	6.	2/26
58.	6.	2/26
60.	6.	2/26
56.	6.	2/26
48.	5.	3/02
47.	5.	3/02
54.	5.	3/03
56.	6.	3/03
57.	10.	3/07
52.	5.	3/08
53.	5.	3/08
53.	5.	3/18
53.	5.	3/18
48.	5.	3/18
52.	5.	3/28
52.	5.	3/28
53.	5.	4/13
50.	5.	4/13
57.	6.	4/15
30.	15.	4/28
59.	6.	5/11
57.	6.	5/11
55.	6.	5/11
54.	5.	5/26
57.	6.	5/26
55.	6.	5/26
49.	5.	6/02
58.	6.	6/02

TABLE C-V (cont)

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NBS 1643b Trace Elements
in Water (cont)

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As (cont)

61.	6.	6/21
53.	5.	6/23
60.	6.	6/23
62.	6.	6/28
67.	7.	6/28
56.	6.	7/01
59.	6.	7/01
59.	6.	7/01
61.	6.	7/01
56.	8.	7/07
60.	10.	7/07
49.	1.	7/19
56.	7.	7/19
63.	6.	8/11
63.	6.	8/11
54.	5.	8/29
57.	3.	8/29
56.	6.	8/31
55.	6.	9/22
52.	5.	9/22
60.	6.	10/13
56.	6.	12/15
50.	5.	12/15
54.	5.	12/15
51.	5.	12/16
52.	5.	12/16

B 84NBS 05 ICPMS

CV = 94. ug/L

Result	± Uncer.	Date
80.	9.	2/19
100.	10.	2/22
100.	10.	2/26
100.	10.	3/02

Ba 84NBS 05 ICPMS

CV = 44. ± 2. ug/L

Result	± Uncer.	Date
46.	5.	1/04
45.	4.	1/04
47.	5.	1/04
44.	4.	1/04
44.	4.	1/04
45.	4.	1/04
42.	4.	1/05
40.	4.	1/05
45.	4.	1/19
52.	5.	1/19
43.	4.	1/20
44.	2.	1/26
40.	0.1	1/26
44.	2.	2/01
46.	3.	2/01
48.	0.4	2/02

Ba (cont)

43.	0.4	2/02
46.	1.	2/02
47.	1.	2/02
49.	5.	2/03
48.	5.	2/03
51.	5.	2/23
48.	5.	2/23
47.	5.	2/23
39.	4.	3/01
44.	5.	3/01
48.	5.	3/02
44.	4.	3/02
40.	4.	3/03
41.	4.	3/03
42.	4.	3/07
43.	4.	3/08
44.	4.	3/08
44.	4.	3/18
41.	4.	3/28
41.	4.	4/05
41.	4.	4/05
41.	4.	4/05
49.	5.	4/05
41.	4.	4/05
43.	4.	4/05
46.	5.	4/13
44.	4.	4/13
44.	4.	4/15
40.	4.	4/15
38.	4.	4/28
41.	4.	4/28
44.	4.	5/06
40.	4.	5/06
40.	4.	5/06
44.	4.	5/06
38.	4.	5/06
38.	4.	5/06
42.	4.	5/11
41.	4.	5/11
43.	4.	5/11
44.	4.	5/26
43.	4.	5/26
44.	4.	5/26
43.	4.	5/31
39.	4.	6/02
41.	4.	6/02
42.	4.	6/22
41.	4.	6/22
39.	4.	6/22
45.	4.	6/24
42.	2.	6/24
43.	1.	6/28
43.	0.5	6/28
42.	4.	7/01
43.	4.	7/01
41.	4.	7/01
40.	4.	7/01
44.	0.5	7/07
43.	2.	7/07
44.	1.	7/11
43.	0.5	7/11
43.	2.	7/11
44.	2.	7/11
45.	4.	7/25
48.	5.	7/25
46.	2.	8/11
48.	2.	8/11
43.	4.	8/18
43.	4.	8/29

Ba (cont)

47.	1.	8/29
41.	4.	10/13
42.	4.	10/13
42.	4.	12/06
40.	4.	12/06
43.	4.	12/06
40.	4.	12/06
44.	4.	12/06
44.	0.5	12/08
44.	1.	12/08
48.	5.	12/14
50.	5.	12/14

Be 84NBS 05 ETVAA

CV = 19. ± 2. ug/L

Result	± Uncer.	Date
20.	4.	8/30
21.	4.	8/30
20.	4.	8/30
20.	4.	8/30
19.	4.	8/30
21.	4.	8/30
20.	4.	8/30
20.	4.	8/30
21.	4.	8/30
19.	4.	8/30
20.	4.	8/30
20.	4.	8/30
20.	4.	8/30
21.	4.	8/30
20.	4.	8/30
20.	4.	8/30
20.	4.	8/30
19.	4.	8/30
20.	4.	8/30
19.	4.	8/30
20.	4.	8/30
19.	4.	8/30
21.	4.	8/30
21.	4.	8/30
19.	4.	8/30
19.	4.	8/30
20.	4.	8/30
20.	4.	8/30

Be 84NBS 05 ICPMS

CV = 19. ± 2. ug/L

Result	± Uncer.	Date
22.	2.	1/04
18.	2.	1/04
20.	2.	1/04
19.	2.	1/04
19.	2.	1/05
22.	2.	1/05
20.	1.	1/26
20.	0.3	1/26
25.	2.	2/01
19.	0.2	2/01
20.	2.	2/03
23.	2.	2/19

TABLE C-V (cont)

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NBS 1643b Trace Elements
in Water (cont)

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Be (cont)

23.	3.	2/19
24.	2.	2/22
20.	2.	2/26
22.	2.	2/26
23.	2.	2/26
23.	2.	2/26
19.	2.	3/02
22.	2.	3/03
21.	2.	3/03
22.	2.	3/07
22.	4.	3/07
22.	4.	3/07
21.	2.	3/18
20.	2.	3/18
23.	2.	3/18
19.	3.	3/24
19.	3.	3/24
17.	2.	3/24
19.	2.	3/28
16.	2.	4/05
22.	2.	4/06
18.	2.	4/06
19.	2.	4/13
19.	2.	4/14
22.	2.	6/23
21.	2.	6/23
18.	2.	6/23
20.	2.	6/23
19.	2.	6/23
19.	2.	6/23
19.	2.	6/23
19.	2.	6/23
18.	2.	6/23
18.	2.	6/23
18.	2.	6/27
20.	2.	6/27
12.	6.	6/28
23.	2.	6/28
19.	2.	7/01
16.	2.	7/01
22.	2.	7/01
22.	2.	7/01
14.	4.	7/06
16.	4.	7/06
19.	0.5	7/08
20.	1.	7/08
20.	2.	8/26
22.	3.	8/26
19.	1.	8/29
14.	5.	9/22
14.	5.	9/22
22.	2.	9/23
22.	3.	9/23
15.	3.	9/23
15.	2.	9/23

Bi 84NBS 05 ICPMS

CV = 11. ug/L

Result	± Uncer.	Date
11.	1.	3/03
10.	1.	3/03
11.	1.	3/18
11.	1.	3/28

Cd 84NBS 05 ETVAA

CV = 20. ± 1. ug/L

Result	± Uncer.	Date
21.	4.	9/19
18.	4.	11/03
20.	4.	11/03

Cd 84NBS 05 ICPMS

CV = 20. ± 1. ug/L

Result	± Uncer.	Date
21.	2.	1/04
22.	2.	1/04
20.	2.	1/04
21.	2.	1/04
20.	2.	1/05
22.	2.	1/05
24.	1.	1/19
19.	0.2	1/19
19.	2.	1/20
19.	2.	1/20
22.	0.3	2/03
23.	1.	2/03
23.	2.	2/26
21.	2.	2/26
21.	2.	2/26
22.	2.	3/02
20.	2.	3/03
20.	2.	3/03
20.	2.	3/04
20.	2.	3/08
20.	2.	3/08
20.	2.	3/16
23.	2.	3/16
16.	2.	3/18
19.	2.	3/18
21.	2.	3/18
20.	2.	3/28
19.	2.	4/13
21.	2.	4/13
22.	2.	4/15
22.	2.	4/15
20.	2.	5/11
20.	2.	5/11
19.	2.	5/11
18.	2.	5/26
18.	2.	5/26
18.	2.	5/26
20.	2.	6/02
18.	2.	6/02
20.	2.	6/23
20.	2.	6/23
20.	2.	6/28

Cd (cont)

22.	2.	6/28
20.	2.	7/01
21.	2.	7/01
18.	2.	7/01
20.	2.	7/01
19.	1.	7/07
19.	1.	7/07
21.	1.	7/08
18.	2.	7/08
21.	2.	7/18
21.	1.	7/18
20.	2.	8/11
20.	1.	8/11
22.	2.	8/29
20.	1.	8/29
19.	2.	8/31
20.	2.	10/13
21.	0.1	12/08
20.	0.1	12/08
20.	2.	12/14
22.	2.	12/14

Co 84NBS 05 ICPMS

CV = 26. ± 1. ug/L

Result	± Uncer.	Date
30.	3.	1/04
28.	3.	1/04
26.	3.	1/04
29.	3.	1/04
27.	3.	1/04
27.	3.	1/04
26.	3.	1/05
27.	3.	1/05
23.	2.	3/02
28.	3.	3/03
28.	3.	3/03
30.	3.	3/18
28.	3.	3/28
27.	4.	8/29
28.	2.	8/29
29.	3.	8/31
28.	3.	10/13
31.	3.	10/13

Cr 84NBS 05 ETVAA

CV = 18.6 ± 0.4 ug/L

Result	± Uncer.	Date
22.	2.	5/25
22.	2.	5/26
17.	3.	7/18
16.	3.	11/03
16.	3.	11/03
17.	3.	11/03
16.	3.	11/03
14.	3.	11/03
15.	3.	11/03

TABLE C-V (cont)

****

NBS 1643b Trace Elements
in Water (cont)

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Cr 84NBS 05 ICPMS

CV = 18.6 ± 0.4 ug/L

Result	± Uncer.	Date
18.	2.	1/04
20.	2.	1/04
19.	2.	1/04
20.	2.	1/04
18.	2.	1/05
19.	2.	1/05
19.	1.	1/26
17.	0.5	1/26
18.	0.1	2/01
19.	0.4	2/01
18.	0.3	2/02
19.	1.	2/02
21.	3.	2/03
21.	3.	2/03
20.	2.	2/19
18.	2.	2/19
17.	2.	2/19
15.	2.	2/19
18.	2.	2/19
18.	2.	2/19
18.	2.	2/19
19.	2.	2/19
18.	2.	2/19
18.	2.	2/26
19.	2.	2/26
21.	2.	2/26
17.	2.	3/01
17.	2.	3/01
18.	2.	3/03
20.	2.	3/03
22.	2.	3/07
20.	2.	3/08
20.	2.	3/08
19.	2.	3/18
19.	2.	3/18
20.	2.	3/18
18.	2.	3/28
22.	2.	4/15
19.	2.	4/15
17.	2.	5/11
17.	2.	5/11
18.	2.	5/11
19.	2.	6/02
18.	2.	6/23
20.	2.	6/23
20.	2.	6/27
23.	2.	6/27
18.	2.	7/01
17.	2.	7/01
18.	2.	7/01
17.	2.	7/01
17.	2.	7/01
17.	2.	7/01
17.	2.	7/01
17.	2.	7/01
18.	1.	7/06
20.	1.	7/06
17.	1.	7/18

Cr (cont)

18.	2.	7/18
21.	2.	8/11
22.	4.	8/11
18.	2.	8/29
19.	1.	8/29
21.	2.	8/31
21.	2.	10/13
19.	2.	10/13
18.	0.2	12/08
17.	1.	12/08
18.	2.	12/14

Cu 84NBS 05 FAA

CV = 21.9 ± 0.4 ug/L

Result	± Uncer.	Date
23.	2.	11/03
22.	2.	11/03
22.	2.	11/03
22.	2.	11/03
22.	2.	11/03

Cu 84NBS 05 ICPMS

CV = 21.9 ± 0.4 ug/L

Result	± Uncer.	Date
18.	2.	1/04
23.	2.	1/04
18.	2.	1/04
19.	2.	1/04
18.	2.	1/05
21.	2.	1/26
20.	1.	1/26
21.	0.3	2/01
22.	0.1	2/01
23.	1.	2/02
21.	1.	2/02
19.	2.	2/02
21.	2.	2/02
25.	2.	2/22
17.	2.	2/22
19.	2.	3/02
23.	2.	3/03
22.	2.	3/03
22.	2.	3/07
24.	2.	3/18
22.	2.	6/23
20.	2.	6/23
24.	2.	6/27
22.	0.5	6/27
18.	4.	7/07
19.	3.	7/07
21.	1.	7/11
20.	1.	7/11
21.	1.	7/11
20.	1.	7/11
18.	4.	7/19
19.	4.	7/19
22.	1.	8/11
22.	1.	8/11
18.	2.	8/29
18.	2.	8/29
19.	2.	8/29

Cu (cont)

23.	2.	8/31
21.	2.	10/13
20.	2.	10/13
20.	2.	11/08
24.	2.	11/08
23.	2.	11/08
21.	2.	11/30
22.	2.	11/30
24.	2.	11/30
21.	2.	12/08
20.	2.	12/08
19.	2.	12/08
17.	2.	12/15
19.	2.	12/15
19.	2.	12/16
18.	2.	12/16
24.	2.	12/21
25.	2.	12/23

Fe 84NBS 05 ETVAA

CV = 99. ± 8. ug/L

Result	± Uncer.	Date
91.	9.	1/26
95.	10.	1/26
78.	8.	1/26
100.	10.	2/09
110.	10.	2/09
110.	10.	2/10
110.	10.	2/10
100.	10.	2/10
95.	10.	9/26
96.	10.	9/26
97.	10.	9/26
100.	10.	9/26
99.	10.	9/26
96.	10.	9/26
89.	9.	9/26
110.	10.	9/26
100.	10.	9/26
110.	10.	9/26

Fe 84NBS 05 FAA

CV = 99. ± 8. ug/L

Result	± Uncer.	Date
100.	10.	1/21
120.	10.	1/21
120.	10.	1/21
110.	10.	1/22
110.	10.	1/22
140.	10.	1/22
110.	10.	1/22
110.	10.	1/22
110.	10.	11/03
110.	10.	11/03
110.	10.	11/03
110.	10.	11/03
110.	10.	11/03

TABLE C-V (cont)

****

NBS 1643b Trace Elements
in Water (cont)

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Fe 84NBS 05 ICPES

CV = 99. ± 8. ug/L

Result	± Uncer.	Date
120.	10.	12/23
120.	10.	12/23

Fe 84NBS 05 ICPMS

CV = 99. ± 8. ug/L

Result	± Uncer.	Date
90.	9.	1/20
100.	10.	3/03
100.	10.	3/03
120.	10.	3/04
120.	10.	3/04

Mn 84NBS 05 ICPMS

CV = 28. ± 2. ug/L

Result	± Uncer.	Date
32.	3.	1/04
33.	3.	1/04
30.	3.	1/04
31.	3.	1/04
33.	3.	1/05
33.	1.	1/15
28.	3.	1/20
31.	1.	1/26
31.	1.	1/26
31.	1.	2/02
33.	0.4	2/02
25.	3.	3/02
30.	3.	3/03
30.	3.	3/03
31.	3.	3/04
34.	3.	3/18
31.	3.	3/28
30.	3.	6/02
25.	3.	6/02
33.	3.	6/23
32.	3.	6/23
35.	4.	6/27
32.	3.	6/27
28.	5.	7/06
28.	2.	7/06
29.	1.	7/18
28.	1.	7/18
34.	6.	8/11
34.	6.	8/11
28.	4.	8/29
31.	3.	8/29
35.	4.	8/31
30.	3.	10/13
33.	3.	10/13
28.	3.	12/08

Mn (cont)

26.	2.	12/08
22.	3.	12/15
23.	3.	12/15
23.	3.	12/15

Mo 84NBS 05 ICPMS

CV = 85. ± 3. ug/L

Result	± Uncer.	Date
100.	10.	1/04
100.	10.	1/04
104.	6.	1/05
100.	10.	1/05
103.	1.	1/15
98.	1.	1/15
96.	0.2	1/26
91.	9.	1/26
100.	10.	2/02
103.	4.	2/02
100.	10.	2/02
100.	10.	2/02
103.	0.3	2/02
103.	4.	2/02
110.	15.	2/23
110.	15.	2/23
110.	15.	2/23
93.	9.	3/02
100.	10.	3/03
100.	10.	3/07
100.	10.	4/14
100.	10.	4/14
100.	10.	6/23
100.	10.	6/23
100.	20.	6/28
100.	20.	6/28
100.	20.	6/28
100.	15.	7/07
100.	10.	7/07
110.	20.	7/08
100.	10.	7/08
100.	20.	7/25
94.	9.	7/25

Ni 84NBS 05 ICPMS

CV = 49. ± 3. ug/L

Result	± Uncer.	Date
43.	4.	1/04
42.	4.	1/04
47.	5.	1/04
41.	4.	1/04
43.	4.	1/05
45.	4.	1/05
44.	4.	1/20
42.	0.4	1/26
47.	2.	1/26
49.	1.	2/01
48.	2.	2/01
48.	1.	2/02
44.	3.	2/02
46.	3.	2/03
48.	2.	2/03
56.	6.	2/22

Ni (cont)

49.	4.	2/22
55.	6.	2/22
53.	5.	2/23
51.	5.	3/03
50.	5.	3/03
51.	5.	3/04
51.	5.	3/04
46.	5.	3/08
49.	5.	3/08
52.	5.	3/18
50.	5.	3/28
41.	5.	4/15
54.	5.	5/26
49.	5.	5/26
51.	5.	5/26
48.	5.	6/02
54.	5.	6/02
46.	4.	7/19
40.	10.	7/19
51.	5.	8/31
58.	6.	11/10
57.	6.	11/30
48.	5.	11/30
50.	5.	11/30
58.	5.	12/02
52.	5.	12/08
49.	5.	12/08
45.	4.	12/08
55.	6.	12/21
49.	5.	12/23

Pb 84NBS 05 ETVAA

CV = 23.7 ± 0.7 ug/L

Result	± Uncer.	Date
24.	2.	5/19
23.	2.	5/19
24.	2.	5/19
23.	2.	5/19
20.	4.	5/26
20.	4.	5/26
30.	6.	9/19
22.	5.	11/03
24.	5.	11/03

Pb 84NBS 05 ICPMS

CV = 23.7 ± 0.7 ug/L

Result	± Uncer.	Date
28.	3.	1/04
24.	2.	1/04
23.	2.	1/04
27.	3.	1/04
27.	3.	1/04
28.	3.	1/04
22.	2.	1/05
25.	2.	1/05
25.	0.5	1/19
22.	0.2	1/26
22.	0.3	1/26
29.	3.	2/01
24.	2.	2/01
30.	0.4	2/02

TABLE C-V (cont)

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NBS 1643b Trace Elements
in Water (cont)

****

Pb (cont)

27.	0.1	2/02
24.	2.	2/19
27.	3.	2/19
27.	3.	2/19
26.	3.	2/23
28.	3.	2/23
27.	3.	2/26
25.	3.	3/01
25.	3.	3/01
22.	2.	3/03
23.	2.	3/03
23.	2.	3/04
25.	3.	3/07
24.	2.	3/08
22.	2.	3/08
25.	2.	3/18
21.	2.	3/18
25.	3.	3/24
23.	2.	3/28
23.	2.	4/05
24.	2.	4/06
21.	2.	4/06
24.	2.	4/13
24.	2.	4/13
24.	2.	4/13
24.	2.	4/13
26.	3.	4/14
26.	3.	4/14
27.	3.	4/14
26.	3.	4/14
27.	3.	4/15
26.	3.	4/15
21.	2.	5/06
24.	2.	5/11
25.	3.	5/11
25.	3.	5/11
25.	2.	5/26
25.	2.	5/26
25.	2.	5/26
24.	2.	6/02
24.	2.	6/02
25.	3.	6/21
23.	2.	6/21
24.	2.	6/23
22.	2.	6/23
26.	3.	6/23
22.	2.	6/23
22.	2.	6/23
25.	2.	6/23
24.	2.	6/23
25.	2.	6/23
23.	2.	6/23
22.	2.	6/23
26.	3.	6/23
24.	2.	6/23
22.	2.	6/24
22.	1.	6/24
23.	3.	6/24
22.	2.	6/28
26.	3.	6/28
26.	3.	6/28
24.	0.2	6/28

Pb (cont)

24.	2.	7/01
23.	2.	7/01
24.	2.	7/01
24.	2.	7/01
24.	2.	7/01
24.	2.	7/01
24.	2.	7/01
23.	2.	7/01
23.	2.	7/01
25.	3.	7/01
23.	2.	7/01
23.	2.	7/01
26.	3.	7/07
24.	0.2	7/07
25.	2.	7/11
24.	0.5	7/11
23.	2.	8/11
22.	2.	8/11
21.	2.	8/19
22.	2.	8/26
26.	3.	8/26
25.	3.	8/29
22.	2.	9/22
24.	3.	9/23
22.	2.	9/23
22.	2.	9/23
22.	3.	9/23
24.	3.	9/23
26.	3.	9/23
23.	2.	10/13
24.	2.	11/08
21.	2.	11/08
24.	2.	11/08
22.	2.	11/08
24.	2.	11/30
25.	2.	11/30
27.	3.	11/30
23.	2.	11/30
27.	0.4	12/08
29.	0.1	12/08
26.	3.	12/08
25.	2.	12/08
27.	3.	12/08
22.	2.	12/16
22.	2.	12/16
22.	2.	12/16
22.	2.	12/16
21.	2.	12/16
23.	2.	12/21
22.	2.	12/23

Se 84NBS 05 ETVAA

CV = 9.7 ± 0.5 ug/L

Result	± Uncer.	Date
10.	2.	2/17
10.	2.	2/17
10.	2.	2/17
9.	2.	2/17
9.	2.	2/17
10.	2.	2/17
10.	2.	2/17
10.	2.	2/17
10.	2.	2/17
10.	2.	2/17
9.	2.	2/17

Se (cont)

9.	2.	6/07
10.	2.	7/18
10.	2.	7/18
10.	2.	7/18
10.	2.	7/18
10.	2.	7/24
7.	2.	9/06
7.	2.	9/06
10.	2.	10/12
10.	2.	10/12
10.	2.	10/12
10.	2.	10/12

Se 84NBS 05 ICPES

CV = 9.7 ± 0.5 ug/L

Result	± Uncer.	Date
10.	1.	12/23
10.	1.	12/23

Se 84NBS 05 ICPMS

CV = 9.7 ± 0.5 ug/L

Result	± Uncer.	Date
10.	1.	2/03
11.	1.	2/19
12.	2.	2/19
10.	1.	3/02
8.	2.	3/03
10.	1.	3/08
11.	1.	3/18
10.	1.	3/28
12.	2.	4/15
9.	1.	4/15
13.	2.	5/11
10.	2.	5/11
7.	2.	5/11
8.	1.	6/02
11.	1.	7/01
17.	4.	7/01
7.	2.	7/01

Sr 84NBS 05 ICPMS

CV = 227. ± 6. ug/L

Result	± Uncer.	Date
230.	20.	3/02
220.	20.	3/02
230.	20.	3/03
230.	20.	3/03
250.	20.	3/18
230.	20.	3/28

TABLE C-V (cont)

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NBS 1643b Trace Elements
in Water (cont)

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Tl 84NBS 05 ETVAA

CV = 8. ± 0.2 ug/L

Result	± Uncer.	Date
7.5	1.5	7/24
7.0	1.5	7/24
7.0	1.5	7/29
7.0	1.5	7/29
7.5	1.5	7/29
8.0	1.0	10/17
8.0	1.5	11/15
10.5	2.0	11/15
9.0	2.0	11/15
7.5	1.5	11/15
6.5	1.5	11/15
5.0	2.0	11/29
6.0	2.0	11/29
5.0	2.0	11/29
6.0	2.0	11/29
7.0	2.0	11/29

Tl 84NBS 05 FAA

CV = 8. ± 0.2 ug/L

Result	± Uncer.	Date
6.	2.	11/15
8.	2.	11/15
7.	2.	11/15
8.	2.	11/15
7.	2.	11/15
10.	2.	11/15
7.	2.	11/15
9.	2.	11/15

Tl 84NBS 05 ICPMS

CV = 8. ± 0.2 ug/L

Result	± Uncer.	Date
10.	1.	1/04
9.	1.	1/04
8.	1.	1/04
9.	1.	1/05
8.	1.	1/05
8.	1.	1/19
8.	1.	1/26
8.	0.3	1/26
8.	0.01	2/01
10.	1.	2/01
9.	0.5	2/02
10.	0.1	2/02
11.	0.1	2/03
9.	0.4	2/03
6.	2.	3/02
8.	1.	3/03
7.	1.	3/03
8.	0.1	3/14

Tl (cont)

8.	1.	3/18
8.	1.	3/28
7.	1.	4/15
7.	1.	4/15
9.	1.	6/14
10.	1.	6/14
9.	1.	6/22
8.	1.	6/22
7.	1.	6/22
8.	1.	6/24
8.	0.03	6/24
8.	1.	6/28
8.	1.	6/28
9.	1.	7/07
8.	0.4	7/07
8.	0.4	7/11
9.	0.4	7/11
8.	0.4	7/11
9.	1.	7/11
8.	1.	8/18
8.	1.	8/29
10.	1.	8/29
8.	1.	8/31
9.	1.	9/22
7.	1.	9/22
5.	1.	10/13
9.	1.	10/13
8.	1.	12/06
9.	1.	12/06
9.	1.	12/06
9.	1.	12/06
9.	1.	12/06

V 84NBS 05 ICPMS

CV = 45.2 ± 0.4 ug/L

Result	± Uncer.	Date
51.	5.	1/04
47.	5.	1/04
49.	5.	1/04
50.	5.	1/04
52.	5.	1/05
49.	5.	1/05
53.	1.	1/15
40.	4.	1/20
49.	5.	3/03
49.	5.	3/03
51.	5.	3/18

Zn 84NBS 05 FAA

CV = 66. ± 2. ug/L

Result	± Uncer.	Date
74.	7.	11/03
73.	7.	11/03

Zn 84NBS 05 ICPMS

CV = 66. ± 2. ug/L

Result	± Uncer.	Date
74.	7.	1/04
74.	7.	1/04
69.	7.	1/04
65.	6.	1/04
68.	7.	1/05
67.	7.	1/05
67.	5.	1/15
74.	1.	1/15
76.	8.	1/20
66.	2.	1/26
64.	1.	1/26
74.	2.	2/02
67.	1.	2/02
70.	2.	2/02
68.	1.	2/02
72.	4.	2/02
68.	0.1	2/02
61.	6.	3/02
65.	7.	3/02
68.	7.	3/03
67.	7.	3/03
66.	7.	3/07
74.	7.	3/18
70.	7.	3/28
71.	7.	6/02
62.	6.	6/02
71.	7.	6/02
64.	6.	6/02
63.	6.	6/23
59.	6.	6/23
65.	6.	6/28
64.	3.	6/28
64.	6.	7/01
71.	7.	7/01
65.	6.	7/01
64.	6.	7/01
62.	6.	7/01
71.	7.	7/01
62.	6.	7/01
65.	6.	7/01
56.	10.	7/07
59.	7.	7/07
72.	7.	7/08
73.	7.	7/08
62.	6.	7/18
62.	6.	7/18
66.	7.	8/11
60.	6.	8/11
66.	7.	8/29
64.	7.	8/29
74.	7.	8/31
69.	10.	12/15
68.	7.	12/15
51.	5.	12/15
69.	7.	12/16
68.	7.	12/16

TABLE C-V (cont)

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NBS 1645 River Sediment

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Al 82NBS 11 ATNA

CV = 2.26 ± 0.04 %

Result	± Uncer.	Date
2.4	0.1	3/03
2.7	0.2	9/30
2.5	0.2	9/30
2.6	0.2	9/30
2.4	0.1	9/30
2.2	0.1	9/30
2.6	0.1	9/30
2.8	0.1	10/20

Ba 87GLA 01 ATNA

CV = 374. ± 26. ug/g

Result	± Uncer.	Date
310.	60.	3/03
280.	50.	9/30
300.	60.	9/30
280.	40.	9/30
290.	50.	9/30
330.	60.	9/30
350.	60.	9/30
420.	70.	10/20

Ba 87GLA 01 ICPMS

CV = 374. ± 26. ug/g

Result	± Uncer.	Date
420.	40.	9/26

Ba 87GLA 01 ITNA

CV = 374. ± 26. ug/g

Result	± Uncer.	Date
300.	60.	3/23
330.	70.	3/23

Ca 87GLA 01 ATNA

CV = 2.6 ± 0.3 %

Result	± Uncer.	Date
3.2	0.2	3/03
2.9	0.2	9/30
3.0	0.2	9/30
3.1	0.2	9/30
3.3	0.2	9/30
3.1	0.2	9/30
3.1	0.2	9/30
3.1	0.2	10/20

Cd 82NBS 11 ICPMS

CV = 10. ± 2. ug/g

Result	± Uncer.	Date
11.	1.	4/28
12.	1.	4/28
9.	1.	4/28
7.	1.	4/28
12.	1.	4/28
12.	1.	4/28
8.	2.	4/28
7.	1.	4/28
7.	2.	4/28
8.	2.	4/28
9.	1.	4/28
9.	1.	4/28
11.	1.	4/28
7.	1.	4/28
8.	2.	4/28
10.	1.	4/28
8.	1.	4/28
9.	1.	4/28
9.	1.	4/28
11.	1.	4/28
10.	1.	4/28
10.	1.	4/28
8.	2.	4/28
10.	1.	4/28
8.	2.	4/28
10.	1.	4/28
11.	1.	4/28
8.	2.	4/28

Cl ATNA

CV = No Data Available (ug/g)

Result	± Uncer.	Date
90.	30.	3/08
120.	40.	9/30
120.	40.	9/30
40.	40.	9/30
110.	40.	9/30
80.	40.	9/30
40.	40.	9/30
100.	40.	10/20

Cu 82NBS 11 ATNA

CV = 110. ± 20. ug/g

Result	± Uncer.	Date
< 130.		10/20
< 130.		12/12

Cu 82NBS 11 ICPMS

CV = 110. ± 20. ug/g

Result	± Uncer.	Date
90.	20.	4/28
140.	30.	4/28
130.	20.	4/28

Cu (cont)

120.	20.	4/28
100.	20.	4/28
120.	20.	4/28
90.	20.	4/28
100.	20.	4/28
110.	10.	4/28
130.	30.	4/28
80.	20.	4/28
130.	30.	4/28
130.	20.	4/28
160.	30.	4/28
90.	20.	4/28
120.	10.	4/28
110.	10.	4/28
100.	20.	4/28
130.	30.	4/28
130.	20.	4/28
120.	10.	4/28
90.	20.	4/28
90.	20.	4/28
100.	10.	4/28
100.	10.	4/28
120.	20.	4/28
160.	30.	4/28
190.	60.	4/28
120.	10.	4/28
160.	30.	4/28
110.	10.	9/26
110.	10.	11/08
90.	10.	11/30
90.	10.	11/30
120.	10.	11/30
140.	30.	12/23

Cu 82NBS 11 ITNA

CV = 110. ± 20. ug/g

Result	± Uncer.	Date
120.	10.	3/23

Dy 87GLA 01 ATNA

CV = 2. ug/g

Result	± Uncer.	Date
1.3	0.2	3/03
< 3.9		9/30
< 4.7		9/30
1.0	0.2	9/30
< 4.7		9/30
7.	2.	9/30
0.7	0.2	9/30
1.1	0.2	10/20

Eu 87GLA 01 ATNA

CV = 500. ng/g

Result	± Uncer.	Date
< 650.		9/30
< 640.		9/30
< 660.		9/30

TABLE C-V (cont)

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NBS 1645 River Sediment
(cont)

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Eu (cont)

< 890.		9/30
< 900.		9/30
< 870.		9/30
600.	200.	10/20

F 88GLA 02 ISE

CV = 1500. ± 200. ug/g

Result	± Uncer.	Date
2000.	200.	8/11
1600.	200.	8/11
2000.	200.	8/11
1900.	200.	8/11

Ga 87GLA 01 ATNA

CV = 41. ± 20. ug/g

Result	± Uncer.	Date
< 40.		3/03
< 41.		9/30
< 42.		9/30
< 40.		9/30
< 58.		9/30
< 57.		9/30
< 58.		9/30

I ATNA

CV = No Data Available (ug/g)

Result	± Uncer.	Date
< 21.		9/30
< 16.		9/30
< 21.		9/30
< 15.		9/30
< 21.		9/30
< 16.		9/30
< 15.		10/20

In 87GLA 01 ATNA

CV = < 790. ng/g

Result	± Uncer.	Date
280.	50.	3/03
300.	60.	9/30
310.	40.	9/30
210.	50.	9/30
250.	50.	9/30
290.	60.	9/30
< 170.		9/30
340.	50.	10/20

K 82NBS 11 ATNA

CV = 1.26 ± 0.05 %

Result	± Uncer.	Date
1.2	0.2	3/03
1.3	0.2	9/30
0.9	0.2	9/30
1.3	0.1	9/30
1.3	0.2	9/30
1.1	0.2	9/30
1.3	0.2	9/30
1.1	0.2	10/20

Mg 82NBS 11 ATNA

CV = 7400. ± 200. ug/g

Result	± Uncer.	Date
7000.	1000.	3/03
7000.	1000.	9/30
11000.	1500.	9/30
8000.	1500.	9/30
7000.	1000.	9/30
7400.	100.	9/30
10000.	1000.	9/30
4900.	800.	10/20

Mn 82NBS 11 ATNA

CV = 780. ± 100. ug/g

Result	± Uncer.	Date
820.	40.	3/03
710.	30.	9/30
740.	30.	9/30
720.	30.	9/30
720.	30.	9/30
720.	30.	9/30
730.	30.	9/30
810.	40.	10/20

Na 82NBS 11 ATNA

CV = 5400. ± 100. ug/g

Result	± Uncer.	Date
5200.	200.	3/03
5700.	200.	9/30
5700.	200.	9/30
5600.	200.	9/30
5700.	200.	9/30
5600.	200.	9/30
5600.	200.	9/30
5200.	200.	10/20

Ni 82NBS 11 ICPMS

CV = 45.8 ± 2.9 ug/g

Result	± Uncer.	Date
37.	9.	4/28
37.	9.	4/28

Ni (cont)

35.	7.	4/28
36.	9.	4/28
30.	30.	4/28
52.	5.	4/28
35.	9.	4/28
45.	4.	4/28
37.	8.	4/28
35.	9.	4/28
20.	20.	4/28
54.	5.	4/28
49.	5.	4/28
51.	5.	4/28
44.	4.	4/28
38.	8.	4/28
35.	7.	4/28
60.	10.	4/28
60.	10.	4/28
52.	5.	4/28
80.	40.	4/28
60.	10.	4/28
43.	4.	4/28
52.	5.	4/28
40.	4.	4/28
44.	4.	11/10
46.	5.	11/10
48.	5.	11/30
53.	5.	12/23

Pb 82NBS 11 ICPMS

CV = 714. ± 28. ug/g

Result	± Uncer.	Date
760.	80.	4/28
860.	90.	4/28
900.	100.	4/28
800.	100.	4/28
740.	70.	4/28
790.	80.	4/28
900.	200.	4/28
760.	80.	4/28
760.	80.	4/28
900.	200.	4/28
810.	80.	4/28
770.	80.	4/28
760.	80.	4/28
600.	90.	4/28
730.	70.	4/28
600.	100.	4/28
790.	80.	4/28
700.	70.	4/28
790.	80.	4/28
670.	70.	4/28
600.	100.	4/28
810.	80.	4/28
800.	100.	4/28
800.	80.	4/28
800.	100.	4/28
760.	80.	4/28
780.	80.	4/28
800.	100.	4/28
900.	100.	4/28
850.	80.	4/28
770.	80.	4/28
900.	100.	4/28
770.	80.	4/28
900.	100.	4/28

TABLE C-V (cont)

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NBS 1645 River Sediment
(cont)

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Pb (cont)

800.	80.	4/28
790.	80.	9/26
640.	60.	11/30
620.	60.	11/30
600.	60.	11/30
620.	60.	12/08
750.	80.	12/23

Si 87GLA 01 AENA

CV = 23. ± 3. %

Result	± Uncer.	Date
22.	2.	6/22

Sm 87GLA 01 ATNA

CV = 1.24 ug/g

Result	± Uncer.	Date
< 2.0		3/08
< 2.3		9/30
< 1.9		9/30
< 2.3		9/30
< 2.3		9/30
< 1.9		9/30
< 1.9		9/30
< 2.0		10/20

Sr 87GLA 01 ATNA

CV = 880. ± 90. ug/g

Result	± Uncer.	Date
1000.	150.	3/03
600.	100.	9/30
800.	150.	9/30
700.	150.	9/30
500.	100.	9/30
700.	150.	9/30
700.	150.	9/30
850.	100.	10/20

Th 82NBS 11 ICPMS

CV = 1.6 ± 0.2 ug/g

Result	± Uncer.	Date
1.7	0.2	4/25
1.3	0.2	4/25
1.5	0.3	4/25
1.3	0.2	4/25
1.2	0.2	4/25
1.4	0.2	4/25
1.5	0.2	4/25

Th (cont)

1.6	0.2	4/25
1.6	0.2	4/25
1.5	0.2	4/25
1.6	0.2	4/25
1.0	0.3	4/25
1.0	0.3	4/25
0.8	0.4	4/25
0.7	0.4	4/25
0.7	0.5	4/25
0.8	0.4	4/25
1.2	0.3	4/25
1.0	0.3	4/25
1.3	0.2	4/25
1.4	0.2	4/25
0.9	0.4	4/25
0.8	0.4	4/25
1.3	0.2	4/25
1.0	0.3	4/25
1.4	0.2	4/25
1.4	0.2	4/25
1.7	0.2	4/25
1.7	0.2	4/25
1.6	0.2	4/25
1.6	0.2	4/25
1.3	0.2	4/25
1.1	0.3	9/26
1.7	0.2	11/23
0.5	0.2	12/23

Ti 87GLA 01 ATNA

CV = 500. ± 200. ug/g

Result	± Uncer.	Date
800.	150.	3/03
650.	100.	9/30
800.	150.	9/30
700.	150.	9/30
750.	150.	9/30
950.	200.	9/30
800.	200.	9/30
800.	150.	10/20

U 82NBS 11 ATNA

CV = 1.11 ± 0.05 ug/g

Result	± Uncer.	Date
1.1	0.2	10/20

U 82NBS 11 DNA

CV = 1.11 ± 0.05 ug/g

Result	± Uncer.	Date
1.2	0.1	1/31
1.2	0.1	1/31
1.2	0.1	1/31
1.1	0.2	2/01
1.1	0.2	2/01
1.1	0.2	2/01
1.2	0.1	2/06
1.2	0.1	2/06

U (cont)

1.2	0.1	2/06
1.2	0.1	3/09
1.1	0.1	3/09
1.1	0.1	3/09
1.1	0.1	3/09
1.1	0.1	3/09
1.1	0.1	3/10
1.1	0.1	3/10
1.1	0.1	3/10
1.0	0.2	3/15
1.0	0.2	3/15
1.0	0.2	3/15
1.2	0.1	3/23
1.1	0.1	3/23
1.1	0.1	3/23
1.2	0.1	3/23
1.2	0.1	3/23
1.2	0.1	3/23
1.2	0.2	4/18
1.1	0.2	5/23
1.2	0.2	5/23
1.1	0.2	5/23
1.1	0.2	6/08
1.1	0.2	6/08
1.2	0.2	6/08
1.0	0.2	7/07
1.1	0.2	7/07
1.0	0.2	7/07
1.0	0.2	7/07
1.1	0.2	7/07
1.0	0.2	7/07
1.1	0.2	8/03
1.1	0.2	8/03
1.1	0.2	8/03
1.1	0.2	10/04
1.1	0.2	10/04
1.1	0.2	10/04
1.1	0.2	10/13
1.1	0.2	10/13
1.1	0.2	10/13
1.1	0.2	10/26
1.1	0.2	10/26
1.1	0.2	10/26

U 82NBS 11 ICPMS

CV = 1.11 ± 0.05 ug/g

Result	± Uncer.	Date
1.1	0.2	4/28
1.1	0.2	4/28
1.0	0.2	4/28
1.0	0.2	4/28
1.3	0.2	4/28
1.0	0.2	4/28
0.8	0.3	4/28
1.0	0.2	4/28
0.9	0.3	4/28
0.8	0.3	4/28
1.0	0.2	4/28
1.0	0.2	4/28
1.0	0.2	4/28
1.2	0.1	4/28
0.9	0.2	4/28
1.3	0.2	4/28
1.1	0.2	4/28
1.2	0.2	4/28

TABLE C-V (cont)

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NBS 1645 River Sediment
(cont)

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U (cont)

1.2	0.2	4/28
1.0	0.2	4/28
1.3	0.2	4/28
0.9	0.2	4/28
1.3	0.2	4/28
1.0	0.2	4/28
1.2	0.2	4/28
1.2	0.2	4/28
0.8	0.3	4/28
0.8	0.1	8/05
1.0	0.1	9/26
1.0	0.1	11/10
1.1	0.1	11/10
0.9	0.1	11/23
1.0	0.1	12/23

V 82NBS 11 ATNA

CV = 23.5 ± 6.9 ug/g

Result	± Uncer.	Date
26.	2.	3/03
23.	2.	9/30
24.	2.	9/30
23.	2.	9/30
27.	2.	9/30
23.	2.	9/30
24.	2.	9/30
27.	2.	9/30
24.	2.	10/20

W 87GLA 01 ATNA

CV = 54. ug/g

Result	± Uncer.	Date
< 100.		3/03
< 140.		9/30
< 140.		9/30
< 150.		9/30
< 190.		9/30
< 190.		9/30
< 190.		9/30

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NBS 1646 Estuarine Sediment

****

Al 82NBS 01 ATNA

CV = 6.25 ± 0.2 %

Result	± Uncer.	Date
6.3	0.2	2/16
7.0	0.3	2/16
6.4	0.3	3/25
7.5	0.7	9/30
6.2	0.3	9/30
6.3	0.3	9/30
6.6	0.3	9/30
6.1	0.3	9/30
6.3	0.3	9/30
7.5	0.3	9/30
6.4	0.3	9/30
6.2	0.3	9/30

As 82NBS 01 ITNA

CV = 12. ± 1. ug/g

Result	± Uncer.	Date
15.	4.	4/04
9.	1.	4/04
15.	3.	4/04

Ba 87GLA 01 ATNA

CV = 409. ug/g

Result	± Uncer.	Date
400.	80.	2/16
480.	70.	3/25
410.	80.	9/30
320.	70.	9/30
360.	80.	9/30
210.	70.	9/30
390.	80.	9/30
360.	80.	9/30
250.	70.	9/30
350.	70.	9/30
360.	80.	9/30

Ba 87GLA 01 ITNA

CV = 409. ug/g

Result	± Uncer.	Date
410.	40.	3/23
440.	70.	3/23
430.	60.	5/06

Ca 82NBS 01 ATNA

CV = 8300. ± 300. ug/g

Result	± Uncer.	Date
8000.	1000.	2/16
8000.	1000.	3/25
8000.	1000.	9/30
10200.	1000.	9/30
9000.	1000.	9/30
9000.	1000.	9/30
10000.	1000.	9/30
8000.	1000.	9/30
9000.	1000.	9/30
8000.	1000.	9/30
9000.	1000.	9/30

Ce 87GLA 01 ITNA

CV = 80. ± 4. ug/g

Result	± Uncer.	Date
84.	4.	4/01
80.	4.	4/01
82.	4.	4/01
84.	4.	4/01
80.	4.	4/01
82.	4.	4/01
82.	6.	5/09

Cl 87GLA 01 ATNA

CV = 1.38 %

Result	± Uncer.	Date
1.3	0.1	2/16
1.7	0.1	3/25
1.5	0.1	9/30
1.7	0.1	9/30
1.4	0.1	9/30
1.3	0.1	9/30
1.8	0.1	9/30
1.7	0.1	9/30
1.5	0.1	9/30
1.5	0.1	9/30
1.4	0.1	9/30

Co 82NBS 01 ITNA

CV = 10. ± 1. ug/g

Result	± Uncer.	Date
11.2	0.8	2/26
10.7	0.7	2/26
10.3	0.7	2/26
10.6	0.7	2/26
10.8	0.7	2/26
10.6	0.7	2/26
10.7	1.1	5/06

TABLE C-V (cont)

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NBS 1646 Estuarine Sediment (cont)

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Cr 82NBS 01 ITNA

CV = 76. ± 3. ug/g

Result	± Uncer.	Date
67.	4.	4/01
66.	4.	4/01
72.	4.	4/01
71.	4.	4/01
72.	4.	4/01
74.	4.	4/01
82.	5.	5/04

Cs 87GLA 01 ITNA

CV = 3.69 ± 0.1 ug/g

Result	± Uncer.	Date
3.3	0.4	4/01
3.5	0.5	4/01
3.9	0.5	4/01
3.8	0.5	4/01
3.7	0.4	4/01
4.0	0.4	4/01
3.5	0.4	5/06

Dy 87GLA 01 ATNA

CV = 4.3 ± 2. ug/g

Result	± Uncer.	Date
4.8	0.5	2/16
5.9	0.7	3/25
4.6	0.4	9/30
4.7	0.4	9/30
4.3	0.4	9/30
3.1	0.4	9/30
5.0	0.8	9/30
4.5	0.4	9/30
5.2	0.6	9/30
4.4	0.5	9/30
4.4	0.5	9/30

Eu 87GLA 01 ITNA

CV = 1.4 ± 0.2 ug/g

Result	± Uncer.	Date
1.5	0.1	4/04
1.4	0.1	4/04
1.5	0.1	4/04
1.4	0.1	4/04
1.5	0.1	4/04
1.5	0.1	4/04
1.6	0.1	5/10

Fe 82NBS 01 ITNA

CV = 3.35 ± 0.1 %

Result	± Uncer.	Date
3.4	0.2	5/03

Ga 87GLA 01 ATNA

CV = 19. ug/g

Result	± Uncer.	Date
< 60.		2/16
< 50.		3/25
< 50.		9/30
< 50.		9/30
< 51.		9/30
< 88.		9/30
< 85.		9/30
< 87.		9/30
< 63.		9/30
< 61.		9/30
< 63.		9/30

Hf 87GLA 01 ITNA

CV = 11.2 ug/g

Result	± Uncer.	Date
11.1	0.6	4/01
10.2	0.6	4/01
11.3	0.7	4/01
11.2	0.7	4/01
11.7	0.6	4/01
10.7	0.6	4/01
11.2	0.8	5/05

I 87GLA 01 ATNA

CV = 34.2 ug/g

Result	± Uncer.	Date
37.	4.	9/30
26.	6.	9/30
35.	5.	9/30
31.	5.	9/30
34.	6.	9/30
29.	7.	9/30
37.	6.	9/30
40.	6.	9/30
33.	7.	9/30

In 88GLA 02 ATNA

CV = 60. ng/g

Result	± Uncer.	Date
< 200.		2/16
< 190.		3/25
< 230.		9/30
< 200.		9/30
< 220.		9/30

In (cont)

< 310.		9/30
< 200.		9/30
< 310.		9/30
< 210.		9/30
< 230.		9/30
< 310.		9/30

K 82NBS 01 ATNA

CV = 1.4 %

Result	± Uncer.	Date
1.8	0.2	2/16
1.9	0.3	3/25
1.9	0.2	9/30
2.1	0.3	9/30
1.7	0.2	9/30
1.9	0.3	9/30
1.8	0.3	9/30
1.9	0.2	9/30
2.0	0.2	9/30
1.8	0.2	9/30
2.2	0.2	9/30

K 82NBS 01 ITNA

CV = 1.4 %

Result	± Uncer.	Date
2.0	0.3	4/04
1.8	0.2	4/04
2.1	0.3	4/04

La 87GLA 01 ITNA

CV = 37. ± 2. ug/g

Result	± Uncer.	Date
41.	4.	4/04
39.	4.	4/04
40.	4.	4/04

Lu 87GLA 01 ITNA

CV = 380. ± 60. ng/g

Result	± Uncer.	Date
480.	40.	4/04
450.	40.	4/04
490.	40.	4/04
580.	40.	4/04
410.	40.	4/04
500.	40.	4/04

TABLE C-V (cont)

****

NBS 1646 Estuarine Sediment (cont)

****

Mg 82NBS 01 ATNA

CV = 1.09 ± 0.08 %

Result	± Uncer.	Date
1.0	0.2	2/16
1.0	0.2	3/25
0.9	0.3	9/30
0.9	0.2	9/30
1.6	0.2	9/30
1.1	0.2	9/30
1.1	0.1	9/30
0.8	0.2	9/30
1.4	0.2	9/30
1.6	0.2	9/30
1.0	0.2	9/30

Mn 82NBS 01 ATNA

CV = 375. ± 20. ug/g

Result	± Uncer.	Date
380.	20.	2/16
390.	20.	3/25
350.	20.	9/30
350.	20.	9/30
340.	20.	9/30
350.	20.	9/30
350.	20.	9/30
340.	20.	9/30
360.	20.	9/30
350.	20.	9/30
350.	20.	9/30

Na 87GLA 01 ATNA

CV = 2. ± 0.2 %

Result	± Uncer.	Date
1.93	0.07	2/16
1.96	0.07	3/25
1.96	0.07	9/30
1.97	0.07	9/30
1.99	0.07	9/30
2.03	0.07	9/30
1.98	0.07	9/30
2.02	0.07	9/30
2.03	0.07	9/30
1.99	0.07	9/30
2.00	0.07	9/30

Na 87GLA 01 ITNA

CV = 2. ± 0.2 %

Result	± Uncer.	Date
1.9	0.1	4/04
1.8	0.1	4/04
2.0	0.1	4/04

Rb 82NBS 01 ITNA

CV = 87. ug/g

Result	± Uncer.	Date
90.	10.	4/04
90.	10.	4/04
90.	10.	4/04
90.	10.	4/04
80.	10.	4/04
90.	10.	4/04
90.	10.	5/06

Sb 87GLA 01 ITNA

CV = 790. ± 200. ng/g

Result	± Uncer.	Date
500.	300.	5/06

Sc 87GLA 01 ITNA

CV = 10.8 ± 0.4 ug/g

Result	± Uncer.	Date
10.4	0.5	4/01
9.9	0.5	4/01
10.3	0.5	4/01
10.0	0.5	4/01
10.2	0.5	4/01
10.3	0.5	4/01
11.1	1.1	5/02

Si 82NBS 01 AENA

CV = 31. %

Result	± Uncer.	Date
25.	2.	6/15

Sm 87GLA 01 ATNA

CV = 6.4 ± 0.3 ug/g

Result	± Uncer.	Date
5.	2.	2/16
< 4.		3/25
< 3.6		9/30
< 3.6		9/30
< 3.3		9/30
< 3.3		9/30

Sm (cont)

7.	2.	9/30
6.	1.	9/30
< 3.2		9/30
6.	2.	9/30
< 2.8		9/30

Sm 87GLA 01 ITNA

CV = 6.4 ± 0.3 ug/g

Result	± Uncer.	Date
6.6	0.4	4/04
6.2	0.4	4/04
6.1	0.4	4/04
6.7	0.7	5/11

Sr 87GLA 01 ATNA

CV = 220. ug/g

Result	± Uncer.	Date
< 300.		2/16
< 300.		3/25
< 250.		9/30
< 260.		9/30
< 350.		9/30
< 250.		9/30
< 260.		9/30
< 260.		9/30
< 350.		9/30
< 350.		9/30
< 250.		9/30

Ta 87GLA 01 ITNA

CV = 1. ug/g

Result	± Uncer.	Date
1.3	0.3	5/09

Tb 87GLA 01 ITNA

CV = 0.95 ug/g

Result	± Uncer.	Date
1.0	0.3	5/10

Th 87GLA 01 ITNA

CV = 10. ± 0.6 ug/g

Result	± Uncer.	Date
9.6	0.5	4/04
9.9	0.6	4/04
9.2	0.5	4/04
9.6	0.5	4/04
9.6	0.5	4/04
9.2	0.5	4/04
9.9	0.5	5/04

****

NBS 1646 Estuarine Sediment (cont)

****

Ti 87GLA 01 ATNA

CV = 4200. ± 800. ug/g

Result	± Uncer.	Date
4500.	400.	2/16
5300.	700.	3/25
4400.	400.	9/30
4400.	400.	9/30
5200.	400.	9/30
4700.	700.	9/30
5000.	700.	9/30
4600.	600.	9/30
4700.	400.	9/30
4400.	400.	9/30
4700.	400.	9/30

U 87GLA 01 DNA

CV = 2.99 ± 0.06 ug/g

Result	± Uncer.	Date
3.1	0.2	1/31
3.0	0.2	1/31
3.3	0.2	1/31
3.1	0.2	3/23
3.0	0.2	3/23

V 82NBS 01 ATNA

CV = 94. ± 1. ug/g

Result	± Uncer.	Date
100.	5.	2/16
88.	4.	3/25
86.	4.	9/30
86.	4.	9/30
91.	4.	9/30
86.	4.	9/30
89.	4.	9/30
85.	6.	9/30
88.	4.	9/30
86.	6.	9/30
82.	6.	9/30

W ATNA

CV = No Data Available (ug/g)

Result	± Uncer.	Date
< 140.		2/16
< 150.		3/25
< 190.		9/30
< 180.		9/30
< 180.		9/30
< 240.		9/30

W (cont)

< 180.		9/30
< 170.		9/30
< 190.		9/30

Yb ITNA

CV = No Data Available (ug/g)

Result	± Uncer.	Date
3.2	0.4	4/04
3.2	0.4	4/04
3.0	0.4	4/04
3.3	0.4	4/04
3.5	0.4	4/04
3.2	0.4	4/04
2.7	0.3	5/10

Zn 82NBS 01 ITNA

CV = 138. ± 6. ug/g

Result	± Uncer.	Date
140.	20.	5/09

****

NBS 1c Argillaceous Limestone

****

CO2 88GLA 03 GASEV

CV = 40.1 ± 0.5 %

Result	± Uncer.	Date
42.	2.	8/02
42.	2.	8/02
44.	2.	8/02
44.	2.	8/02
42.	2.	8/02
44.	2.	8/02
42.	2.	8/02
44.	2.	8/02
43.	2.	8/02
42.	2.	8/02
44.	2.	8/02
44.	2.	8/02
42.	2.	8/02
43.	2.	8/02
44.	2.	8/02
43.	2.	8/02
43.	2.	8/02
46.	2.	8/02
43.	2.	8/02
42.	2.	8/02
43.	2.	8/02
43.	2.	8/02
45.	2.	8/02
40.	2.	8/02
46.	2.	8/02
46.	2.	8/02
44.	2.	8/02
44.	2.	8/02
42.	2.	8/02

CO2 (cont)

44.	2.	8/02
44.	2.	8/02
45.	2.	8/02
43.	2.	8/02
42.	2.	8/02
42.	2.	8/02
42.	2.	8/02
41.	2.	8/02
43.	2.	8/02
44.	2.	8/02
41.	2.	8/04
41.	2.	8/04
42.	2.	8/04
42.	2.	8/04
42.	2.	8/04

F ISE

CV = No Data Available (%)

Result	± Uncer.	Date
160.	20.	2/03

****

NBS 2677-Blank Be and As on Filter Media

****

As 86GLA 01 IENA

CV = < 10. ng/filter

Result	± Uncer.	Date
7.	6.	4/09

****

NBS 2677-I Be and As on Filter Media

****

As 85NBS 07 IENA

CV = 103. ± 5. ng/filter

Result	± Uncer.	Date
100.	20.	3/24

****

NBS 2677-II Be and As on Filter Media

****

As 85NBS 07 IENA

CV = 1.07 ± 0.05 ug/filter

Result	± Uncer.	Date
0.9	0.2	3/24

****

NBS 2677-III Be and As on Filter Media

****

As 85NBS 07 IENA

CV = 10.5 ± 0.5 ug/filter

Result	± Uncer.	Date
10.0	0.7	4/09

****

NBS 3191 Aqueous Electrolytic Conductance

****

Conductivity 87NBS 01 CB

CV = 100. ± 0.5 uS/cm

Result	± Uncer.	Date
90.	9.	8/11
90.	9.	9/21
91.	9.	9/21
92.	9.	10/27
93.	9.	10/27
95.	5.	11/16
95.	10.	11/16

****

NBS 3192 Aqueous Electrolytic Conductance

****

Conductivity 87NBS 01 CB

CV = 500. ± 0.7 uS/cm

Result	± Uncer.	Date
440.	40.	9/21
480.	50.	11/16

****

NBS 3193 Aqueous Electrolytic Conductance

****

Conductivity 87NBS 01 CB

CV = 1000. ± 1. uS/cm

Result	± Uncer.	Date
980.	100.	11/16

****

NBS 4350 Environmental Radioactivity Sediment

****

Am-241 75NBS 03 G

CV = 0.0084 pCi/g

Result	± Uncer.	Date
0.02	0.09	11/30
0.07	0.05	11/30

Co-60 75NBS 03 G

CV = 4. ± 0.22 pCi/g

Result	± Uncer.	Date
3.1	0.8	2/17
3.5	0.9	6/28

Cs-137 75NBS 03 G

CV = 2.7 ± 0.12 pCi/g

Result	± Uncer.	Date
2.4	0.4	1/13
2.5	0.4	1/13
2.4	0.4	1/13
2.5	0.4	1/13
2.5	0.4	1/13
2.0	0.4	1/13
2.4	0.4	1/28
2.4	0.4	1/28
2.6	0.1	2/17
2.1	0.4	3/15
2.4	0.4	4/13
2.3	0.4	4/13
2.6	0.4	5/18
2.4	0.4	5/19
2.5	0.4	6/15
2.6	0.4	6/28
2.8	0.5	10/24
2.3	0.4	10/24
2.8	0.5	10/25
2.3	0.4	11/30
2.4	0.4	11/30

K-40 75NBS 03 G

CV = 14.6 ± 1.3 pCi/g

Result	± Uncer.	Date
16.	3.	5/18

****

NBS 4350B River Sediment

****

Co-60 81NBS 02 G

CV = 0.125 ± 0.006 pCi/g

Result	± Uncer.	Date
0.16	0.3	6/28

Cs-137 81NBS 02 G

CV = 0.783 ± 0.049 pCi/g

Result	± Uncer.	Date
0.62	0.15	1/13
0.80	0.15	1/13
0.77	0.20	1/28
0.82	0.20	1/28
0.68	0.15	2/17
0.60	0.15	3/15
0.78	0.15	4/13
0.75	0.15	4/13
0.70	0.20	6/15
0.66	0.20	6/15
0.82	0.15	6/28
0.67	0.15	7/12
0.73	0.15	10/24
0.97	0.25	10/25
0.73	0.20	10/25

****

NBS 4353 Rocky-Flats Soil # 1

****

Cs-137 81NBS 01 G

CV = 0.464 ± 0.021 pCi/g

Result	± Uncer.	Date
0.4	0.1	5/18
0.4	0.2	5/19

K-40 81NBS 01 G

CV = 20. ± 2. pCi/g

Result	± Uncer.	Date
18.	3.	5/18

TABLE C-V (cont)

****

NBS 4926-C Tritium in Water
(HSE-9 Dilution)

****

H-3 84PER 01 LS

CV = 6124. ± 800. pCi/L

Result	± Uncer.	Date
6700.	800.	1/19
6100.	700.	1/19
6400.	800.	1/19
6700.	800.	1/26
6800.	800.	1/26
7400.	900.	1/26
6700.	800.	1/26
6200.	700.	1/26
5800.	700.	1/26
6300.	800.	2/01
6400.	800.	2/01
6200.	800.	2/01
5600.	700.	2/03
5800.	700.	2/03
5100.	700.	2/03
6600.	800.	2/09
6700.	800.	2/09
6500.	800.	2/09
6400.	800.	2/22
6000.	700.	2/22
7300.	900.	2/22
6200.	800.	2/22
6600.	800.	2/22
5300.	700.	2/22
7300.	900.	2/22
6200.	800.	2/22
6400.	800.	2/22
5300.	700.	2/22
6200.	800.	2/22
6000.	700.	2/22
6600.	800.	2/22
5300.	700.	2/22
6000.	700.	2/22
4900.	700.	2/22
6300.	800.	2/22
4000.	600.	2/22
5300.	700.	2/23
6400.	800.	2/23
6000.	700.	2/23
6100.	800.	2/24
6800.	800.	2/24
6000.	700.	2/24
5900.	800.	3/01
6800.	800.	3/01
5300.	700.	3/01
5900.	800.	3/02

****

NBS 4927-B Tritium in Water
(HSE-9 Dilution)

****

H-3 88GAU 03 LS

CV = 7820. ± 400. pCi/L

Result	± Uncer.	Date
7800.	900.	5/02
7800.	900.	5/02
7800.	900.	5/02
7600.	900.	5/20
7000.	800.	5/20
6900.	800.	5/20
8300.	900.	5/20
7700.	900.	5/20
7800.	900.	5/20
7600.	900.	5/31
7500.	900.	5/31
7500.	900.	5/31
7200.	800.	5/31
7200.	800.	5/31
7500.	900.	5/31
7600.	900.	5/31
7600.	900.	5/31
7200.	800.	5/31
7800.	900.	6/02
7800.	900.	6/02
7800.	900.	6/02
7800.	900.	6/02
7900.	900.	6/16
7700.	900.	6/16
7900.	900.	6/16
7900.	900.	6/16
7700.	900.	6/16
7900.	900.	6/16
7700.	900.	7/01
8500.	900.	7/01
7700.	900.	7/01
8400.	900.	7/01
8500.	900.	7/01
8400.	900.	7/01
7700.	900.	7/18
7500.	900.	7/18
8000.	900.	7/18
7800.	900.	8/02
7800.	900.	8/02
8100.	900.	8/02
7300.	800.	8/02
7300.	800.	8/02
8100.	900.	8/02
7100.	800.	8/16
7500.	900.	8/16
7400.	800.	8/16
6200.	700.	8/22
7900.	900.	8/22
6900.	800.	8/22
7500.	900.	8/22
7100.	800.	8/22
6500.	800.	8/22
7400.	900.	9/01
7300.	900.	9/01
7000.	800.	9/01
8100.	900.	9/19
7100.	800.	9/19
7400.	900.	9/19

H-3 (cont)

7400.	900.	9/26
7000.	800.	9/26
7200.	800.	9/26
6900.	800.	10/05
7400.	900.	10/05
6900.	800.	10/05
7100.	800.	10/05
7800.	900.	10/05
7100.	900.	10/05
8000.	900.	10/17
7900.	900.	10/17
8400.	900.	10/17
6900.	800.	10/26
7800.	900.	10/26
8000.	900.	10/26
8000.	900.	10/26
8000.	900.	10/26
8800.	1000.	10/26
8000.	900.	11/07
7800.	900.	11/07
8700.	1000.	11/07
9000.	1000.	11/14
9000.	1000.	11/14
8000.	900.	11/14
7800.	900.	11/21
7800.	900.	11/21
7700.	900.	11/21
8300.	900.	12/14
8400.	900.	12/14
8700.	1000.	12/14
7300.	800.	12/20
7300.	800.	12/20
7300.	800.	12/20
9000.	1000.	12/23
8300.	900.	12/23
8200.	900.	12/23

****

NBS 8030 Aquatic Plant
(CRM 060)

****

Mo 82BCr 01 IENA

CV = 2. ug/g

Result	± Uncer.	Date
< 1.		1/04

W 82BCr 01 IENA

CV = 20. ug/g

Result	± Uncer.	Date
13.	1.	1/04

TABLE C-V (cont)

****

NBS 8031 Aquatic Plant
(CRM 061)

****

Mo 82BCr 02 IENA

CV = 11. ug/g

Result	± Uncer.	Date
5.	2.	1/04

W 82BCr 02 IENA

CV = 239. ug/g

Result	± Uncer.	Date
170.	10.	1/04

****

NBS 8032 Calcareous Loam Soil
(CRM 141)

****

Al 83BCR 03 ATNA

CV = 5.59 %

Result	± Uncer.	Date
5.4	0.2	3/08

Ba 83BCR 04 ATNA

CV = 243. ug/g

Result	± Uncer.	Date
190.	50.	3/08

Ca 83BCR 03 ATNA

CV = 12.86 %

Result	± Uncer.	Date
12.2	0.6	3/08

Cl ATNA

CV = No Data Available (%)

Result	± Uncer.	Date
160.	50.	3/08

Dy ATNA

CV = No Data Available (%)

Result	± Uncer.	Date
3.7	0.4	3/08

Ga 83BCR 04 ATNA

CV = 14. ug/g

Result	± Uncer.	Date
< 30.		3/08

In ATNA

CV = No Data Available (ug/g)

Result	± Uncer.	Date
< 110.		3/08

K 83BCR 03 ATNA

CV = 1.29 %

Result	± Uncer.	Date
1.3	0.2	3/08

Mg 83BCR 03 ATNA

CV = 7180. ug/g

Result	± Uncer.	Date
8000.	1000.	3/08

Mn ATNA

CV = No Data Available (ug/g)

Result	± Uncer.	Date
570.	30.	3/08

Na 83BCR 03 ATNA

CV = 3200. ug/g

Result	± Uncer.	Date
3000.	100.	3/08

Sm 83BCR 04 ATNA

CV = 6.3 ug/g

Result	± Uncer.	Date
5.0	1.5	3/08

Sr 83BCR 04 ATNA

CV = 460. ug/g

Result	± Uncer.	Date
600.	100.	3/08

Ti 83BCR 03 ATNA

CV = 2800. ug/g

Result	± Uncer.	Date
2700.	400.	3/08

V ATNA

CV = No Data Available (ug/g)

Result	± Uncer.	Date
79.	4.	3/08

W 83BCR 04 ATNA

CV = 1.4 ug/g

Result	± Uncer.	Date
< 120.		3/08

****

NBS 8033 Light Sandy Soil
(CRM 142)

****

Al 83BCR 05 ATNA

CV = 5.01 %

Result	± Uncer.	Date
4.9	0.2	3/08

Ba 83BCR 06 ATNA

CV = 450. ug/g

Result	± Uncer.	Date
460.	60.	3/08

Ca 83BCR 05 ATNA

CV = 3.53 %

Result	± Uncer.	Date
3.7	0.2	3/08

TABLE C-V (cont)

****

NBS 8033 Light Sandy Soil
(CRM 142) (cont)

****

Cl ATNA

CV = No Data Available (%)

Result	± Uncer.	Date
80.	40.	3/08

Dy 83BCR 06 ATNA

CV = 5.15 ug/g

Result	± Uncer.	Date
5.5	0.5	3/08

Ga 83BCR 06 ATNA

CV = 11. ug/g

Result	± Uncer.	Date
< 40.		3/08

In ATNA

CV = No Data Available (ug/g)

Result	± Uncer.	Date
< 110.		3/08

K 83BCR 05 ATNA

CV = 2. %

Result	± Uncer.	Date
1.9	0.2	3/08

Mg 83BCR 05 ATNA

CV = 6570. ug/g

Result	± Uncer.	Date
7000.	1000.	3/08

Mn ATNA

CV = No Data Available (ug/g)

Result	± Uncer.	Date
610.	30.	3/08

Na 83BCR 05 ATNA

CV = 7200. ug/g

Result	± Uncer.	Date
6900.	200.	3/08

Sm 83BCR 06 ATNA

CV = 6.8 ug/g

Result	± Uncer.	Date
5.1	1.5	3/08

Sr 83BCR 06 ATNA

CV = 164. ug/g

Result	± Uncer.	Date
< 200.		3/08

Ti 83BCR 05 ATNA

CV = 3700. ug/g

Result	± Uncer.	Date
3600.	300.	3/08

V ATNA

CV = No Data Available (ug/g)

Result	± Uncer.	Date
55.	3.	3/08

W 83BCR 06 ATNA

CV = 1.2 ug/g

Result	± Uncer.	Date
< 100.		3/08

****

NBS 8034 Sewage Sludge
(CRM 144)

****

Ag 85BCr 02 FAA

CV = 13. ug/g

Result	± Uncer.	Date
14.	3.	6/27
15.	3.	8/23
15.	3.	8/23
15.	3.	8/23
15.	3.	8/23

Ag (cont)

15.	3.	8/23
13.	3.	8/23
15.	3.	8/23
13.	3.	8/23
15.	3.	8/23
15.	3.	8/23
15.	3.	8/23
15.	3.	8/23

As 85BCr 02 ETVAA

CV = 6.7 ug/g

Result	± Uncer.	Date
4.7	0.9	8/23
4.7	0.9	8/23

Cr 85BCr 02 FAA

CV = 485. ± 44. ug/g

Result	± Uncer.	Date
500.	100.	8/23
500.	100.	8/23
500.	100.	8/23
500.	100.	8/23
500.	100.	8/23
500.	100.	8/23
500.	100.	8/23
500.	100.	8/23
500.	100.	8/23

Hg 85BCr 02 CVAA

CV = 1.49 ± 0.22 ug/g

Result	± Uncer.	Date
1.2	0.2	9/07
1.2	0.2	9/07
1.2	0.2	9/07

Pb 85BCr 02 FAA

CV = 495. ± 19. ug/g

Result	± Uncer.	Date
600.	100.	8/23
500.	100.	8/23
500.	100.	8/23
500.	100.	8/23
500.	100.	8/23
500.	100.	8/23
500.	100.	8/23
500.	100.	8/23
500.	100.	8/23
500.	100.	8/23
600.	100.	8/23
500.	100.	8/23
500.	100.	8/23
500.	100.	8/23
500.	100.	8/23
500.	100.	8/23

TABLE C-V (cont)

****

NBS 8034 Sewage Sludge
(CRM 144) (cont)

****

Se 85BCr 02 ETVAA

CV = 2.3 ± 0.2 ug/g

Result	± Uncer.	Date
1.1	0.2	8/23
1.1	0.2	8/23

****

NBS 8035 Sewage Sludge
(CRM 146)

****

Ag 83BCR 01 FAA

CV = 203. ug/g

Result	± Uncer.	Date
200.	40.	8/23
200.	40.	8/23

Cd 83BCR 01 FAA

CV = 77.7 ± 2.6 ug/g

Result	± Uncer.	Date
75.	15.	8/23
75.	15.	8/23
70.	15.	8/23
75.	15.	8/23
75.	15.	8/23
75.	15.	8/23
75.	15.	8/23
75.	15.	8/23
75.	15.	8/23
70.	15.	8/23
75.	15.	8/23
75.	15.	8/23

Cr 83BCR 01 FAA

CV = 784. ± 37. ug/g

Result	± Uncer.	Date
760.	20.	8/23
760.	20.	8/23
760.	20.	8/23
760.	20.	8/23
760.	20.	8/23
760.	20.	8/23
770.	20.	8/23
770.	20.	8/23
760.	20.	8/23
760.	20.	8/23

Hg 83BCR 01 CVAA

CV = 9.49 ± 0.76 ug/g

Result	± Uncer.	Date
10.	2.	9/07
13.	3.	9/07

Pb 83BCR 01 FAA

CV = 1270. ± 28. ug/g

Result	± Uncer.	Date
1300.	300.	8/23
1300.	300.	8/23
1300.	300.	8/23
1600.	300.	8/23
1600.	300.	8/23
1600.	300.	8/23
1600.	300.	8/23
1300.	300.	8/23
1600.	300.	8/23
1600.	300.	8/23
1300.	300.	8/23
1300.	300.	8/23
1600.	300.	8/23
1300.	300.	8/23
1300.	300.	8/23
1300.	300.	8/23
1600.	300.	8/23
1300.	300.	8/23

****

NIOSH PAT Round 92
Trace Metals on Air Filter

****

Cd 88PAT 01 FAAC

CV = 7.1 ± 0.3 ug/filter

Result	± Uncer.	Date
5.7	0.5	2/02

CV = 10. ± 0.4 ug/filter

Result	± Uncer.	Date
8.	1.	2/02

CV = 14. ± 0.6 ug/filter

Result	± Uncer.	Date
12.	1.	2/02

CV = 15.9 ± 0.5 ug/filter

Result	± Uncer.	Date
15.	1.	2/02

All results for cadmium were out of control because the calibration standard was too high.

Pb 88PAT 01 FAAC

CV = 19.5 ± 0.8 ug/filter

Result	± Uncer.	Date
16.	1.	2/02

CV = 48.7 ± 1.9 ug/filter

Result	± Uncer.	Date
49.	5.	2/02

CV = 60.4 ± 2.3 ug/filter

Result	± Uncer.	Date
61.	6.	2/02

CV = 73.9 ± 3.4 ug/filter

Result	± Uncer.	Date
73.	7.	2/02

Zn 88PAT 01 FAAC

CV = 106.6 ± 4.6 ug/filter

Result	± Uncer.	Date
100.	10.	2/02

CV = 122.8 ± 5.1 ug/filter

Result	± Uncer.	Date
130.	10.	2/02

CV = 150.9 ± 5.9 ug/filter

Result	± Uncer.	Date
140.	10.	2/02

CV = 212.6 ± 8.2 ug/filter

Result	± Uncer.	Date
250.	20.	2/02

****

NIOSH PAT Round 93
Trace Metals on Air Filter

****

Cd 88PAT 01 FAA

CV = 7.0 ± 0.3 ug/filter

Result	± Uncer.	Date
7.0	0.3	4/21
7.0	0.3	4/21

****

NIOSH PAT Round 93
Trace Metals on Air Filter
(cont)

****

Cd (cont)

CV = 10.0 ± 0.4 ug/filter

Result	± Uncer.	Date
10.1	0.4	4/21
9.9	0.3	4/21

CV = 12.1 ± 0.4 ug/filter

Result	± Uncer.	Date
12.4	0.4	4/21
12.2	0.5	4/21

CV = 15.1 ± 0.5 ug/filter

Result	± Uncer.	Date
15.5	1.0	4/21
16.0	0.6	4/21

Pb 88PAT 01 FAA

CV = 15.9 ± 0.9 ug/filter

Result	± Uncer.	Date
18.0	0.6	4/22
16.8	0.8	4/22

CV = 31.4 ± 1.1 ug/filter

Result	± Uncer.	Date
33.	1.	4/22
33.	2.	4/22

CV = 44.3 ± 1.4 ug/filter

Result	± Uncer.	Date
47.	2.	4/22
46.	4.	4/22

CV = 58.9 ± 1.9 ug/filter

Result	± Uncer.	Date
59.	3.	4/22
60.	3.	4/22

Zn 88PAT 01 FAA

CV = 141.7 ± 3.9 ug/filter

Result	± Uncer.	Date
140.	6.	4/22
146.	7.	4/22

Zn (cont)

CV = 186.2 ± 6. ug/filter

Result	± Uncer.	Date
208.	8.	4/22
180.	10.	4/22

CV = 208.5 ± 7.6 ug/filter

Result	± Uncer.	Date
216.	9.	4/22
201.	7.	4/22

CV = 243.6 ± 9.3 ug/filter

Result	± Uncer.	Date
240.	30.	4/22
240.	10.	4/22

****

NIOSH PAT Round 94
Trace Metals on Air Filter

****

Cd 88PAT 01 FAA

CV = 8.0 ± 0.3 ug/filter

Result	± Uncer.	Date
8.7	0.4	7/12

CV = 10.0 ± 0.4 ug/filter

Result	± Uncer.	Date
9.4	0.5	7/12

CV = 15.8 ± 0.6 ug/filter

Result	± Uncer.	Date
15.0	0.6	7/12

CV = 18.1 ± 0.6 ug/filter

Result	± Uncer.	Date
16.0	0.6	7/12

Pb 88PAT 01 FAA

CV = 19.4 ± 0.9 ug/filter

Result	± Uncer.	Date
26.	1.	7/12

CV = 32.8 ± 1.5 ug/filter

Result	± Uncer.	Date
32.	1.	7/12

Pb (cont)

CV = 42.6 ± 1.5 ug/filter

Result	± Uncer.	Date
46.	2.	7/12

CV = 48.3 ± 1.7 ug/filter

Result	± Uncer.	Date
25.	1.	7/12
53.	2.	7/12

Zn 88PAT 01 FAA

CV = 80. ± 4. ug/filter

Result	± Uncer.	Date
82.	5.	7/12

CV = 105.2 ± 5.1 ug/filter

Result	± Uncer.	Date
107.	6.	7/12

CV = 150.8 ± 5.4 ug/filter

Result	± Uncer.	Date
150.	8.	7/12

CV = 194.8 ± 6.9 ug/filter

Result	± Uncer.	Date
200.	10.	7/12

****

NIOSH PAT Round 95
Trace Metals on Air Filter

****

Cd 88PAT 01 FAA

CV = 9.0 ± 0.3 ug/filter

Result	± Uncer.	Date
8.	1.	10/21

CV = 12. ± 0.4 ug/filter

Result	± Uncer.	Date
11.	1.	10/21

CV = 15.8 ± 0.6 ug/filter

Result	± Uncer.	Date
15.	1.	10/21

****

NIOSH PAT Round 95
Trace Metals on Air Filter
(cont)

****

Cd (cont)

CV = 18.8 ± 0.7 ug/filter

Result	± Uncer.	Date
17.	1.	10/21

Pb 88PAT 01 FAA

CV = 21.1 ± 1.3 ug/filter

Result	± Uncer.	Date
21.	4.	10/21

CV = 33.7 ± 1.5 ug/filter

Result	± Uncer.	Date
32.	4.	10/21

CV = 38.5 ± 1.6 ug/filter

Result	± Uncer.	Date
38.	5.	10/21

CV = 57.3 ± 3.5 ug/filter

Result	± Uncer.	Date
55.	5.	10/21

Zn 88PAT 01 FAA

CV = 118. ± 4. ug/filter

Result	± Uncer.	Date
120.	10.	10/21

CV = 127. ± 4.5 ug/filter

Result	± Uncer.	Date
130.	10.	10/21

CV = 163. ± 6.3 ug/filter

Result	± Uncer.	Date
170.	10.	10/21

CV = 195. ± 7. ug/filter

Result	± Uncer.	Date
200.	20.	10/21

****

Packard Instruments
Radionuclides in Water

****

H-3 79PAC 01 LS

CV = 12.5 ± 0.5 uCi/L

Result	± Uncer.	Date
12.7	0.4	1/21
12.6	0.4	1/27
12.6	0.4	2/10
12.6	0.4	2/24
12.6	0.4	3/10
12.7	0.4	3/14
12.6	0.4	3/17
12.6	0.4	3/29
12.6	0.3	4/19
12.7	0.4	4/27
12.7	0.4	5/26
12.6	0.4	6/21
12.6	0.4	7/06
12.6	0.3	7/11
12.6	0.3	7/22
12.6	0.3	7/26
12.6	0.3	9/02
12.6	0.3	9/06
12.6	0.3	9/15
12.6	0.3	9/16
12.6	0.3	9/27
12.6	0.3	10/05
12.6	0.4	10/25
12.6	0.3	10/28
12.6	0.3	11/07
12.6	0.3	11/09
12.6	0.3	11/22
12.5	0.3	11/28
13.4	0.1	12/02
12.5	0.3	12/16
12.5	0.3	12/20

****

UNLV-QAL Trace Elements
in Soil

****

Ag 87QAL 01 FAA

CV = 22.2 ug/g

Result	± Uncer.	Date
29.	6.	8/23
29.	6.	8/23

As 87QAL 01 ETVAA

CV = 917. ug/g

Result	± Uncer.	Date
940.	20.	8/18

Cd 87QAL 01 FAA

CV = 45.4 ug/g

Result	± Uncer.	Date
49.	10.	8/18

Cr 87QAL 01 FAA

CV = 99.6 ug/g

Result	± Uncer.	Date
130.	30.	8/23
130.	30.	8/23

Se 87QAL 01 ETVAA

CV = 39.2 ug/g

Result	± Uncer.	Date
60.	10.	8/18

****

USGS AGV-1 Andesite

****

H2O+ 83GLA 04 COUL

CV = 8000. ± 1800. ug/g

Result	± Uncer.	Date
5600.	500.	1/31
6400.	500.	1/31
5900.	500.	1/31

H2O- 83GLA 04 COUL

CV = 1. ± 0.2 %

Result	± Uncer.	Date
1.2	0.1	1/31
1.2	0.1	1/31
1.1	0.1	1/31

****

USGS BIR-1 Basalt

****

H2O+ 88GLA 01 COUL

CV = 1000. ± 300. ug/g

Result	± Uncer.	Date
1100.	200.	1/31
1000.	200.	1/31
1200.	200.	1/31

TABLE C-V (cont)

****

USGS BIR-1 Basalt (cont)

****

H2O- 88GLA 01 COUL

CV = 700. ± 200. ug/g

Result	± Uncer.	Date
800.	200.	1/31
900.	200.	1/31
500.	200.	1/31

****

USGS DNC-1 Diabase

****

F 88GLA 01 DISE

CV = 66. ± 10. ug/g

Result	± Uncer.	Date
130.	10.	8/11

****

USGS DTS-1

****

Si 83GLA 04 AENA

CV = 18.9 ± 0.25 %

Result	± Uncer.	Date
19.	2.	6/15
20.	1.	6/15
19.	1.	6/15
18.	1.	6/15
19.	1.	6/15
16.	3.	6/15
17.	1.	6/15
19.	2.	6/15

****

USGS G-2 Granite

****

H2O+ 83GLA 04 COUL

CV = 5100. ± 900. ug/g

Result	± Uncer.	Date
4800.	400.	1/31
5200.	400.	1/31
4800.	400.	1/31

H2O- 83GLA 04 COUL

CV = 1000. ± 400. ug/g

Result	± Uncer.	Date
1600.	200.	1/31
1700.	200.	1/31
1700.	200.	1/31

****

USGS GXR-1 Jasperoid

****

Al 84GLA 09 ATNA

CV = 3.6 ± 0.14 %

Result	± Uncer.	Date
3.3	0.2	3/03
3.5	0.1	10/20

Ba 84GLA 09 ATNA

CV = 610. ± 70. ug/g

Result	± Uncer.	Date
700.	90.	3/03
800.	100.	10/20

Ba 84GLA 09 ITNA

CV = 610. ± 70. ug/g

Result	± Uncer.	Date
800.	100.	3/23
700.	100.	3/23

Ca 84GLA 09 ATNA

CV = 8900. ± 400. ug/g

Result	± Uncer.	Date
4200.	700.	3/03
8600.	900.	3/03
10100.	1000.	10/20

Cl 84GLA 09 ATNA

CV = 110. ug/g

Result	± Uncer.	Date
140.	40.	3/08
160.	40.	10/20

Cu 84GLA 09 ATNA

CV = 1070. ± 60. ug/g

Result	± Uncer.	Date
1000.	100.	10/20
1000.	100.	12/12

Cu 84GLA 09 ITNA

CV = 1070. ± 60. ug/g

Result	± Uncer.	Date
1100.	200.	3/23
1000.	200.	3/23

Dy 84GLA 09 ATNA

CV = 3.1 ug/g

Result	± Uncer.	Date
4.4	0.5	3/03
4.1	0.4	10/20

Eu 84GLA 09 ATNA

CV = 680. ng/g

Result	± Uncer.	Date
< 900.		10/20

Ga 84GLA 09 ATNA

CV = 11. ug/g

Result	± Uncer.	Date
< 50.		3/03

I ATNA

CV = No Data Available (ug/g)

Result	± Uncer.	Date
< 30.		10/20

In 84GLA 09 ATNA

CV = 0.97 ug/g

Result	± Uncer.	Date
0.9	0.1	3/03
1.0	0.1	10/20

TABLE C-V (cont)

****

USGS GXR-1 Jasperoid (cont)

****

K 84GLA 09 ATNA

CV = 490. ± 90. ug/g

Result	± Uncer.	Date
< 6000.		3/03
< 6000.		10/20

Mg 84GLA 09 ATNA

CV = 2200. ± 400. ug/g

Result	± Uncer.	Date
< 3000.		3/03
< 3000.		10/20

Mn 88GLA 02 ATNA

CV = 900. ± 150. ug/g

Result	± Uncer.	Date
1150.	50.	3/03
1150.	50.	10/20

Na 84GLA 09 ATNA

CV = 810. ± 300. ug/g

Result	± Uncer.	Date
500.	30.	3/03
460.	30.	10/20

Si 84GLA 09 AENA

CV = 22.7 ± 0.4 %

Result	± Uncer.	Date
21.	1.	6/22

Sm 88GLA 02 ATNA

CV = 2.7 ± 0.3 ug/g

Result	± Uncer.	Date
< 3.		3/08
< 3.		10/20

Sr 84GLA 09 ATNA

CV = 270. ± 20. ug/g

Result	± Uncer.	Date
< 300.		3/03
< 300.		10/20

Ti 84GLA 09 ATNA

CV = 380. ± 200. ug/g

Result	± Uncer.	Date
< 3000.		3/03
< 4000.		10/20

U 84GLA 09 ATNA

CV = 35. ± 1.4 ug/g

Result	± Uncer.	Date
33.9	0.9	10/20

V 84GLA 09 ATNA

CV = 79. ± 9. ug/g

Result	± Uncer.	Date
85.	4.	3/03
84.	5.	10/20

W 84GLA 09 ATNA

CV = 210. ± 40. ug/g

Result	± Uncer.	Date
180.	30.	3/03

****

USGS GXR-2 Soil

****

U 84GLA 09 DNA

CV = 2.91 ± 0.07 ug/g

Result	± Uncer.	Date
3.1	0.2	1/31
3.0	0.2	1/31
3.0	0.2	1/31

****

USGS GXR-4 Copper Mill Heads

****

U 84GLA 09 DNA

CV = 6.5 ± 0.4 ug/g

Result	± Uncer.	Date
6.4	0.4	1/31
6.4	0.5	1/31
6.4	0.4	1/31
6.4	0.4	3/23
6.2	0.4	3/23

U-235/238 88GAL 02 ICPMS

CV = 0.0072 ± 0.0001 ratio

Result	± Uncer.	Date
0.0075	0.0002	4/12

****

USGS PCC-1 Peridotite

****

H2O+ 83GLA 04 COUL

CV = 4.71 ± 0.12 %

Result	± Uncer.	Date
4.8	0.3	1/31
4.6	0.3	1/31
4.8	0.3	1/31
4.9	0.3	1/31
4.8	0.3	1/31

H2O- 83GLA 04 COUL

CV = 4200. ± 1000. ug/g

Result	± Uncer.	Date
4100.	600.	1/31
6200.	800.	1/31
4200.	600.	1/31
5200.	400.	1/31
4800.	600.	1/31

Si 83GLA 04 AENA

CV = 19.56 ± 0.28 %

Result	± Uncer.	Date
19.	2.	6/22
21.	3.	6/22
20.	2.	6/22
20.	3.	6/22
20.	1.	6/22
18.	2.	6/22
20.	2.	6/22
20.	2.	6/22

TABLE C-V (cont)

****

USGS QLO-1 Quartz Latite

****

Si 88GLA 04 AENA

CV = 30.61 ± 0.22 %

Result	± Uncer.	Date
29.	2.	6/15
29.	4.	6/15
34.	2.	6/15
28.	5.	6/15
32.	4.	6/15
34.	2.	6/15

****

USGS RGM-1 Rhyolite

****

H2O+ 88GLA 04 COUL

CV = 5900. ± 2600. ug/g

Result	± Uncer.	Date
10300.	700.	1/31
10000.	700.	1/31
9700.	700.	1/31

H2O- 88GLA 04 COUL

CV = 1100. ± 200. ug/g

Result	± Uncer.	Date
1200.	200.	1/31
1100.	200.	1/31
1200.	200.	1/31

Si 88GLA 04 AENA

CV = 34.3 ± 0.25 %

Result	± Uncer.	Date
28.	2.	6/22
28.	2.	6/22
30.	2.	6/22
31.	3.	6/23
32.	2.	6/23
32.	3.	6/23
30.	2.	6/23
29.	2.	6/23

****

USGS SCo-1 Cody Shale

****

Si 88GLA 04 AENA

CV = 29.32 ± 0.31 %

Result	± Uncer.	Date
26.	2.	6/22
32.	2.	6/22
30.	2.	6/22
29.	2.	6/22
25.	1.	6/22
30.	3.	6/22
26.	2.	6/22

****

USGS STM-1 Syenite

****

Si 88GLA 04 AENA

CV = 27.85 ± 0.23 %

Result	± Uncer.	Date
32.	2.	6/15
28.	2.	6/15
29.	3.	6/15
31.	2.	6/15
27.	3.	6/15
30.	2.	6/15
29.	3.	6/15
24.	1.	6/15
28.	3.	6/22
28.	2.	6/22
26.	3.	6/22
27.	2.	6/22
30.	2.	6/22
31.	2.	6/22
26.	3.	6/22
27.	2.	6/22

****

USGS W-2 Diabase

****

H2O+ 84FLA 02 COUL

CV = 5500. ± 400. ug/g

Result	± Uncer.	Date
5300.	400.	1/31
5500.	400.	1/31
5500.	400.	1/31

H2O- 84FLA 02 COUL

CV = 2300. ± 500. ug/g

Result	± Uncer.	Date
2200.	300.	1/31
1900.	300.	1/31
2300.	300.	1/31

****

EPA Drinking Water Study 22

****

Alachlor 88EPA 02 GCEC

CV = 1.13 ± 0.5 ug/L

Result	± Uncer.	Date
1.2	0.1	5/17

CV = 10.1 ± 3. ug/L

Result	± Uncer.	Date
9.3	0.9	5/17

Aroclor 1016 88EPA 02 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 0.0010		5/16
0.0020	0.0002	5/16

Aroclor 1232 88EPA 02 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 0.0010		5/16
< 0.0010		5/16

Aroclor 1242 88EPA 02 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 0.0010		5/16

CV = 0.981 ± 0.4 ug/L

Result	± Uncer.	Date
< 0.0010		5/16

TABLE C-V (cont)

****

EPA Drinking Water Study 22
(cont)

****

Aroclor 1248 88EPA 02 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 0.0010		5/16
< 0.0010		5/16

Aroclor 1254 88EPA 02 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 0.0010		5/16

CV = 2.66 ± 1. ug/L

Result	± Uncer.	Date
6.	2.	5/16

Aroclor 1260 88EPA 02 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 0.0010		5/16
< 0.0010		5/16

Atrazine 88EPA 02 GCEC

CV = 7.81 ± 6. ug/L

Result	± Uncer.	Date
3.7	0.4	5/17

CV = 44.6 ± 35. ug/L

Result	± Uncer.	Date
51.	5.	5/17

Benzene 88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

CV = 6.32 ± 2.5 ug/L

Result	± Uncer.	Date
6.	2.	5/10

Bis(2-chloroisopropyl)ether 88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

Bromobenzene 88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

Bromochloromethane 88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

Bromodichloromethane 88EPA 02 PTGC

CV = 16.7 ± 3. ug/L

Result	± Uncer.	Date
17.	2.	5/10

CV = 55.7 ± 11. ug/L

Result	± Uncer.	Date
54.	6.	5/10

Bromoform 88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

CV = 23.2 ± 5. ug/L

Result	± Uncer.	Date
21.	4.	5/10

CV = 54.9 ± 11. ug/L

Result	± Uncer.	Date
55.	6.	5/10

n-Butylbenzene 88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

sec-Butylbenzene 88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

tert-Butylbenzene 88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

Carbon tetrachloride 88EPA 02 PTGC

CV = 3.65 ± 1.5 ug/L

Result	± Uncer.	Date
4.	2.	5/10

CV = 8.36 ± 3. ug/L

Result	± Uncer.	Date
8.	2.	5/10

Chlordane 88EPA 02 GCEC

CV = 1.65 ± 0.6 ug/L

Result	± Uncer.	Date
4.2	0.4	5/17

CV = 6.6 ± 1.9 ug/L

Result	± Uncer.	Date
3.9	0.4	5/17

Chlorobenzene 88EPA 02 PTGC

CV = 7.5 ± 3. ug/L

Result	± Uncer.	Date
7.3	0.6	5/10

TABLE C-V (cont)

****

EPA Drinking Water Study 22
(cont)

****

Chlorodibromomethane
88EPA 02 PTGC

CV = 14.2 ± 3. ug/L

Result	± Uncer.	Date
12.	3.	5/10

CV = 67.6 ± 14. ug/L

Result	± Uncer.	Date
66.	9.	5/10

Chloroethane
88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

Chloroform 88EPA 02 PTGC

CV = 21.2 ± 4. ug/L

Result	± Uncer.	Date
< 2.		5/10
20.	3.	5/10

CV = 42.4 ± 8. ug/L

Result	± Uncer.	Date
46.	9.	5/10

---

o-Chlorotoluene
p-Chlorotoluene
88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

2,4-D 88EPA 02 GCEC

CV = 2.65 ± 2. ug/L

Result	± Uncer.	Date
2.6	0.3	7/26

CV = 89.6 ± 40. ug/L

Result	± Uncer.	Date
84.	8.	6/16

1,2-Dibromo-3-chloropropane
88EPA 02 PTGC

CV = 0.235 ± 0.09 ug/L

Result	± Uncer.	Date
< 2.		5/10

1,2-Dibromoethane
88EPA 02 PTGC

CV = 0.15 ± 0.06 ug/L

Result	± Uncer.	Date
< 2.		5/10

Dibromomethane
88EPA 02 PTGC

CV = 5.12 ± 2. ug/L

Result	± Uncer.	Date
6.	1.	5/10

1,1-Dichloro-1-propene
88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

---

o-Dichlorobenzene (1,2)
88EPA 02 PTGC

CV = 12.1 ± 2. ug/L

Result	± Uncer.	Date
11.	3.	5/10

---

m-Dichlorobenzene (1,3)
88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

---

p-Dichlorobenzene (1,4)
88EPA 02 PTGC

CV = 8.72 ± 3.5 ug/L

Result	± Uncer.	Date
7.	5.	5/10

p-Dichlorobenzene (1,4)(cont)

CV = 11.1 ± 2. ug/L

Result	± Uncer.	Date
9.	3.	5/10

Dichlorodifluoromethane
1,1-Dichloroethane
88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

1,2-Dichloroethane
88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

CV = 2.56 ± 1. ug/L

Result	± Uncer.	Date
1.7	0.4	5/10

1,1-Dichloroethene
88EPA 02 PTGC

CV = 4.35 ± 1.8 ug/L

Result	± Uncer.	Date
8.	5.	5/10

CV = 13.5 ± 3. ug/L

Result	± Uncer.	Date
10.	10.	5/10

---

cis-1,2-Dichloroethylene
88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

---

trans-1,2-Dichloroethylene
88EPA 02 PTGC

CV = 5.45 ± 2. ug/L

Result	± Uncer.	Date
6.	3.	5/10

TABLE C-V (cont)

****

EPA Drinking Water Study 22
(cont)

****

1,2-Dichloropropane
88EPA 02 PTGC

CV = 3.41 ± 1.4 ug/L

Result	± Uncer.	Date
6.	3.	5/10

1,3-Dichloropropane
2,2-Dichloropropane
88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

Endrin 88EPA 02 GCEC

CV = 0.479 ± 0.14 ug/L

Result	± Uncer.	Date
< 0.1		5/17

CV = 6.71 ± 2. ug/L

Result	± Uncer.	Date
8.1	0.8	5/17

Ethylbenzene
Fluorotrichloromethane
88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

Heptachlor 88EPA 02 GCEC

CV = 0.334 ± 0.16 ug/L

Result	± Uncer.	Date
0.20	0.02	5/17

CV = 1.91 ± 0.9 ug/L

Result	± Uncer.	Date
3.8	0.4	5/17

Heptachlor epoxide
88EPA 02 GCEC

CV = 0.233 ± 0.07 ug/L

Result	± Uncer.	Date
0.11	0.01	5/17

CV = 1.55 ± 0.5 ug/L

Result	± Uncer.	Date
0.69	0.07	5/17

Hexachlorobutadiene
Isopropylbenzene
4-Isopropyltoluene
88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

Lindane 88EPA 02 GCEC

CV = 0.116 ± 0.05 ug/L

Result	± Uncer.	Date
< 0.05		5/17

CV = 3.47 ± 1.4 ug/L

Result	± Uncer.	Date
2.1	0.2	5/17

Methoxychlor 88EPA 02 GCEC

CV = 2.62 ± 0.9 ug/L

Result	± Uncer.	Date
1.0	0.1	5/17

CV = 65.4 ± 20. ug/L

Result	± Uncer.	Date
150.	15.	5/17

Methyl bromide
Methyl chloride
88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

Methylene chloride
88EPA 02 PTGC

CV = 2.6 ± 1. ug/L

Result	± Uncer.	Date
< 2.		5/10

Naphthalene
Pentachloroethane
88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

Pentachlorophenol
88EPA 02 GCEC

CV = 1. ± 0.2 ug/L

Result	± Uncer.	Date
1.0	0.5	7/26

CV = 7.68 ± 5. ug/L

Result	± Uncer.	Date
10.	5.	6/16

Propylbenzene
88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

Silvex 88EPA 02 GCEC

CV = 1.2 ± 0.6 ug/L

Result	± Uncer.	Date
1.0	0.2	7/26

CV = 25. ± 10. ug/L

Result	± Uncer.	Date
22.	2.	7/26

Styrene
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

TABLE C-V (cont)

****

EPA Drinking Water Study 22
(cont)

****

Tetrachloroethylene
88EPA 02 PTGC

CV = 4.52 ± 2. ug/L

Result	± Uncer.	Date
4.5	0.3	5/10

Toluene 88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

Toxaphene 88EPA 02 GCEC

CV = 2.58 ± 1.1 ug/L

Result	± Uncer.	Date
< 10.		5/17

CV = 8.94 ± 3.2 ug/L

Result	± Uncer.	Date
< 10.		5/17

1,2,3-Trichlorobenzene
1,2,4-Trichlorobenzene
88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

1,1,1-Trichloroethane
88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

CV = 6.41 ± 2.6 ug/L

Result	± Uncer.	Date
6.	3.	5/10

1,1,2-Trichloroethane
88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

Trichloroethylene
88EPA 02 PTGC

CV = 2.57 ± 1. ug/L

Result	± Uncer.	Date
1.8	0.8	5/10

CV = 11. ± 2. ug/L

Result	± Uncer.	Date
11.	4.	5/10

1,2,3-Trichloropropane
1,2,4-Trimethylbenzene
1,3,5-Trimethylbenzene
88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

Vinyl chloride
88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

CV = 3.04 ± 1.2 ug/L

Result	± Uncer.	Date
6.	3.	5/10

m-Xylene, o-Xylene,
p-Xylene 88EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		5/10

The majority of the volatile organic anlyses that were out of control were at or below our detection limits. We are attempting to lower these limits. The insecticide and herbicide analyses were performed by multiple analysts which has been rectified for future studies.

****

EPA Drinking Water Study 23

****

Acenaphthylene
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 1.		11/23
< 1.		11/23

Anthracene 88EPA 02 GCMS

CV = 2.35 ± 1.42 ug/L

Result	± Uncer.	Date
2.3	0.5	11/23

CV = 14.1 ± 4.8 ug/L

Result	± Uncer.	Date
13.	2.	11/23

Aroclor 1016 88EPA 02 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 0.1		12/08
< 0.1		12/16

Aroclor 1232 88EPA 02 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 0.1		12/08

CV = 0.75 ± 0.4 ug/L

Result	± Uncer.	Date
< 0.1		12/08

Aroclor 1242 88EPA 02 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 0.1		12/08
0.35	0.03	12/08

TABLE C-V (cont)

****

EPA Drinking Water Study 23
(cont)

****

Aroclor 1248 88EPA 02 GCEC

CV = Blank (ug/L)

Result	±	Uncer.	Date
< 0.1			12/08
< 0.1			12/08

Aroclor 1254 88EPA 02 GCEC

CV = Blank (ug/L)

Result	±	Uncer.	Date
< 0.1			12/08
< 0.1			12/08

Aroclor 1260 88EPA 02 GCEC

CV = Blank (ug/L)

Result	±	Uncer.	Date
< 0.1			12/08
< 0.1			12/08

1,2-Benzanthracene
88EPA 02 GCMS

CV = Blank (ug/L)

Result	±	Uncer.	Date
25.		5.	11/23
3.5		0.7	11/23

Benzene 88EPA 02 GCMS

CV = Blank (ug/L)

Result	±	Uncer.	Date
< 2.			11/28

CV = 8.1 ± 3.2 ug/L

Result	±	Uncer.	Date
9.		3.	11/29

Benzo(g,h,i)perylene
88EPA 02 GCMS

CV = Blank (ug/L)

Result	±	Uncer.	Date
< 5.			11/23
< 5.			11/23

Benzo-a-pyrene
Benzo-b-fluoranthene
Benzo-k-fluoranthene
88EPA 02 GCMS

CV = Blank (ug/L)

Result	±	Uncer.	Date
< 1.			11/23
< 1.			11/23

Bis(2-ethylhexyl)adipate
88EPA 02 GCMS

CV = 5.22 ug/L

Result	±	Uncer.	Date
< 50.			11/22

CV = 34.8 ug/L

Result	±	Uncer.	Date
< 50.			11/22

Bis(2-ethylhexyl)phthalate
88EPA 02 GCMS

CV = 2.8 ± 8.1 ug/L

Result	±	Uncer.	Date
< 10.			11/22

CV = 18.7 ± 12.6 ug/L

Result	±	Uncer.	Date
15.		3.	11/22

Bromobenzene
Bromochloromethane
88EPA 02 GCMS

CV = Blank (ug/L)

Result	±	Uncer.	Date
< 2.			11/28
< 2.			11/28

Bromodichloromethane
88EPA 02 PTGC

CV = Blank (ug/L)

Result	±	Uncer.	Date
< 2.			11/28
< 2.			11/28

CV = 13. ± 2.6 ug/L

Result	±	Uncer.	Date
14.		4.	11/29

Bromodichloromethane (cont)

CV = 66.9 ± 13.4 ug/L

Result	±	Uncer.	Date
60.		20.	11/29

Bromoform 88EPA 02 GCMS

CV = Blank (ug/L)

Result	±	Uncer.	Date
< 2.			11/28
< 2.			11/28

CV = 19. ± 3.8 ug/L

Result	±	Uncer.	Date
20.		6.	11/29

CV = 73.9 ± 14.8 ug/L

Result	±	Uncer.	Date
60.		20.	11/29

n-Butylbenzene
sec-Butylbenzene
tert-Butylbenzene
88EPA 02 GCMS

CV = Blank (ug/L)

Result	±	Uncer.	Date
< 2.			11/28
< 2.			11/28

Butylbenzyl phthalate
88EPA 02 GCMS

CV = 1.5 ± 3.6 ug/L

Result	±	Uncer.	Date
< 10.			11/22

CV = 23.2 ± 12.4 ug/L

Result	±	Uncer.	Date
16.		3.	11/23

Carbon tetrachloride
88EPA 02 GCMS

CV = Blank (ug/L)

Result	±	Uncer.	Date
< 2.			11/28

TABLE C-V (cont)

****

EPA Drinking Water Study 23
(cont)

****

Carbon tetrachloride (cont)
CV = 11.5 ± 2.3 ug/L

Result	± Uncer.	Date
13.	4.	11/29

Chlorobenzene 88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28

CV = 16.3 ± 3.3 ug/L

Result	± Uncer.	Date
< 2.		11/28

Chlorodibromomethane
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28
< 2.		11/28

CV = 28.4 ± 5.7 ug/L

Result	± Uncer.	Date
28.	8.	11/29

CV = 53.3 ± 10.7 ug/L

Result	± Uncer.	Date
52.	15.	11/29

Chloroethane
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28
< 2.		11/28

Chloroform 88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28
< 2.		11/28

Chloroform (cont)

CV = 38.9 ± 7.8 ug/L

Result	± Uncer.	Date
46.	15.	11/29

CV = 54.8 ± 11. ug/L

Result	± Uncer.	Date
55.	20.	11/29

---

o-Chlorotoluene
p-Chlorotoluene
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28
< 2.		11/28

Chrysene
88EPA 02 GCMS

CV = 2.6 ± 2.1 ug/L

Result	± Uncer.	Date
3.0	0.6	11/23

CV = 21.1 ± 7.5 ug/L

Result	± Uncer.	Date
22.	4.	11/23

Decachlorobiphenyl
(2,2',3,3',4,4',5,5',6,6'-)
88EPA 02 GCEC

CV = 1. ± 2. ug/L

Result	± Uncer.	Date
< 0.1		12/08

CV = 1.6 ± 2.9 ug/L

Result	± Uncer.	Date
< 0.1		12/08

Dibenzo(a,h)anthracene
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		11/23
< 10.		11/23

1,2-Dibromo-3-chloropropane
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28

CV = 0.58 ± 0.23 ug/L

Result	± Uncer.	Date
< 2.		11/28
< 2.		11/28

1,2-Dibromoethane
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28

CV = 0.77 ± 0.31 ug/L

Result	± Uncer.	Date
< 2.		11/28
< 2.		11/28

Dibromomethane
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28

CV = 14.6 ± 2.9 ug/L

Result	± Uncer.	Date
17.	3.	11/29

---

o-Dichlorobenzene (1,2)
m-Dichlorobenzene (1,3)
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28
< 2.		11/28

---

p-Dichlorobenzene (1,4)
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28

TABLE C-V (cont)

****

EPA Drinking Water Study 23
(cont)

****

p-Dichlorobenzene (cont)

CV = 12.8 ± 2.6 ug/L

Result	± Uncer.	Date
12.	3.	11/29

Dichlorodifluoromethane
1,1-Dichloroethane
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28
< 2.		11/28

1,2-Dichloroethane
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28

CV = 8. ± 3.2 ug/L

Result	± Uncer.	Date
10.	3.	11/29

1,1-Dichloroethene
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28

CV = 8.1 ± 3.3 ug/L

Result	± Uncer.	Date
17.	3.	11/29

---

cis-1,2-Dichloroethylene
trans-1,2-Dichloroethylene
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28
< 2.		11/28

1,2-Dichloropropane
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28

CV = 6.1 ± 2.5 ug/L

Result	± Uncer.	Date
8.	3.	11/29

1,3-Dichloropropane
2,2-Dichloropropane
1,3-Dichloropropene
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28
< 2.		11/28

1,1-Dichloropropene
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28
< 2.		11/28

Ethylbenzene
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28

CV = 16. ± 3.2 ug/L

Result	± Uncer.	Date
5.	2.	11/29

Fluoranthene
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 1.		11/23
< 1.		11/23

Fluorene 88EPA 02 GCMS

CV = 0.84 ± 0.7 ug/L

Result	± Uncer.	Date
< 1.		11/23

CV = 12.6 ± 6.8 ug/L

Result	± Uncer.	Date
11.	2.	11/23

Fluorotrichloromethane
Hexachlorobutadiene
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28
< 2.		11/28

Indeno(1,2,3-cd)pyrene
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 5.		11/23
< 5.		11/23

Isopropylbenzene
4-Isopropyltoluene
Methyl bromide
Methyl chloride
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28
< 2.		11/28

Methylene chloride
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28

CV = 8.2 ± 3.3 ug/L

Result	± Uncer.	Date
< 2.		11/28

TABLE C-V (cont)

****

EPA Drinking Water Study 23
(cont)

****

Naphthalene 88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 1.		11/23
< 1.		11/23
< 2.		11/28
< 2.		11/28

Phenanthrene 88EPA 02 GCMS

CV = 1.7 ± 0.9 ug/L

Result	± Uncer.	Date
1.9	0.4	11/23

CV = 8.5 ± 2.9 ug/L

Result	± Uncer.	Date
7.	1.	11/23

Propylbenzene
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28
< 2.		11/28

Pyrene 88EPA 02 GCMS

CV = 1.4 ± 0.5 ug/L

Result	± Uncer.	Date
1.7	0.5	11/23

CV = 13.3 ± 3.2 ug/L

Result	± Uncer.	Date
13.	3.	11/23

Styrene 88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28

CV = 13. ± 2.6 ug/L

Result	± Uncer.	Date
14.	4.	11/29

1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28
< 2.		11/28

Tetrachloroethylene
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28

CV = 12.9 ± 2.6 ug/L

Result	± Uncer.	Date
11.	3.	11/29

Toluene 88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28

CV = 7.2 ± 2.9 ug/L

Result	± Uncer.	Date
9.	3.	11/29

1,2,3-Trichlorobenzene
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28
< 2.		11/28

1,2,4-Trichlorobenzene
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28

CV = 18.4 ± 3.7 ug/L

Result	± Uncer.	Date
< 2.		11/28

1,1,1-Trichloroethane
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28

CV = 9.8 ± 3.9 ug/L

Result	± Uncer.	Date
11.	3.	11/29

1,1,2-Trichloroethane
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28

CV = 10.2 ± 2. ug/L

Result	± Uncer.	Date
12.	4.	11/29

Trichloroethylene
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28

CV = 5.6 ± 2.2 ug/L

Result	± Uncer.	Date
6.	2.	11/29

1,2,3-Trichloropropane
1,2,4-Trimethylbenzene
1,3,5-Trimethylbenzene
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28
< 2.		11/28

Vinyl chloride
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28

****

EPA Drinking Water Study 23
(cont)

****

Vinyl chloride (cont)

CV = 6.5 ± 2.6 ug/L

Result	± Uncer.	Date
< 20.		11/29

Mixed-Xylenes
88EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		11/28
< 2.		11/28

****

EPA GC/MS Acids in Water

****

Acenaphthene
Acenaphthylene
Anthracene
1,2-Benzanthracene
Benzo(g,h,i)perylene
Benzo-a-pyrene
Benzo-b-fluoranthene
Benzo-k-fluoranthene
Benzoic acid
Benzyl alcohol
Bis(2-chloroethoxy)methane
Bis(2-chloroethyl)ether
Bis(2-chloroisopropyl)ether
Bis(2-ethylhexyl)phthalate
4-Bromophenylphenyl ether
Butylbenzyl phthalate
81EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 5.		8/25

4-Chloro-3-methylphenol
81EPA 01 GCMS

CV = 75. ± 15. ug/L

Result	± Uncer.	Date
22.	4.	9/14

CV = 100. ± 40. ug/L

Result	± Uncer.	Date
220.	40.	5/12
60.	10.	11/15

4-Chloroaniline
2-Chloronaphthalene
81EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 5.		8/25

---

o-Chlorophenol
81EPA 01 GCMS

CV = 30. ± 6. ug/L

Result	± Uncer.	Date
31.	6.	9/14

CV = 100. ± 30. ug/L

Result	± Uncer.	Date
290.	60.	5/12
30.	6.	11/15

4-Chlorophenylphenyl ether
Chrysene
Di-n-butyl phthalate
Di-n-octyl phthalate
Dibenzo(a,h)anthracene
Dibenzofuran
o-Dichlorobenzene (1,2)
m-Dichlorobenzene (1,3)
p-Dichlorobenzene (1,4)
3,3'-Dichlorobenzidine
81EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 5.		8/25

2,4-Dichlorophenol
88EPA 02 GCMS

CV = 100. ± 30. ug/L

Result	± Uncer.	Date
470.	100.	5/12
42.	8.	11/15

Diethyl phthalate
Dimethyl phthalate
81EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 5.		8/25

2,4-Dimethylphenol
81EPA 01 GCMS

CV = 30. ± 6. ug/L

Result	± Uncer.	Date
< 5.		8/25

CV = 100. ± 30. ug/L

Result	± Uncer.	Date
430.	90.	5/12
50.	10.	11/15

2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno(1,2,3-cd)pyrene
Isophorone
81EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 5.		8/25

2-Methyl-4,6-dinitrophenol
88EPA 02 GCMS

CV = 100. ± 90. ug/L

Result	± Uncer.	Date
< 50.		5/12
50.	10.	11/15

CV = 250. ± 50. ug/L

Result	± Uncer.	Date
140.	30.	9/14

2-Methylnaphthalene
2-Methylphenol
4-Methylphenol
Naphthalene
2-Nitroaniline
3-Nitroaniline
4-Nitroaniline
Nitrobenzene
81EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 5.		8/25

TABLE C-V (cont)

****

EPA GC/MS Acids in Water
(cont)

****

o-Nitrophenol
81EPA 01 GCMS

CV = 50. ± 10. ug/L

Result	± Uncer.	Date
29.	6.	9/14

CV = 100. ± 40. ug/L

Result	± Uncer.	Date
600.	100.	5/12
33.	7.	11/15

---

p-Nitrophenol
81EPA 01 GCMS

CV = 50. ± 10. ug/L

Result	± Uncer.	Date
3.	3.	9/14

CV = 100. ± 50. ug/L

Result	± Uncer.	Date
90.	20.	5/12
< 50.		11/15

N-Nitrosodi-n-propylamine
N-Nitrosodiphenylamine
81EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 5.		8/25

Pentachlorophenol
81EPA 01 GCMS

CV = 75. ± 15. ug/L

Result	± Uncer.	Date
< 5.		9/14

CV = 100. ± 50. ug/L

Result	± Uncer.	Date
110.	20.	5/12
30.	6.	11/15

Phenanthrene
81EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 5.		8/25

Phenol 88EPA 02 GCMS

CV = 100. ± 20. ug/L

Result	± Uncer.	Date
200.	40.	5/12
45.	9.	9/14
8.	2.	11/15

Pyrene
1,2,4-Trichlorobenzene
2,4,5-Trichlorophenol
81EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 5.		8/25

2,4,6-Trichlorophenol
81EPA 01 GCMS

CV = 25. ± 5. ug/L

Result	± Uncer.	Date
10.	2.	9/14

CV = 100. ± 30. ug/L

Result	± Uncer.	Date
200.	40.	5/12
50.	10.	11/15

****

EPA GC/MS Acids/Base Neutrals
in Water

****

4-Chloro-3-methylphenol
88GAU 04 GCMS

CV = 113. ± 23. ug/L

Result	± Uncer.	Date
110.	20.	7/22

o-Chlorophenol
88GAU 04 GCMS

CV = 150. ± 30. ug/L

Result	± Uncer.	Date
110.	20.	7/22

2,4-Dichlorophenol
88GAU 04 GCMS

CV = 125. ± 25. ug/L

Result	± Uncer.	Date
120.	20.	7/22

2,4-Dimethylphenol
88GAU 04 GCMS

CV = 75. ± 15. ug/L

Result	± Uncer.	Date
21.	4.	7/22

2-Methyl-4,6-dinitrophenol
88GAU 04 GCMS

CV = 375. ± 75. ug/L

Result	± Uncer.	Date
170.	30.	7/22

---

o-Nitrophenol
88GAU 04 GCMS

CV = 125. ± 25. ug/L

Result	± Uncer.	Date
100.	20.	7/22

---

p-Nitrophenol
88GAU 04 GCMS

CV = 125. ± 15. ug/L

Result	± Uncer.	Date
< 50.		7/22

Pentachlorophenol
88GAU 04 GCMS

CV = 188. ± 38. ug/L

Result	± Uncer.	Date
180.	40.	7/22

TABLE C-V (cont)

****

EPA GC/MS Acids/Base Neutrals in Water (cont)

****

Phenol 88GAU 04 GCMS

CV = 125. ± 25. ug/L

Result	± Uncer.	Date
24.	5.	7/22

2,4,6-Trichlorophenol 88GAU 04 GCMS

CV = 125. ± 25. ug/L

Result	± Uncer.	Date
< 20.		7/22

****

EPA GC/MS Base Neutrals in Water

****

Acenaphthene 82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		9/14

CV = 19.5 ± 3.9 ug/L

Result	± Uncer.	Date
< 20.		9/01

CV = 69. ± 7. ug/L

Result	± Uncer.	Date
70.	10.	9/15

CV = 100. ± 27.6 ug/L

Result	± Uncer.	Date
60.	10.	11/15
70.	10.	12/12

Acenaphthylene 82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 10.		12/12

Aniline 86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		12/12

Anthracene 82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25

CV = 40. ± 8. ug/L

Result	± Uncer.	Date
< 20.		9/01

CV = 70. ± 7. ug/L

Result	± Uncer.	Date
50.	10.	9/15

CV = 100. ± 32. ug/L

Result	± Uncer.	Date
80.	15.	11/15
85.	15.	12/12

Azobenzene 86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 50.		12/12

1,2-Benzanthracene 86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/12

CV = 73.9 ± 14.8 ug/L

Result	± Uncer.	Date
65.	15.	7/22
65.	15.	9/14

---

m-Benzidine 86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 50.		12/12

Benzo(g,h,i)perylene 82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25

CV = 80.4 ± 16. ug/L

Result	± Uncer.	Date
< 20.		9/01

CV = 100. ± 58.9 ug/L

Result	± Uncer.	Date
90.	20.	11/15
60.	10.	12/12

CV = 110. ± 10. ug/L

Result	± Uncer.	Date
200.	100.	9/15

Benzo-a-pyrene 82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25

CV = 24.9 ± 5. ug/L

Result	± Uncer.	Date
< 20.		9/01

CV = 78. ± 8. ug/L

Result	± Uncer.	Date
60.	10.	9/15

CV = 100. ± 39. ug/L

Result	± Uncer.	Date
200.	40.	11/15
90.	20.	12/12

Benzo-b-fluoranthene 82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25

CV = 40. ± 8. ug/L

Result	± Uncer.	Date
< 20.		9/01

****

EPA GC/MS Base Neutrals
in Water (cont)

****

Benzo-b-fluoranthene (cont)

CV = 71. ± 7. ug/L

Result	± Uncer.	Date
50.	10.	9/15

CV = 100. ± 38.8 ug/L

Result	± Uncer.	Date
190.	40.	11/15
90.	20.	12/12

Benzo-k-fluoranthene
86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/12

CV = 45.7 ± 9.1 ug/L

Result	± Uncer.	Date
42.	8.	7/22
33.	7.	9/14

Benzoic acid
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 50.		12/12

Benzyl alcohol
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 10.		12/12

Bis(2-chloroethoxy)methane
86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/12

Bis(2-chloroethoxy)methane
(cont)

CV = 48.6 ± 9.7 ug/L

Result	± Uncer.	Date
50.	10.	7/22
23.	4.	9/14

Bis(2-chloroethyl)ether
86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/12

CV = 48.2 ± 9.6 ug/L

Result	± Uncer.	Date
< 50.		7/22
25.	5.	9/14

Bis(2-chloroisopropyl)ether
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 10.		12/12

CV = 38.8 ± 7.8 ug/L

Result	± Uncer.	Date
< 20.		9/01

CV = 71. ± 7. ug/L

Result	± Uncer.	Date
70.	15.	9/15

Bis(2-ethylhexyl)phthalate
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
80.	15.	7/22
140.	30.	9/14

CV = 29.1 ± 5.8 ug/L

Result	± Uncer.	Date
< 20.		9/01

CV = 54. ± 5. ug/L

Result	± Uncer.	Date
400.	300.	9/15

Bis(2-ethylhexyl)phthalate
(cont)

CV = 100. ± 41.1 ug/L

Result	± Uncer.	Date
120.	20.	11/15
140.	30.	12/12

4-Bromophenylphenyl ether
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25

CV = 41.5 ± 8.3 ug/L

Result	± Uncer.	Date
< 20.		9/01

CV = 100. ± 23. ug/L

Result	± Uncer.	Date
50.	10.	11/15
50.	10.	12/12

CV = 130. ± 10. ug/L

Result	± Uncer.	Date
80.	15.	9/15

Butylbenzyl phthalate
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25

CV = 88. ± 9. ug/L

Result	± Uncer.	Date
170.	100.	9/15

CV = 100. ± 23.4 ug/L

Result	± Uncer.	Date
110.	20.	11/15
125.	25.	12/12

4-Chloro-3-methylphenol
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		9/14
< 10.		12/12

TABLE C-V (cont)

****

EPA GC/MS Base Neutrals in Water (cont)

****

4-Chloroaniline
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 10.		12/12

2-Chloronaphthalene
86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/12

CV = 25.4 ± 5.1 ug/L

Result	± Uncer.	Date
20.	4.	7/22
12.	2.	9/14

o-Chlorophenol
86EPA 02 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
30.	6.	12/12

o-Chlorophenol
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 10.		12/12

4-Chlorophenylphenyl ether
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25

CV = 76.7 ± 15.3 ug/L

Result	± Uncer.	Date
< 20.		9/01

4-Chlorophenylphenyl ether (cont)

CV = 100. ± 33.4 ug/L

Result	± Uncer.	Date
100.	20.	11/15
90.	20.	12/12

CV = 130. ± 10. ug/L

Result	± Uncer.	Date
101.	20.2	9/15

Chrysene 82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25

CV = 69.9 ± 14. ug/L

Result	± Uncer.	Date
< 20.		9/01

CV = 73. ± 7. ug/L

Result	± Uncer.	Date
160.	30.	9/15

CV = 100. ± 48.3 ug/L

Result	± Uncer.	Date
90.	20.	11/15
110.	20.	12/12

Di-n-butyl phthalate
86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/12

CV = 24.9 ± 5. ug/L

Result	± Uncer.	Date
33.	7.	7/22
15.	8.	9/14

Di-n-octyl phthalate
86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
5.	1.	12/12

Di-n-octyl phthalate (cont)

CV = 43.9 ± 8.8 ug/L

Result	± Uncer.	Date
< 20.		8/25

Dibenzo(a,h)anthracene
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25

CV = 40.7 ± 8. ug/L

Result	± Uncer.	Date
< 20.		9/01

CV = 71. ± 7. ug/L

Result	± Uncer.	Date
75.	15.	9/15

CV = 100. ± 70. ug/L

Result	± Uncer.	Date
160.	30.	11/15
60.	10.	12/12

Dibenzofuran
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 10.		12/12

o-Dichlorobenzene (1,2)
86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/12

CV = 24.7 ± 4.9 ug/L

Result	± Uncer.	Date
13.	3.	7/22
< 20.		9/14

TABLE C-V (cont)

****

EPA GC/MS Base Neutrals
in Water (cont)

****

m-Dichlorobenzene (1,3)
86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/12

CV = 52. ± 10.4 ug/L

Result	± Uncer.	Date
26.	5.	7/22
8.	8.	9/14

---

p-Dichlorobenzene (1,4)
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25

CV = 24.8 ± 5. ug/L

Result	± Uncer.	Date
< 20.		9/01

CV = 88. ± 9. ug/L

Result	± Uncer.	Date
28.	6.	9/15

CV = 100. ± 32.1 ug/L

Result	± Uncer.	Date
28.	6.	11/15
44.	9.	12/12

3,3'-Dichlorobenzidine
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 20.		12/12

2,4-Dichlorophenol
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 10.		12/12

Diethyl phthalate
86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/12

CV = 25.1 ± 5. ug/L

Result	± Uncer.	Date
< 20.		7/22
16.	8.	9/14

Dimethyl phthalate
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25

CV = 40. ± 8. ug/L

Result	± Uncer.	Date
< 20.		9/01

CV = 100. ± 23.2 ug/L

Result	± Uncer.	Date
75.	15.	11/15
75.	15.	12/12

CV = 140. ± 10. ug/L

Result	± Uncer.	Date
85.	15.	9/15

2,4-Dimethylphenol
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 10.		12/12

2,4-Dinitrophenol
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 50.		12/12

2,4-Dinitrotoluene
86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/12

CV = 73.8 ± 14.8 ug/L

Result	± Uncer.	Date
< 20.		7/22
65.	15.	9/14

2,6-Dinitrotoluene
86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/12

CV = 76.5 ± 15.3 ug/L

Result	± Uncer.	Date
60.	10.	7/22
50.	10.	9/14

Fluoranthene
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25

CV = 29.8 ± 6. ug/L

Result	± Uncer.	Date
< 20.		9/01

CV = 100. ± 32.8 ug/L

Result	± Uncer.	Date
80.	15.	11/15
90.	20.	12/12

CV = 110. ± 10. ug/L

Result	± Uncer.	Date
55.	10.	9/15

TABLE C-V (cont)

****

EPA GC/MS Base Neutrals
in Water (cont)

****

Fluorene 82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25

CV = 51.2 ± 10.2 ug/L

Result	± Uncer.	Date
< 20.		9/01

CV = 88. ± 9. ug/L

Result	± Uncer.	Date
80.	15.	9/15

CV = 100. ± 20.7 ug/L

Result	± Uncer.	Date
80.	15.	11/15
80.	15.	12/12

Hexachlorobenzene
86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/12

CV = 35.7 ± 7.1 ug/L

Result	± Uncer.	Date
40.	8.	7/22
30.	60.	9/14

Hexachlorobutadiene
86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/12

CV = 49.6 ± 9.9 ug/L

Result	± Uncer.	Date
27.	5.	7/22
21.	4.	9/14

Hexachlorocyclopentadiene
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 10.		12/12

Hexachloroethane
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25

CV = 30. ± 6. ug/L

Result	± Uncer.	Date
< 20.		9/01

CV = 100. ± 24.5 ug/L

Result	± Uncer.	Date
24.	5.	11/15
43.	9.	12/12

CV = 110. ± 10. ug/L

Result	± Uncer.	Date
34.	7.	9/15

Indeno(1,2,3-cd)pyrene
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 10.		12/12

Isophorone 86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/12

CV = 76.7 ± 15.3 ug/L

Result	± Uncer.	Date
90.	20.	7/22
17.	3.	9/14

2-Methyl-4,6-dinitrophenol
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 50.		12/12

2-Methylnaphthalene
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 10.		12/12

2-Methylphenol
4-Methylphenol
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 10.		12/12

Naphthalene 82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25

CV = 24.8 ± 5. ug/L

Result	± Uncer.	Date
< 20.		9/01

CV = 88. ± 9. ug/L

Result	± Uncer.	Date
70.	15.	9/15

CV = 100. ± 30.1 ug/L

Result	± Uncer.	Date
39.	8.	11/15
50.	10.	12/12

2-Nitroaniline
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 50.		12/12

****

EPA GC/MS Base Neutrals
in Water (cont)

****

3-Nitroaniline
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 50.		12/12

4-Nitroaniline
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 50.		12/12

Nitrobenzene
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25

CV = 76.5 ± 15.3 ug/L

Result	± Uncer.	Date
< 20.		9/01

CV = 100. ± 39.3 ug/L

Result	± Uncer.	Date
38.	8.	11/15
60.	10.	12/12

CV = 130. ± 10. ug/L

Result	± Uncer.	Date
90.	20.	9/15

---

o-Nitrophenol
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 10.		12/12

p-Nitrophenol
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 50.		12/12

N-Nitrosodi-n-propylamine
86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/12

CV = 34.8 ± 7. ug/L

Result	± Uncer.	Date
23.	5.	7/22
110.	20.	9/14

N-Nitrosodimethylamine
86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		12/12

N-Nitrosodiphenylamine
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 10.		12/12

Pentachlorophenol
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 50.		12/12

Phenanthrene
86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/12

Phenanthrene (cont)

CV = 40.2 ± 8. ug/L

Result	± Uncer.	Date
44.	9.	7/22
20.	4.	9/14

Phenol 86EPA 02 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
8.	2.	12/12

Phenol 82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 10.		12/12
< 10.		12/12

Pyrene 86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/12

CV = 60.2 ± 12. ug/L

Result	± Uncer.	Date
70.	15.	7/22
105.	20.	9/14

1,2,4-Trichlorobenzene
86EPA 02 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/12

CV = 25.3 ± 5.1 ug/L

Result	± Uncer.	Date
23.	5.	7/22
< 20.		9/14

2,4,5-Trichlorophenol
82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 20.		12/12

TABLE C-V (cont)

****

EPA GC/MS Base Neutrals in Water (cont)

****

2,4,6-Trichlorophenol 82EPA 01 GCMS

CV = Blank (ug/L)

Result	± Uncer.	Date
< 20.		8/25
< 10.		12/12

****

EPA Herbicides in Water

****

2,4-D 85EPA 02 GCEC

CV = 100. ± 22. ug/L

Result	± Uncer.	Date
105.	15.	7/26
105.	15.	7/26

Silvex 85EPA 02 GCEC

CV = 10. ± 2.4 ug/L

Result	± Uncer.	Date
9.	2.	7/26
9.	2.	7/26

****

EPA Trihalomethane in Water

****

Bromodichloromethane 86EPA 02 GCEC

CV = 20. ± 4. ug/L

Result	± Uncer.	Date
16.	2.	6/29

Bromoform 86EPA 02 GCEC

CV = 20. ± 3. ug/L

Result	± Uncer.	Date
8.	8.	6/29

Carbon tetrachloride 86EPA 02 GCEC

CV = 26.6 ug/L

Result	± Uncer.	Date
18.	2.	6/29

Chlorobenzene 86EPA 02 GCEC

CV = 40.4 ug/L

Result	± Uncer.	Date
34.	3.	6/29

Chlorodibromomethane 86EPA 02 GCEC

CV = 49. ± 7. ug/L

Result	± Uncer.	Date
33.	3.	6/29

Chloroform 86EPA 02 GCEC

CV = 20. ± 4. ug/L

Result	± Uncer.	Date
19.	2.	6/29

1,2-Dichloroethane 86EPA 02 GCEC

CV = 25.0 ug/L

Result	± Uncer.	Date
24.	2.	6/29

1,1-Dichloroethene 86EPA 02 GCEC

CV = 20.8 ug/L

Result	± Uncer.	Date
15.	2.	6/29

---

trans-1,2-Dichloroethylene 86EPA 02 GCEC

CV = 55.2 ug/L

Result	± Uncer.	Date
28.	3.	6/29

1,2-Dichloropropane 86EPA 02 GCEC

CV = 40.0 ug/L

Result	± Uncer.	Date
37.	4.	6/29

Methylene chloride 86EPA 02 GCEC

CV = 40.0 ug/L

Result	± Uncer.	Date
21.	2.	6/29

1,1,2,2-Tetrachloroethane 86EPA 02 GCEC

CV = 50.6 ug/L

Result	± Uncer.	Date
28.	3.	6/29

Trichloroethylene 86EPA 02 GCEC

CV = 49.6 ug/L

Result	± Uncer.	Date
50.	5.	6/29

****

EPA Volatile Organic Contaminant in Water

****

Mixed Cymenes 84EPA 02 PTGC

CV = 19.9 ug/L

Result	± Uncer.	Date
< 2.		9/22

Acetone
Benzene 84EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		9/22
< 2.		10/25

TABLE C-V (cont)

****

EPA Volatile Organic
Contaminant in Water (cont)

****

Bis(2-chloroethyl)ether
84EPA 02 PTGC

CV = 20.2 ug/L

Result	± Uncer.	Date
< 2.		9/22

Bromodichloromethane
84EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		9/22
< 2.		10/25

Bromoform 84EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		9/22
< 2.		10/25

CV = 20.4 ug/L

Result	± Uncer.	Date
< 2.		9/22

2-Butanone 84EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		9/22
< 2.		10/25

tert-Butylbenzene
84EPA 02 PTGC

CV = 20. ug/L

Result	± Uncer.	Date
28.	5.	9/19

Carbon disulfide
84EPA 02 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
0.6	0.1	9/19

Carbon disulfide
84EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		9/22
< 2.		10/25

Carbon tetrachloride
84EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		9/22

CV = 20.4 ug/L

Result	± Uncer.	Date
< 2.		10/25

Chlorobenzene
Chlorodibromomethane
Chloroethane
84EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		9/22
< 2.		10/25

Chloroform 84EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		9/22

CV = 20.2 ug/L

Result	± Uncer.	Date
< 2.		10/25

m-Dichlorobenzene (1,3)
84EPA 02 PTGC

CV = 20. ug/L

Result	± Uncer.	Date
60.	10.	9/19

1,1-Dichloroethane
1,2-Dichloroethane
84EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		9/22
< 2.		10/25

1,1-Dichloroethene
84EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		9/22
< 2.		10/25

CV = 20. ug/L

Result	± Uncer.	Date
< 2.		9/22

1,2-Dichloroethene
84EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		9/22
< 2.		10/25

cis-1,2-Dichloroethylene
84EPA 02 PTGC

CV = 20.4 ug/L

Result	± Uncer.	Date
< 2.		9/22

1,2-Dichloropropane
cis-1,3-Dichloropropene
trans-1,3-Dichloropropene
Ethylbenzene
2-Hexanone
84EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		9/22
< 2.		10/25

TABLE C-V (cont)

****

EPA Volatile Organic Contaminant in Water (cont)

****

4-Isopropyltoluene
84EPA 02 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
23.	4.	9/19

Methyl bromide
Methyl chloride
4-Methyl-2-pentanone
Methylene chloride
Styrene
1,1,2,2-Tetrachloroethane
84EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		9/22
< 2.		10/25

Tetrachloroethylene
84EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		9/22
< 2.		10/25

CV = 20. ug/L

Result	± Uncer.	Date
< 2.		9/22

Toluene 84EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		9/22
< 2.		10/25

1,1,1-Trichloroethane
84EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		9/22
< 2.		10/25

1,1,1-Trichloroethane (cont)

CV = 19.8 ug/L

Result	± Uncer.	Date
< 2.		9/22

1,1,2-Trichloroethane
84EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		9/22
< 2.		10/25

CV = 20.2 ug/L

Result	± Uncer.	Date
< 2.		9/22

Trichloroethylene
84EPA 02 PTGC

CV = 19.8 ug/L

Result	± Uncer.	Date
36.	7.	9/19
< 2.		9/22

CV = 20.2 ug/L

Result	± Uncer.	Date
< 2.		10/25

Vinyl acetate
Vinyl chloride
84EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		9/22
< 2.		10/25

---

m-Xylene 84EPA 02 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
8.	2.	9/19

---

o-Xylene 84EPA 02 PTGC

CV = 20.1 ug/L

Result	± Uncer.	Date
34.	6.	9/19

p-Xylene 84EPA 02 PTGC

CV = 19.9 ug/L

Result	± Uncer.	Date
< 2.		9/22

Mixed-Xylenes
84EPA 02 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		9/22
< 2.		10/25

****

EPA Water Pollution Study 21

****

Aroclor 1016 88EPA 02 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 0.1		11/02
< 0.1		11/02
< 0.1		11/02
< 0.1		11/02

Aroclor 1232 88EPA 02 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 0.1		11/02

CV = 7.23 ± 2.02 ug/L

Result	± Uncer.	Date
< 0.1		11/02

Aroclor 1242 88EPA 02 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 0.1		11/02
4.3	0.8	11/02
< 0.1		11/02

CV = 42.6 ± 14.4 ug/L

Result	± Uncer.	Date
34.	6.	11/02

TABLE C-V (cont)

****

EPA Water Pollution Study 21
(cont)

****

Aroclor 1248 88EPA 02 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 0.1		11/02
< 0.1		11/02

Aroclor 1254 88EPA 02 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 0.1		11/02
< 0.1		11/02
< 0.1		11/02
< 0.1		11/02
< 0.1		11/08

Aroclor 1260 88EPA 02 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 0.1		11/02
< 0.1		11/02

CV = 3.75 ± 1.54 ug/L

Result	± Uncer.	Date
2.6	0.5	11/02

CV = 7.12 ± 3.23 ug/L

Result	± Uncer.	Date
3.9	0.8	11/02

****

HSE-9 Organics in Bulk Liquids

****

Acetone 88GAU 01 GCMS

CV = IDENT

Result	± Uncer.	Date
Present		3/16

CV = 21. ± 1. %

Result	± Uncer.	Date
20.	4.	4/06
20.	4.	4/06

Acetone (cont)

CV = 31. ± 2. %

Result	± Uncer.	Date
31.	6.	3/21

Mixed-Aroclor
87GAU 04 GCEC

CV = 36.4 ± 3.6 ug/g

Result	± Uncer.	Date
38.	7.	11/01

Aroclor 1242 86GAU 01 GCEC

CV = 7.2 ± 0.7 ug/g

Result	± Uncer.	Date
5.	1.	7/14
6.	1.	7/26
5.	1.	9/06

CV = 7.9 ± 0.8 ug/g

Result	± Uncer.	Date
7.	1.	3/21
9.	2.	4/01
6.	1.	6/28
6.	1.	7/14

CV = 31. ± 3. ug/g

Result	± Uncer.	Date
22.	4.	7/14
25.	4.	7/14
22.	4.	9/07

CV = 36.4 ± 3.6 ug/g

Result	± Uncer.	Date
36.	5.	4/27
38.	5.	5/20
34.	6.	8/01
37.	8.	9/06
30.	6.	11/01

CV = 53.3 ± 5.3 ug/g

Result	± Uncer.	Date
55.	6.	3/23
46.	5.	4/20
40.	5.	5/10
52.	8.	6/01
41.	8.	6/28
53.	10.	7/14
54.	10.	9/07
55.	10.	11/01
53.	10.	11/01
49.	10.	11/01
59.	6.	12/06

Aroclor 1242 (cont)

51.	10.	12/08
53.	10.	12/16

CV = 300. ± 30. ug/g

Result	± Uncer.	Date
340.	70.	3/11
310.	60.	5/24
320.	60.	5/27
280.	60.	7/14
300.	60.	7/20
260.	50.	9/06

Aroclor 1254 87GAU 04 GCEC

CV = Blank (ug/g)

Result	± Uncer.	Date
5.	1.	11/01
2.	0.5	11/01
4.	1.	11/01

Aroclor 1260 87GAU 04 GCEC

CV = 5. ± 0.5 ug/g

Result	± Uncer.	Date
3.7	0.4	2/01
4.1	0.1	2/26

CV = 21.4 ± 2.1 ug/g

Result	± Uncer.	Date
17.	2.	2/01
21.	3.	5/20
15.	3.	8/16
15.	3.	8/16
22.	4.	12/16

CV = 25. ± 2. ug/g

Result	± Uncer.	Date
20.	4.	7/14
21.	4.	7/14
28.	6.	7/20
20.	4.	9/07

CV = 44.5 ± 4.4 ug/g

Result	± Uncer.	Date
36.	6.	7/14
49.	10.	7/26
38.	8.	8/08
38.	8.	8/16
41.	8.	9/06
34.	6.	11/01
41.	8.	12/08

TABLE C-V (cont)

****

HSE-9 Organics in Bulk Liquids

****

Aroclor 1260 (cont)

CV = 57. ± 6. ug/g

Result	± Uncer.	Date
48.	5.	2/10
48.	5.	4/06

Chlorobenzene 88GAU 01 GCMS

CV = 178. ± 22. ug/g

Result	± Uncer.	Date
180.	50.	9/15

Chloroform 88GAU 01 GCMS

CV = IDENT

Result	± Uncer.	Date
Present		3/16

CV = 40. ± 2. %

Result	± Uncer.	Date
40.	8.	4/06
40.	8.	4/06

CV = 46. ± 5. %

Result	± Uncer.	Date
40.	20.	2/02

---

n-Decane 88GAU 01 GCMS

CV = 22. ± 1. %

Result	± Uncer.	Date
24.	5.	4/06
24.	5.	4/07

---

o-Dichlorobenzene (1,2) 88GAU 01 GCMS

CV = 42. ± 2. %

Result	± Uncer.	Date
24.	5.	3/21

Ethyl acetate 88GAU 01 GCMS

CV = IDENT

Result	± Uncer.	Date
Present		3/16

Hexane 88GAU 01 GCMS

CV = IDENT

Result	± Uncer.	Date
Present		3/16

CV = 17. ± 1. %

Result	± Uncer.	Date
16.	3.	4/06
16.	3.	4/06

CV = 26. ± 3. %

Result	± Uncer.	Date
20.	10.	2/02

CV = 27. ± 1. %

Result	± Uncer.	Date
46.	8.	3/21

CV = 35. ± 4. %

Result	± Uncer.	Date
35.	15.	2/03

2-Hexanone 87GAU 01 GCMS

CV = 65. ± 6. %

Result	± Uncer.	Date
60.	15.	2/03

Isopropyl alcohol 88GAU 01 GCMS

CV = IDENT

Result	± Uncer.	Date
Present		3/16

2-Methyl-1-pentene NDA GCMS

CV = Blank (%)

Result	± Uncer.	Date
5.	2.	2/03

4-Methyl-2-pentanone 88GAU 01 GCMS

CV = IDENT

Result	± Uncer.	Date
Present		3/16

Toluene 88GAU 01 GCMS

CV = IDENT

Result	± Uncer.	Date
Present		3/16

CV = 122. ± 11. ug/g

Result	± Uncer.	Date
120.	30.	9/15

CV = 28. ± 3. %

Result	± Uncer.	Date
40.	20.	2/02

****

HSE-9 Organics in Water

****

Acenaphthene 88GAU 01 GCMS

CV = 39. ug/L

Result	± Uncer.	Date
44.	9.	5/12

CV = 85. ± 9. ug/L

Result	± Uncer.	Date
30.	6.	3/07

Acetone 88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
18.	2.	7/22
47.	5.	7/25
19.	2.	7/25
< 2.		8/02
< 2.		8/09
< 2.		8/09
< 2.		8/29
< 2.		8/29
< 2.		10/25
< 2.		12/14
< 2.		12/20

TABLE C-V (cont)

****

HSE-9 Organics in Water
(cont)

****

Acetone (cont)

CV = 68. ± 7. ug/L

Result	± Uncer.	Date
90.	35.	11/04

Aldrin 87GAU 01 GCEC

CV = 99. ± 20. ng/L

Result	± Uncer.	Date
60.	200.	2/05

Anthracene 88GAU 01 GCMS

CV = 80. ug/L

Result	± Uncer.	Date
70.	15.	5/12

Aroclor 1242 88GAU 01 GCEC

CV = 4. ± 0.4 ug/L

Result	± Uncer.	Date
3.6	0.7	7/26
3.8	0.5	8/03
3.8	0.5	8/03
3.8	0.5	8/03

Benzene 88GAU 01 GCEC

CV = 63. ± 6. ug/L

Result	± Uncer.	Date
50.	15.	12/20

Benzene 88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/02
< 2.		8/09
< 2.		8/09
< 2.		8/29
< 2.		12/14

CV = 61. ± 6. ug/L

Result	± Uncer.	Date
26.	3.	8/02

Benzene (cont)

CV = 65. ± 6. ug/L

Result	± Uncer.	Date
62.	6.	7/25
< 2.		10/25

CV = 68. ± 7. ug/L

Result	± Uncer.	Date
63.	6.	8/02
< 2.		8/02

CV = 70. ± 7. ug/L

Result	± Uncer.	Date
74.	7.	7/22

CV = 72. ± 7. ug/L

Result	± Uncer.	Date
65.	20.	12/20

CV = 74. ± 7. ug/L

Result	± Uncer.	Date
68.	7.	8/04

CV = 83. ± 8. ug/L

Result	± Uncer.	Date
71.	7.	7/30

CV = 92. ± 9. ug/L

Result	± Uncer.	Date
64.	6.	7/25
< 2.		8/29

Benzo(g,h,i)perylene
88GAU 01 GCMS

CV = 161. ug/L

Result	± Uncer.	Date
110.	20.	5/12

Benzo-a-pyrene
88GAU 01 GCMS

CV = 49.8 ug/L

Result	± Uncer.	Date
29.	6.	5/12

Benzo-b-fluoranthene
88GAU 01 GCMS

CV = 80. ug/L

Result	± Uncer.	Date
70.	15.	5/12

Bis(2-chloroethyl)ether
87GAU 01 GCMS

CV = 52. ± 8. ug/L

Result	± Uncer.	Date
< 200.		1/14
< 200.		3/08

Bis(2-chloroisopropyl)ether
87GAU 01 GCFID

CV = 380. ± 40. ug/L

Result	± Uncer.	Date
< 200.		1/14

Bis(2-chloroisopropyl)ether
88GAU 01 GCMS

CV = 77.6 ug/L

Result	± Uncer.	Date
90.	20.	5/12

Bis(2-ethylhexyl)phthalate
88GAU 01 GCMS

CV = 58.2 ug/L

Result	± Uncer.	Date
95.	20.	5/12

Bromobenzene
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		12/14
< 2.		12/20

Bromochloromethane
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/14
< 10.		12/20

TABLE C-V (cont)

****

HSE-9 Organics in Water
(cont)

****

Bromodichloromethane
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/02
< 2.		8/09
< 2.		8/29
< 2.		8/29
< 2.		10/25

CV = 68. ± 7. ug/L

Result	± Uncer.	Date
58.	6.	5/31
67.	7.	6/29

CV = 69. ± 7. ug/L

Result	± Uncer.	Date
58.	15.	12/20

CV = 72. ± 7. ug/L

Result	± Uncer.	Date
68.	7.	3/14
71.	7.	6/29

CV = 77. ± 8. ug/L

Result	± Uncer.	Date
60.	20.	12/14

CV = 81. ± 8. ug/L

Result	± Uncer.	Date
77.	8.	4/29
70.	7.	5/31

CV = 94. ± 9. ug/L

Result	± Uncer.	Date
88.	9.	6/01
94.	9.	6/29

CV = 98. ± 10. ug/L

Result	± Uncer.	Date
96.	10.	3/14

Bromoform 88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/02
< 2.		8/09
< 2.		8/09
< 2.		8/29

CV = 64. ± 6. ug/L

Result	± Uncer.	Date
48.	5.	8/02

CV = 68. ± 7. ug/L

Result	± Uncer.	Date
67.	7.	7/25
< 2.		10/25

CV = 72. ± 7. ug/L

Result	± Uncer.	Date
96.	10.	8/02

CV = 74. ± 7. ug/L

Result	± Uncer.	Date
83.	8.	7/22

CV = 78. ± 8. ug/L

Result	± Uncer.	Date
79.	8.	8/04

CV = 83. ± 8. ug/L

Result	± Uncer.	Date
87.	9.	4/29

CV = 88. ± 9. ug/L

Result	± Uncer.	Date
130.	10.	7/30

CV = 91. ± 9. ug/L

Result	± Uncer.	Date
70.	20.	12/20

CV = 98. ± 10. ug/L

Result	± Uncer.	Date
73.	7.	7/25
< 2.		8/29

CV = 103. ± 10. ug/L

Result	± Uncer.	Date
70.	20.	12/14

4-Bromophenylphenyl ether
88GAU 01 GCMS

CV = 83. ug/L

Result	± Uncer.	Date
60.	10.	5/12

2-Butanone 88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
32.	3.	6/29
44.	4.	6/29
98.	10.	7/22
95.	10.	7/25
53.	5.	7/25
110.	10.	8/25
< 2.		8/29
< 2.		8/29
30.	6.	9/19
< 2.		10/25
< 10.		12/14
< 10.		12/20

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n-Butylbenzene
sec-Butylbenzene
tert-Butylbenzene
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		12/14
< 2.		12/20

Butylbenzyl phthalate
88GAU 01 GCMS

CV = 103. ug/L

Result	± Uncer.	Date
125.	25.	5/12

Carbon disulfide
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/02
< 2.		8/09
< 2.		8/09
< 2.		8/09
< 2.		8/29
< 2.		8/29
< 2.		8/29
< 2.		10/25
< 10.		12/14
< 10.		12/20

****

HSE-9 Organics in Water
(cont)

****

Carbon tetrachloride
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
0.09		7/22
< 2.		8/09
< 2.		8/09
< 2.		8/29

CV = 61. ± 6. ug/L

Result	± Uncer.	Date
21.	2.	8/02

CV = 64. ± 6. ug/L

Result	± Uncer.	Date
44.	4.	7/25
< 2.		10/25

CV = 65. ± 6. ug/L

Result	± Uncer.	Date
59.	6.	3/14

CV = 68. ± 7. ug/L

Result	± Uncer.	Date
58.	6.	8/02

CV = 70. ± 7. ug/L

Result	± Uncer.	Date
60.	6.	7/22

CV = 74. ± 7. ug/L

Result	± Uncer.	Date
66.	7.	4/29
49.	5.	7/22

CV = 80. ± 8. ug/L

Result	± Uncer.	Date
70.	20.	12/20

CV = 83. ± 8. ug/L

Result	± Uncer.	Date
72.	7.	7/30

Carbon tetrachloride (cont)

CV = 89. ± 9. ug/L

Result	± Uncer.	Date
82.	8.	3/14

CV = 90. ± 9. ug/L

Result	± Uncer.	Date
60.	20.	12/14

CV = 92. ± 9. ug/L

Result	± Uncer.	Date
47.	5.	7/25
< 2.		8/29

4-Chloro-3-methylphenol
88GAU 01 GCMS

CV = 54. ± 5. ug/L

Result	± Uncer.	Date
31.	3.	3/28

CV = 86. ± 9. ug/L

Result	± Uncer.	Date
36.	4.	3/28

CV = 180. ± 20. ug/L

Result	± Uncer.	Date
31.	6.	3/07

Chlorobenzene
88GAU 01 GCEC

CV = 77. ± 8. ug/L

Result	± Uncer.	Date
50.	15.	12/20

Chlorobenzene
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/09
< 2.		8/09
< 2.		8/29
< 2.		8/29
< 2.		10/25
< 2.		12/20

Chlorobenzene (cont)

CV = 42. ± 4. ug/L

Result	± Uncer.	Date
32.	3.	3/14

CV = 48. ± 5. ug/L

Result	± Uncer.	Date
41.	4.	4/29

CV = 50. ± 5. ug/L

Result	± Uncer.	Date
80.	15.	9/19

CV = 54. ± 5. ug/L

Result	± Uncer.	Date
50.	5.	7/30

CV = 58. ± 6. ug/L

Result	± Uncer.	Date
52.	5.	3/14

CV = 62. ± 6. ug/L

Result	± Uncer.	Date
59.	6.	7/25
58.	6.	7/25

CV = 64. ± 6. ug/L

Result	± Uncer.	Date
55.	6.	4/29

CV = 67. ± 7. ug/L

Result	± Uncer.	Date
< 5.		2/22

CV = 70. ± 7. ug/L

Result	± Uncer.	Date
67.	7.	7/22
67.	7.	8/02

CV = 73. ± 7. ug/L

Result	± Uncer.	Date
30.	3.	8/02
130.	30.	9/19

CV = 78. ± 8. ug/L

Result	± Uncer.	Date
84.	8.	8/08

****

HSE-9 Organics in Water
(cont)

****

Chlorobenzene (cont)

CV = 98. ± 10. ug/L

Result	± Uncer.	Date
45.	15.	12/14

Chlorodibromomethane
88GAU 01 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
1.	1.	7/22

Chlorodibromomethane
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/09
< 2.		8/09
< 2.		8/29
< 2.		8/29
< 2.		10/25
< 2.		12/14
< 2.		12/20

CV = 59. ± 6. ug/L

Result	± Uncer.	Date
60.	10.	9/19

CV = 64. ± 6. ug/L

Result	± Uncer.	Date
70.	7.	7/30

CV = 74. ± 7. ug/L

Result	± Uncer.	Date
69.	7.	7/25
64.	6.	7/25

CV = 83. ± 8. ug/L

Result	± Uncer.	Date
75.	8.	7/22
75.	8.	8/02

Chlorodibromomethane (cont)

CV = 86. ± 9. ug/L

Result	± Uncer.	Date
51.	5.	8/02
110.	20.	9/19

CV = 92. ± 9. ug/L

Result	± Uncer.	Date
96.	10.	8/04

CV = 110. ± 10. ug/L

Result	± Uncer.	Date
100.	10.	4/29

Chloroethane
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/02
< 2.		8/09
< 2.		8/09
< 2.		8/09
< 2.		8/29
< 2.		8/29
< 2.		8/29
< 2.		10/25
< 2.		12/14
< 2.		12/20

Chloroform 88GAU 01 GCEC

CV = 51. ± 5. ug/L

Result	± Uncer.	Date
40.	15.	12/20

Chloroform 88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 15.		8/29
< 2.		12/14

CV = 58. ± 6. ug/L

Result	± Uncer.	Date
55.	15.	12/20

CV = 73. ± 7. ug/L

Result	± Uncer.	Date
68.	7.	8/02

Chloroform (cont)

CV = 80. ± 8. ug/L

Result	± Uncer.	Date
70.	15.	5/31
65.	6.	6/29

CV = 84. ± 8. ug/L

Result	± Uncer.	Date
68.	7.	4/29
< 2.		8/29
< 2.		10/25

CV = 86. ± 9. ug/L

Result	± Uncer.	Date
76.	8.	6/29

CV = 94. ± 9. ug/L

Result	± Uncer.	Date
85.	8.	7/22
85.	8.	8/02

CV = 96. ± 10. ug/L

Result	± Uncer.	Date
80.	8.	5/31

CV = 98. ± 10. ug/L

Result	± Uncer.	Date
79.	8.	8/02

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
90.	9.	7/22
100.	10.	7/25
90.	10.	7/30

CV = 110. ± 10. ug/L

Result	± Uncer.	Date
100.	10.	6/01
94.	9.	6/29

1-Chlorohexane
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		12/14
< 2.		12/20

TABLE C-V (cont)

****

HSE-9 Organics in Water
(cont)

****

2-Chloronaphthalene
87GAU 01 GCMS

CV = 57. ± 8. ug/L

Result	± Uncer.	Date
< 5.		1/14
< 5.		3/08

o-Chlorophenol
88GAU 01 GCMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
73.	7.	3/28

CV = 160. ± 20. ug/L

Result	± Uncer.	Date
46.	5.	3/28

p-Chlorophenol
88GAU 01 GCMS

CV = 180. ± 20. ug/L

Result	± Uncer.	Date
< 20.		3/08

4-Chlorophenylphenyl ether
88GAU 01 GCMS

CV = 153. ug/L

Result	± Uncer.	Date
160.	30.	5/12

o-Chlorotoluene
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		12/14
< 2.		12/20

p-Chlorotoluene
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/14
< 10.		12/20

Chrysene 88GAU 01 GCMS

CV = 140. ug/L

Result	± Uncer.	Date
120.	20.	5/12

2,4-D 88GAU 01 GCEC

CV = 0.96 ± 0.1 ug/L

Result	± Uncer.	Date
1.2	0.4	8/03
1.2	0.4	8/03

CV = 5.4 ± 0.5 ug/L

Result	± Uncer.	Date
5.4	0.3	8/31

Dibenzo(a,h)anthracene
88GAU 01 GCMS

CV = 81.4 ug/L

Result	± Uncer.	Date
50.	10.	5/12

1,2-Dibromo-3-chloropropane
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/14
< 10.		12/20

Dibromomethane
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		12/14
< 2.		12/20

1,1-Dichloro-1-propene
88GAU 01 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
70.	20.	7/22

1,1-Dichloro-1-propene
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/14
< 10.		12/20

o-Dichlorobenzene (1,2)
87GAU 01 GCMS

CV = 72. ± 10. ug/L

Result	± Uncer.	Date
160.	30.	4/06

o-Dichlorobenzene (1,2)
m-Dichlorobenzene (1,3)
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		12/14
< 2.		12/20

p-Dichlorobenzene (1,4)
88GAU 01 GCMS

CV = 49.6 ug/L

Result	± Uncer.	Date
19.	4.	5/12

CV = 52. ± 5. ug/L

Result	± Uncer.	Date
20.	20.	3/28

CV = 60. ± 6. ug/L

Result	± Uncer.	Date
< 20.		3/28

TABLE C-V (cont)

****

HSE-9 Organics in Water
(cont)

****

p-Dichlorobenzene (1,4)
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/14
< 10.		12/20

1,1-Dichloroethane
88GAU 01 PTGC

Result	± Uncer.	Date
< 2.		8/02
< 2.		8/09
< 2.		8/09
< 2.		8/09
< 2.		8/29
< 2.		8/29
< 2.		8/29
< 2.		10/25
< 2.		12/14
< 2.		12/20

1,2-Dichloroethane
88GAU 01 GCEC

CV = 77. ± 8. ug/L

Result	± Uncer.	Date
60.	20.	12/20

1,2-Dichloroethane
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/09
< 2.		8/09
< 2.		8/29
< 2.		12/14

CV = 66. ± 7. ug/L

Result	± Uncer.	Date
70.	7.	7/22

CV = 76. ± 8. ug/L

Result	± Uncer.	Date
< 2.		8/29
< 2.		10/25

1,2-Dichloroethane (cont)

CV = 86. ± 9. ug/L

Result	± Uncer.	Date
89.	9.	7/22
89.	9.	8/02

CV = 88. ± 9. ug/L

Result	± Uncer.	Date
75.	25.	12/20

CV = 89. ± 9. ug/L

Result	± Uncer.	Date
85.	8.	8/02

CV = 91. ± 9. ug/L

Result	± Uncer.	Date
180.	20.	7/30

CV = 95. ± 10. ug/L

Result	± Uncer.	Date
100.	10.	7/22
170.	20.	8/08

1,1-Dichloroethene
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/02
< 2.		8/09
< 2.		8/09
< 2.		8/09
< 2.		8/29
< 2.		8/29
< 2.		8/29
< 2.		10/25
< 2.		12/14
< 2.		12/20

1,2-Dichloroethene
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
91.	9.	7/22
2.	0.2	7/25
170.	10.	7/25
< 2.		8/02
< 2.		8/09
< 2.		8/09
< 2.		8/29
< 2.		8/29
< 2.		10/25

cis-1,2-Dichloroethylene
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		12/14
< 2.		12/20

trans-1,2-Dichloroethylene
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		12/14
< 2.		12/20

CV = 75. ± 8. ug/L

Result	± Uncer.	Date
< 5.		2/22

1,2-Dichloropropane
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/02
< 2.		8/09
< 2.		8/09
< 2.		8/09
< 2.		8/29
< 2.		8/29
< 2.		8/29
< 2.		10/25
< 2.		12/14
< 2.		12/20

1,3-Dichloropropane
2,2-Dichloropropane
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		12/14
< 2.		12/20

cis-1,3-Dichloropropene
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/02
< 2.		8/09
< 2.		8/09
< 2.		8/09
< 2.		8/29

****

HSE-9 Organics in Water
(cont)

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cis-1,3-Dichloropropene (cont)

< 2.	8/29
< 2.	8/29
< 2.	10/25
< 10.	12/14
< 10.	12/20

---

trans-1,3-Dichloropropene
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/02
< 2.		8/09
< 2.		8/09
< 2.		8/09
< 2.		8/29
< 2.		8/29
< 2.		8/29
< 2.		10/25
< 2.		12/14
< 2.		12/20

Dimethyl phthalate
88GAU 01 GCMS

CV = 80. ug/L

Result	± Uncer.	Date
100.	20.	5/12

2,4-Dinitrotoluene
88GAU 01 GCMS

CV = 74. ± 7. ug/L

Result	± Uncer.	Date
46.	5.	3/28

CV = 84. ± 8. ug/L

Result	± Uncer.	Date
50.	5.	3/28

2,6-Dinitrotoluene
87GAU 01 GCFID

CV = 280. ± 30. ug/L

Result	± Uncer.	Date
< 200.		1/14

1,4-Dioxane
88GAU 01 PTGC

CV = 84. ± 8. ug/L

Result	± Uncer.	Date
< 500.		11/04

Endrin 88GAU 01 GCEC

CV = 0.18 ± 0.02 ug/L

Result	± Uncer.	Date
0.2	0.2	4/01

Ethylbenzene
88GAU 01 GCMS

CV = 49. ± 5. mg/L

Result	± Uncer.	Date
35.	9.	7/15
38.	10.	7/15

Ethylbenzene
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/29

CV = 49. ± 5. ug/L

Result	± Uncer.	Date
55.	6.	7/22

CV = 51. ± 5. ug/L

Result	± Uncer.	Date
43.	4.	5/31

CV = 56. ± 6. ug/L

Result	± Uncer.	Date
< 2.		8/29
< 2.		10/25

CV = 60. ± 6. ug/L

Result	± Uncer.	Date
52.	5.	6/29

CV = 61. ± 9. ug/L

Result	± Uncer.	Date
52.	5.	1/22

Ethylbenzene (cont)

CV = 62. ± 6. ug/L

Result	± Uncer.	Date
50.	15.	12/20

CV = 63. ± 6. ug/L

Result	± Uncer.	Date
65.	6.	7/22
65.	6.	8/02

CV = 66. ± 7. ug/L

Result	± Uncer.	Date
63.	6.	8/02

CV = 67. ± 7. ug/L

Result	± Uncer.	Date
66.	7.	7/30

CV = 68. ± 7. ug/L

Result	± Uncer.	Date
65.	6.	6/01

CV = 69. ± 7. ug/L

Result	± Uncer.	Date
40.	15.	12/14

CV = 70. ± 7. ug/L

Result	± Uncer.	Date
75.	8.	7/25
70.	7.	8/04

CV = 76. ± 8. ug/L

Result	± Uncer.	Date
70.	7.	6/29

Fluoranthene
88GAU 01 GCMS

CV = 59.6 ug/L

Result	± Uncer.	Date
85.	15.	5/12

Fluorene 88GAU 01 GCMS

CV = 102.4 ug/L

Result	± Uncer.	Date
100.	20.	5/12

TABLE C-V (cont)

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HSE-9 Organics in Water
(cont)

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Fluorotrichloromethane
Hexachlorobutadiene
88GAU 01 PTGC

CV = Blank (ug/L)

Result	±	Uncer.	Date
< 2.			12/14
< 2.			12/20

Hexachloroethane
88GAU 01 GCMS

CV = 60. ug/L

Result	±	Uncer.	Date
33.		7.	5/12

2-Hexanone 88GAU 01 PTGC

CV = Blank (ug/L)

Result	±	Uncer.	Date
14.		1.	7/22
14.		1.	7/25
17.		2.	7/25
< 2.			8/09
< 2.			8/09
12.		1.	8/25
< 2.			8/29
< 2.			8/29
< 2.			10/25
< 10.			12/14
< 10.			12/20

Isopropylbenzene
88GAU 01 PTGC

CV = Blank (ug/L)

Result	±	Uncer.	Date
< 10.			12/14
< 10.			12/20

4-Isopropyltoluene
88GAU 01 PTGC

CV = Blank (ug/L)

Result	±	Uncer.	Date
< 2.			12/14
< 2.			12/20

Lindane 88GAU 01 GCEC

CV = 0.056 ± 0.006 ug/L

Result	±	Uncer.	Date
0.2		0.2	3/24

CV = 0.1 ± 0.01 ug/L

Result	±	Uncer.	Date
0.08		0.02	7/26
0.08		0.02	7/26

CV = 0.15 ± 0.02 ug/L

Result	±	Uncer.	Date
0.17		0.05	8/03
0.17		0.05	8/03

CV = 130. ± 20. ng/L

Result	±	Uncer.	Date
100.		200.	2/05

Methoxychlor 88GAU 01 GCEC

CV = 0.11 ± 0.01 ug/L

Result	±	Uncer.	Date
0.17		0.05	7/26
0.17		0.05	7/26

CV = 1. ± 0.1 ug/L

Result	±	Uncer.	Date
1.0		0.2	8/03
1.0		0.2	8/03

Methyl bromide
Methyl chloride
88GAU 01 PTGC

CV = Blank (ug/L)

Result	±	Uncer.	Date
< 2.			8/02
< 2.			8/09
< 2.			8/09
< 2.			8/09
< 2.			8/29
< 2.			8/29
< 2.			8/29
< 2.			10/25
< 2.			12/14
< 2.			12/20

4-Methyl-2-pentanone
88GAU 01 PTGC

CV = Blank (ug/L)

Result	±	Uncer.	Date
< 2.			8/02
< 2.			8/29
< 10.			12/14
< 10.			12/20

CV = 42. ± 4. ug/L

Result	±	Uncer.	Date
41.		8.	5/31

CV = 49. ± 5. ug/L

Result	±	Uncer.	Date
45.		9.	6/29

CV = 52. ± 5. ug/L

Result	±	Uncer.	Date
42.		4.	8/02

CV = 55. ± 6. ug/L

Result	±	Uncer.	Date
56.		6.	7/25
< 2.			10/25

CV = 56. ± 6. ug/L

Result	±	Uncer.	Date
39.		8.	6/01

CV = 58. ± 6. ug/L

Result	±	Uncer.	Date
57.		6.	8/02

CV = 60. ± 6. ug/L

Result	±	Uncer.	Date
62.		6.	7/22

CV = 63. ± 6. ug/L

Result	±	Uncer.	Date
69.		7.	6/29
56.		6.	8/04

CV = 71. ± 7. ug/L

Result	±	Uncer.	Date
81.		8.	7/30

TABLE C-V (cont)

****

HSE-9 Organics in Water
(cont)

****

4-Methyl-2-pentanone (cont)

CV = 79. ± 8. ug/L

Result	± Uncer.	Date
53.	5.	7/25
< 2.		8/29

Methylene chloride 88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/02
< 2.		8/09
< 2.		8/09
< 2.		8/09
< 2.		8/29
< 2.		8/29
< 2.		8/29
< 2.		10/25
< 2.		12/14
< 2.		12/20

CV = IDENT %

Result	± Uncer.	Date
> 10.		3/14
> 10.		3/14
5.	9.	9/19

2-Methylnaphthalene 88GAU 01 GCMS

CV = 130. ± 10. ug/L

Result	± Uncer.	Date
61.	6.	3/28

CV = 150. ± 20. ug/L

Result	± Uncer.	Date
33.	3.	3/28

Naphthalene 88GAU 01 GCMS

CV = 49.6 ug/L

Result	± Uncer.	Date
60.	10.	5/12

Naphthalene 88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		12/14
< 2.		12/20

Nitrobenzene 88GAU 01 GCMS

CV = 153. ug/L

Result	± Uncer.	Date
130.	30.	5/12

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o-Nitrophenol 87GAU 01 GCMS

CV = 76. ± 20. ug/L

Result	± Uncer.	Date
< 20.		4/06

CV = 100. ± 20. ug/L

Result	± Uncer.	Date
76.	8.	1/14
< 20.		1/14
< 20.		3/08

N-Nitrosodimethylamine 87GAU 01 GCFID

CV = 480. ± 50. ug/L

Result	± Uncer.	Date
< 200.		1/14

N-Nitrosodiphenylamine 87GAU 01 GCMS

CV = 51. ± 8. ug/L

Result	± Uncer.	Date
< 5.		1/14
< 5.		3/08

Pentachlorophenol 88GAU 01 GCMS

CV = 68. ± 7. ug/L

Result	± Uncer.	Date
50.	50.	3/28

Pentachlorophenol (cont)

CV = 88. ± 20. ug/L

Result	± Uncer.	Date
< 100.		4/06

CV = 96. ± 10. ug/L

Result	± Uncer.	Date
< 5.		1/14
90.	9.	1/14
< 5.		3/08

CV = 110. ± 10. ug/L

Result	± Uncer.	Date
88.	9.	3/28

CV = 160. ± 20. ug/L

Result	± Uncer.	Date
110.	50.	3/07

Phenol 87GAU 01 GCMS

CV = 97. ± 10. ug/L

Result	± Uncer.	Date
< 5.		1/14
35.	4.	1/14
< 5.		3/08

Propylbenzene 88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		12/14
< 2.		12/20

Pyrene 88GAU 01 GCMS

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
100.	20.	3/07

CV = 112. ± 12. ug/L

Result	± Uncer.	Date
115.	25.	5/12

TABLE C-V (cont)

****

HSE-9 Organics in Water
(cont)

****

Silvex 88GAU 01 GCEC

CV = 1.2 ± 0.1 ug/L

Result	± Uncer.	Date
1.2	0.2	8/03
1.2	0.2	8/03

CV = 2.4 ± 0.2 ug/L

Result	± Uncer.	Date
2.0	0.2	8/31

Styrene 88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/02
< 2.		8/09
< 2.		8/09
< 2.		8/09
< 2.		8/29
< 2.		8/29
< 2.		8/29
< 2.		10/25
< 2.		12/14
< 2.		12/20

1,1,1,2-Tetrachloroethane
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		12/14
< 2.		12/20

1,1,2,2-Tetrachloroethane
88GAU 01 GCEC

CV = 68. ± 7. ug/L

Result	± Uncer.	Date
50.	15.	12/20

1,1,2,2-Tetrachloroethane
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/02
< 2.		8/09
< 2.		8/09
< 2.		8/09
< 2.		8/29
< 2.		8/29
< 2.		8/29
< 2.		10/25
< 10.		12/20

CV = 87. ± 9. ug/L

Result	± Uncer.	Date
40.	10.	12/14

Tetrachloroethylene
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/02
< 2.		8/09
< 2.		8/09
< 2.		8/09
< 2.		8/29
< 2.		8/29
< 2.		8/29
< 2.		10/25
< 2.		12/14
< 2.		12/20

CV = 64. ± 6. ug/L

Result	± Uncer.	Date
55.	6.	3/14

CV = 73. ± 7. ug/L

Result	± Uncer.	Date
62.	6.	4/29

CV = 87. ± 9. ug/L

Result	± Uncer.	Date
80.	8.	3/14

CV = 100. ± 10. ug/L

Result	± Uncer.	Date
< 5.		2/22

Toluene 88GAU 01 GCEC

CV = 63. ± 6. ug/L

Result	± Uncer.	Date
45.	15.	12/20

Toluene 88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/29
< 2.		10/25
< 2.		12/14

CV = 42. ± 4. ug/L

Result	± Uncer.	Date
36.	4.	6/29

CV = 43. ± 4. ug/L

Result	± Uncer.	Date
32.	3.	5/31

CV = 47. ± 5. ug/L

Result	± Uncer.	Date
41.	4.	6/29

CV = 50. ± 8. ug/L

Result	± Uncer.	Date
42.	4.	1/22

CV = 51. ± 5. ug/L

Result	± Uncer.	Date
38.	8.	5/31
80.	15.	9/19

CV = 56. ± 6. ug/L

Result	± Uncer.	Date
30.	15.	4/29
50.	5.	7/30

CV = 60. ± 6. ug/L

Result	± Uncer.	Date
39.	4.	6/01
54.	5.	6/29

CV = 64. ± 6. ug/L

Result	± Uncer.	Date
62.	6.	7/25
64.	6.	7/25

****

HSE-9 Organics in Water
(cont)

****

Toluene (cont)

CV = 72. ± 7. ug/L

Result	± Uncer.	Date
72.	7.	7/22
72.	7.	8/02
60.	20.	12/20

CV = 75. ± 8. ug/L

Result	± Uncer.	Date
33.	3.	8/02
120.	25.	9/19

CV = 80. ± 8. ug/L

Result	± Uncer.	Date
86.	9.	8/04

Total trihalomethanes
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		9/22

1,2,3-Trichlorobenzene
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		12/14
< 2.		12/20

1,2,4-Trichlorobenzene
88GAU 01 GCMS

CV = 60. ± 6. ug/L

Result	± Uncer.	Date
< 20.		3/08

CV = 98. ± 20. ug/L

Result	± Uncer.	Date
25.	5.	4/06

CV = 164. ± 16. ug/L

Result	± Uncer.	Date
100.	20.	5/12

1,2,4-Trichlorobenzene
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		12/14
< 2.		12/20

1,1,1-Trichloroethane
88GAU 01 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
60.	6.	8/02

1,1,1-Trichloroethane
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/09
< 2.		8/09
< 2.		8/29
< 2.		8/29
< 2.		10/25
< 2.		12/14
< 2.		12/20

CV = 54. ± 5. ug/L

Result	± Uncer.	Date
75.	15.	9/19

CV = 60. ± 6. ug/L

Result	± Uncer.	Date
44.	4.	7/30

CV = 68. ± 7. ug/L

Result	± Uncer.	Date
48.	5.	7/25
55.	6.	7/25

CV = 76. ± 8. ug/L

Result	± Uncer.	Date
60.	6.	7/22
60.	6.	8/02

CV = 80. ± 8. ug/L

Result	± Uncer.	Date
32.	3.	8/02
110.	20.	9/19

1,1,1-Trichloroethane (cont)

CV = 85. ± 8. ug/L

Result	± Uncer.	Date
82.	8.	7/22

1,1,2-Trichloroethane
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/02
< 2.		8/09
< 2.		8/09
< 2.		8/09
< 2.		8/29
< 2.		8/29
< 2.		8/29
< 2.		10/25
< 2.		12/14
< 2.		12/20

Trichloroethylene
88GAU 01 GCEC

CV = 56. ± 6. ug/L

Result	± Uncer.	Date
40.	10.	12/20

Trichloroethylene
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/02
70.	7.	8/04
< 2.		8/09
< 2.		8/09
< 2.		8/09
< 2.		8/29
< 2.		8/29
< 2.		10/25
< 2.		12/20

CV = 72. ± 7. ug/L

Result	± Uncer.	Date
30.	10.	12/14

1,2,3-Trichloropropane
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 10.		12/14
< 10.		12/20

TABLE C-V (cont)

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HSE-9 Organics in Water
(cont)

****

1,1,2-Trichlorotrifluoroethane
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
14.	2.	7/25
3.4	0.3	8/25

1,2,4-Trimethylbenzene
1,3,5-Trimethylbenzene
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		12/14
< 2.		12/20

Vinyl acetate
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/02
< 2.		8/09
< 2.		8/09
< 2.		8/09
< 2.		8/29
< 2.		8/29
< 2.		8/29
< 2.		10/25
< 2.		12/14
< 2.		12/20

Vinyl chloride
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		8/02
< 2.		8/09
< 2.		8/09
< 2.		8/09
< 2.		8/29
< 2.		8/29
< 2.		8/29
< 2.		10/25
< 2.		12/14
< 2.		12/20

m-Xylene 88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
28.	8.	12/14
28.	8.	12/20

o-Xylene 88GAU 01 GCEC

CV = 47. ± 5. ug/L

Result	± Uncer.	Date
30.	10.	12/20

o-Xylene 88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
< 2.		12/20

CV = 52. ± 5. ug/L

Result	± Uncer.	Date
< 2.		8/02

CV = 61. ± 6. ug/L

Result	± Uncer.	Date
28.	9.	12/14

CV = 67. ± 7. ug/L

Result	± Uncer.	Date
64.	6.	8/02

CV = 70. ± 7. ug/L

Result	± Uncer.	Date
62.	6.	8/02

CV = 71. ± 7. ug/L

Result	± Uncer.	Date
66.	7.	7/30

CV = 74. ± 7. ug/L

Result	± Uncer.	Date
72.	7.	7/25

p-Xylene 88GAU 01 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
80.	8.	6/01

p-Xylene 88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
63.	6.	8/04

Mixed-Xylenes
88GAU 01 GCEC

CV = Blank (ug/L)

Result	± Uncer.	Date
52.	5.	7/22

Mixed-Xylenes
88GAU 01 PTGC

CV = Blank (ug/L)

Result	± Uncer.	Date
60.	10.	7/22
< 2.		8/02
< 2.		8/09
< 2.		8/09
< 2.		8/09
67.	7.	8/25
< 2.		8/29
< 2.		8/29
< 2.		10/25

****

HSE-9 Organics on Charcoal

****

Acetone 88GAU 01 GCFID

CV = 2. ± 0.2 mg/tube

Result	± Uncer.	Date
2.1	0.1	2/24
2.1	0.1	2/24

Acetone 88GAU 01 GCMS

CV = 0.7 ± 0.07 mg/badge

Result	± Uncer.	Date
1.3	0.2	8/10

CV = 0.97 ± 0.1 mg/badge

Result	± Uncer.	Date
1.3	0.2	7/21

TABLE C-V (cont)

****

HSE-9 Organics on Charcoal
(cont)

****

Benzene 88GAU 01 GCFID

CV = 0.1048 ± 0.0079 mg/tube

Result	± Uncer.	Date
0.10	0.1	10/25

CV = 0.24 ± 0.02 mg/tube

Result	± Uncer.	Date
0.19	0.1	10/25

CV = 0.32 ± 0.03 mg/tube

Result	± Uncer.	Date
0.3	0.1	10/25

CV = 0.49 ± 0.05 mg/tube

Result	± Uncer.	Date
0.4	0.1	10/25

CV = 0.8 ± 0.1 mg/tube

Result	± Uncer.	Date
0.7	0.1	3/25

Benzene 88GAU 01 GCMS

CV = Blank (ug/tube)

Result	± Uncer.	Date
< 10.		10/26
< 10.		10/26
< 10.		10/26

CV = 53. ± 5. ug/tube

Result	± Uncer.	Date
45.2	0.1	11/08

CV = 64. ± 6. ug/tube

Result	± Uncer.	Date
53.4	0.1	11/08

CV = 74. ± 7. ug/tube

Result	± Uncer.	Date
61.2	0.1	11/08

Benzene (cont)

CV = 110. ± 10. ug/tube

Result	± Uncer.	Date
88.6	0.1	11/08
15.0	0.1	11/08

CV = 160. ± 20. ug/tube

Result	± Uncer.	Date
145.2	0.1	11/08

Carbon tetrachloride
88GAU 01 GCFID

CV = 0.33 ± 0.03 mg/tube

Result	± Uncer.	Date
0.4	0.1	7/28

CV = 0.52 ± 0.05 mg/tube

Result	± Uncer.	Date
0.5	0.1	7/28

CV = 0.73 ± 0.05 mg/tube

Result	± Uncer.	Date
0.6	0.1	7/28

CV = 0.79 ± 0.08 mg/tube

Result	± Uncer.	Date
0.8	0.1	7/28

CV = 0.8425 ± 0.0576 mg/tube

Result	± Uncer.	Date
0.8	0.1	2/10

CV = 1.2 ± 0.1 mg/tube

Result	± Uncer.	Date
1.2	0.1	2/10

CV = 1.6 ± 0.2 mg/tube

Result	± Uncer.	Date
1.6	0.1	2/10

CV = 1.8 ± 0.2 mg/tube

Result	± Uncer.	Date
1.9	0.1	2/10

Carbon tetrachloride
88GAU 01 GCMS

CV = Blank (ug/tube)

Result	± Uncer.	Date
< 10.		10/26
< 10.		10/26
< 10.		10/26

CV = 59. ± 6. ug/tube

Result	± Uncer.	Date
71.0	0.1	11/08
70.2	0.1	11/08

CV = 71. ± 7. ug/tube

Result	± Uncer.	Date
81.5	0.1	11/08

CV = 89. ± 9. ug/tube

Result	± Uncer.	Date
96.6	0.1	11/08

CV = 120. ± 10. ug/tube

Result	± Uncer.	Date
129.4	0.1	11/08

CV = 180. ± 20. ug/tube

Result	± Uncer.	Date
195.4	0.1	11/08

Cellosolve acetate
88GAU 01 GCFID

CV = 0.39 ± 0.04 mg/tube

Result	± Uncer.	Date
0.3	0.1	5/02

CV = 0.79 ± 0.08 mg/tube

Result	± Uncer.	Date
0.6	0.1	5/02

CV = 0.98 ± 0.1 mg/tube

Result	± Uncer.	Date
0.8	0.1	5/02

CV = 1.0819 ± 0.3742 mg/tube

Result	± Uncer.	Date
0.9	0.1	5/02

TABLE C-V (cont)

****

HSE-9 Organics on Charcoal (cont)

****

Chlorobenzene 88GAU 01 GCMS

CV = Blank (ug/tube)

Result	± Uncer.	Date
< 10.		10/26
< 10.		10/26
0.5	0.1	11/08

CV = 63. ± 6. ug/tube

Result	± Uncer.	Date
46.4	0.1	11/08

CV = 75. ± 8. ug/tube

Result	± Uncer.	Date
50.8	0.2	11/08

CV = 88. ± 9. ug/tube

Result	± Uncer.	Date
61.	6.	11/08

CV = 130. ± 10. ug/tube

Result	± Uncer.	Date
86.4	0.1	11/08
16.8	0.1	11/08

CV = 190. ± 20. ug/tube

Result	± Uncer.	Date
130.1	0.1	11/08

Chloroform 88GAU 01 GCFID

CV = 0.57 ± 0.06 mg/tube

Result	± Uncer.	Date
0.6	0.1	7/28

CV = 0.74 ± 0.05 mg/tube

Result	± Uncer.	Date
0.6	0.1	7/28

CV = 0.92 ± 0.09 mg/tube

Result	± Uncer.	Date
0.9	0.1	7/28

Chloroform (cont)

CV = 1.4 ± 0.1 mg/tube

Result	± Uncer.	Date
1.5	0.1	7/28

Chloroform 88GAU 01 GCMS

CV = IDENT

Result	± Uncer.	Date
Present		2/18

CV = Blank (ug/tube)

Result	± Uncer.	Date
< 10.		10/19
< 10.		10/26
< 10.		10/26

CV = 55. ± 6. ug/tube

Result	± Uncer.	Date
47.6	0.1	11/08
47.3	0.1	11/08

CV = 66. ± 7. ug/tube

Result	± Uncer.	Date
58.7	0.1	11/08

CV = 82. ± 8. ug/tube

Result	± Uncer.	Date
70.7	0.1	11/08
64.	6.	11/19

CV = 110. ± 10. ug/tube

Result	± Uncer.	Date
88.2	0.1	11/08

CV = 160. ± 20. ug/tube

Result	± Uncer.	Date
129.2	0.1	11/08

1,2-Dichloroethane 88GAU 01 GCFID

CV = Blank (mg/tube)

Result	± Uncer.	Date
< 0.05		7/28

CV = 0.86 ± 0.09 mg/tube

Result	± Uncer.	Date
0.8	0.1	7/28

1,2-Dichloroethane (cont)

CV = 0.91 ± 0.1 mg/tube

Result	± Uncer.	Date
0.9	0.1	2/10

CV = 1.0316 ± 0.047 mg/tube

Result	± Uncer.	Date
1.0	0.1	2/10

CV = 1.2 ± 0.1 mg/tube

Result	± Uncer.	Date
1.2	0.1	2/10

CV = 1.4 ± 0.1 mg/tube

Result	± Uncer.	Date
1.4	0.1	2/10
1.4	0.1	7/28

CV = 2.1 ± 0.2 mg/tube

Result	± Uncer.	Date
2.1	0.1	7/28

1,4-Dioxane 88GAU 01 GCFID

CV = 0.6 ± 0.06 mg/tube

Result	± Uncer.	Date
0.5	0.1	5/02

CV = 0.7528 ± 0.1133 mg/tube

Result	± Uncer.	Date
0.7	0.1	5/02

CV = 1.2 ± 0.1 mg/tube

Result	± Uncer.	Date
1.1	0.1	5/02

CV = 1.5 ± 0.15 mg/tube

Result	± Uncer.	Date
1.4	0.1	5/02

CV = 1.9 ± 0.2 mg/tube

Result	± Uncer.	Date
1.9	0.1	2/05

****

HSE-9 Organics on Charcoal
(cont)

****

Ethanol 88GAU 01 GCMS

CV = 0.63 ± 0.06 mg/badge

Result	± Uncer.	Date
0.6	0.1	8/10

CV = 0.88 ± 0.09 mg/badge

Result	± Uncer.	Date
0.4	0.1	7/21

CV = 71. ± 7. ug/badge

Result	± Uncer.	Date
21.	6.	12/14

Ethylbenzene
88GAU 01 GCMS

CV = Blank (ug/tube)

Result	± Uncer.	Date
< 10.		10/26
< 10.		10/26
< 10.		10/26

CV = 54. ± 5. ug/tube

Result	± Uncer.	Date
41.6	0.1	11/08
42.2	0.1	11/08

CV = 64. ± 6. ug/tube

Result	± Uncer.	Date
53.0	0.1	11/08

CV = 80. ± 8. ug/tube

Result	± Uncer.	Date
64.9	0.1	11/08

CV = 110. ± 10. ug/tube

Result	± Uncer.	Date
85.7	0.1	11/08

CV = 160. ± 20. ug/tube

Result	± Uncer.	Date
124.1	0.1	11/08

Hydroquinone
88GAU 01 GCFID

CV = 0.67 ± 0.2 mg/tube

Result	± Uncer.	Date
0.8	0.2	4/08

Methanol 88GAU 01 GCFID

CV = 1.6 ± 0.2 mg/tube

Result	± Uncer.	Date
0.5	0.1	2/24
0.5	0.1	2/24

Tetrachloroethylene
88GAU 01 GCMS

CV = Blank (ug/tube)

Result	± Uncer.	Date
< 10.		10/26
< 10.		10/26
< 10.		11/08

CV = 46. ± 5. ug/tube

Result	± Uncer.	Date
40.6	0.1	11/08

CV = 55. ± 6. ug/tube

Result	± Uncer.	Date
43.6	0.1	11/08

CV = 64. ± 6. ug/tube

Result	± Uncer.	Date
54.6	0.1	11/08

CV = 92. ± 9. ug/tube

Result	± Uncer.	Date
13.0	0.1	11/08
76.4	0.1	11/08

CV = 140. ± 10. ug/tube

Result	± Uncer.	Date
118.3	0.1	11/08

Tetrahydrofuran
88GAU 01 GCMS

CV = 0.85 ± 0.08 mg/tube

Result	± Uncer.	Date
1.0	0.1	6/30

Tetrahydrofuran (cont)

CV = 48. ± 5. ug/tube

Result	± Uncer.	Date
16.	2.	11/19

Toluene 88GAU 01 GCFID

CV = 0.88 ± 0.09 mg/tube

Result	± Uncer.	Date
0.8	0.1	10/25

CV = 1.18 ± 0.1 mg/tube

Result	± Uncer.	Date
1.0	0.1	10/25

CV = 1.248 ± 0.094 mg/tube

Result	± Uncer.	Date
1.1	0.1	10/25

CV = 1.76 ± 0.2 mg/tube

Result	± Uncer.	Date
1.5	0.1	10/25

Toluene 88GAU 01 GCMS

CV = IDENT

Result	± Uncer.	Date
Present		1/26

CV = Blank (ug/tube)

Result	± Uncer.	Date
< 10.		10/26
< 10.		10/26
< 10.		11/08

CV = 50. ± 5. ug/tube

Result	± Uncer.	Date
44.4	0.1	11/08

CV = 61. ± 6. ug/tube

Result	± Uncer.	Date
49.2	0.1	11/08

CV = 71. ± 7. ug/tube

Result	± Uncer.	Date
59.8	0.1	11/08

TABLE C-V (cont)

****

HSE-9 Organics on Charcoal
(cont)

****

Toluene (cont)

CV = 100. ± 10. ug/tube

Result	± Uncer.	Date
85.9	0.1	11/08
14.0	0.1	11/08

CV = 150. ± 15. ug/tube

Result	± Uncer.	Date
138.0	0.1	11/08

1,1,1-Trichloroethane
88GAU 01 GCMS

CV = Blank (ug/tube)

Result	± Uncer.	Date
< 10.		10/26
< 10.		10/26
< 10.		11/08

CV = 54. ± 5. ug/tube

Result	± Uncer.	Date
56.8	0.1	11/08
65.1	0.1	11/08

CV = 65. ± 6. ug/tube

Result	± Uncer.	Date
71.4	0.1	11/08

CV = 81. ± 8. ug/tube

Result	± Uncer.	Date
86.8	0.1	11/08

CV = 110. ± 10. ug/tube

Result	± Uncer.	Date
104.3	0.1	11/08

CV = 160. ± 20. ug/tube

Result	± Uncer.	Date
268.3	0.1	11/08

Trichloroethylene
88GAU 01 GCFID

CV = 0.9334 ± 0.0568 mg/tube

Result	± Uncer.	Date
0.9	0.1	2/10

CV = 0.98 ± 0.1 mg/tube

Result	± Uncer.	Date
1.0	0.1	2/10

CV = 1.3 ± 0.1 mg/tube

Result	± Uncer.	Date
1.3	0.1	2/10

CV = 1.5 ± 0.2 mg/tube

Result	± Uncer.	Date
1.5	0.1	2/10

Trichloroethylene
88GAU 01 GCMS

CV = Blank (ug/tube)

Result	± Uncer.	Date
< 10.		10/26
< 10.		10/26
< 10.		10/26
< 10.		10/26
< 10.		10/26
< 10.		10/26
< 10.		10/26
< 10.		10/26
< 10.		10/26

CV = 0.84 ± 0.08 mg/badge

Result	± Uncer.	Date
0.7	0.1	8/10

1,1,2-Trichlorotrifluoroethane
88GAU 01 GCMS

CV = 0.48 ± 0.05 mg/tube

Result	± Uncer.	Date
0.37	0.04	6/24

1,2,4-Trimethylbenzene
88GAU 01 GCMS

CV = Blank (ug/tube)

Result	± Uncer.	Date
< 10.		10/26
< 10.		10/26
< 10.		11/08

1,2,4-Trimethylbenzene (cont)

CV = 44. ± 4. ug/tube

Result	± Uncer.	Date
34.3	0.1	11/08

CV = 52. ± 5. ug/tube

Result	± Uncer.	Date
39.6	0.1	11/08

CV = 61. ± 6. ug/tube

Result	± Uncer.	Date
48.1	0.1	11/08

CV = 87. ± 9. ug/tube

Result	± Uncer.	Date
14.3	0.1	11/08
67.9	0.1	11/08

CV = 130. ± 10. ug/tube

Result	± Uncer.	Date
99.7	0.1	11/08

---

m-Xylene 88GAU 01 GCMS

CV = IDENT

Result	± Uncer.	Date
Present		1/26

---

o-Xylene 88GAU 01 GCFID

CV = 0.47 ± 0.05 mg/tube

Result	± Uncer.	Date
0.4	0.1	5/02

CV = 0.95 ± 0.1 mg/tube

Result	± Uncer.	Date
0.8	0.1	5/02

CV = 1. ± 0.1 mg/tube

Result	± Uncer.	Date
0.9	0.1	10/25

CV = 1.134 ± 0.068 mg/tube

Result	± Uncer.	Date
1.0	0.1	10/25

****

HSE-9 Organics on Charcoal
(cont)

****

o-Xylene (cont)

CV = 1.2 ± 0.1 mg/tube

Result	± Uncer.	Date
1.0	0.1	5/02

CV = 1.3 ± 0.1 mg/tube

Result	± Uncer.	Date
1.2	0.1	10/25

CV = 2. ± 0.2 mg/tube

Result	± Uncer.	Date
1.7	0.1	10/25

CV = 2.2007 ± 0.3763 mg/tube

Result	± Uncer.	Date
2.1	0.1	5/02

---

o-Xylene 88GAU 01 GCMS

CV = Blank (ug/tube)

Result	± Uncer.	Date
< 10.		10/26
< 10.		10/26
< 10.		10/26
< 10.		10/26
< 10.		10/26
< 10.		10/26
< 10.		10/26
< 10.		10/26
< 10.		10/26

---

p-Xylene 87GAU 01 GCMS

CV = 0.43 ± 0.04 mg/tube

Result	± Uncer.	Date
0.8	0.1	4/07

Mixed-Xylenes
88GAU 01 GCMS

CV = Blank (ug/tube)

Result	± Uncer.	Date
< 10.		10/26
< 10.		10/26
< 10.		10/26
< 10.		10/26

Mixed-Xylenes (cont)

< 10.		10/26
< 10.		10/26
< 10.		10/26
< 10.		10/26
< 10.		10/26

****

HSE-9 Organics on Filter Media

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Aroclor 1254 87GAU 04 GCEC

CV = 57. ± 6. ug/filter

Result	± Uncer.	Date
47.	5.	3/30

Aroclor 1260 88GAU 04 GCEC

CV = 6. ± 0.3 ug/sample

Result	± Uncer.	Date
7.5	1.5	12/08

****

HSE-9 Organics on Fluorisil

****

Aroclor 1242 88GAU 01 GCEC

CV = 1. ± 0.1 ug/tube

Result	± Uncer.	Date
0.9	0.2	5/23
0.8	0.2	5/23

Chloroform 87GAU 01 GCMS

CV = IDENT

Result	± Uncer.	Date
Present		2/02

****

HSE-9 Organics on Silica Tubes

****

N-Nitrosodi-n-propylamine
87GAU 01 GCMS

CV = 1.9 ± 0.2 mg/tube

Result	± Uncer.	Date
1.6	0.4	1/26

****

HSE-9 Organics on Soil

****

Erratic results for volatile organics on soil were first noticed in the fourth quarter of 1988. The investigation into the cause is ongoing.

Acenaphthene 87GAU 01 GCMS

CV = 96. ± 10. ug/sample

Result	± Uncer.	Date
120.	10.	2/03

Acetone 88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
200.	60.	12/19
270.	80.	12/20
290.	90.	12/22
280.	80.	12/22

Aroclor 1242 88GAU 04 GCEC

CV = 19. ± 2. ug/g

Result	± Uncer.	Date
17.	3.	6/27
22.	4.	12/07
23.	4.	12/07
24.	4.	12/08

CV = 22. ± 2. ug/g

Result	± Uncer.	Date
16.	3.	6/27
15.	3.	6/27
21.	4.	12/08

CV = 25. ± 3. ug/g

Result	± Uncer.	Date
16.	3.	6/29
26.	5.	11/01

CV = 28. ± 3. ug/g

Result	± Uncer.	Date
18.	4.	6/27

CV = 30. ± 3. ug/g

Result	± Uncer.	Date
30.	6.	12/16

TABLE C-V (cont)

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HSE-9 Organics on Soil
(cont)

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Aroclor 1242 (cont)

CV = 31. ± 3. ug/g

Result	± Uncer.	Date
27.	5.	6/27
22.	4.	6/29
26.	5.	8/16
26.	5.	9/07

CV = 34. ± 3. ug/g

Result	± Uncer.	Date
21.	4.	6/27
22.	5.	6/27

CV = 38. ± 4. ug/g

Result	± Uncer.	Date
20.	4.	7/20

CV = 41. ± 4. ug/g

Result	± Uncer.	Date
37.	7.	8/19
44.	8.	12/07
50.	10.	12/09

CV = 44. ± 4. ug/g

Result	± Uncer.	Date
40.	8.	6/27

CV = 45. ± 4. ug/g

Result	± Uncer.	Date
50.	10.	12/08

CV = 49. ± 5. ug/g

Result	± Uncer.	Date
55.	10.	12/08

CV = 50. ± 5. ug/g

Result	± Uncer.	Date
52.	10.	7/26
49.	10.	8/22
49.	10.	8/22
49.	10.	8/22
49.	10.	9/01

CV = 51. ± 5. ug/g

Result	± Uncer.	Date
40.	8.	5/20

Benzene 88GAU 01 PTGC

CV = 23. ± 2. ug/kg

Result	± Uncer.	Date
< 5.		7/12

CV = 25. ± 3. ug/kg

Result	± Uncer.	Date
2.4	0.3	7/20

CV = 45. ± 5. ug/kg

Result	± Uncer.	Date
12.6	0.3	7/20

CV = 58. ± 6. ug/kg

Result	± Uncer.	Date
15.2	0.3	7/12
70.	20.	9/20

CV = 124. ± 12. ug/kg

Result	± Uncer.	Date
240.	70.	12/06

CV = 130. ± 10. ug/kg

Result	± Uncer.	Date
25.	7.	12/19

CV = 140. ± 14. ug/kg

Result	± Uncer.	Date
85.	25.	12/22

CV = 141. ± 14. ug/kg

Result	± Uncer.	Date
70.	20.	12/22

CV = 150. ± 20. ug/kg

Result	± Uncer.	Date
85.	25.	12/19
21.	6.	12/20

CV = 180. ± 20. ug/kg

Result	± Uncer.	Date
175.	50.	12/19

Bromobenzene 88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
10.	3.	12/19
< 2.		12/22
< 2.		12/22

Bromochloromethane 88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 10.		12/22
< 10.		12/22

Bromodichloromethane 88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
2.7	0.8	12/20
< 2.		12/22
< 2.		12/22

CV = 153. ± 15. ug/kg

Result	± Uncer.	Date
310.	90.	12/06

Bromoform 88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 10.		12/22
< 10.		12/22

CV = 203. ± 20. ug/kg

Result	± Uncer.	Date
210.	60.	12/06

2-Butanone 88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 10.		12/06
< 10.		12/22
40.	10.	12/22

****

HSE-9 Organics on Soil
(cont)

****

n-Butylbenzene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
11.	3.	12/19
11.	3.	12/20
< 2.		12/22
< 2.		12/22

sec-Butylbenzene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
4.	1.	12/20
< 2.		12/22
< 2.		12/22

tert-Butylbenzene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 2.		12/22
< 2.		12/22

Carbon disulfide
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
20.	6.	12/06
40.	10.	12/19
5.	2.	12/19
6.	2.	12/20
< 2.		12/22
< 2.		12/22

Carbon tetrachloride
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/22
< 2.		12/22

Carbon tetrachloride (cont)

CV = 178. ± 18. ug/kg

Result	± Uncer.	Date
150.	50.	12/06

Chlorobenzene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06

CV = 167. ± 17. ug/kg

Result	± Uncer.	Date
110.	30.	12/22

CV = 169. ± 17. ug/kg

Result	± Uncer.	Date
100.	30.	12/22

CV = 180. ± 20. ug/kg

Result	± Uncer.	Date
140.	40.	12/19

CV = 210. ± 20. ug/kg

Result	± Uncer.	Date
120.	40.	12/19

CV = 220. ± 20. ug/kg

Result	± Uncer.	Date
120.	40.	12/20

CV = 250. ± 20. ug/kg

Result	± Uncer.	Date
300.	100.	12/19

Chlorodibromomethane
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 10.		12/22
< 2.		12/22

Chloroethane
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 10.		12/22
< 10.		12/22

Chloroform 88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06

CV = 113. ± 11. ug/kg

Result	± Uncer.	Date
45.	15.	12/22

CV = 115. ± 11. ug/kg

Result	± Uncer.	Date
40.	10.	12/22

1-Chlorohexane
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
5.	2.	12/19
< 2.		12/22
7.	2.	12/22

o-Chlorotoluene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 2.		12/19
< 2.		12/22
< 2.		12/22

p-Chlorotoluene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 2.		12/19
< 10.		12/22
< 2.		12/22

TABLE C-V (cont)

****

HSE-9 Organics on Soil
(cont)

****

1,2-Dibromo-3-chloropropane
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 10.		12/22
< 10.		12/22

Dibromomethane
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 10.		12/22
< 2.		12/22

1,1-Dichloro-1-propene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
4.	1.	12/19
4.	1.	12/20
< 10.		12/22
< 2.		12/22

o-Dichlorobenzene (1,2)
87GAU 01 GCMS

CV = 90. ± 9. ug/sample

Result	± Uncer.	Date
300.	150.	4/01

o-Dichlorobenzene (1,2)
m-Dichlorobenzene (1,3)
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 2.		12/22
< 2.		12/22

p-Dichlorobenzene (1,4)
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 2.		12/22
< 10.		12/22

1,1-Dichloroethane
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 2.		12/22
< 2.		12/22

1,2-Dichloroethane
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06

CV = 172. ± 17. ug/kg

Result	± Uncer.	Date
110.	30.	12/22

CV = 174. ± 17. ug/kg

Result	± Uncer.	Date
100.	30.	12/22

1,1-Dichloroethene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 2.		12/22
< 10.		12/22

cis-1,2-Dichloroethylene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 2.		12/22
< 2.		12/22

trans-1,2-Dichloroethylene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 2.		12/22
< 10.		12/22

1,2-Dichloropropane
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 2.		12/22
< 2.		12/22

1,3-Dichloropropane
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
80.	25.	12/19
< 2.		12/22
< 2.		12/22

2,2-Dichloropropane
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 10.		12/06
< 2.		12/22
< 2.		12/22

cis-1,3-Dichloropropene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 10.		12/06
< 10.		12/22
< 80.		12/22

trans-1,3-Dichloropropene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 10.		12/06
< 2.		12/22
< 2.		12/22

TABLE C-V (cont)

****

HSE-9 Organics on Soil
(cont)

****

2,4-Dinitrotoluene
87GAU 01 GCMS

CV = 120. ± 20. ug/sample

Result	± Uncer.	Date
150.	10.	2/03

Ethylbenzene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
2.	1.	12/19
110.	30.	12/19
85.	25.	12/20
< 2.		12/22
3.	1.	12/22

CV = 137. ± 14. ug/kg

Result	± Uncer.	Date
290.	90.	12/06

Fluorotrichloromethane
Hexachlorobutadiene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 2.		12/22
< 2.		12/22

2-Hexanone 88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 20.		12/06
< 80.		12/22
< 10.		12/22

CV = 170. ± 20. ug/kg

Result	± Uncer.	Date
250.	80.	12/20

CV = 200. ± 20. ug/kg

Result	± Uncer.	Date
260.	80.	12/19

Isopropylbenzene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
2.2	0.7	12/20
< 10.		12/22
< 2.		12/22

4-Isopropyltoluene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 10.		12/22
< 2.		12/22

Methyl bromide
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 2.		12/22
< 2.		12/22

Methyl chloride
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 10.		12/06
< 10.		12/22
< 10.		12/22

4-Methyl-2-pentanone
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 10.		12/06
40.	10.	12/19
160.	50.	12/19
45.	15.	12/20
< 10.		12/22
< 10.		12/22

Methylene chloride
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 10.		12/06
120.	30.	12/19
160.	50.	12/19
< 2.		12/22
< 10.		12/22

Naphthalene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
18.	5.	12/19
18.	5.	12/20
< 2.		12/22
< 2.		12/22

o-Nitrophenol
87GAU 01 GCMS

CV = 95. ± 10. ug/sample

Result	± Uncer.	Date
28.	6.	4/06

p-Nitrophenol
87GAU 01 GCMS

CV = 220. ± 30. ug/sample

Result	± Uncer.	Date
390.	40.	2/03

N-Nitrosodi-n-propylamine
87GAU 01 GCMS

CV = 100. ± 20. ug/sample

Result	± Uncer.	Date
110.	10.	2/03

Pentachlorophenol
87GAU 01 GCMS

CV = 110. ± 10. ug/sample

Result	± Uncer.	Date
< 100.		4/01

CV = 190. ± 30. ug/sample

Result	± Uncer.	Date
490.	50.	2/03

TABLE C-V (cont)

****

HSE-9 Organics on Soil
(cont)

****

Phenol 87GAU 01 GCMS

CV = 200. ± 30. ug/sample

Result	± Uncer.	Date
210.	20.	2/03

Propylbenzene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
10.	3.	12/20
< 2.		12/22
< 2.		12/22

Styrene 88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
11.	3.	12/19
6.	2.	12/19
40.	10.	12/19
5.	1.	12/20
< 2.		12/22
< 2.		12/22

1,1,1,2-Tetrachloroethane
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 10.		12/22
< 2.		12/22

1,1,2,2-Tetrachloroethane
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 10.		12/06

CV = 147. ± 15. ug/kg

Result	± Uncer.	Date
45.	15.	12/22

1,1,2,2-Tetrachloroethane
(cont)

CV = 149. ± 15. ug/kg

Result	± Uncer.	Date
40.	10.	12/22

Tetrachloroethylene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 2.		12/22
< 2.		12/22

Toluene 8GAU 01 PTGC

CV = 28. ± 3. ug/kg

Result	± Uncer.	Date
< 45.		7/12

CV = 31. ± 3. ug/kg

Result	± Uncer.	Date
25.6	0.3	7/20

CV = 56. ± 6. ug/kg

Result	± Uncer.	Date
18.2	0.3	7/20

CV = 72. ± 7. ug/kg

Result	± Uncer.	Date
90.	30.	9/20

CV = 73. ± 7. ug/kg

Result	± Uncer.	Date
< 45.		7/12

CV = 140. ± 14. ug/kg

Result	± Uncer.	Date
100.	30.	12/22

CV = 142. ± 14. ug/kg

Result	± Uncer.	Date
90.	30.	12/22

CV = 176. ± 18. ug/kg

Result	± Uncer.	Date
400.	100.	12/06

Toluene (cont)

CV = 180. ± 20. ug/kg

Result	± Uncer.	Date
75.	20.	12/19

CV = 210. ± 20. ug/kg

Result	± Uncer.	Date
150.	50.	12/19
50.	15.	12/20

CV = 250. ± 20. ug/kg

Result	± Uncer.	Date
260.	80.	12/19

1,2,3-Trichlorobenzene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 2.		12/22
< 2.		12/22

1,2,4-Trichlorobenzene
87GAU 01 GCMS

CV = 120. ± 10. ug/sample

Result	± Uncer.	Date
75.	15.	4/06

1,2,4-Trichlorobenzene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 2.		12/22
< 2.		12/22

1,1,1-Trichloroethane
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 10.		12/06
< 2.		12/22
< 2.		12/22

TABLE C-V (cont)

****

HSE-9 Organics on Soil
(cont)

****

1,1,2-Trichloroethane
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 10.		12/22
< 2.		12/22

Trichloroethylene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06

CV = 122. ± 12. ug/kg

Result	± Uncer.	Date
90.	30.	12/22

CV = 123. ± 12. ug/kg

Result	± Uncer.	Date
70.	20.	12/22

1,2,3-Trichloropropane
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 10.		12/22
< 10.		12/22

1,2,4-Trimethylbenzene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 2.		12/19
< 2.		12/20
< 2.		12/22
< 2.		12/22

1,3,5-Trimethylbenzene
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
8.	2.	12/19
< 2.		12/22
< 2.		12/22

Vinyl acetate
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 10.		12/06
< 2.		12/22
< 80.		12/22

CV = 250. ± 20. ug/kg

Result	± Uncer.	Date
26.	8.	12/19

Vinyl chloride
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06
< 10.		12/22
< 10.		12/22

m-Xylene 88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/22
< 2.		12/22

CV = 140. ± 14. ug/kg

Result	± Uncer.	Date
150.	50.	12/06

CV = 170. ± 20. ug/kg

Result	± Uncer.	Date
80.	25.	12/19
50.	15.	12/20

CV = 200. ± 20. ug/kg

Result	± Uncer.	Date
140.	45.	12/19

o-Xylene 88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 2.		12/06

CV = 30. ± 3. ug/kg

Result	± Uncer.	Date
13.9	0.3	7/20

CV = 54. ± 5. ug/kg

Result	± Uncer.	Date
21.9	0.3	7/20

CV = 103. ± 10. ug/kg

Result	± Uncer.	Date
70.	20.	12/22

CV = 104. ± 10. ug/kg

Result	± Uncer.	Date
65.	20.	12/22

Mixed-Xylenes
88GAU 01 PTGC

CV = Blank (ug/kg)

Result	± Uncer.	Date
< 10.		7/12
16.5	0.3	7/12
60.	20.	9/20

****

HSE-9 Organics on Vapor Badge

****

Acetone 88GAU 01 GCMS

CV = 0.2 ± 0.02 mg/tube

Result	± Uncer.	Date
0.08	0.02	6/10
0.11	0.02	6/10

CV = 0.25 ± 0.03 mg/tube

Result	± Uncer.	Date
< 0.2		6/15

CV = 0.31 ± 0.03 mg/tube

Result	± Uncer.	Date
0.14	0.03	6/10

TABLE C-V (cont)

****

HSE-9 Organics on Vapor Badge (cont)

****

Acetone (cont)

CV = 0.35 ± 0.04 mg/tube

Result	± Uncer.	Date
0.12	0.02	6/10
0.09	0.01	6/21

CV = 0.61 ± 0.06 mg/badge

Result	± Uncer.	Date
1.9	0.2	7/18

CV = 0.99 ± 0.1 mg/badge

Result	± Uncer.	Date
1.3	0.2	7/18

CV = 1.3 ± 0.1 mg/badge

Result	± Uncer.	Date
1.7	0.2	7/18

Acetonitrile 88GAU 01 GCMS

CV = 0.35 ± 0.04 mg/tube

Result	± Uncer.	Date
0.27	0.05	6/21

CV = 0.83 ± 0.08 mg/badge

Result	± Uncer.	Date
1.0	0.2	8/26

Chlorobenzene 88GAU 01 GCMS

CV = 0.13 ± 0.01 mg/tube

Result	± Uncer.	Date
0.12	0.02	6/10

CV = 0.19 ± 0.02 mg/tube

Result	± Uncer.	Date
0.33	0.06	6/21

Chlorobenzene (cont)

CV = 0.24 ± 0.02 mg/tube

Result	± Uncer.	Date
0.3	0.1	6/10
< 0.001		6/15
0.5	0.1	6/15

Chloroform 88GAU 01 GCMS

CV = 0.19 ± 0.02 mg/tube

Result	± Uncer.	Date
0.07	0.01	6/10

CV = 0.27 ± 0.03 mg/tube

Result	± Uncer.	Date
0.35	0.07	6/21

CV = 0.35 ± 0.04 mg/tube

Result	± Uncer.	Date
0.19	0.04	6/10
0.5	0.1	6/15

Diethyl ether 88GAU 01 GCMS

CV = 1.2 ± 0.1 mg/tube

Result	± Uncer.	Date
0.19	0.04	6/21

---

n,n-Dimethylacetamide 88GAU 01 GCMS

CV = 0.31 ± 0.03 mg/tube

Result	± Uncer.	Date
0.13	0.02	6/21

N,N-Dimethylformamide 88GAU 01 GCMS

CV = 0.87 ± 0.09 mg/badge

Result	± Uncer.	Date
1.0	0.2	8/26

Ethanol 88GAU 01 GCMS

CV = 0.44 ± 0.04 mg/badge

Result	± Uncer.	Date
0.26	0.04	7/18

Ethanol (cont)

CV = 0.72 ± 0.07 mg/badge

Result	± Uncer.	Date
0.6	0.1	7/18

CV = 0.96 ± 0.1 mg/badge

Result	± Uncer.	Date
0.8	0.1	7/18

---

n-Heptane 88GAU 01 GCMS

CV = 0.23 ± 0.02 mg/tube

Result	± Uncer.	Date
0.31	0.06	6/15

Methanol 88GAU 01 GCMS

CV = 0.3 ± 0.03 mg/badge

Result	± Uncer.	Date
0.11	0.02	7/18

CV = 0.49 ± 0.05 mg/badge

Result	± Uncer.	Date
0.07	0.01	7/18

CV = 0.66 ± 0.07 mg/badge

Result	± Uncer.	Date
0.12	0.02	7/18

Styrene 88GAU 01 GCMS

CV = 0.13 ± 0.01 mg/tube

Result	± Uncer.	Date
0.17	0.03	6/10
0.21	0.04	6/10

CV = 0.14 ± 0.01 mg/tube

Result	± Uncer.	Date
0.19	0.04	6/15

CV = 0.16 ± 0.02 mg/tube

Result	± Uncer.	Date
0.28	0.06	6/15

CV = 0.2 ± 0.02 mg/tube

Result	± Uncer.	Date
0.31	0.06	6/10

TABLE C-V (cont)

****

HSE-9 Organics on Vapor Badge
(cont)

****

Styrene (cont)

CV = 0.23 ± 0.02 mg/tube

Result	± Uncer.	Date
0.33	0.06	6/10
0.39	0.07	6/21

Tetrahydrofuran 88GAU 01 GCMS

CV = 0.8 ± 0.08 mg/badge

Result	± Uncer.	Date
0.9	0.1	6/30

CV = 0.87 ± 0.09 mg/tube

Result	± Uncer.	Date
0.8	0.1	6/21

Toluene 88GAU 01 GCMS

CV = IDENT

Result	± Uncer.	Date
Present		1/29

CV = 0.2 ± 0.02 mg/tube

Result	± Uncer.	Date
0.29	0.06	6/15

CV = 0.22 ± 0.02 mg/tube

Result	± Uncer.	Date
0.21	0.04	6/10

CV = 0.31 ± 0.03 mg/tube

Result	± Uncer.	Date
0.41	0.08	6/21

CV = 0.4 ± 0.04 mg/tube

Result	± Uncer.	Date
0.46	0.1	6/10
0.54	0.1	6/15

CV = 1.1 ± 0.1 mg/tube

Result	± Uncer.	Date
1.0	0.2	6/21

Trichloroethylene 88GAU 01 GCMS

CV = 0.69 ± 0.07 mg/tube

Result	± Uncer.	Date
1.0	0.2	11/17

---

m-Xylene 88GAU 01 GCMS

CV = IDENT

Result	± Uncer.	Date
Present		1/29

CV = 0.44 ± 0.04 mg/tube

Result	± Uncer.	Date
1.1	0.3	11/17

---

o-Xylene 88GAU 01 GCMS

CV = 0.62 ± 0.06 mg/tube

Result	± Uncer.	Date
1.1	0.3	12/12

****

NIOSH PAT Round 92
Organics on Charcoal

****

Carbon tetrachloride 88PAT 01 GCFID

CV = 405.4 ± 38.6 ug/tube

Result	± Uncer.	Date
400.	100.	2/10

CV = 496.1 ± 39.2 ug/tube

Result	± Uncer.	Date
500.	100.	2/10

CV = 736.8 ± 53.8 ug/tube

Result	± Uncer.	Date
700.	100.	2/10

CV = 976.2 ± 72.2 ug/tube

Result	± Uncer.	Date
1000.	100.	2/10

1,2-Dichloroethane 88PAT 01 GCFID

CV = 697.9 ± 38.5 ug/tube

Result	± Uncer.	Date
700.	100.	2/10

CV = 798.1 ± 41.9 ug/tube

Result	± Uncer.	Date
800.	100.	2/10

CV = 882.2 ± 51.7 ug/tube

Result	± Uncer.	Date
900.	100.	2/10

CV = 1079.9 ± 55.2 ug/tube

Result	± Uncer.	Date
1100.	100.	2/10

Trichloroethylene 88PAT 01 GCFID

CV = 703.3 ± 38. ug/tube

Result	± Uncer.	Date
700.	100.	2/10

CV = 816.4 ± 47.1 ug/tube

Result	± Uncer.	Date
800.	100.	2/10

CV = 1031.5 ± 57.4 ug/tube

Result	± Uncer.	Date
1000.	100.	2/10

CV = 1338.9 ± 67.5 ug/tube

Result	± Uncer.	Date
1400.	100.	2/10

****

NIOSH PAT Round 93
Organics on Charcoal

****

Cellosolve acetate 88PAT 01 GCFID

CV = 166.1 ± 30.1 ug/tube

Result	± Uncer.	Date
150.	100.	5/03

TABLE C-V (cont)

****

NIOSH PAT Round 93
Organics on Charcoal (cont)

****

Cellosolve acetate (cont)

CV = 616.4 ± 88.4 ug/tube

Result	± Uncer.	Date
500.	100.	5/03

CV = 732.5 ± 99.2 ug/tube

Result	± Uncer.	Date
700.	100.	5/03

CV = 870.6 ± 113.3 ug/tube

Result	± Uncer.	Date
800.	100.	5/03

1,4-Dioxane 88PAT 01 GCFID

CV = 297.7 ± 18.7 ug/tube

Result	± Uncer.	Date
300.	100.	5/03

CV = 445.3 ± 26.1 ug/tube

Result	± Uncer.	Date
400.	100.	5/03

CV = 615.6 ± 30.9 ug/tube

Result	± Uncer.	Date
600.	100.	5/03

CV = 880.1 ± 52.2 ug/tube

Result	± Uncer.	Date
800.	100.	5/03

---

o-Xylene 88PAT 01 GCFID

CV = 766.4 ± 38.8 ug/tube

Result	± Uncer.	Date
800.	100.	5/03

CV = 1021.6 ± 49.8 ug/tube

Result	± Uncer.	Date
900.	100.	5/03

o-Xylene (cont)

CV = 1053.3 ± 51.2 ug/tube

Result	± Uncer.	Date
1000.	100.	5/03

CV = 1466.9 ± 79.8 ug/tube

Result	± Uncer.	Date
1400.	100.	5/03

****

NIOSH PAT Round 94
Organics on Charcoal

****

Carbon tetrachloride
88PAT 01 GCFID

CV = 310.4 ± 28. ug/tube

Result	± Uncer.	Date
400.	100.	7/28

CV = 693.1 ± 43. ug/tube

Result	± Uncer.	Date
650.	100.	7/28

CV = 709.9 ± 42. ug/tube

Result	± Uncer.	Date
500.	100.	7/28

CV = 1032.1 ± 55. ug/tube

Result	± Uncer.	Date
900.	100.	7/28

Chloroform 88PAT 01 GCFID

CV = 307.1 ± 23. ug/tube

Result	± Uncer.	Date
250.	100.	7/28

CV = 461. ± 26. ug/tube

Result	± Uncer.	Date
400.	100.	7/28

CV = 718.9 ± 35. ug/tube

Result	± Uncer.	Date
600.	100.	7/28

Chloroform (cont)

CV = 957. ± 48. ug/tube

Result	± Uncer.	Date
700.	100.	7/28

1,2-Dichloroethane
88PAT 01 GCFID

CV = 635.1 ± 28. ug/tube

Result	± Uncer.	Date
600.	100.	7/28

CV = 764.3 ± 37. ug/tube

Result	± Uncer.	Date
500.	100.	7/28

CV = 839.9 ± 41. ug/tube

Result	± Uncer.	Date
800.	100.	7/28

CV = 987.5 ± 46. ug/tube

Result	± Uncer.	Date
900.	100.	7/28

Four of the above results were out of control for this round. The outliers are attributed to techniques used by the summer student who assisted the analyst with the sample set.

****

NIOSH PAT Round 95
Organics on Charcoal

****

Benzene 88PAT 01 GCEC

CV = 0.774 ± 0.03 mg/tube

Result	± Uncer.	Date
0.2	0.1	12/07

CV = 0.978 ± 0.04 mg/tube

Result	± Uncer.	Date
0.2	0.1	12/07

CV = 1.22 ± 0.05 mg/tube

Result	± Uncer.	Date
0.1	0.1	12/07

****

NIOSH PAT Round 95
Organics on Charcoal (cont)

****

Benzene (cont)

CV = 1.5 ± 0.06 mg/tube

Result	±	Uncer.	Date
0.2		0.1	12/07

Toluene 88PAT 01 GCEC

CV = 0.142 ± 0.01 mg/tube

Result	±	Uncer.	Date
1.1		0.1	12/07

CV = 0.186 ± 0.01 mg/tube

Result	±	Uncer.	Date
0.7		0.1	12/07

CV = 0.235 ± 0.01 mg/tube

Result	±	Uncer.	Date
1.0		0.1	12/07

CV = 0.28 ± 0.02 mg/tube

Result	±	Uncer.	Date
1.4		0.1	12/07

---

o-Xylene 88PAT 01 GCEC

CV = 1.03 ± 0.05 mg/tube

Result	±	Uncer.	Date
0.9		0.1	12/07

CV = 1.33 ± 0.06 mg/tube

Result	±	Uncer.	Date
1.3		0.1	12/07

CV = 1.58 ± 0.1 mg/tube

Result	±	Uncer.	Date
1.5		0.1	12/07

CV = 1.79 ± 0.09 mg/tube

Result	±	Uncer.	Date
1.7		0.1	12/07

TABLE C-VI

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TABLE C-VII

REFERENCES FOR INDIVIDUAL CONSTITUENT CONCENTRATIONS IN QUALITY ASSURANCE MATERIALS MEASURED BY HSE-9 IN 1988

Code	N	Reference
75NBS	01	National Bureau of Standards, Certificate of Analysis, SRM 1633, Trace Elements in Coal Fly Ash (1975).
75NBS	03	National Bureau of Standards, Certificate of Analysis, SRM 4350, Environmental Radioactivity Standard: River Sediment (1975).
76EPA	02	Environmental Protection Agency, Report of Calibration, Mancos Shale (1976).
76NBS	02	National Bureau of Standards, Certificate of Analysis, SRM 1573, Tomato Leaves (1976).
76NBS	03	National Bureau of Standards, Certificate of Analysis, SRM 1575, Pine Needles (1976).
77ING	01	J. C. Ingles, R. Sutarno, W. S. Bowman, and G. Faye, Radioactive Ores DH-1, DL-1, BL-1, BL-2, BL-3, BL-4: Certified Reference Materials, CANMET Report 77-64 (1977).
77NBS	03	National Bureau of Standards, Certificate of Analysis, SRM 1577, Bovine Liver (1977).
78EPA	01	Environmental Protection Agency, Water Supply Quality Control Check Samples, EMSL, Cincinnati (1978).
79PAC	01	Packard Instrument Company, Tritium standard certified against NBS reference material, Downer's Grove, Illinois, (1979).
80EML	01	Environmental Measurements Laboratory, Private Communication (1980).
80NBS	01	National Bureau of Standards, Certificate of Analysis, SRM 1643A, Trace Elements in Water (1980).
81EPA	01	Environmental Protection Agency, EPA Water Pollution Quality Control Samples, EMSL, Cincinnati (1981).
81GLA	06	E. S. Gladney, Comparison of Methods for Calculation of Recommended Elemental Concentration Values for Canadian Certified Reference Materials Project Standards SY-2, SY-3, and MRG-1, Los Alamos National Laboratory Report LA-8770-MS (1981).
81H-8	03	Ibid., Assumption of Natural Isotopic Abundance for Uranium (1981).
81NBS	01	National Bureau of Standards, Certificate of Analysis, SRM 4353, Environmental Radioactivity, Rocky Flats Soil No. 1 (1981).
81NBS	02	National Bureau of Standards, Certificate of Analysis, SRM 4350B, Environmental Radioactivity, River Sediment (1981).
81NBS	03	National Bureau of Standards, Certificate of Analysis, SRM 278, Obsidian Rock (1981).
81NBS	04	National Bureau of Standards, Certificate of Analysis, SRM 688, Basalt Rock (1981).
82BCR	01	Community Bureau of Reference (1982), Certificate of Analysis, Certified Reference Material BCR 60, Trace Elements in an Aquatic Plant (Lagarosiphon Major).

TABLE C-VII (cont)

Code	N	Reference
82BCR	02	Community Bureau of Reference (1982) Certificate of Analysis, Certified Reference Material BCR 61, Trace Elements in an Aquatic Plant (Platihypnidium Riparioides).
82EPA	01	Environmental Protection Agency, Quality Control Samples for Water Pollution, EMSL, Cincinnati (1982).
82NBS	01	National Bureau of Standards, Certificate of Analysis, SRM 1646, Estuarine Sediment, (Revised 6/7/82) (1982).
82NBS	03	National Bureau of Standards, Certificate of Analysis, SRM 1572, Citrus Leaves (Revised 12/20/82) (1982).
82NBS	08	National Bureau of Standards, Certificate of Analysis, SRM 1642b, Mercury in Water (1982).
82NBS	11	National Bureau of Standards, Certificate of Analysis, SRM 1645, River Sediment (Revised) (1982).
83BCR	01	Community Bureau of Reference (1983), Certificate of Analysis, Certified Reference Material BCR 146: Trace Elements in a Sewage Sludge of Mainly Industrial Origin; and BCR report EUR 8838 EN.
83BCR	03	Community Bureau of Reference (1983), Certificate of Analysis, Certified Reference Material BCR 141, Trace Elements in a Calcareous Loam Soil.
83BCR	04	Community Bureau of Reference (1983), The Certification of the Contents of Cd, Cu, Hg, Pb, and Zn in a Calcareous Loam Soil (BCR No. 141), BCR report EUR 8833 EN.
83BCR	05	Community Bureau of Reference (1983), Certificate of Analysis, Certified Reference Material BCR 142, Trace Elements in Light Sandy Soil.
83BCR	06	Community Bureau of Reference (1983), The Certification of the Contents of Cd, Cu, Hg, Ni, Pb, and Zn in a Light Sandy Soil, BCR report EUR 8834 EN.
83EPA	01	Environmental Protection Agency, Quality Assurance Check Samples, EMSL, Las Vegas (1983).
83EPA	02	Environmental Protection Agency, Quality Control Samples for Water Pollution, EMSL, Cincinnati (1983).
83GLA	04	E. S. Gladney, C. E. Burns, and I. Roelandts, 1982 Compilation of Elemental Concentrations in Eleven United States Geological Survey Rock Standards, Geostandards Newsletter, 7: 2-236 (1983).
83NBS	02	National Bureau of Standards, Certificate of Analysis, SRM 1566, Oyster Tissue (1983).
84ADA	01	W. H. Adams, HSE-9 In-House Quality Control Standard for pH, TDS, and Conductivity, Standard Methods, 15th Edition, p. 29 (1984).
84EML	01	Environmental Measurements Laboratory, Quality Assessment Program, Department of Energy, New York (1984).
84EPA	01	Environmental Protection Agency, Quality Assurance Check Samples, EMSL, Las Vegas (1984).
84EPA	02	Environmental Protection Agency, Quality Assurance Check Samples, EMSL, Cincinnati (1984).
84FLA	02	F. J. Flanagan, Three USGS Mafic Rock Reference Samples, W-2, DNC-1, and BIR-1, USGS Bulletin 1623 (1984).

TABLE C-VII (cont)

Code	N	Reference
84GLA	09	E. S. Gladney, C. E. Burns, and I. Roelandts, 1982 Compilation of Elemental Concentration Data for the United States Geological Survey's Geochemical Exploration Reference Samples GXR-1 to GXR-6, Geostandards Newletter, 8: 119-154, (1984).
84GLA	12	E. S. Gladney, Interim Calculations of Compiled Values from SRMs Literature Database (1984).
84NBS	05	National Bureau of Standards, Certificate, SRM 1643B, Trace Elements in Water (1984).
84NBS	06	National Bureau of Standards, Certificate of Analysis, SRM 1549, Non-Fat Milk Powder (1984).
84PER	01	D. Perrin, HSE-9 Dilution of Master NBS Solution SRM 4926C (1984).
84SMI	01	C. W. Smith, H. F. Steger, and W. S. Bowman, Uranium Tailings Reference Materials, National Uranium Tailings Program Report NUTP-2E (1984).
85BCR	02	Community Bureau of Reference, Certificate of Analysis, Certified Reference Material BCR 144, Trace Elements in Sewage Sludge, revised (1985).
85CAN	01	Canadian Certified Reference Materials Project, Revised Certificates of Analysis, DL-1a, DH-1a, BL-4a, BL-5, and SO-1 thru SO-4 (1985).
85CUR	01	D. B. Curtis, Private Communication, Los Alamos National Laboratory, New Mexico (1985).
85EPA	02	Environmental Protection Agency, Quality Assurance Check Samples, EMSL, Cincinnati (1985).
85GAU	01	M. A. Gautier, HSE-9 In-House Quality Assurance Samples, Miscellaneous Samples (1985).
85GLA	01	E. S. Gladney, C. E. Burns, and I. Roelandts, 1983 Compilation of Elemental Concentration Data for Samples SO-1 to SO-4, Geostandards Newsletter, 9: 35-68 (1985).
85NBS	07	National Bureau of Standards, Certificate of Analysis, SRM 2677, Beryllium and Arsenic on Filter Media (1985).
85NBS	09	National Bureau of Standards, Certificate of Analysis, SRM 1083, 1084, and 1085, Wear-Metals in Oil (1985).
85NBS	11	National Bureau of Standards, Certficate of Analysis SRM 1633a, Trace Elements in Coal Fly Ash (1985).
85WIL	01	M. C. Williams, HSE-9 In-House Quality Assurance Samples Prepeared at TA-50 (1985).
86ABB	01	S. Abbey and E. S. Gladney, A Re-Evaluation of Three Canadian Reference Rocks, Geostandards Newsletter 10: 3-11 (1986).
86DAL	01	J. L. Dalton and W. S. Bowman, "Vegetative Radionuclide Reference Materials," National Uranium Tailings Program report NUTP-4E, CANMET (1986).
86DAL	02	J. L. Dalton and W. S. Bowman, "CUP-1: A Certified Uranium Reference Ore," Minerals Research Program, Mineral Sciences Laboratories report CCRMP 86-2E (1986).
86EPA	01	Environmental Protection Agency, Quality Assurance Check Samples, EMSL, Las Vegas (1986).

TABLE C-VII (cont)

Code	N	Reference
86EPA	02	Environmental Protection Agency, Quality Assurance Check Samples, EMSL, Cincinnati (1986).
86GAU	01	M. A. Gautier, HSE-9 In-House Quality Assurance Samples, Miscellaneous Samples (1986).
86GAU	02	M. A. Gautier, HSE-9 In-House Quality Assurance Samples, Fisher and Spex Certified Reference Solutions (1986).
86GAU	04	M. A. Gautier, HSE-9 In-House Quality Assurance Samples, Prepared from EPA Traceable Materials (1986).
86GLA	01	E. S. Gladney, Private Communications of Instrumental Thermal Neutron Activation Measurements (1986).
86WIL	01	M. C. Williams, HSE-9 In-House Quality Assurance Samples Prepared at TA-50 (1986).
87AND	01	A. Ando, Written communication of compiled values for Geological Survey of Japan, Reference Materials (1987).
87EPA	01	Environmental Protection Agency, Quality Assurance Check Samples, EMSL, Las Vegas (1987).
87EPA	02	Environmental Protection Agency, Quality Assurance Check Samples, EMSL, Cincinnati (1987).
87GAU	01	M. A. Gautier, HSE-9 In-House Quality Assurance Samples, Miscellaneous Samples (1987).
87GAU	02	M. A. Gautier, HSE-9 In-House Quality Assurance Samples, Fisher, Spex, and Alfa Products Certified Reference Solutions (1987).
87GAU	03	M. A. Gautier, HSE-9 In-House Quality Assurance Samples, Prepared from NBS Traceable Materials (1987).
87GAU	04	M. A. Gautier, HSE-9 In-House Quality Assurance Samples, Prepared from EPA Traceable Materials (1987).
87GLA	01	E. S. Gladney, B. O'Malley, I. Roelandts, and T. E. Gills, Compilation of Elemental Concentration Data for NBS Clinical, Biological, Geological and Environmental Standard Reference Materials, NBS Special Publication 260-111 (1987).
87GOV	01	K. Govindaraju, 1987 Compilation Report on Ailsa Craig Granite AC-E with the Participation of 128 GIT-IWG Laboratories, Geostandards Newsletter, 11: 203-255 (1987).
87NBS	01	National Bureau of Standards, Certificate of Analysis, SRM 3191, 3192, 3193, Aqueous Electrolytic Conductance (1987).
87QAL	01	University of Nevada, Quality Assurance Laboratory, Environmental Research Center, Las Vegas (1987).
87WIL	01	M. C. Williams, HSE-9 In-House Quality Assurance Samples Prepared at TA-50 (1987).
88BEL	01	M. G. Bell (1988), Spike intentionally added to pre-existing EPA Uranium in Water QA.
88CAH	01	Richard A. Cahill and A. D. Autrey, Total and Inorganic Carbon Content of Eighteen National Bureau of Standards and Four Canadian Certified Reference Materials, Geostandards Newsletter, 12: 39-42 (1988).
88DOE	01	Department of Energy, Beryllium Round Robin Quality Assurance Samples (1988).

TABLE C-VII (cont)

Code	N	Reference
88EML	01	Environmental Measurements Laboratory, DOE-QAP Quality Assurance Program (1988).
88EPA	01	Environmental Protection Agency, Quality Assurance Check Samples, EMSL, Las Vegas (1988).
88EPA	02	Environmental Protection Agency, Quality Assurance Check Samples, EMSL, Cincinnati (1988).
88GAU	01	M. A. Gautier, HSE-9 In-House Quality Assurance Samples, Miscellaneous Samples (1988).
88GAU	02	M. A. Gautier, HSE-9 In-House Quality Assurance Samples, Fisher, Spex, and Alfa Products Certified Reference Solutions (1988).
88GAU	03	M. A. Gautier, HSE-9 In-House Quality Assurance Samples, Prepared from NBS Traceable Materials (1988).
88GAU	04	M. A. Gautier, HSE-9 In-House Quality Assurance Samples, Prepared from EPA Traceable Materials (1988).
88GLA	01	E. S. Gladney, I. Roelandts, 1987 Compilation Elemental Concentration Data for USGS BIR-1, DNC-1, and W-2, Geostandards Newsletter (1988).
88GLA	02	E. S. Gladney, Interim Calculations of Compiled Value from SRMS Literature Database (1988).
88GLA	03	E. S. Gladney, Calculated by difference using NBS oxide values (1988).
88GLA	04	E. S. Gladney and I. Roelandts, 1987 Compilation of Elemental Concentration Data for USGS BHVO-1, MAG-1, QLO-1, RGM-1, SCo-1, SDC-1, SGR-1, and STM-1, Geostandards Newsletter, in press (1988).
88PAT	01	Proficiency Analytical Testing Program, National Institute for Occupational Safety and Health (1988).
88WIL	01	M. C. Williams, E. A. Stallings, T. M. Foreman, and E. S. Gladney, Pressure Digestion of Sewage Sludge, Atomic Spectroscopy, 9: 110-114 (1988).
88WIL	02	M. C. Williams, HSE-9 In-House Quality Assurance Samples Prepared at TA-50 (1988).
89GLA	01	E. S. Gladney, P. E. Neifert, and N. W. Bower, Determination of Silicon in NBS Biological SRM's by Instrumental Epithermal Neutron Activation and X-ray Fluorescence Spectrometry, Analytical Chemistry, submitted
??EPA	05	Environmental Protection Agency, EPA Quality Control Samples, Municipal Digested Sludge, EMSL, Cincinnati (Date Unknown).

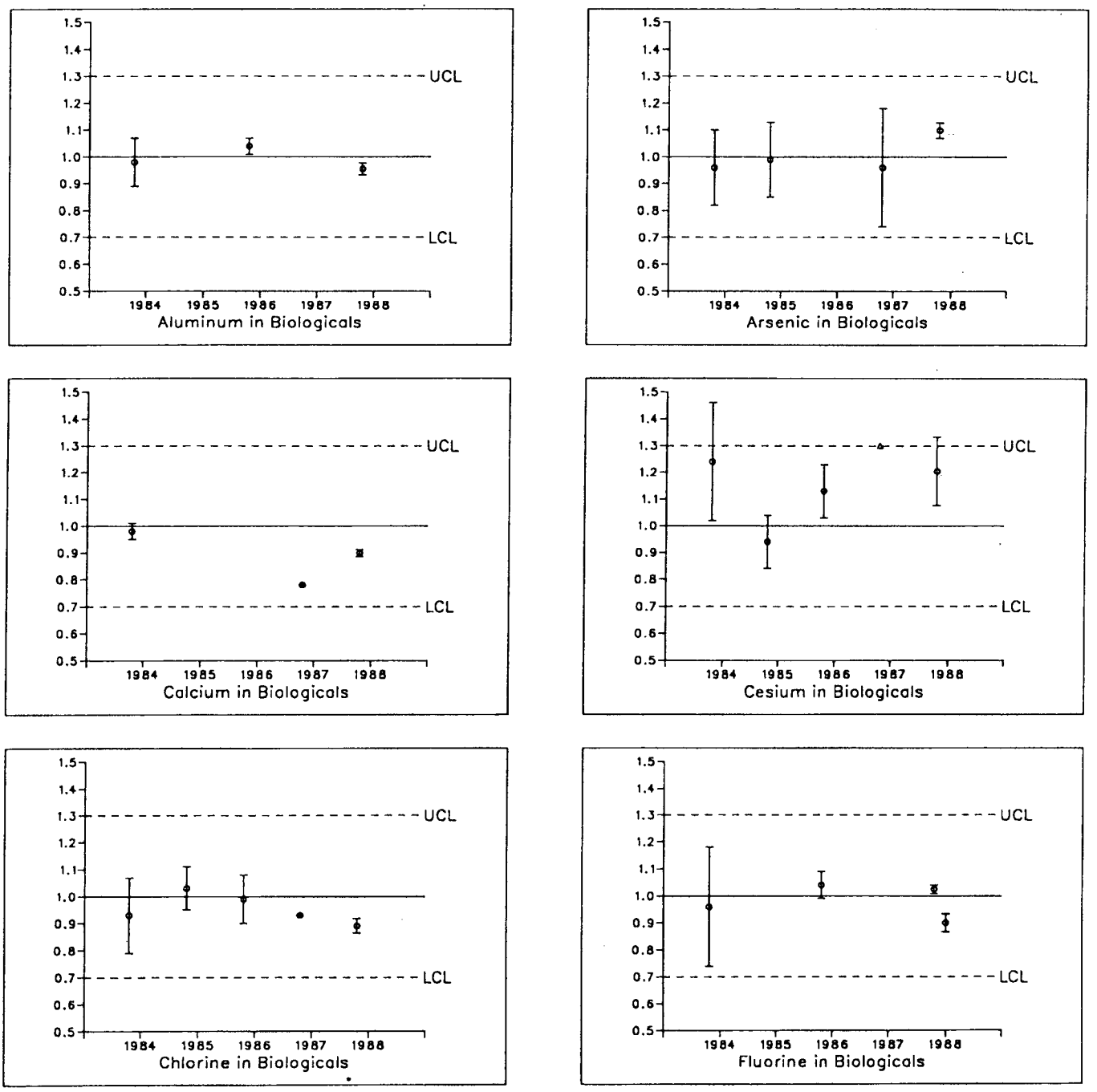
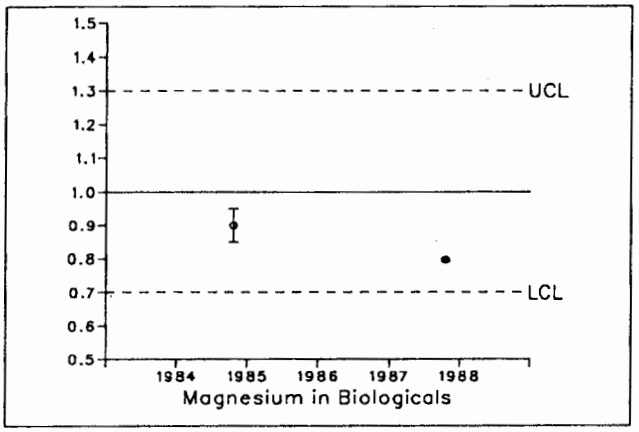


Fig. C-1. Five-year trends in quality assurance data for inorganic analyses.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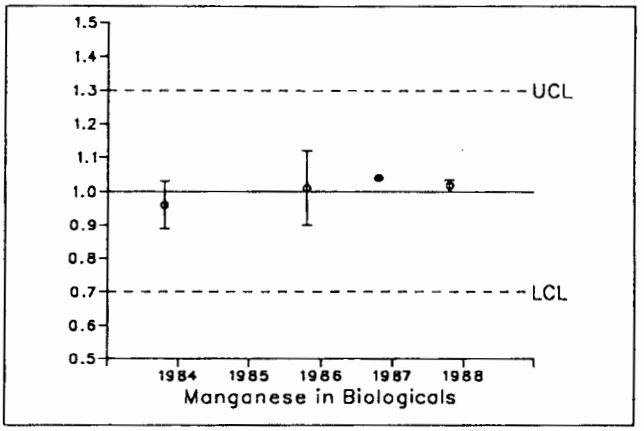
Magnesium in Biologicals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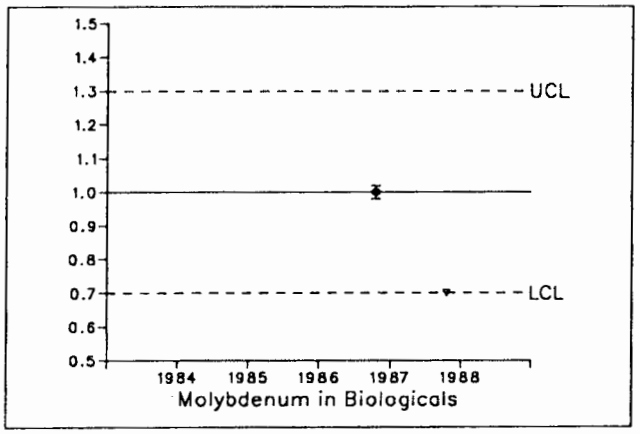
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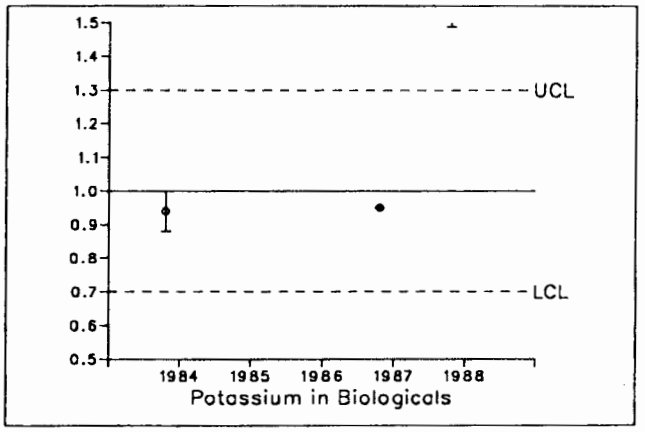
Molybdenum in Biologicals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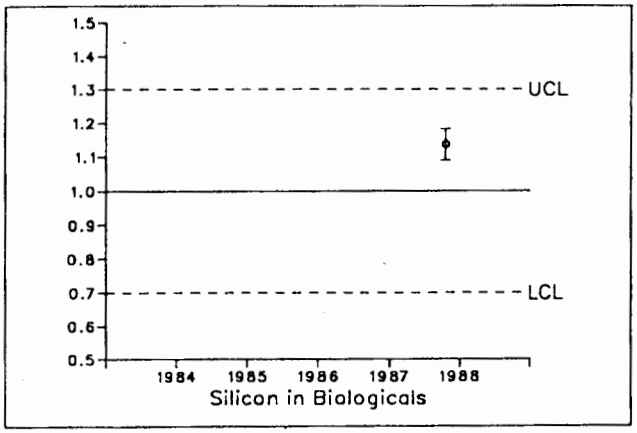
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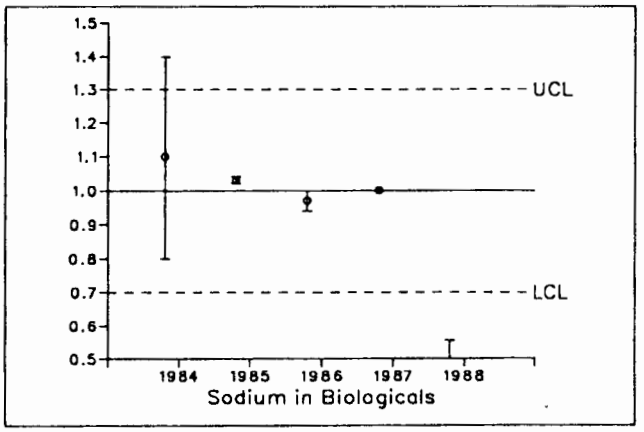
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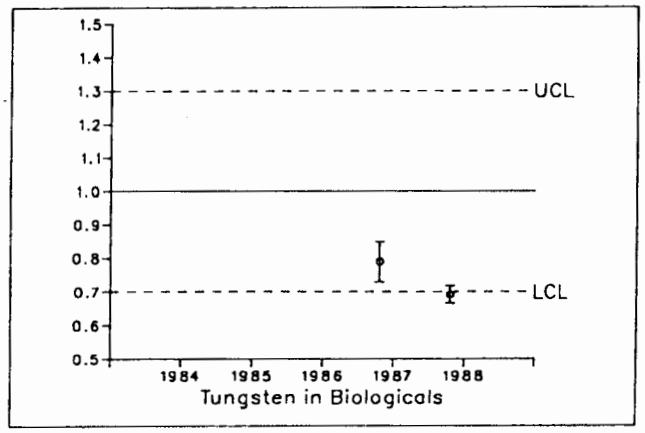
Fig. C-1. (cont)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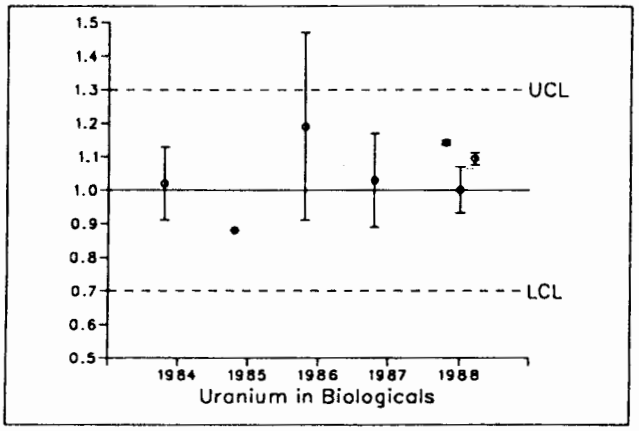
Tungsten in Biologicals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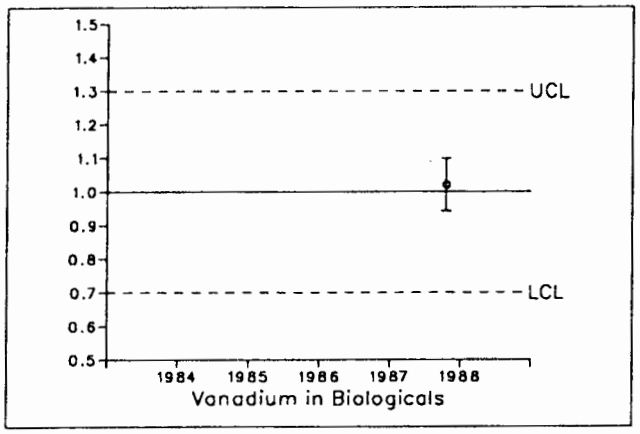
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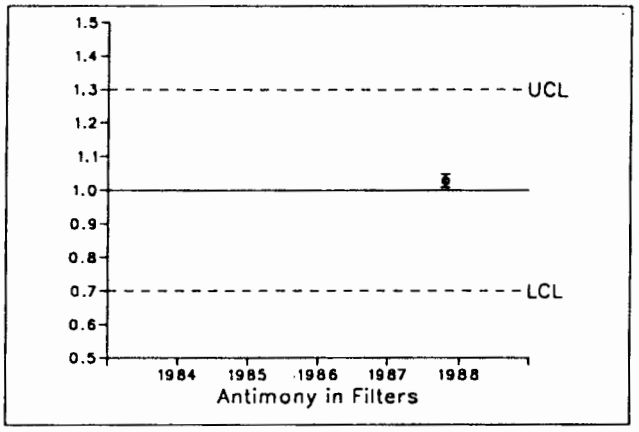
Vanadium in Biologicals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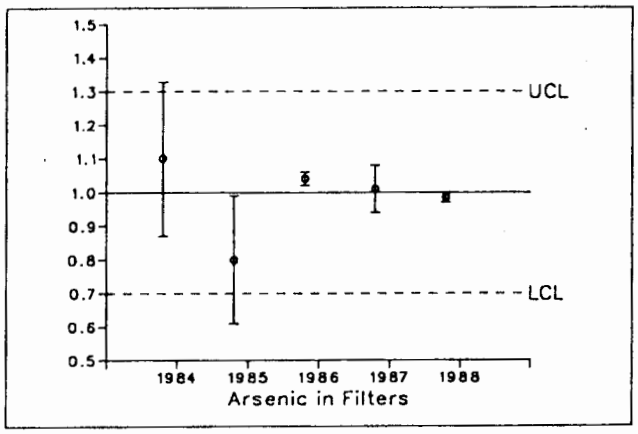
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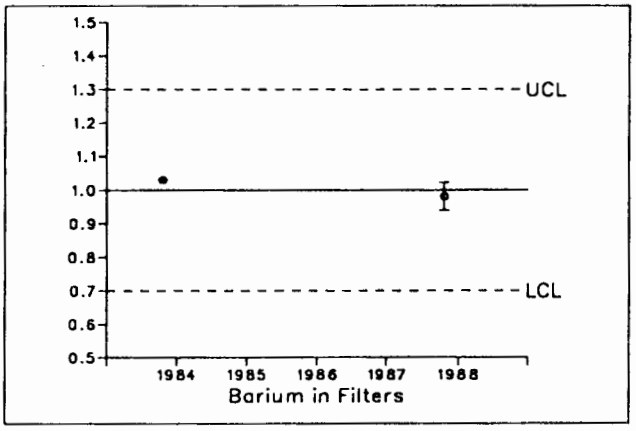
Arsenic in Filters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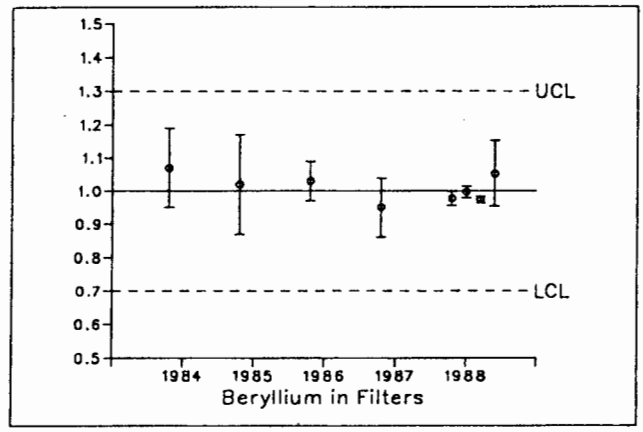
Barium in Filters

Fig. C-1. (cont)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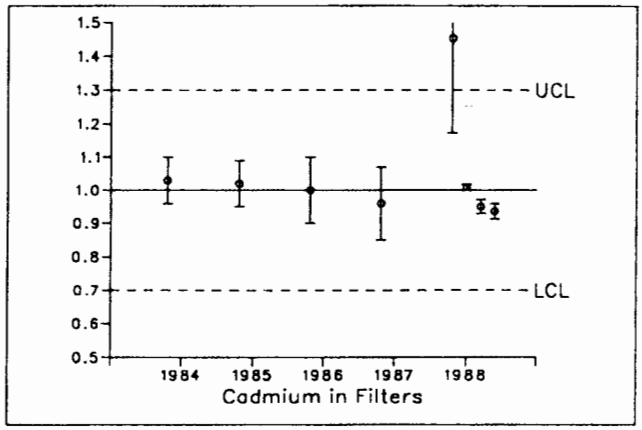
LCL
1984
1985
1986
1987
1988
Beryllium in Filters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1984
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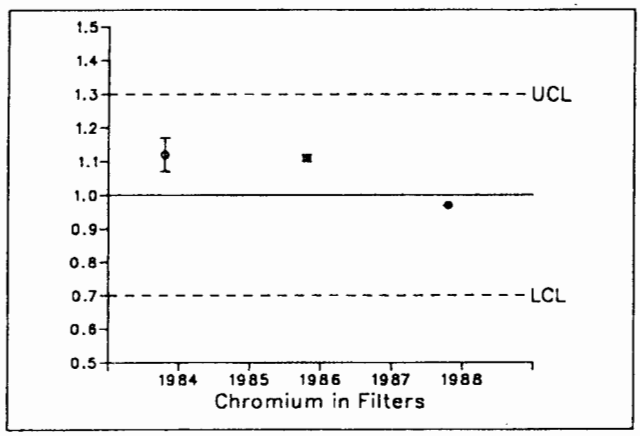
Cadmium in Filters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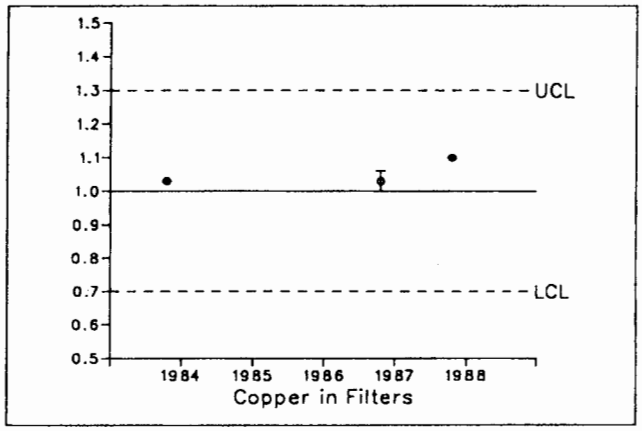
Chromium in Filters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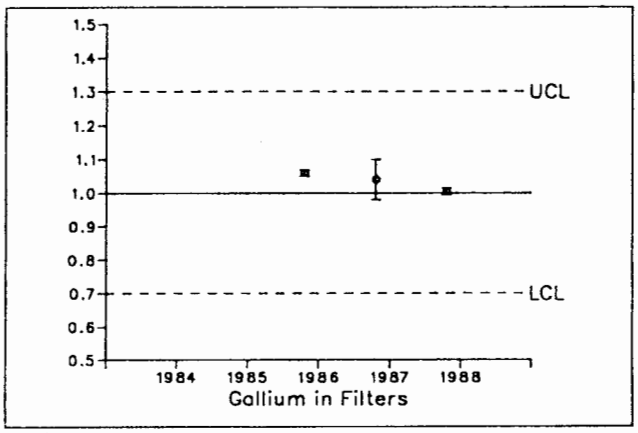
Copper in Filters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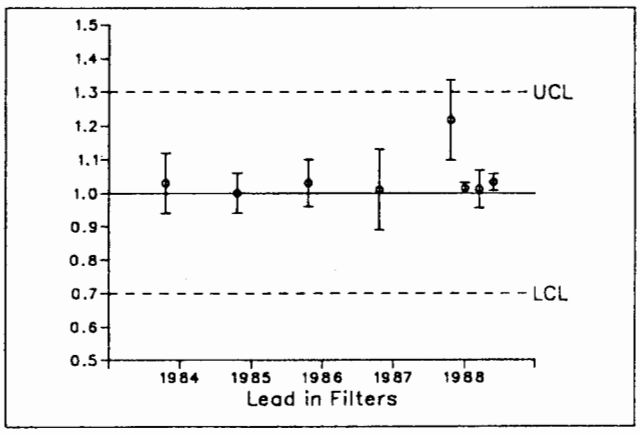
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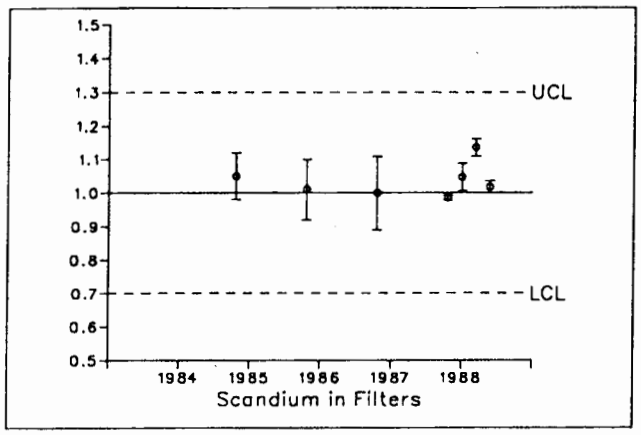
1987
1988
Lead in Filters

Fig. C-1. (cont)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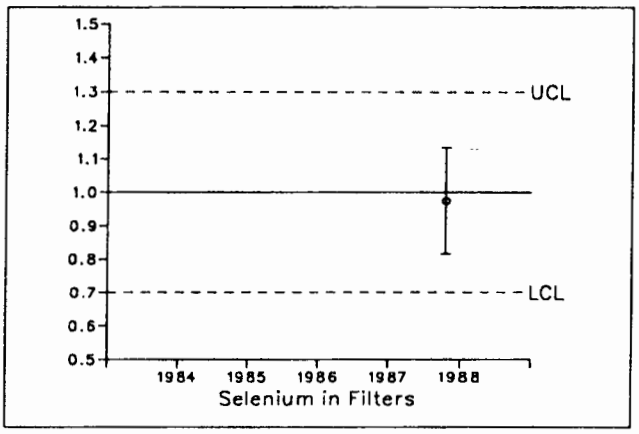
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LCL
1984
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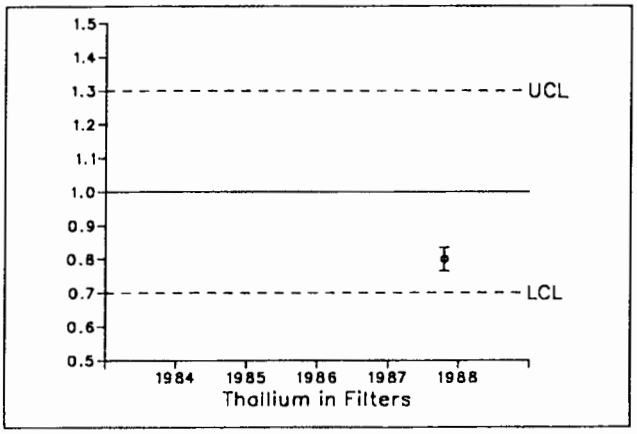
Selenium in Filters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1984
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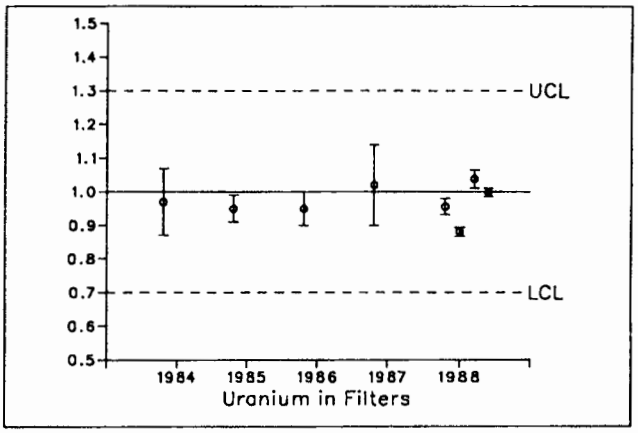
Thallium in Filters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1984
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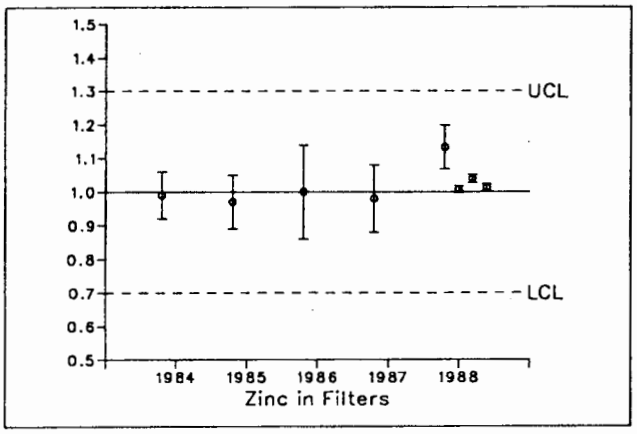
1988
Uranium in Filters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LCL
1984
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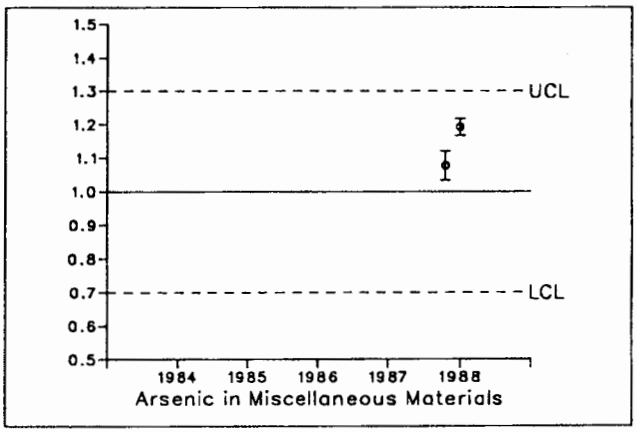
1988
Zinc in Filters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LCL
1984
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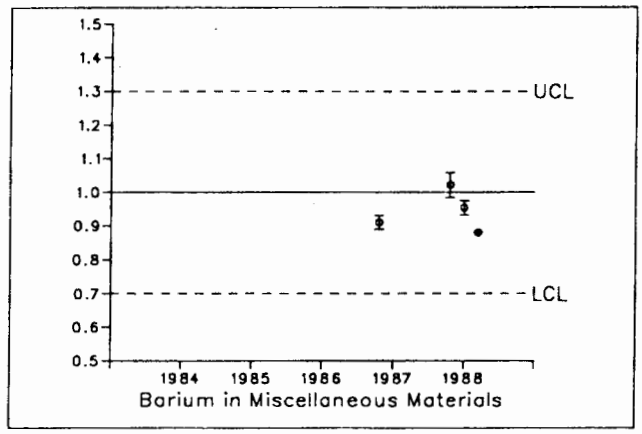
1986
1987
1988
Arsenic in Miscellaneous Materials

Fig. C-1. (cont)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LCL
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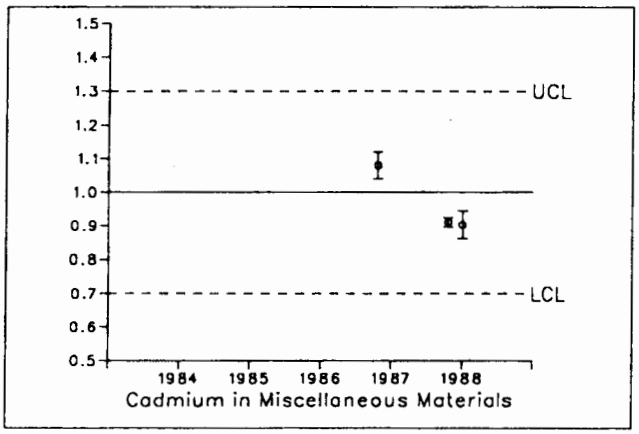
Barium in Miscellaneous Materials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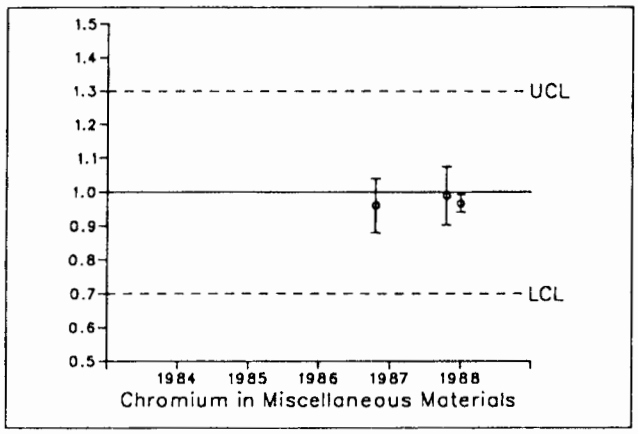
Cadmium in Miscellaneous Materials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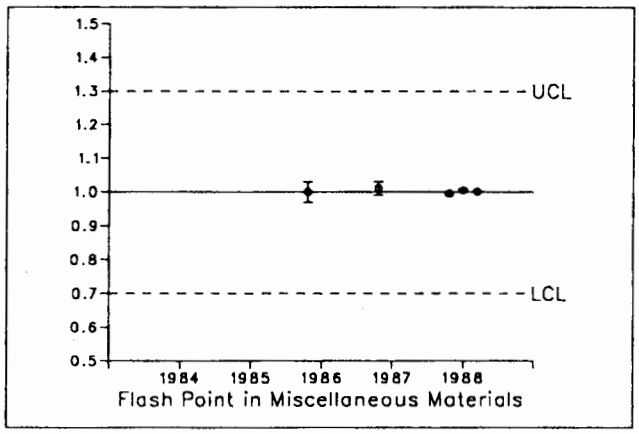
Chromium in Miscellaneous Materials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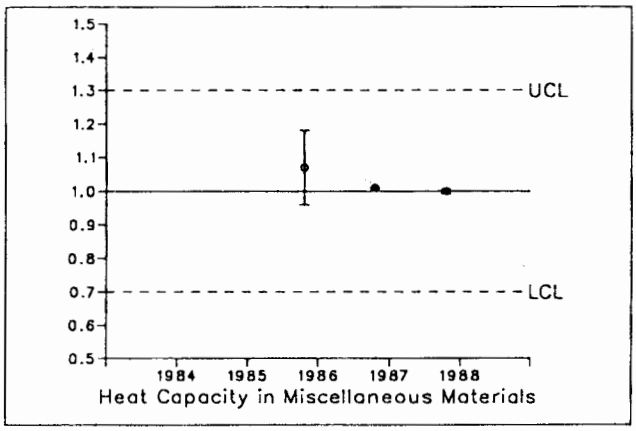
Flash Point in Miscellaneous Materials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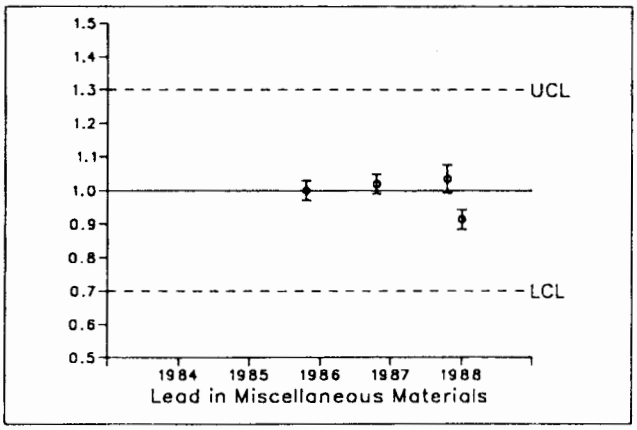
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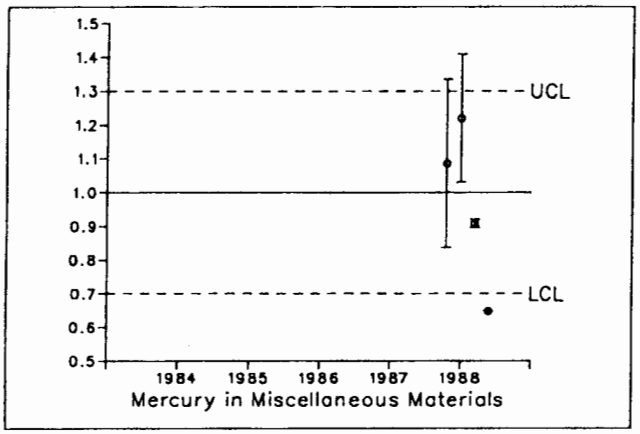
LCL
1984 1985 1986 1987 1988
Lead in Miscellaneous Materials

Fig. C-1. (cont)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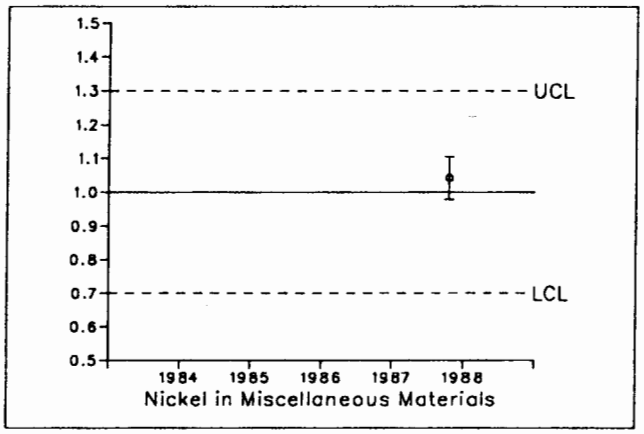
Mercury in Miscellaneous Materials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LCL
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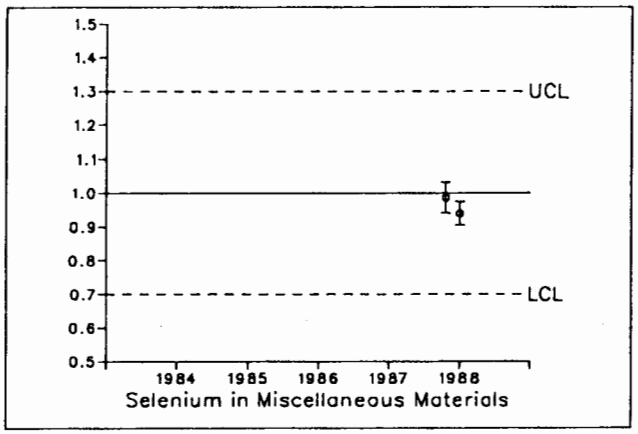
Nickel in Miscellaneous Materials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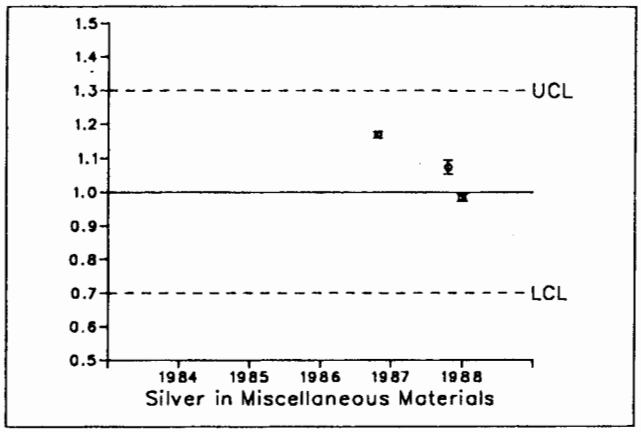
Selenium in Miscellaneous Materials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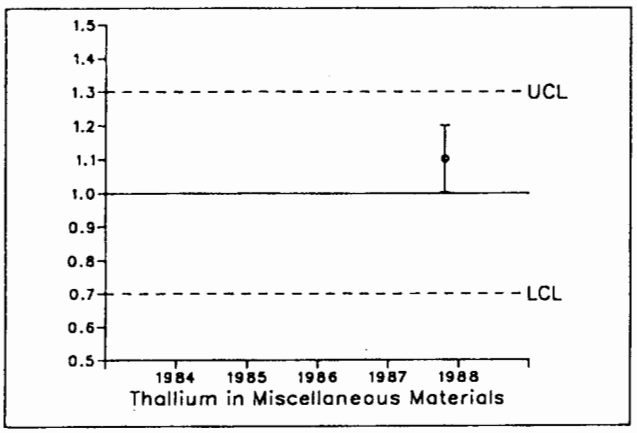
Silver in Miscellaneous Materials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LCL
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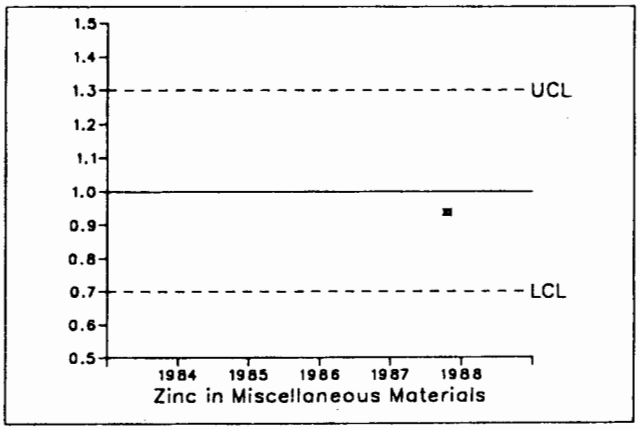
Thallium in Miscellaneous Materials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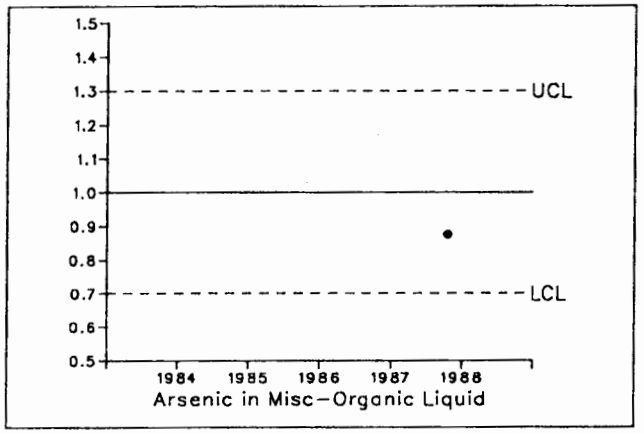
LCL
1984 1985 1986 1987 1988
Zinc in Miscellaneous Materials

Fig. C-1. (cont)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LCL
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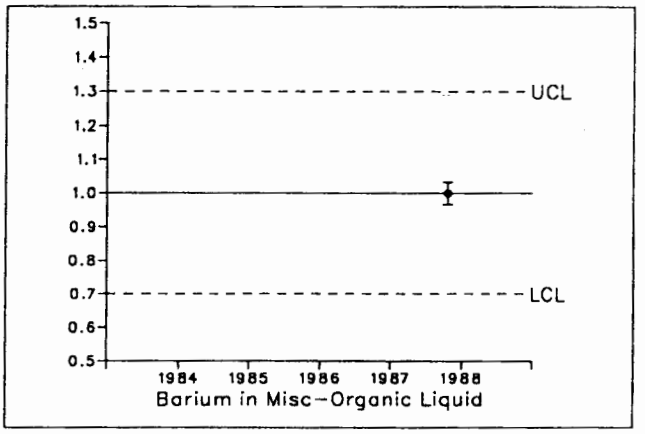
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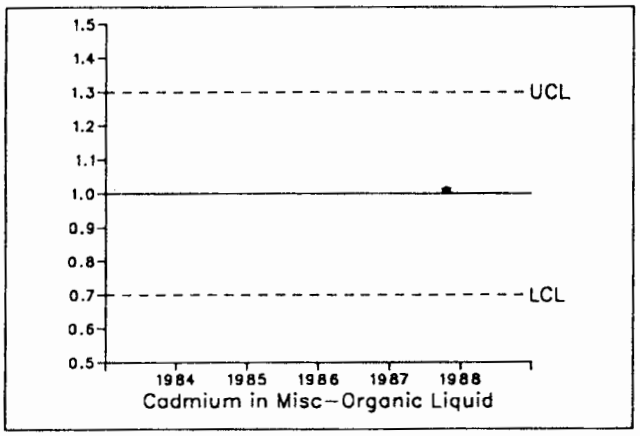
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LCL
1984 1985 1986 1987 1988
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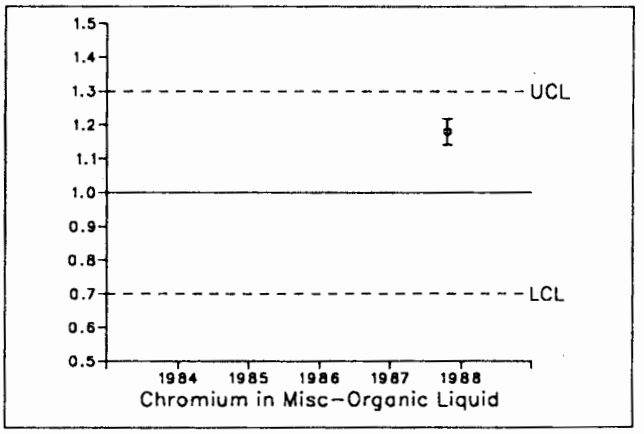
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LCL
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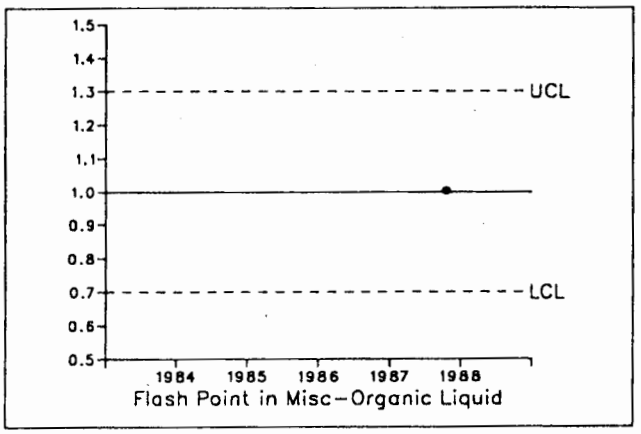
Chromium in Misc–Organic Liquid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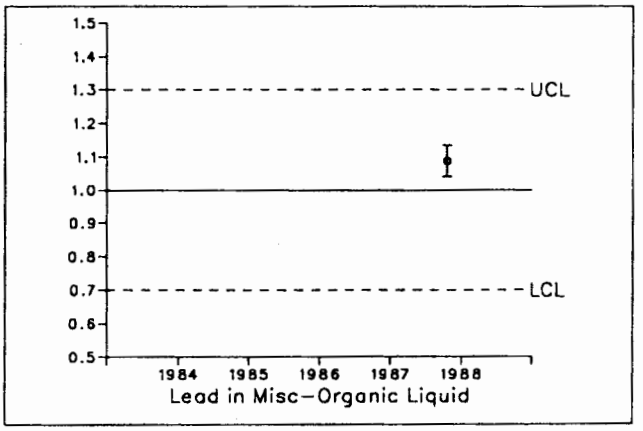
Flash Point in Misc–Organic Liquid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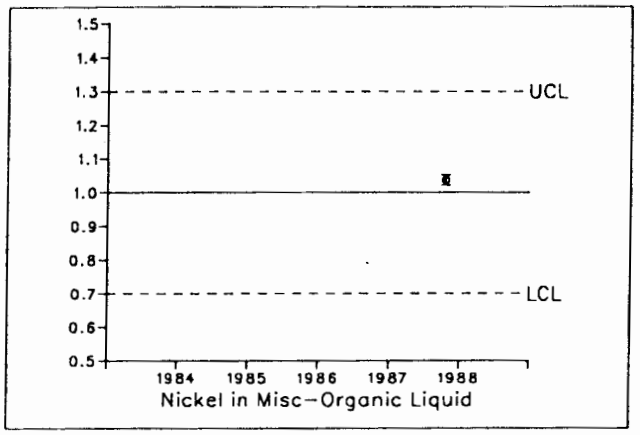
LCL
1984 1985 1986 1987 1988
Lead in Misc–Organic Liquid

Fig. C-1. (cont)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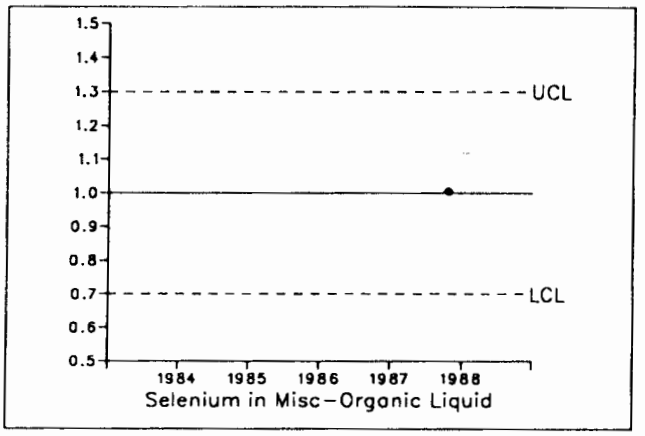
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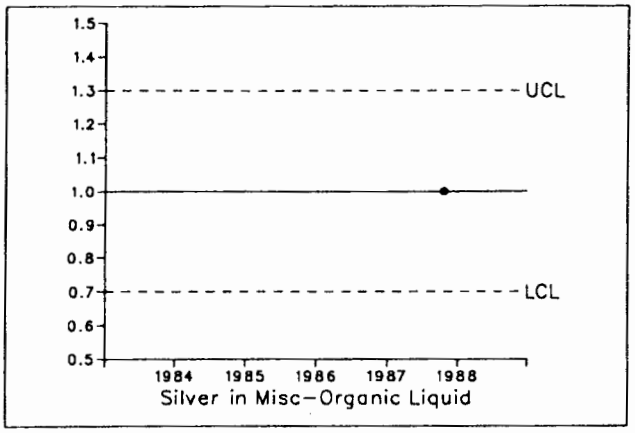
Selenium in Misc–Organic Liquid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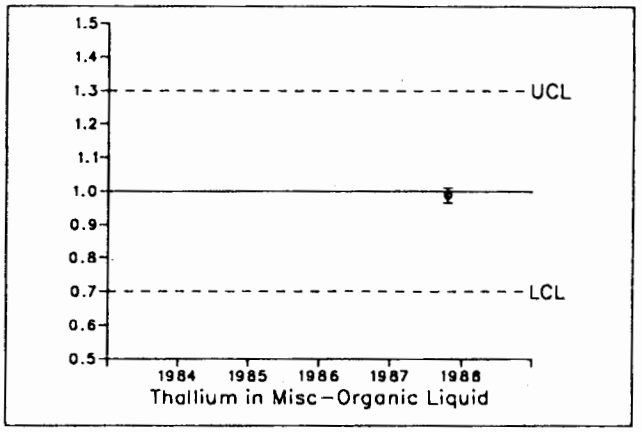
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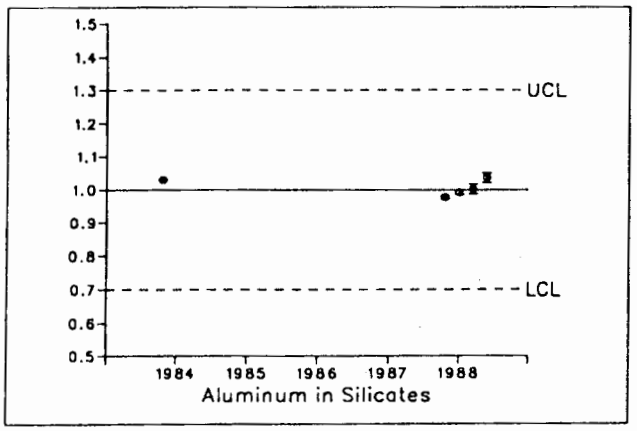
Thallium in Misc–Organic Liquid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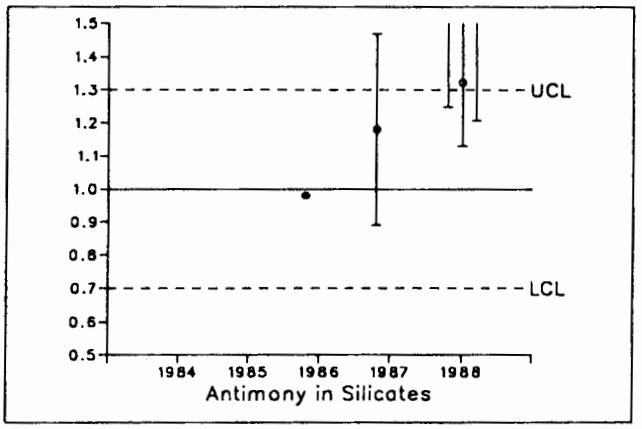
Aluminum in Silicates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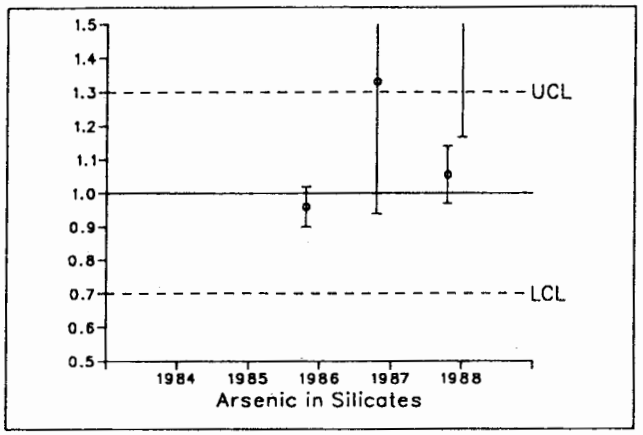
LCL
1984 1985 1986 1987 1988
Antimony in Silicates

Fig. C-1. (cont)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1984
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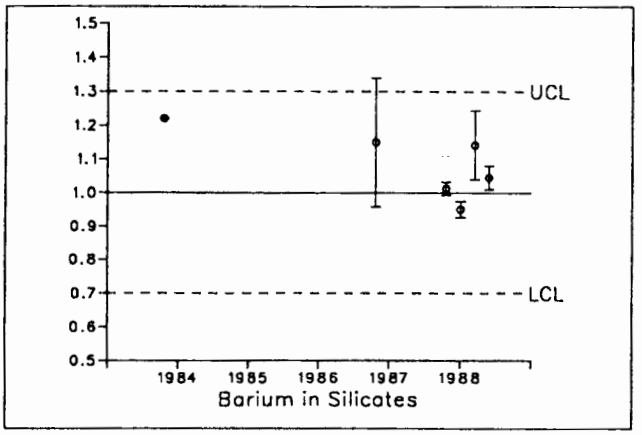
1987
1988
Arsenic in Silicates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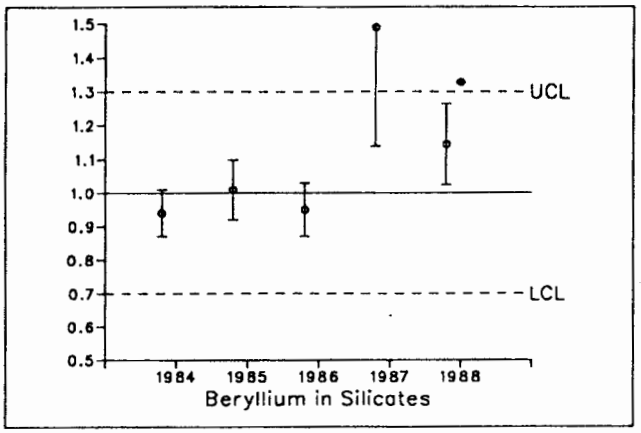
LCL
1984
1985
1986
1987
1988
Barium in Silicates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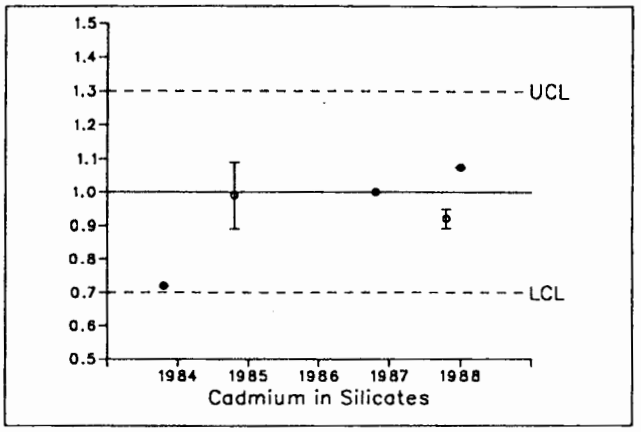
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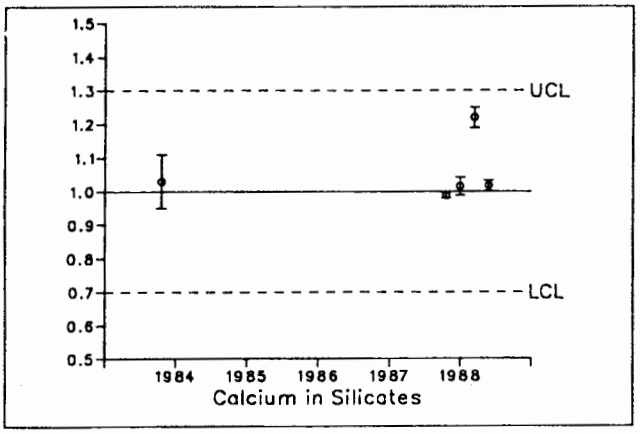
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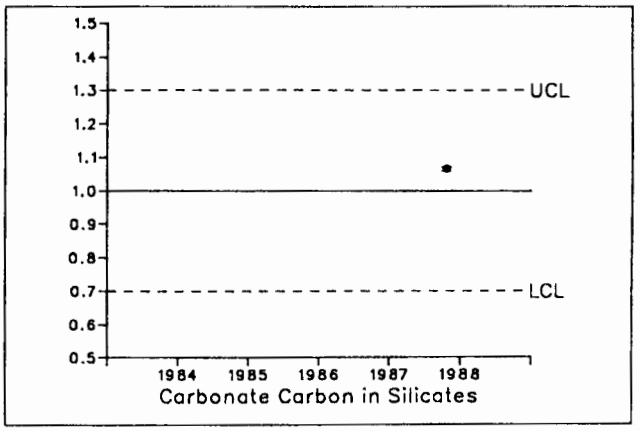
Calcium in Silicates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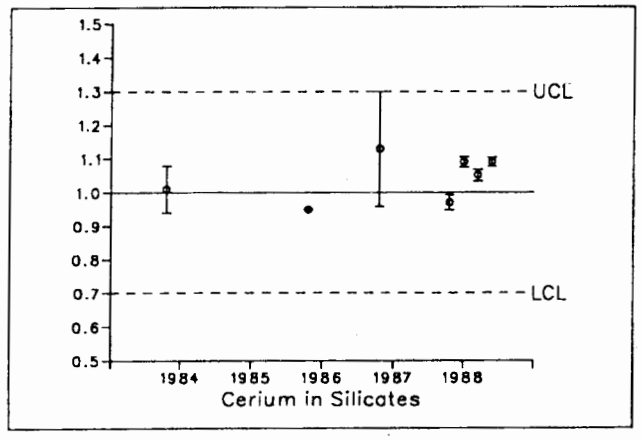
Carbonate Carbon in Silicates

Fig. C-1. (cont)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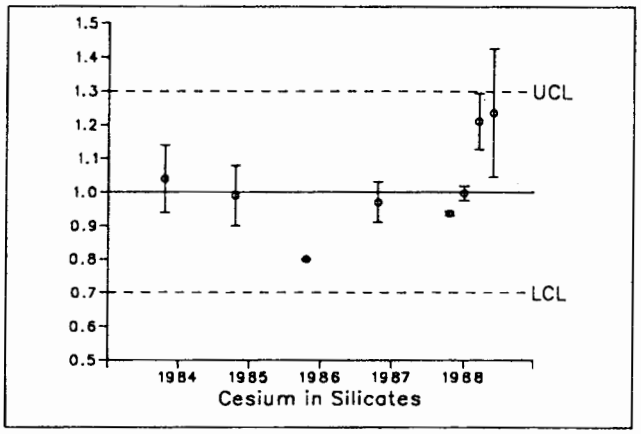
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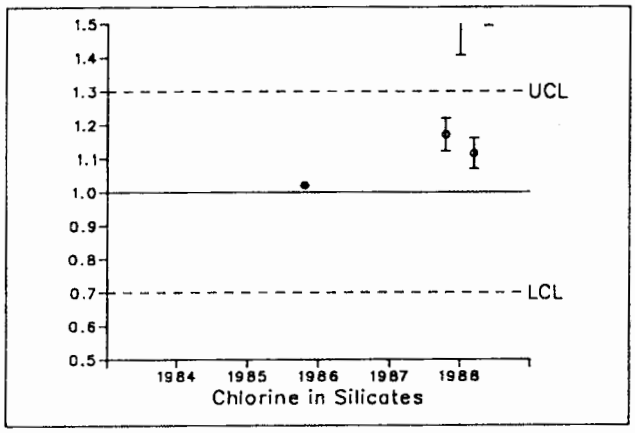
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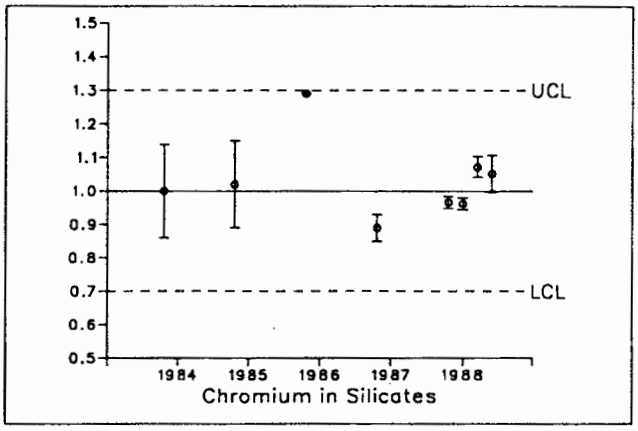
Chlorine in Silicates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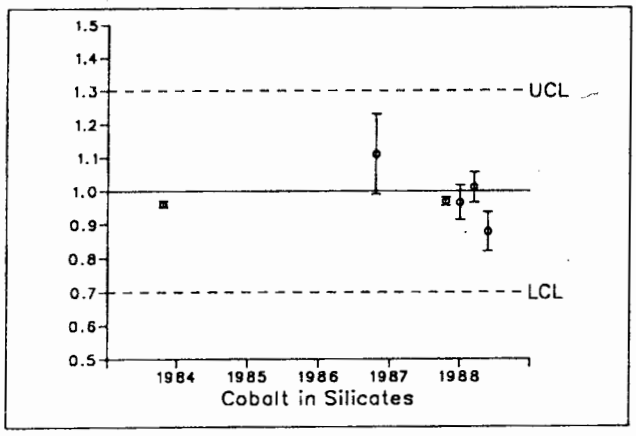
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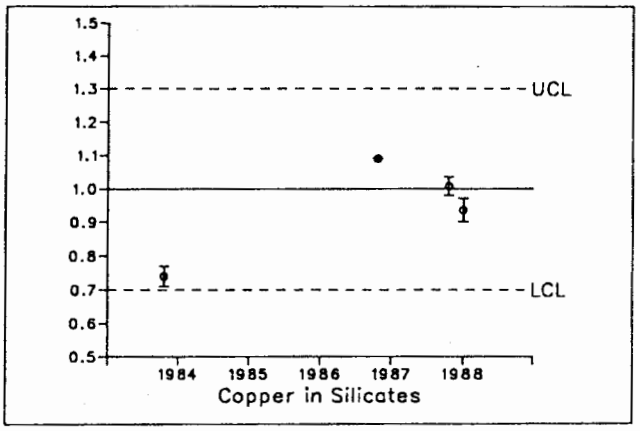
Cobalt in Silicates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1984
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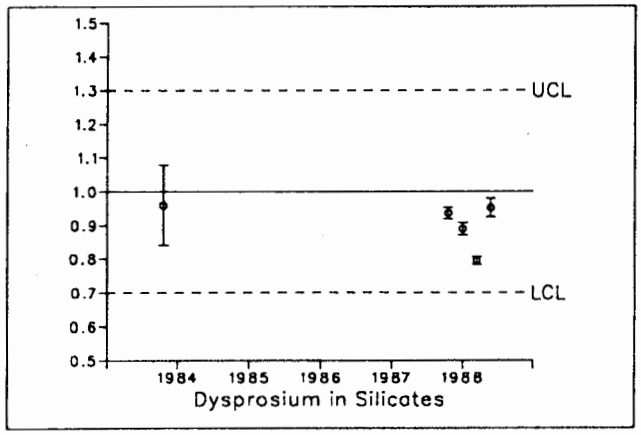
1986
1987
1988
Copper in Silicates

Fig. C-1. (cont)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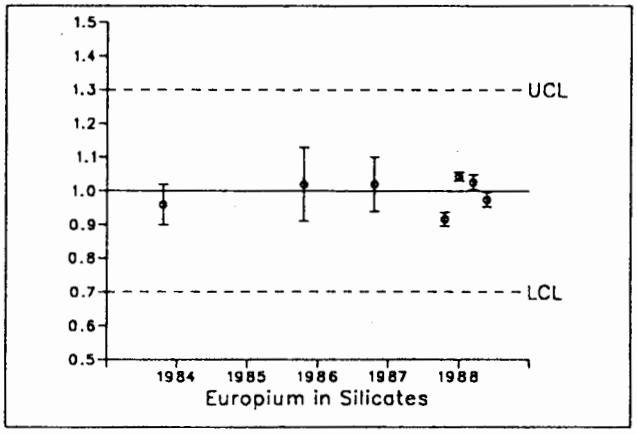
Dysprosium in Silicates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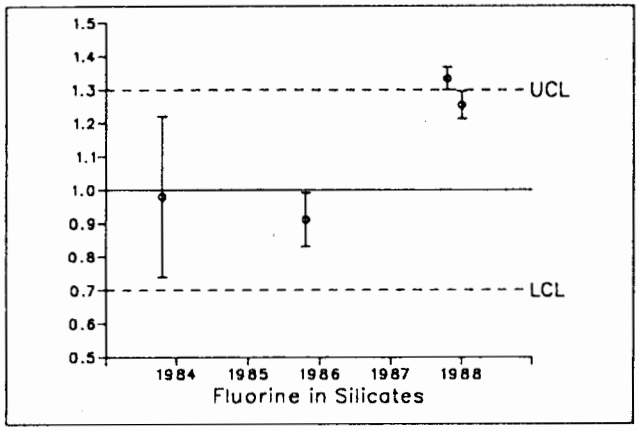
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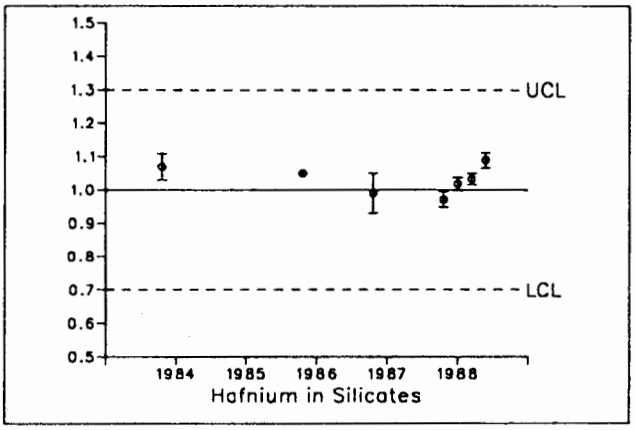
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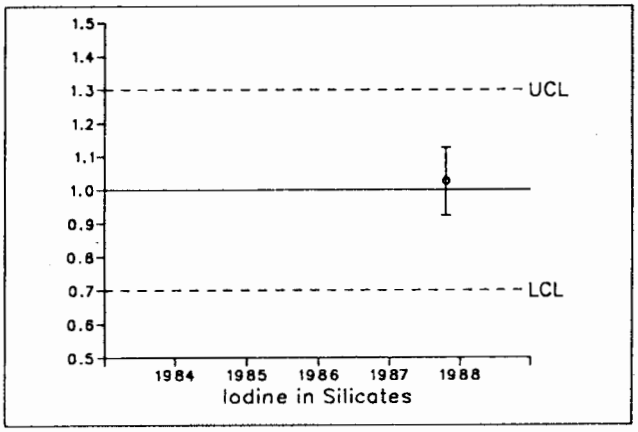
1988
Hafnium in Silicates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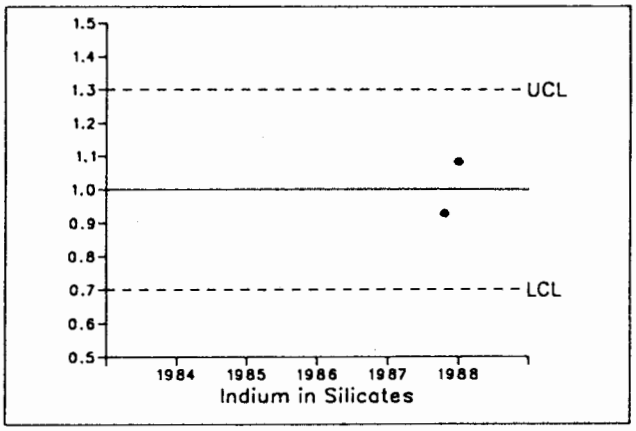
Iodine in Silicates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LCL
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1987
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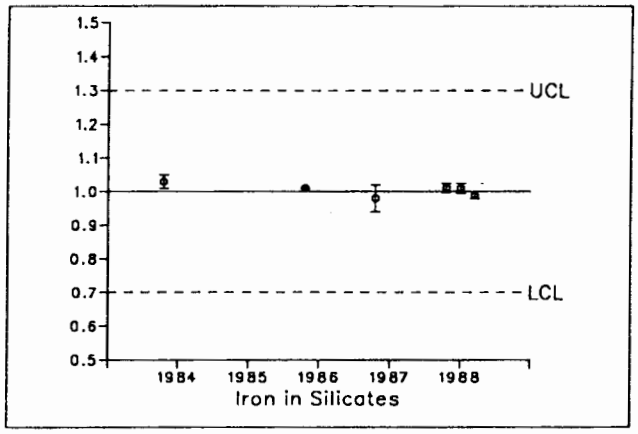
Indium in Silicates

Fig. C-1. (cont)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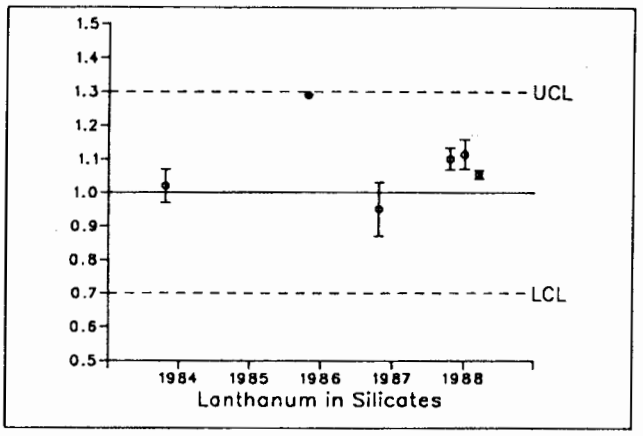
Iron in Silicates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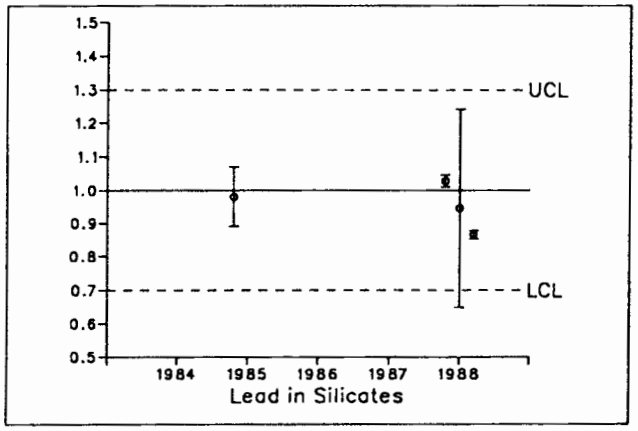
Lanthanum in Silicates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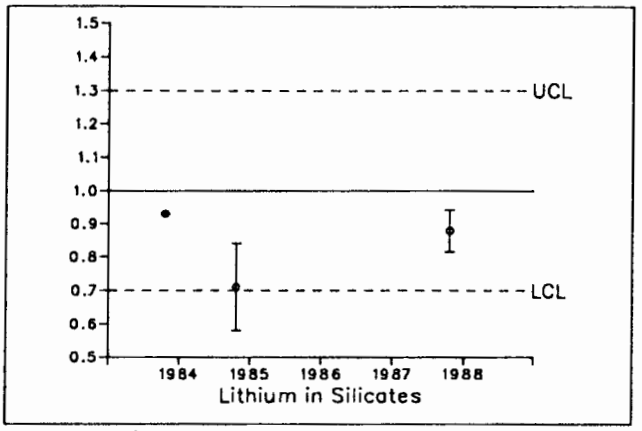
Lead in Silicates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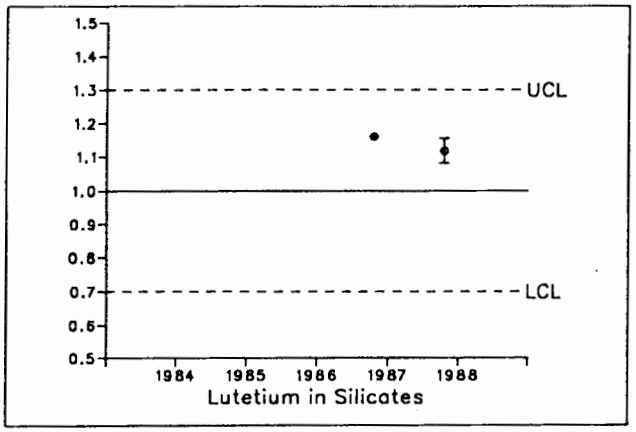
Lithium in Silicates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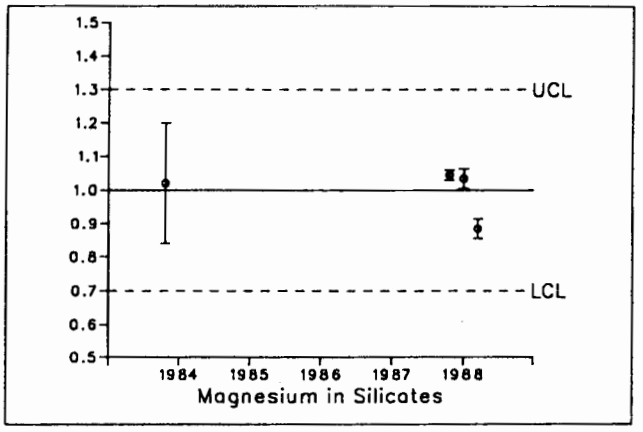
Lutetium in Silicates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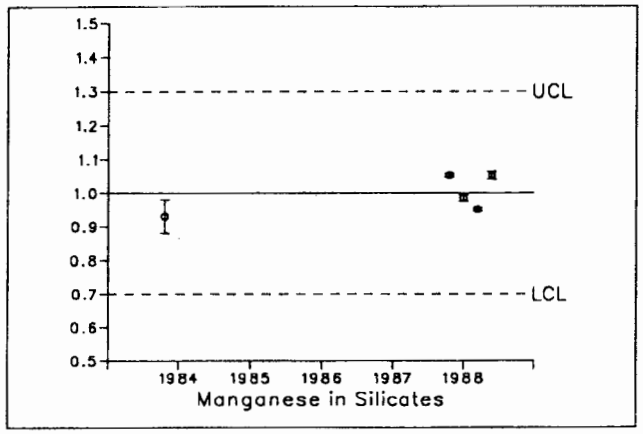
1988
Magnesium in Silicates

Fig. C-1. (cont)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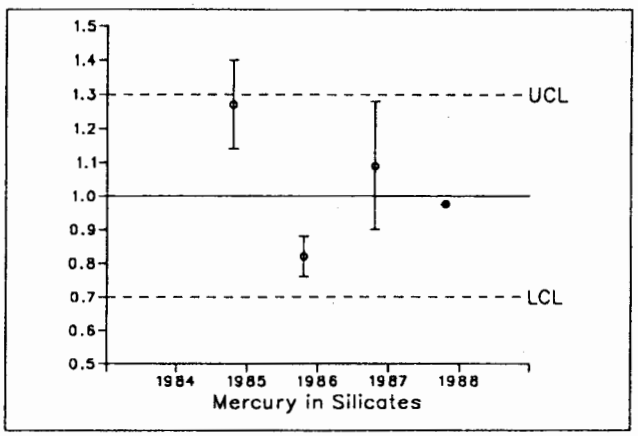
Manganese in Silicates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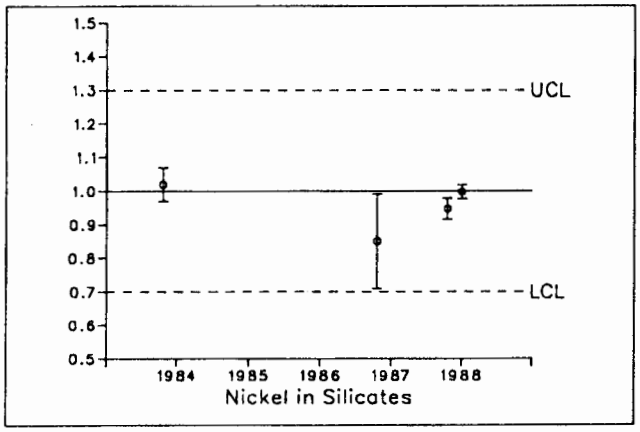
Mercury in Silicates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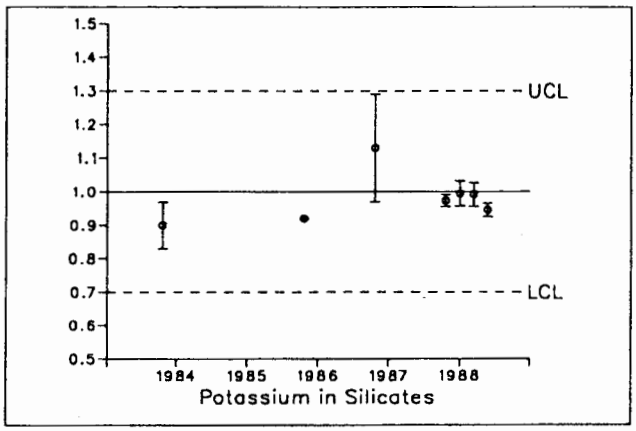
Nickel in Silicates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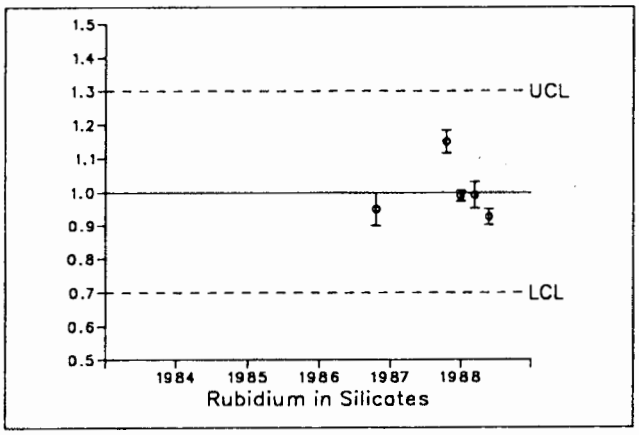
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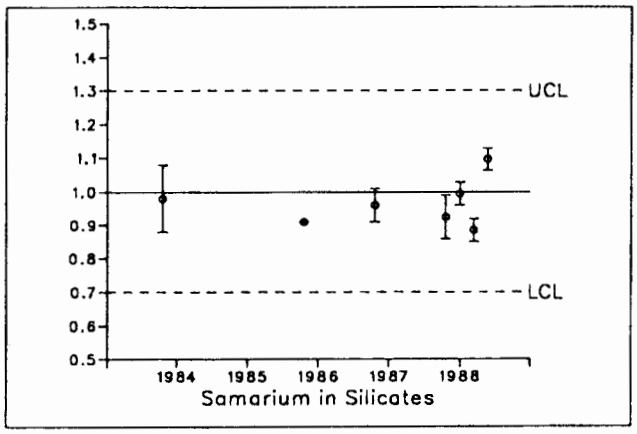
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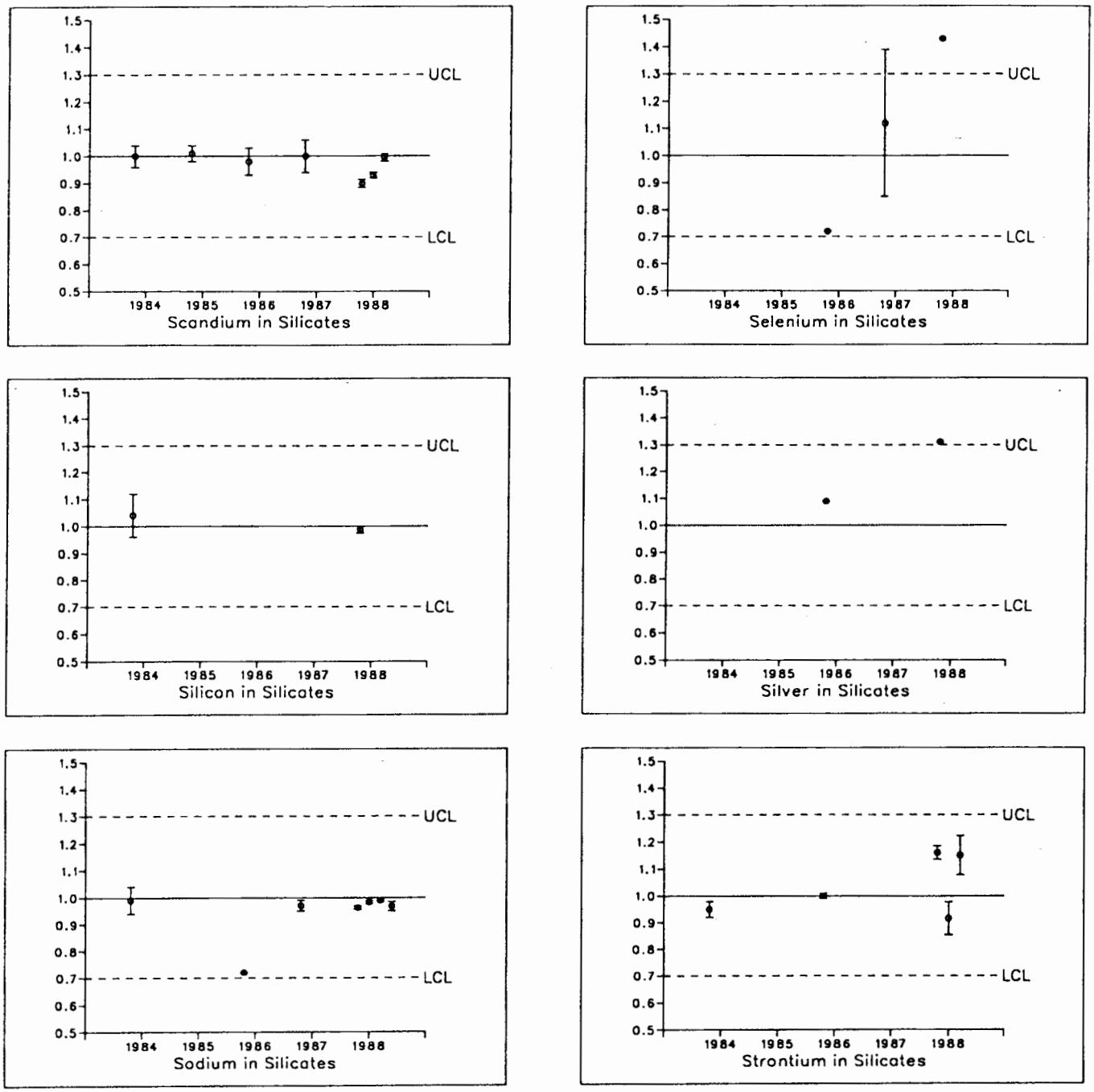
Fig. C-1. (cont)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LCL
1984
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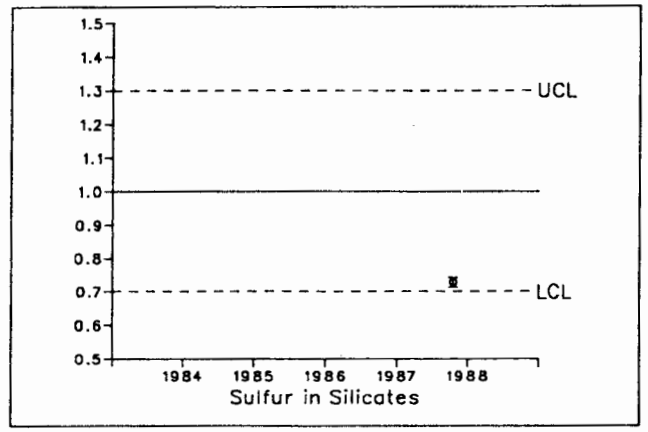
Scandium in Silicates
Selenium in Silicates
Silicon in Silicates
Silver in Silicates
Sodium in Silicates
Strontium in Silicates

Fig. C-1. (cont)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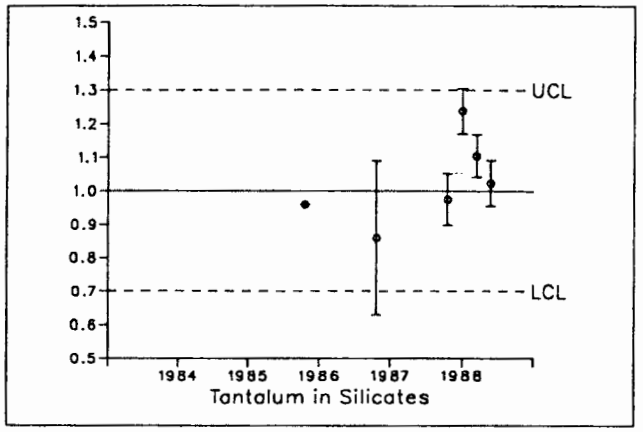
Sulfur in Silicates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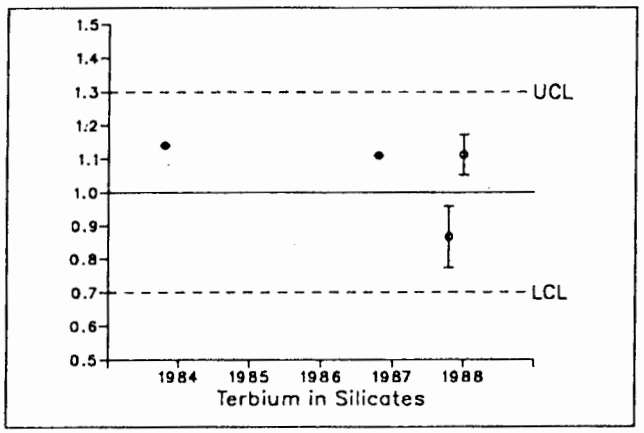
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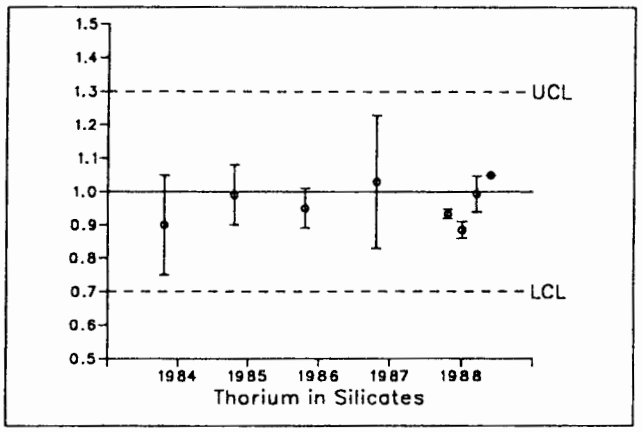
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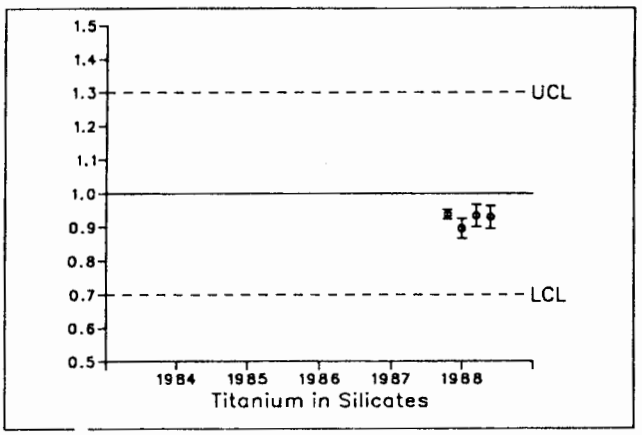
Thorium in Silicates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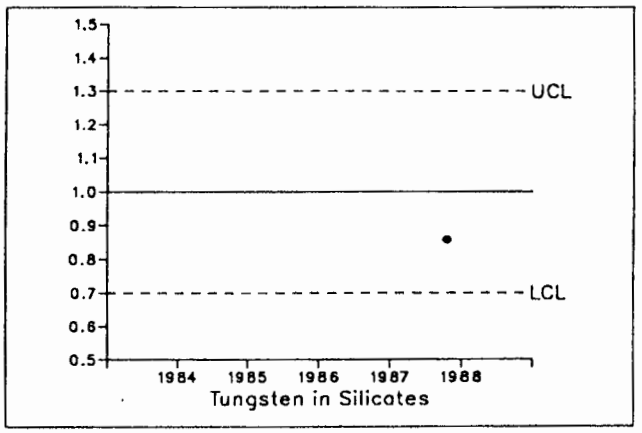
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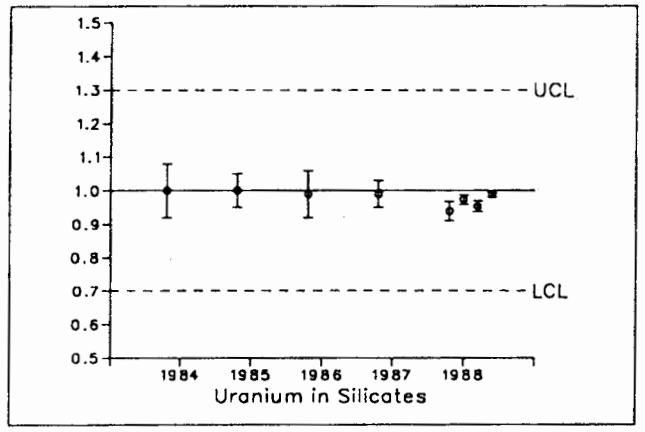
1986
1987
1988
Tungsten in Silicates

Fig. C-1. (cont)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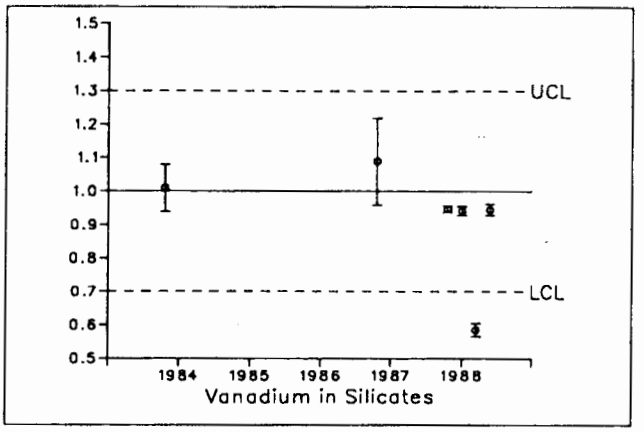
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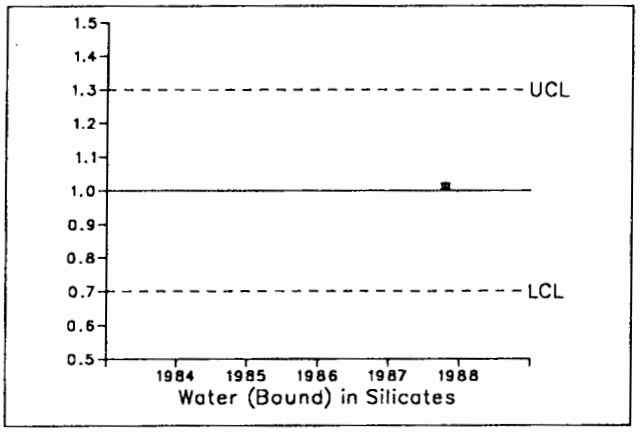
Vanadium in Silicates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LCL
1984
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1986
1987
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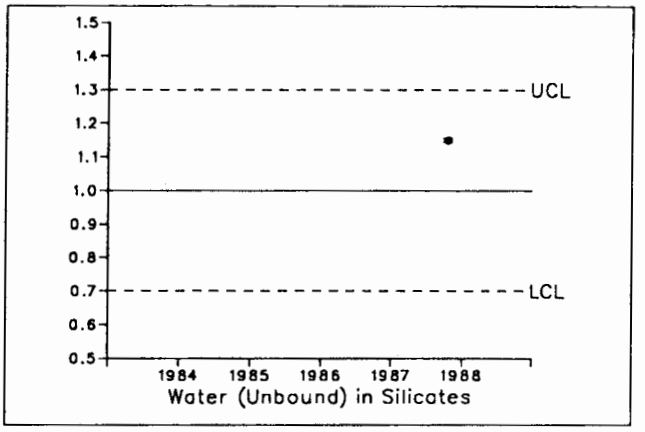
Water (Bound) in Silicates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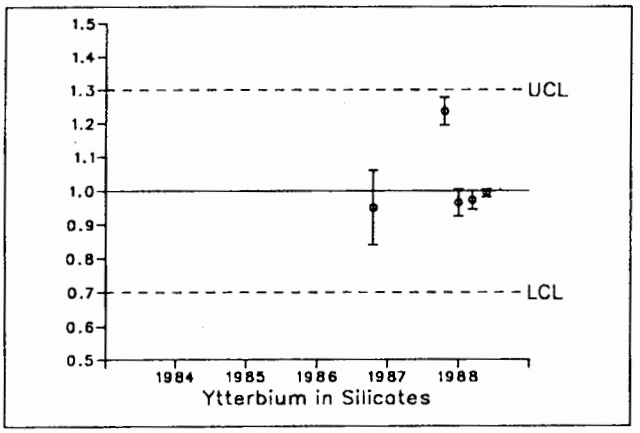
1988
Water (Unbound) in Silicates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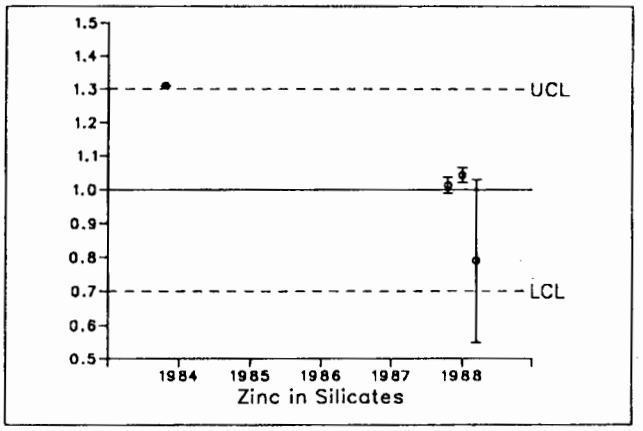
1988
Ytterbium in Silicates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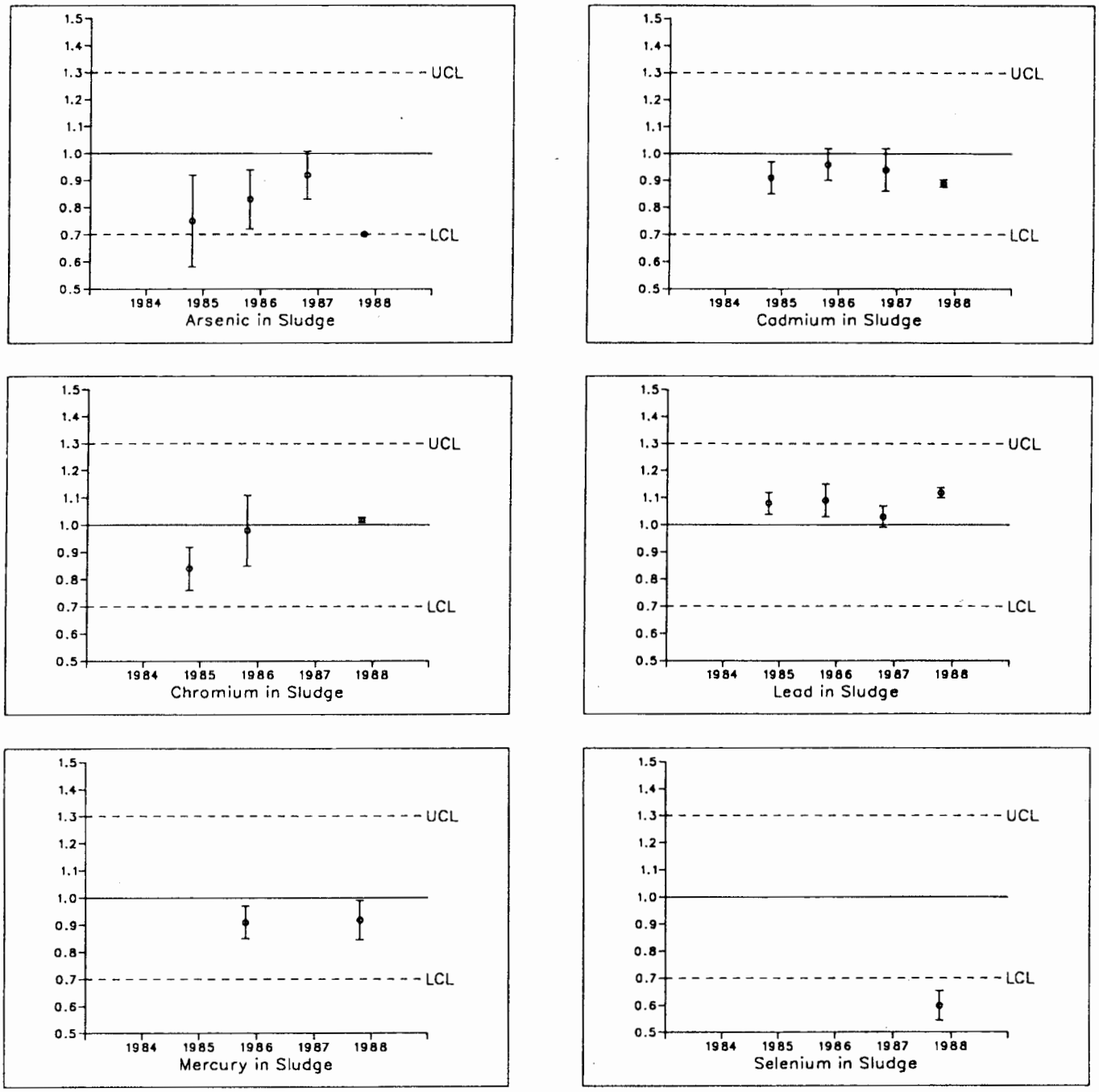
1987
1988
Zinc in Silicates

Fig. C-1. (cont)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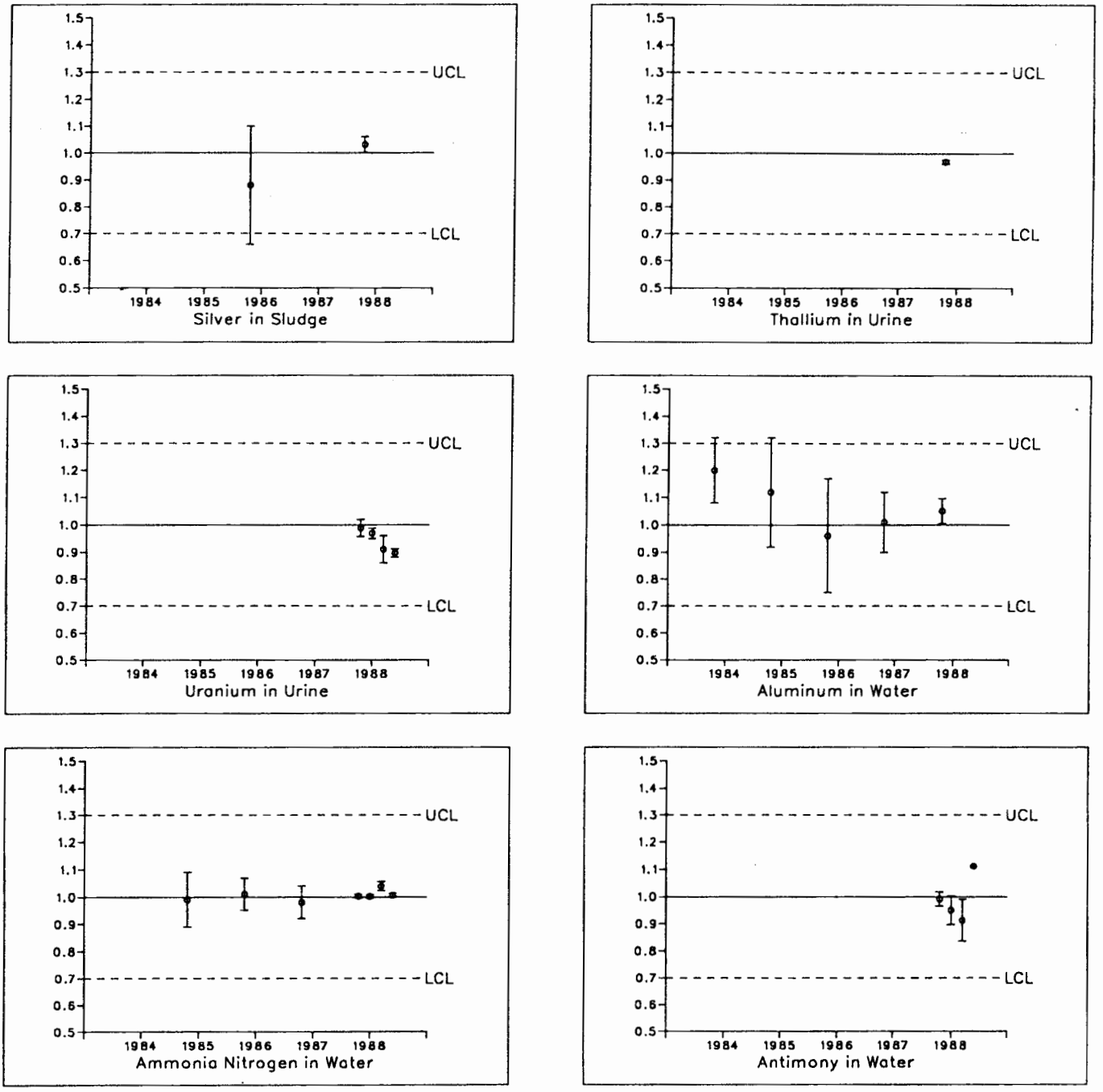
1984
1985
1986
1987
1988
Arsenic in Sludge
Cadmium in Sludge
Chromium in Sludge
Lead in Sludge
Mercury in Sludge
Selenium in Sludge

Fig. C-1. (cont)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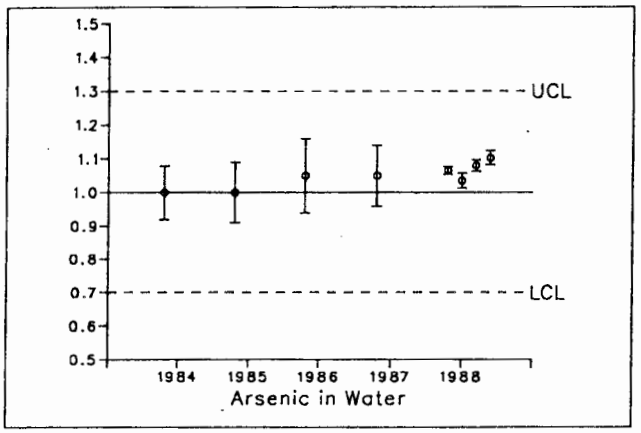
LCL
1984
1985
1986
1987
1988
Silver in Sludge
Thallium in Urine
Uranium in Urine
Aluminum in Water
Ammonia Nitrogen in Water
Antimony in Water

Fig. C-1. (cont)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1984
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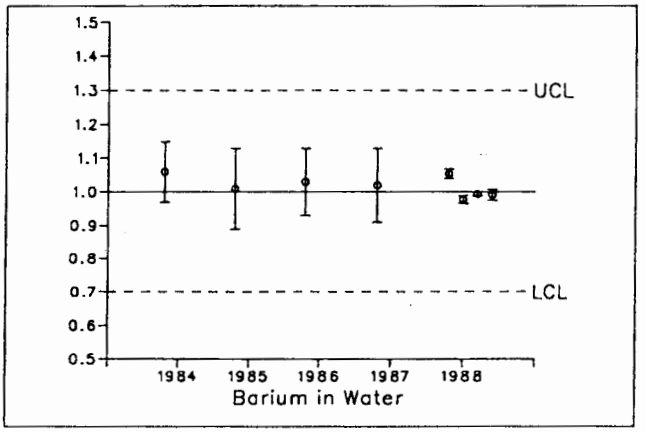
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LCL
1984
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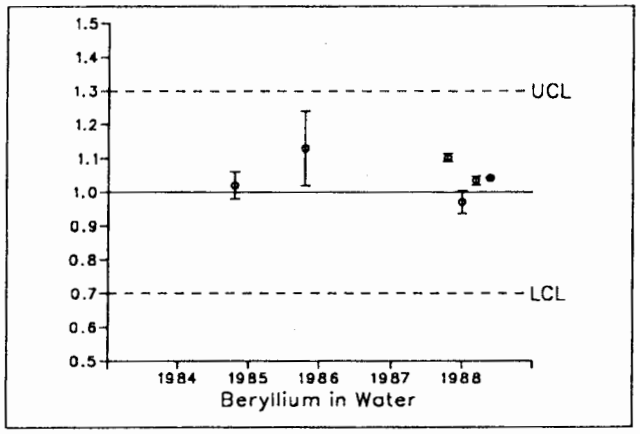
Barium in Water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LCL
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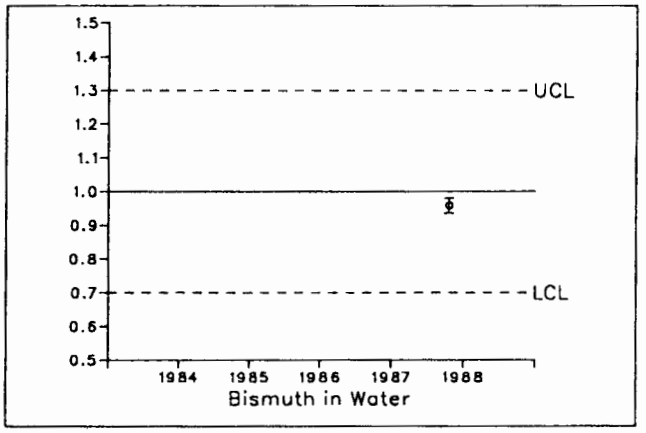
1988
Beryllium in Water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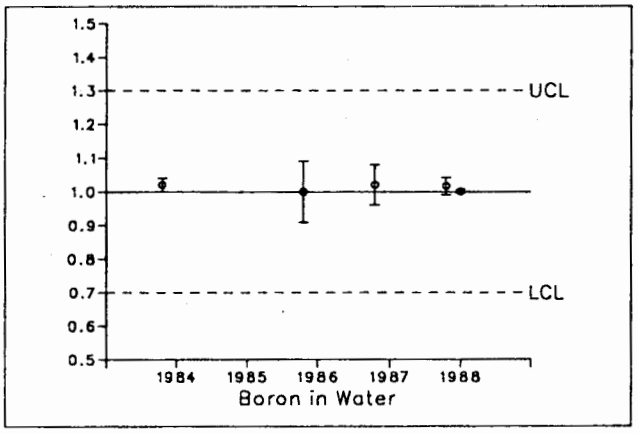
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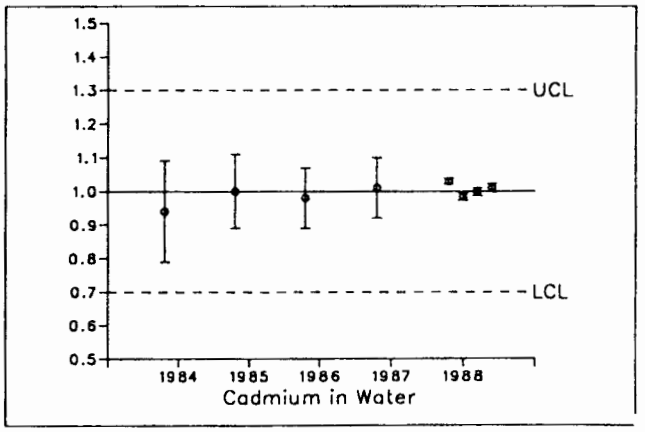
Boron in Water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UCL
LCL
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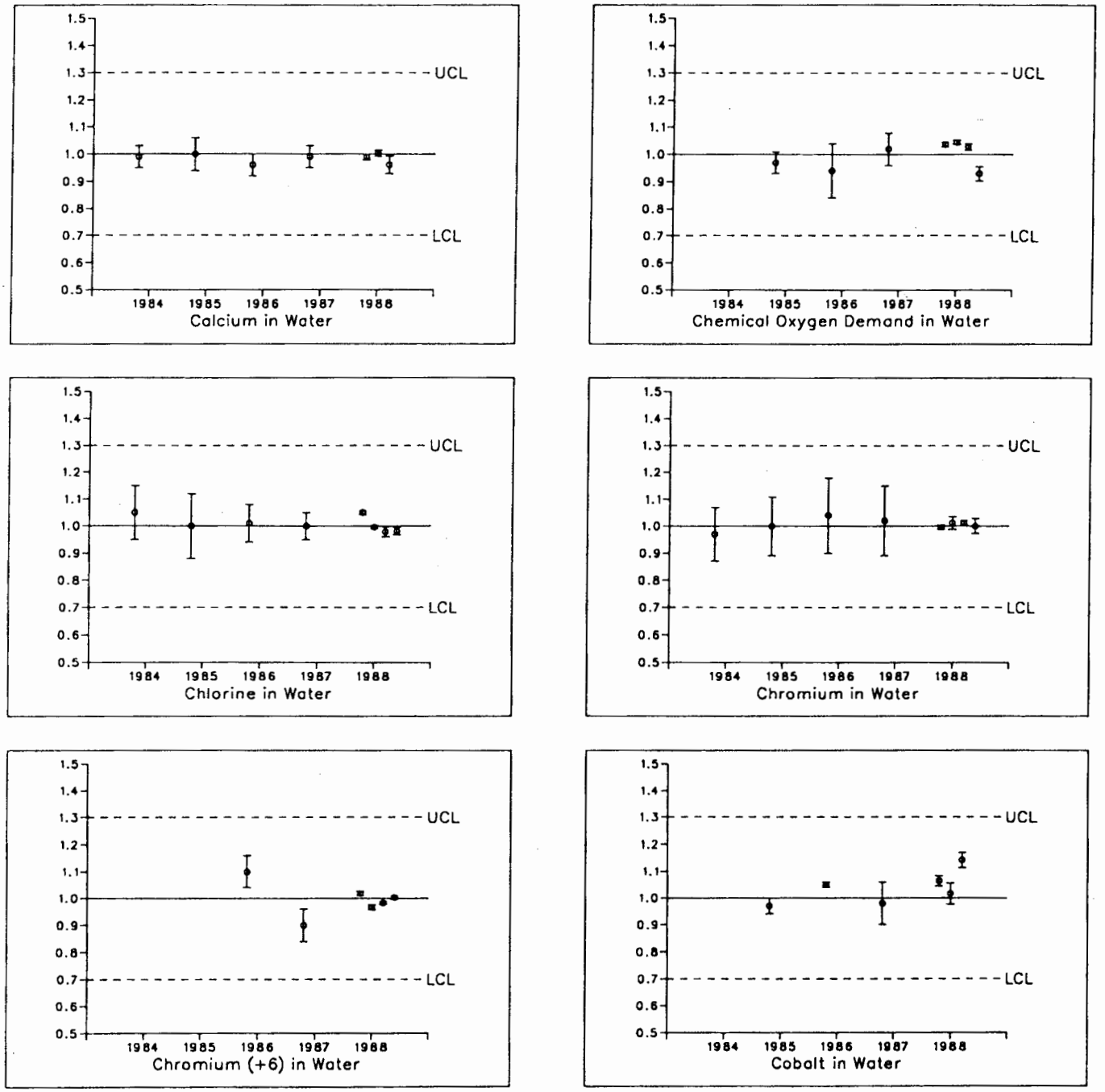
1987
1988
Cadmium in Water

Fig. C-1. (cont)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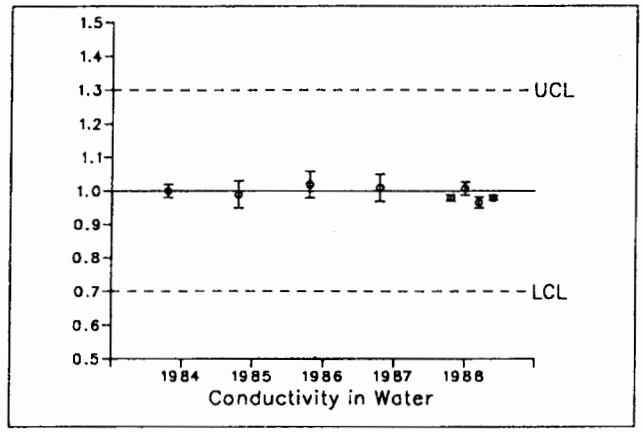
UCL
LCL
1984
1985
1986
1987
1988
Calcium in Water
Chemical Oxygen Demand in Water
Chlorine in Water
Chromium in Water
Chromium (+6) in Water
Cobalt in Water

Fig. C-1. (cont)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UCL
LCL
1984
1985
1986
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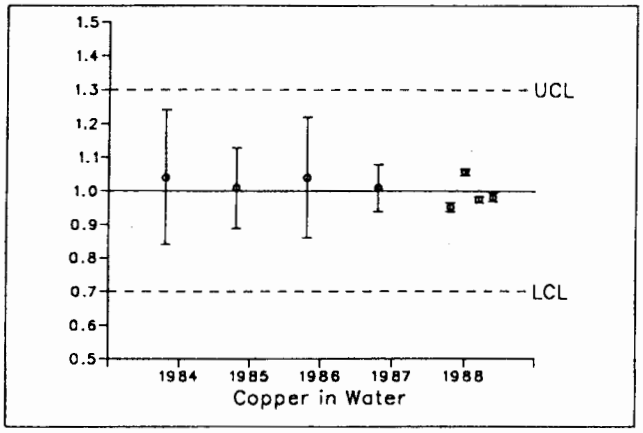
1988
Conductivity in Water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LCL
1984
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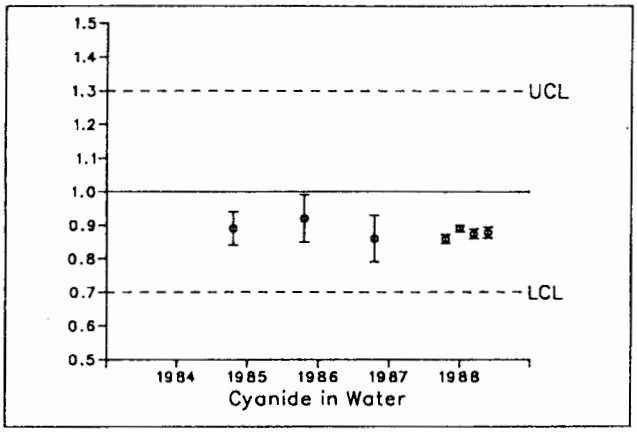
Copper in Water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LCL
1984
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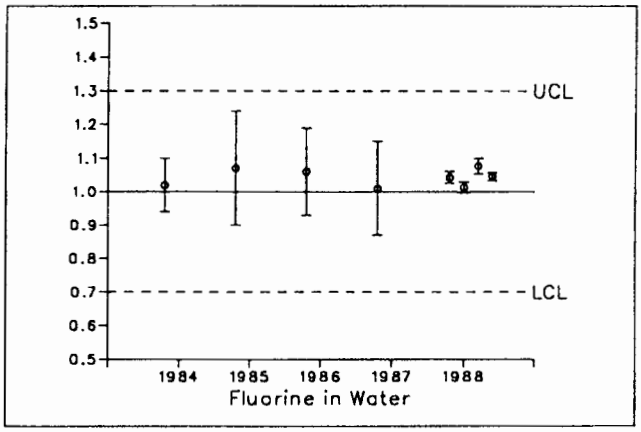
Cyanide in Water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LCL
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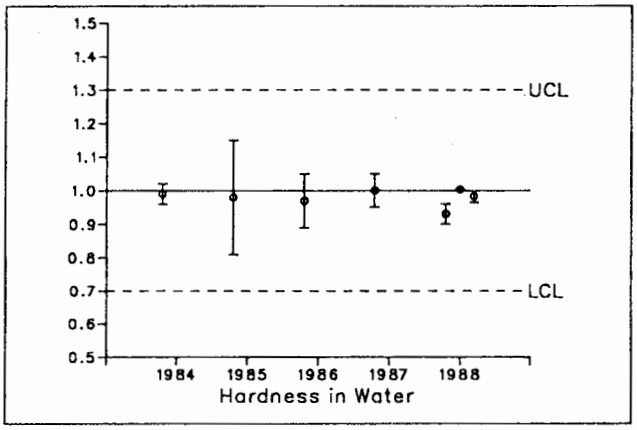
1988
Fluorine in Water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LCL
1984
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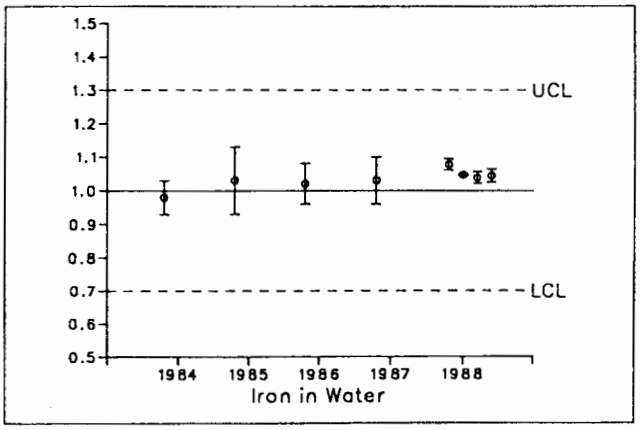
1987
1988
Hardness in Water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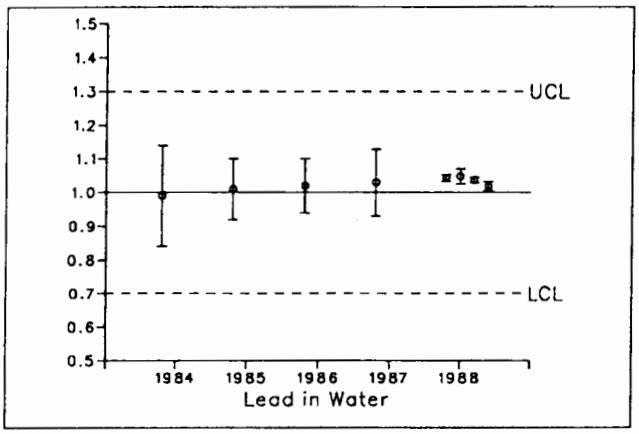
Iron in Water

Fig. C-1. (cont)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LCL
1984
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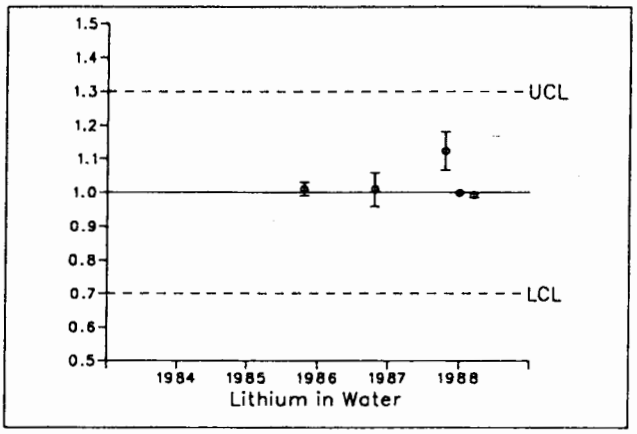
1988
Lead in Water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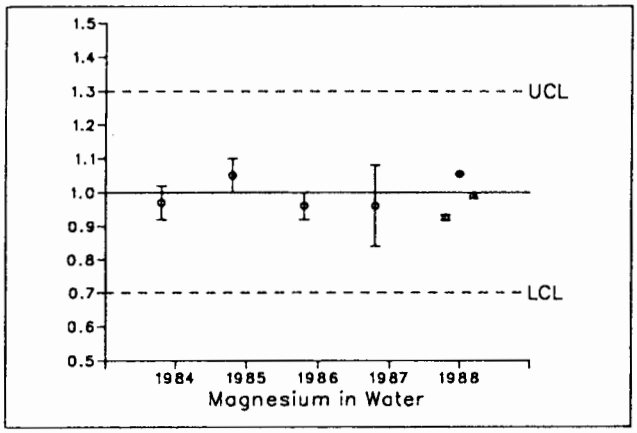
LCL
1984
1985
1986
1987
1988
Lithium in Water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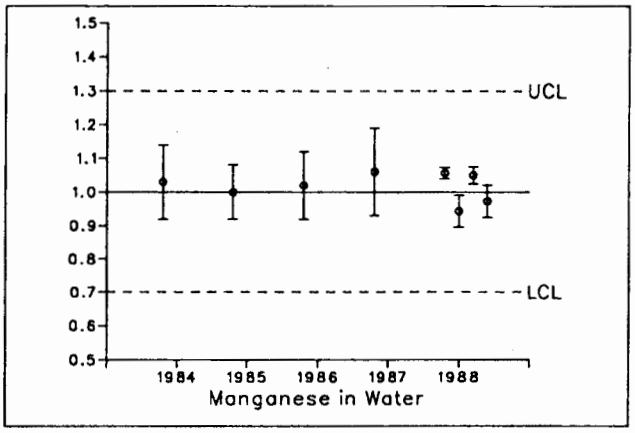
Magnesium in Water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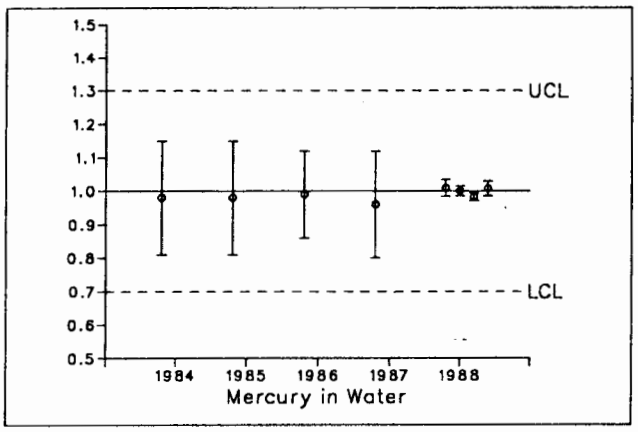
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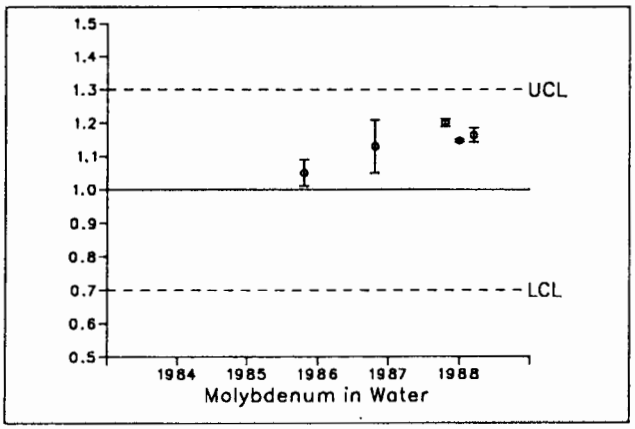
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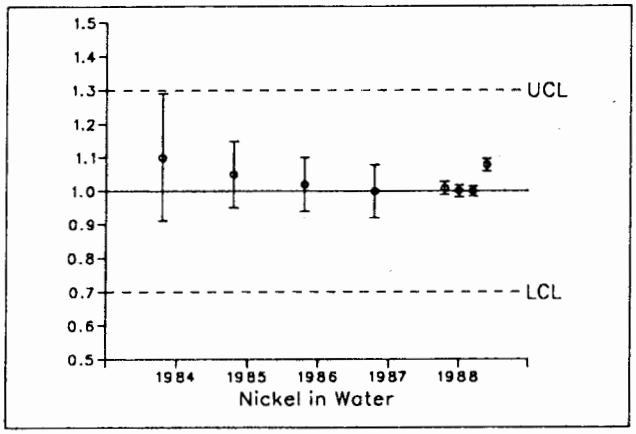
1987
1988
Molybdenum in Water

Fig. C-1. (cont)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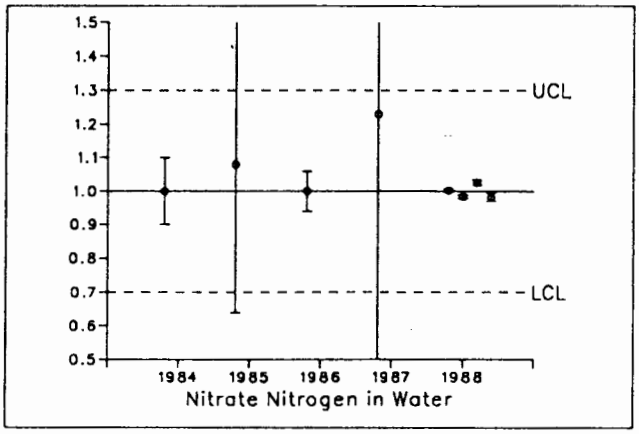
Nickel in Water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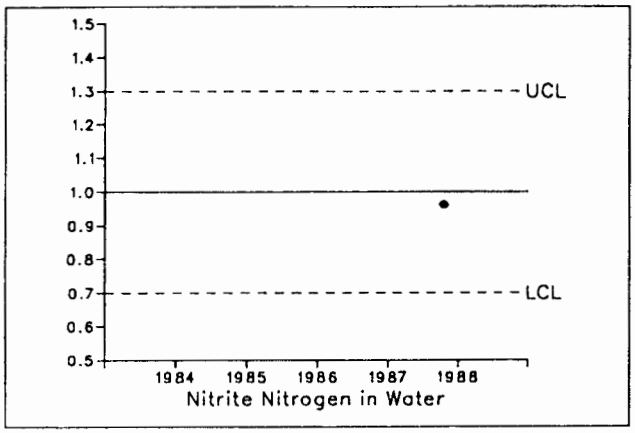
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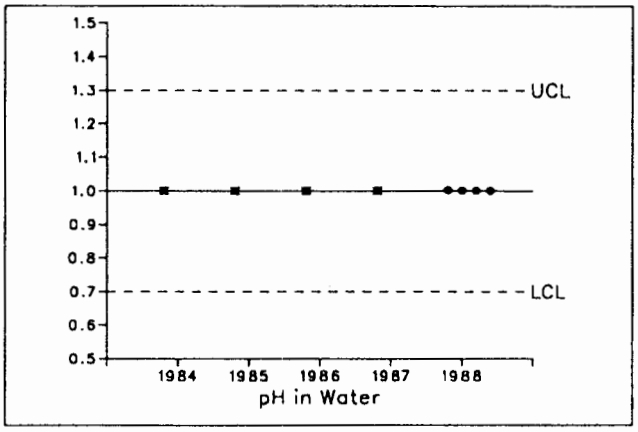
Nitrite Nitrogen in Water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LCL
1984
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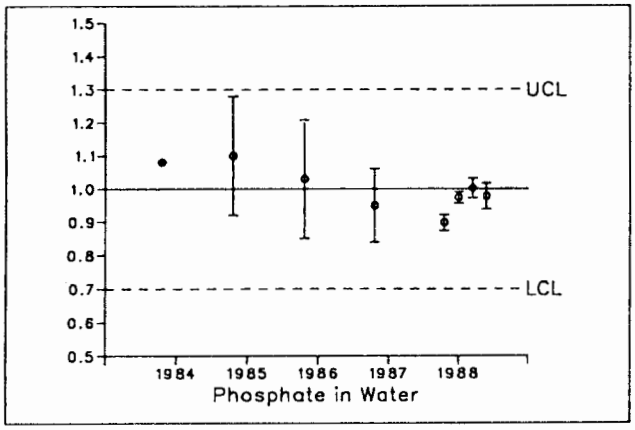
1987
1988
pH in Water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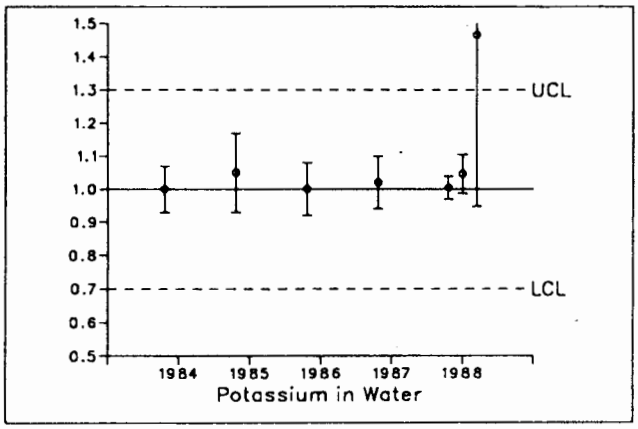
Phosphate in Water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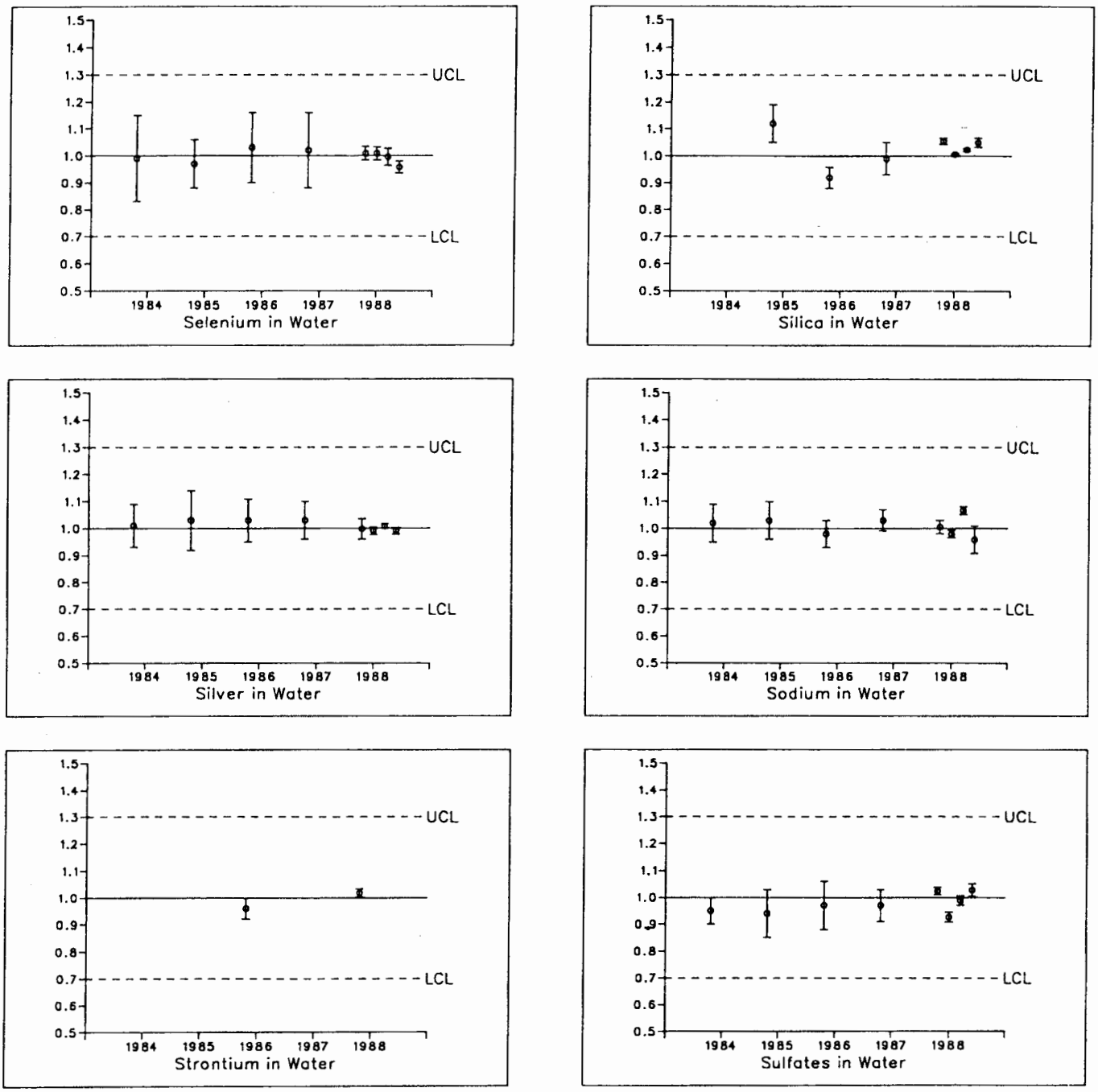
LCL
1984
1985
1986
1987
1988
Potassium in Water

Fig. C-1. (cont)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LCL
1984
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1987
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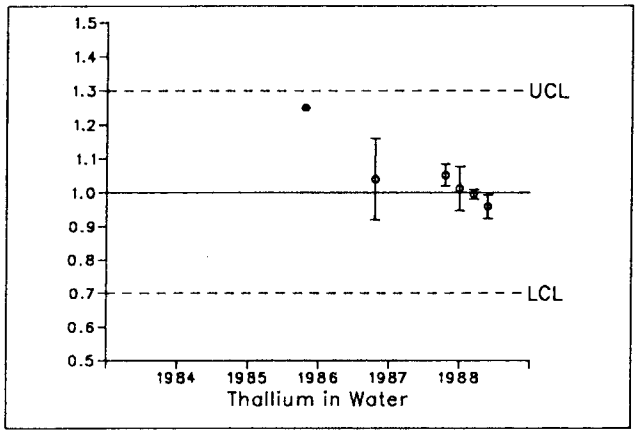
Selenium in Water
Silica in Water
Silver in Water
Sodium in Water
Strontium in Water
Sulfates in Water

Fig. C-1. (cont)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1988
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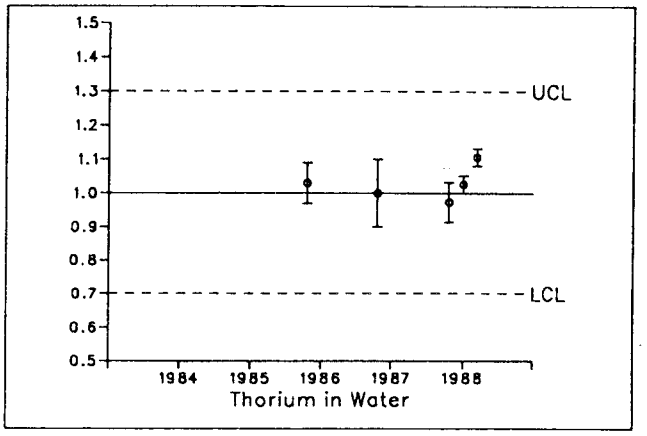
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LCL
1984
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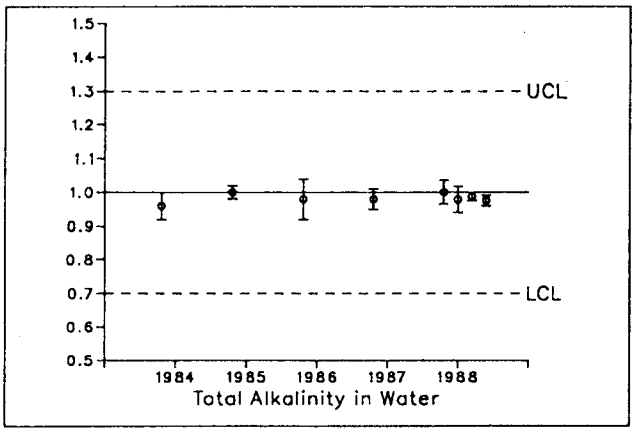
Thorium in Water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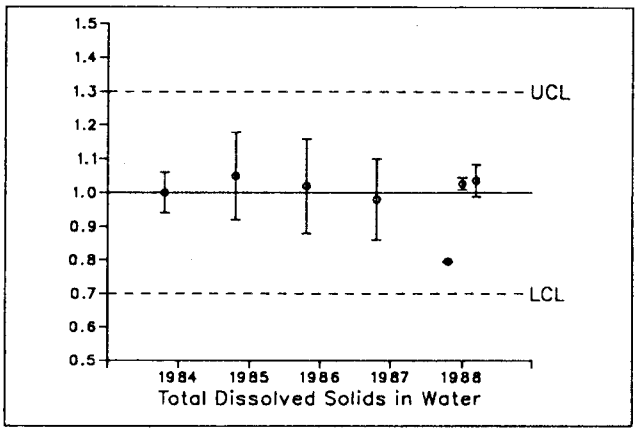
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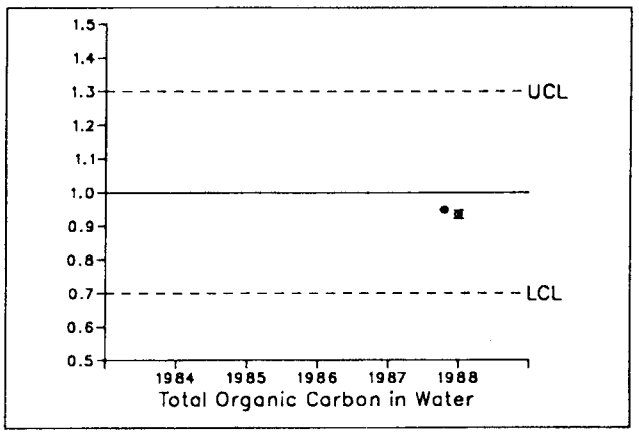
1988
Total Dissolved Solids in Water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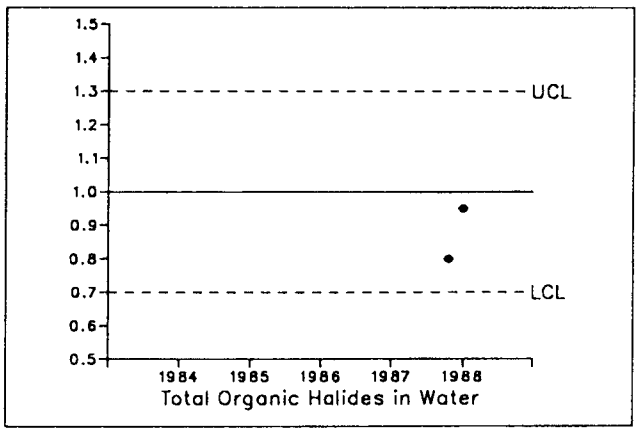
UCL
LCL
1984
1985
1986
1987
1988
Total Organic Carbon in Water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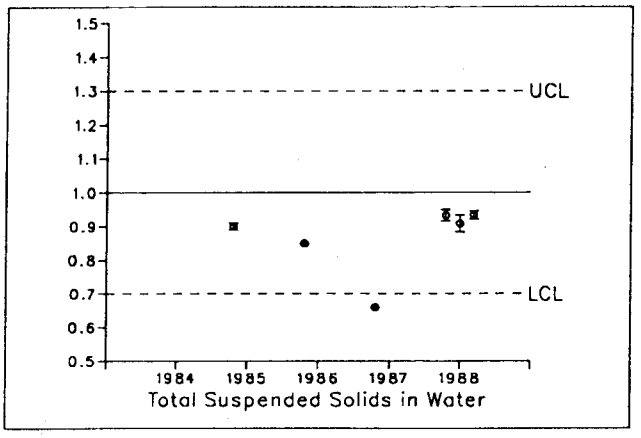
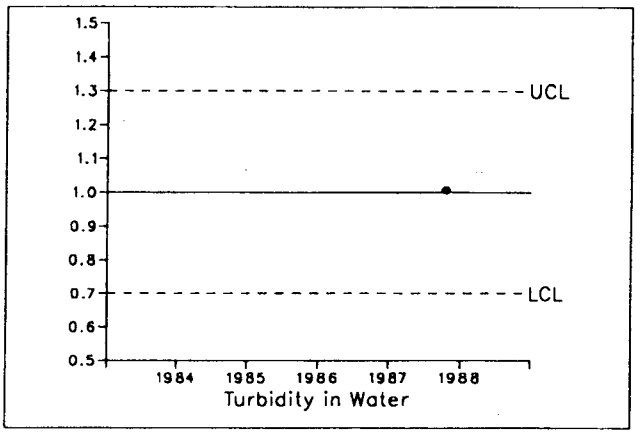
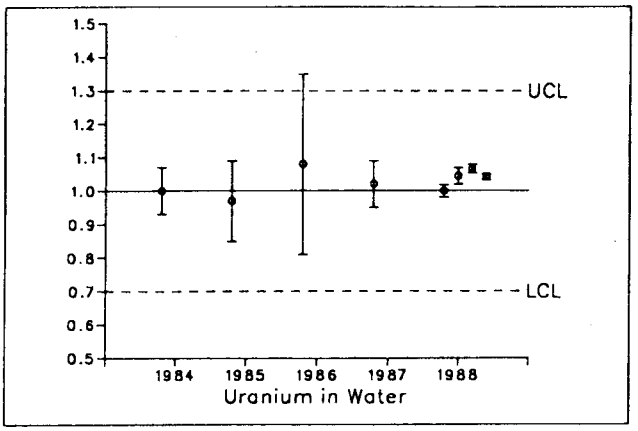
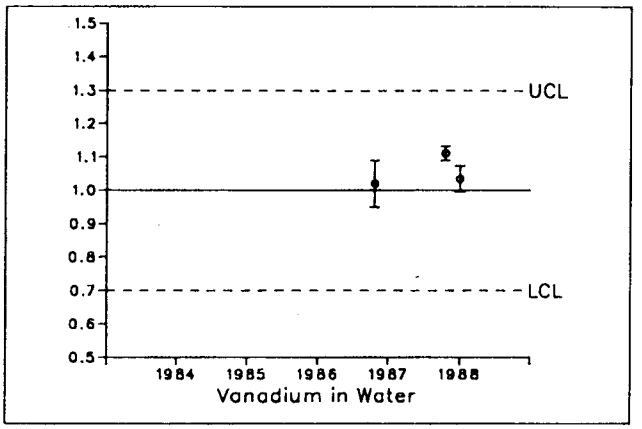
UCL
LCL
1984
1985
1986
1987
1988
Total Organic Halides in Water

Fig. C-1. (cont)









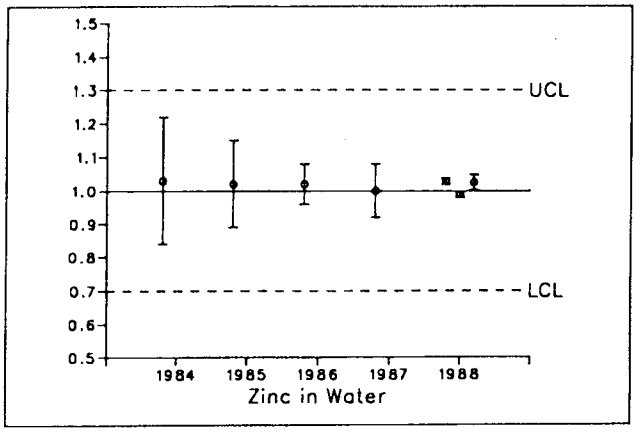


Fig. C-1. (cont)

NOTE: Δ ∇ indicates data points beyond the $\pm$ 3 σ control limits.

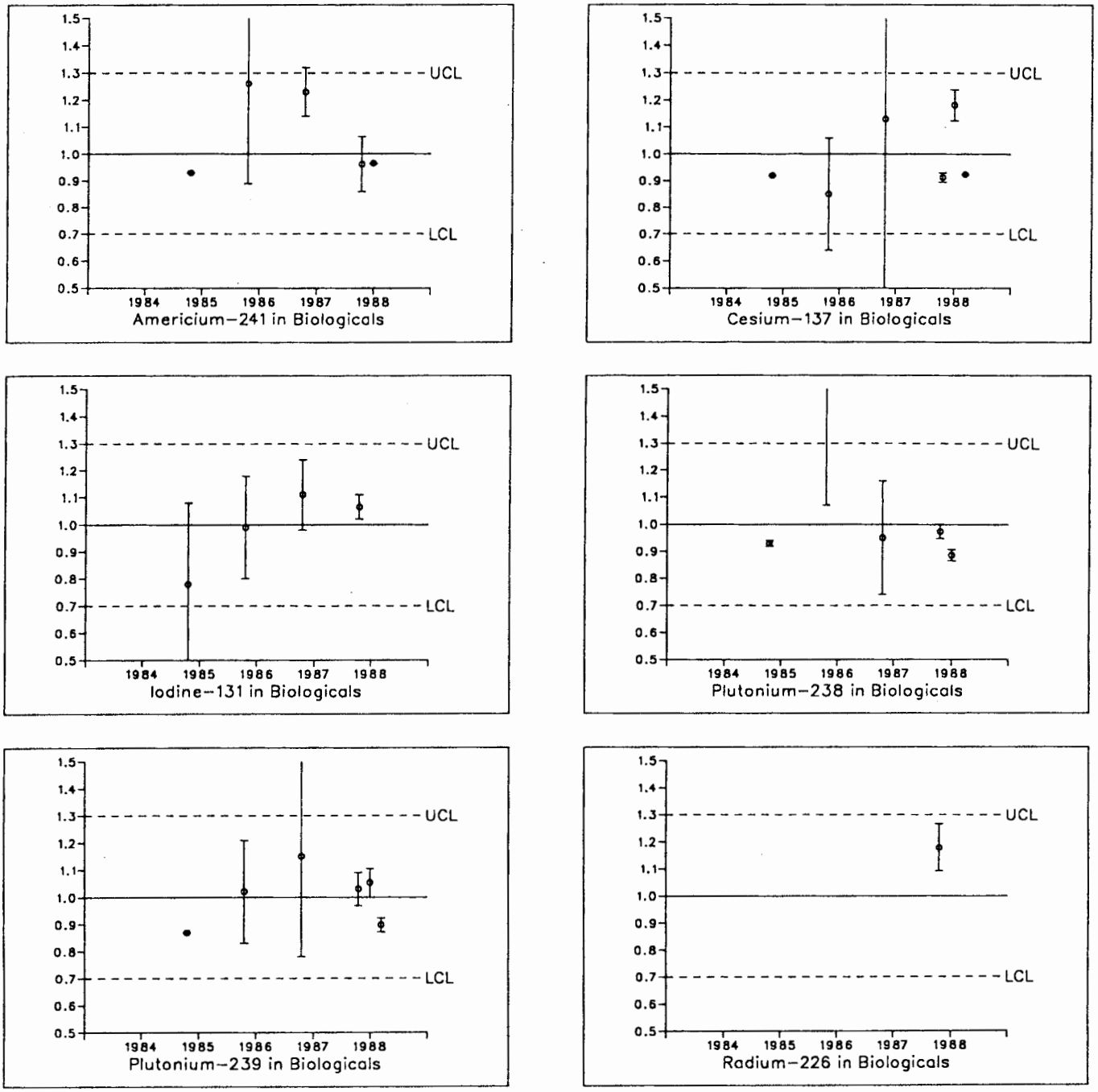
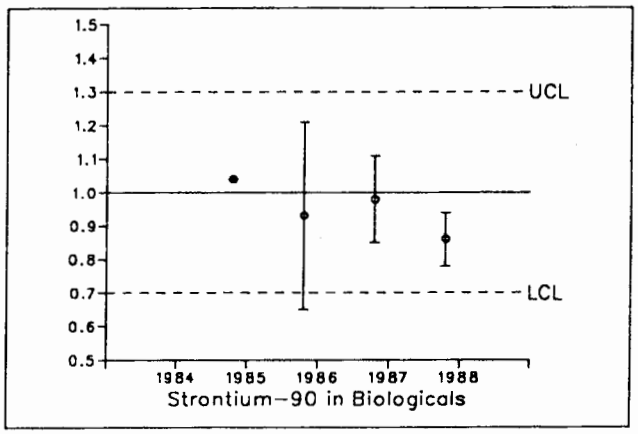


Fig. C-2. Five-year trends in quality assurance data for radiochemical analyses.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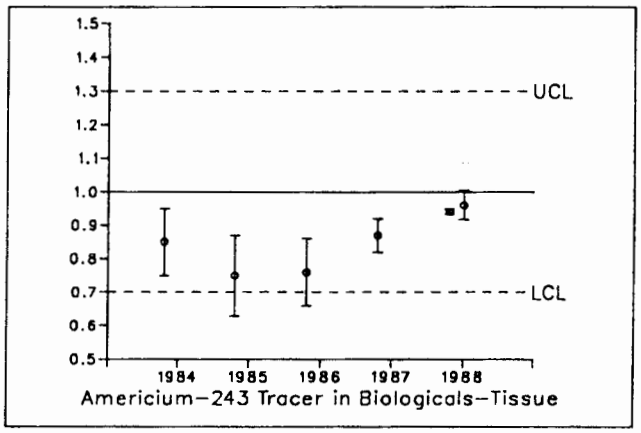
UCL
LCL
1984
1985
1986
1987
1988
Strontium-90 in Biologicals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UCL
LCL
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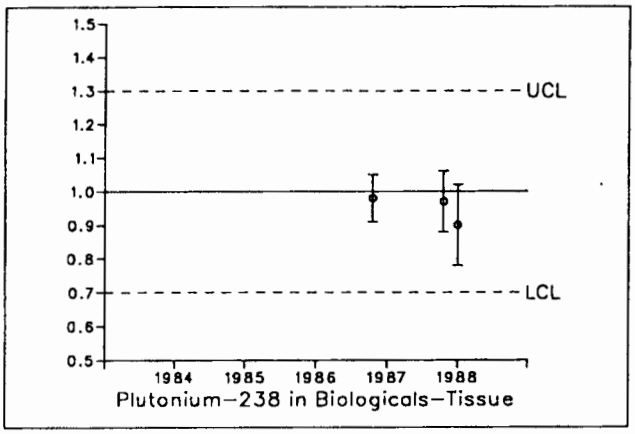
1985
1986
1987
1988
Americium-243 Tracer in Biologicals-Tissue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LCL
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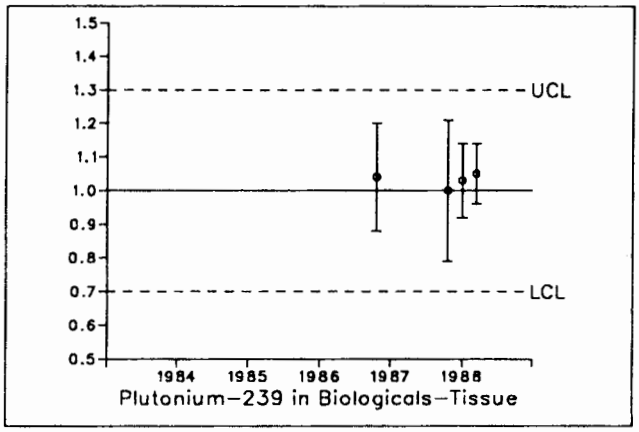
1985
1986
1987
1988
Plutonium-238 in Biologicals-Tissue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LCL
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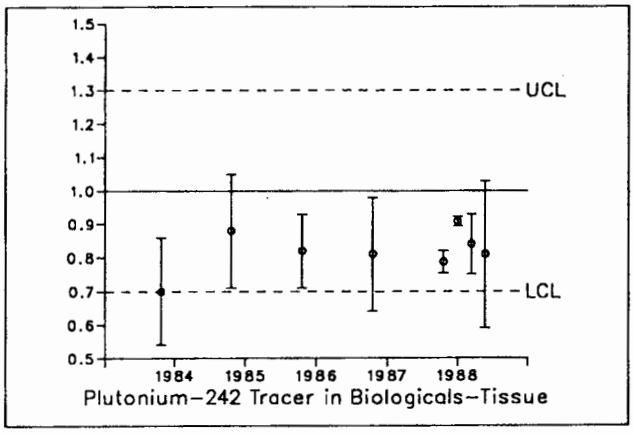
1985
1986
1987
1988
Plutonium-239 in Biologicals-Tissue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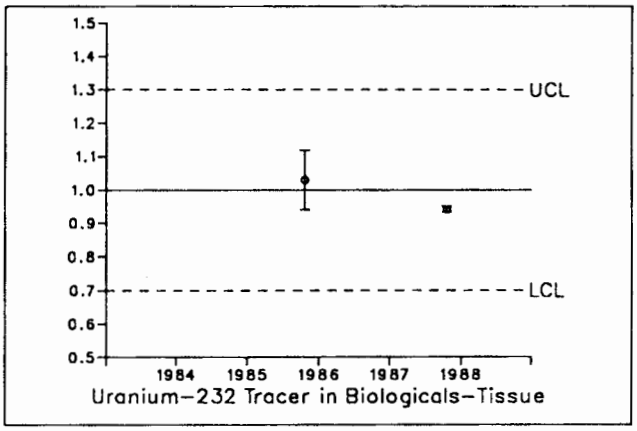
LCL
1984
1985
1986
1987
1988
Plutonium-242 Tracer in Biologicals-Tissue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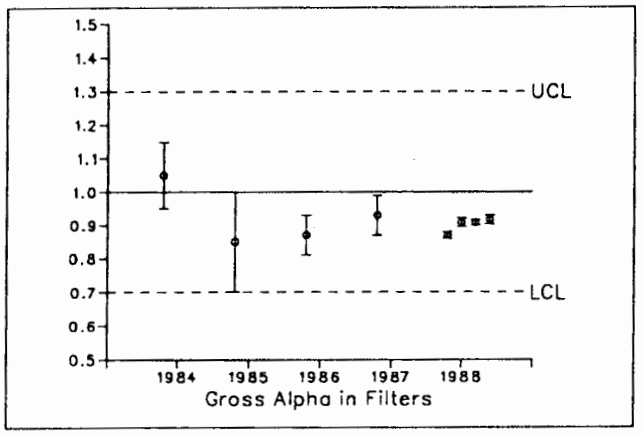
LCL
1984
1985
1986
1987
1988
Uranium-232 Tracer in Biologicals-Tissue

Fig. C-2. (cont)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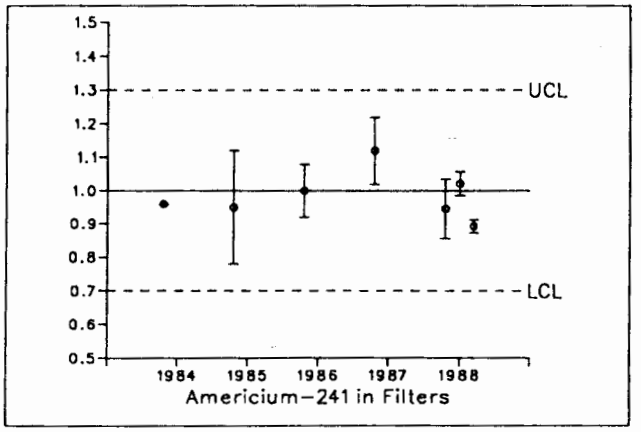
LCL
1984
1985
1986
1987
1988
Gross Alpha in Filters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UCL
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1984
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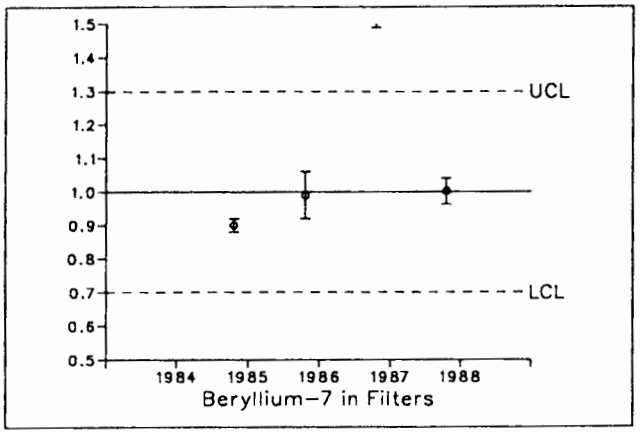
1986
1987
1988
Americium-241 in Filters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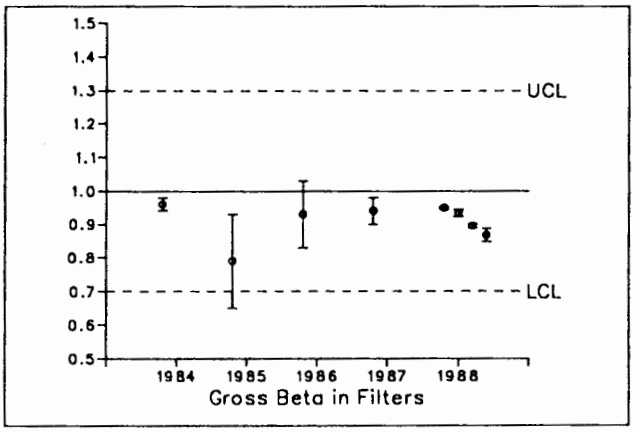
1984
1985
1986
1987
1988
Beryllium-7 in Filters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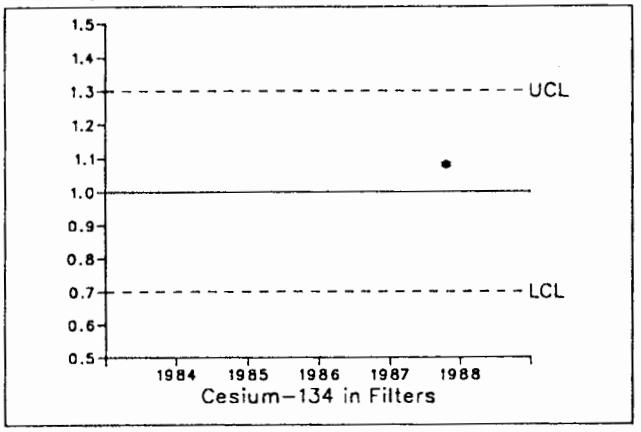
1988
Gross Beta in Filters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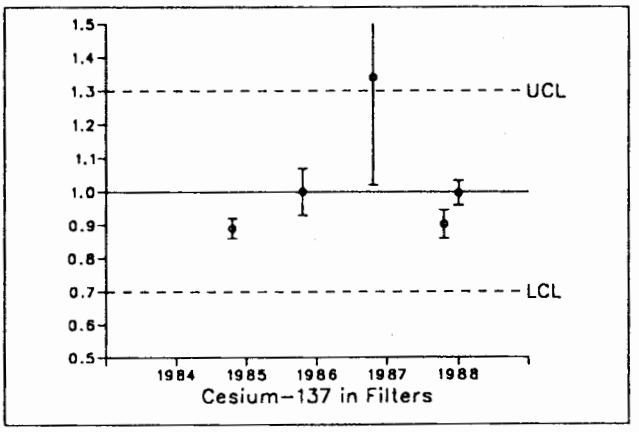
1988
Cesium-134 in Filters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LCL
1984
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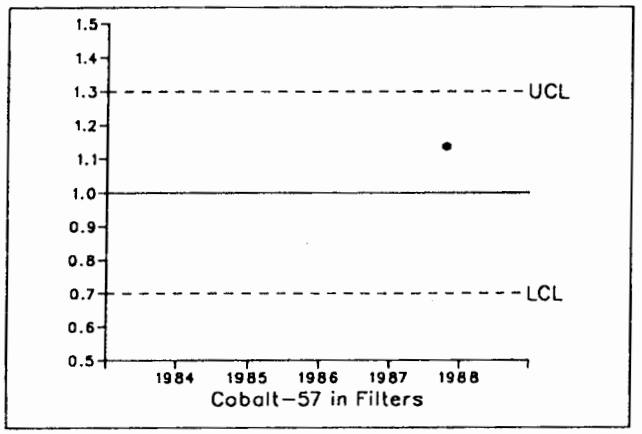
1987
1988
Cesium-137 in Filters

Fig. C-2. (cont)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1984
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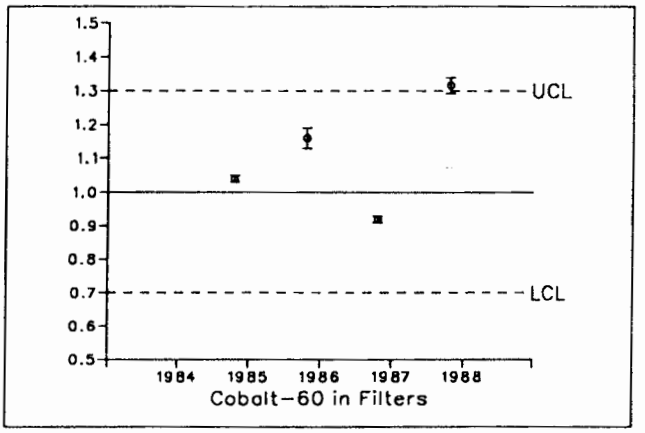
1988
Cobalt-57 in Filters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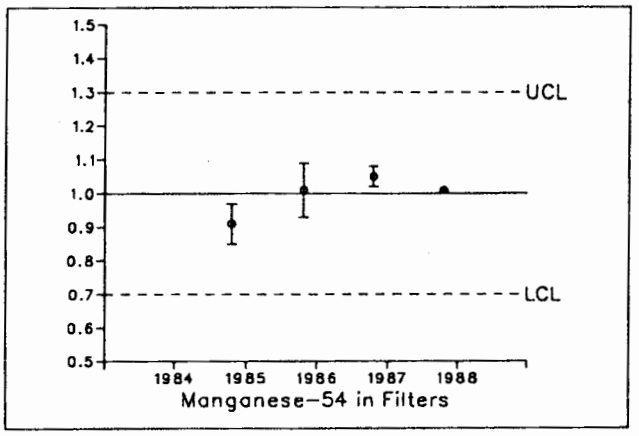
Cobalt-60 in Filters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LCL
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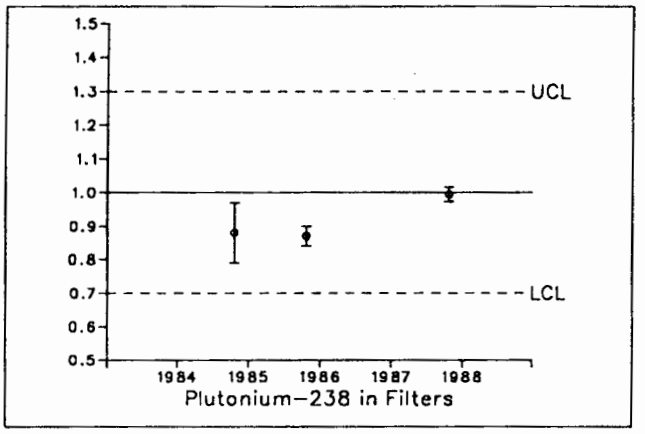
1986
1987
1988
Manganese-54 in Filters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1984
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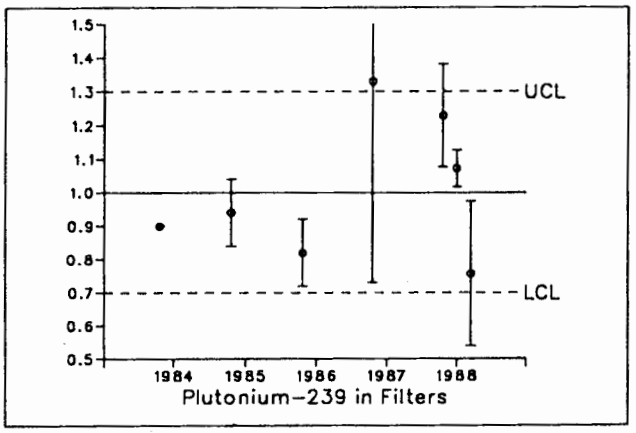
1988
Plutonium-238 in Filters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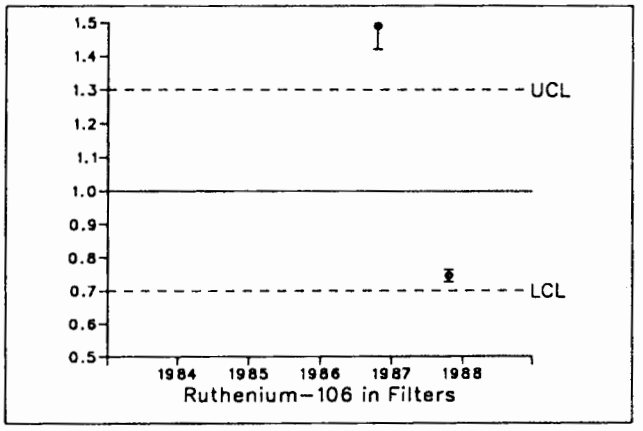
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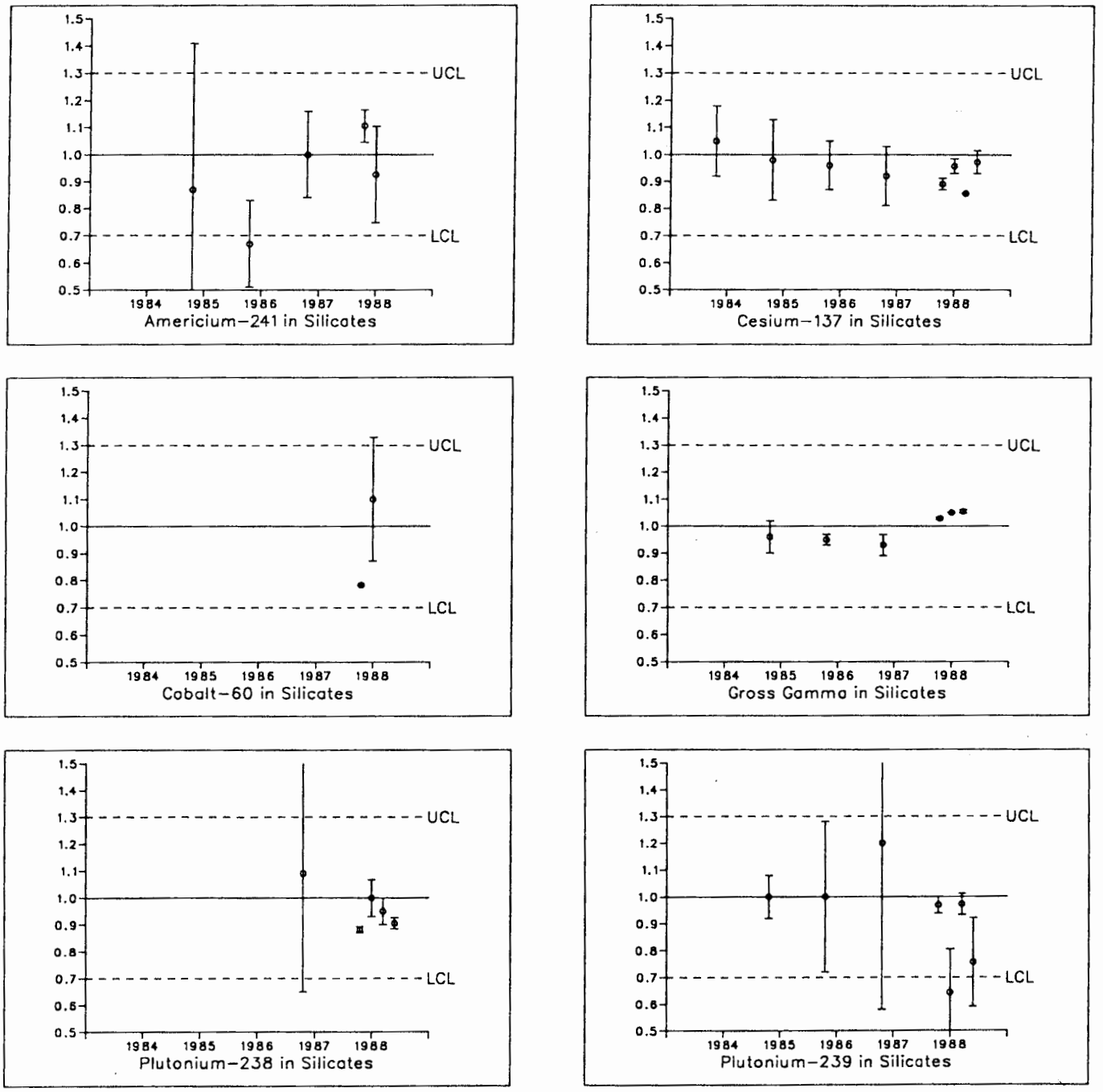
Ruthenium-106 in Filters

Fig. C-2. (cont)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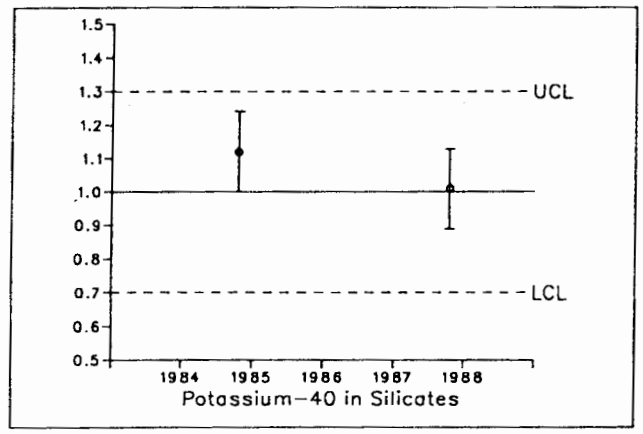
UCL
LCL
1984
1985
1986
1987
1988
Americium−241 in Silicates
Cesium−137 in Silicates
Cobalt−60 in Silicates
Gross Gamma in Silicates
Plutonium−238 in Silicates
Plutonium−239 in Silicates

Fig. C-2. (cont)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UCL
LCL
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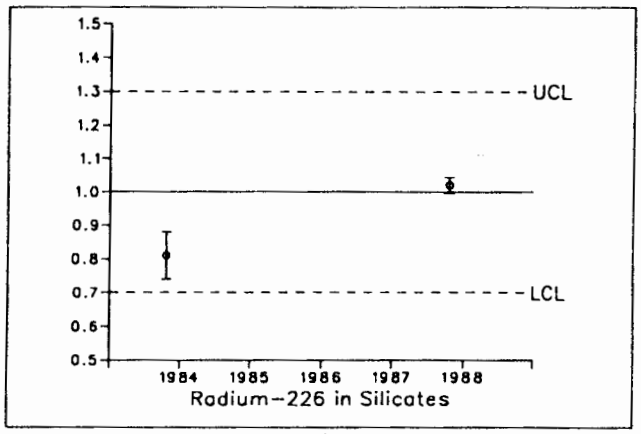
Potassium-40 in Silicates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LCL
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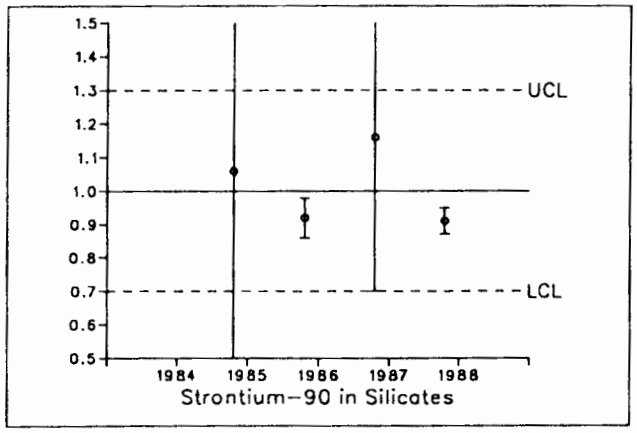
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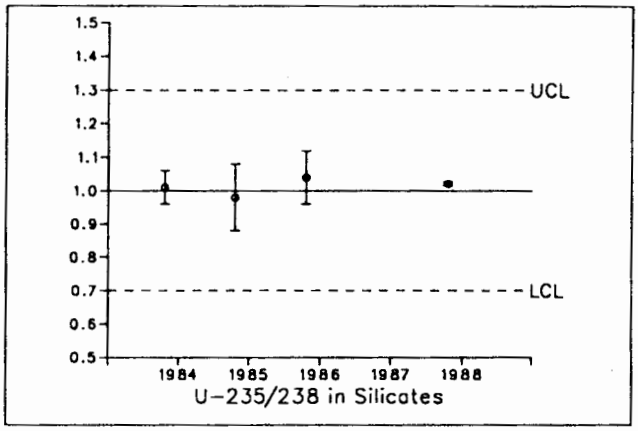
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LCL
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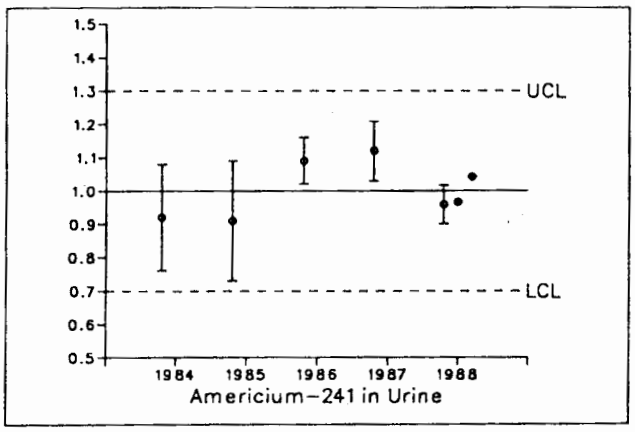
U-235/238 in Silicates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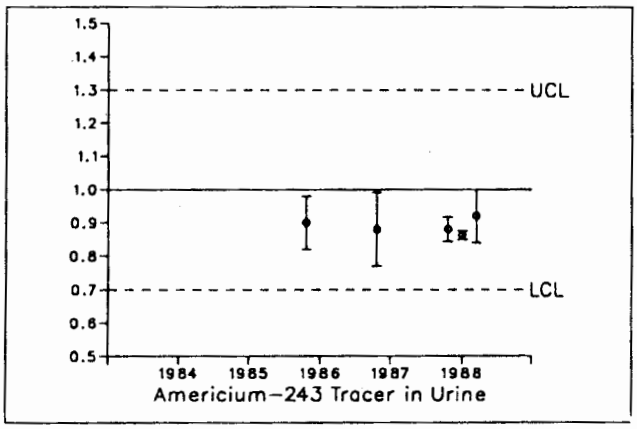
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LCL
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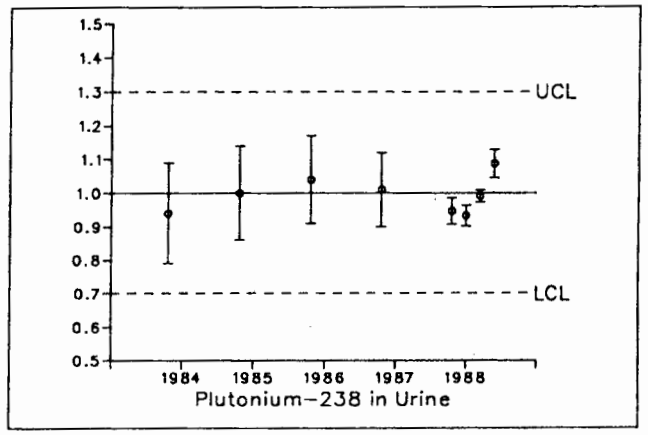
Americium-243 Tracer in Urine

Fig. C-2. (cont)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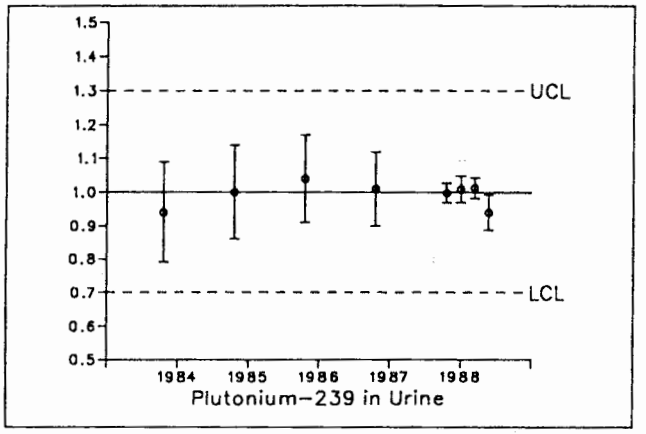
Plutonium-238 in Urine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LCL
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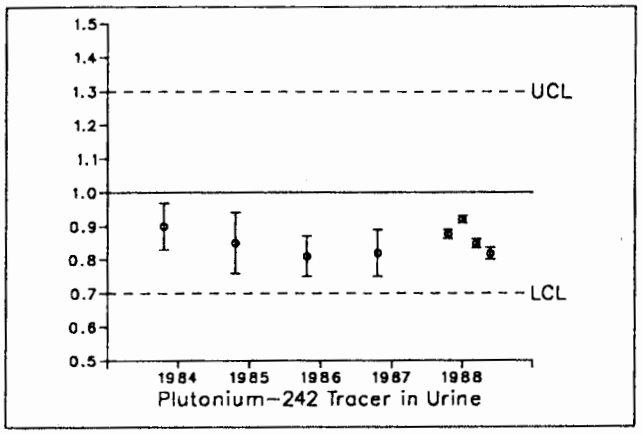
1987
1988
Plutonium-239 in Urine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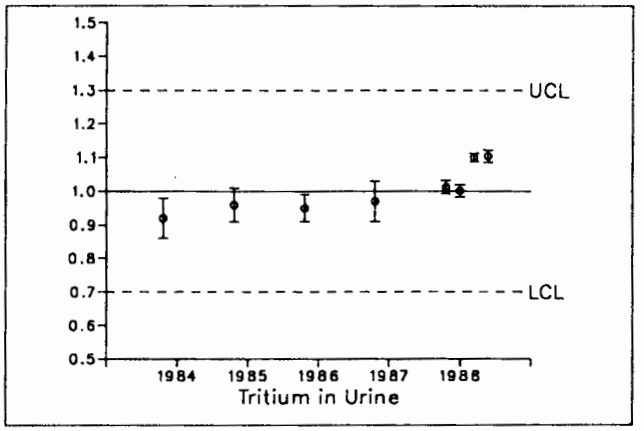
1984
1985
1986
1987
1988
Plutonium-242 Tracer in Urine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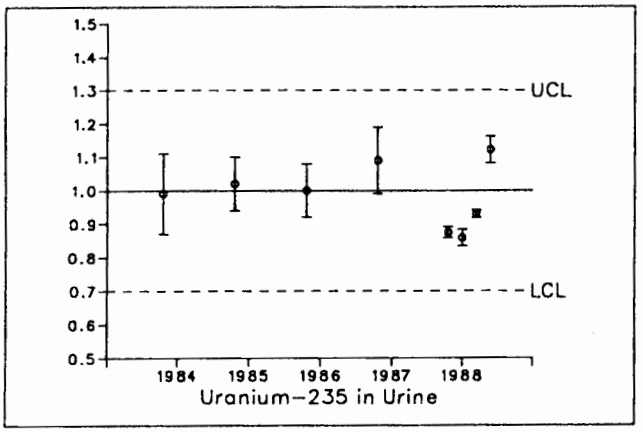
1987
1988
Tritium in Urine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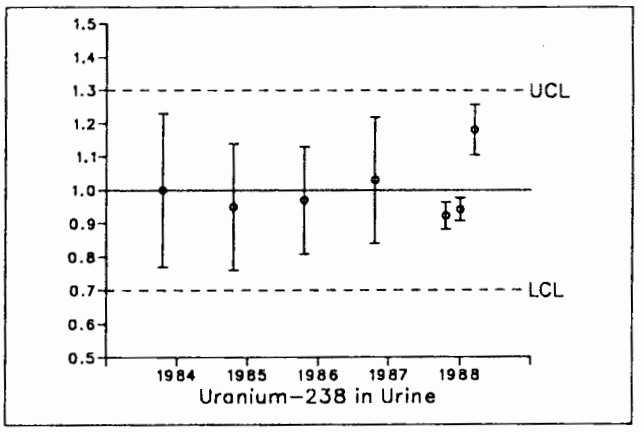
1984
1985
1986
1987
1988
Uranium-235 in Urine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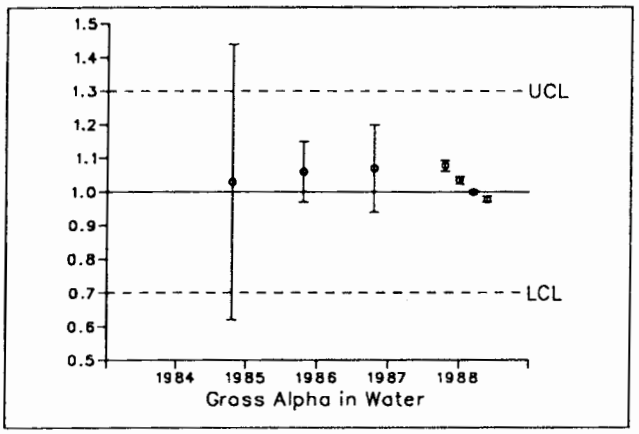
1984
1985
1986
1987
1988
Uranium-238 in Urine

Fig. C-2. (cont)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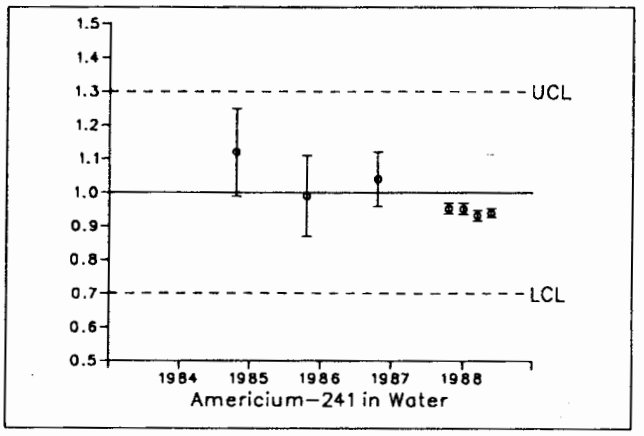
UCL
LCL
1984
1985
1986
1987
1988
Gross Alpha in Water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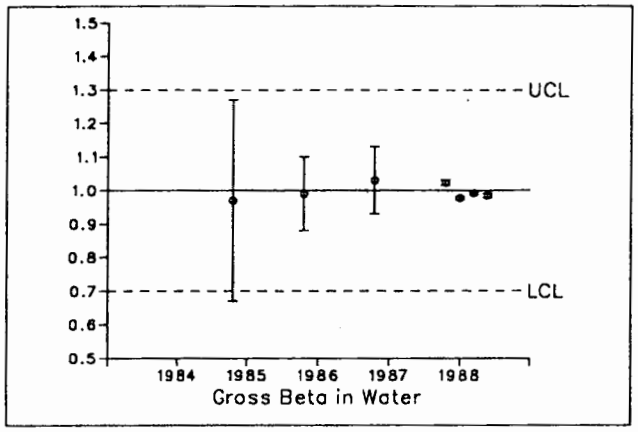
UCL
LCL
1984
1985
1986
1987
1988
Americium-241 in Water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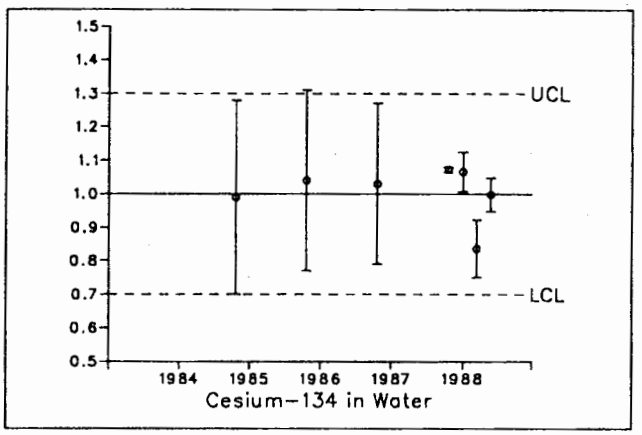
LCL
1984
1985
1986
1987
1988
Gross Beta in Water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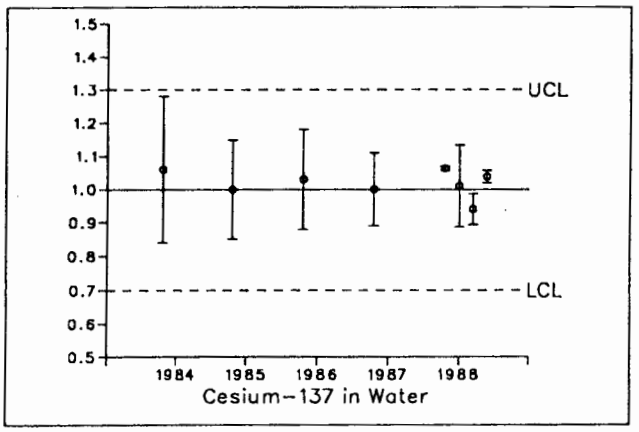
1984
1985
1986
1987
1988
Cesium-134 in Water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LCL
1984
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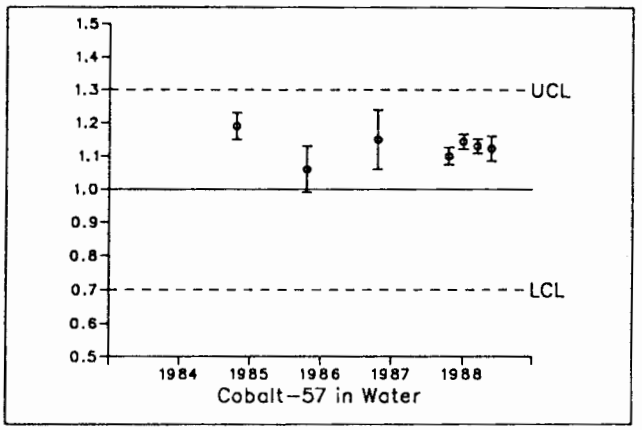
1986
1987
1988
Cesium-137 in Water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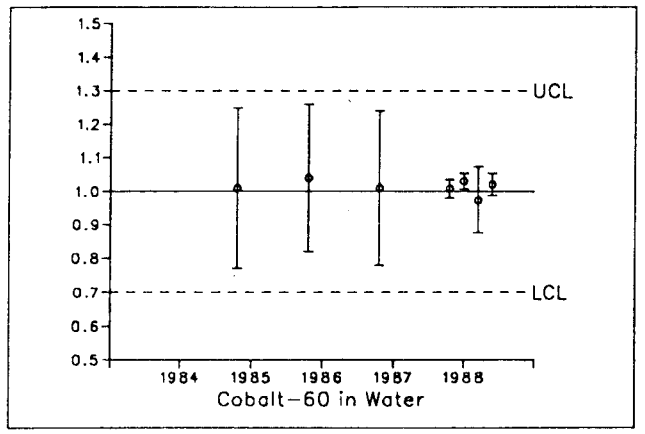
UCL
LCL
1984
1985
1986
1987
1988
Cobalt-57 in Water

Fig. C-2. (cont)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LCL
1984
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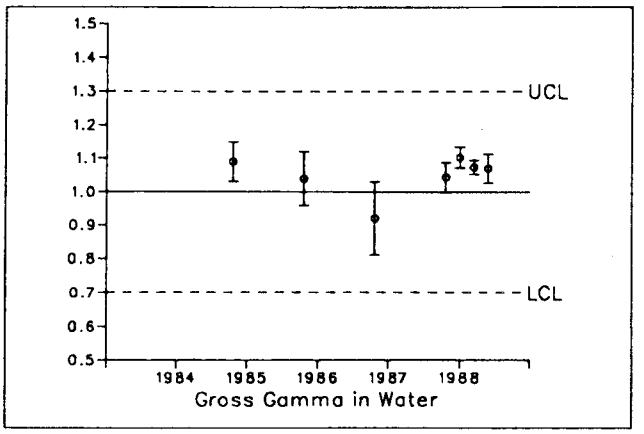
1986
1987
1988
Cobalt-60 in Water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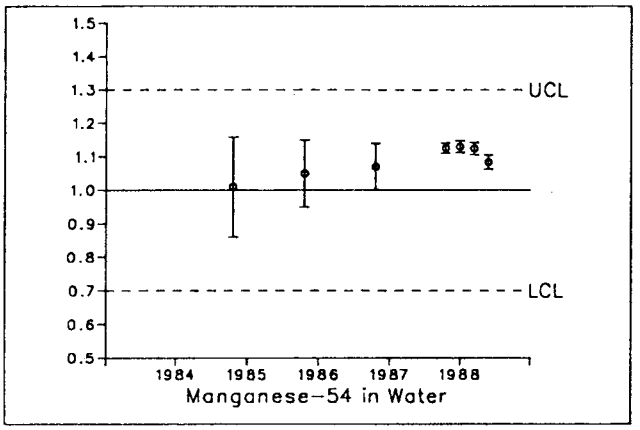
LCL
1984
1985
1986
1987
1988
Gross Gamma in Water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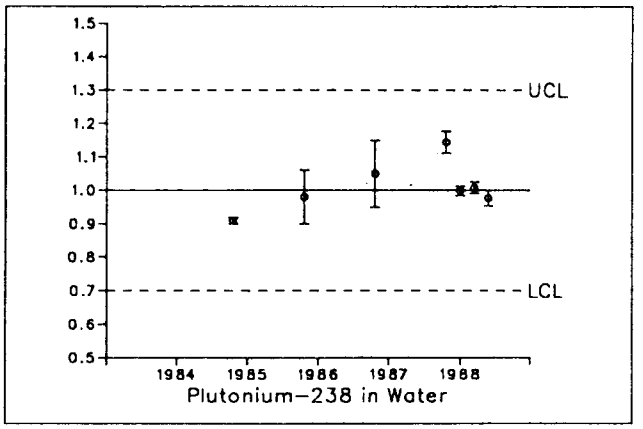
UCL
LCL
1984
1985
1986
1987
1988
Manganese-54 in Water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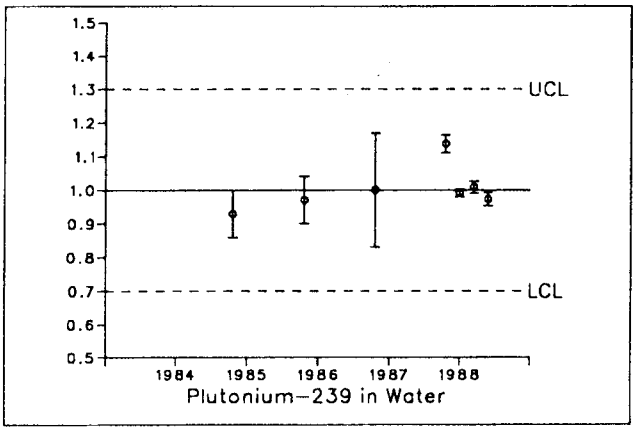
LCL
1984
1985
1986
1987
1988
Plutonium-238 in Water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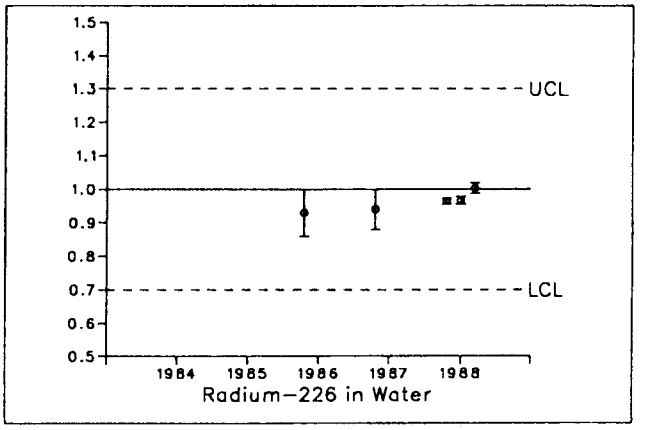
LCL
1984
1985
1986
1987
1988
Plutonium-239 in Water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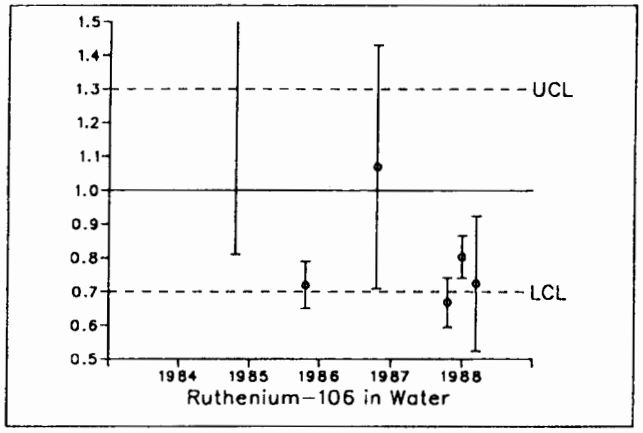
0.5
UCL
LCL
1984
1985
1986
1987
1988
Radium-226 in Water

Fig. C-2. (cont)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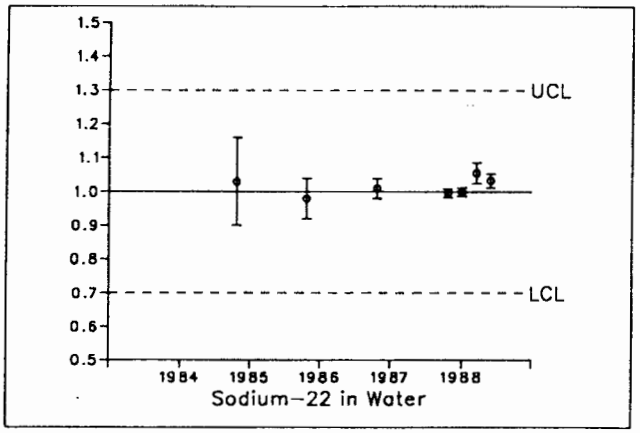
0.5
UCL
LCL
1984
1985
1986
1987
1988
Ruthenium-106 in Water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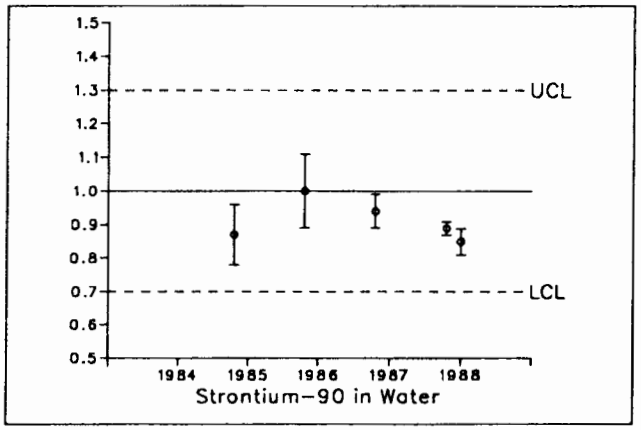
UCL
LCL
1984
1985
1986
1987
1988
Sodium-22 in Water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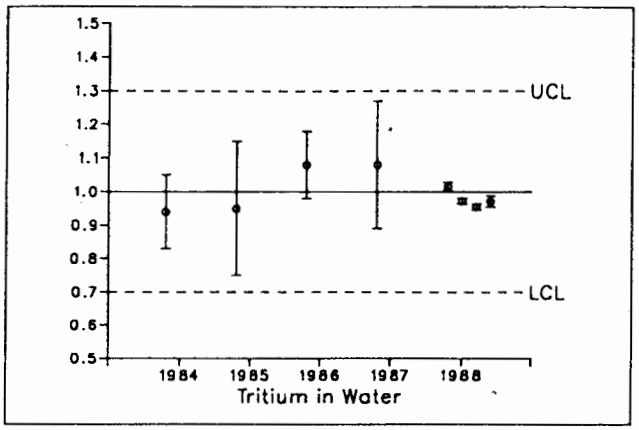
LCL
1984
1985
1986
1987
1988
Strontium-90 in Water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LCL
1984
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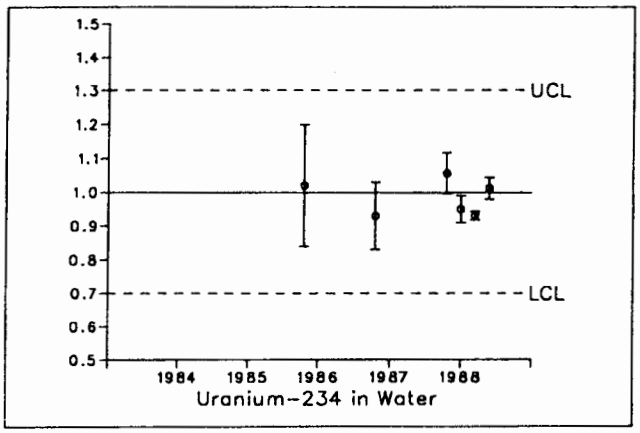
1986
1987
1988
Tritium in Water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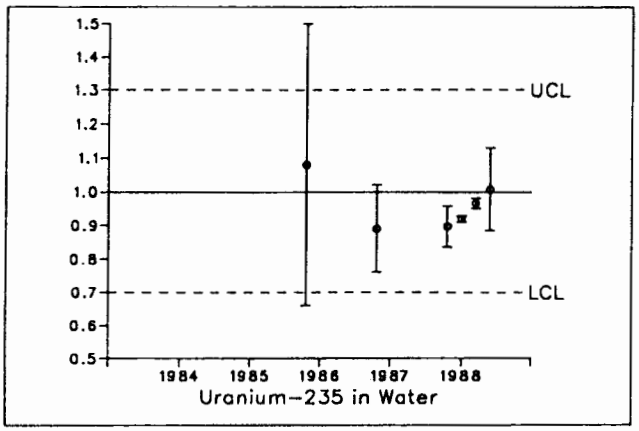
UCL
LCL
1984
1985
1986
1987
1988
Uranium-234 in Water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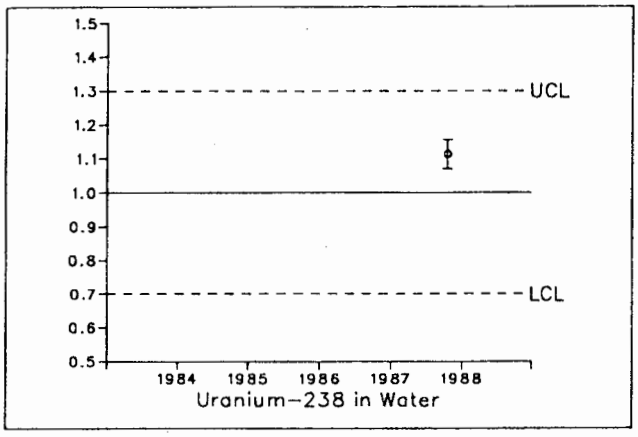
UCL
LCL
1984
1985
1986
1987
1988
Uranium-235 in Water

Fig. C-2. (cont)



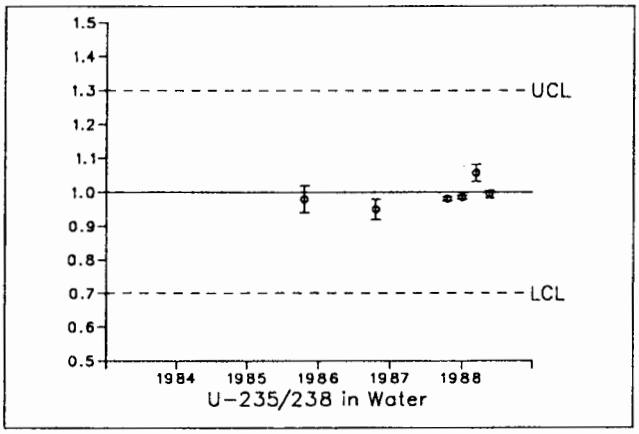


Fig. C-2 (cont)

NOTE: Δ ∇ indicates data points beyond the ± 3 σ control limits.

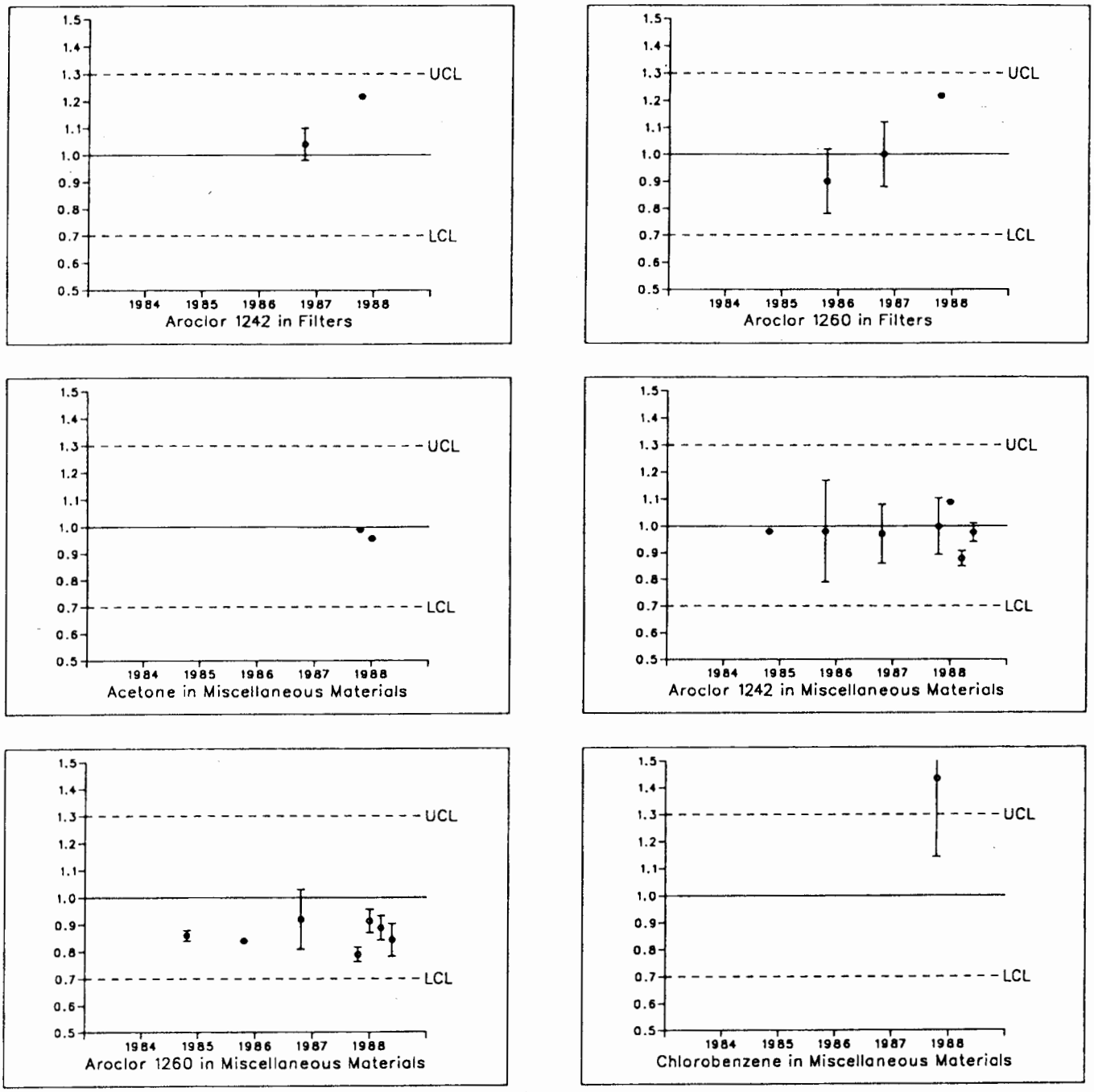
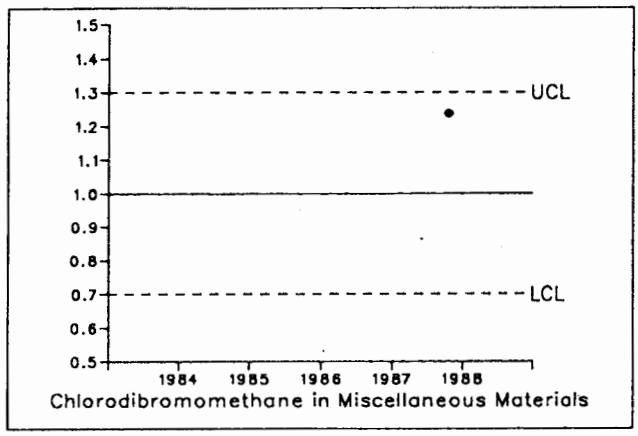


Fig. C-3. Five-year trends in quality assurance data for organic analyses.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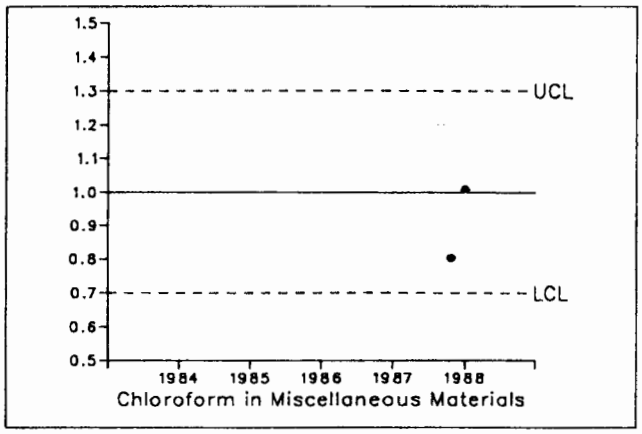
UCL
LCL
1984 1985 1986 1987 1988
Chlorodibromomethane in Miscellaneous Materials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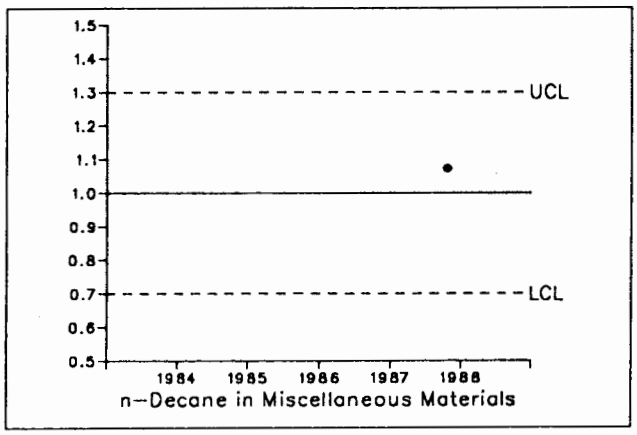
UCL
LCL
1984 1985 1986 1987 1988
Chloroform in Miscellaneous Materials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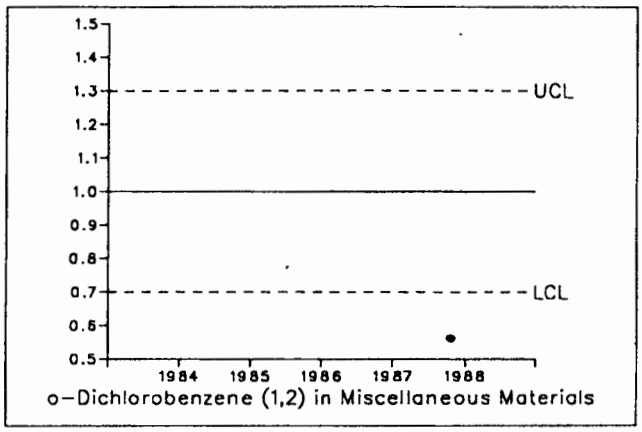
LCL
1984 1985 1986 1987 1988
n-Decane in Miscellaneous Materials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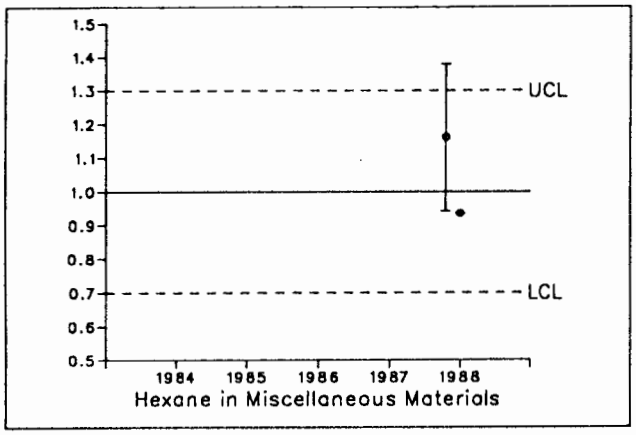
0.5
UCL
LCL
1984 1985 1986 1987 1988
o-Dichlorobenzene (1,2) in Miscellaneous Materials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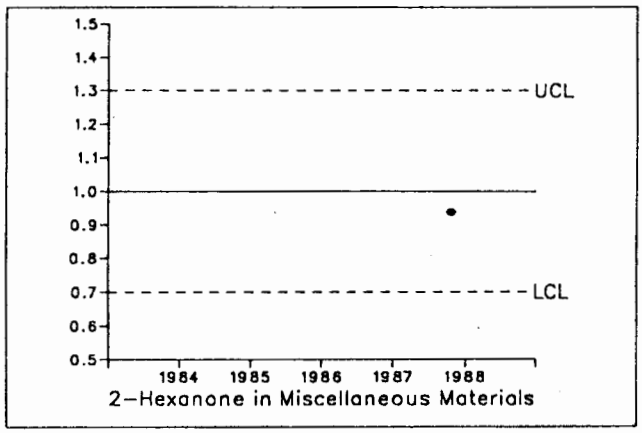
LCL
1984 1985 1986 1987 1988
Hexane in Miscellaneous Materials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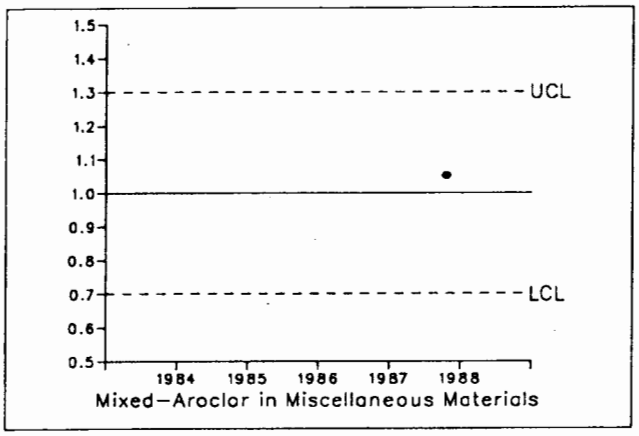
UCL
LCL
1984 1985 1986 1987 1988
2-Hexanone in Miscellaneous Materials

Fig. C-3. (cont)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UCL
LCL
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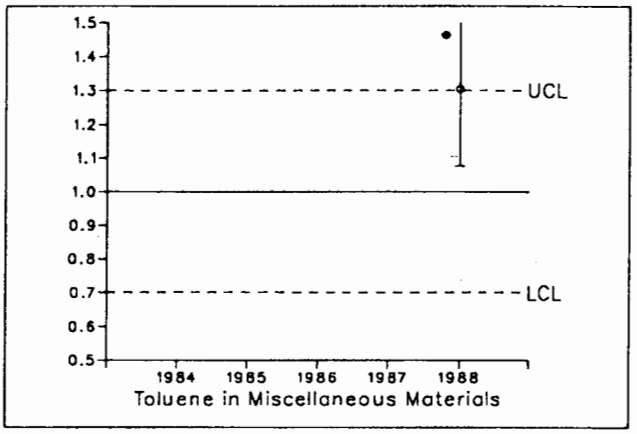
Mixed–Aroclor in Miscellaneous Materials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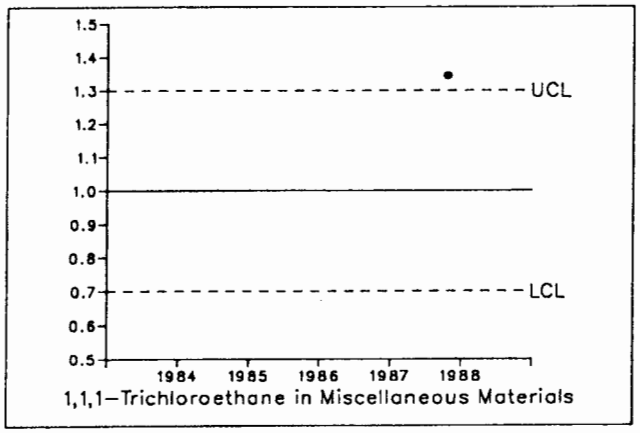
UCL
LCL
1984 1985 1986 1987 1988
Toluene in Miscellaneous Materials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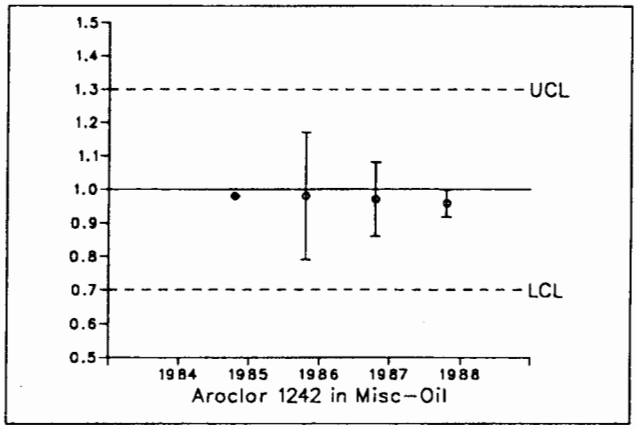
LCL
1984 1985 1986 1987 1988
1,1,1–Trichloroethane in Miscellaneous Materials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UCL
LCL
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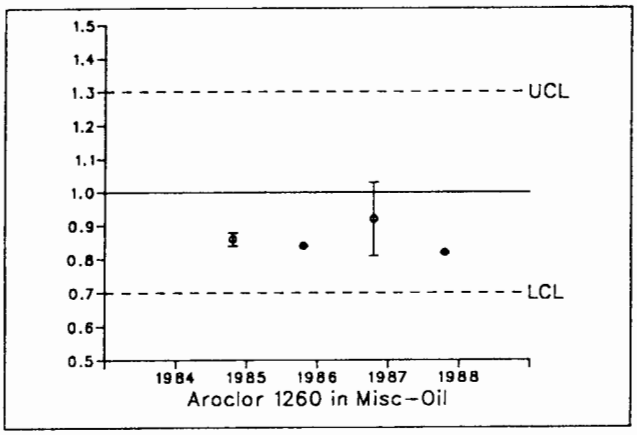
Aroclor 1242 in Misc–Oil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LCL
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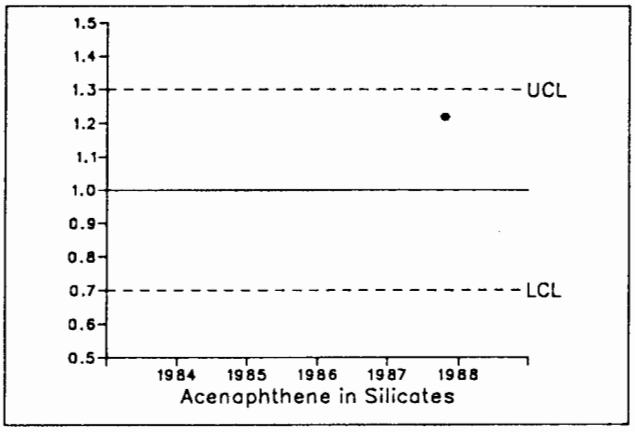
Aroclor 1260 in Misc–Oil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UCL
LCL
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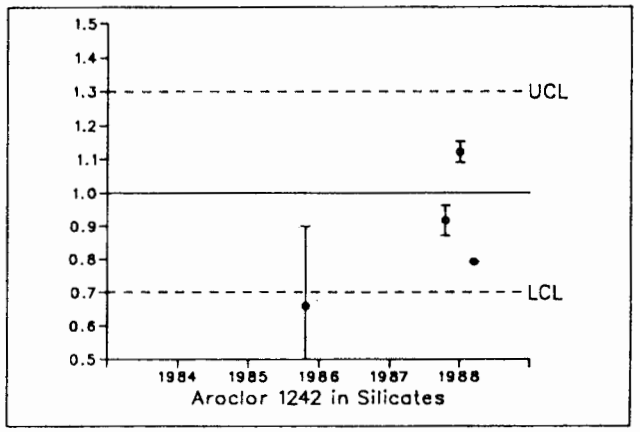
Acenaphthene in Silicates

Fig. C-3. (cont)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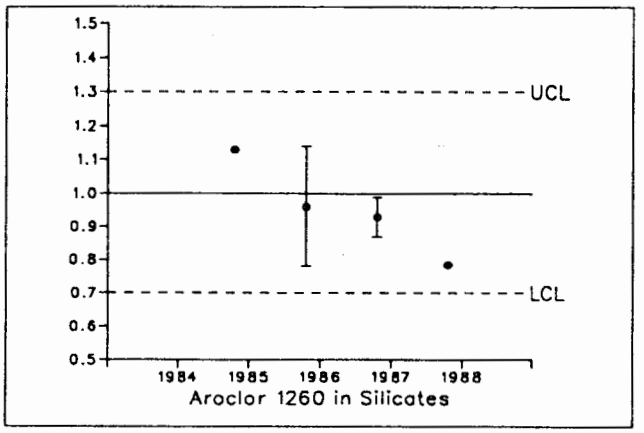
UCL
LCL
1984 1985 1986 1987 1988
Aroclor 1242 in Silicates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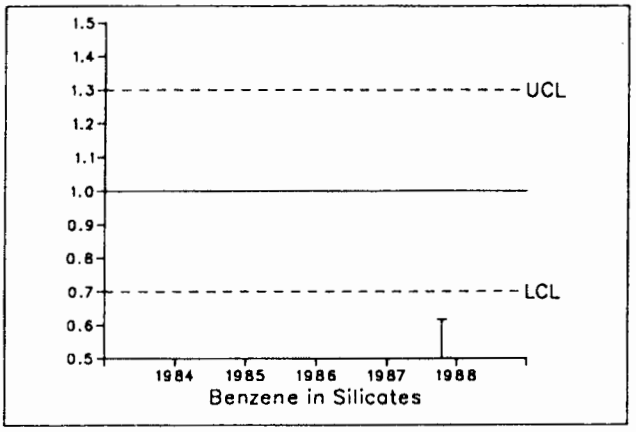
LCL
1984 1985 1986 1987 1988
Aroclor 1260 in Silicates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UCL
LCL
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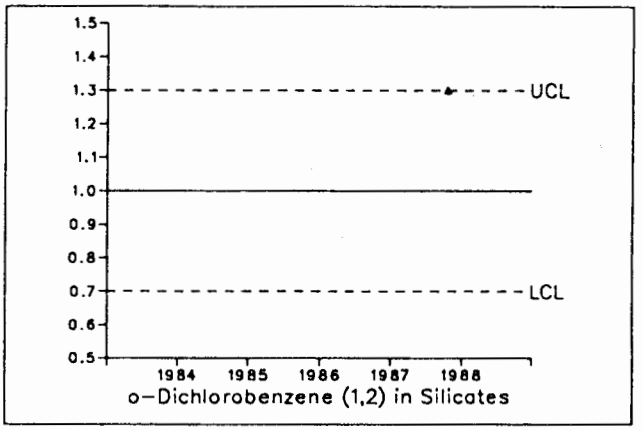
Benzene in Silicates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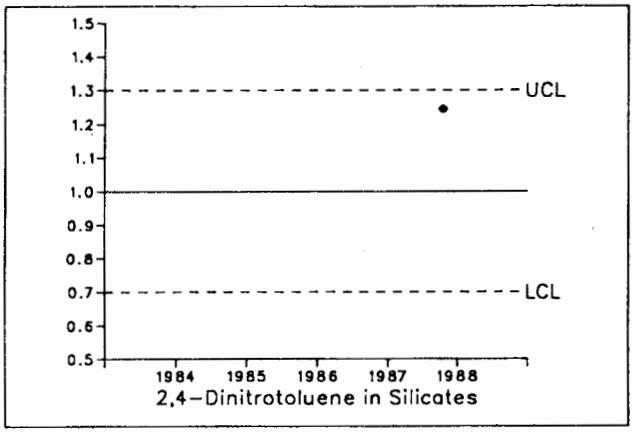
0.5
UCL
LCL
1984 1985 1986 1987 1988
o-Dichlorobenzene (1,2) in Silicates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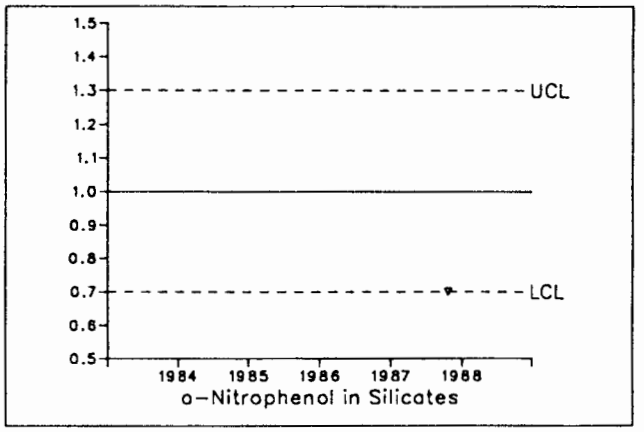
LCL
1984 1985 1986 1987 1988
2,4-Dinitrotoluene in Silicates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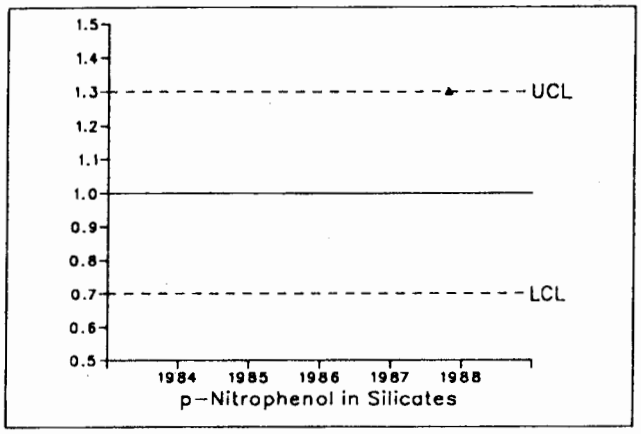
0.5
UCL
LCL
1984 1985 1986 1987 1988
o-Nitrophenol in Silicates

Fig. C-3. (cont)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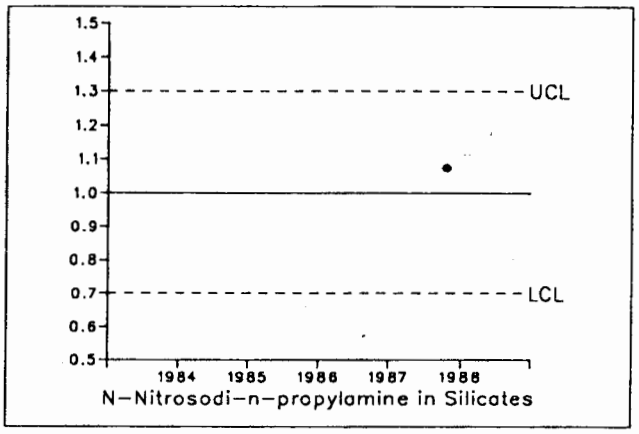
0.6
0.5
UCL
LCL
1984 1985 1986 1987 1988
p-Nitrophenol in Silicates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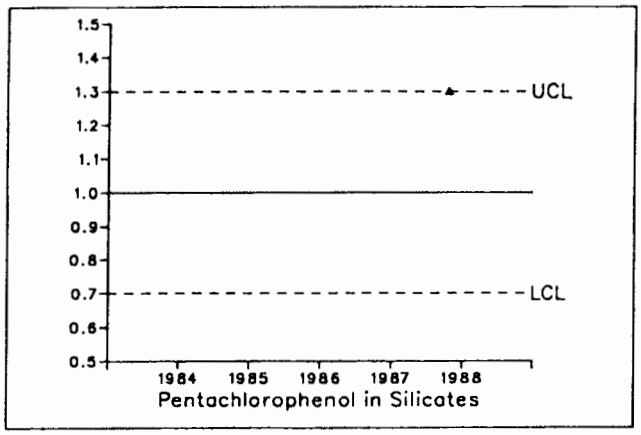
UCL
LCL
1984 1985 1986 1987 1988
N-Nitrosodi-n-propylamine in Silicates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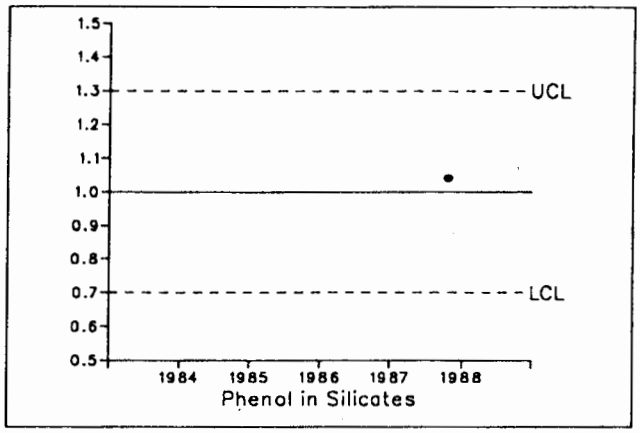
Pentachlorophenol in Silicates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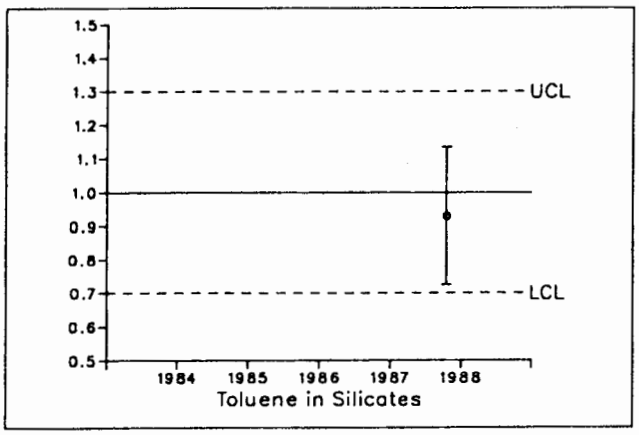
Phenol in Silicates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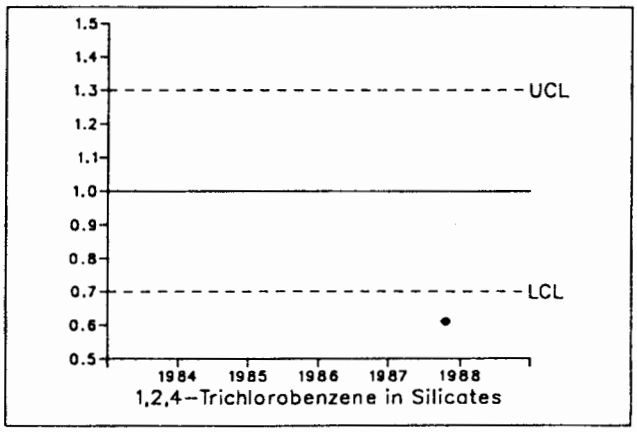
Toluene in Silicates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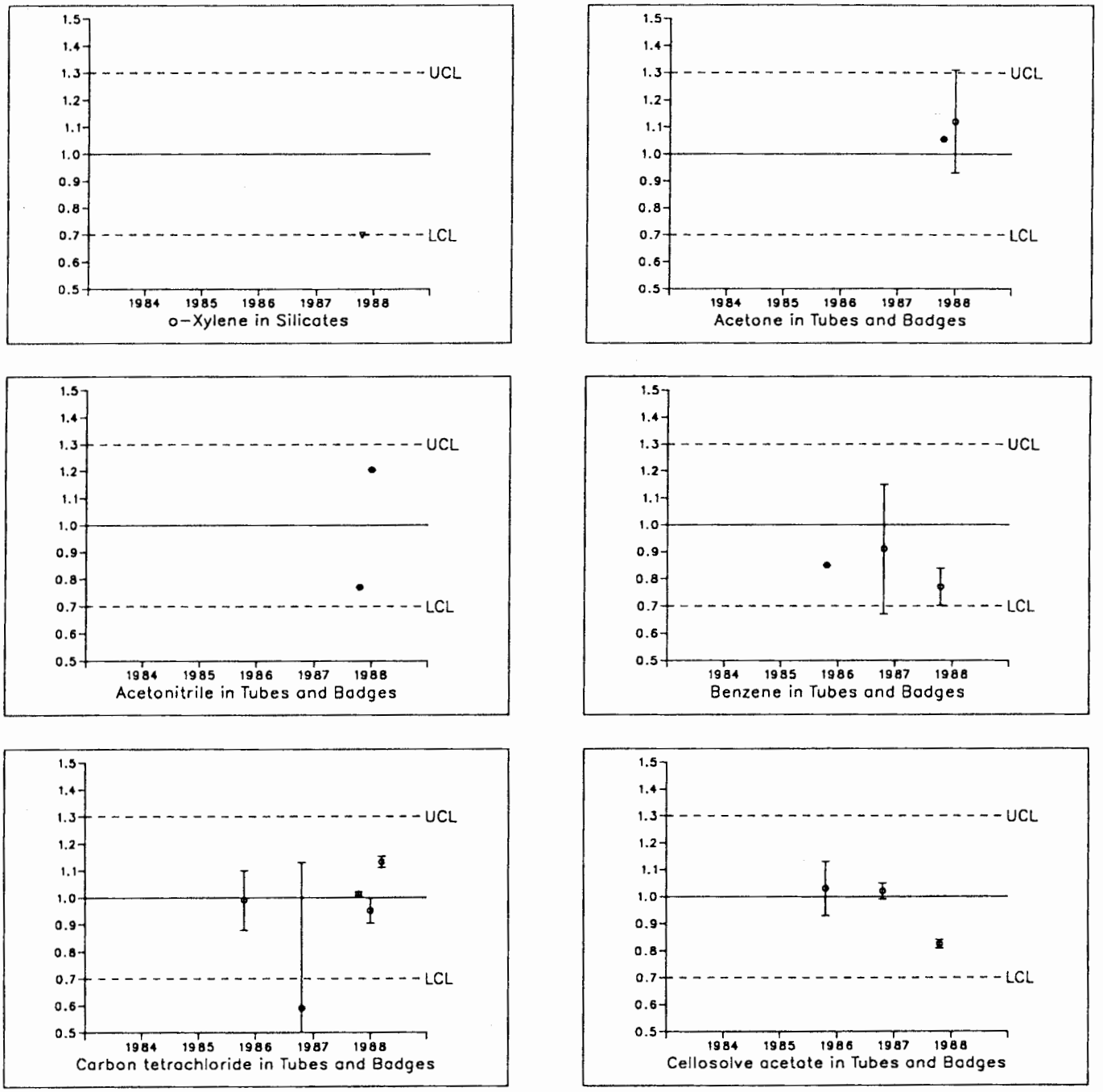
LCL
1984 1985 1986 1987 1988
1,2,4-Trichlorobenzene in Silicates

Fig. C-3. (cont)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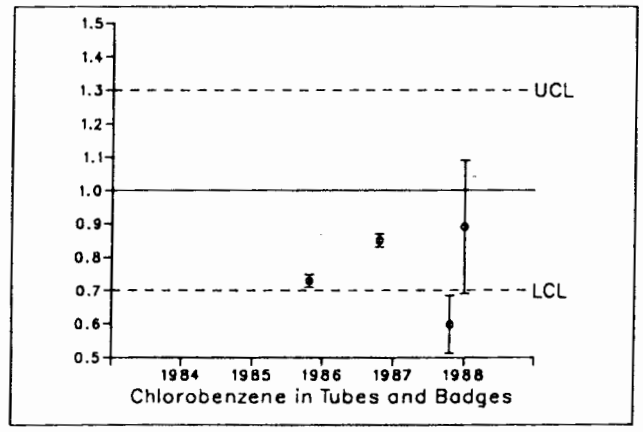
UCL
LCL
1984 1985 1986 1987 1988
o-Xylene in Silicates
Acetone in Tubes and Badges
Acetonitrile in Tubes and Badges
Benzene in Tubes and Badges
Carbon tetrachloride in Tubes and Badges
Cellosolve acetate in Tubes and Badges

Fig. C-3. (cont)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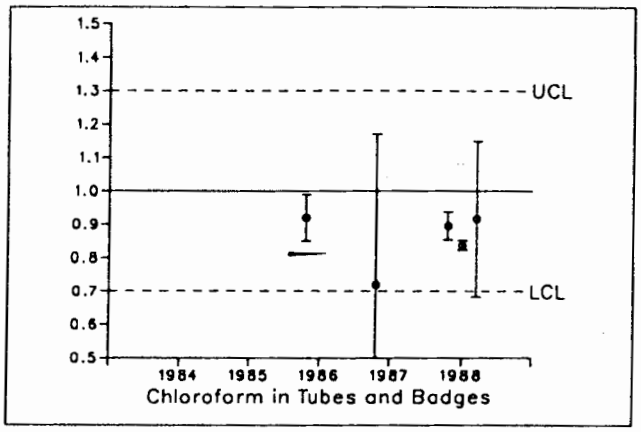
Chlorobenzene in Tubes and Badges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LCL
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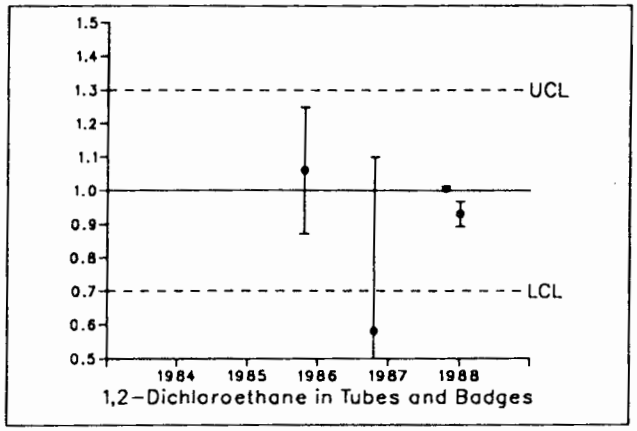
Chloroform in Tubes and Badges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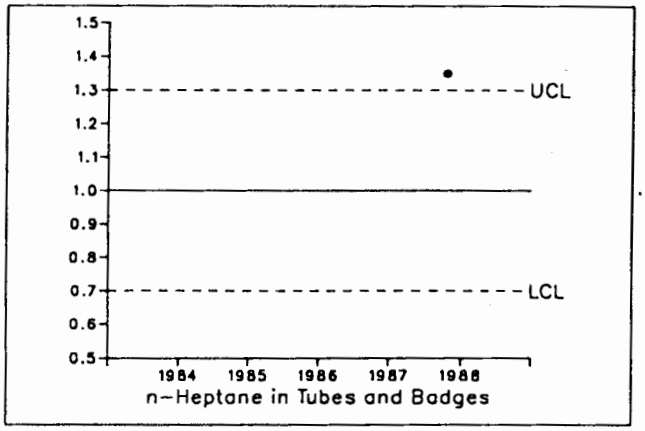
1,2-Dichloroethane in Tubes and Badges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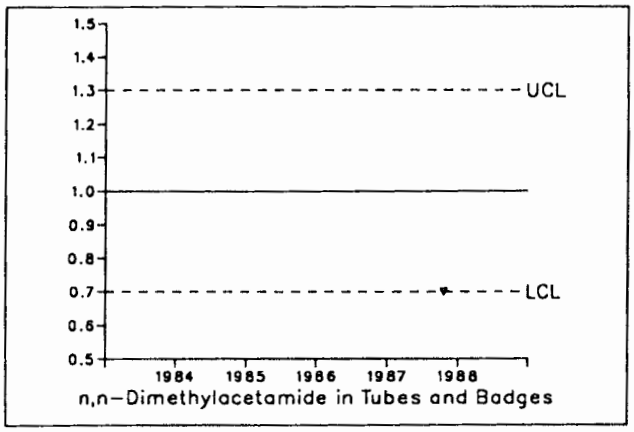
1984 1985 1986 1987 1988
n-Heptane in Tubes and Badges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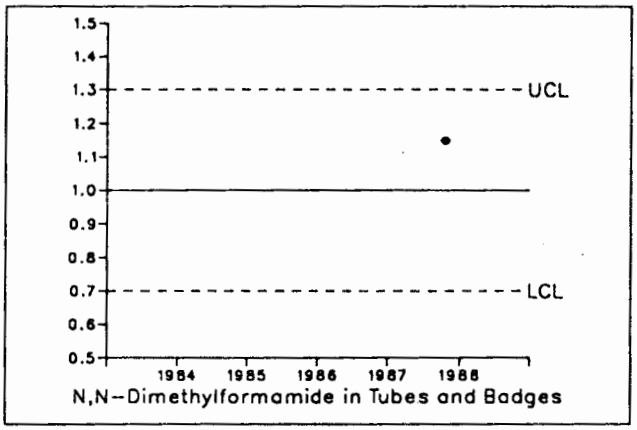
n,n-Dimethylacetamide in Tubes and Badges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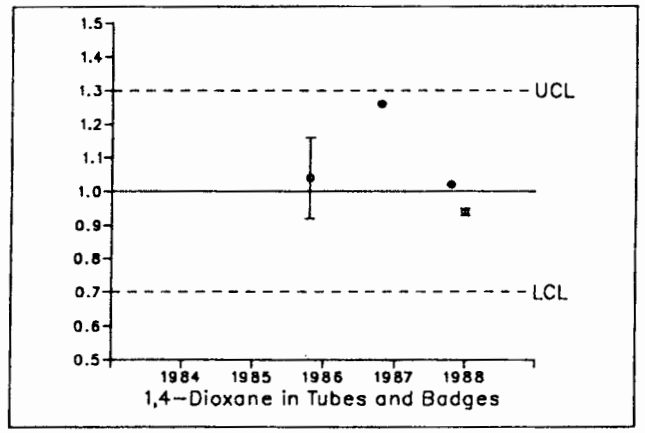
N,N-Dimethylformamide in Tubes and Badges

Fig. C-3. (cont)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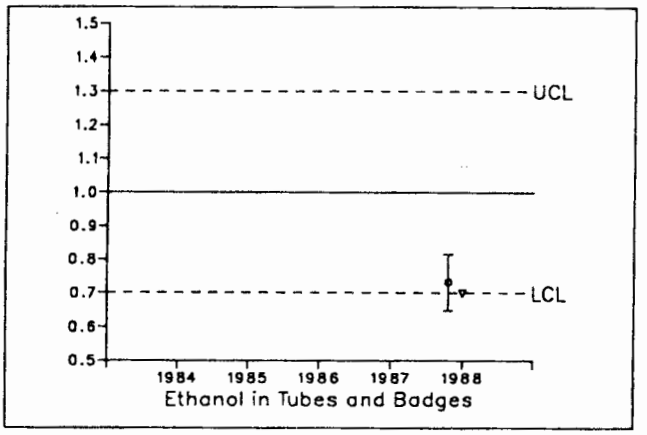
1,4-Dioxane in Tubes and Badges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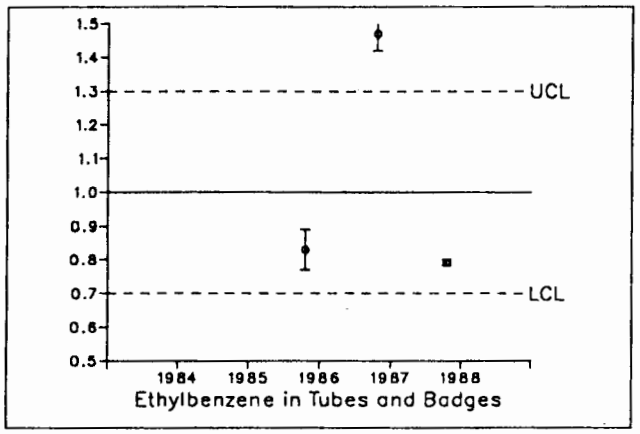
1984 1985 1986 1987 1988
Ethanol in Tubes and Badges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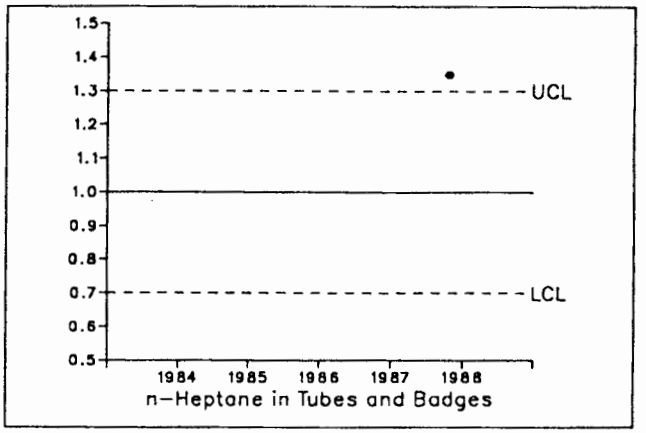
Ethylbenzene in Tubes and Badges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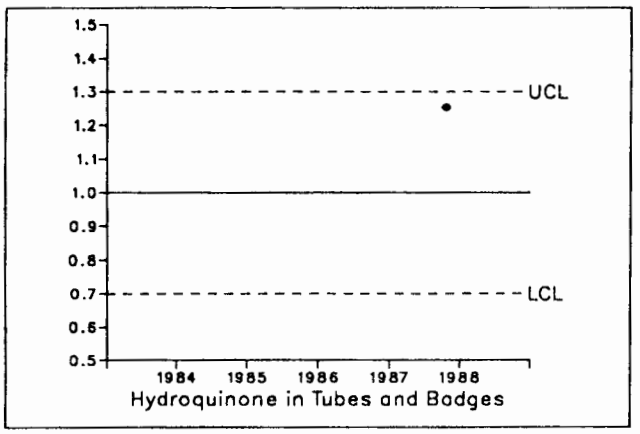
LCL
1984 1985 1986 1987 1988
n-Heptane in Tubes and Badges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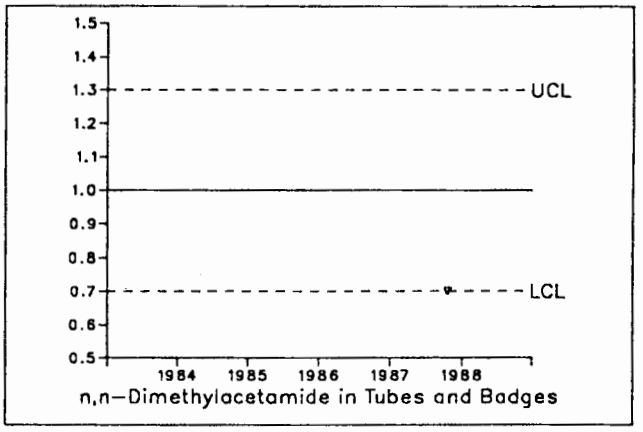
1984 1985 1986 1987 1988
Hydroquinone in Tubes and Badges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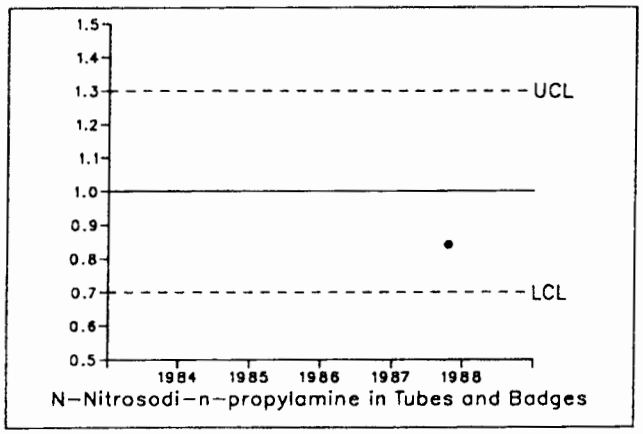
1984 1985 1986 1987 1988
n,n-Dimethylacetamide in Tubes and Badges

Fig. C-3. (cont)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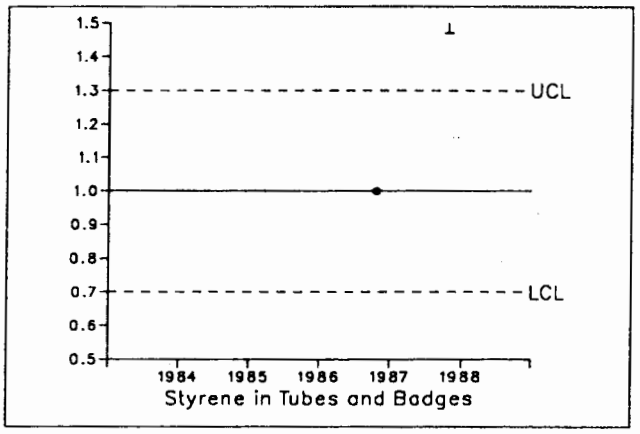
1984 1985 1986 1987 1988
N-Nitrosodi-n-propylamine in Tubes and Badges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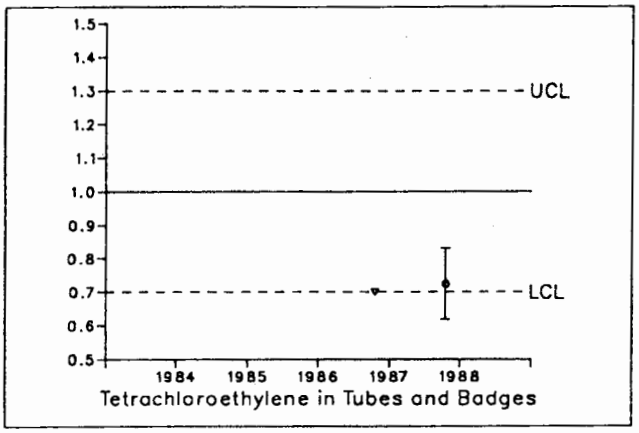
Styrene in Tubes and Badges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LCL
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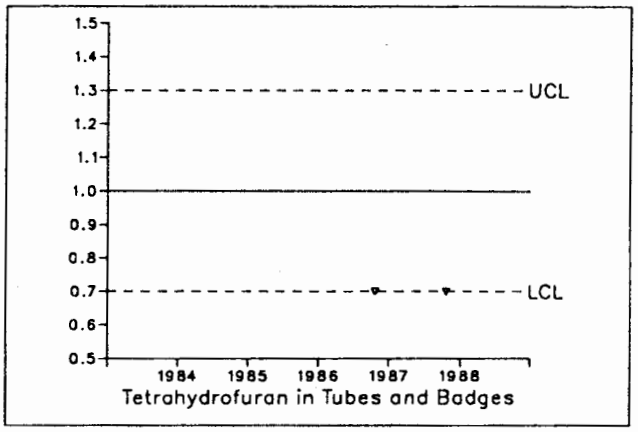
Tetrachloroethylene in Tubes and Badges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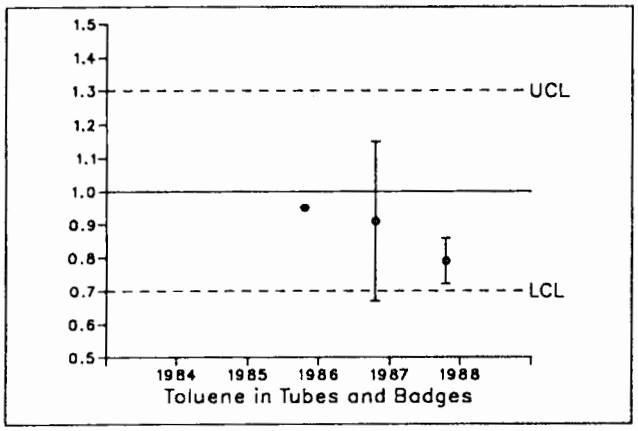
Tetrahydrofuran in Tubes and Badges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LCL
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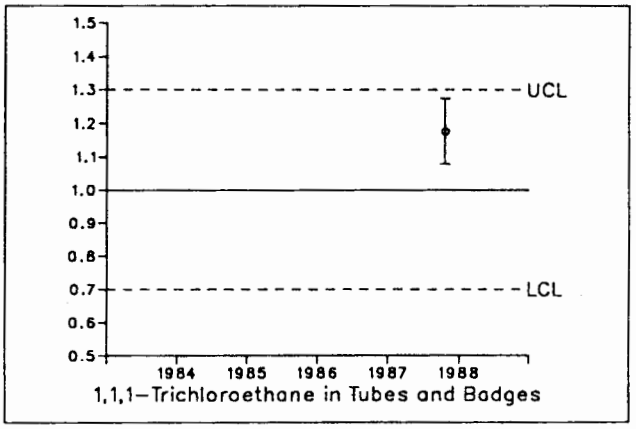
Toluene in Tubes and Badges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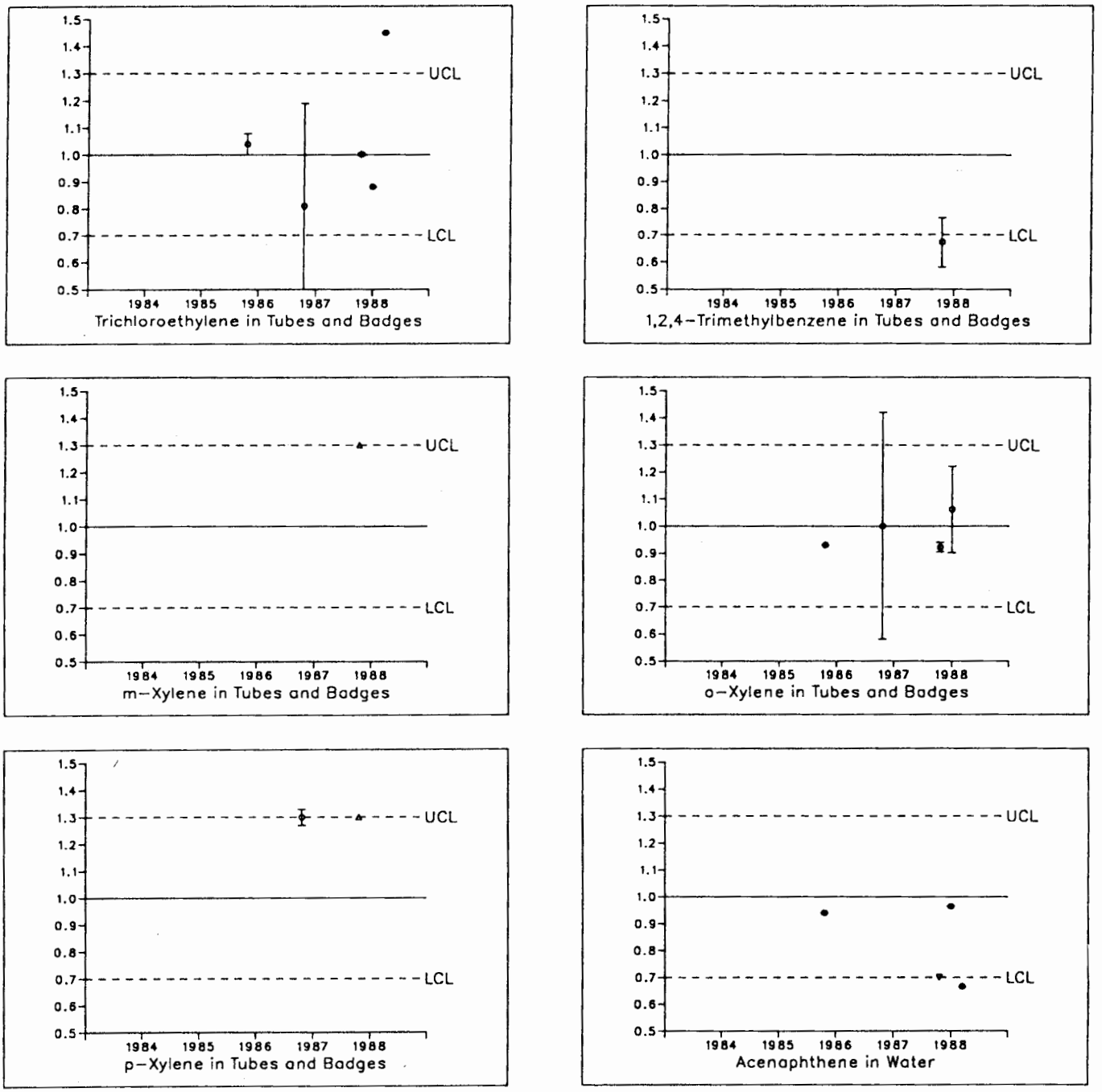
1,1,1-Trichloroethane in Tubes and Badges

Fig. C-3. (cont)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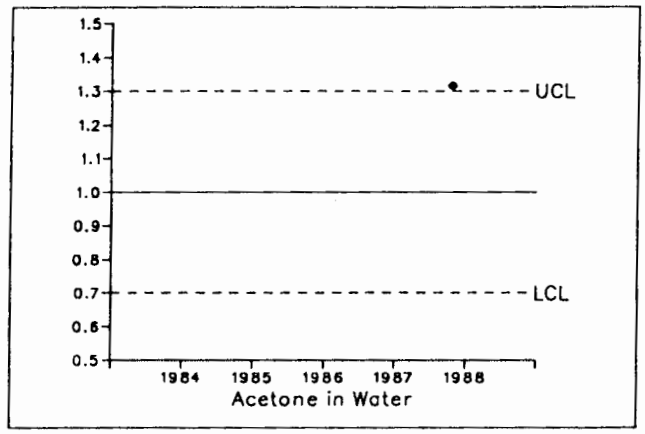
LCL
1984 1985 1986 1987 1988
Trichloroethylene in Tubes and Badges
1,2,4-Trimethylbenzene in Tubes and Badges
m-Xylene in Tubes and Badges
o-Xylene in Tubes and Badges
p-Xylene in Tubes and Badges
Acenaphthene in Water

Fig. C-3. (cont)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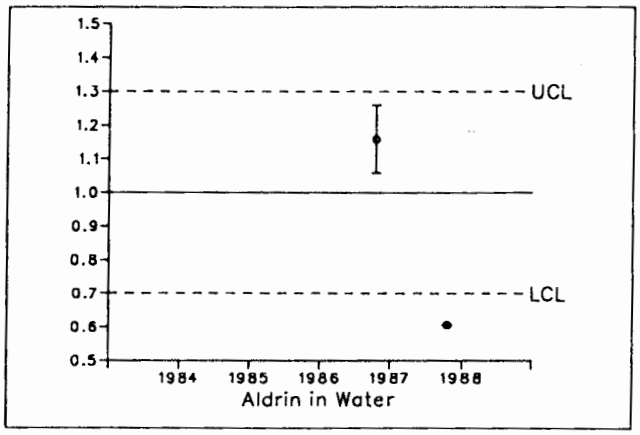
UCL
LCL
1984 1985 1986 1987 1988
Acetone in Water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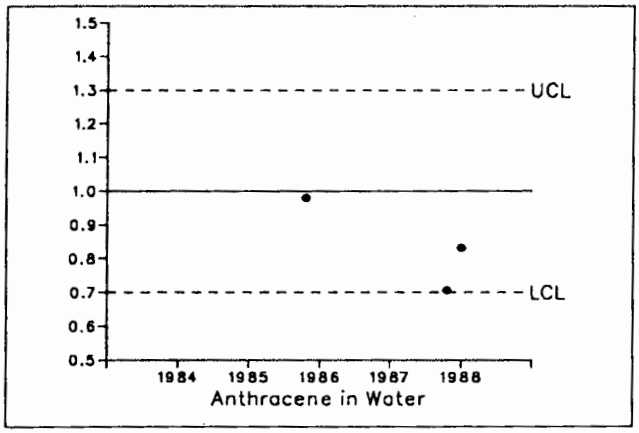
LCL
1984 1985 1986 1987 1988
Aldrin in Water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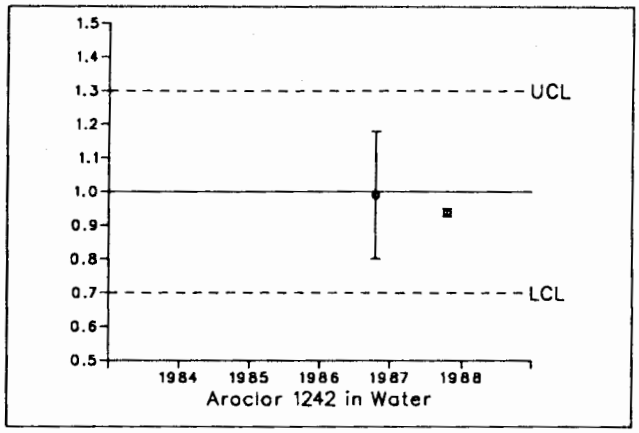
LCL
1984 1985 1986 1987 1988
Anthracene in Water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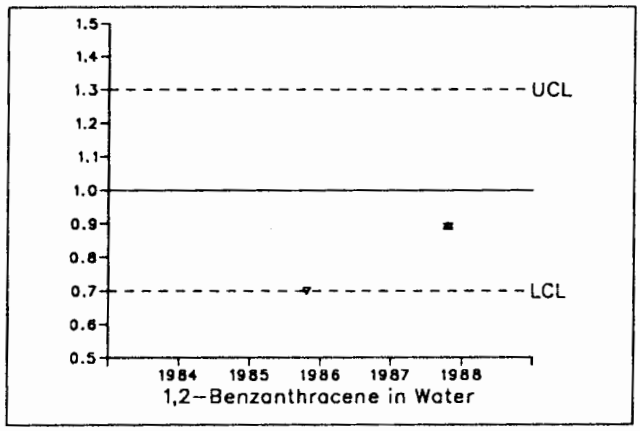
UCL
LCL
1984 1985 1986 1987 1988
Aroclor 1242 in Water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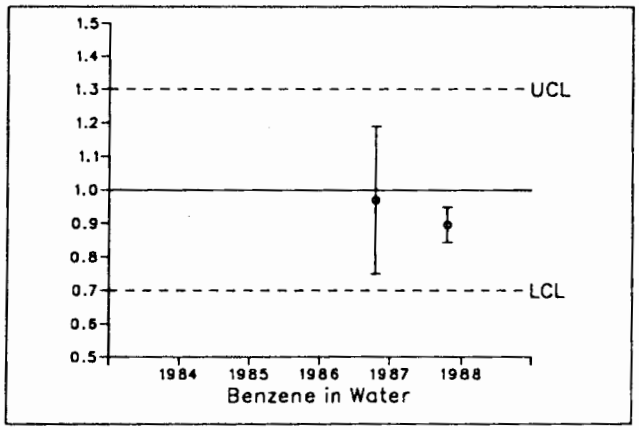
LCL
1984 1985 1986 1987 1988
1,2-Benzanthracene in Water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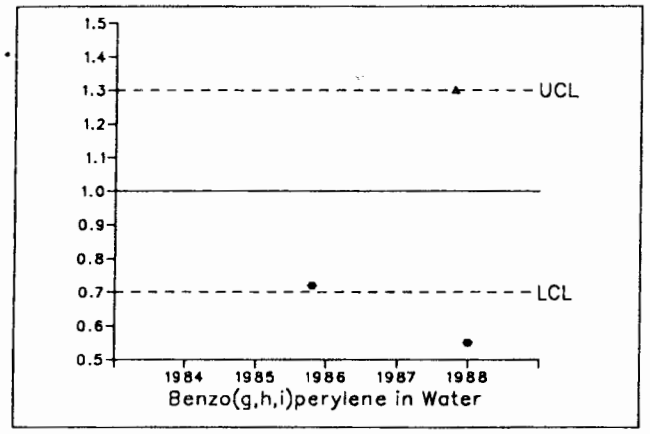
LCL
1984 1985 1986 1987 1988
Benzene in Water

Fig. C-3. (cont)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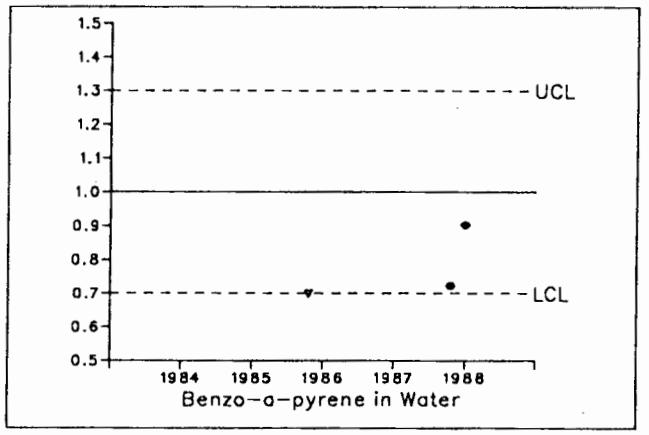
LCL
1984
1985
1986
1987
1988
Benzo(g,h,i)perylene in Water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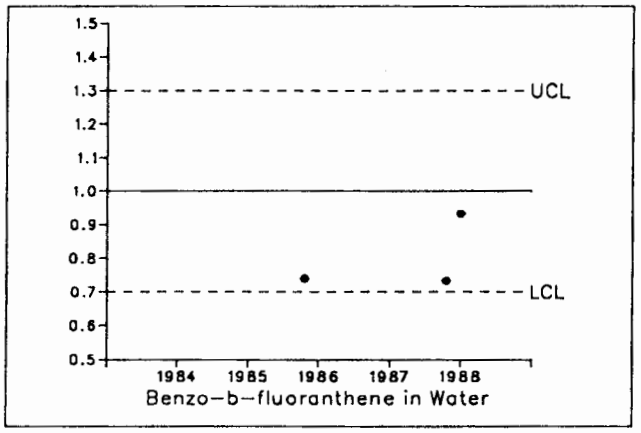
LCL
1984
1985
1986
1987
1988
Benzo-a-pyrene in Water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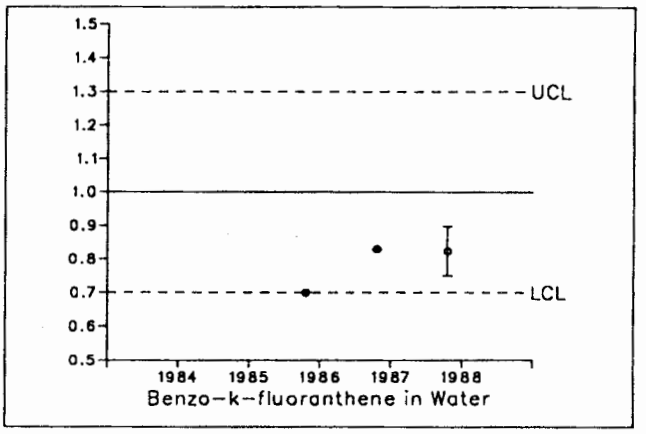
UCL
LCL
1984
1985
1986
1987
1988
Benzo-b-fluoranthene in Water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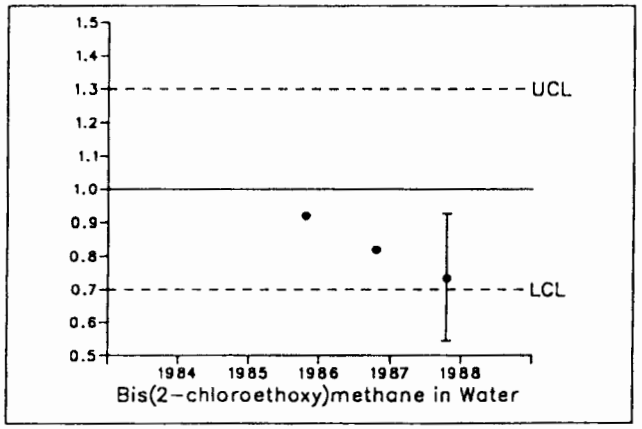
LCL
1984
1985
1986
1987
1988
Benzo-k-fluoranthene in Water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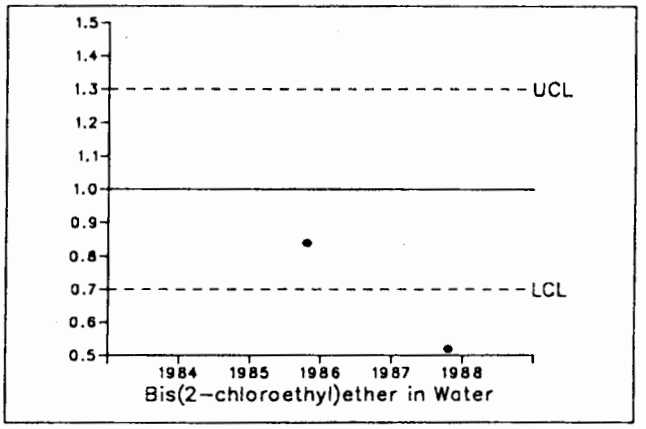
LCL
1984
1985
1986
1987
1988
Bis(2-chloroethoxy)methane in Water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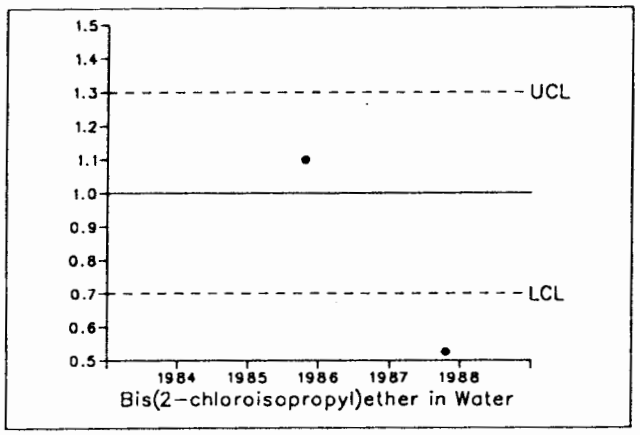
UCL
LCL
1984
1985
1986
1987
1988
Bis(2-chloroethyl)ether in Water

Fig. C-3. (cont)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UCL
LCL
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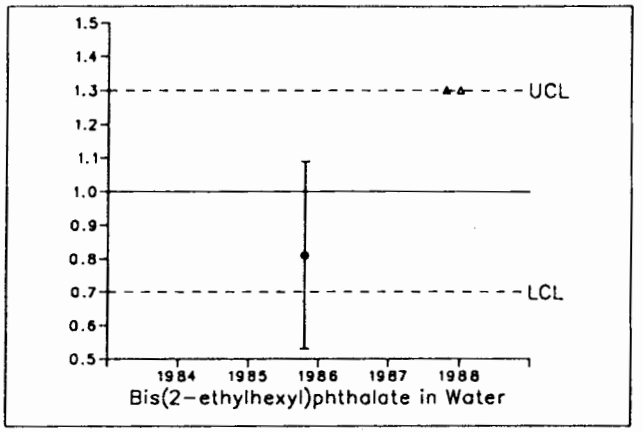
Bis(2-chloroisopropyl)ether in Water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LCL
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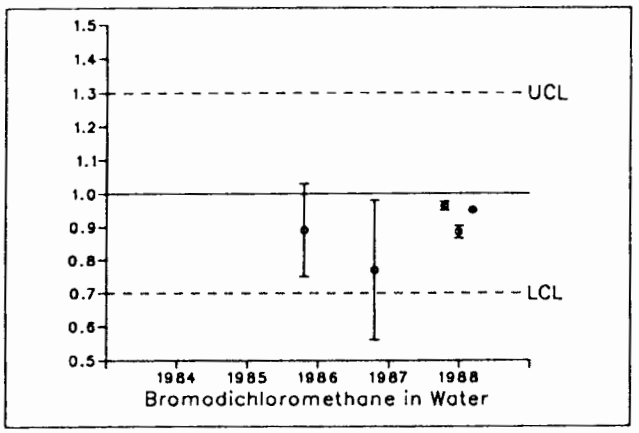
Bis(2-ethylhexyl)phthalate in Water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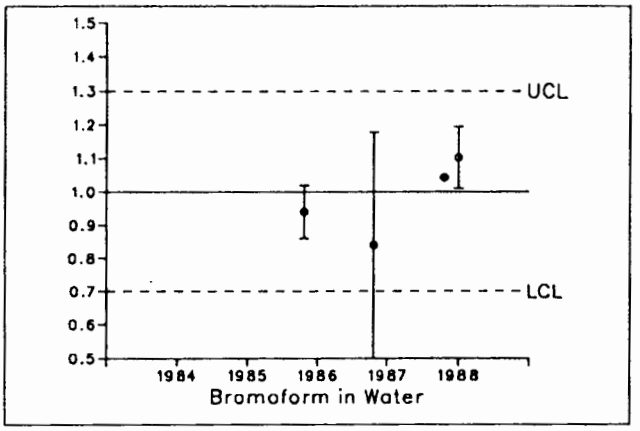
Bromodichloromethane in Water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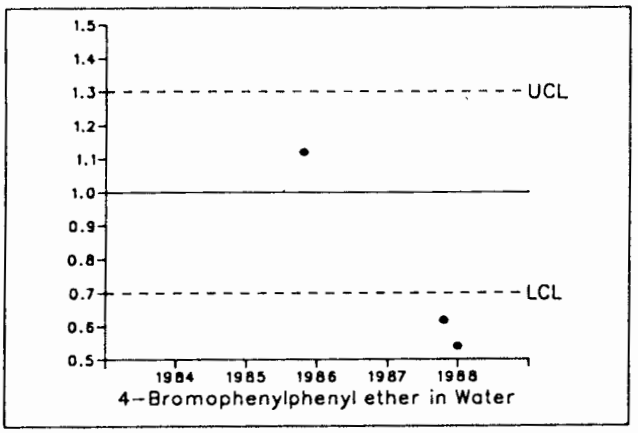
Bromoform in Water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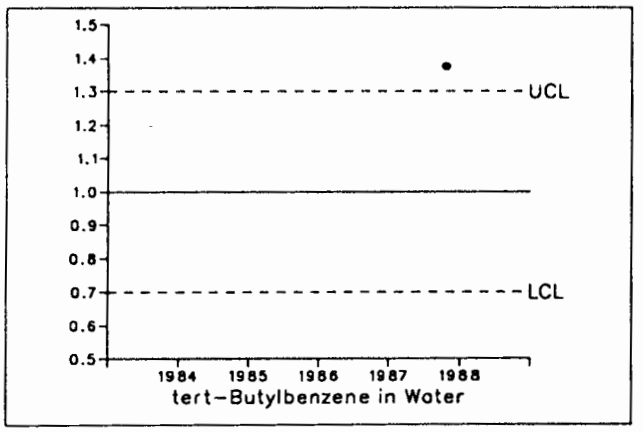
LCL
1984 1985 1986 1987 1988
4-Bromophenylphenyl ether in Water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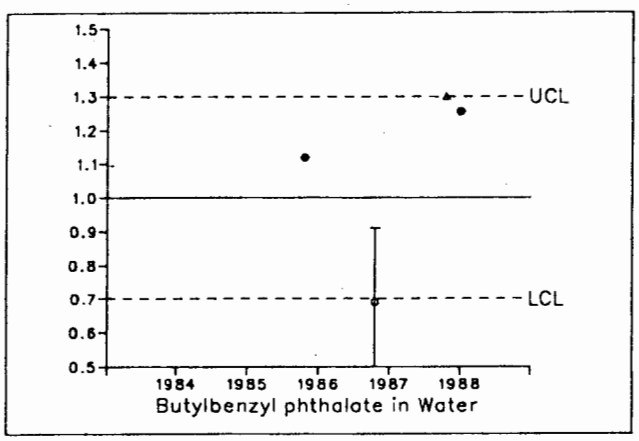
UCL
LCL
1984 1985 1986 1987 1988
tert-Butylbenzene in Water

Fig. C-3. (cont)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LCL
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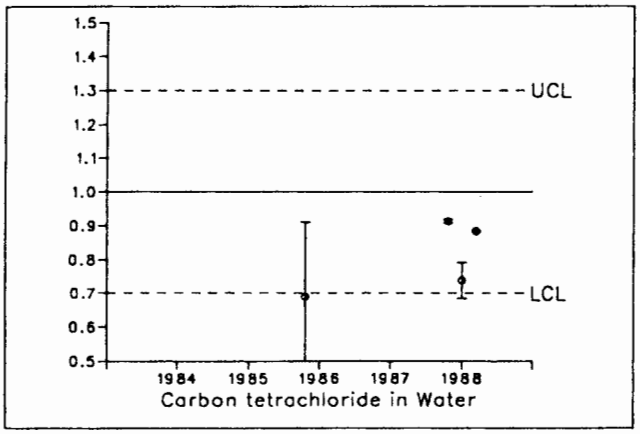
Butylbenzyl phthalate in Water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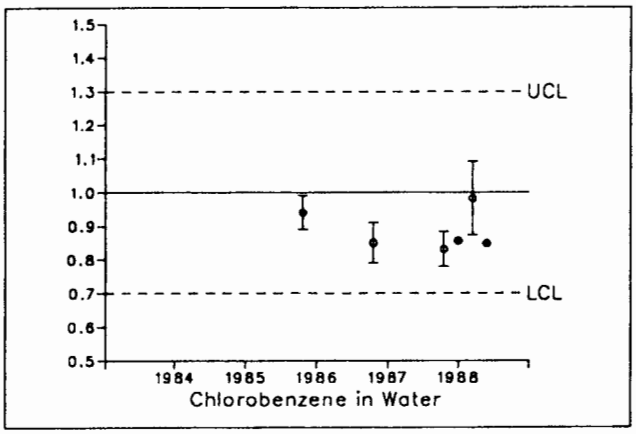
1984 1985 1986 1987 1988
Carbon tetrachloride in Water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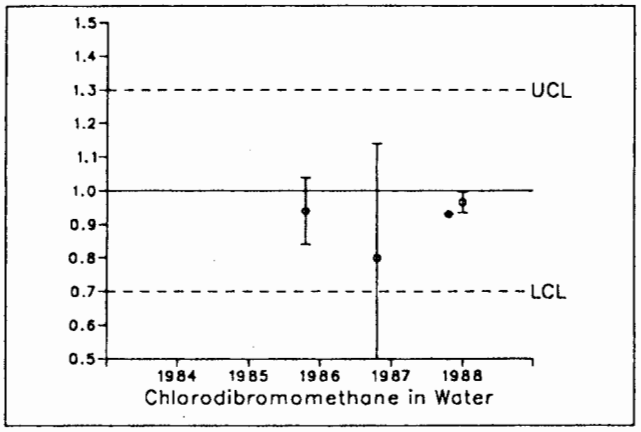
Chlorobenzene in Water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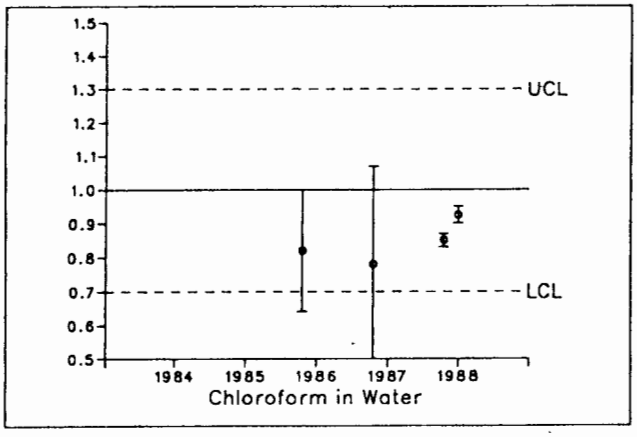
Chlorodibromomethane in Water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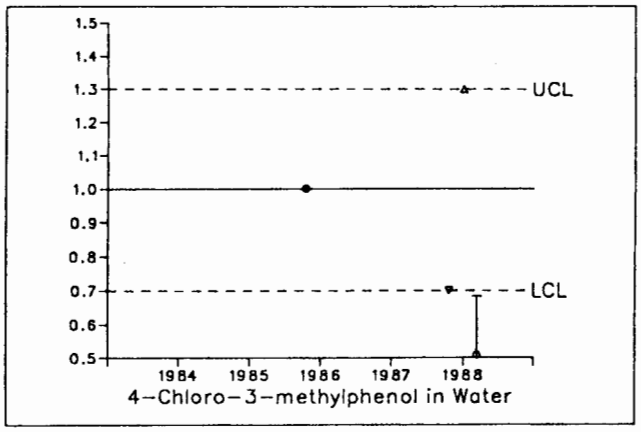
1984 1985 1986 1987 1988
Chloroform in Water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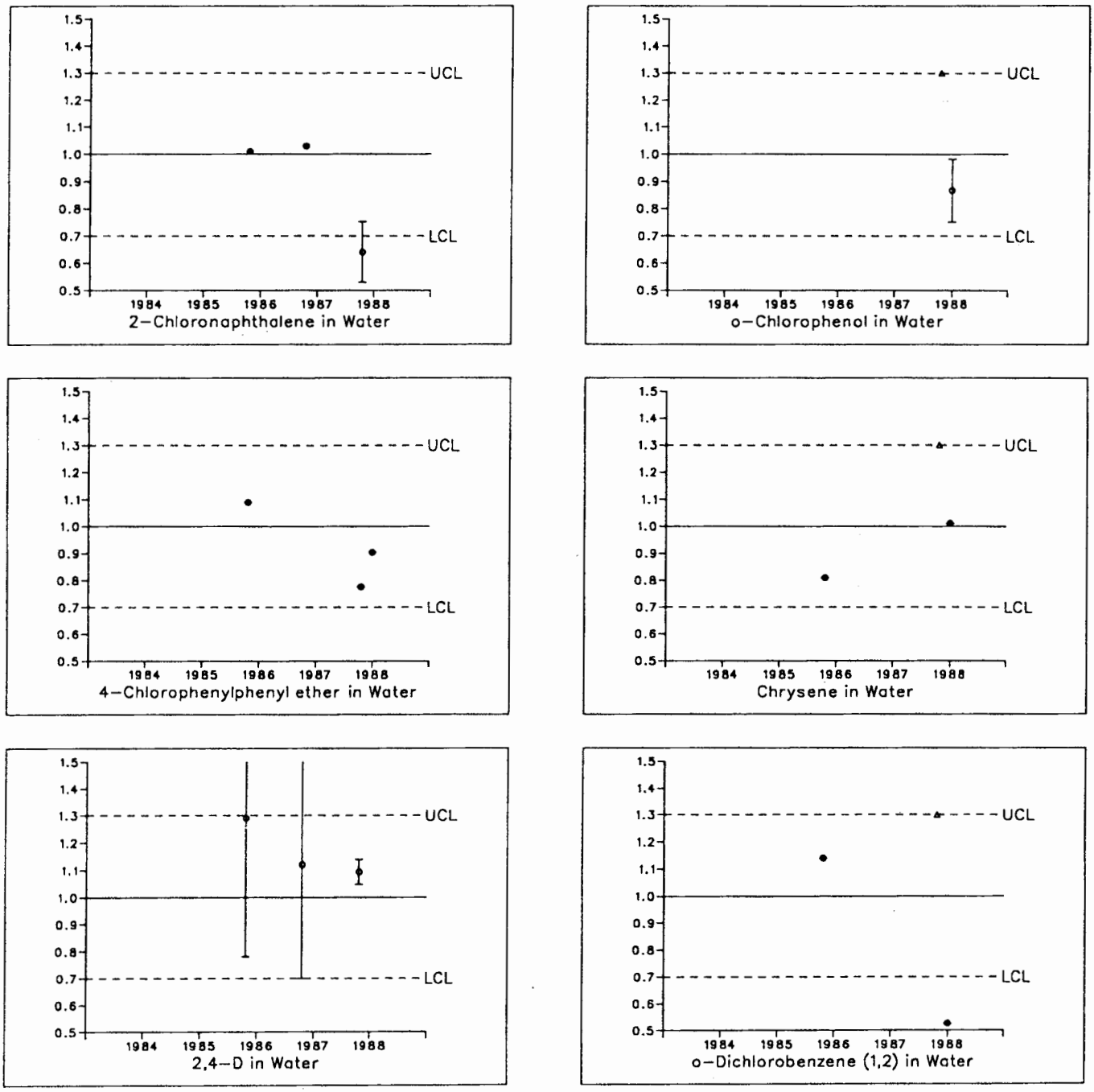
LCL
1984 1985 1986 1987 1988
4-Chloro-3-methylphenol in Water

Fig. C-3. (cont)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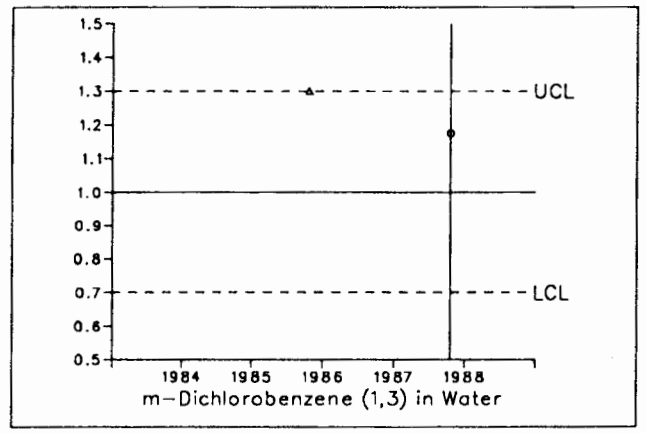
UCL
LCL
1984 1985 1986 1987 1988
2-Chloronaphthalene in Water
o-Chlorophenol in Water
4-Chlorophenylphenyl ether in Water
Chrysene in Water
2,4-D in Water
o-Dichlorobenzene (1,2) in Water

Fig. C-3. (cont)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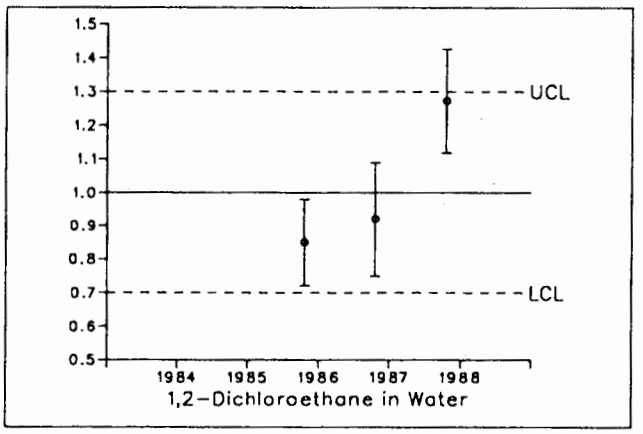
LCL
1984 1985 1986 1987 1988
m-Dichlorobenzene (1,3) in Water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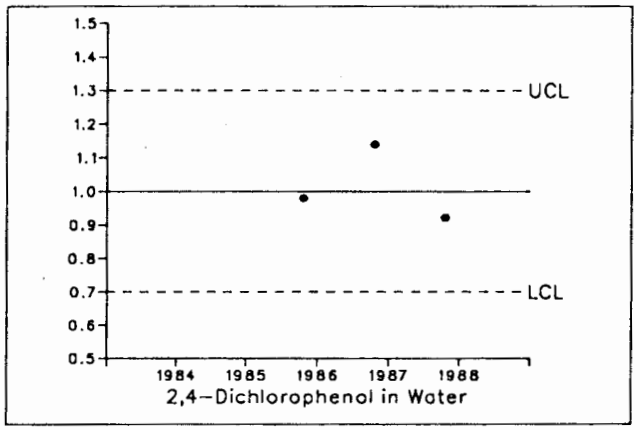
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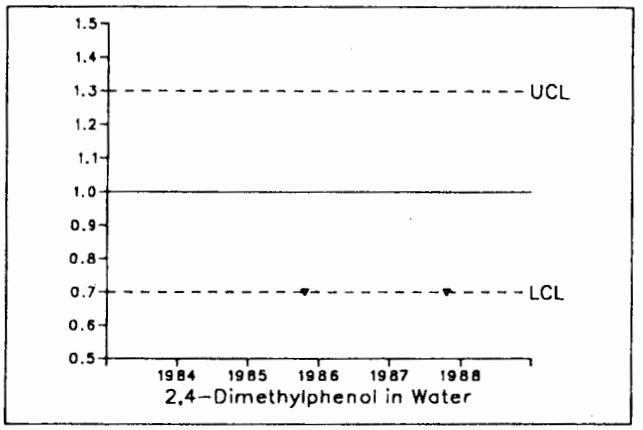
2,4-Dichlorophenol in Water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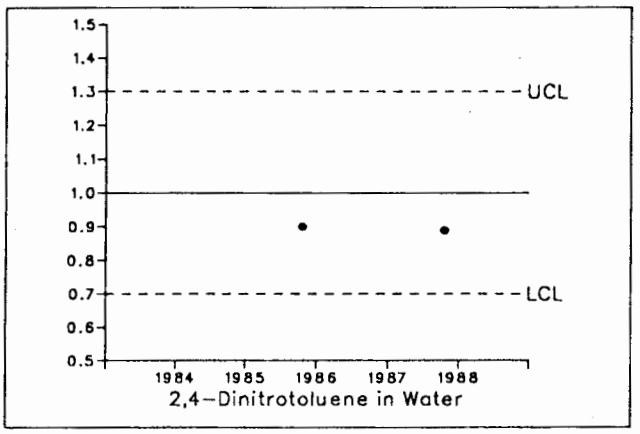
1984 1985 1986 1987 1988
2,4-Dimethylphenol in Water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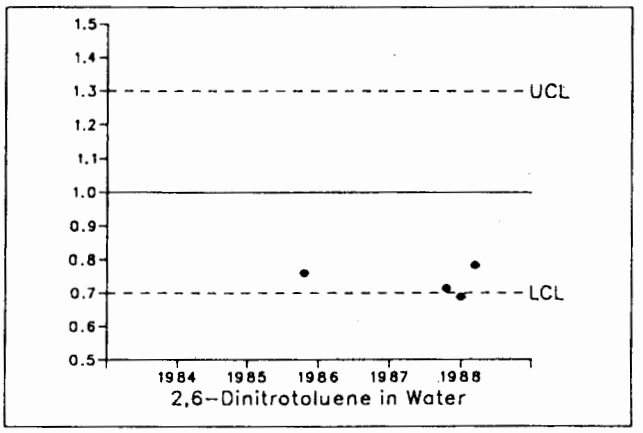
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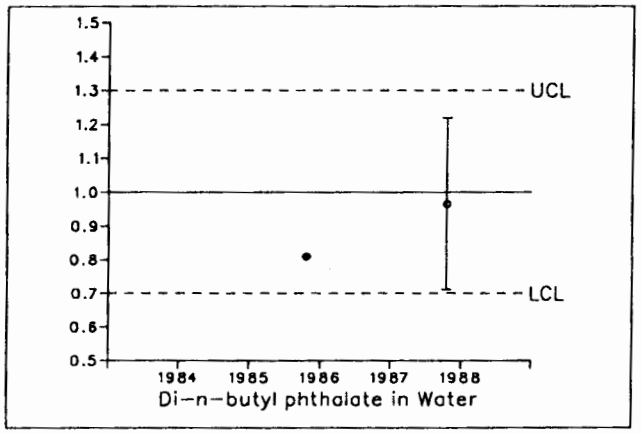
2,6-Dinitrotoluene in Water

Fig. C-3. (cont)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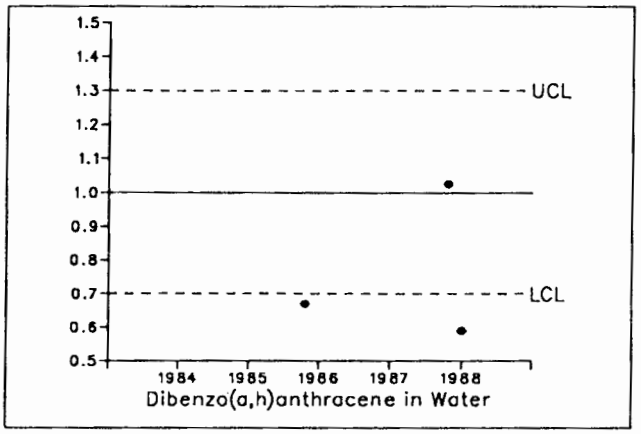
Di-n-butyl phthalate in Water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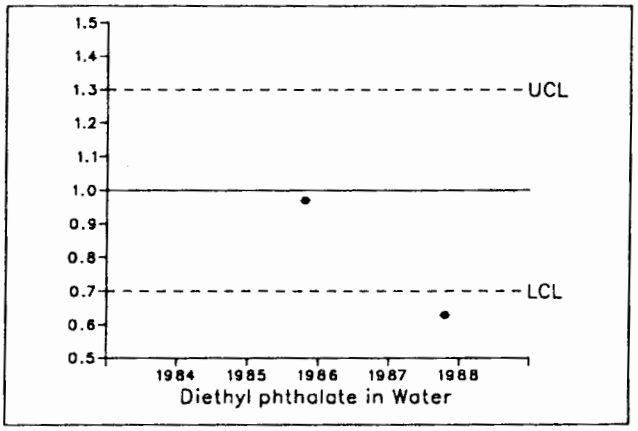
LCL
1984 1985 1986 1987 1988
Dibenzo(a,h)anthracene in Water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LCL
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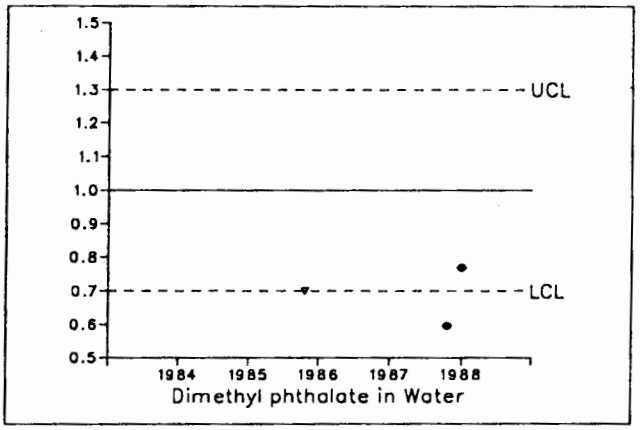
Diethyl phthalate in Water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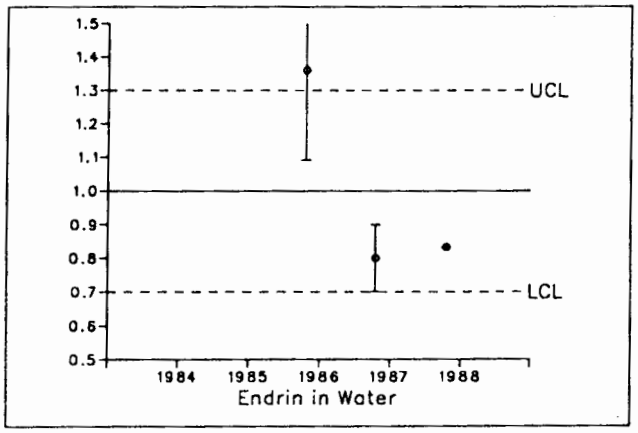
1984 1985 1986 1987 1988
Dimethyl phthalate in Water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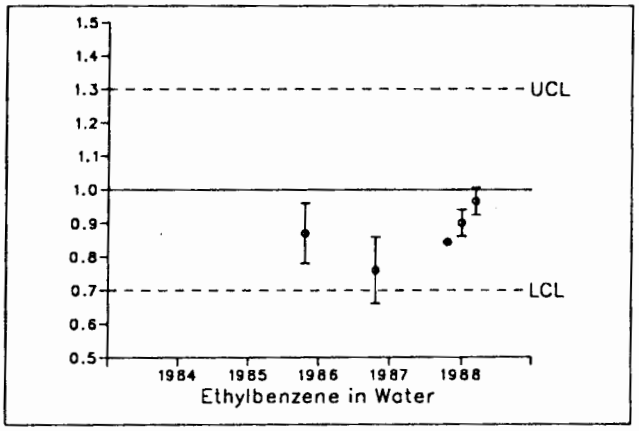
LCL
1984 1985 1986 1987 1988
Endrin in Water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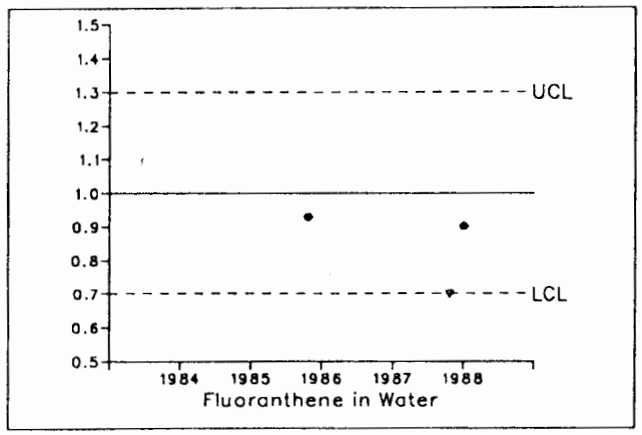
LCL
1984 1985 1986 1987 1988
Ethylbenzene in Water

Fig. C-3. (cont)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LCL
1984 1985 1986 1987 1988
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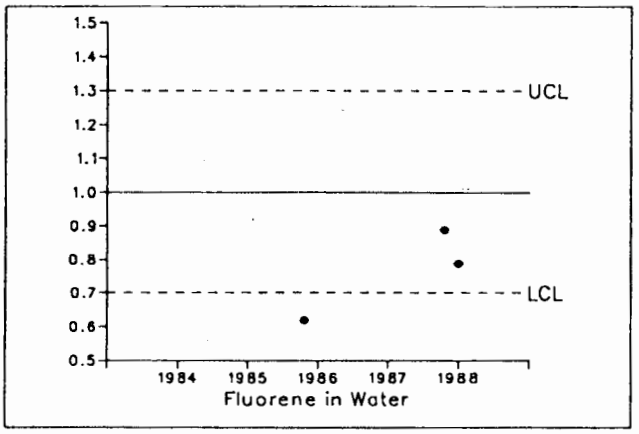
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LCL
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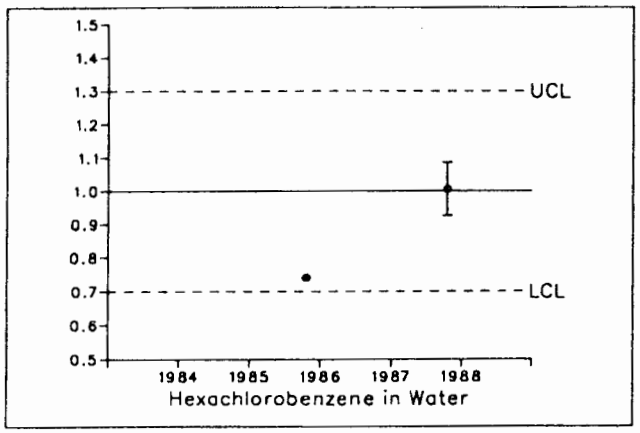
Fluorene in Water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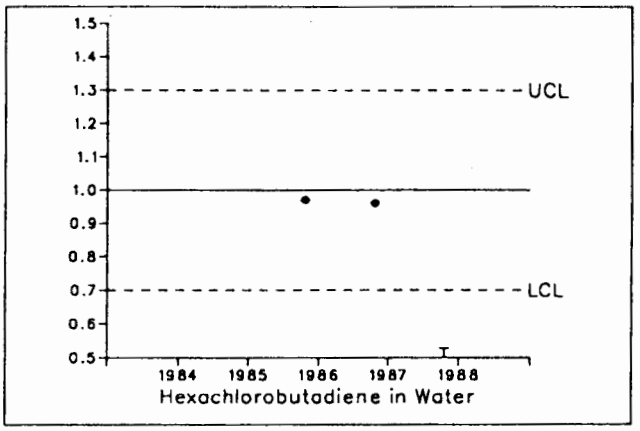
UCL
LCL
1984 1985 1986 1987 1988
Hexachlorobenzene in Water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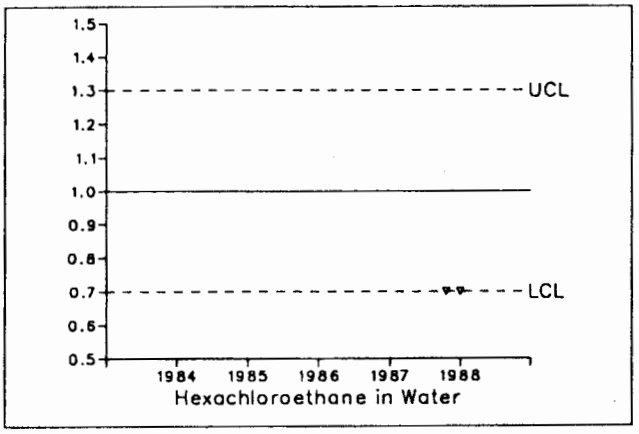
UCL
LCL
1984 1985 1986 1987 1988
Hexachlorobutadiene in Water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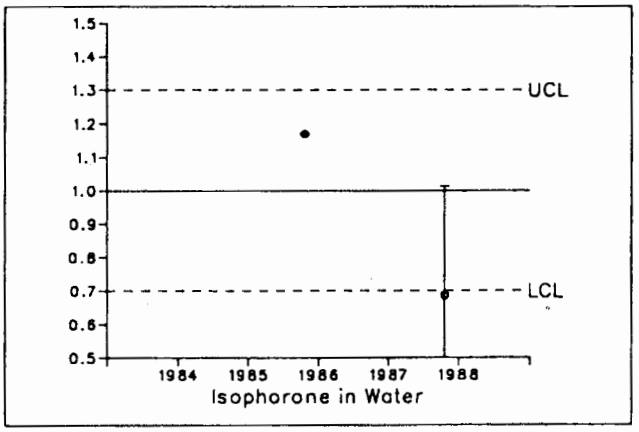
Hexachloroethane in Water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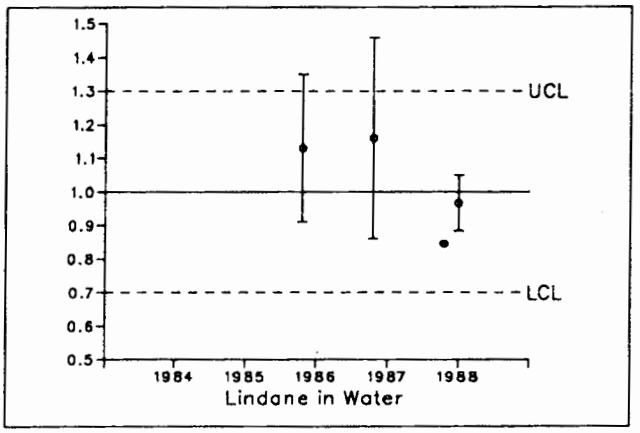
LCL
1984 1985 1986 1987 1988
Isophorone in Water

Fig. C-3. (cont)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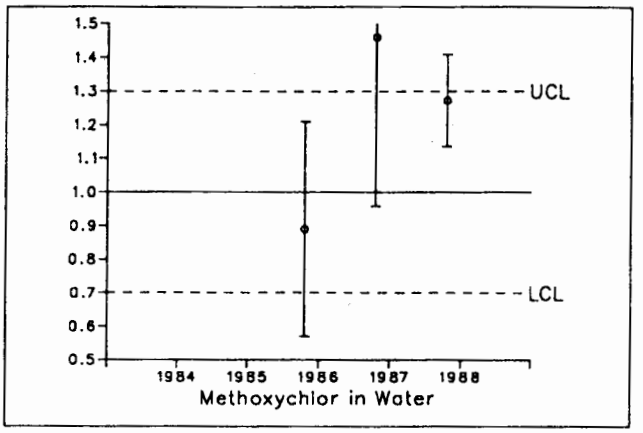
LCL
1984
1985
1986
1987
1988
Lindane in Water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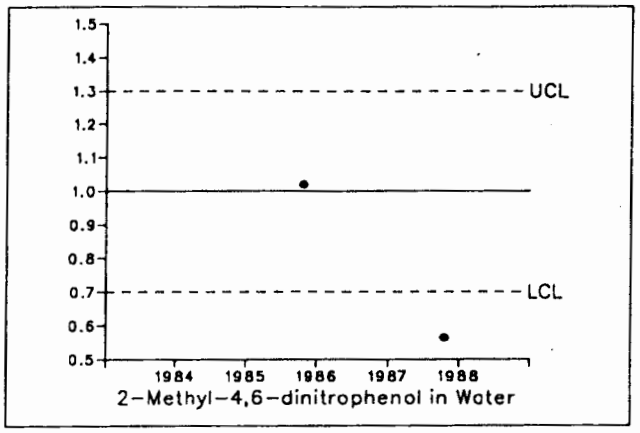
LCL
1984
1985
1986
1987
1988
Methoxychlor in Water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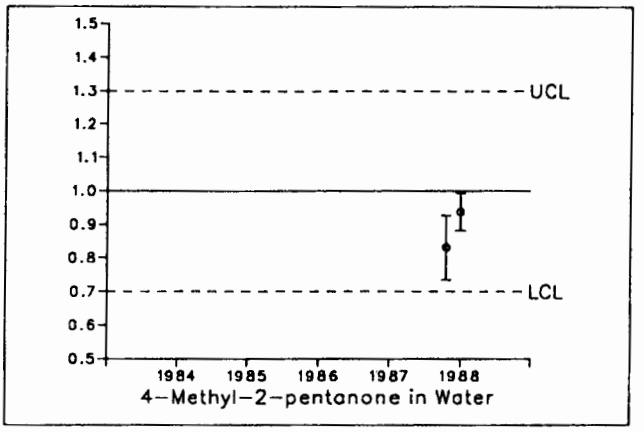
LCL
1984
1985
1986
1987
1988
2-Methyl-4,6-dinitrophenol in Water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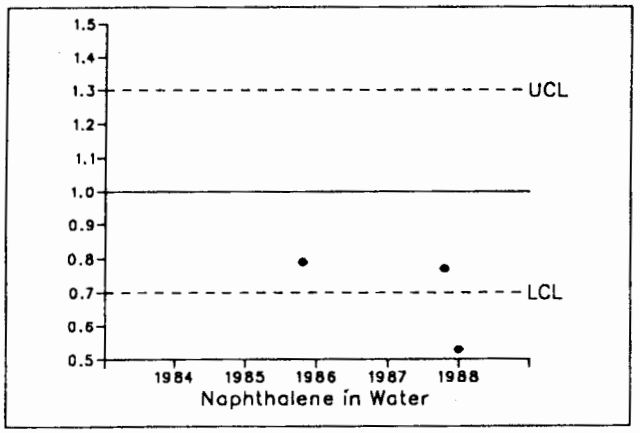
UCL
LCL
1984
1985
1986
1987
1988
4-Methyl-2-pentanone in Water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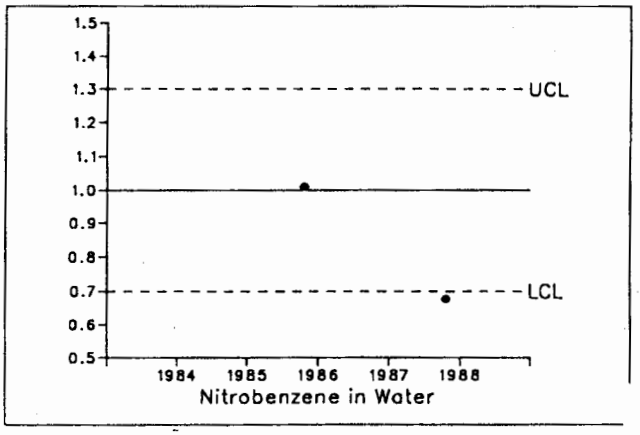
LCL
1984
1985
1986
1987
1988
Naphthalene in Water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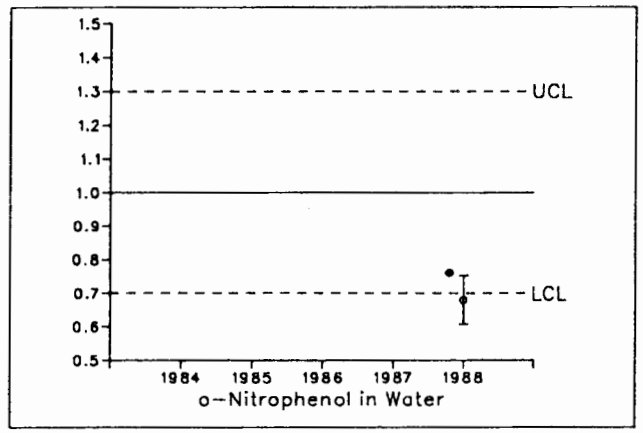
LCL
1984
1985
1986
1987
1988
Nitrobenzene in Water

Fig. C-3. (cont)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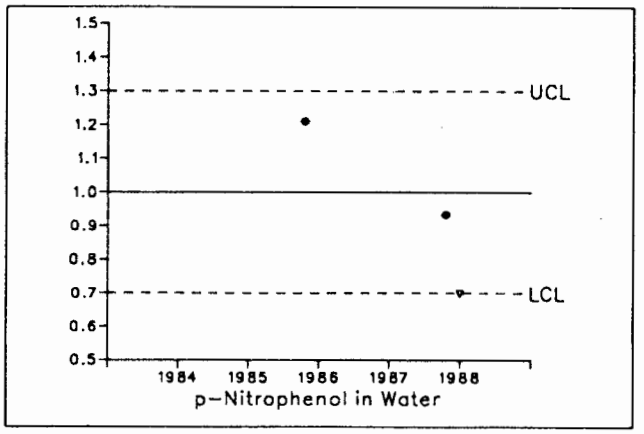
UCL
LCL
1984 1985 1986 1987 1988
o-Nitrophenol in Water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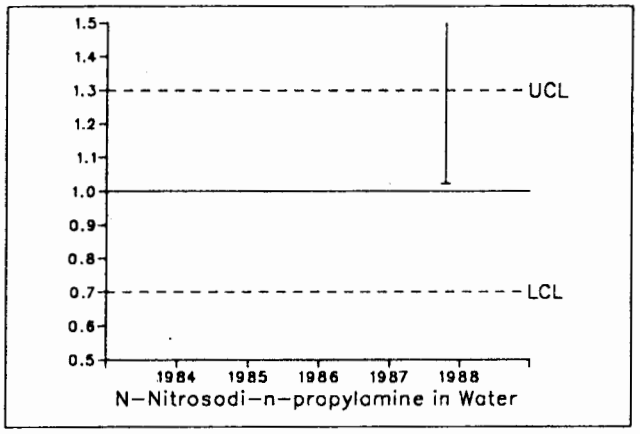
0.6
0.5
UCL
LCL
1984 1985 1986 1987 1988
p-Nitrophenol in Water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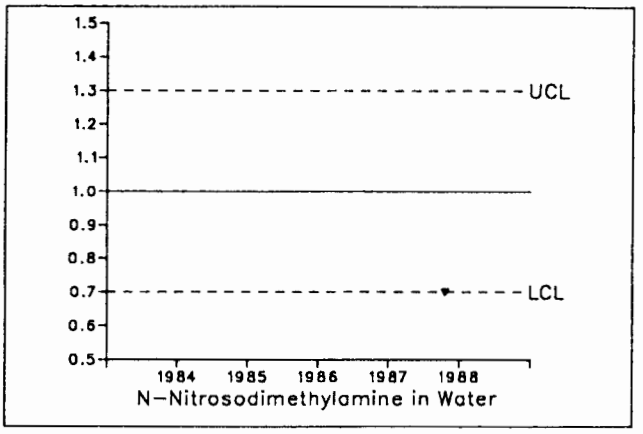
UCL
LCL
1984 1985 1986 1987 1988
N-Nitrosodi-n-propylamine in Water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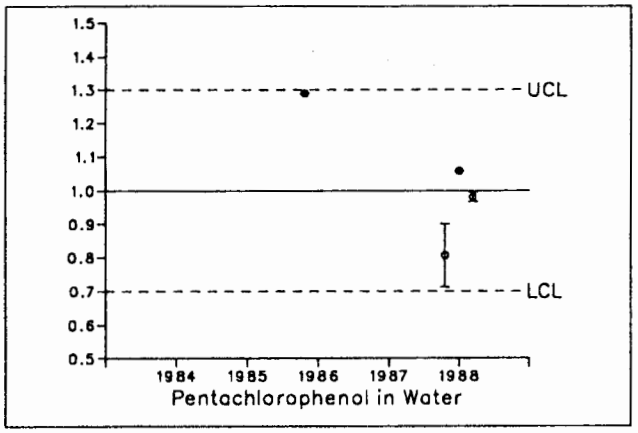
LCL
1984 1985 1986 1987 1988
N-Nitrosodimethylamine in Water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LCL
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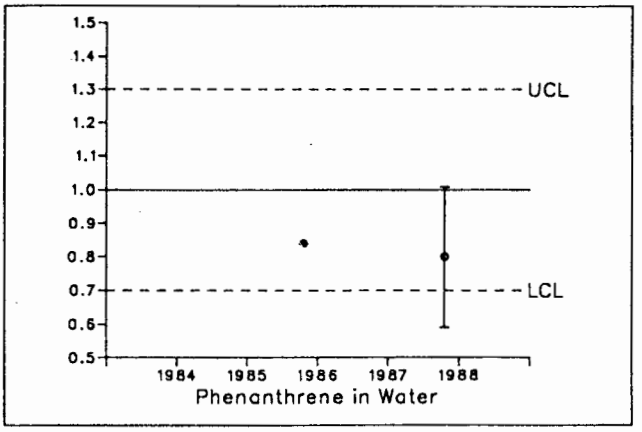
Pentachlorophenol in Water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0.5
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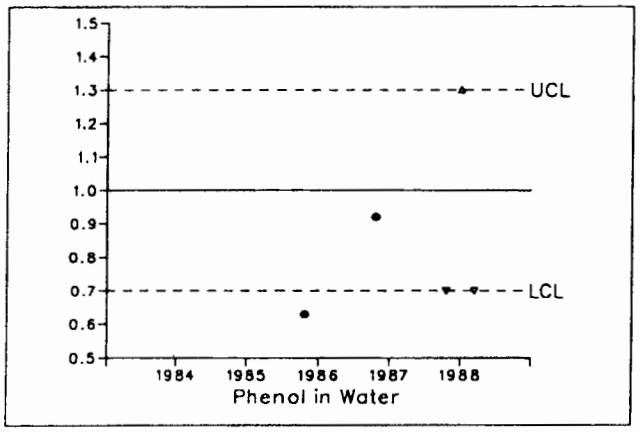
LCL
1984 1985 1986 1987 1988
Phenanthrene in Water

Fig. C-3. (cont)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LCL
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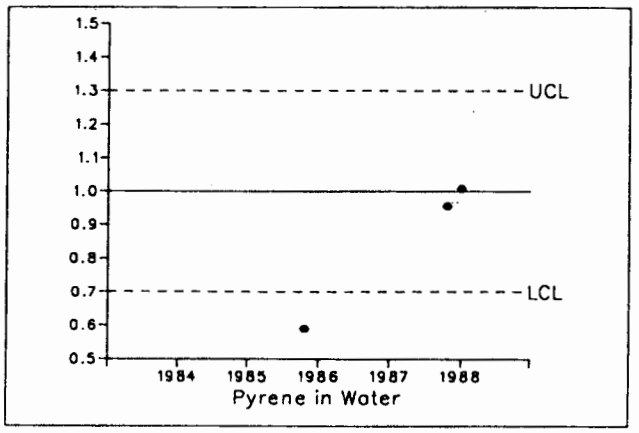
1985
1986
1987
1988
Phenol in Water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0.5
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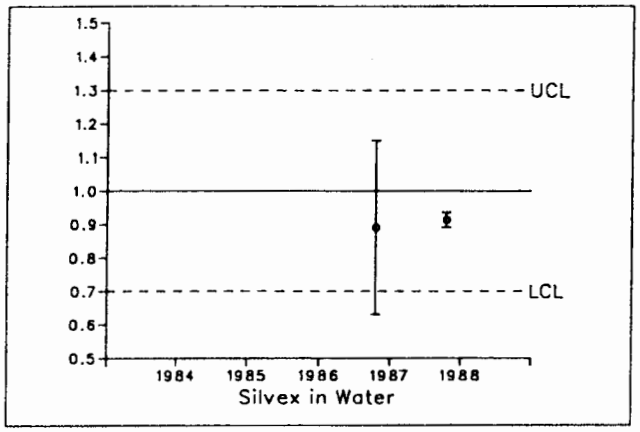
LCL
1984
1985
1986
1987
1988
Pyrene in Water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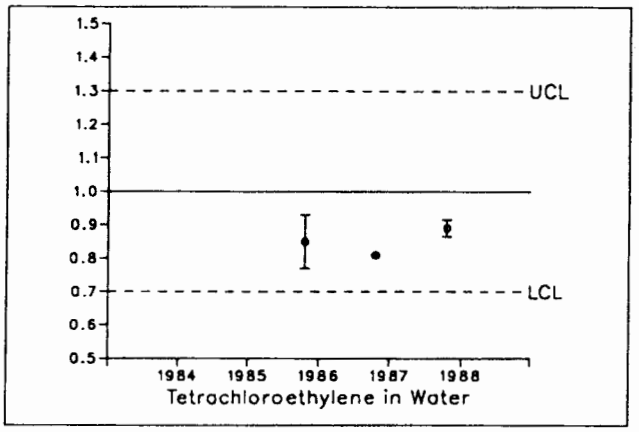
LCL
1984
1985
1986
1987
1988
Silvex in Water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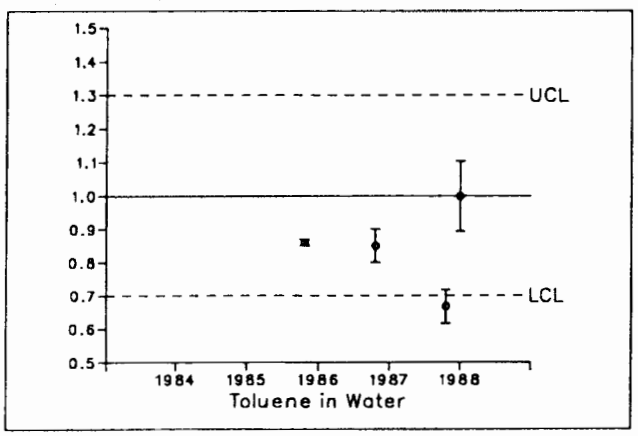
0.6
0.5
UCL
LCL
1984
1985
1986
1987
1988
Tetrachloroethylene in Water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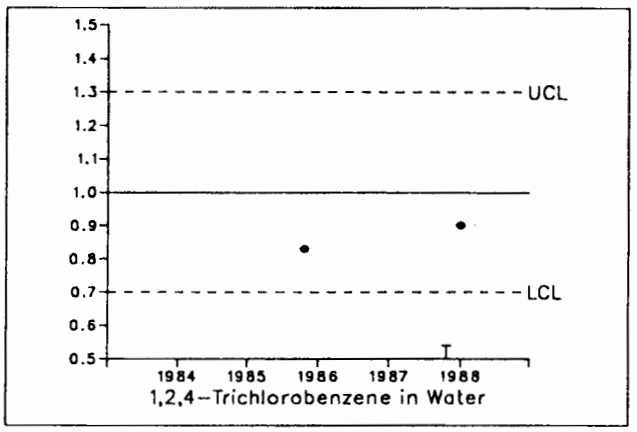
0.7
0.6
0.5
UCL
LCL
1984
1985
1986
1987
1988
Toluene in Water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1.2
1.1
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0.9
0.8
0.7
0.6
0.5
UCL
LCL
1984
1985
1986
1987
1988
1,2,4-Trichlorobenzene in Water

Fig. C-3. (cont)

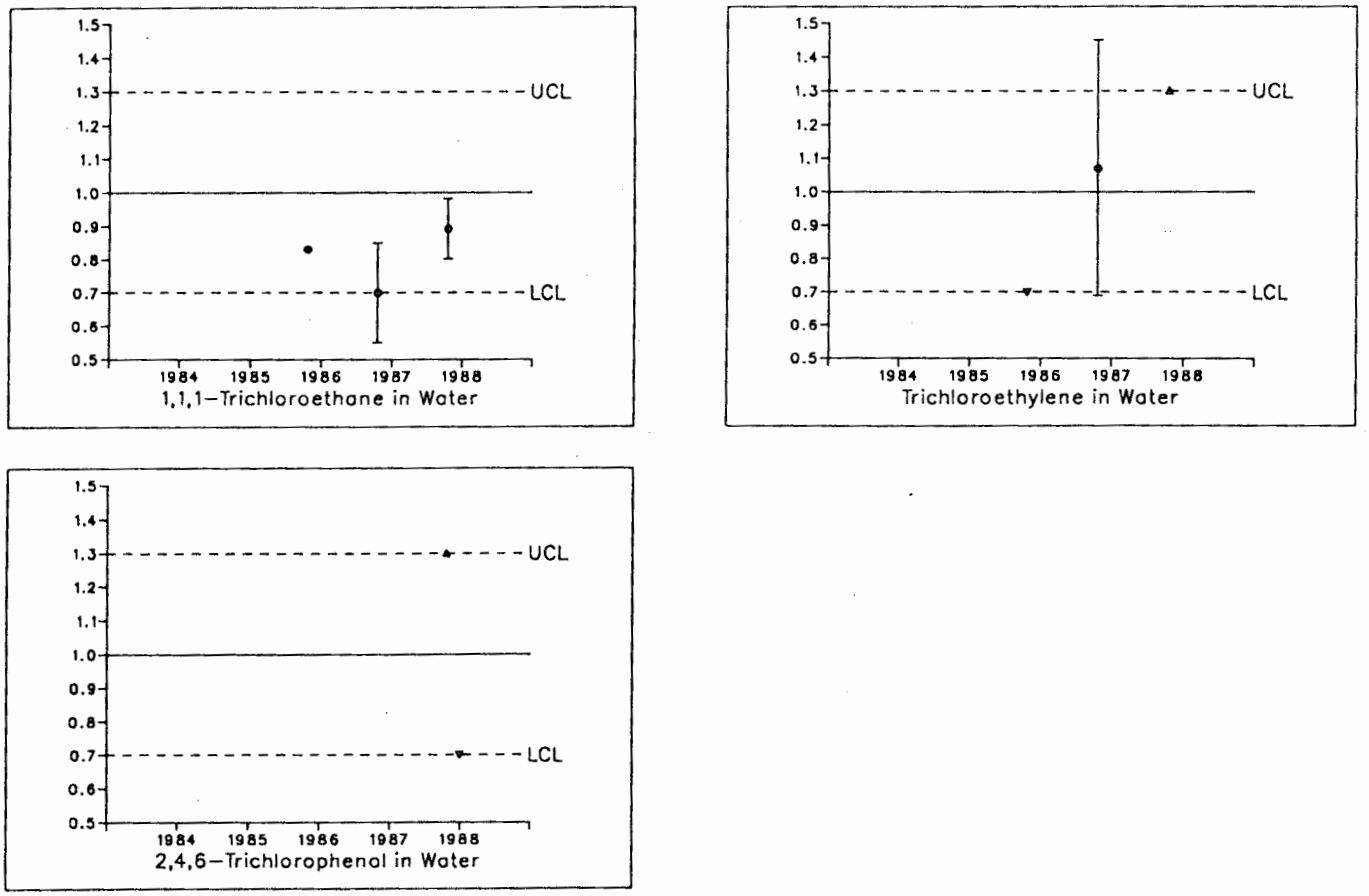


Fig. C-3. (cont)

NOTE: Δ ∇ indicates data points beyond the ± 3 σ control limits.

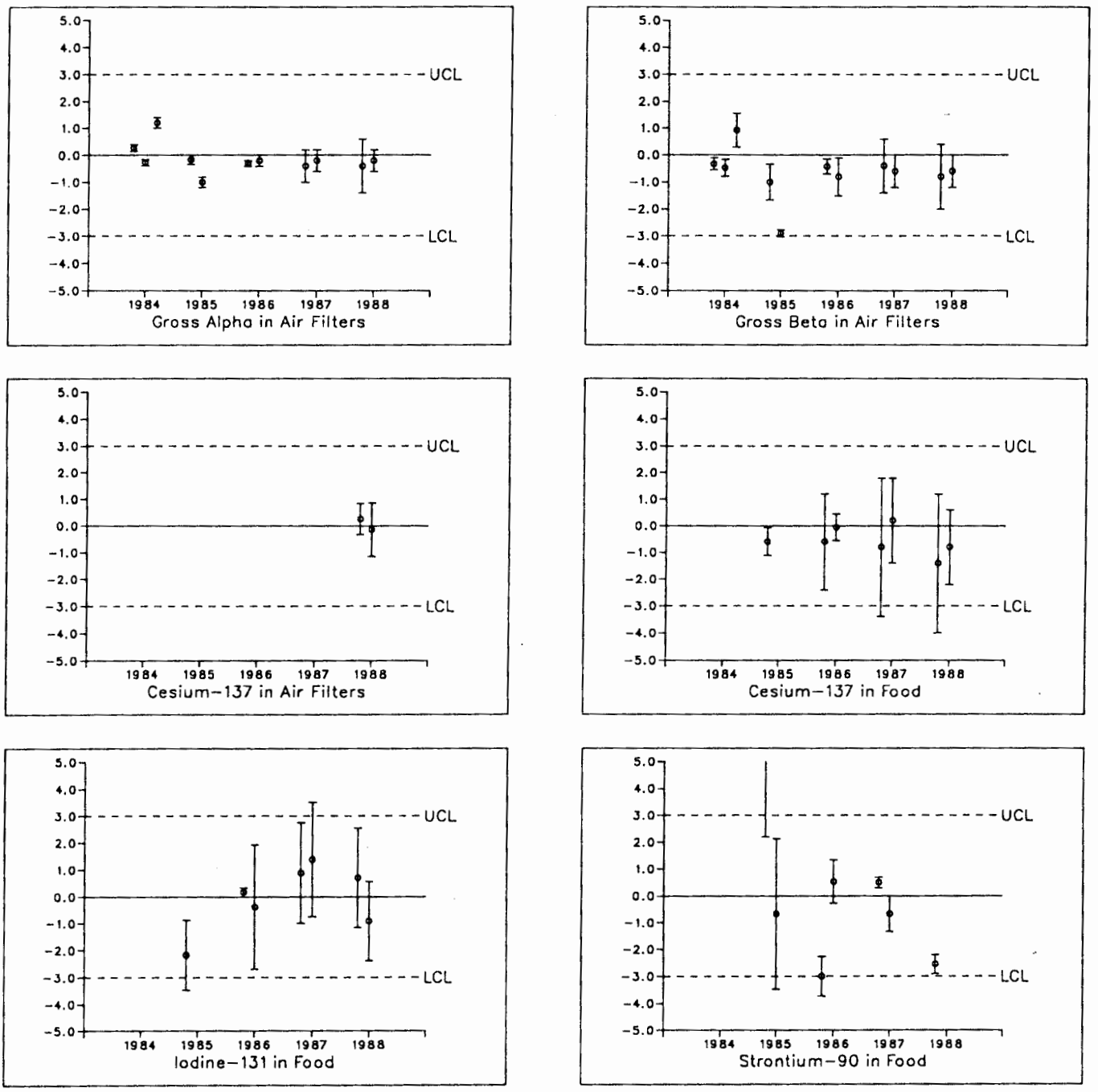
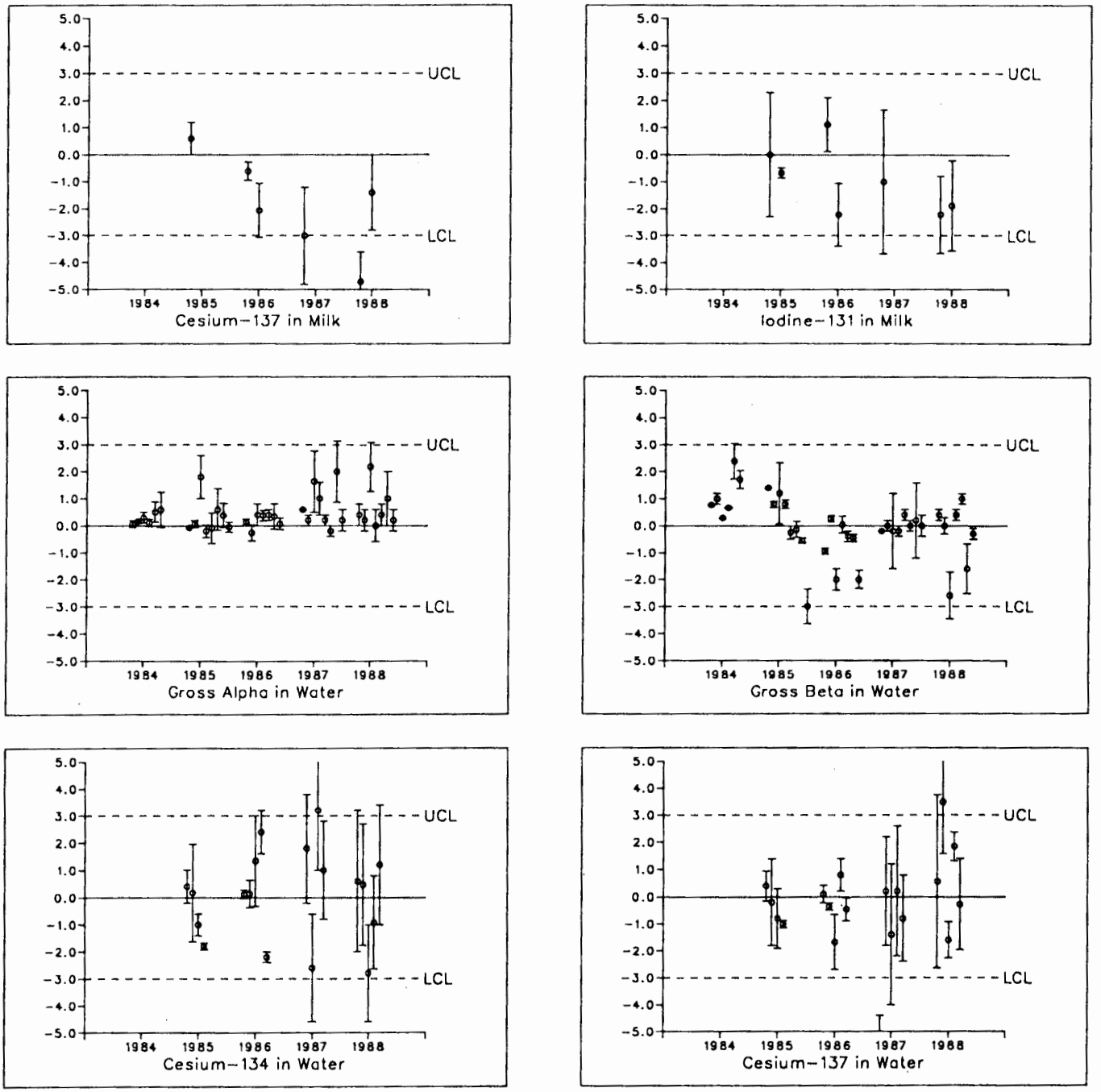


Fig. C-4. Five-year trends in EPA radiochemical quality assurance program for air filters, food, water, and milk.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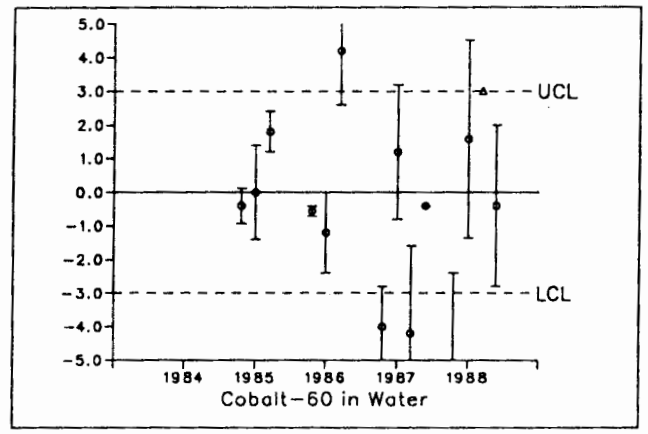
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Cesium-137 in Milk
Iodine-131 in Milk
Gross Alpha in Water
Gross Beta in Water
Cesium-134 in Water
Cesium-137 in Water

Fig. C-4. (cont)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2.0
1.0
0.0
-1.0
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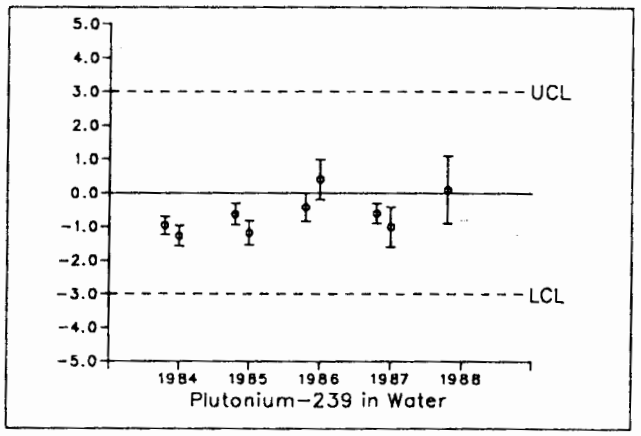
-3.0
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Cobalt-60 in Water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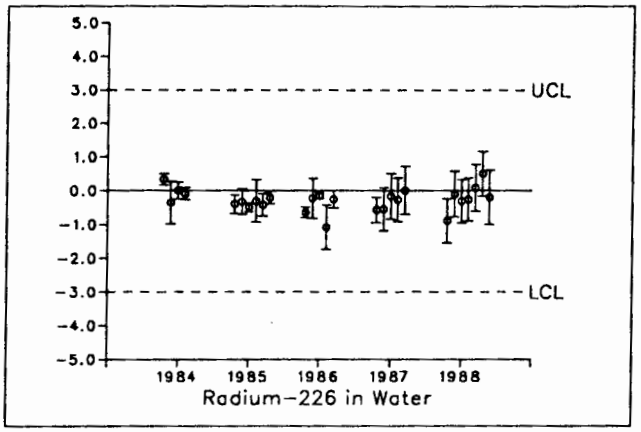
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Plutonium-239 in Water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-5.0
UCL
LCL
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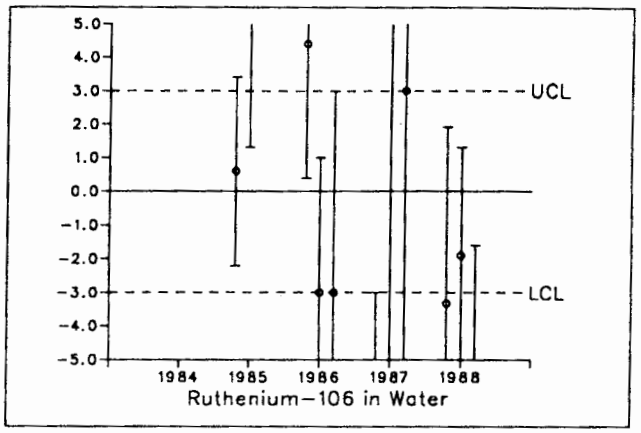
1985
1986
1987
1988
Radium-226 in Water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1.0
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-4.0
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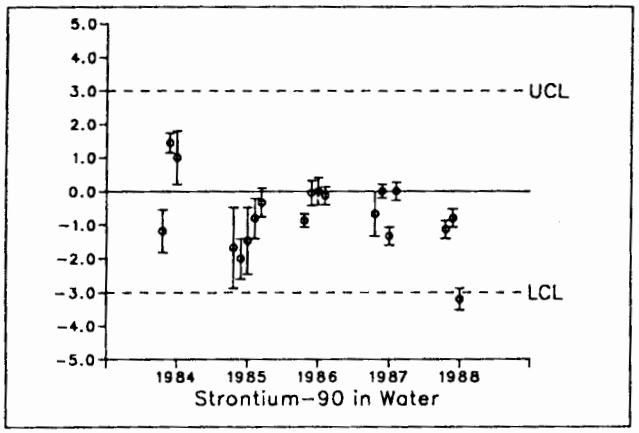
UCL
LCL
1984
1985
1986
1987
1988
Ruthenium-106 in Water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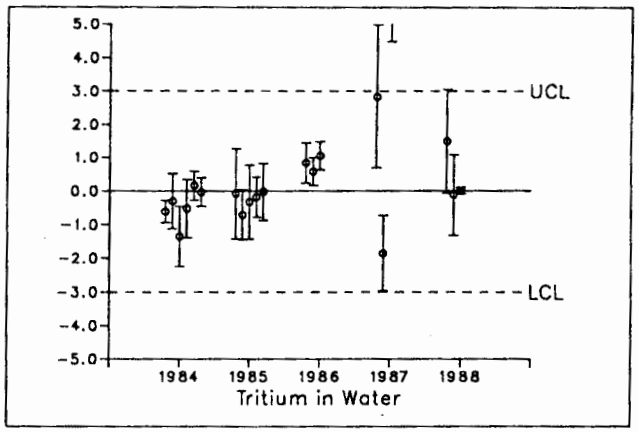
UCL
LCL
1984
1985
1986
1987
1988
Strontium-90 in Water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4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
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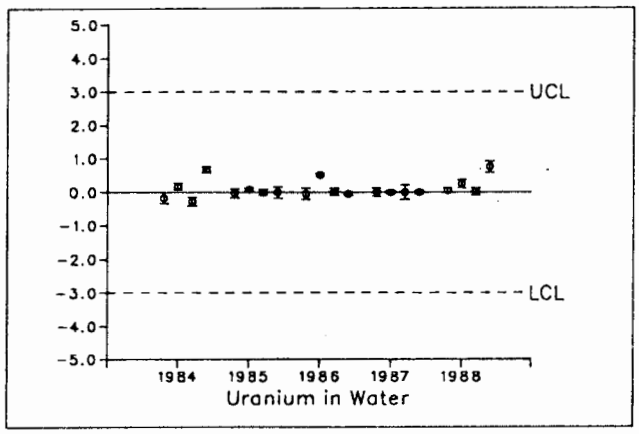
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Tritium in Water

Fig. C-4. (cont)



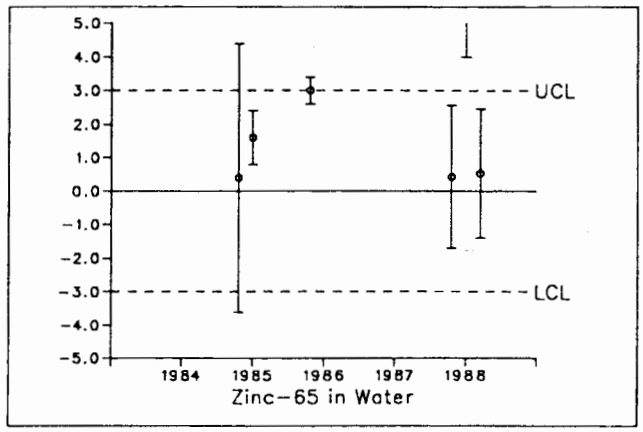


Fig. C-4. (cont)

Note: The position of each data point is determined by dividing the difference between the HSE-9 and agency values by the expected standard deviation given by the agency. The size of the error bar is determined by dividing the HSE-9 standard deviation by the agency standard deviation. In most cases, the HSE-9 mean is within one standard deviation of the agency value and our error bars overlap the agency mean value. For environmental levels of radioactivity, this record is good.

Δ ∇ indicates data points beyond the $\pm$ 3 σ control limits.

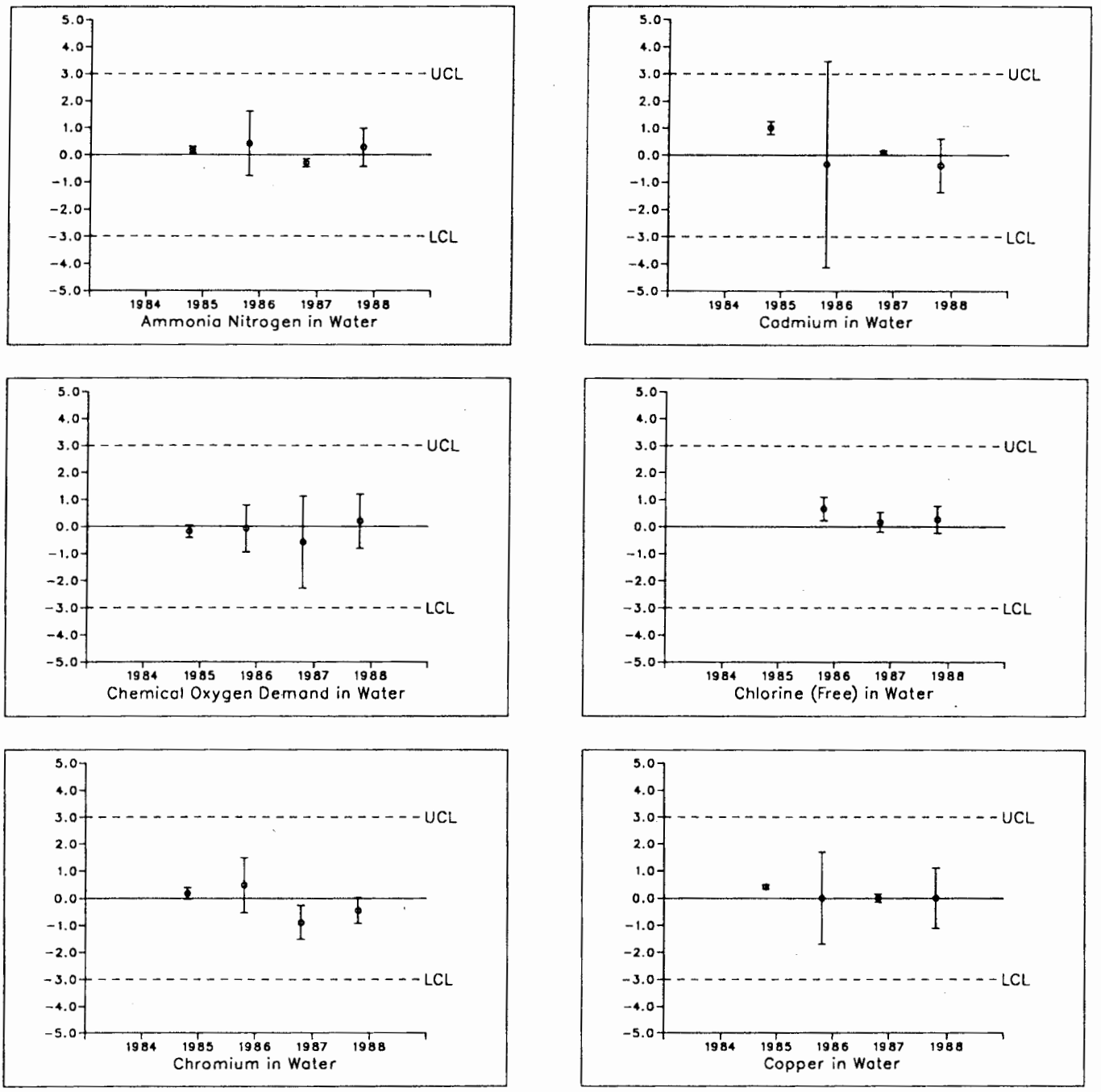
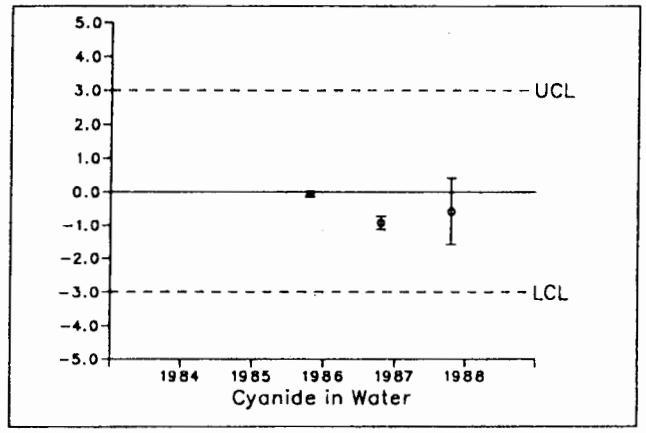


Fig. C-5. Five-year trends in National Pollutant Discharge Elimination System quality assurance program for industrial and municipal wastewaters.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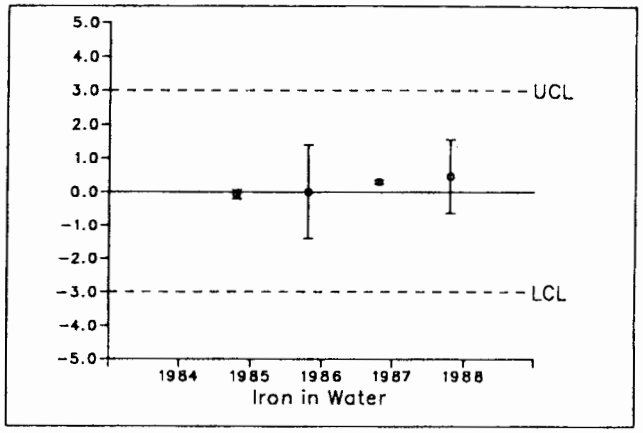
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Cyanide in Water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4.0
3.0
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1.0
0.0
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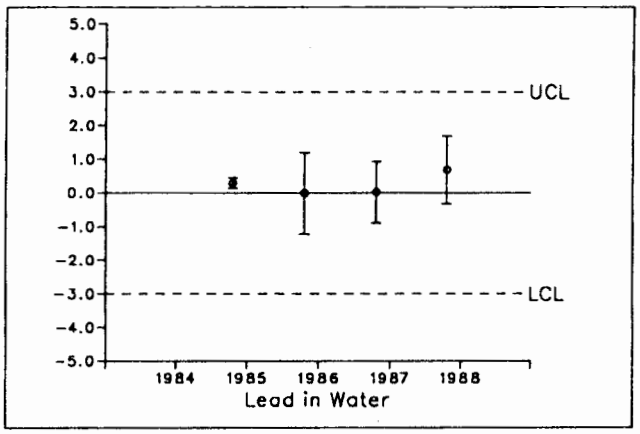
-3.0
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Iron in Water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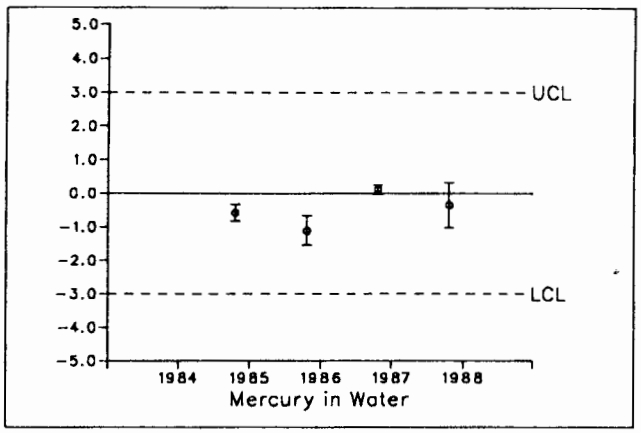
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Lead in Water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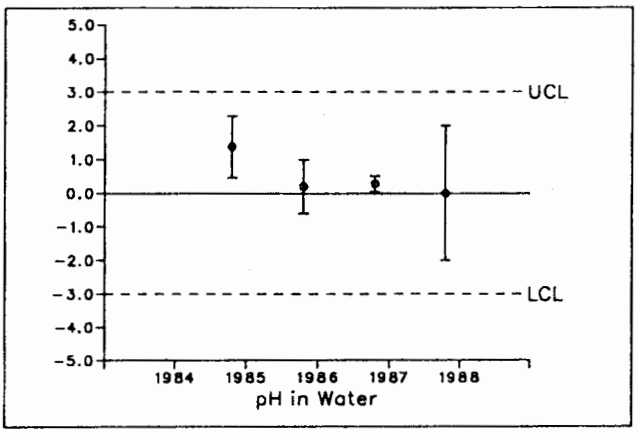
UCL
LCL
1984
1985
1986
1987
1988
Mercury in Water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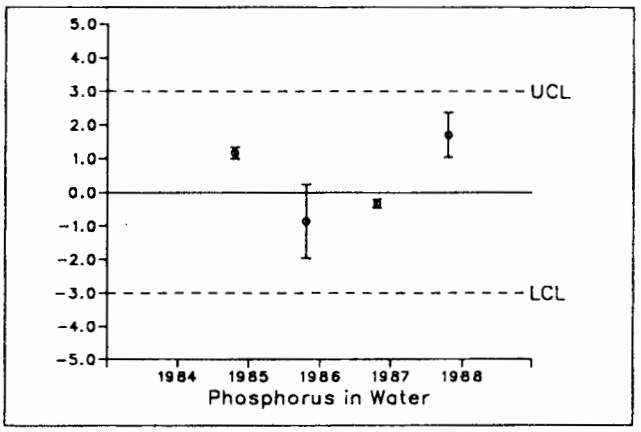
LCL
1984
1985
1986
1987
1988
pH in Water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0.0
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-2.0
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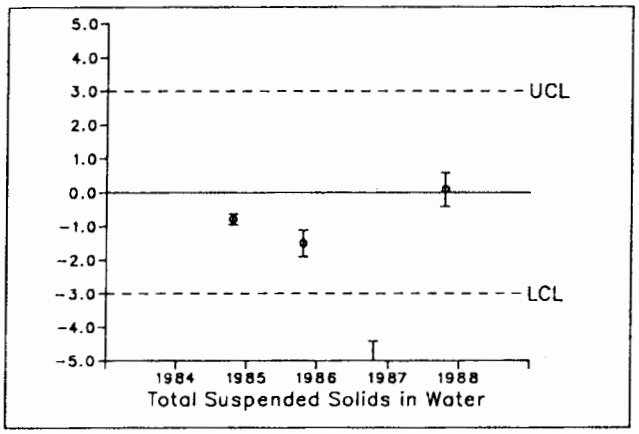
UCL
LCL
1984
1985
1986
1987
1988
Phosphorus in Water

Fig. C-5. (cont)



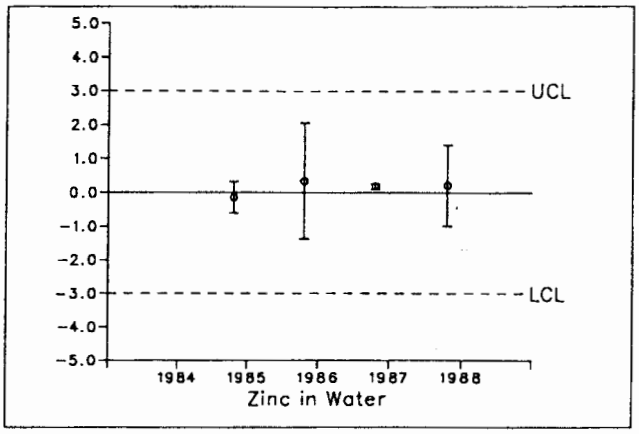


Fig. C-5. (cont)

Note: The position of each data point is determined by dividing the difference between the HSE-9 and agency values by the expected standard deviation given by the agency. The size of the error bar is determined by dividing the HSE-9 standard deviation by the agency standard deviation. In most cases, the HSE-9 mean is within one standard deviation of the agency value and our error bars overlap the agency mean value.

Δ ∇ indicates data points beyond the $\pm$ 3 σ control limits.

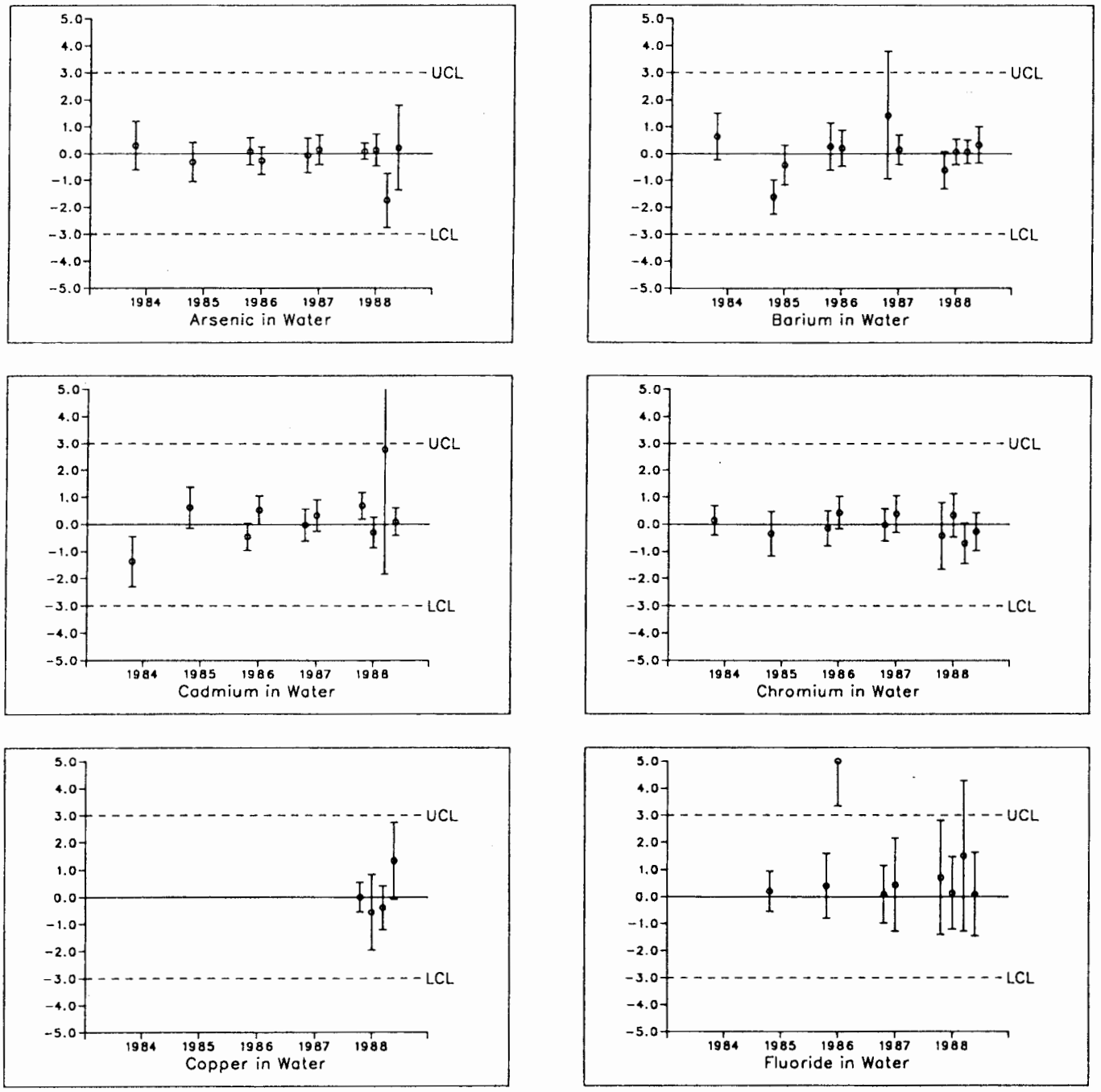
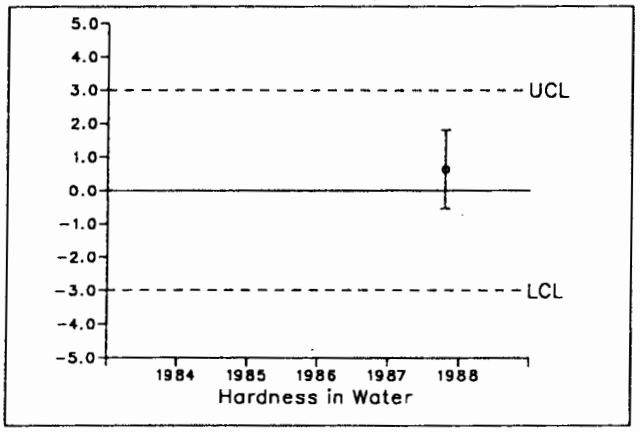


Fig. C-6. Five-year trends in EPA Water Supply Performance Evaluation Studies.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3.0
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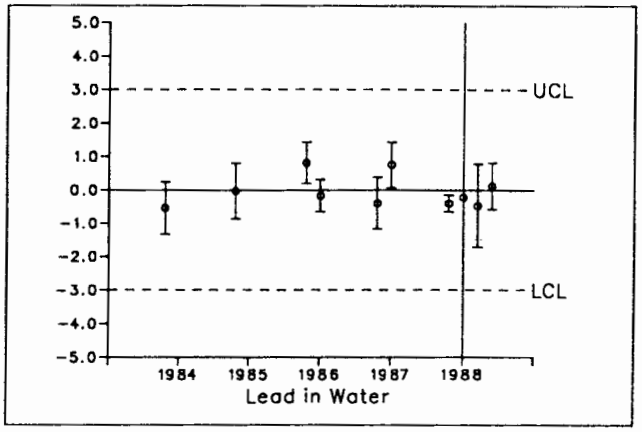
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Hardness in Water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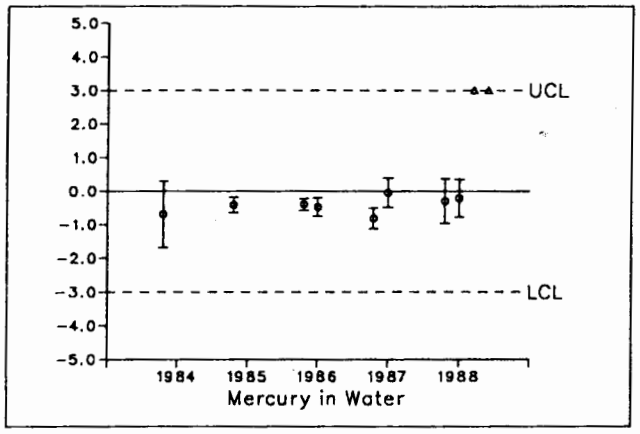
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Lead in Water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1.0
0.0
-1.0
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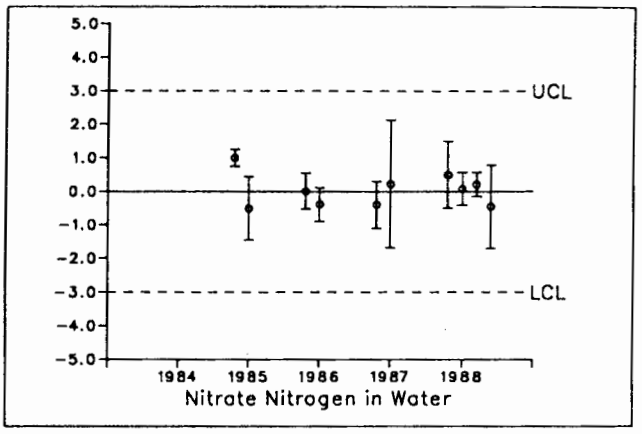
UCL
LCL
1984
1985
1986
1987
1988
Mercury in Water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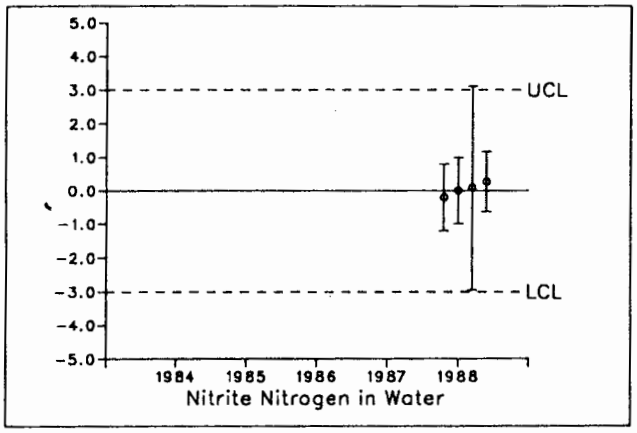
UCL
LCL
1984
1985
1986
1987
1988
Nitrate Nitrogen in Water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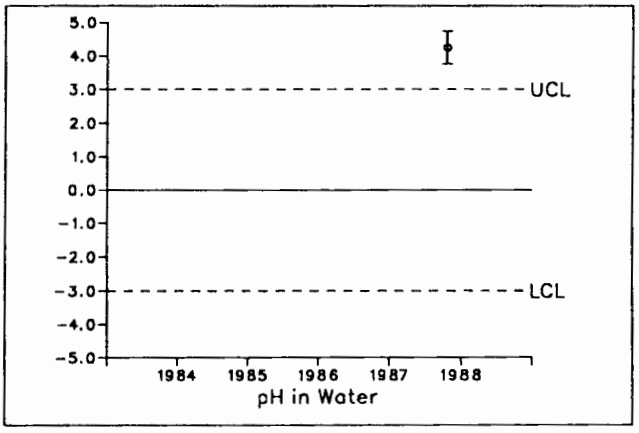
UCL
LCL
1984
1985
1986
1987
1988
Nitrite Nitrogen in Water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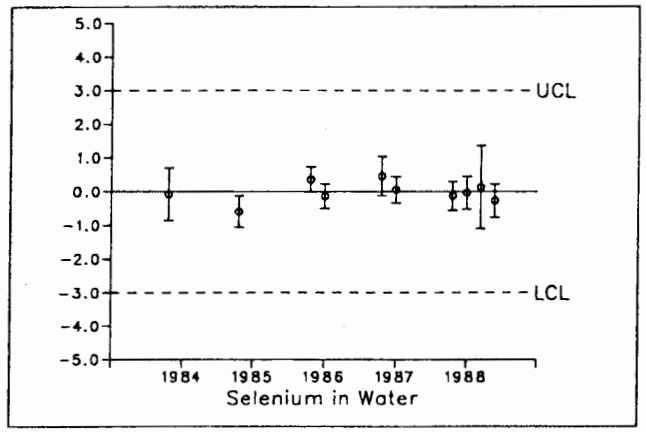
UCL
LCL
1984
1985
1986
1987
1988
pH in Water

Fig. C-6. (cont)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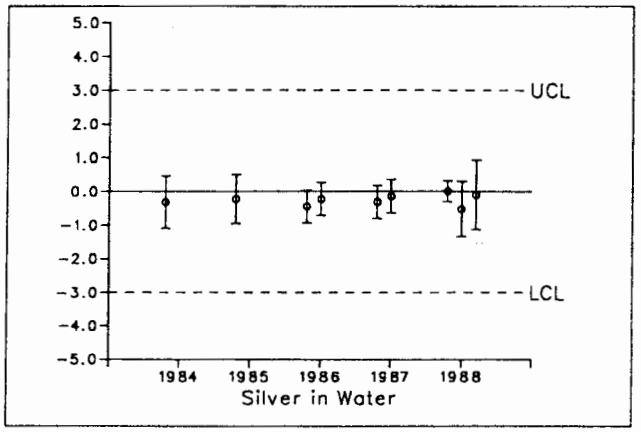
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Selenium in Water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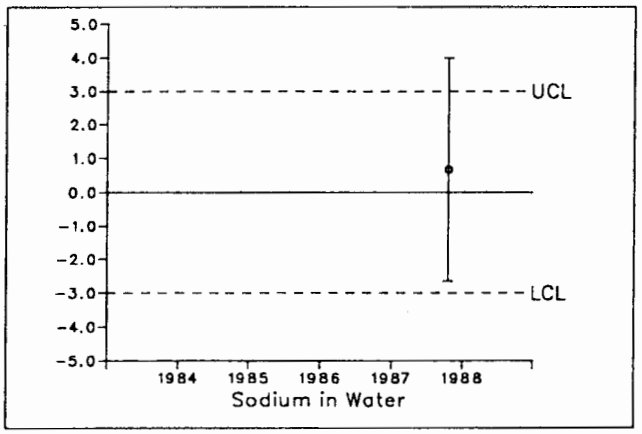
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Silver in Water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1.0
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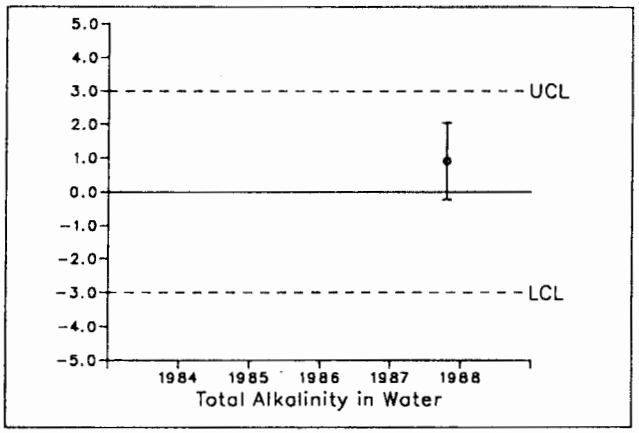
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Sodium in Water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3.0
2.0
1.0
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-2.0
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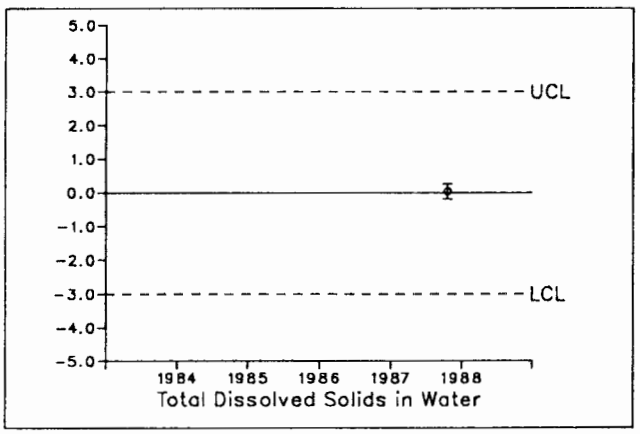
UCL
LCL
1984
1985
1986
1987
1988
Total Alkalinity in Water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-2.0
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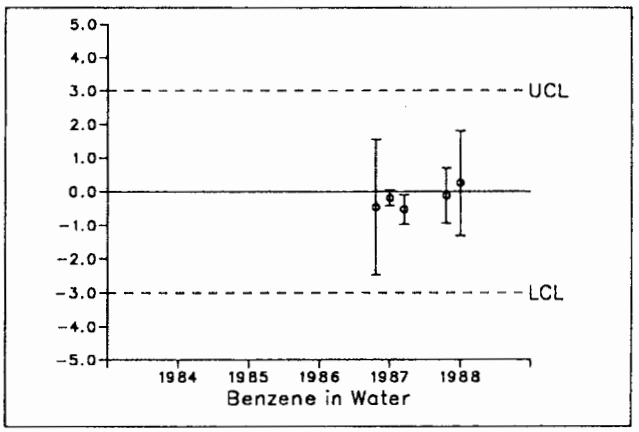
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Total Dissolved Solids in Water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1.0
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-2.0
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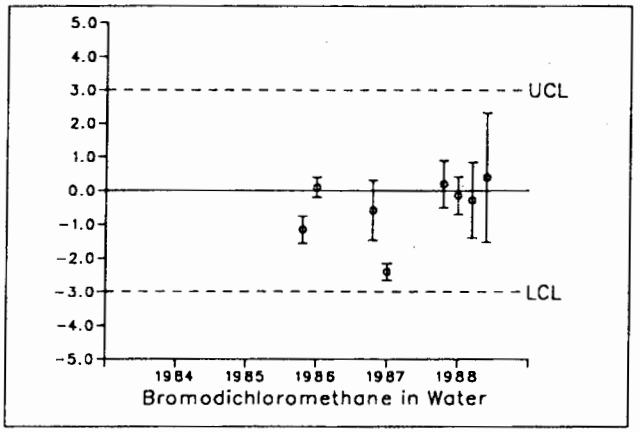
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Benzene in Water

Fig. C-6. (cont)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1.0
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-2.0
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-4.0
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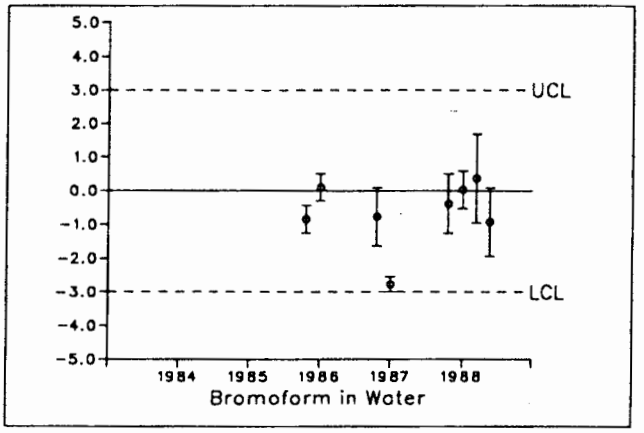
UCL
LCL
1984
1985
1986
1987
1988
Bromodichloromethane in Water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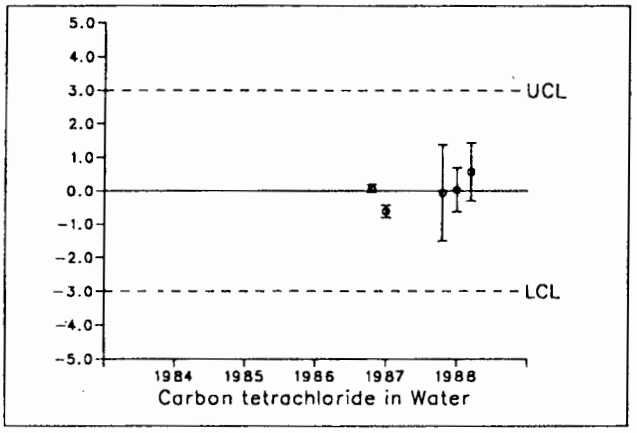
UCL
LCL
1984
1985
1986
1987
1988
Bromoform in Water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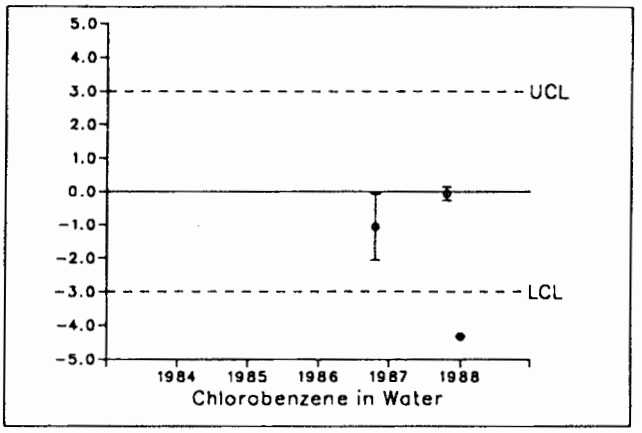
UCL
LCL
1984
1985
1986
1987
1988
Carbon tetrachloride in Water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2.0
1.0
0.0
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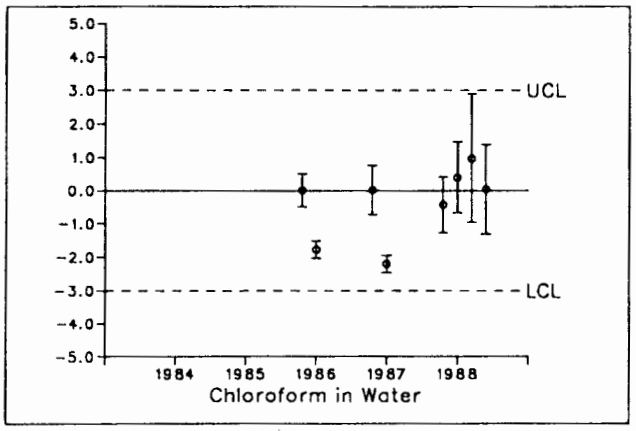
-2.0
-3.0
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Chlorobenzene in Water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2.0
1.0
0.0
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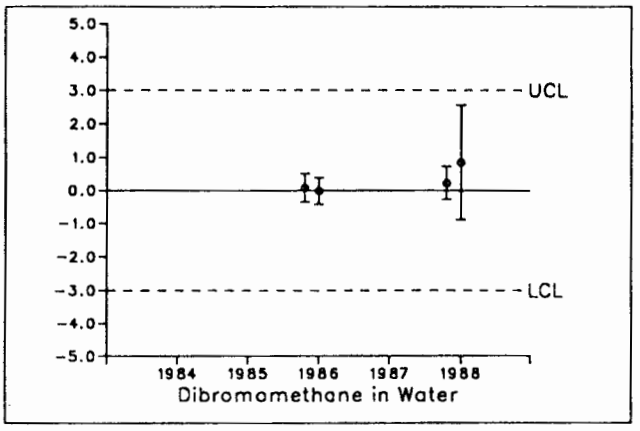
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Chloroform in Water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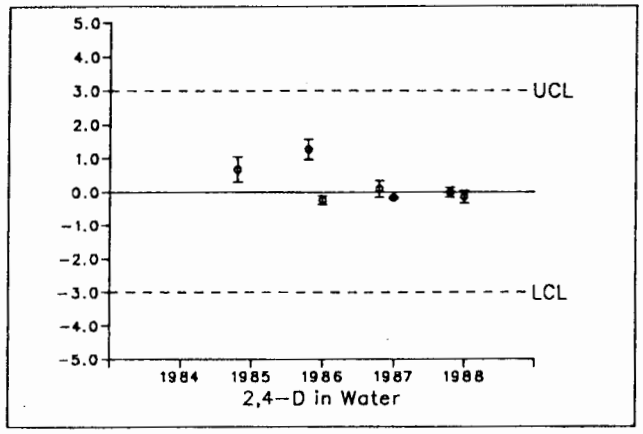
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Dibromomethane in Water

Fig. C-6. (cont)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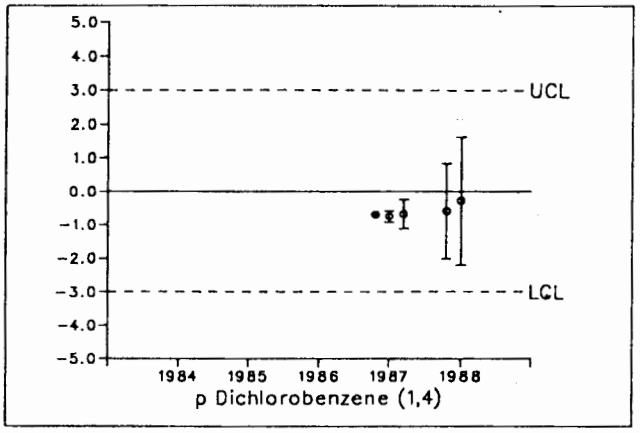
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
2,4-D in Water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1.0
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-1.0
-2.0
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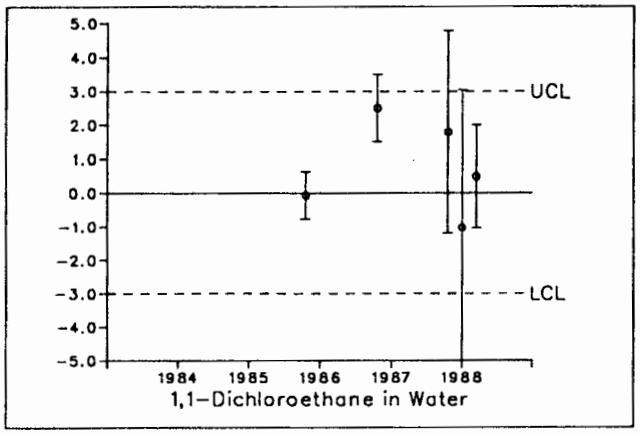
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
p Dichlorobenzene (1,4)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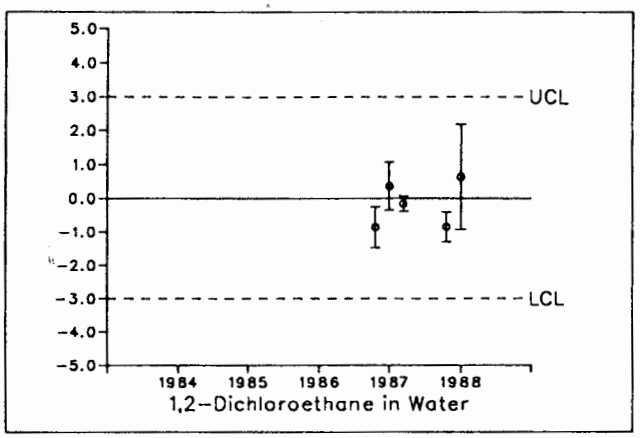
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
1,1-Dichloroethane in Water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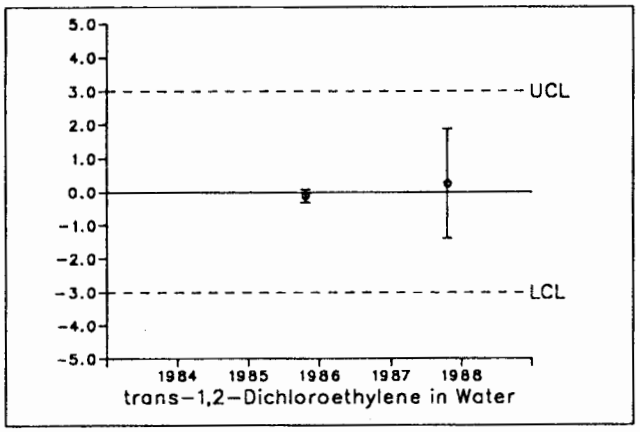
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
1,2-Dichloroethane in Water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4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
trans-1,2-Dichloroethylene in Water

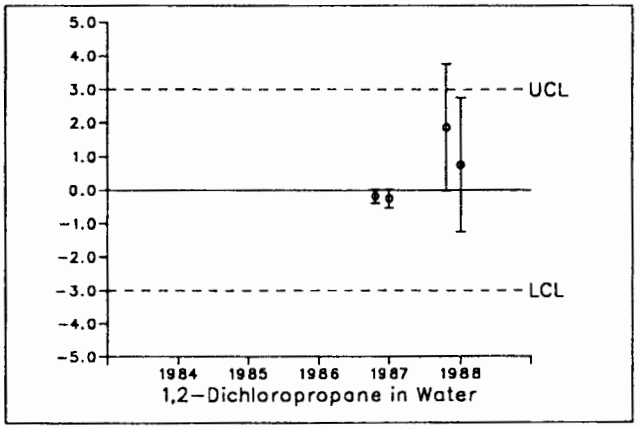
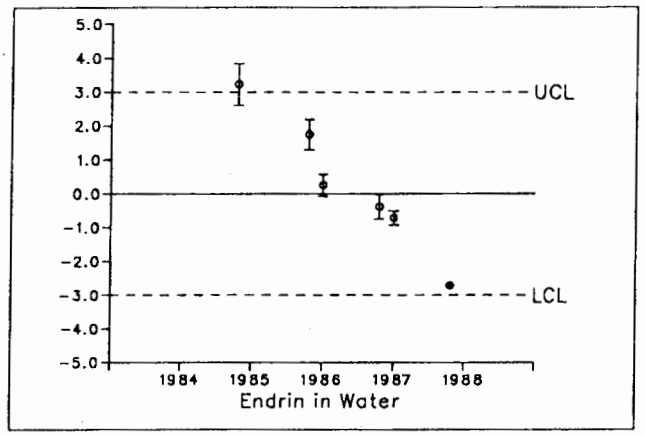

5.0
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
1,2-Dichloropropane in Water

Fig. C-6. (cont)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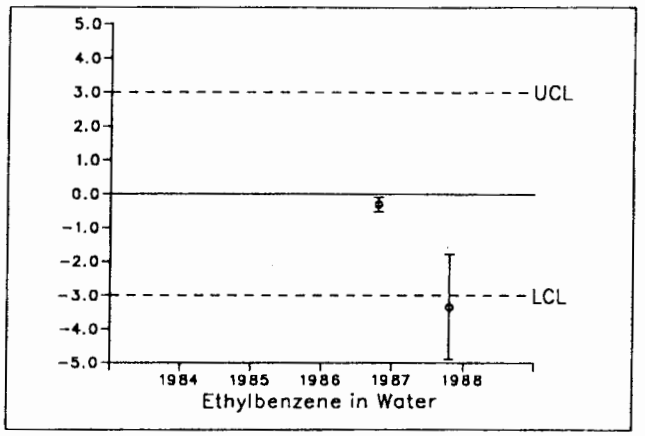
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Endrin in Water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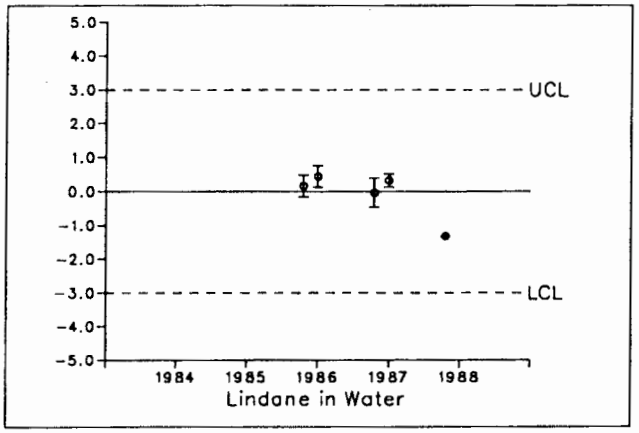
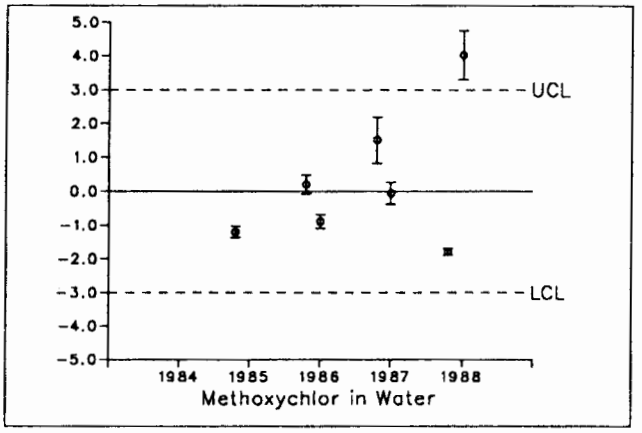
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Ethylbenzene in Water


5.0
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Lindane in Water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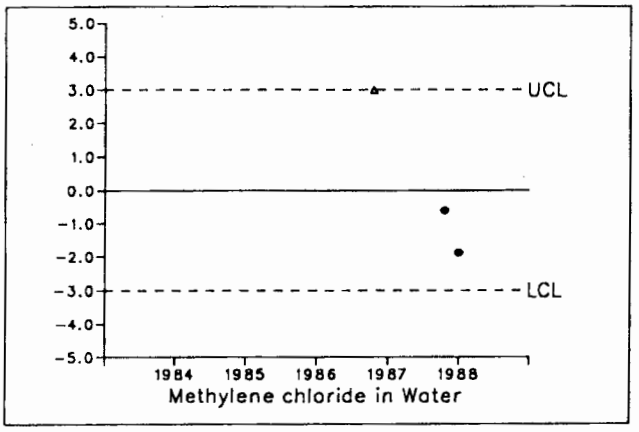
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Methoxychlor in Water


5.0
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Methylene chloride in Water

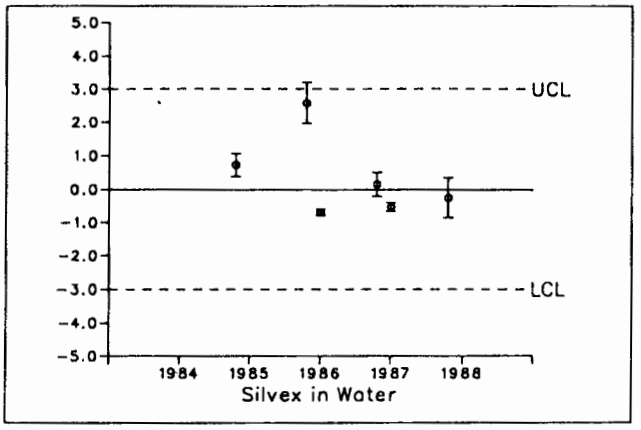

5.0
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
UCL
LCL
1984
1985
1986
1987
1988
Silvex in Water

Fig. C-6. (cont)

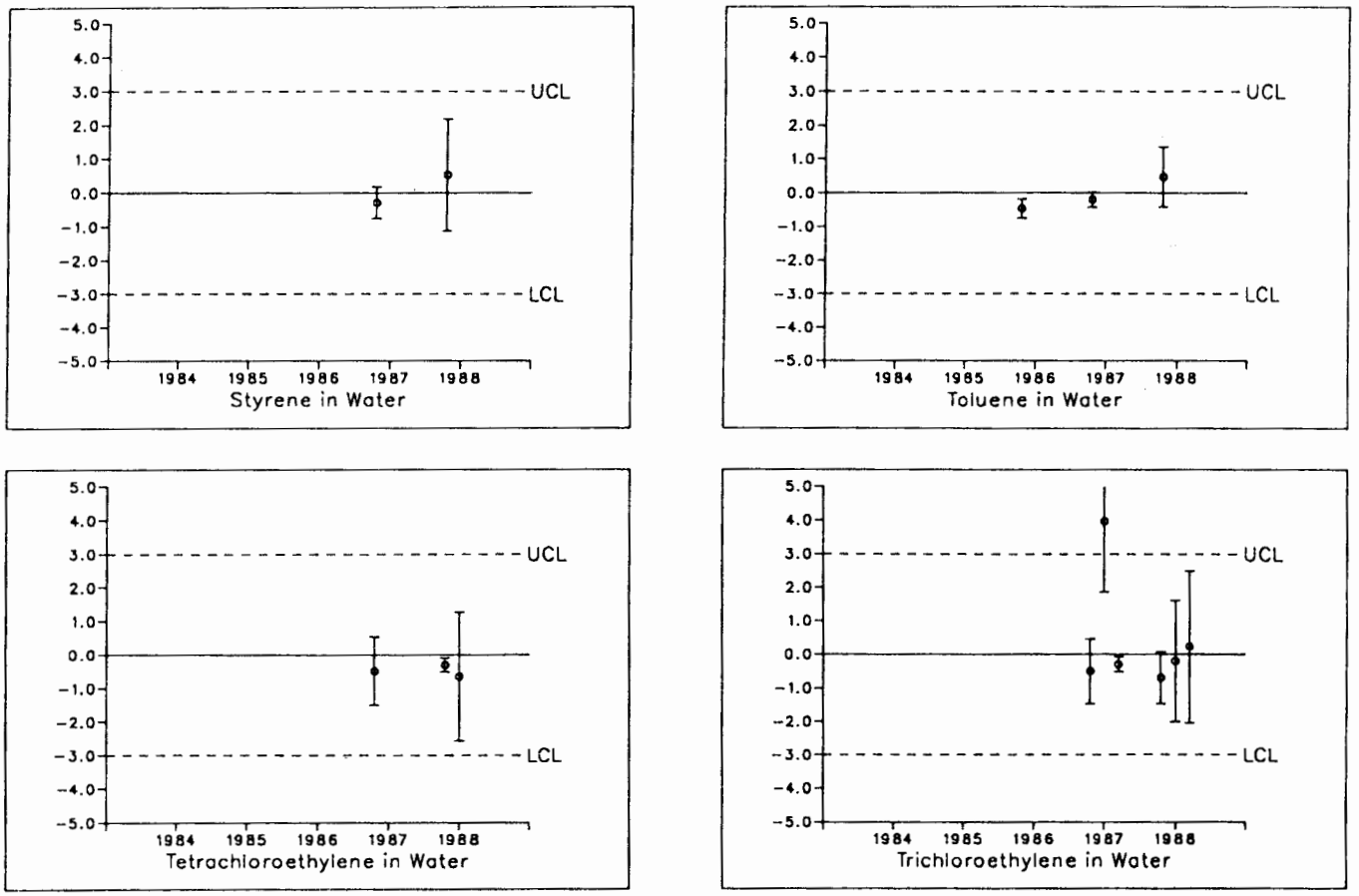


Fig. C-6. (cont)

Note: The position of each data point is determined by dividing the difference between the HSE-9 and agency values by the expected standard deviation given by the agency. The size of the error bar is determined by dividing the HSE-9 standard deviation by the agency standard deviation. In most cases, the HSE-9 mean is within one standard deviation of the agency value and our error bars overlap the agency mean value.

Δ ∇ indicates data points beyond the ± 3 σ control limits.

APPENDIX D

SUMMARY OF ANALYSES COMPLETED BY HSE-9 IN 1988

TABLE D-I

RADIOCHEMICAL ANALYSES COMPLETED BY HSE-9 IN 1988

ANALYSIS	SILICATE	SLUDGE	WATER	BIOLOGICAL	FILTER	BULK	TUBE	BIOASSAY	TISSUE	TOTAL
Alpha	9	23	2024	-	92	112	-	-	-	2260
Am-241	121	22	579	199	104	-	-	35	497	1557
Be-7	10	-	61	32	5	-	-	-	-	108
Beta	9	4	1733	-	91	111	-	-	-	1948
Co-56	-	2	54	-	-	-	-	-	-	56
Co-57	42	7	178	32	5	-	-	-	-	264
Co-58	-	4	75	-	-	-	-	-	-	79
Co-60	35	6	155	-	5	-	-	-	-	201
Cr-51	-	1	9	-	-	-	-	-	-	10
Cs-134	42	-	117	-	5	-	-	-	-	164
Cs-137	319	2	357	220	10	-	-	-	-	908
Gamma	477	6	1215	107	-	83	-	-	-	1888
Gamma Scan	-	-	7	-	-	-	-	-	-	7
H-3	111	4	1561	32	-	-	-	2292	-	4000
I-131	-	-	-	12	-	-	-	-	-	12
I-133	-	-	8	-	-	-	-	-	-	8
K-40	5	-	-	-	-	-	-	-	-	5
Mn-52	-	-	3	-	-	-	-	-	-	3
Mn-54	10	6	160	32	5	-	-	-	-	213
Na-22	10	-	95	32	-	-	-	-	-	137
Nb-94	-	-	2	-	-	-	-	-	-	2
Nb-95	-	7	87	-	-	-	-	-	-	94
Pu-238	495	27	339	239	175	-	-	2015	461	3751
Pu-239	498	27	350	250	179	-	-	2014	461	3779
Pu-240	-	-	1	-	-	-	-	-	-	1
Ra-226	7	-	55	5	-	-	-	-	-	67
Rb-83	10	-	1	32	-	-	-	-	-	43
Ru-106	-	-	10	-	-	-	-	-	-	10
Sc-46	-	-	16	-	-	-	-	-	-	16
Sc-48	-	-	4	-	-	-	-	-	-	4
Se-75	32	8	175	-	-	-	-	-	-	215
Sn-113	-	6	69	-	-	-	-	-	-	75
Sr-85	-	6	120	-	-	-	-	-	-	126
Sr-89	-	-	60	-	-	-	-	-	-	60
Sr-90	87	-	92	47	2	-	-	-	-	228
Th-232	-	-	1	-	-	-	-	-	-	1
U-234	-	27	77	-	-	-	-	-	-	104
U-235	-	28	77	-	-	-	-	607	-	712
U-235/238	681	-	344	142	7	3	-	-	-	1177
U-238	-	-	2	-	-	-	-	870	-	872
Xe-133	-	-	3	-	-	-	-	-	-	3
Y-88	-	3	24	-	-	-	-	-	-	27
Zn-65	-	6	44	-	-	-	-	-	-	50

TOTAL RADIOCHEMICAL ANALYSES 25245

TABLE D-II

INORGANIC ANALYSES COMPLETED BY HSE-9 IN 1988

ANALYSIS	SILICATE	SLUDGE	WATER	BIOLOGICAL	FILTER	BULK	TUBE	BIOASSAY	TISSUE	TOTAL
Ag	44	83	798	1	13	222	-	-	-	1161
Al	825	1	100	43	8	2	-	-	-	979
As	86	17	778	86	51	152	-	-	-	1170
Au	6	-	81	1	13	-	-	-	-	101
B	6	1	144	68	13	2	-	-	-	234
Ba	1214	18	759	1	132	211	-	-	-	2335
Be	461	1	402	179	612	6	-	-	-	1661
Bi	6	1	93	1	13	2	-	-	-	116
Br	11	1	89	1	17	117	-	-	-	236
Ca	822	-	236	38	-	2	-	-	-	1098
Cd	192	54	877	94	60	217	-	-	-	1494
Ce	407	1	87	1	13	2	-	-	-	511
Cl	793	-	307	38	5	116	-	-	-	1259
Cl2	-	-	7	-	-	-	-	-	-	7
CN	-	-	367	-	-	-	-	-	-	367
CN(Free)	-	-	10	-	-	-	-	-	-	10
Co	380	1	132	1	13	8	-	-	-	535
CO2	600	-	-	-	-	6	-	-	-	606
Chem O2 Demand	-	2	449	-	-	-	-	-	-	451
Conductivity	-	-	225	-	-	-	-	-	-	225
Cr	438	75	1027	68	22	198	-	-	-	1828
Cr(+6)	-	-	358	-	-	1	-	-	-	359
Cs	368	1	87	19	13	2	-	-	-	490
Cu	652	1	858	2	49	5	-	-	-	1567
Dy	794	1	87	1	13	2	-	-	-	898
Er	6	1	87	1	13	2	-	-	-	110
Eu	615	1	87	1	13	2	-	-	-	719
F	86	-	325	77	6	116	-	-	-	610
Fe	377	1	798	1	13	5	-	-	-	1195
Flash Point	-	-	3	-	-	124	-	-	-	127
Ga	395	1	87	1	42	4	-	-	-	530
Gd	6	1	87	1	13	2	-	-	-	110
Ge	6	1	87	1	13	2	-	-	-	110
H2O	-	-	-	-	-	2	-	-	-	2
H2O+	20	-	-	-	-	-	-	-	-	20
H2O-	21	-	-	-	-	-	-	-	-	21
Hardness	-	-	84	-	-	-	-	-	-	84
Heat Capacity	-	-	-	2	-	65	-	-	-	67
Hf	416	1	87	1	13	2	-	-	-	520
Hg	42	67	749	56	14	182	-	-	-	1110
Ho	6	1	87	1	13	2	-	-	-	110
I	301	1	89	1	17	118	-	-	-	527
Identification	-	-	1	-	1	2	-	-	-	4
In	723	1	87	1	13	2	-	-	-	827
Ir	6	1	87	1	13	2	-	-	-	110
K	874	-	229	38	-	2	-	-	-	1143
La	125	1	87	1	13	2	-	-	-	229
Li	166	1	160	17	13	4	-	-	-	361
Lu	69	1	87	1	13	2	-	-	-	173

TABLE D-II (cont)

ANALYSIS	SILICATE	SLUDGE	WATER	BIOLOGICAL	FILTER	BULK	TUBE	BIOASSAY	TISSUE	TOTAL
Mg	829	1	268	39	8	4	-	-	-	1149
Mn	829	1	275	39	13	2	-	-	-	1159
Mo	6	1	208	43	13	3	-	-	-	274
N2	-	-	-	-	-	1	-	-	-	1
N2H4	-	-	-	-	-	1	-	-	-	1
N2O	-	-	-	-	-	5	-	-	-	5
Na	920	1	361	39	16	4	-	-	-	1341
Na2S2O3.5H2O	-	-	-	-	-	1	-	-	-	1
Nb	6	1	86	1	13	2	-	-	-	109
Nd	6	1	97	1	13	2	-	-	-	120
NH3(Free)	-	-	4	-	-	-	-	-	-	4
NH3-N	-	-	612	-	-	-	-	-	-	612
NH4Cl	-	-	-	-	-	1	-	-	-	1
NH4NO3	-	-	-	-	-	1	-	-	-	1
(NH4)2SO4	-	-	-	-	-	1	-	-	-	1
Ni	344	2	450	1	13	134	-	-	-	944
Nickel sulfamate	-	-	-	-	-	3	-	-	-	3
Nitrogen/Oxygen	-	-	-	-	-	1	-	-	-	1
NO2	-	-	-	-	-	6	-	-	-	6
NO2-N	-	-	117	-	-	-	-	-	-	117
NO3-N	-	-	472	-	-	-	-	-	-	472
Normality	-	-	69	-	-	-	-	-	-	69
O2	-	-	-	-	-	6	-	-	-	6
O3	-	-	1	-	-	-	-	-	-	1
Oil/Grease	-	-	12	-	-	-	-	-	-	12
Os	6	1	86	1	13	1	-	-	-	108
P	5	1	517	1	8	2	-	-	-	534
P Alkalinity	-	-	159	-	-	-	-	-	-	159
Pb	727	92	1054	175	191	249	-	-	-	2488
Pd	6	1	87	1	13	2	-	-	-	110
pH	-	5	1657	-	-	72	-	-	-	1734
Phase	-	-	1	-	-	13	-	-	-	14
PO4-P	-	-	122	-	-	-	-	-	-	122
Pr	6	1	87	1	13	2	-	-	-	110
Pt	6	1	87	1	13	2	-	-	-	110
Rb	394	1	87	1	13	2	-	-	-	498
Re	6	1	87	1	13	2	-	-	-	110
Rh	6	1	87	1	13	2	-	-	-	110
Ru	6	1	87	1	13	2	-	-	-	110
S	1025	-	3	43	4	118	-	-	-	1193
Salinity	-	-	2	-	-	-	-	-	-	2
Sb	309	1	178	1	18	2	-	-	-	509
Sc	416	1	86	1	76	2	-	-	-	582
Se	33	19	848	34	21	160	-	-	-	1115
Si	359	-	166	86	-	-	-	-	-	611
Sm	701	1	87	1	13	2	-	-	-	805
Sn	6	1	119	1	15	2	-	-	-	144
SO2	-	-	-	-	-	6	-	-	-	6
SO3	-	-	82	-	-	-	-	-	-	82
SO4	-	-	309	-	1	-	-	-	-	310
Solids	-	19	-	-	-	-	-	-	-	19

TABLE D-II (cont)

ANALYSIS	SILICATE	SLUDGE	WATER	BIOLOGICAL	FILTER	BULK	TUBE	BIOASSAY	TISSUE	TOTAL
Specific Gravity	-	5	2	-	-	-	-	-	-	7
Sr	653	1	96	1	13	2	-	-	-	766
Ta	361	1	88	1	13	2	-	-	-	466
Total Alkalinity	-	-	267	-	-	-	-	-	-	267
Tb	122	1	87	1	13	2	-	-	-	226
Total Cations	-	-	40	-	-	-	-	-	-	40
Tot Dis Solids	-	-	185	-	-	-	-	-	-	185
Te	6	1	86	1	13	2	-	-	-	109
Th	725	1	193	5	14	2	-	-	-	940
Ti	799	1	117	2	18	2	-	-	-	939
Tl	7	6	372	1	96	119	-	24	-	625
Tm	6	1	88	1	13	2	-	-	-	111
Tot Org Carbon	-	-	26	-	-	-	-	-	-	26
Total Org Halides	-	-	11	-	-	-	-	-	-	11
Tot Susp Solids	-	-	392	-	-	-	-	-	-	392
Turbidity	-	-	5	-	-	-	-	-	-	5
U	1658	1	607	308	176	2	-	141	-	2893
V	839	1	154	43	13	2	-	-	-	1052
W	408	1	88	43	13	3	-	-	-	556
Y	6	1	87	1	13	2	-	-	-	110
Yb	399	1	87	1	13	2	-	-	-	503
Zn	297	1	611	2	74	68	-	-	-	1053
Zr	6	1	87	1	13	2	-	-	-	110

TOTAL INORGANIC ANALYSES 58013

(6780 of the 58013 are from MSCAN as shown below: 113 samples x 60 analytes)

ANALYSIS	SILICATE	SLUDGE	WATER	BIOLOGICAL	FILTER	BULK	TUBE	BIOASSAY	TISSUE	TOTAL
Mass Scan	6	1	87	4	13	2	-	-	-	113

TABLE D-III

ORGANIC ANALYSES COMPLETED BY HSE-9 IN 1988

ANALYSIS	SIL	SLU	WAT	BIOL	FIL	BULK	TUBE	BIOA	TIS	TOT
4-(1,1,3,3-Tetramethylbutyl)phenol	-	-	-	-	-	1	-	-	-	1
2-(2-(4-(1,1,3,3-Tetramethylbutyl)phenoxy)-ethoxy)ethanol	-	-	-	-	-	1	-	-	-	1
2-(2-(2-Butoxyethoxy)ethoxy)ethanol	-	-	-	-	-	1	-	-	-	1
1-(2-Methoxy-1-methylethoxy)-2-propanol	-	-	-	-	-	1	-	-	-	1
2-(2-Methoxyethoxy)ethanol	-	-	-	-	-	1	-	-	-	1
Acenaphthene	14	-	102	-	-	4	-	-	-	120
Acenaphthylene	12	-	98	-	-	4	-	-	-	114
Acetic acid	-	-	-	-	-	1	-	-	-	1
Acetone	72	-	151	-	-	55	72	-	-	350
Acetonitrile	-	-	-	-	-	-	11	-	-	11
Acetylene	-	-	-	-	-	6	-	-	-	6
Acrolein	-	-	-	-	-	2	-	-	-	2
Activated carbon	-	-	-	-	-	1	-	-	-	1
Alachlor	-	-	2	-	-	-	-	-	-	2
Alcohols	-	-	-	-	-	2	-	-	-	2
Aldrin	-	-	20	-	-	-	-	-	-	20
Amines	-	-	-	-	-	3	-	-	-	3
Aniline	-	-	4	-	-	-	-	-	-	4
Anthracene	12	-	102	-	-	4	-	-	-	118
Mixed-Aroclor	67	-	2	-	18	276	1	-	-	364
Aroclor 1016	-	-	13	-	-	1	-	-	-	14
Aroclor 1221	-	-	6	-	-	-	-	-	-	6
Aroclor 1232	-	-	12	-	-	-	-	-	-	12
Aroclor 1242	195	-	18	-	2	42	3	-	-	260
Aroclor 1248	-	-	12	-	-	-	-	-	-	12
Aroclor 1254	28	-	16	-	4	21	-	-	-	69
Aroclor 1260	40	-	16	-	5	34	-	-	-	95
Atrazine	-	-	2	-	-	-	-	-	-	2
Azobenzene	-	-	4	-	-	-	-	-	-	4
beta-BHC	-	-	19	-	-	-	-	-	-	19
alpha-BHC	-	-	19	-	-	-	-	-	-	19
delta-BHC	-	-	19	-	-	-	-	-	-	19
Benz(a)anthracene	13	-	99	-	-	4	-	-	-	116
Benzaldehyde	-	-	-	-	-	1	-	-	-	1
Benzene	82	-	152	-	-	7	120	-	-	361
m-Benzidine	-	-	4	-	-	-	-	-	-	4
Benzidine dihydrochloride	-	-	-	-	-	1	-	-	-	1
Benzo(g,h,i)perylene	13	-	102	-	-	4	-	-	-	119
Benzo-a-pyrene	13	-	102	-	-	4	-	-	-	119
Benzo-b-fluoranthene	13	-	102	-	-	4	-	-	-	119
Benzo-k-fluoranthene	13	-	99	-	-	4	-	-	-	116
Benzoic acid	13	-	97	-	-	4	-	-	-	114
Benzyl alcohol	13	-	97	-	-	4	-	-	-	114
Bibenzyl	-	-	-	-	-	3	-	-	-	3
1,1'-Biphenyl	-	-	-	-	-	2	-	-	-	2
Biphenyl-2-ol	-	-	-	-	-	1	-	-	-	1
Bis(2-chloroethoxy)methane	13	-	97	-	-	4	-	-	-	114

TABLE D-III (cont)

ANALYSIS	SIL	SLU	WAT	BIOL	FIL	BULK	TUBE	BIOA	TIS	TOT
Bis(2-chloroethyl)ether	13	-	100	-	-	4	-	-	-	117
Bis(2-chloroisopropyl)ether	13	-	115	-	-	4	-	-	-	132
Bis(2-ethylhexyl) sebacate	-	-	-	-	-	4	6	-	-	10
Bis(2-ethylhexyl)adipate	-	-	2	-	-	-	-	-	-	2
Bis(2-ethylhexyl)phthalate	12	-	104	-	-	5	-	-	-	121
Bromobenzene	21	-	17	-	-	-	-	-	-	38
Bromochloromethane	20	-	16	-	-	-	-	-	-	36
Bromodichloromethane	66	-	154	-	-	-	-	-	-	220
4-Bromofluorobenzene (vol sur #3) also CAS=460004	20	-	13	-	-	-	-	-	-	33
Bromoform	65	-	157	-	-	-	-	-	-	222
Bromomethane	65	-	144	-	-	-	-	-	-	209
4-Bromophenylphenyl ether	13	-	100	-	-	4	-	-	-	117
2-Butanol	-	-	-	-	-	1	-	-	-	1
2-Butanone	65	-	144	-	-	19	-	-	-	228
Butoxy-2-ethanol	-	-	-	-	-	-	3	-	-	3
n-Butyl acetate	-	-	-	-	-	2	-	-	-	2
tert-Butylbenzene	20	-	19	-	-	-	-	-	-	39
n-Butylbenzene	26	-	17	-	-	-	-	-	-	43
sec-Butylbenzene	21	-	17	-	-	-	-	-	-	38
Butylbenzyl phthalate	13	-	102	-	-	4	-	-	-	119
Caprolactam	-	-	-	-	-	-	9	-	-	9
Carbon disulfide	70	-	143	-	-	2	-	-	-	215
Carbon tetrachloride	65	-	154	-	-	1	122	-	-	342
Cellosolve acetate	-	-	-	-	-	-	10	-	-	10
Chlordane	-	-	15	-	-	-	-	-	-	15
gamma-Chlordane	-	-	6	-	-	-	-	-	-	6
alpha-Chlordane	-	-	6	-	-	-	-	-	-	6
4-Chloro-3-methylphenol	13	-	105	-	-	4	-	-	-	122
4-Chloroaniline	13	-	96	-	-	4	-	-	-	113
Chlorobenzene	67	-	157	-	-	3	112	-	-	339
Chlorodibromomethane	65	-	156	-	-	-	-	-	-	221
Chloroethane	65	-	144	-	-	-	-	-	-	209
Chloroform	65	-	160	-	-	9	127	-	-	361
1-Chlorohexane	21	-	13	-	-	-	-	-	-	34
Chloromethane	65	-	144	-	-	1	-	-	-	210
2-Chloronaphthalene	14	-	100	-	-	4	-	-	-	118
o-Chlorophenol	13	-	103	-	-	4	-	-	-	120
p-Chlorophenol	-	-	1	-	-	-	-	-	-	1
4-Chlorophenylphenyl ether	13	-	100	-	-	4	-	-	-	117
p-Chlorotoluene	22	-	17	-	-	-	-	-	-	39
o-Chlorotoluene	22	-	17	-	-	-	-	-	-	39
Chlorotrimethylsilane	-	-	-	-	-	1	-	-	-	1
Chrysene	13	-	102	-	-	4	-	-	-	119
2,4,6-Cycloheptatriene-1-one	-	-	-	-	-	1	-	-	-	1
Cyclohexane	-	-	-	-	-	4	-	-	-	4
Cyclohexene	-	-	-	-	-	-	9	-	-	9
Cyclooctatraene	-	-	-	-	-	-	3	-	-	3
2,4-D	-	-	16	-	-	-	-	-	-	16
p,p'-DDD	-	-	19	-	-	-	-	-	-	19

TABLE D-III (cont)

ANALYSIS	SIL	SLU	WAT	BIOL	FIL	BULK	TUBE	BIOA	TIS	TOT
p,p'-DDE	-	-	19	-	-	-	-	-	-	19
p,p'-DDT	-	-	19	-	-	-	-	-	-	19
Decachlorobiphenyl (2,2',3,3',4,4',5,5',6,6'-)	-	-	2	-	-	-	-	-	-	2
n-Decane	-	-	-	-	-	2	-	-	-	2
Di-n-butyl phthalate	12	-	97	-	-	5	-	-	-	114
Di-n-octyl phthalate	12	-	97	-	-	5	-	-	-	114
2,6-Di-t-butylphenol	-	-	-	-	-	2	-	-	-	2
2,6-Di-tert-butyl-p-cresol	-	-	-	-	-	2	-	-	-	2
Dibenzo(a,h)anthracene	13	-	102	-	-	4	-	-	-	119
Dibenzofuran	12	-	96	-	-	4	-	-	-	112
1,2-Dibromo-3-chloropropane	20	-	17	-	-	-	-	-	-	37
1,2-Dibromoethane	12	-	5	-	-	1	-	-	-	18
Dibromomethane	20	-	17	-	-	-	-	-	-	37
o-Dichlorobenzene (1,2)	35	-	116	-	-	8	3	-	-	162
m-Dichlorobenzene (1,3)	34	-	117	-	-	4	-	-	-	155
p-Dichlorobenzene (1,4)	34	-	121	-	-	4	-	-	-	159
Mixed-Dichlorobenzenes	1	-	-	-	-	1	-	-	-	2
3,3'-Dichlorobenzidine	13	-	96	-	-	4	-	-	-	113
Dichlorodifluoromethane	-	-	3	-	-	-	-	-	-	3
1,1-Dichloroethane	65	-	145	-	-	-	-	-	-	210
1,2-Dichloroethane	65	-	152	-	-	1	16	-	-	234
1,2-Dichloroethane d4 (vol sur 1) also CAS=17060070	20	-	13	-	-	-	-	-	-	33
trans-1,2-Dichloroethene	20	-	19	-	-	-	-	-	-	39
1,2-Dichloroethene	45	-	132	-	-	-	-	-	-	177
1,1-Dichloroethene	65	-	149	-	-	-	-	-	-	214
cis-1,2-Dichloroethylene	20	-	17	-	-	-	-	-	-	37
2,4-Dichlorophenol	13	-	100	-	-	4	-	-	-	117
1,3-Dichloropropane	25	-	17	-	-	-	-	-	-	42
2,2-Dichloropropane	20	-	17	-	-	-	-	-	-	37
1,2-Dichloropropane	65	-	145	-	-	-	-	-	-	210
1,1-Dichloropropene	29	-	16	-	-	-	-	-	-	45
1,3-Dichloropropene	-	-	2	-	-	-	-	-	-	2
cis-1,3-Dichloropropene	65	-	141	-	-	-	-	-	-	206
trans-1,3-Dichloropropene	65	-	141	-	-	-	-	-	-	206
Dieldrin	-	-	19	-	-	-	-	-	-	19
Diethyl ether	-	-	-	-	-	-	10	-	-	10
Diethyl phthalate	12	-	97	-	-	5	-	-	-	114
Diethylene triamine	-	-	-	-	-	-	2	-	-	2
Diisopropylbenzene	-	-	-	-	-	1	-	-	-	1
1,2-Dimethoxyethane	-	-	-	-	-	-	3	-	-	3
Dimethyl phthalate	13	-	100	-	-	4	-	-	-	117
n,n-Dimethylacetamide	-	-	-	-	-	-	2	-	-	2
N,N-Dimethylformamide	-	-	-	-	-	1	17	-	-	18
3,3-Dimethyloxetane	-	-	-	-	-	1	-	-	-	1
2,4-Dimethylphenol	13	-	99	-	-	4	-	-	-	116
Dimethylsulfoxide	-	-	-	-	-	3	2	-	-	5
2,4-Dinitrophenol	13	-	99	-	-	4	-	-	-	116
2,4-Dinitrotoluene	14	-	99	-	-	4	-	-	-	117
2,6-Dinitrotoluene	13	-	98	-	-	4	-	-	-	115

TABLE D-III (cont)

ANALYSIS	SIL	SLU	WAT	BIOL	FIL	BULK	TUBE	BIOA	TIS	TOT
1,4-Dioxane	2	-	5	-	-	14	11	-	-	32
m-Dioxane	-	-	-	-	-	1	-	-	-	1
Diphenyl ether	-	-	-	-	-	1	-	-	-	1
Diphenylmethane	-	-	-	-	-	2	-	-	-	2
Divinyl benzene	-	-	-	-	-	-	4	-	-	4
Divinylbenzene	-	-	-	-	-	-	1	-	-	1
Endosulfan I	-	-	19	-	-	-	-	-	-	19
Endosulfan II	-	-	19	-	-	-	-	-	-	19
Endosulfan sulfate	-	-	19	-	-	-	-	-	-	19
Endrin	-	-	26	-	-	-	-	-	-	26
Endrin aldehyde	-	-	13	-	-	-	-	-	-	13
Endrin ketone	-	-	6	-	-	-	-	-	-	6
Ethanol	-	-	-	-	-	15	37	-	-	52
2-Ethoxy ethanol	-	-	-	-	-	1	-	-	-	1
Ethyl acetate	-	-	-	-	-	5	1	-	-	6
2-Ethyl-1-hexanol	-	-	-	-	-	2	9	-	-	11
Ethylbenzene	70	-	155	-	-	-	106	-	-	331
Ethylchloroacetate	-	-	-	-	-	1	-	-	-	1
Ethylene glycol	-	-	-	-	-	4	-	-	-	4
Ethylisothiocyanate	-	-	-	-	-	-	1	-	-	1
Exiton DCM	-	-	-	-	2	1	-	-	-	3
Fluoranthene	12	-	102	-	-	4	-	-	-	118
Fluorene	12	-	102	-	-	4	-	-	-	118
2-Fluorobiphenyl	-	-	4	-	-	-	-	-	-	4
2-Fluorophenol	-	-	4	-	-	-	-	-	-	4
Halogenated hydrocarbons	-	-	-	-	-	7	-	-	-	7
Heptachlor	-	-	21	-	-	-	-	-	-	21
Heptachlor epoxide	-	-	21	-	-	-	-	-	-	21
n-Heptane	-	-	-	-	-	4	3	-	-	7
Hexachlorobenzene	14	-	98	-	-	4	-	-	-	116
Hexachlorobutadiene	34	-	115	-	-	4	-	-	-	153
Hexachlorocyclopentadiene	14	-	97	-	-	4	-	-	-	115
Hexachloroethane	14	-	101	-	-	4	-	-	-	119
Hexadecanoic acid	-	-	-	-	-	1	-	-	-	1
Hexamethyldisiloxane	-	-	-	-	-	2	-	-	-	2
Hexane	-	-	-	-	-	9	15	-	-	24
2-Hexanone	66	-	142	-	-	1	-	-	-	209
Hexyl acetate	-	-	-	-	-	1	-	-	-	1
n-Hexyl formate	-	-	-	-	-	1	-	-	-	1
Hydrazine monohydrate	-	-	-	-	-	1	-	-	-	1
Hydrocarbons	-	-	-	-	-	64	8	-	-	72
Hydroquinone	-	-	-	-	-	-	3	-	-	3
2-Hydroxyethyl methacrylate	-	-	-	-	-	-	6	-	-	6
4-(2-Hydroxyethyl)morpholine	-	-	-	-	-	2	-	-	-	2
8-Hydroxyquinoline	-	-	-	-	-	1	-	-	-	1
Indeno(1,2,3-cd)pyrene	13	-	98	-	-	4	-	-	-	115
Isocyanates	-	-	-	-	-	4	-	-	-	4
Isophorone	13	-	97	-	-	4	-	-	-	114
Isopropyl ether	-	-	-	-	-	1	-	-	-	1

TABLE D-III (cont)

ANALYSIS	SIL	SLU	WAT	BIOL	FIL	BULK	TUBE	BIOA	TIS	TOT
Isopropylbenzene	21	-	17	-	-	-	-	-	-	38
4-Isopropyltoluene	21	-	19	-	-	-	-	-	-	40
Lindane	-	-	31	-	-	-	-	-	-	31
Methane	-	-	-	-	-	6	-	-	-	6
Methanol	-	-	-	-	-	4	31	-	-	35
Methoxychlor	-	-	16	-	-	-	-	-	-	16
Methyl methacrylate	-	-	-	-	-	1	-	-	-	1
Methyl propionate	-	-	-	-	-	1	-	-	-	1
Methyl stearate	-	-	-	-	-	2	-	-	-	2
2-Methyl-1-pentene	-	-	-	-	-	1	-	-	-	1
3-Methyl-2-butanol	-	-	-	-	-	1	-	-	-	1
3-Methyl-2-butanone	-	-	-	-	-	2	-	-	-	2
4-Methyl-2-pentanone	69	-	152	-	-	20	-	-	-	241
1-Methyl-2-pyrrolidinone	-	-	-	-	-	1	-	-	-	1
2-Methyl-3-(1-methylethyl)-oxirane	-	-	-	-	-	1	-	-	-	1
2-Methyl-4,6-dinitrophenol	13	-	102	-	-	4	-	-	-	119
Methylcyclohexane	-	-	-	-	-	2	2	-	-	4
Methylene chloride	65	-	151	-	-	1	-	-	-	217
2-Methylhexane	-	-	-	-	-	1	-	-	-	1
4-Methylmorpholine	-	-	-	-	-	2	-	-	-	2
2-Methylnaphthalene	12	-	98	-	-	4	-	-	-	114
Methylpalmitate	-	-	-	-	-	2	-	-	-	2
4-Methylphenol	13	-	96	-	-	5	-	-	-	114
2-Methylphenol	13	-	96	-	-	4	-	-	-	113
2-Methylsuccinic anhydride	-	-	-	-	-	4	-	-	-	4
Mineral oil	1	-	1	-	-	1	2	-	-	5
Naphthalene	40	-	119	-	-	4	-	-	-	163
alpha-Naphthylamine	-	-	-	-	-	1	-	-	-	1
2-Nitroaniline	13	-	96	-	-	4	-	-	-	113
3-Nitroaniline	13	-	96	-	-	4	-	-	-	113
4-Nitroaniline	13	-	96	-	-	4	-	-	-	113
Nitrobenzene	13	-	100	-	-	4	-	-	-	117
Nitrobenzene-d5	-	-	4	-	-	-	-	-	-	4
p-Nitrophenol	14	-	102	-	-	4	-	-	-	120
2-Nitrophenol	14	-	106	-	-	4	-	-	-	124
N-Nitrosodi-n-propylamine	14	-	97	-	-	4	1	-	-	116
N-Nitrosodimethylamine	-	-	5	-	-	-	-	-	-	5
N-Nitrosodiphenylamine	12	-	98	-	-	4	-	-	-	114
n-Nonane	-	-	-	-	-	1	-	-	-	1
Octane	-	-	-	-	-	1	-	-	-	1
2-Octyne	-	-	-	-	-	1	-	-	-	1
Oxalic acid	-	-	-	-	-	1	-	-	-	1
Pentachloroethane	-	-	1	-	-	-	-	-	-	1
Pentachlorophenol	15	-	110	-	-	4	-	-	-	129
Pentadecanoic acid	-	-	-	-	-	1	-	-	-	1
Pentane	-	-	-	-	-	-	4	-	-	4
2-Pentanone	-	-	-	-	-	2	-	-	-	2
Phenanthrene	12	-	99	-	-	4	-	-	-	115
Phenol	13	-	105	-	-	10	-	-	-	128

TABLE D-III (cont)

ANALYSIS	SIL	SLU	WAT	BIOL	FIL	BULK	TUBE	BIOA	TIS	TOT
Phenol-d5	-	-	4	-	-	-	-	-	-	4
2-Phenyloxazole	-	-	-	-	-	1	-	-	-	1
Phthalate ester	-	-	-	-	-	1	-	-	-	1
Phthalic anhydride	-	-	-	-	-	2	-	-	-	2
1-Propanol	-	-	-	-	-	1	-	-	-	1
2-Propanol	-	-	-	-	-	9	3	-	-	12
n-Propyl acetate	-	-	-	-	-	1	-	-	-	1
Propylbenzene	28	-	17	-	-	-	-	-	-	45
Pyrene	12	-	101	-	-	4	-	-	-	117
Salicylaldehyde	-	-	-	-	-	1	-	-	-	1
Styrene	68	-	143	-	-	1	22	-	-	234
2,4,5-TP	-	-	16	-	-	-	-	-	-	16
Terphenyl-d14	-	-	4	-	-	-	-	-	-	4
1,1,2,2-Tetrachloroethane	65	-	146	-	-	1	-	-	-	212
1,1,1,2-Tetrachloroethane	20	-	17	-	-	-	-	-	-	37
Tetrachloroethylene	65	-	150	-	-	3	105	-	-	323
Tetradecanoic acid	-	-	-	-	-	1	-	-	-	1
trans-Tetrahydro-5,6-dimethyl-2H-pyran-2-one	-	-	-	-	-	1	-	-	-	1
Tetrahydrofuran	-	-	-	-	-	1	15	-	-	16
Toluene	82	-	160	-	-	17	156	-	-	415
Toluene d8 (vol sur #2) also CAS=2037265	20	-	13	-	-	-	-	-	-	33
Total organics, Identification	3	-	5	-	1	96	38	-	-	143
Total trihalomethanes	-	-	1	-	-	-	-	-	-	1
Toxaphene	-	-	25	-	-	-	-	-	-	25
Tri-2-butoxyethyl phosphate	-	-	-	-	-	1	-	-	-	1
2,4,6-Tribromophenol	-	-	4	-	-	-	-	-	-	4
Tributyl phosphate	-	-	-	-	-	-	8	-	-	8
1,1,2-Trichloro-1,2,2-trifluoroethane	-	-	6	-	-	5	4	-	-	15
1,2,4-Trichlorobenzene	36	-	118	-	-	4	-	-	-	158
1,2,3-Trichlorobenzene	21	-	19	-	-	1	-	-	-	41
1,1,1-Trichloroethane	65	-	155	-	-	30	121	-	-	371
1,1,2-Trichloroethane	65	-	146	-	-	1	-	-	-	212
Trichloroethene	65	-	152	-	-	7	132	-	-	356
Trichlorofluoromethane	27	-	18	-	-	6	-	-	-	51
2,4,5-Trichlorophenol	13	-	96	-	-	4	-	-	-	113
2,4,6-Trichlorophenol	13	-	102	-	-	4	-	-	-	119
1,2,3-Trichloropropane	20	-	17	-	-	-	-	-	-	37
Trimethylamine	-	-	-	-	-	2	-	-	-	2
1,2,4-Trimethylbenzene	23	-	20	-	-	1	105	-	-	149
1,3,5-Trimethylbenzene	22	-	18	-	-	-	-	-	-	40
1,2,3-Trimethylbenzene	1	-	-	-	-	-	-	-	-	1
Trimethylsilanol	-	-	-	-	-	1	-	-	-	1
Triphenyl phosphate	-	-	-	-	-	1	-	-	-	1
Tritolyl phosphate	-	-	-	-	-	1	-	-	-	1
Unknown ester	-	-	-	-	-	1	-	-	-	1
Unknown organic compound	-	-	-	-	-	1	-	-	-	1
Vinyl acetate	65	-	142	-	-	-	-	-	-	207
Vinyl chloride	65	-	146	-	-	-	-	-	-	211
Volatiles	-	-	1	-	-	-	-	-	-	1

TABLE D-III (cont)

ANALYSIS	SIL	SLU	WAT	BIOL	FIL	BULK	TUBE	BIOA	TIS	TOT
Water	-	-	-	-	-	45	-	-	-	45
p-Xylene	-	-	4	-	-	-	1	-	-	5
m-Xylene	24	-	17	-	-	-	3	-	-	44
o-Xylene	22	-	24	-	-	-	123	-	-	169
Mixed-Xylenes	58	-	133	-	-	3	114	-	-	308

TOTAL ORGANIC ANALYSES 20093

(The majority of the organic analyses were from the following categories:

ANALYSIS	SIL	SLU	WAT	BIOL	FIL	BULK	TUBE	BIOA	TIS	TOT
Herbicides	-	-	17	-	-	-	-	-	-	17
Pesticides	-	-	21	-	-	-	-	-	-	21
Poregas	-	-	-	-	-	-	106	-	-	106
Semivolatiles	13	-	96	-	-	4	-	-	-	113
Volatiles	70	-	155	-	-	1	-	-	-	226

GRAND TOTAL HSE-9 RADIOCHEMICAL, INORGANIC, AND ORGANIC ANALYSES IN 1988 103351

APPENDIX E
NUCLEAR SPECTROMETRY

Alpha Spectrometer Calibration and Background Data for 1988

TABLE E-I

ALPHA SPECTROMETER CALIBRATION AND BACKGROUND DATA
FIRST QUARTER 1988

16 ALPHA SPECTROMETER

Calibration (17 min) N=10		Background (70 000 s) N=10 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	28.64 ± 1.72	0	0	0
2	27.87 ± 1.67	0	0	1
3	31.98 ± 1.92	0	0	1
4	32.40 ± 1.94	0	0	4
5	31.87 ± 1.91	0	0	5
6	34.53 ± 2.07	1	1	2
7	33.08 ± 1.98	1	1	2
8	33.39 ± 2.00	0	0	1
9	30.71 ± 1.85	0	0	1
10	31.75 ± 1.91	0	0	1
11	34.21 ± 2.05	4	1	3
12	31.38 ± 1.88	2	0	2
13	32.16 ± 1.93	1	1	5
14	32.33 ± 1.94	0	1	1
15	32.16 ± 1.93	0	0	1
16	32.01 ± 1.92	0	0	1

48 ALPHA SPECTROMETER

Calibration (17 min) N=10		Background (70 000 s) N=10 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	31.17 ± 1.87	3	5	4
2	32.99 ± 1.98	3	3	5
3	35.85 ± 2.15	2	4	4
4	30.69 ± 1.84	0	2	5
5	34.04 ± 2.04	3	3	3
6	32.76 ± 1.97	1	0	2
7	33.84 ± 2.03	1	1	2
8	30.35 ± 1.82	1	1	2
9	32.02 ± 1.92	1	2	2
10	34.43 ± 2.07	1	1	2
11	32.73 ± 1.96	1	0	1
12	31.47 ± 1.89	1	1	3
13	29.41 ± 1.76	1	0	1
14	33.63 ± 2.02	1	1	1
15	32.71 ± 1.96	0	0	1
16	33.20 ± 1.99	1	1	1

32 ALPHA SPECTROMETER

Calibration (17 min) N=10		Background (70 000 s) N=10 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	31.48 ± 1.89	1	1	2
2	28.31 ± 1.70	1	1	6
3	30.46 ± 1.83	1	1	2
4	30.21 ± 1.81	0	2	1
5	31.55 ± 1.89	0	1	1
6	31.30 ± 1.88	1	1	1
7	29.60 ± 1.78	0	1	1
8	31.43 ± 1.89	1	1	1
9	32.67 ± 1.96	1	1	2
10	33.64 ± 2.02	2	2	2
11	29.59 ± 1.78	1	0	2
12	31.47 ± 1.89	1	2	2
13	31.99 ± 1.92	1	2	3
14	32.09 ± 1.93	0	0	2
15	32.48 ± 1.95	1	1	2
16	30.26 ± 1.82	0	0	1

64 ALPHA SPECTROMETER

Calibration (17 min) N=10		Background (80 000 s) N=10 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	22.48 ± 1.35	2	2	4
2	20.35 ± 1.22	1	1	1
3	21.38 ± 1.28	2	3	4
4	20.29 ± 1.22	0	0	1
5	22.12 ± 1.33	1	4	5
6	19.80 ± 1.19	0	1	1
7	19.10 ± 1.15	0	1	1
8	19.90 ± 1.19	0	0	1
9	22.39 ± 1.34	3	2	4
10	19.94 ± 1.20	0	0	3
11	21.88 ± 1.31	2	2	2
12	20.81 ± 1.25	2	2	1
13	22.38 ± 1.34	1	0	1
14	21.52 ± 1.29	2	3	2
15	22.19 ± 1.33	0	0	1
16	21.84 ± 1.31	0	0	0

TABLE E-I (cont)

80 ALPHA SPECTROMETER

Calibration (17 min) N=10		Background (80 000 s) N=10 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	20.94 ± 1.26	3	5	4
2	18.88 ± 1.13	1	1	2
3	20.14 ± 1.21	2	4	3
4	20.16 ± 1.21	0	1	6
5	21.52 ± 1.29	2	4	6
6	21.29 ± 1.28	2	4	2
7	19.35 ± 1.16	2	5	4
8	20.13 ± 1.21	1	2	6
9	21.18 ± 1.27	1	0	3
10	21.11 ± 1.27	2	4	5
11	21.81 ± 1.31	4	4	4
12	19.73 ± 1.18	0	0	0
13	20.41 ± 1.22	0	1	2
14	20.40 ± 1.22	0	0	0
15	21.64 ± 1.30	1	2	6
16	20.04 ± 1.20	1	2	2

Uranium and Thorium Background (70 000 s) N=10								
Detector	U-238	U-235	U-234	U232	Th-232	Th-230	Th-229	Th-228
1	0	1	0	5	-	-	-	-
2	0	0	0	1	-	-	-	-
3	0	0	0	1	-	-	-	-
4	0	0	0	0	-	-	-	-
5	0	0	0	0	-	-	-	-
6	0	0	0	0	-	-	-	-
7	0	0	1	0	-	-	-	-
8	0	0	0	0	-	-	-	-
9	0	0	0	1	-	-	-	-
10	0	0	0	0	-	-	-	-
11	0	2	1	4	-	-	-	-
12	0	0	0	0	-	-	-	-
13	0	0	1	3	-	-	-	-
14	0	0	0	0	-	-	-	-
15	0	0	0	0	-	-	-	-
16	1	0	0	1	-	-	-	-

96 ALPHA SPECTROMETER

Plutonium, Uranium and Thorium Calibration (17 min) N=10		Background (80 000 s) N=9 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	15.67 ± 0.94	0	4	3
2	14.18 ± 0.85	0	0	3
3	16.18 ± 0.97	0	0	4
4	15.76 ± 0.95	0	0	3
5	15.09 ± 0.91	0	0	5
6	16.49 ± 0.99	0	0	1
7	14.94 ± 0.90	1	1	2
8	14.91 ± 0.89	0	0	2
9	16.01 ± 0.96	0	0	4
10	15.70 ± 0.94	0	0	2
11	15.80 ± 0.95	1	3	2
12	14.74 ± 0.88	0	0	1
13	14.36 ± 0.86	0	1	3
14	16.15 ± 0.97	0	0	2
15	14.78 ± 0.89	0	0	1
16	14.10 ± 0.85	0	0	3

TABLE E-II

ALPHA SPECTROMETER CALIBRATION AND BACKGROUND DATA
SECOND QUARTER 1988

16 ALPHA SPECTROMETER

Calibration (17 min) N=10		Background (70 000 s) N=10 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	28.94 ± 1.74	0	0	1
2	27.21 ± 1.63	0	0	1
3	32.81 ± 1.97	0	0	1
4	33.05 ± 1.98	0	0	2
5	32.26 ± 1.94	0	1	3
6	35.55 ± 2.13	2	1	3
7	33.13 ± 1.99	1	1	0
8	33.29 ± 2.00	0	0	0
9	30.19 ± 1.87	1	1	1
10	31.89 ± 1.91	0	0	1
11	34.55 ± 2.07	5	0	2
12	31.96 ± 1.92	2	0	1
13	32.71 ± 1.96	2	1	2
14	32.91 ± 1.97	0	0	1
15	32.18 ± 1.93	0	0	1
16	32.13 ± 1.93	1	0	1

48 ALPHA SPECTROMETER

Calibration (17 min) N=10		Background (70 000 s) N=10 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	31.15 ± 1.87	2	1	2
2	32.77 ± 1.97	1	1	2
3	35.47 ± 2.13	2	5	3
4	30.57 ± 1.83	1	1	3
5	34.08 ± 2.04	3	2	3
6	32.88 ± 1.97	1	1	2
7	33.94 ± 2.04	1	0	1
8	30.50 ± 1.83	1	0	2
9	31.54 ± 1.89	4	5	6
10	34.34 ± 2.06	4	3	4
11	32.36 ± 1.94	1	2	2
12	31.37 ± 1.88	2	1	3
13	31.92 ± 1.92	2	2	3
14	33.65 ± 2.02	1	2	2
15	32.53 ± 1.95	2	1	1
16	32.92 ± 1.98	1	1	2

32 ALPHA SPECTROMETER

Calibration (17 min) N=10		Background (70 000 s) N=10 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	30.69 ± 1.84	2	1	2
2	27.60 ± 1.66	1	1	4
3	29.87 ± 1.79	1	1	1
4	29.91 ± 1.79	1	1	1
5	31.71 ± 1.90	2	1	2
6	31.41 ± 1.88	1	1	3
7	29.46 ± 1.77	1	0	1
8	31.14 ± 1.87	2	1	3
9	32.06 ± 1.92	2	2	2
10	33.11 ± 1.99	3	3	3
11	29.26 ± 1.76	1	2	3
12	31.05 ± 1.86	2	2	3
13	31.64 ± 1.90	2	2	3
14	31.76 ± 1.91	1	0	2
15	32.15 ± 1.93	3	1	5
16	29.81 ± 1.79	0	1	2

64 ALPHA SPECTROMETER

Calibration (17 min) N=10		Background (80 000 s) N=10 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	22.15 ± 1.33	2	1	4
2	20.05 ± 1.20	2	1	1
3	21.45 ± 1.29	2	2	4
4	20.11 ± 1.21	1	0	0
5	21.89 ± 1.31	1	3	2
6	20.00 ± 1.20	1	0	1
7	19.38 ± 1.16	1	1	1
8	19.97 ± 1.20	0	1	1
9	22.24 ± 1.33	2	2	4
10	19.89 ± 1.19	1	0	3
11	22.00 ± 1.32	2	6	2
12	21.18 ± 1.27	0	0	0
13	22.38 ± 1.34	0	0	0
14	20.48 ± 1.23	0	2	1
15	22.14 ± 1.33	1	0	1
16	22.07 ± 1.32	1	1	1

TABLE E-II (cont)

80 ALPHA SPECTROMETER

Calibration (17 min) N=10		Background (80 000 s) N=10 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	20.23 ± 1.21	3	5	2
2	18.42 ± 1.11	0	0	1
3	19.81 ± 1.19	1	3	2
4	19.61 ± 1.18	0	1	5
5	20.61 ± 1.24	2	4	4
6	20.28 ± 1.22	1	4	2
7	19.44 ± 1.17	3	4	4
8	19.65 ± 1.18	2	2	4
9	20.10 ± 1.21	1	1	2
10	20.25 ± 1.22	2	4	3
11	21.91 ± 1.25	5	5	3
12	18.96 ± 1.14	0	1	1
13	18.89 ± 1.13	0	0	1
14	19.75 ± 1.19	0	0	0
15	20.66 ± 1.24	1	1	4
16	19.18 ± 1.15	0	0	0

Uranium and Thorium Background (70 000 s) N=10								
Detector	U-238	U-235	U-234	U232	Th-232	Th-230	Th-229	Th-228
1	0	0	0	4	-	-	-	-
2	0	0	0	1	-	-	-	-
3	0	0	0	1	-	-	-	-
4	0	0	0	0	-	-	-	-
5	0	0	0	0	-	-	-	-
6	0	0	0	0	-	-	-	-
7	0	0	1	0	-	-	-	-
8	0	0	0	0	-	-	-	-
9	0	0	0	0	-	-	-	-
10	0	0	0	0	-	-	-	-
11	1	1	1	4	-	-	-	-
12	0	0	0	0	-	-	-	-
13	0	1	1	2	-	-	-	-
14	0	0	0	0	-	-	-	-
15	1	0	0	0	-	-	-	-
16	1	0	0	0	-	-	-	-

96 ALPHA SPECTROMETER

Plutonium, Uranium and Thorium Calibration (17 min) N=10		Background (80 000 s) N=9 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	15.14 ± 0.91	1	4	2
2	14.86 ± 0.89	0	0	3
3	14.54 ± 0.87	0	1	3
4	15.87 ± 0.95	0	0	2
5	14.04 ± 0.84	0	0	5
6	16.08 ± 0.96	1	1	2
7	13.50 ± 0.81	2	0	1
8	14.61 ± 0.88	0	0	2
9	14.42 ± 0.87	0	0	3
10	15.77 ± 0.95	0	0	2
11	14.98 ± 0.90	0	3	2
12	14.58 ± 0.87	0	0	1
13	13.88 ± 0.86	1	1	3
14	15.04 ± 0.97	0	0	2
15	14.95 ± 0.89	0	0	2
16	12.53 ± 0.85	0	0	2

TABLE E-III

ALPHA SPECTROMETER CALIBRATION AND BACKGROUND DATA
THIRD QUARTER 1988

16 ALPHA SPECTROMETER

Calibration (17 min) N=10		Background (70 000 s) N=10 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	29.44 ± 1.77	0	0	0
2	27.96 ± 1.68	0	0	0
3	33.08 ± 1.98	1	0	1
4	32.58 ± 1.95	1	1	2
5	32.82 ± 1.97	0	0	3
6	35.49 ± 2.13	0	0	0
7	36.15 ± 2.17	1	0	1
8	33.33 ± 2.00	0	0	0
9	31.17 ± 1.87	0	1	1
10	32.41 ± 1.94	0	0	0
11	34.99 ± 2.10	5	1	2
12	31.97 ± 1.92	2	0	1
13	33.02 ± 1.98	1	0	1
14	33.44 ± 2.01	1	1	1
15	32.32 ± 1.94	0	1	1
16	32.25 ± 1.94	0	0	1

48 ALPHA SPECTROMETER

Calibration (17 min) N=10		Background (70 000 s) N=10 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	32.56 ± 1.95	2	3	3
2	34.88 ± 2.09	3	3	4
3	37.26 ± 2.24	2	4	4
4	31.89 ± 1.91	1	3	4
5	35.51 ± 2.13	3	3	6
6	34.16 ± 2.05	1	1	3
7	38.69 ± 2.32	1	2	2
8	31.99 ± 1.92	2	2	4
9	32.98 ± 1.98	2	3	4
10	35.51 ± 2.13	3	3	3
11	34.40 ± 2.06	2	1	2
12	33.06 ± 1.98	2	1	1
13	34.01 ± 2.04	1	2	2
14	35.48 ± 2.13	1	2	2
15	34.17 ± 2.05	2	1	1
16	35.02 ± 2.10	1	2	2

32 ALPHA SPECTROMETER

Calibration (17 min) N=10		Background (70 000 s) N=10 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	32.61 ± 1.96	1	1	1
2	29.51 ± 1.77	1	1	4
3	31.63 ± 1.90	1	1	2
4	31.05 ± 1.86	2	2	2
5	32.85 ± 1.97	2	1	1
6	32.99 ± 1.98	1	1	2
7	33.36 ± 2.00	3	1	1
8	33.37 ± 2.00	2	1	3
9	34.16 ± 2.05	2	1	2
10	34.49 ± 2.07	4	3	5
11	31.23 ± 1.87	3	2	4
12	33.23 ± 1.99	2	2	4
13	34.45 ± 2.07	1	2	2
14	33.61 ± 2.02	1	1	3
15	34.08 ± 2.05	3	2	5
16	32.16 ± 1.93	1	1	2

64 ALPHA SPECTROMETER

Calibration (17 min) N=10		Background (80 000 s) N=10 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	22.84 ± 1.37	2	1	3
2	20.50 ± 1.23	4	4	6
3	21.64 ± 1.30	3	2	5
4	21.17 ± 1.27	0	0	1
5	22.37 ± 1.34	1	3	2
6	20.57 ± 1.23	1	0	1
7	20.97 ± 1.26	0	0	1
8	20.85 ± 1.25	1	0	1
9	23.36 ± 1.40	2	2	3
10	20.06 ± 1.20	0	0	3
11	22.83 ± 1.37	1	3	2
12	22.05 ± 1.32	0	0	0
13	23.77 ± 1.43	0	0	0
14	21.09 ± 1.27	0	3	0
15	22.98 ± 1.38	1	0	0
16	23.02 ± 1.38	0	0	0

TABLE E-III (cont)

80 ALPHA SPECTROMETER

Calibration (17 min) N=10		Background (80 000 s) N=10 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	20.61 ± 1.24	2	4	3
2	19.13 ± 1.15	0	0	1
3	20.31 ± 1.22	1	3	1
4	20.02 ± 1.20	0	1	4
5	21.19 ± 1.27	2	5	4
6	20.63 ± 1.24	2	4	1
7	20.74 ± 1.24	2	4	4
8	20.43 ± 1.23	1	3	5
9	20.04 ± 1.20	0	0	3
10	19.86 ± 1.19	2	3	2
11	20.77 ± 1.25	3	4	2
12	18.77 ± 1.13	0	1	1
13	18.81 ± 1.13	0	0	0
14	19.85 ± 1.19	0	0	0
15	20.44 ± 1.23	0	1	5
16	19.15 ± 1.15	0	0	0

Uranium and Thorium Background (70 000 s) N=5								
Detector	U-238	U-235	U-234	U232	Th-232	Th-230	Th-229	Th-228
1	0	0	0	5	-	-	-	-
2	0	1	0	1	-	-	-	-
3	0	0	0	0	-	-	-	-
4	0	0	0	0	-	-	-	-
5	0	0	0	0	-	-	-	-
6	0	0	0	0	-	-	-	-
7	0	0	1	0	-	-	-	-
8	0	0	0	0	-	-	-	-
9	0	0	0	0	-	-	-	-
10	0	0	0	0	-	-	-	-
11	1	1	1	4	-	-	-	-
12	0	0	0	0	-	-	-	-
13	1	1	1	3	-	-	-	-
14	0	0	0	1	-	-	-	-
15	0	0	0	0	-	-	-	-
16	1	0	0	0	-	-	-	-

96 ALPHA SPECTROMETER

Plutonium, Uranium and Thorium Calibration (17 min) N=10		Background (80 000 s) N=9 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	15.40 ± 0.92	1	4	2
2	14.92 ± 0.90	1	0	1
3	15.29 ± 0.92	0	0	1
4	15.61 ± 0.94	0	0	2
5	14.75 ± 0.88	0	0	4
6	16.42 ± 0.99	0	1	2
7	15.09 ± 0.91	1	1	1
8	14.04 ± 0.84	0	0	2
9	16.09 ± 0.97	0	0	4
10	15.93 ± 0.96	0	0	2
11	15.55 ± 0.93	1	4	0
12	14.61 ± 0.88	0	0	1
13	15.96 ± 0.96	1	1	3
14	15.84 ± 0.95	1	0	2
15	14.76 ± 0.89	0	0	1
16	13.39 ± 0.80	0	0	2

Background (80 000 s) N=9 Mean Counts Per 20 Channels		
Detector	Am-243	Am-241
1	5	3
2	0	2
3	0	2
4	0	2
5	0	6
6	1	3
7	1	2
8	0	2
9	0	5
10	0	2
11	4	1
12	0	2
13	1	3
14	0	3
15	0	2
16	0	3

TABLE E-IV

ALPHA SPECTROMETER CALIBRATION AND BACKGROUND DATA
FOURTH QUARTER 1988

16 ALPHA SPECTROMETER

Calibration (17 min) N=10		Background (70 000 s) N=10 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	28.08 ± 1.68	0	0	1
2	26.88 ± 1.61	0	0	0
3	31.38 ± 1.88	0	0	0
4	30.95 ± 1.86	0	1	2
5	31.69 ± 1.90	0	0	5
6	33.65 ± 2.02	0	1	0
7	35.52 ± 2.13	0	0	1
8	32.19 ± 1.93	0	0	0
9	30.27 ± 1.82	0	2	1
10	31.54 ± 1.89	0	0	0
11	33.02 ± 1.98	6	0	1
12	31.75 ± 1.90	2	1	1
13	32.08 ± 1.92	0	1	0
14	32.13 ± 1.93	0	0	1
15	31.40 ± 1.88	1	1	1
16	30.87 ± 1.85	0	0	1

48 ALPHA SPECTROMETER

Calibration (17 min) N=10		Background (70 000 s) N=10 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	30.77 ± 1.85	2	3	4
2	32.14 ± 1.93	3	3	4
3	35.24 ± 2.11	2	4	4
4	30.41 ± 1.82	1	3	3
5	33.51 ± 2.01	3	4	6
6	32.70 ± 1.96	2	1	3
7	37.68 ± 2.26	1	1	2
8	30.22 ± 1.81	2	3	4
9	30.99 ± 1.86	2	3	4
10	34.18 ± 2.05	2	3	4
11	32.62 ± 1.96	2	1	2
12	31.39 ± 1.88	2	1	2
13	32.62 ± 1.96	1	2	2
14	33.79 ± 2.03	1	1	2
15	32.16 ± 1.93	2	1	1
16	32.94 ± 1.98	2	2	2

32 ALPHA SPECTROMETER

Calibration (17 min) N=10		Background (70 000 s) N=10 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	30.64 ± 1.84	1	1	2
2	27.86 ± 1.67	2	2	5
3	30.16 ± 1.81	1	2	4
4	29.97 ± 1.80	2	3	3
5	30.91 ± 1.85	2	2	3
6	31.56 ± 1.89	2	2	4
7	32.43 ± 1.95	2	2	2
8	31.19 ± 1.87	2	2	3
9	32.02 ± 1.92	2	1	2
10	33.08 ± 1.98	3	3	5
11	29.67 ± 1.78	2	2	5
12	31.61 ± 1.90	2	1	3
13	32.33 ± 1.94	1	2	3
14	31.50 ± 1.89	0	1	2
15	32.17 ± 1.93	2	2	5
16	30.40 ± 1.82	1	1	2

64 ALPHA SPECTROMETER

Calibration (17 min) N=10		Background (80 000 s) N=10 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	21.85 ± 1.31	1	1	4
2	19.26 ± 1.16	1	2	2
3	21.00 ± 1.26	2	2	5
4	20.31 ± 1.22	0	0	0
5	21.38 ± 1.28	1	3	2
6	19.77 ± 1.19	0	1	1
7	20.52 ± 1.23	1	1	1
8	19.77 ± 1.19	1	1	2
9	22.15 ± 1.33	3	1	3
10	19.71 ± 1.18	0	1	3
11	22.22 ± 1.33	1	2	1
12	21.15 ± 1.27	0	0	1
13	22.73 ± 1.36	1	1	0
14	20.42 ± 1.23	1	3	1
15	21.94 ± 1.32	0	1	0
16	21.95 ± 1.32	0	1	1

TABLE E-IV (cont)

80 ALPHA SPECTROMETER

Calibration (17 min) N=10		Background (80 000 s) N=10 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	20.48 ± 1.23	2	4	2
2	18.90 ± 1.13	0	1	1
3	20.52 ± 1.23	1	3	1
4	20.10 ± 1.21	1	1	5
5	21.99 ± 1.26	2	4	4
6	20.54 ± 1.23	1	3	2
7	21.00 ± 1.26	2	4	5
8	20.28 ± 1.22	2	3	5
9	19.77 ± 1.19	1	1	2
10	19.81 ± 1.19	1	4	3
11	20.58 ± 1.23	4	3	3
12	18.91 ± 1.13	0	1	0
13	18.93 ± 1.14	0	0	0
14	19.50 ± 1.17	0	0	1
15	20.41 ± 1.22	1	1	4
16	19.05 ± 1.14	0	0	0

Uranium and Thorium Background (70 000 s) N=10								
Detector	U-238	U-235	U-234	U232	Th-232	Th-230	Th-229	Th-228
1	0	1	0	5	-	-	-	-
2	0	0	0	1	-	-	-	-
3	0	0	0	0	-	-	-	-
4	0	0	0	0	-	-	-	-
5	0	0	0	1	-	-	-	-
6	0	0	0	0	-	-	-	-
7	0	0	1	0	-	-	-	-
8	0	0	0	0	-	-	-	-
9	0	0	0	0	-	-	-	-
10	0	0	0	1	-	-	-	-
11	0	1	1	4	-	-	-	-
12	0	0	0	0	-	-	-	-
13	1	0	1	2	-	-	-	-
14	0	0	0	1	-	-	-	-
15	0	0	0	0	-	-	-	-
16	1	0	0	0	-	-	-	-

96 ALPHA SPECTROMETER

Plutonium, Uranium and Thorium Calibration (17 min) N=10		Background (80 000 s) N=9 Mean Counts Per 20 Channels		
Detector	Mean Eff. ± 3 Std Dev	Pu-242	Pu-239	Pu-238
1	15.73 ± 0.94	1	5	1
2	15.09 ± 0.91	0	0	2
3	14.57 ± 0.87	0	0	2
4	15.69 ± 0.94	0	0	2
5	14.93 ± 0.90	0	0	3
6	15.93 ± 0.96	0	0	1
7	16.94 ± 1.02	1	0	1
8	14.32 ± 0.86	0	0	1
9	15.61 ± 0.94	0	0	3
10	15.83 ± 0.95	0	0	1
11	16.06 ± 0.96	1	4	0
12	14.78 ± 0.89	0	0	1
13	16.59 ± 1.00	0	1	3
14	16.29 ± 0.98	0	0	2
15	15.24 ± 0.91	0	0	1
16	13.43 ± 0.81	0	0	2

Background (80 000 s) N=9 Mean Counts Per 20 Channels		
Detector	Am-243	Am-241
1	5	2
2	0	3
3	0	3
4	0	3
5	0	5
6	0	2
7	0	1
8	0	2
9	0	4
10	0	2
11	4	1
12	0	2
13	0	5
14	0	3
15	0	2
16	0	4

TABLE E-V

CALIBRATION DATA FOR THE 16 ROUTINE CALIBRATION PLATES

Plate No.	D/M/30 min Mean ± Std Dev[a]	D/M/30 min Mean ± Std Dev[b]	D/M/30 min Mean ± Std Dev[c]	D/M/30 min Mean ± Std Dev[d]
1	1427 ± 9	1420 ± 10	1414 ± 15	1419 ± 6
2	1402 ± 9	1404 ± 10	1405 ± 12	1397 ± 10
3	1436 ± 7	1431 ± 10	1427 ± 11	1435 ± 9
4	1438 ± 10	1432 ± 10	1432 ± 14	1434 ± 9
5	1424 ± 13	1424 ± 10	1423 ± 12	1415 ± 10
6	1426 ± 9	1430 ± 10	1426 ± 9	1431 ± 11
7	1422 ± 9	1418 ± 8	1442 ± 28	1470 ± 10
8	1442 ± 15	1437 ± 11	1424 ± 10	1430 ± 12
9	1432 ± 10	1420 ± 11	1412 ± 11	1412 ± 11
10	1422 ± 11	1443 ± 6	1431 ± 10	1440 ± 13
11	1443 ± 7	1413 ± 15	1435 ± 12	1447 ± 8
12	1450 ± 8	1427 ± 15	1420 ± 13	1432 ± 12
13	1423 ± 8	1452 ± 20	1444 ± 10	1449 ± 11
14	1440 ± 11	1425 ± 17	1426 ± 9	1431 ± 14
15	1444 ± 8	1448 ± 11	1446 ± 10	1445 ± 6
16	1418 ± 9	1424 ± 13	1419 ± 15	1415 ± 10

$$\text{D/M of std plate} = \frac{\text{counts}}{\text{time x eff}} = \frac{\text{counts}}{30 \times 0.5119}$$

[a]First quarter 1988. Ten calibrations included in the mean.
[b]Second quarter 1988. Ten calibrations included in the mean.
[c]Third quarter 1988. Fourteen calibraions included in the mean.
[d]Fourth quarter 1988. Thirteen calibrations included in the mean.

Note: In June 1984 HSE-9 began using a set of 16 electroplated standards to routinely calibrate all alpha counting equipment. These standards contain Am-241, Pu-239, and Pu-242. The 16 standards are being routinely counted on the gas-flow proportional counter, which is calibrated with NBS SRM 4906-B33. The 1988 data are recorded on pages 54-59 of Notebook A003087.

TABLE E-VI

CALIBRATION DATA FOR THE 16 PLATES AS A SET

Date	No. of Calibrations	Eff. (%)	D/M/30 min Mean ± Std Dev[a]
1-25-88	14	51.19	1429 ± 13
2-02-88	10	50.90	1430 ± 12
3-19-88	12	50.95	1428 ± 12
4-19-88	10	50.91	1429 ± 13
6-01-88	12	50.97	1430 ± 13
7-01-88	10	50.84	1430 ± 12
10-03-88	14	50.89	1427 ± 11
11-28-88	13	50.76	1432 ± 18

[a]All 16 plates.

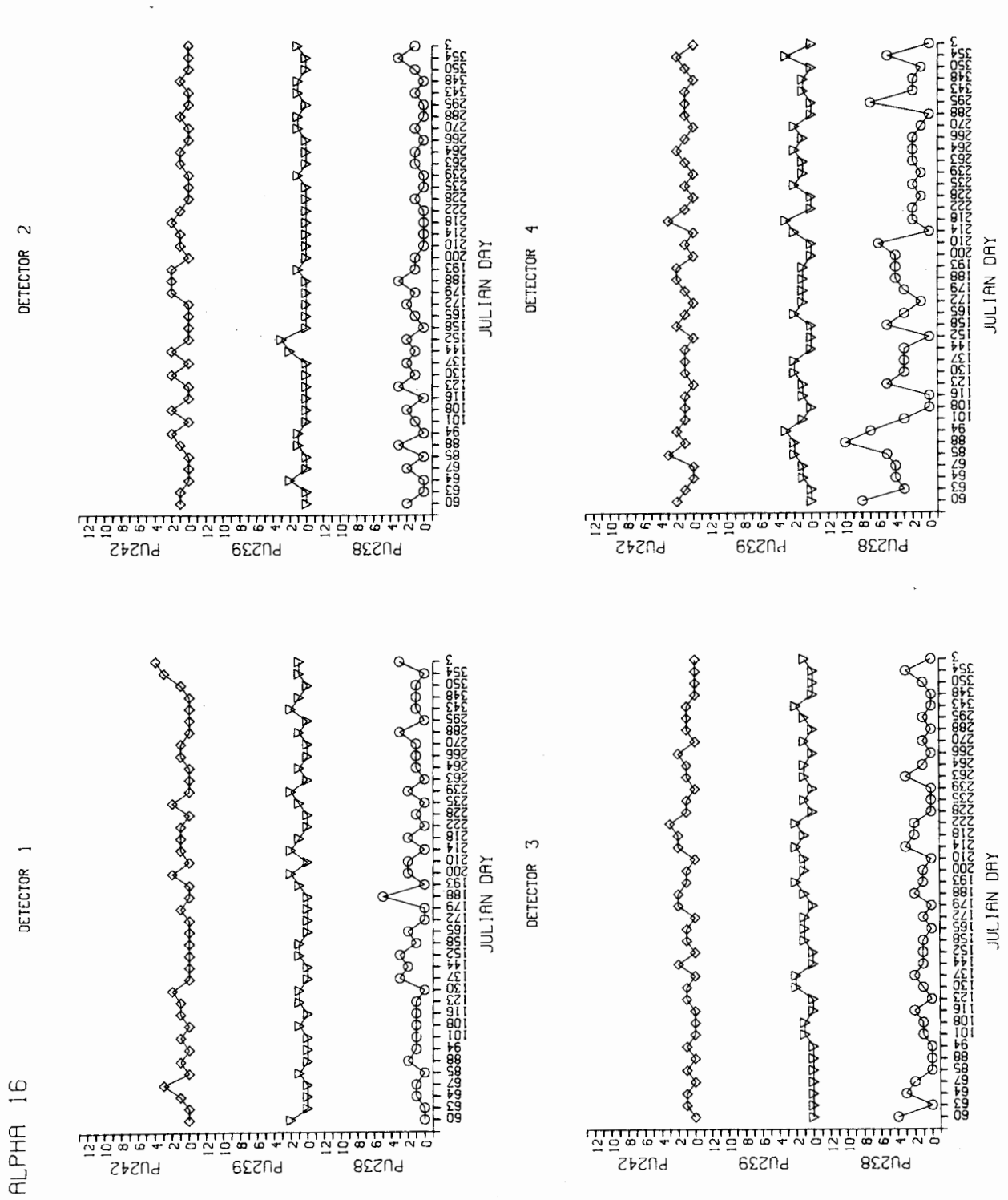


Fig. E-1. Plots of alpha specrtometer background data.

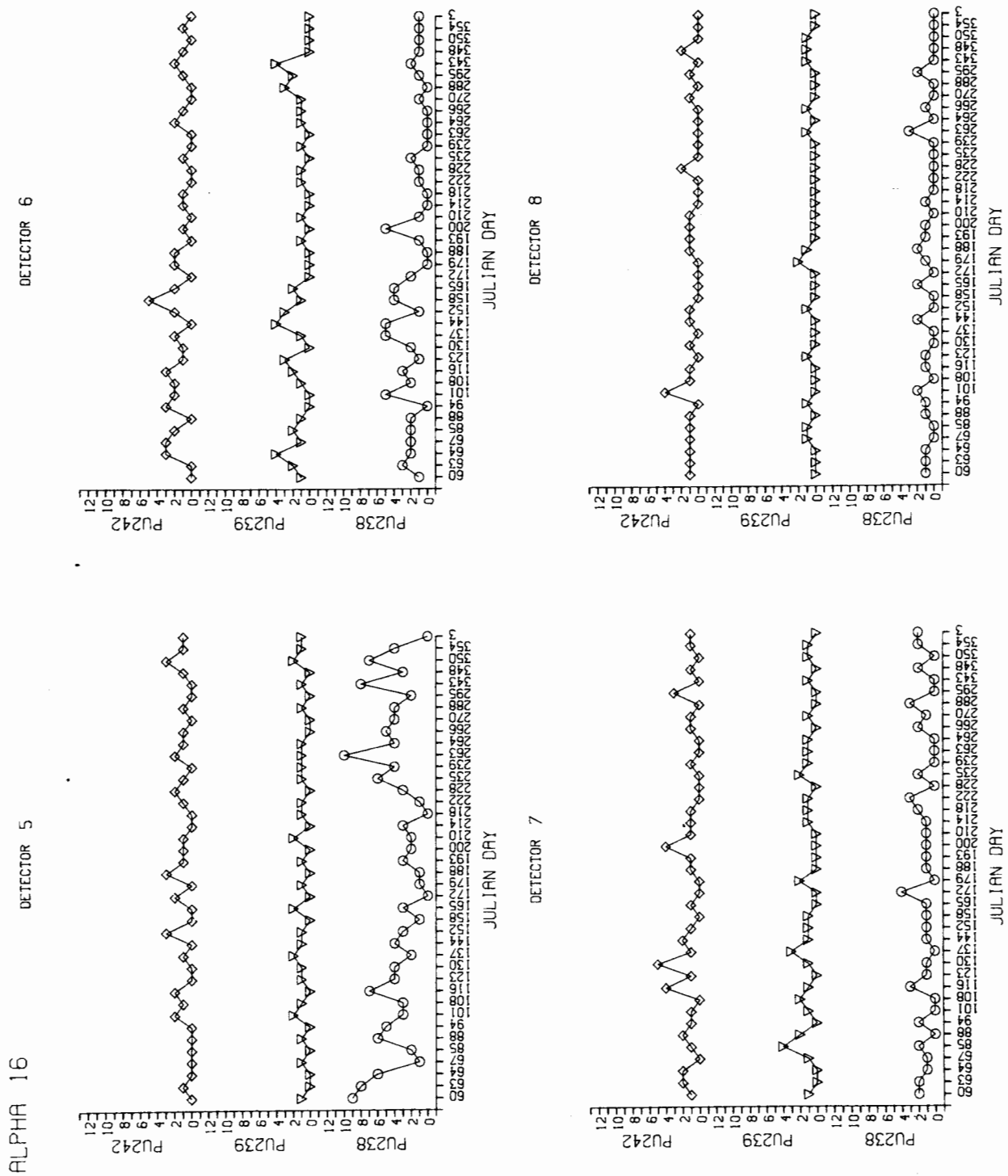

ALPHA 16
DETECTOR 5
DETECTOR 6
DETECTOR 7
DETECTOR 8
PU238
PU239
PU242
JULIAN DAY

Fig. E-1. (cont)

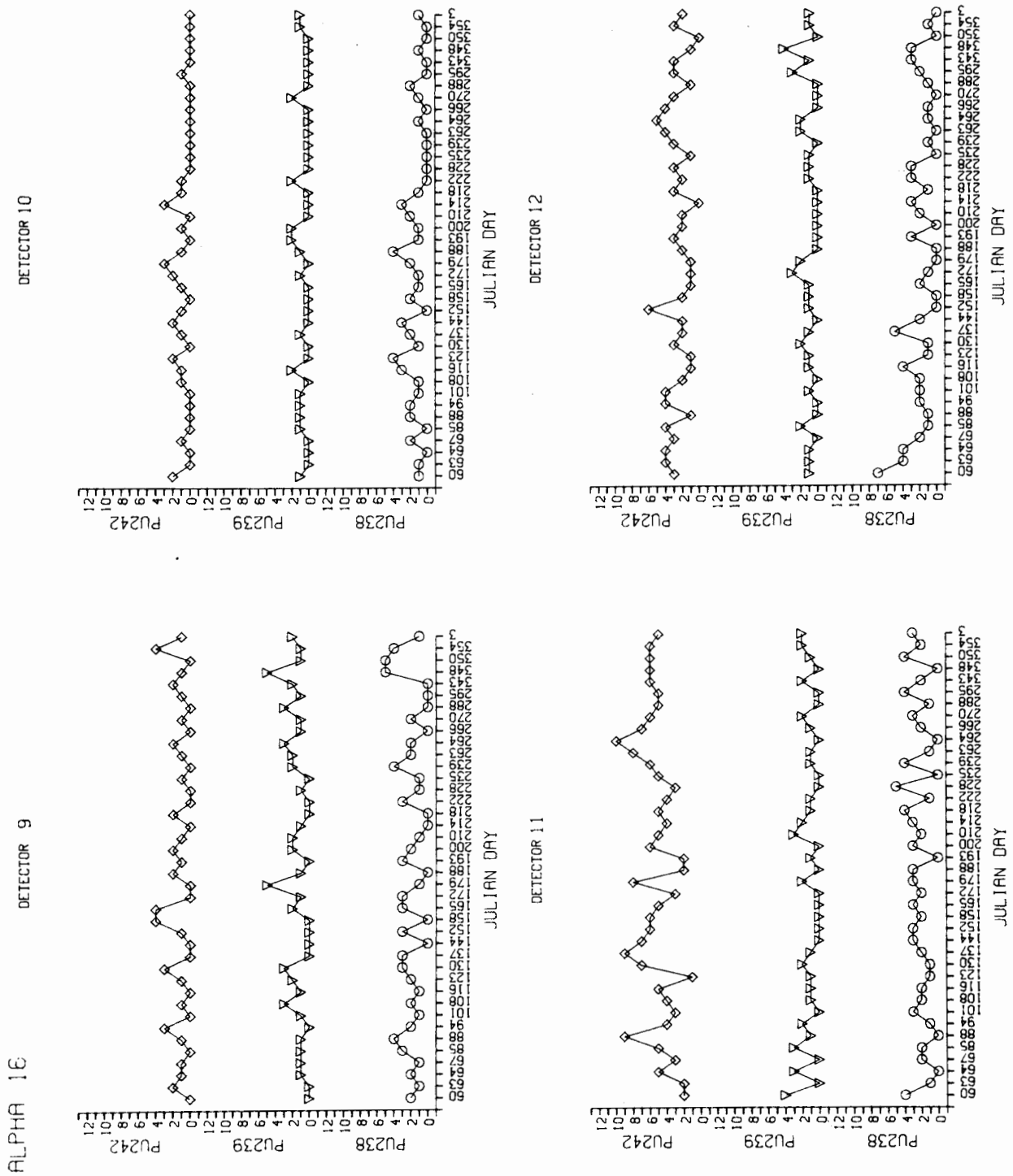

ALPHA 16
DETECTOR 9
DETECTOR 10
DETECTOR 11
DETECTOR 12
PU242
PU239
PU238
JULIAN DAY

Fig. E-1. (cont)

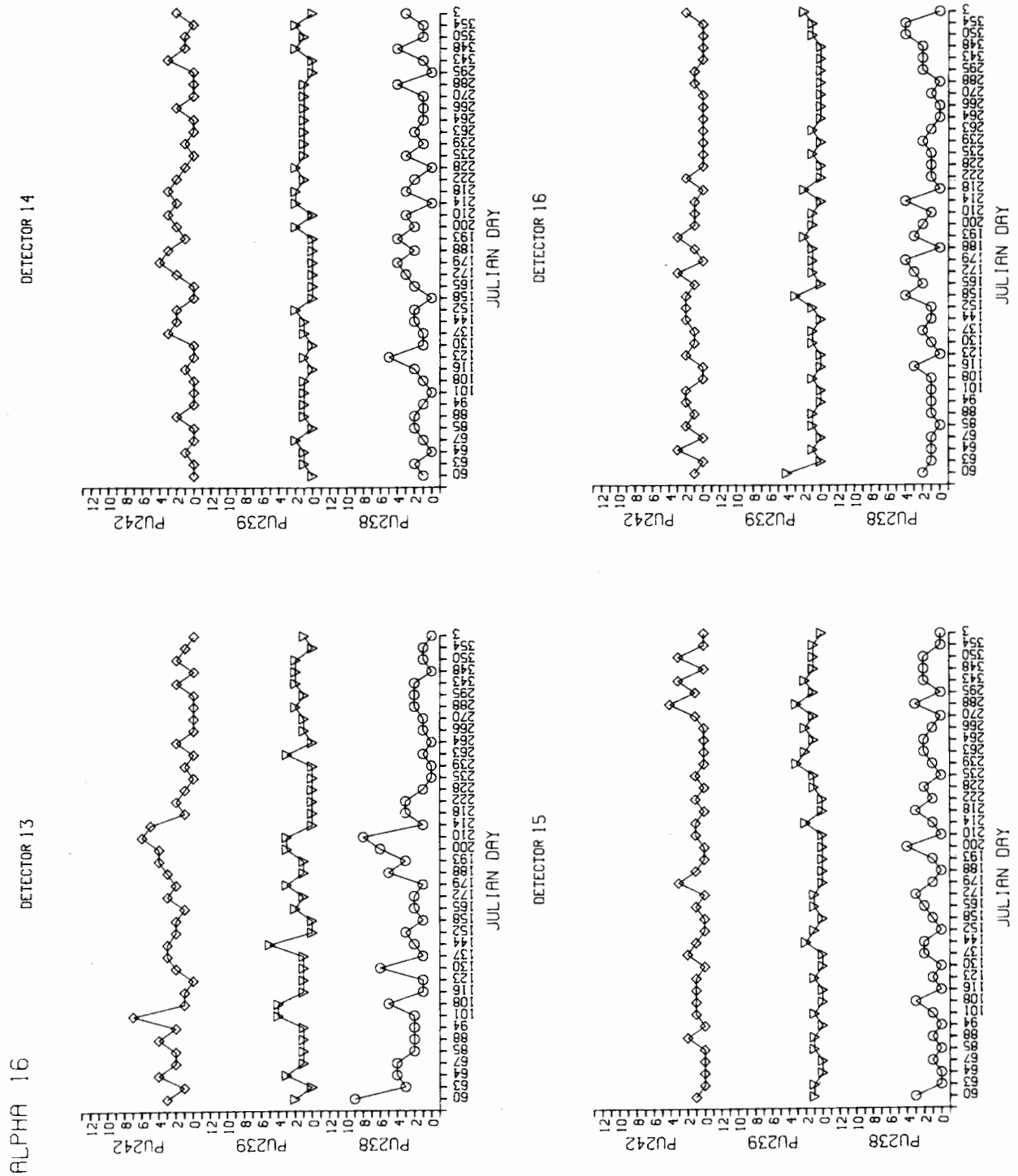

ALPHA 16
DETECTOR 13
DETECTOR 14
DETECTOR 15
DETECTOR 16
PU238
PU239
PU242
JULIAN DAY

Fig. E-1. (cont)

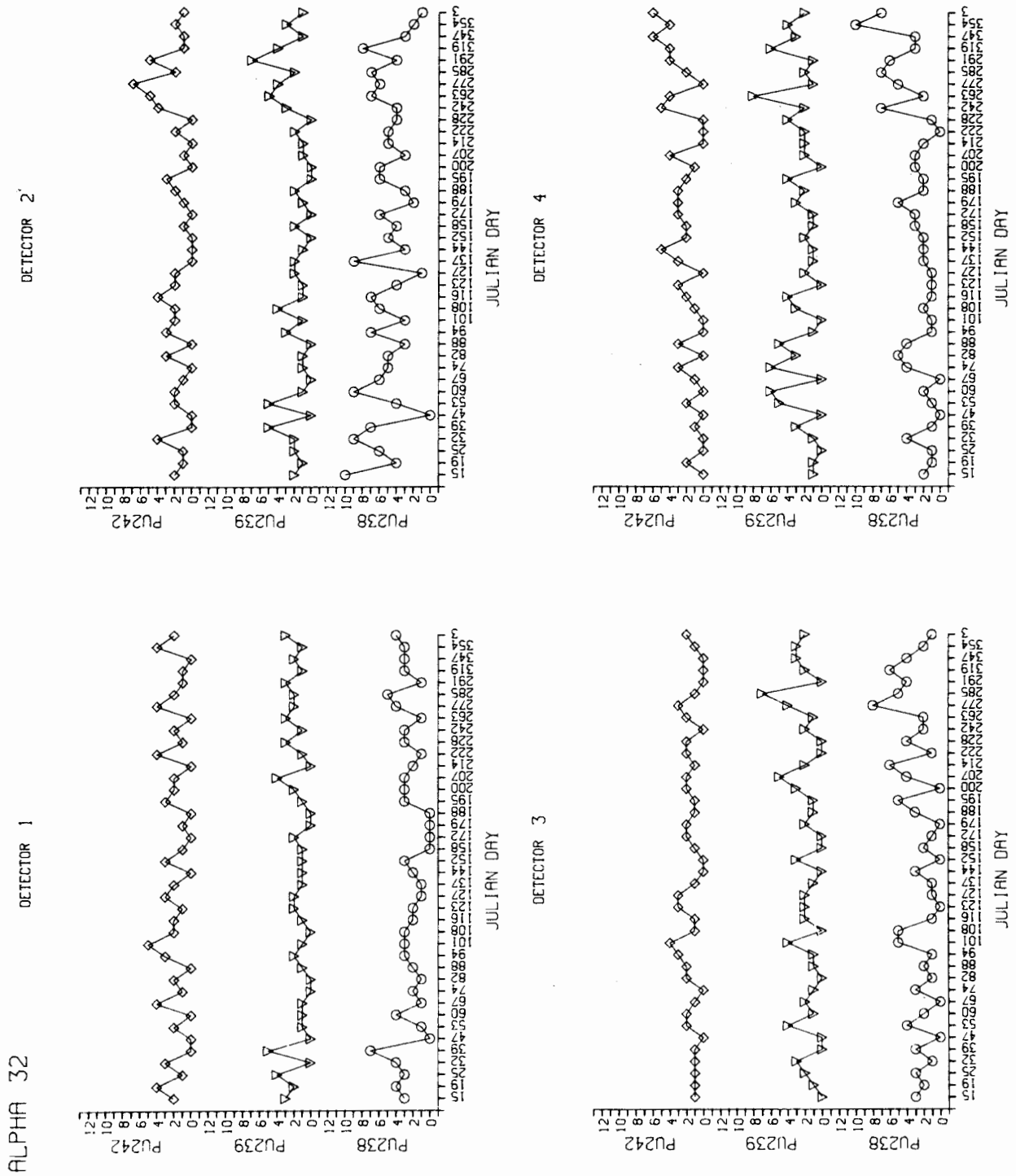

ALPHA 32
DETECTOR 1
DETECTOR 2
DETECTOR 3
DETECTOR 4
PU238
PU239
PU242
JULIAN DAY

Fig. E-1. (cont)

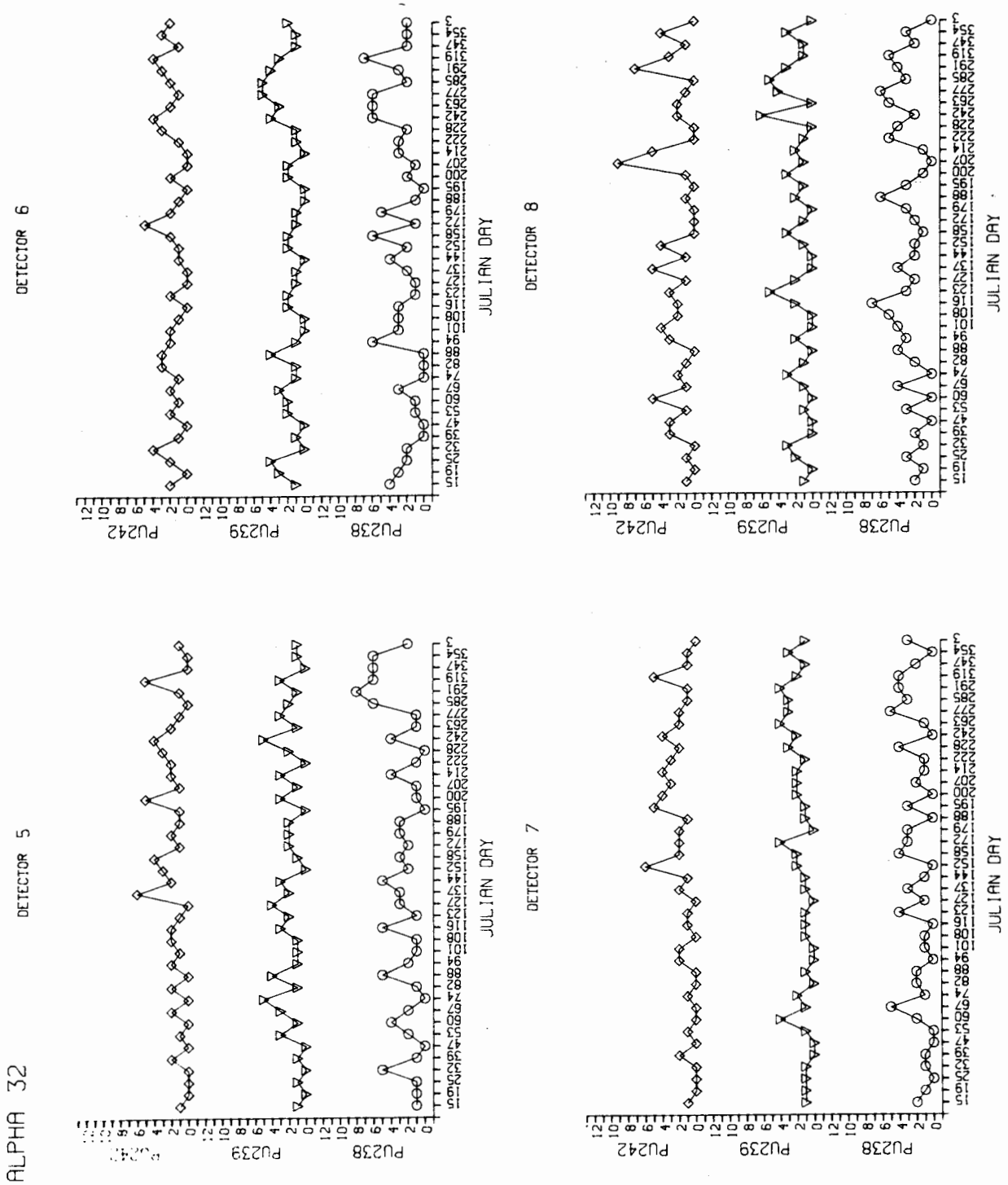

ALPHA 32
DETECTOR 5
DETECTOR 6
DETECTOR 7
DETECTOR 8
PU238
PU239
PU242
JULIAN DAY

Fig. E-1. (cont)

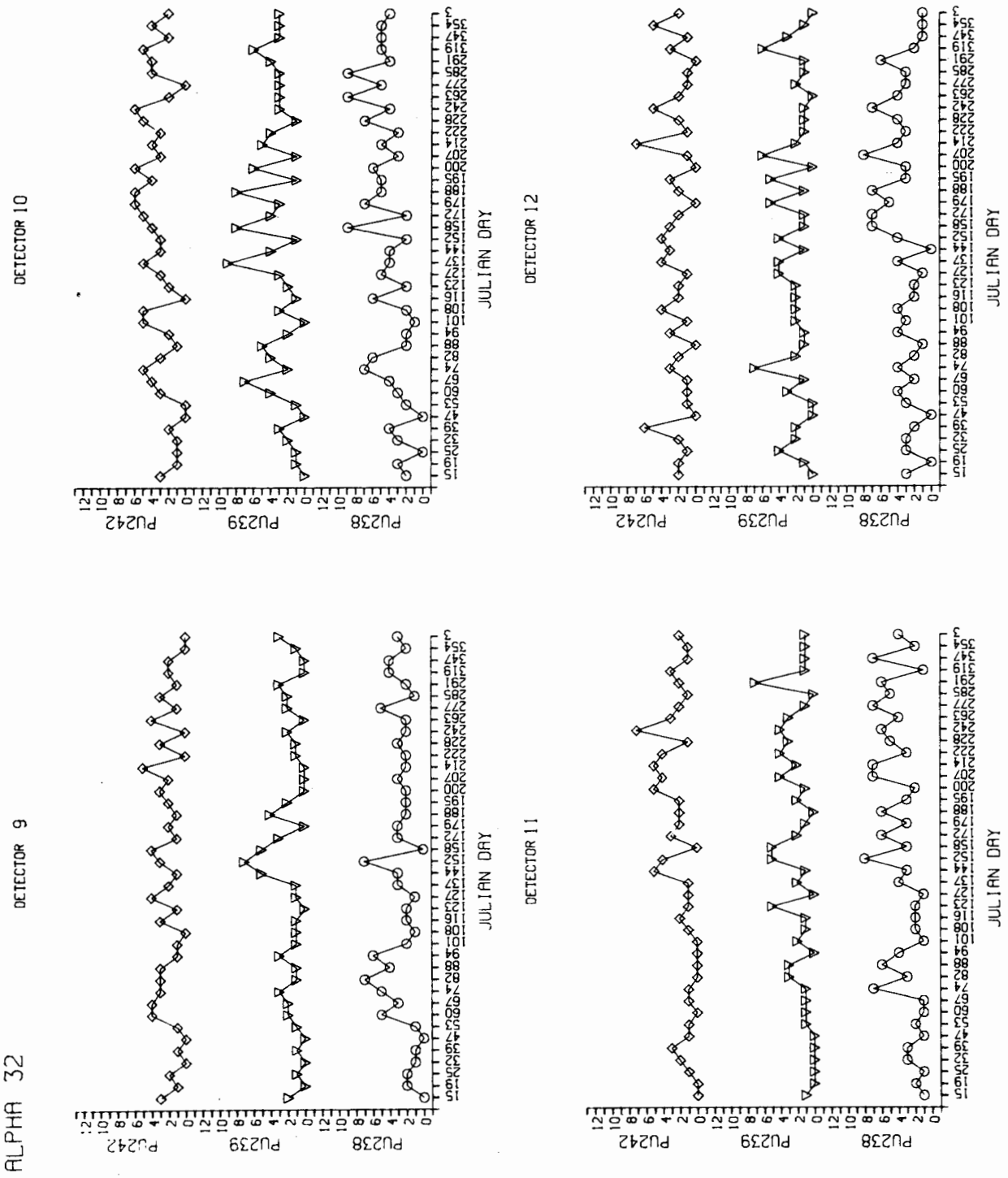

ALPHA 32
DETECTOR 9
DETECTOR 10
DETECTOR 11
DETECTOR 12
PU242
PU239
PU238
JULIAN DAY

Fig. E-1. (cont)

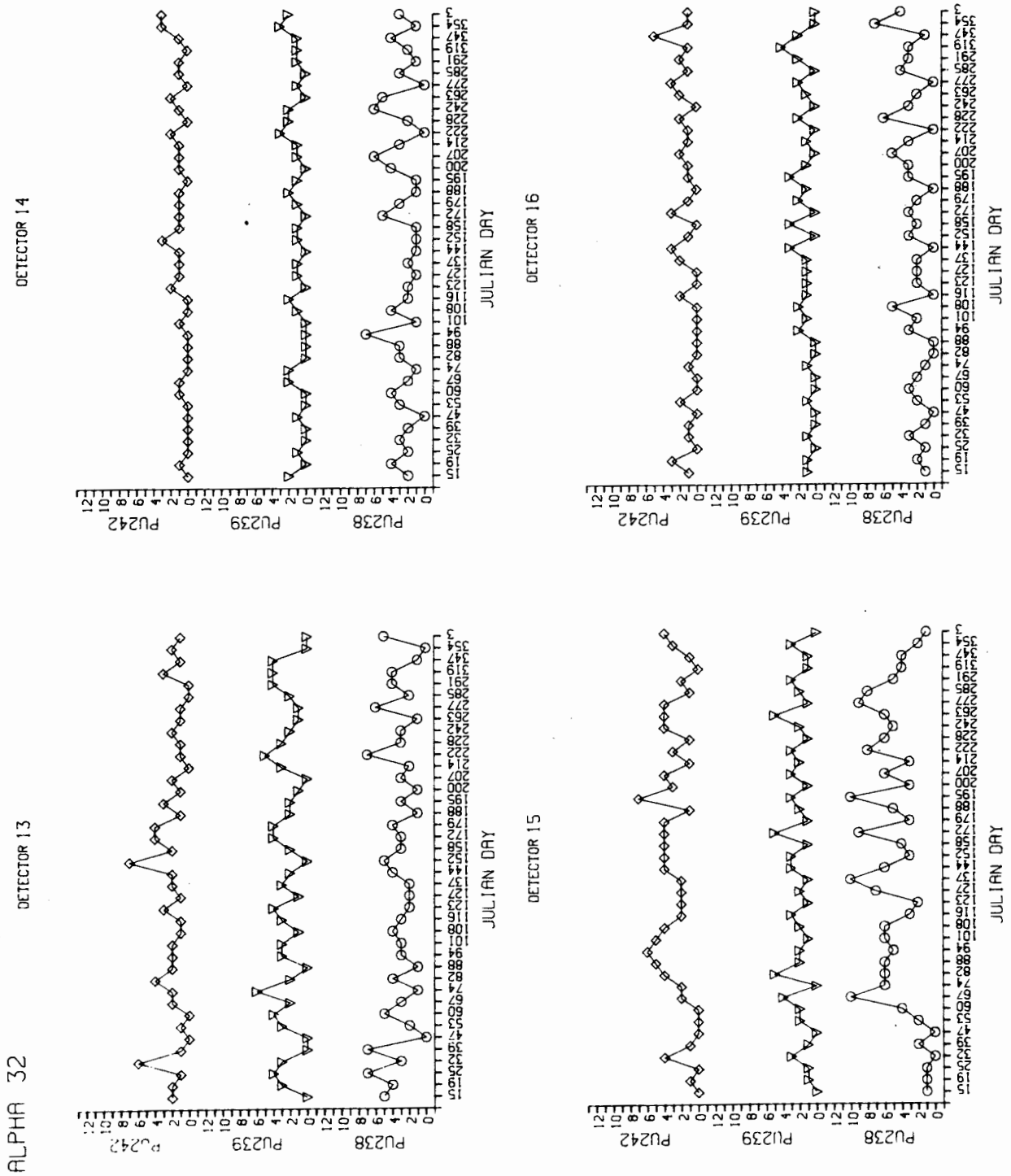

ALPHA 32
DETECTOR 13
DETECTOR 14
DETECTOR 15
DETECTOR 16
PU238
PU239
PU242
JULIAN DAY

Fig. E-1. (cont)

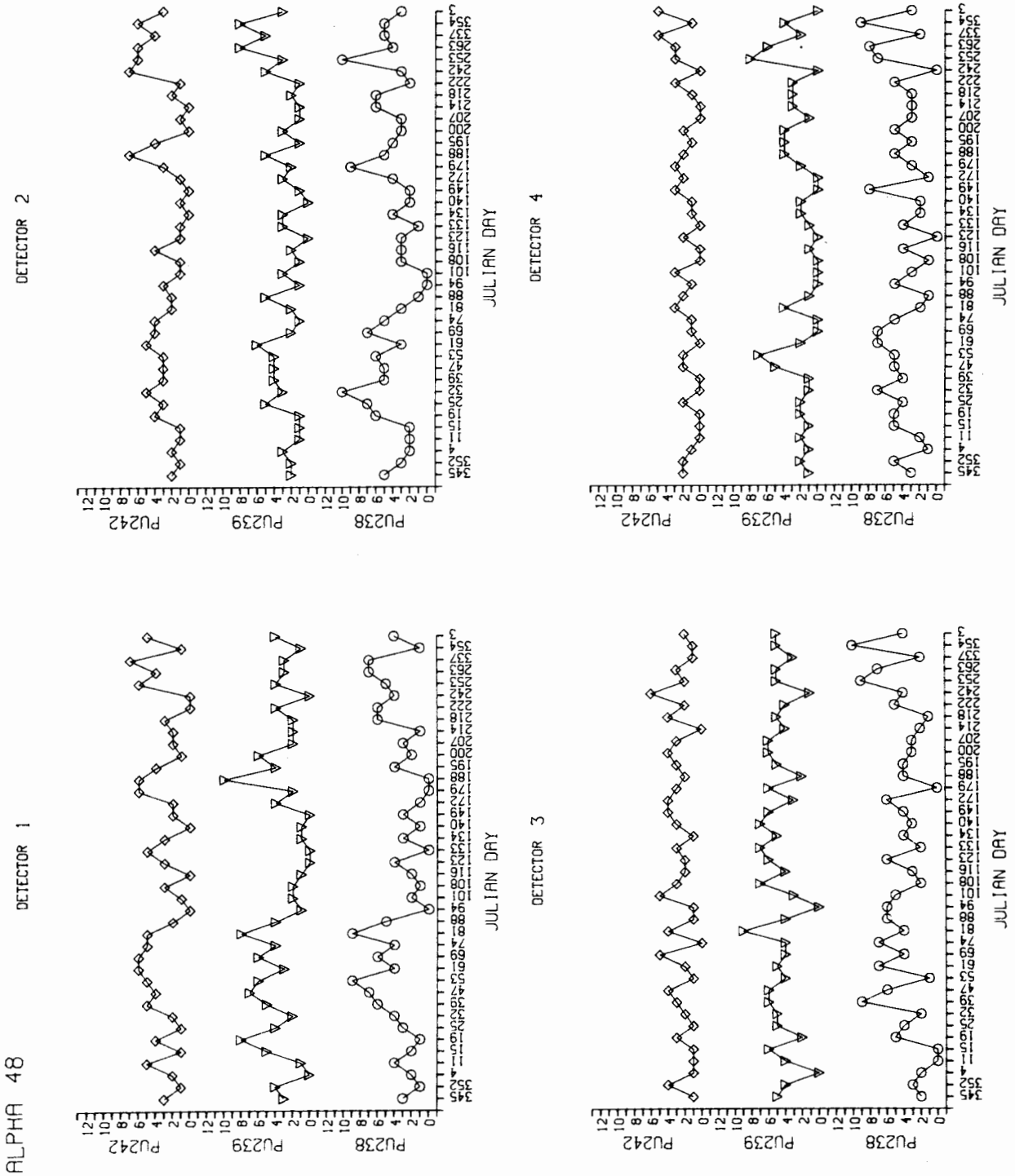

ALPHA 48
DETECTOR 1
DETECTOR 2
DETECTOR 3
DETECTOR 4
PU242
PU239
PU238
JULIAN DAY

Fig. E-1. (cont)

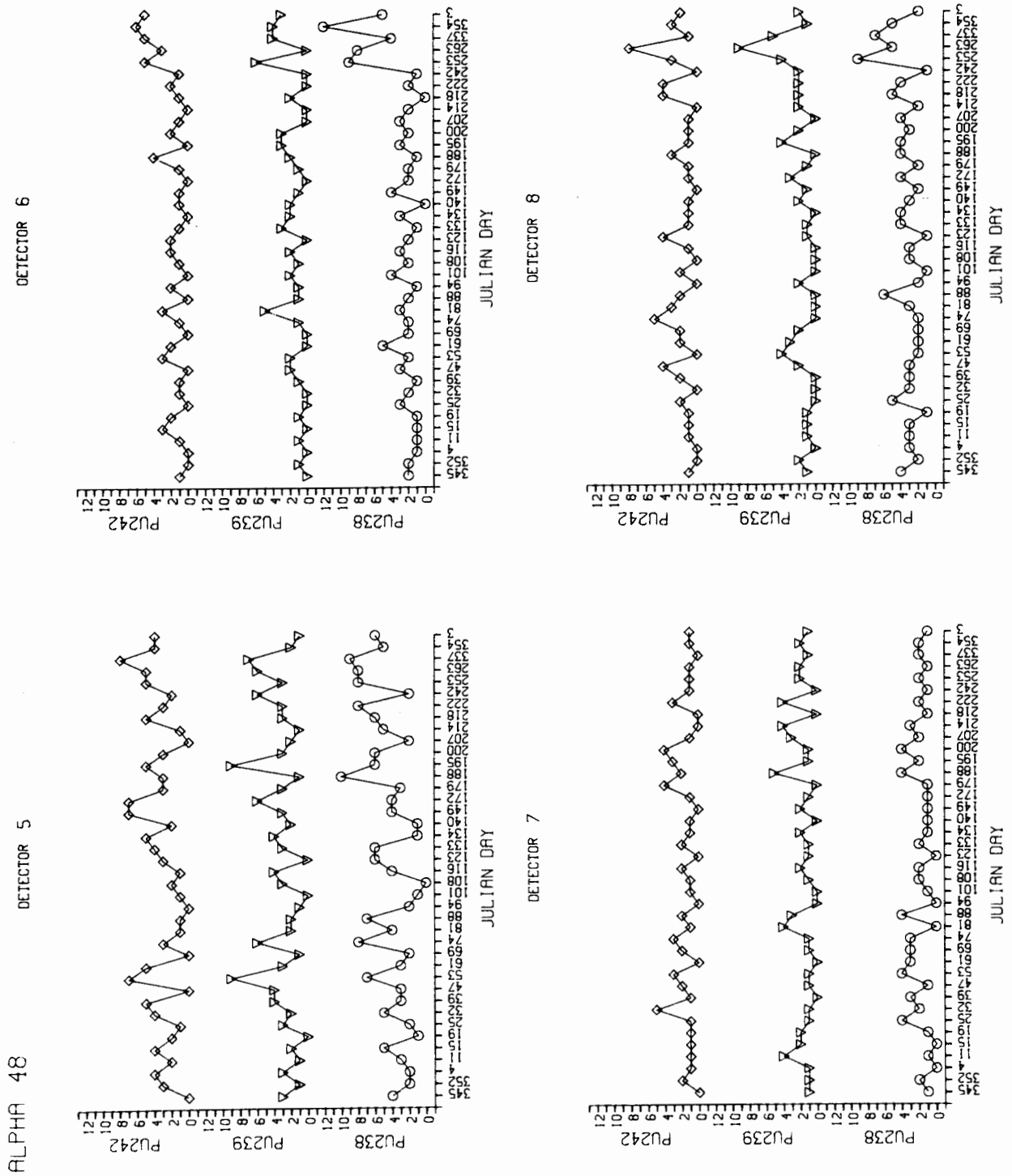

ALPHA 48
DETECTOR 5
DETECTOR 6
DETECTOR 7
DETECTOR 8
PU238
PU239
PU242
JULIAN DAY

Fig. E-1. (cont)

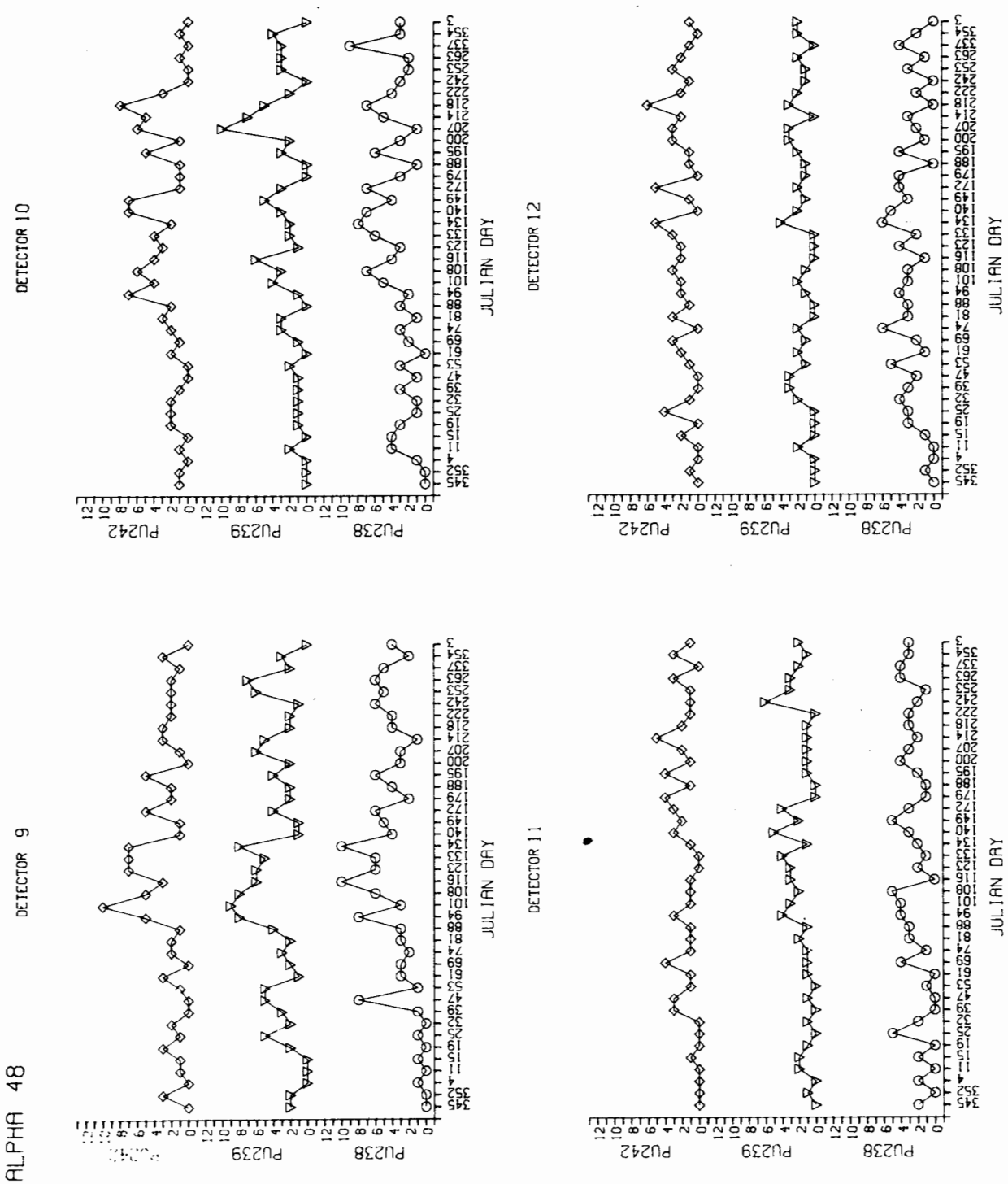

ALPHA 48
DETECTOR 9
DETECTOR 10
DETECTOR 11
DETECTOR 12
PU238
PU239
PU242
JULIAN DAY

Fig. E-1. (cont)

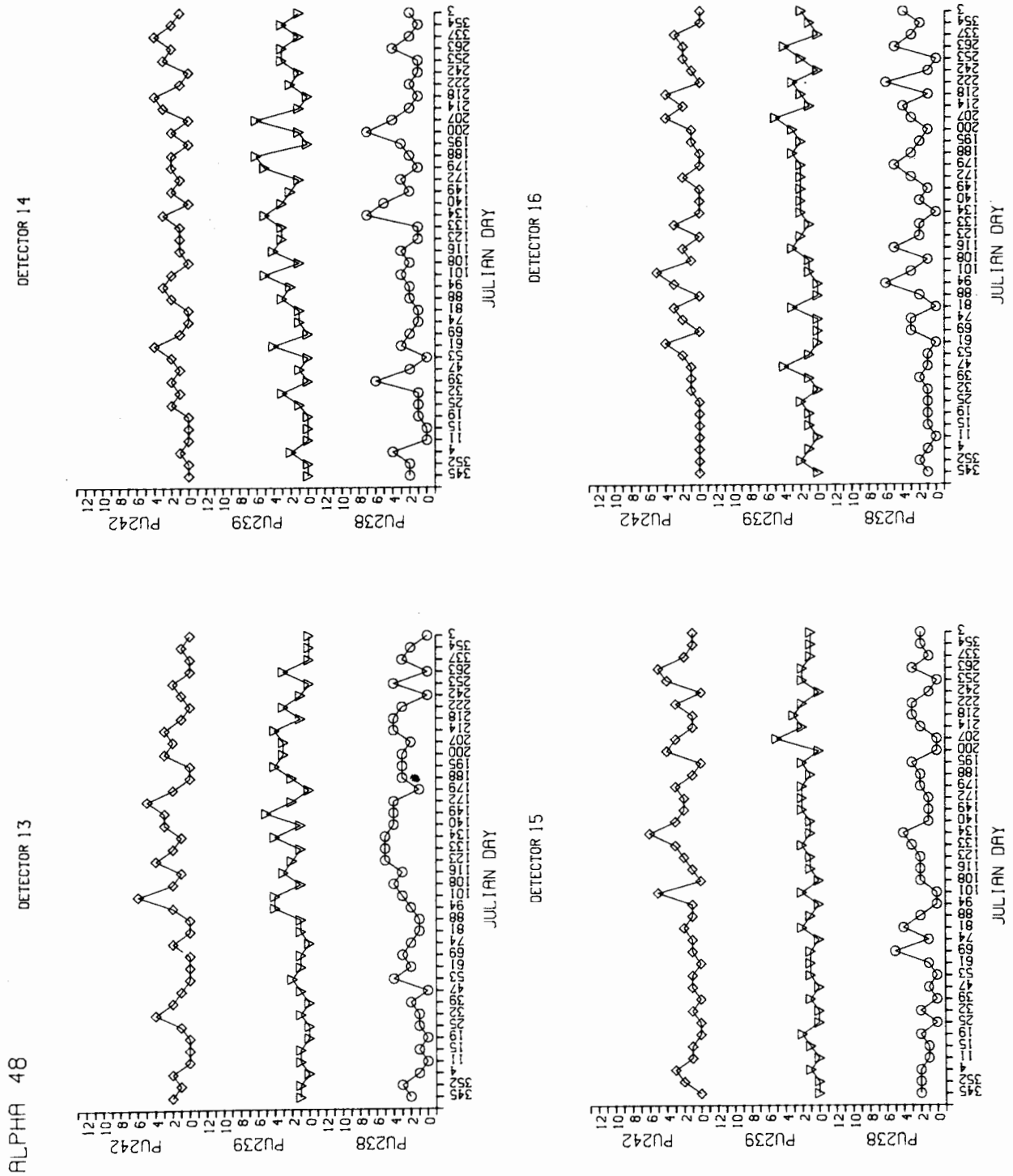

ALPHA 48
DETECTOR 13
DETECTOR 14
DETECTOR 15
DETECTOR 16
PU242
PU239
PU238
JULIAN DAY

Fig. E-1. (cont)

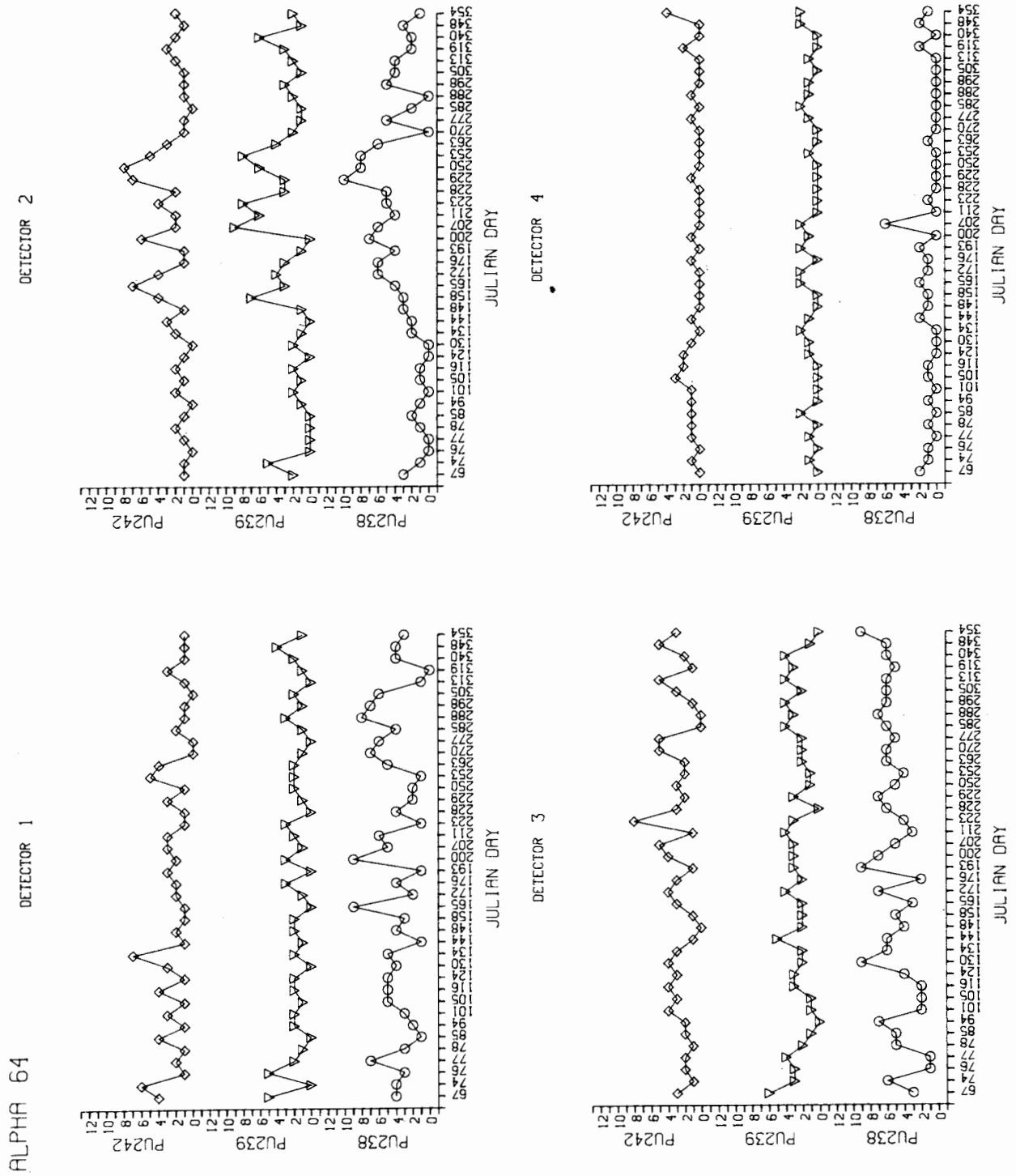

ALPHA 64
DETECTOR 1
DETECTOR 2
DETECTOR 3
DETECTOR 4
PU242
PU239
PU238
JULIAN DAY

Fig. E-1. (cont)

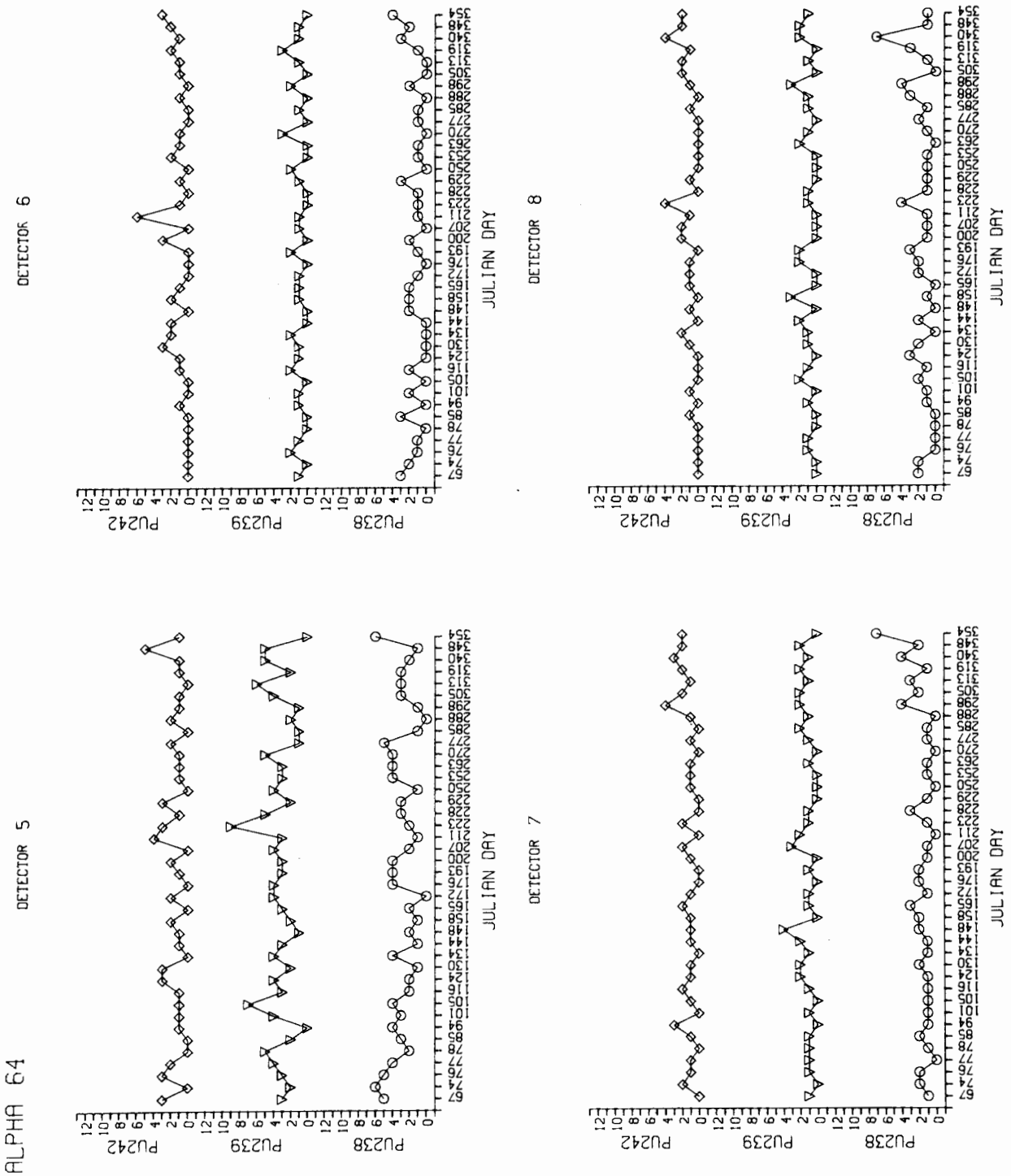

ALPHA 64
DETECTOR 5
DETECTOR 6
DETECTOR 7
DETECTOR 8
PU238
PU239
PU242
JULIAN DAY

Fig. E-1. (cont)

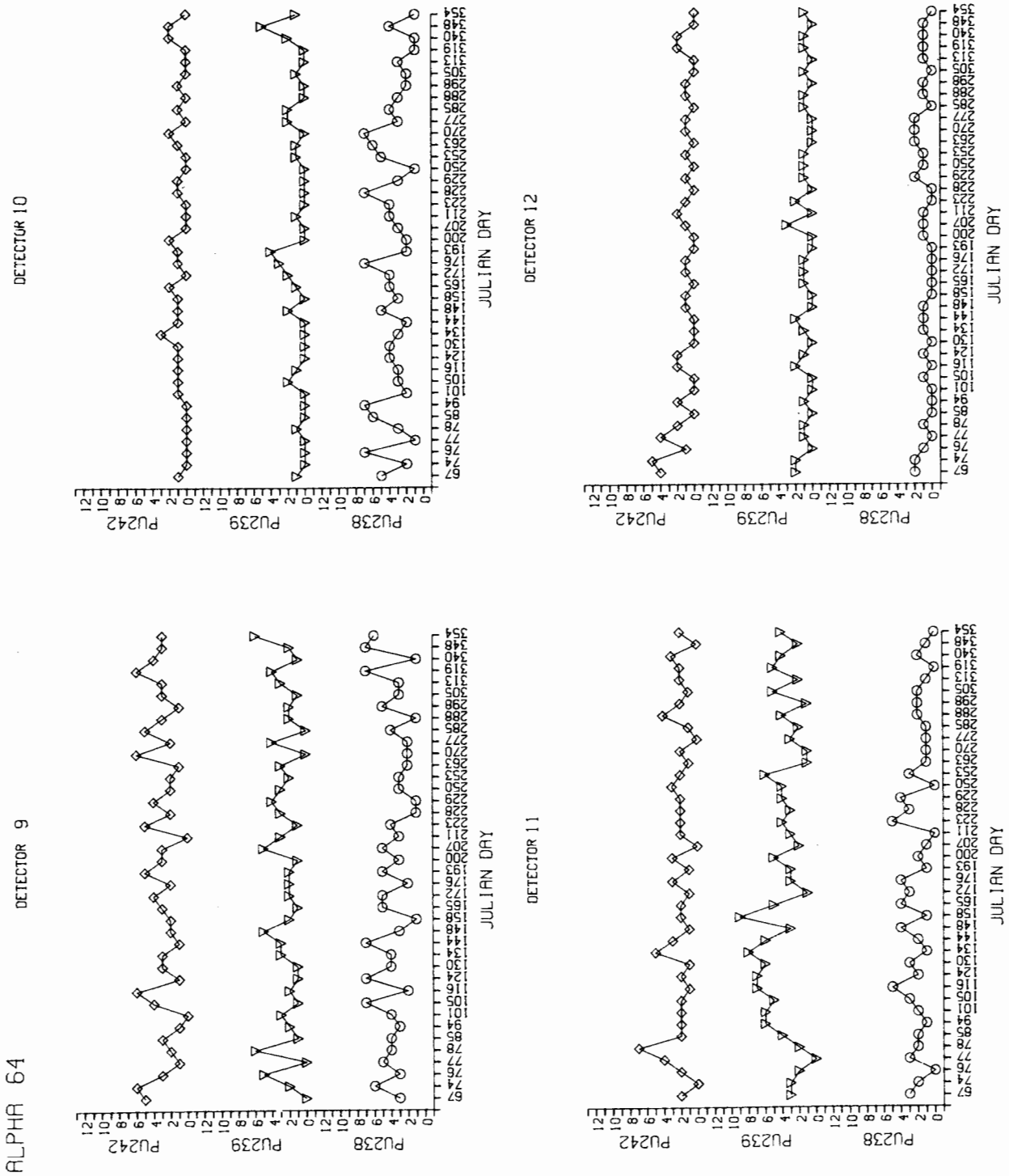
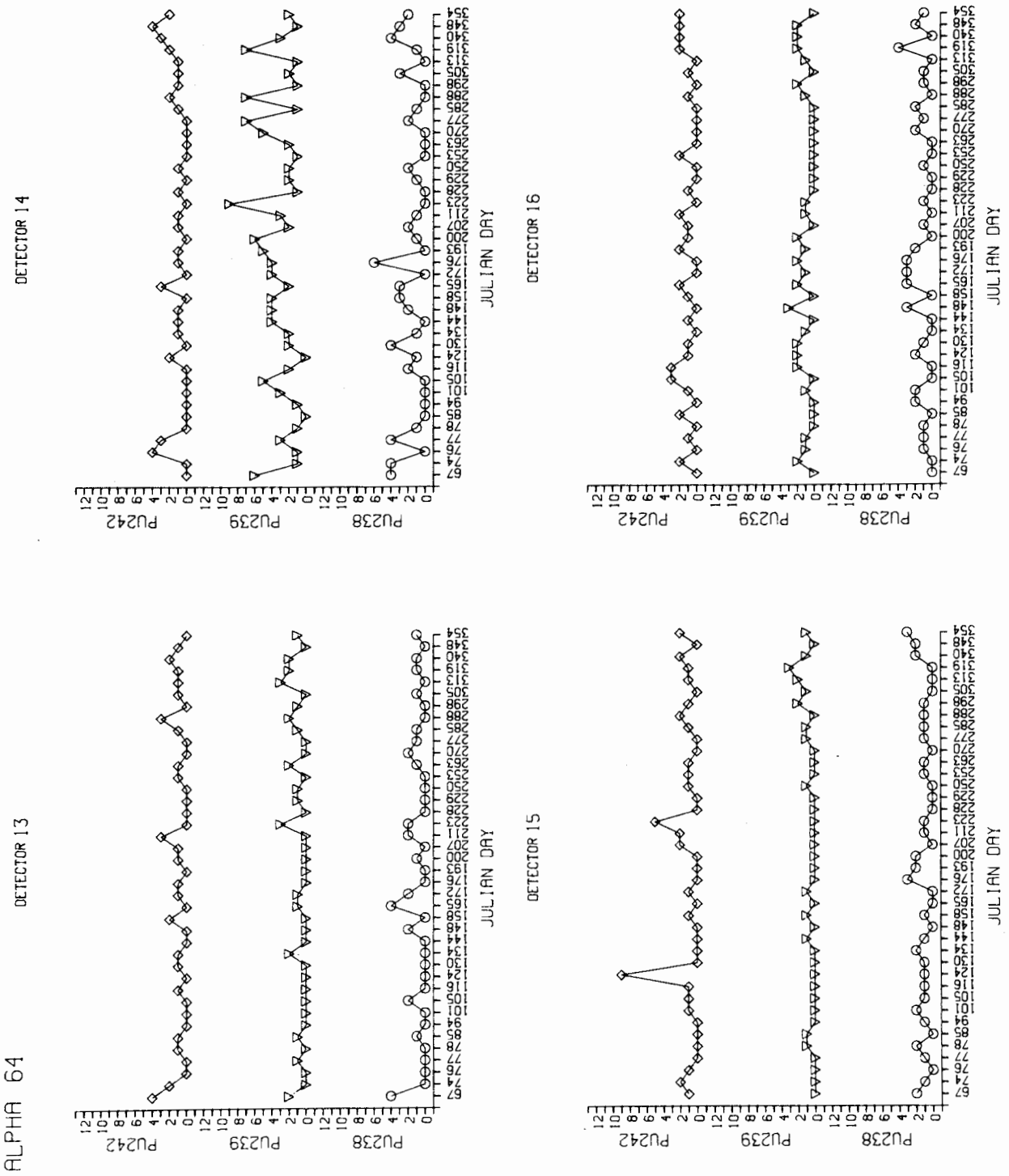

ALPHA 64
DETECTOR 9
DETECTOR 10
DETECTOR 11
DETECTOR 12
PU238
PU239
PU242
JULIAN DAY

Fig. E-1. (cont)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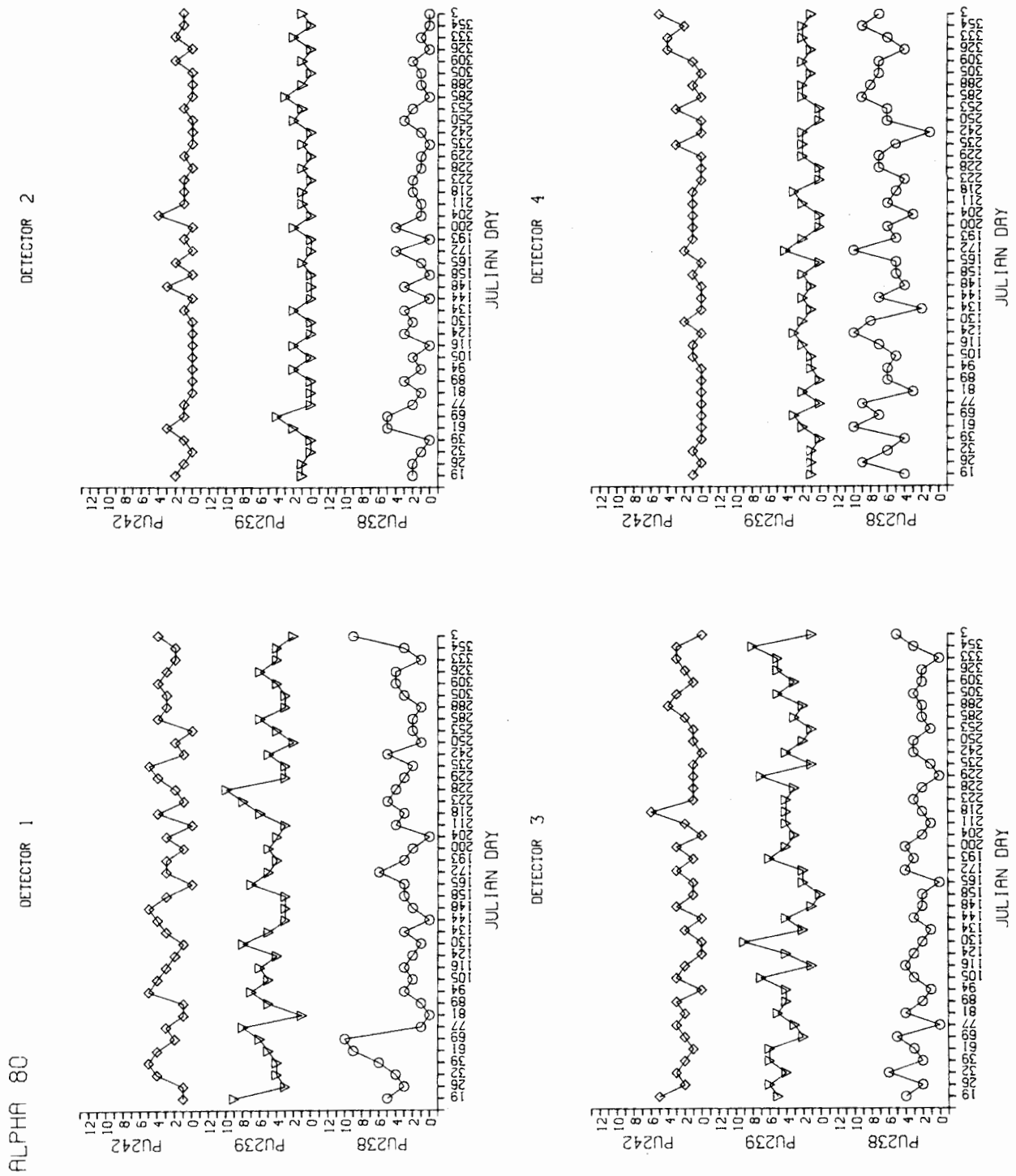
DETECTOR 16
PU238
PU239
PU242
JULIAN DAY

Fig. E-1. (cont)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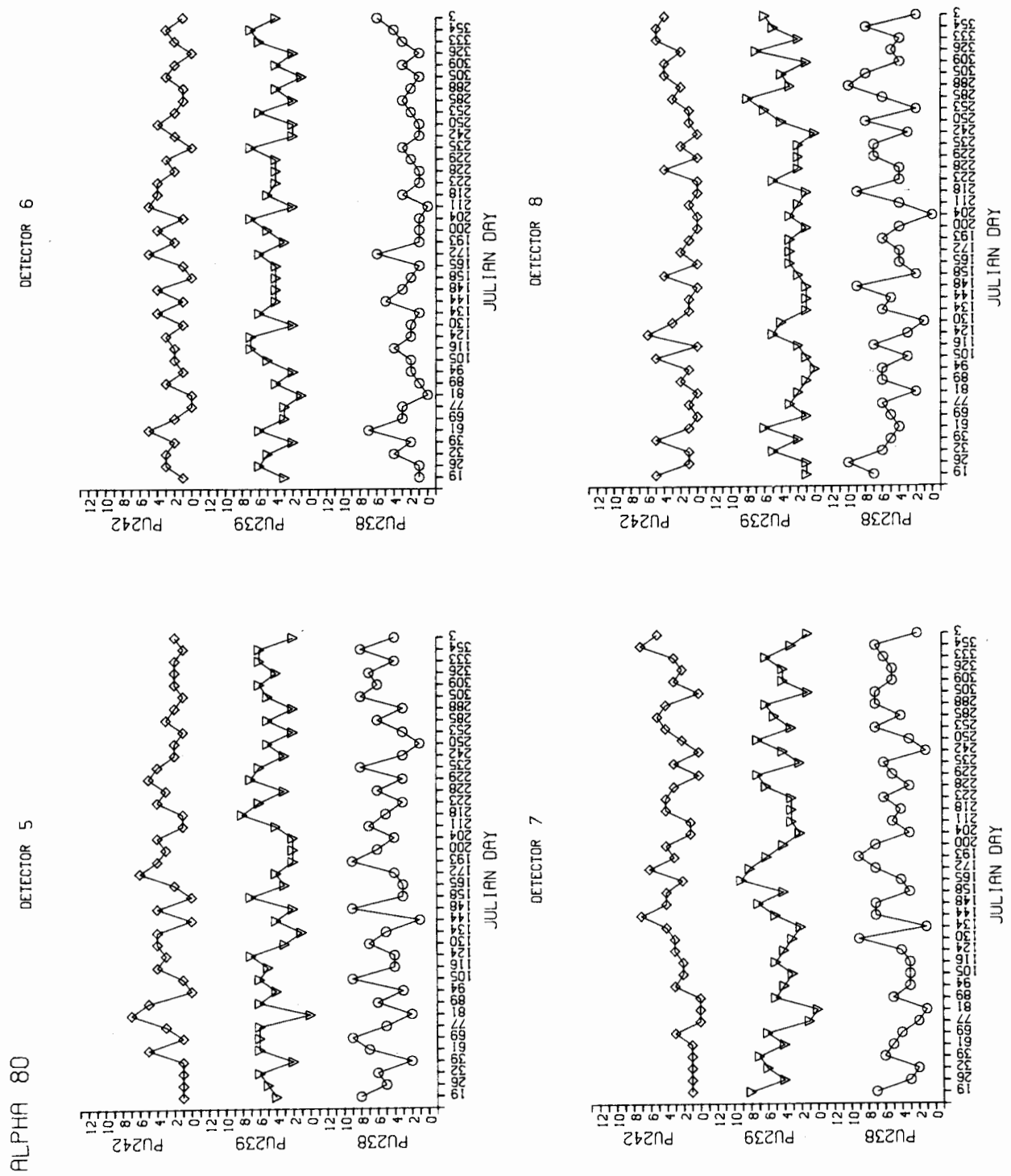
DETECTOR 2
DETECTOR 3
DETECTOR 4
PU238
PU239
PU242
JULIAN DAY

Fig. E-1. (cont)


ALPHA 80
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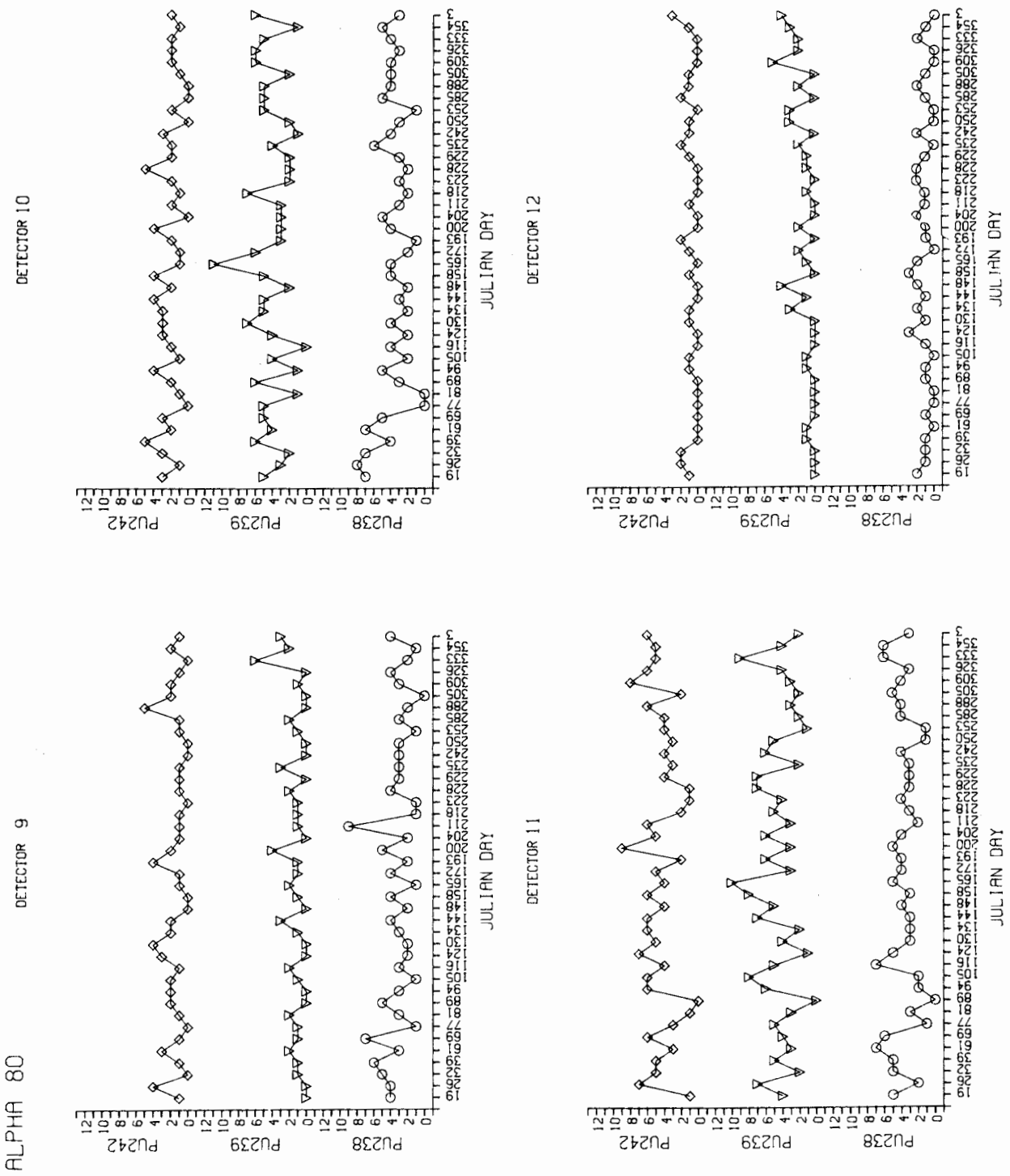
DETECTOR 6
DETECTOR 7
DETECTOR 8
PU238
PU239
PU242
JULIAN DAY

Fig. E-1. (cont)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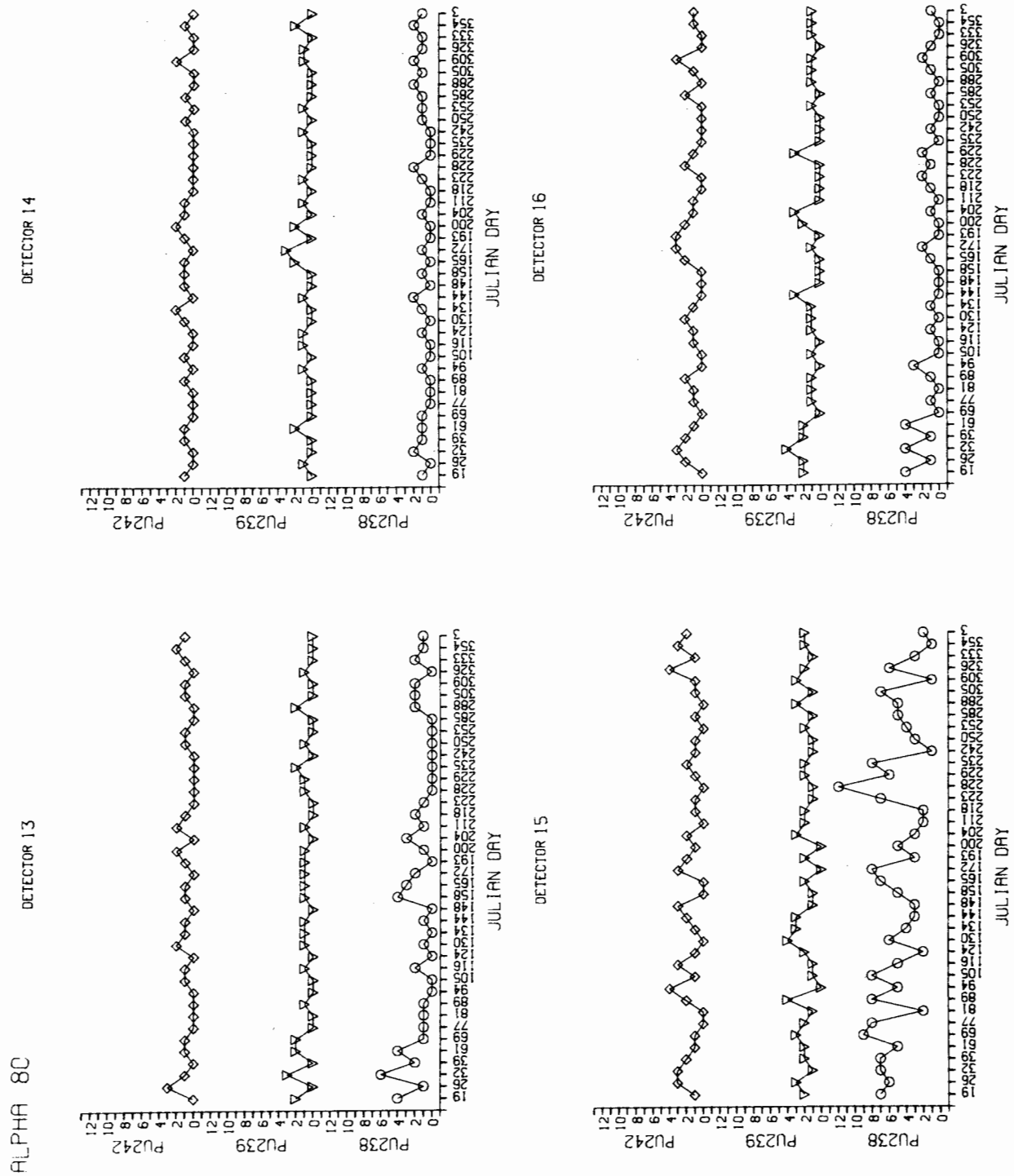
DETECTOR 10
DETECTOR 11
DETECTOR 12
PU238
PU239
PU242
JULIAN DAY

Fig. E-1. (cont)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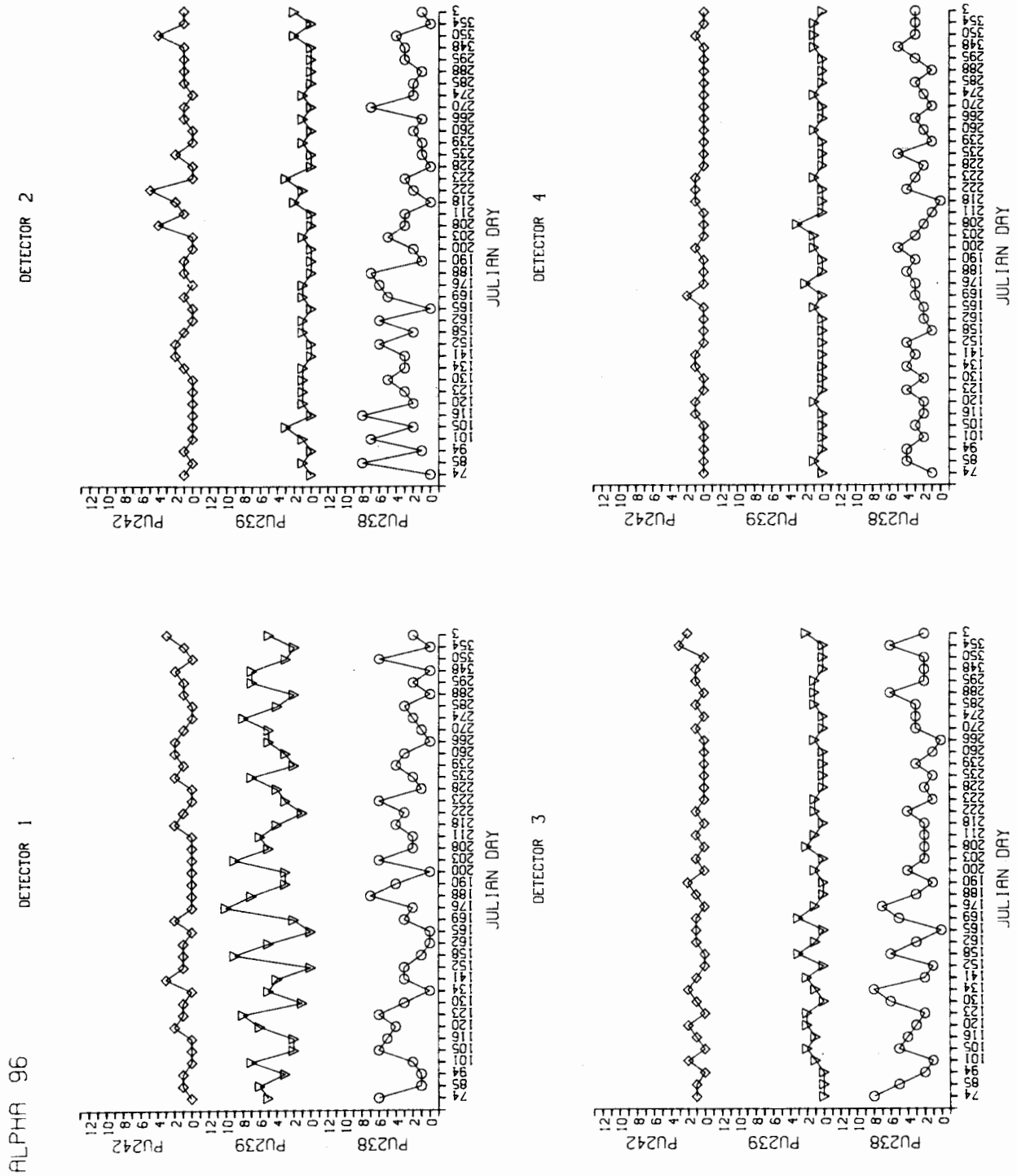
DETECTOR 14
DETECTOR 15
DETECTOR 16
PU238
PU239
PU242
JULIAN DAY

Fig. E-1. (cont)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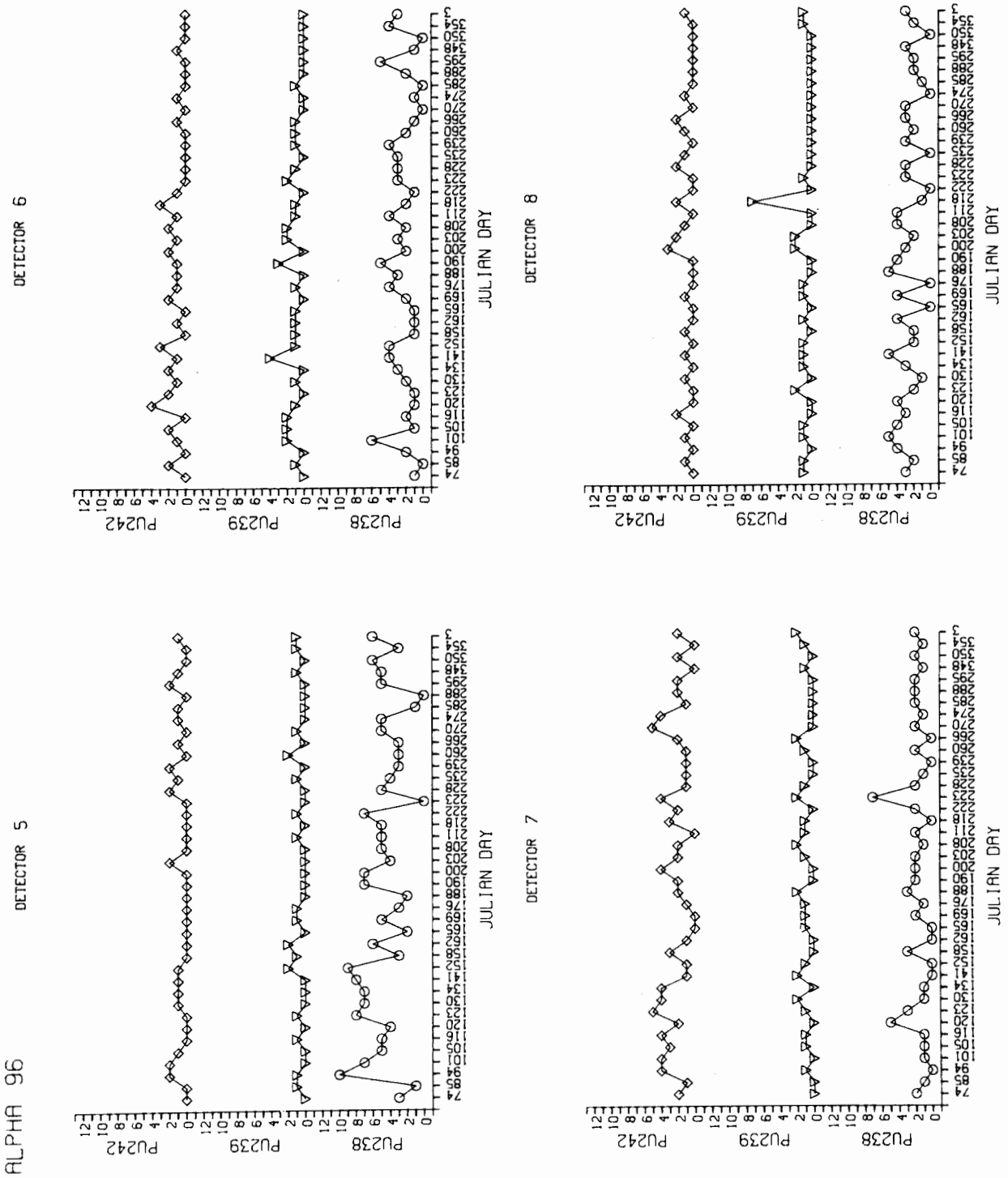
PU238
PU239
PU242
JULIAN DAY

Fig. E-1. (cont)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DETECTOR 7
DETECTOR 8
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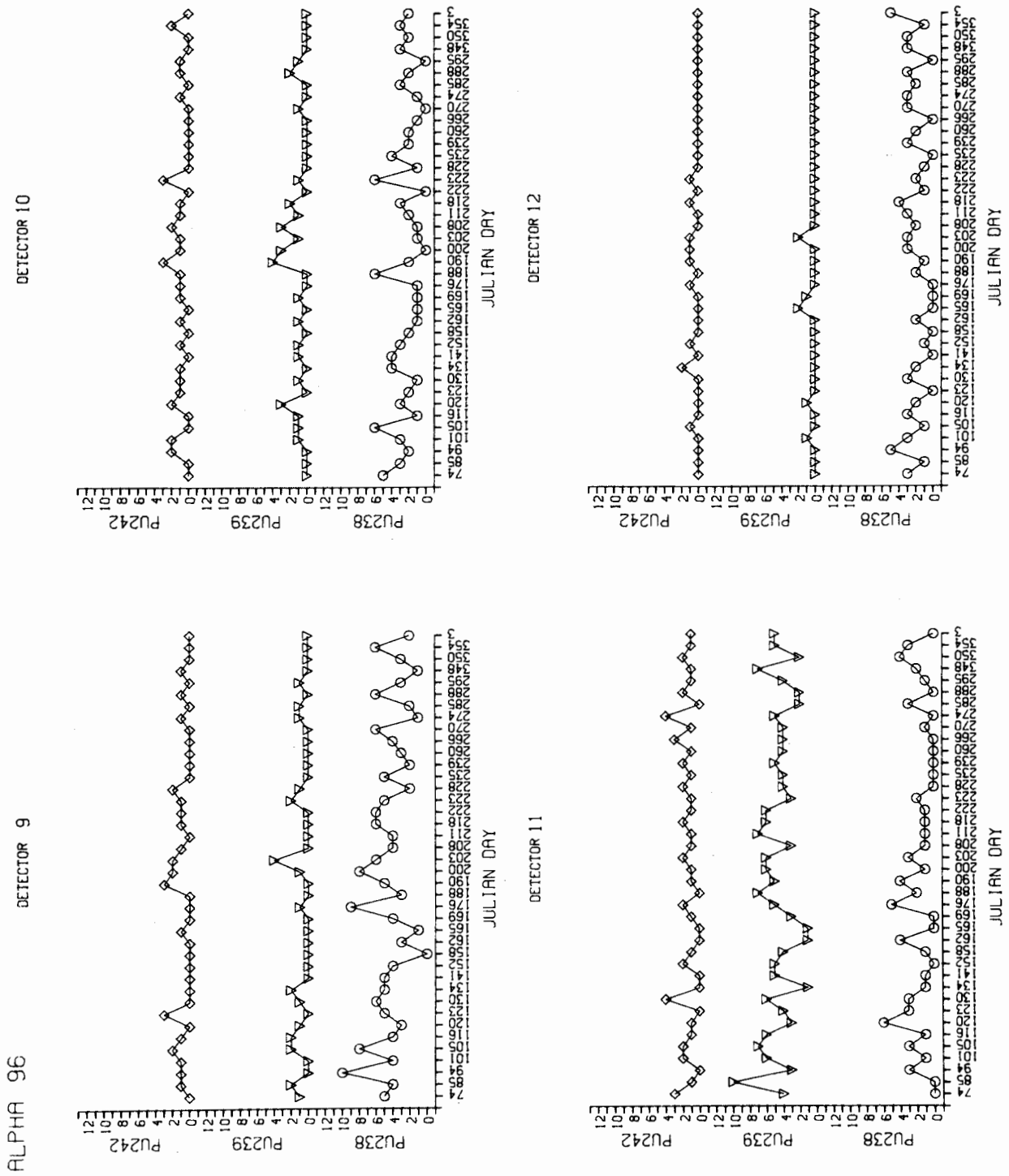
PU239
PU242
JULIAN DAY

Fig. E-1. (cont)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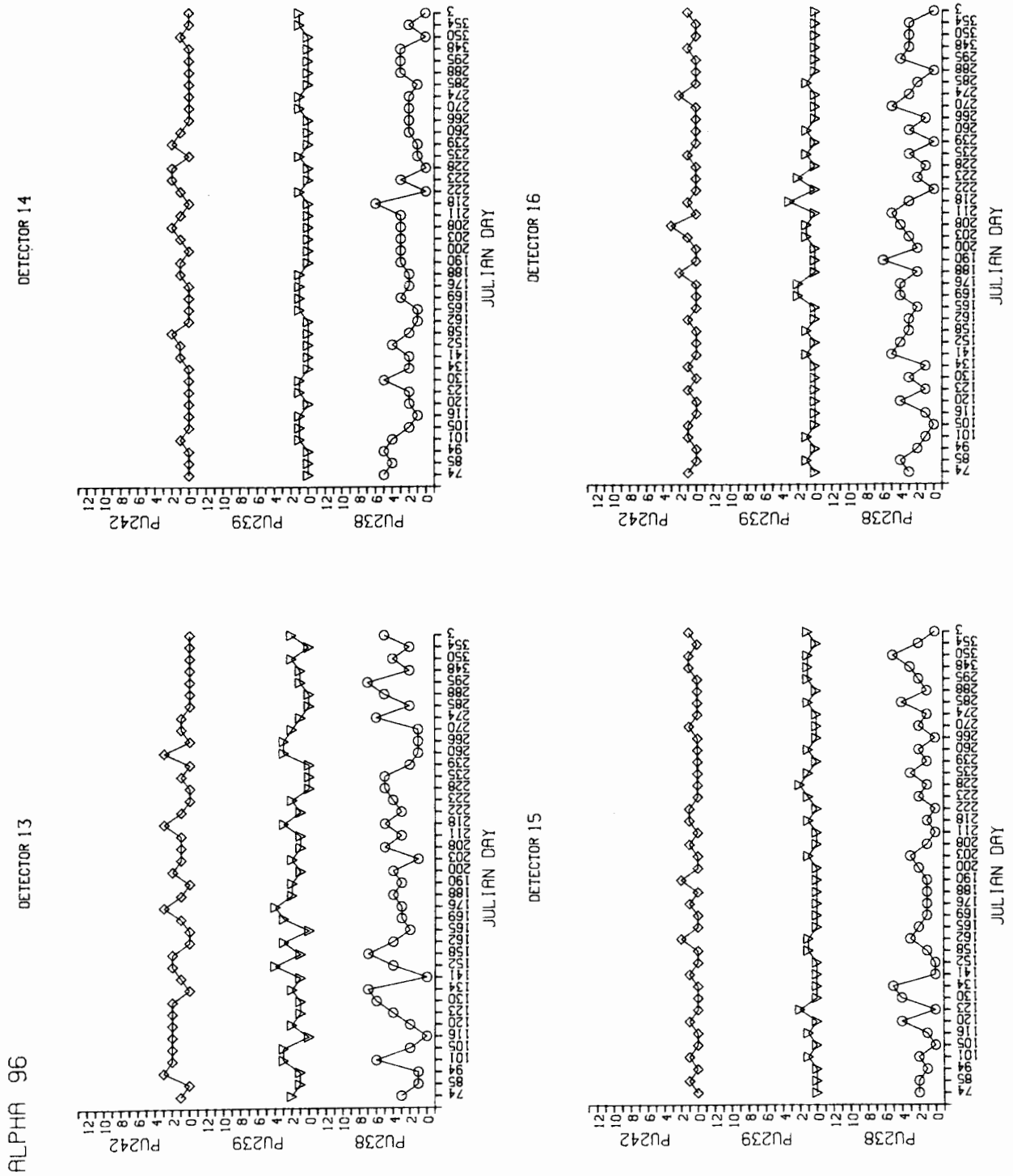
DETECTOR 11
DETECTOR 12
PU238
PU239
PU242
JULIAN DAY

Fig. E-1. (cont)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DETECTOR 14
DETECTOR 15
DETECTOR 16
PU238
PU239
PU242
JULIAN DAY

Fig. E-1. (cont)

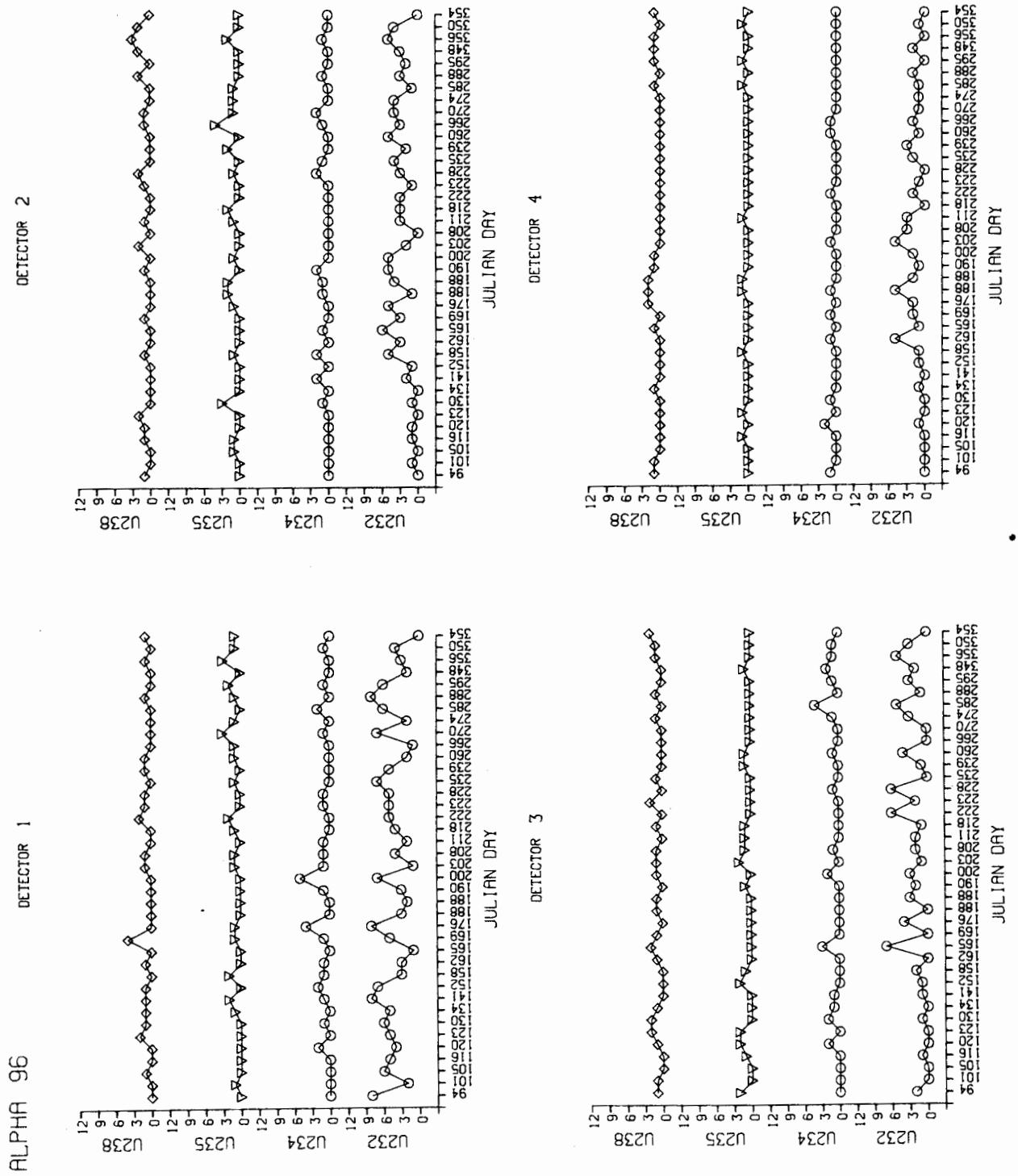
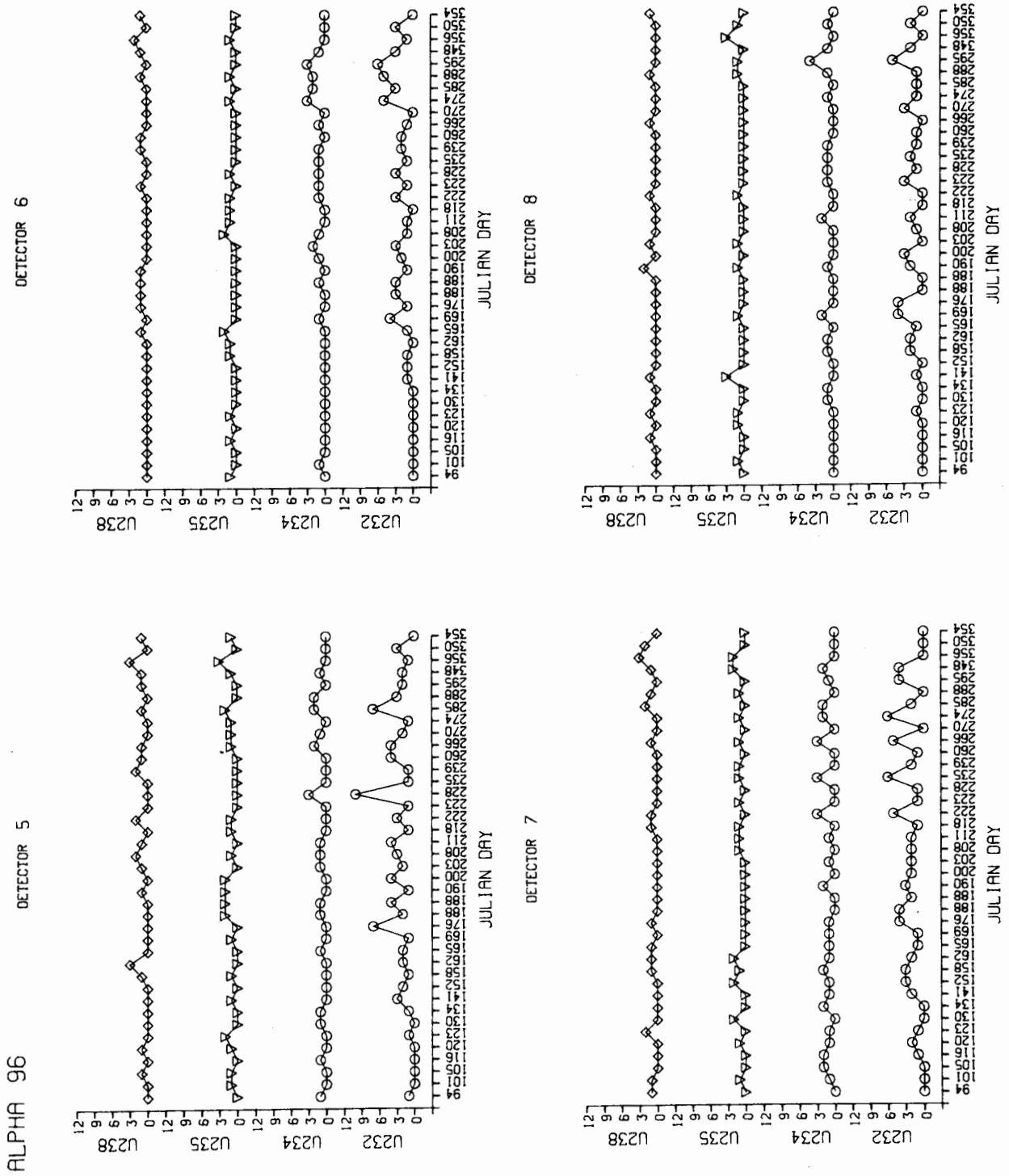

ALPHA 96
DETECTOR 1
DETECTOR 2
DETECTOR 3
DETECTOR 4
U238
U235
U234
U232
JULIAN DAY

Fig. E-1. (cont)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DETECTOR 6
DETECTOR 7
DETECTOR 8
U238
U235
U234
U232
JULIAN DAY

Fig. E-1. (cont)

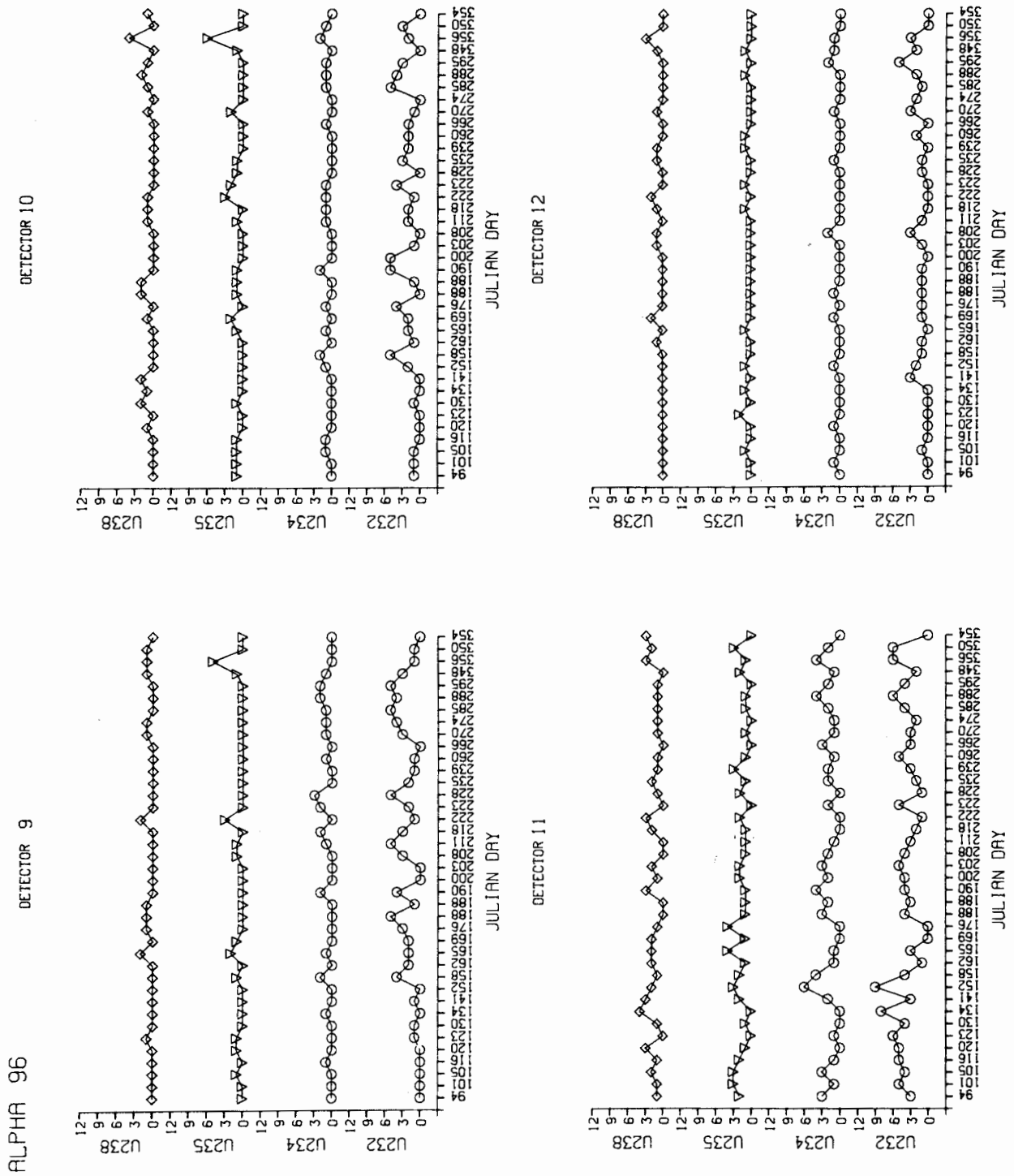
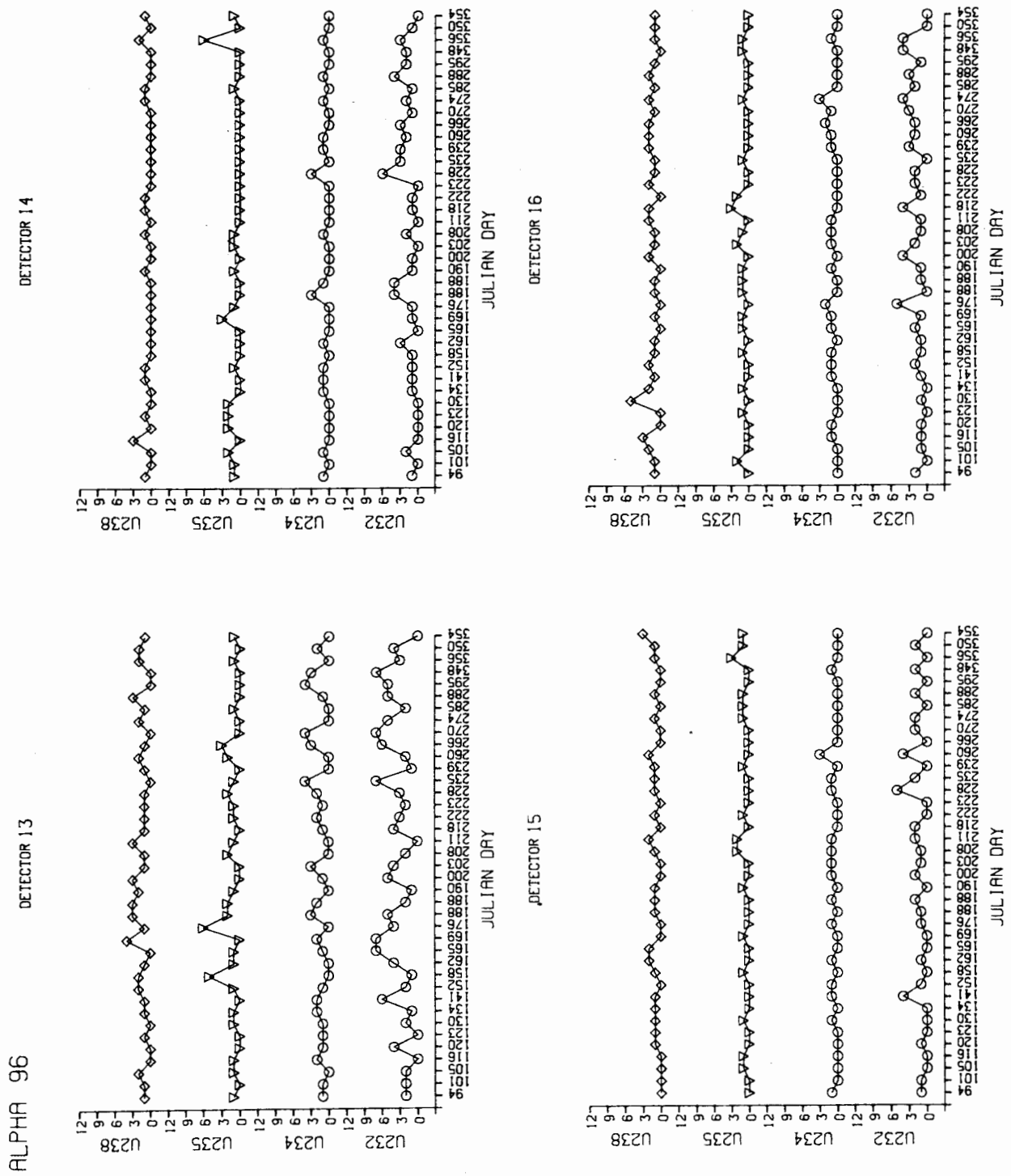

ALPHA 96
DETECTOR 9
DETECTOR 10
DETECTOR 11
DETECTOR 12
U238
U235
U234
U232
JULIAN DAY

Fig. E-1. (cont)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DETECTOR 13
DETECTOR 14
DETECTOR 15
DETECTOR 16
U238
U235
U234
U232
JULIAN DAY

Fig. E-1. (cont)

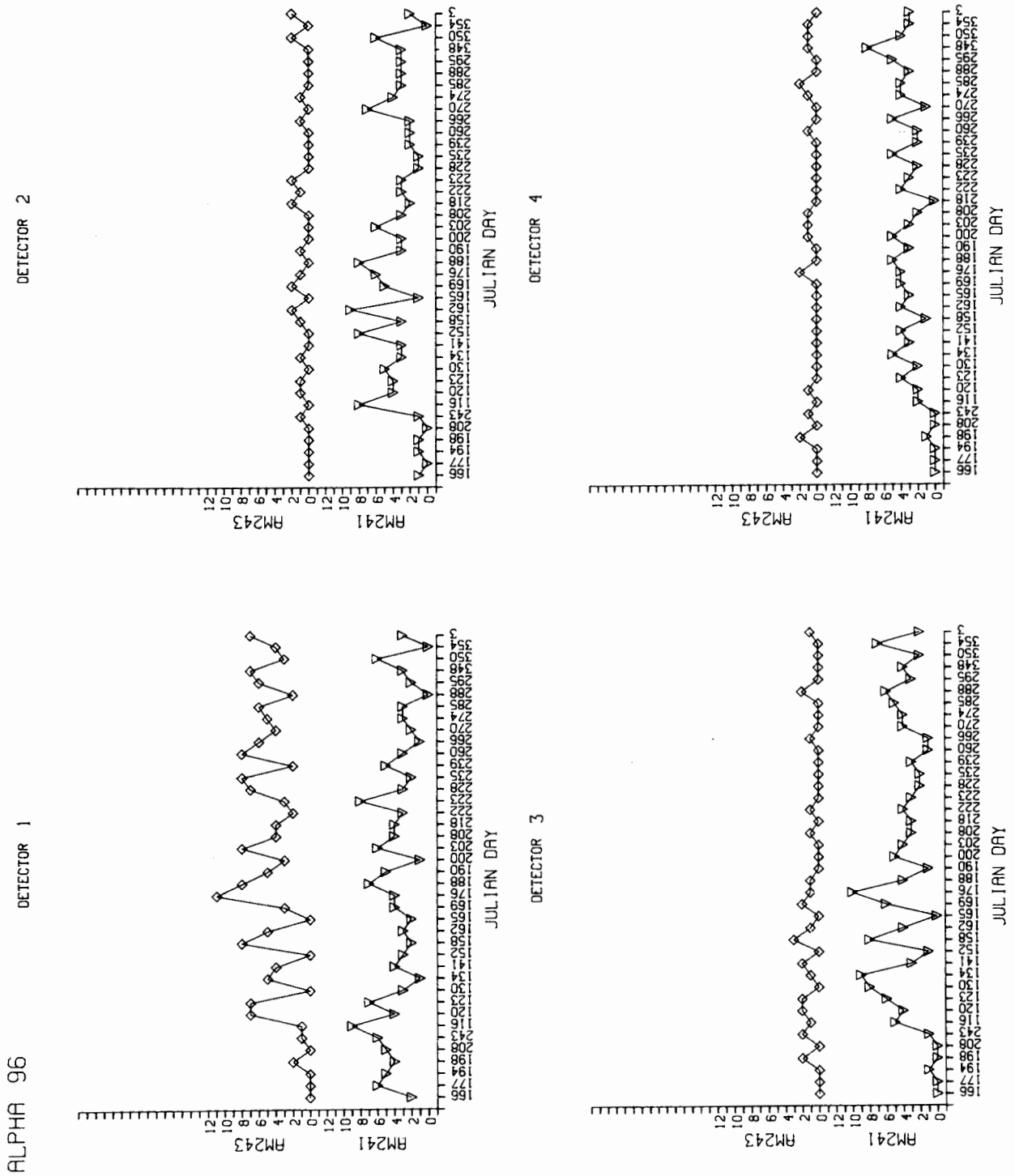
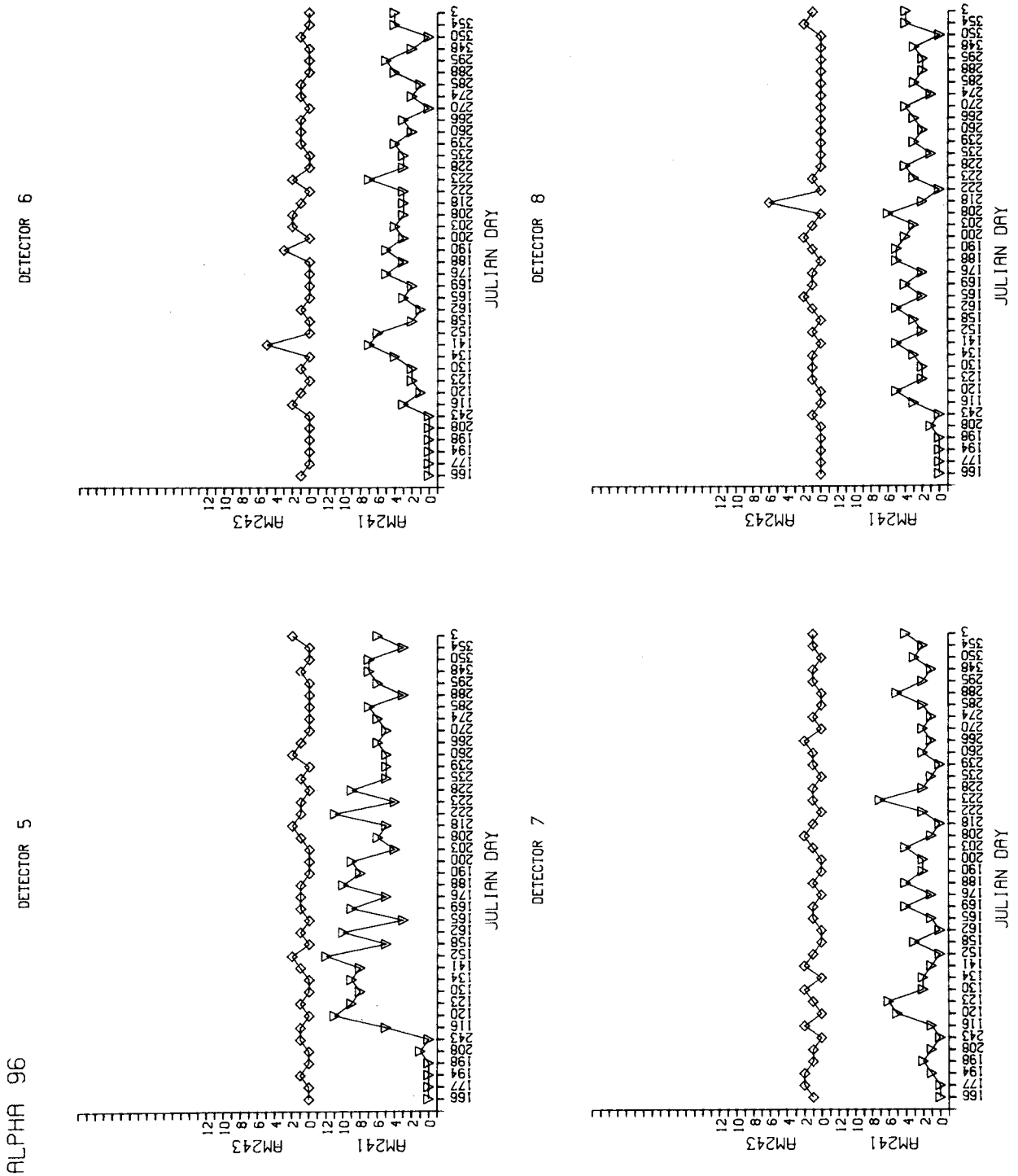

ALPHA 96
DETECTOR 1
DETECTOR 2
DETECTOR 3
DETECTOR 4
RM241
RM243
JULIAN DAY

Fig. E-1. (cont)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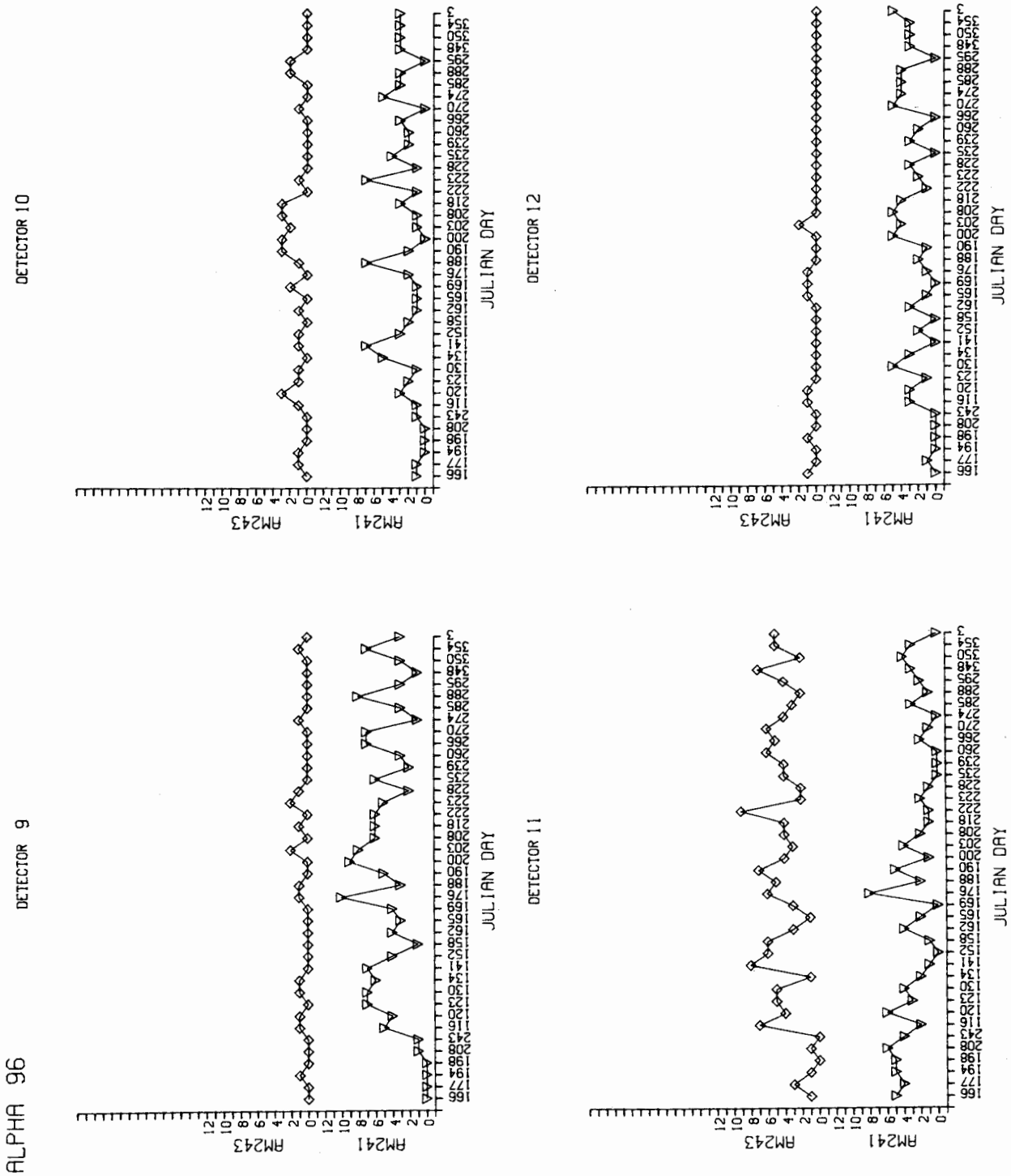
DETECTOR 5
DETECTOR 6
DETECTOR 7
DETECTOR 8
AM241
AM243
JULIAN DAY

Fig. E-1. (cont)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DETECTOR 9
DETECTOR 10
DETECTOR 11
DETECTOR 12
RM241
RM243
JULIAN DAY

Fig. E-1. (cont)

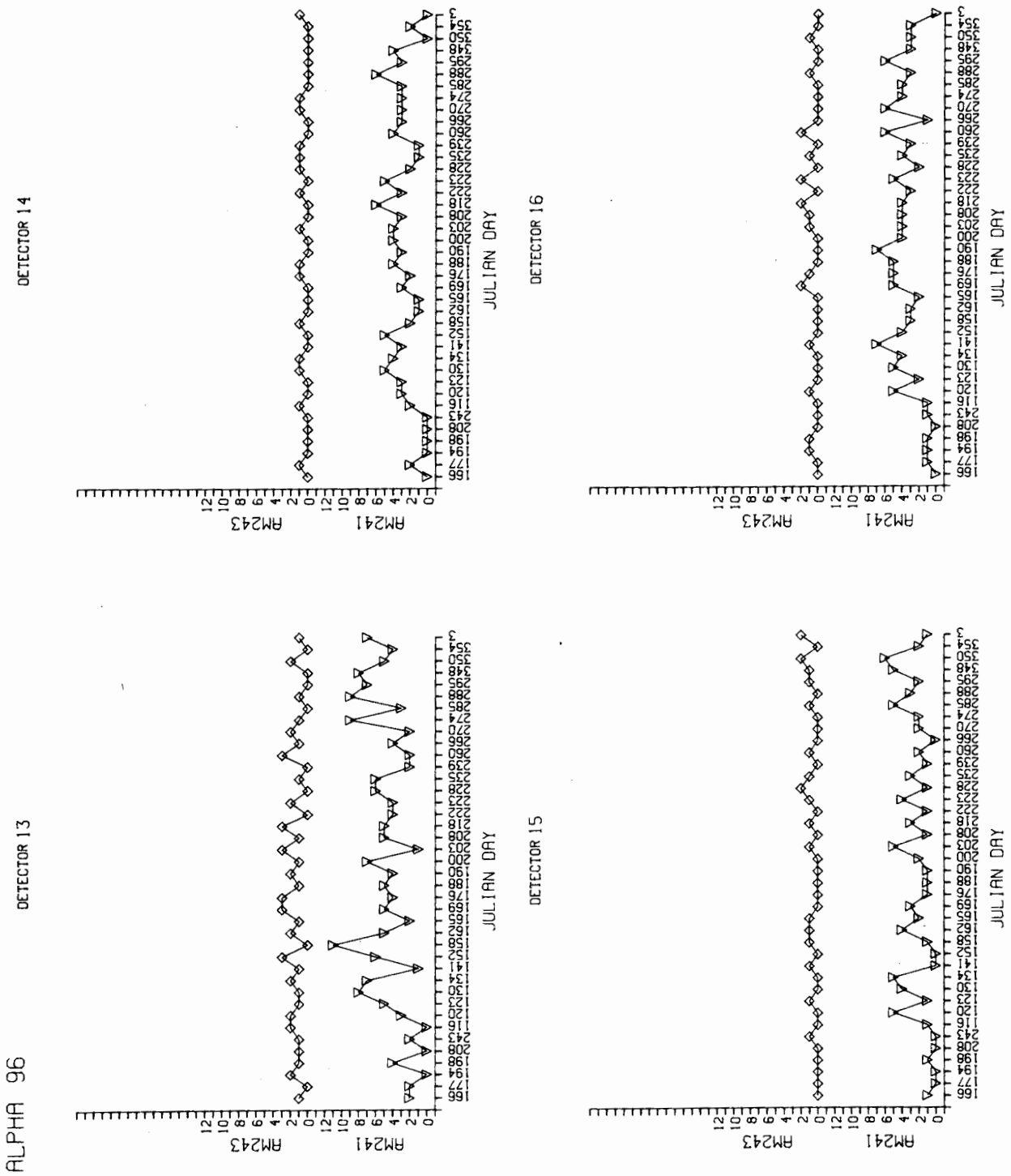


Fig. E-1. (cont)

NOTE: Fluctuations in these data are documented in Laboratory notebook A6487 and are generally due to a detector being replaced or needing cleaning, electrical power surges and failures, vacuum system leaks, electronic noise, and special studies in which samples were counted without using the detector pedestals. The following detectors were replaced during 1988: 16 Alpha System, detector No. 5 on 6-16-88; 64 Alpha System, detector No. 2 on 6-16-88; and 80 Alpha System, detector No. 2 on 9-26-88.

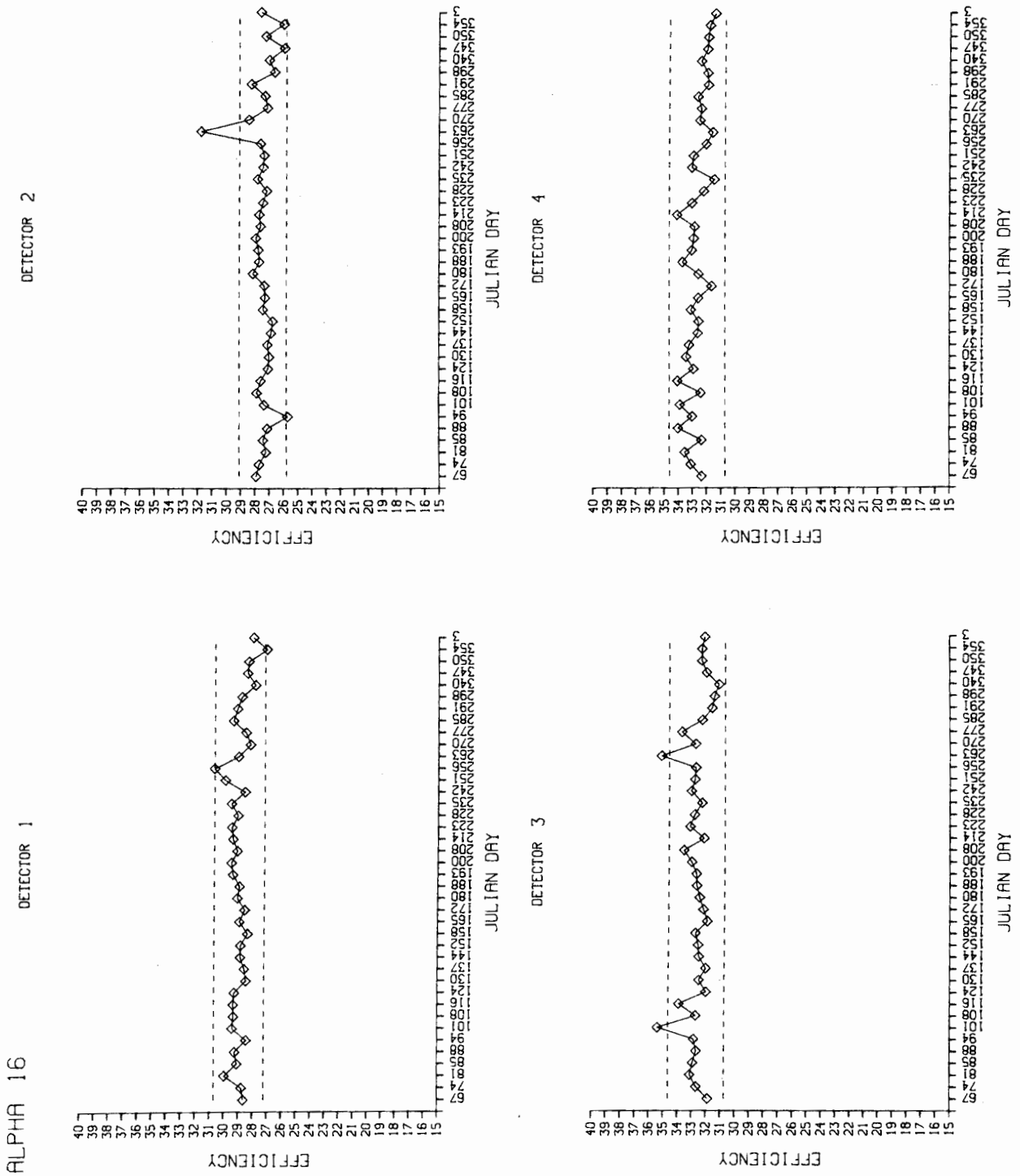


Fig. E-2. Plots of alpha specrtometer calibration data.

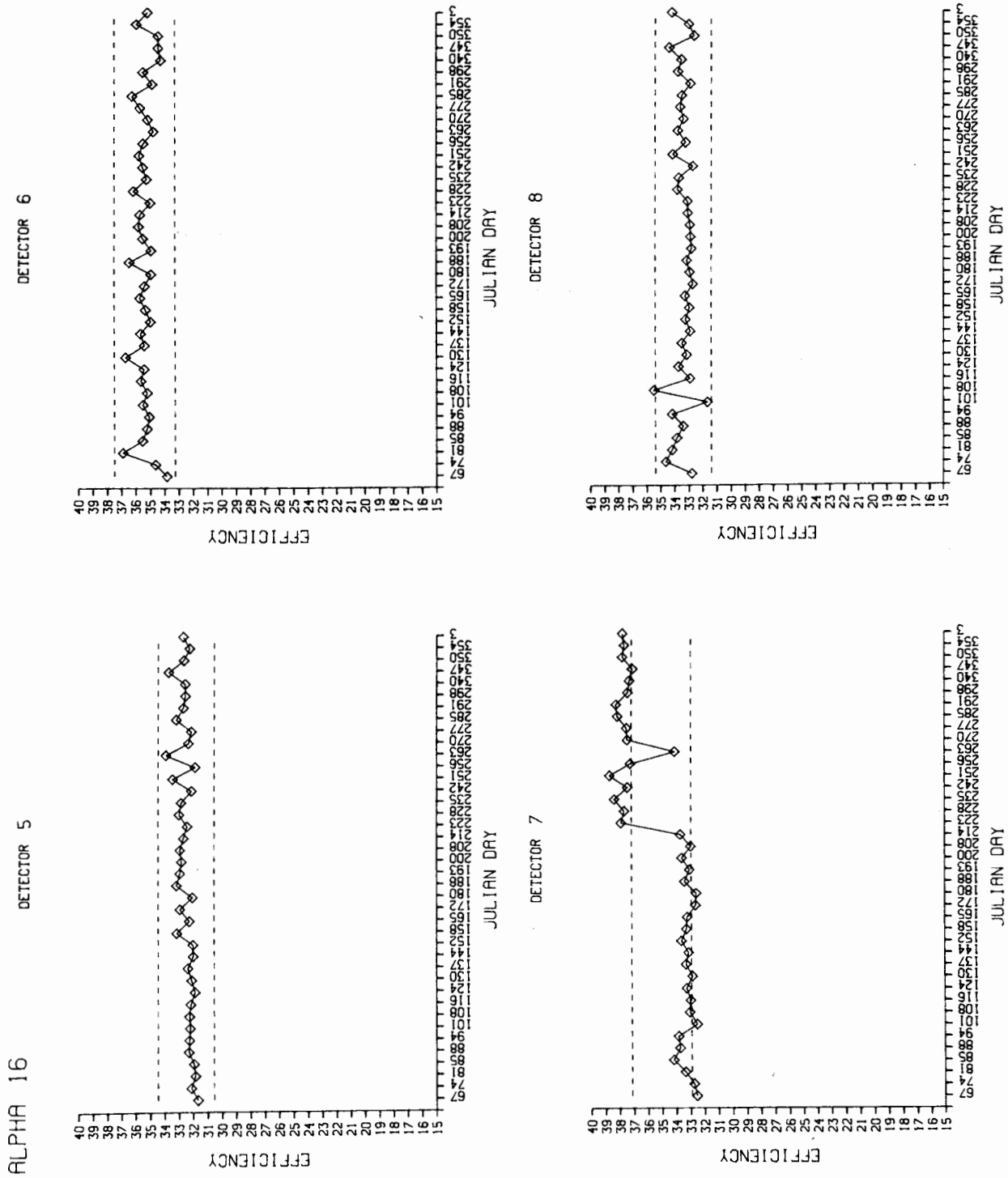
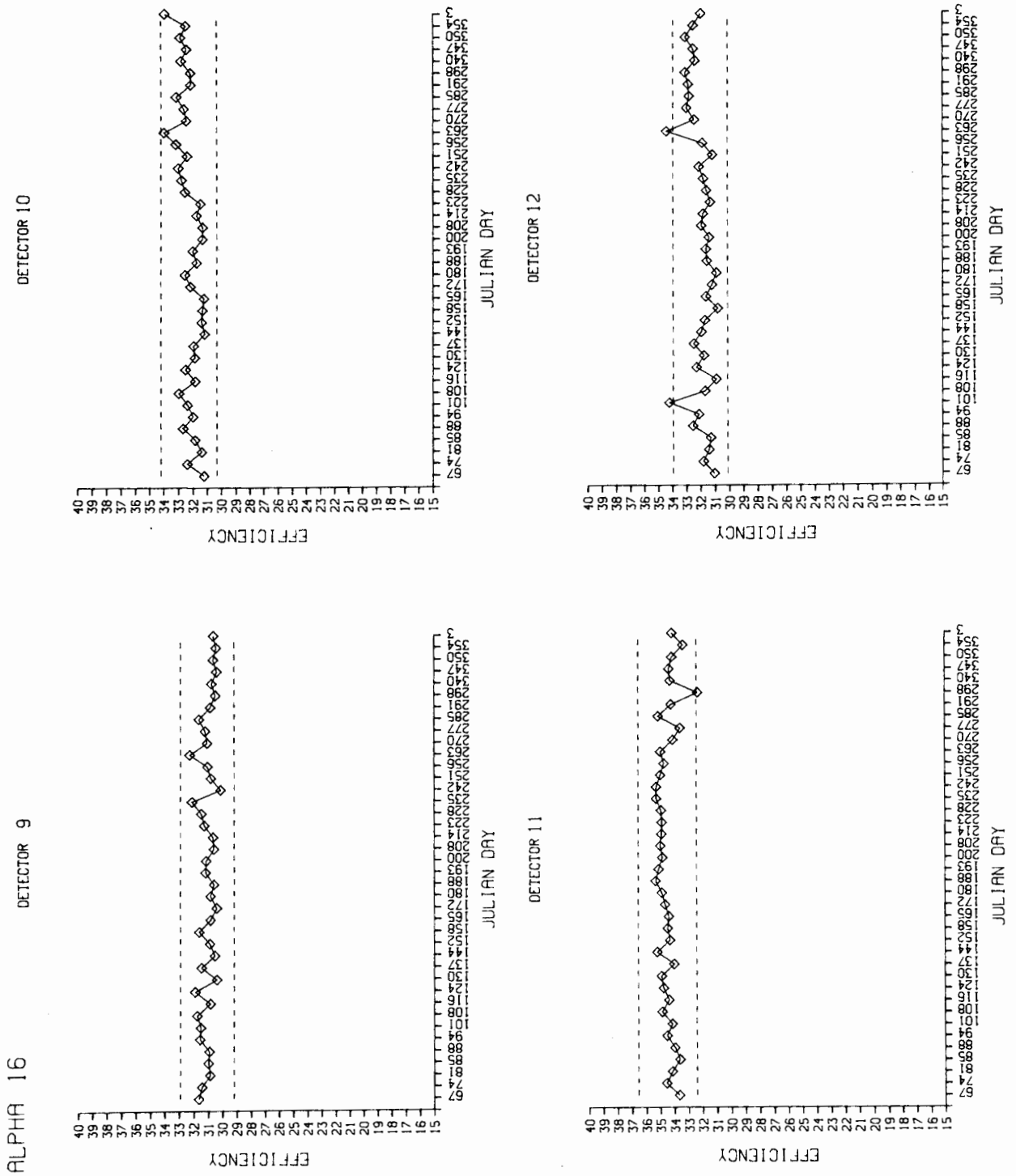

ALPHA 16
DETECTOR 5
DETECTOR 6
DETECTOR 7
DETECTOR 8
EFFICIENCY
JULIAN DAY

Fig. E-2. (cont)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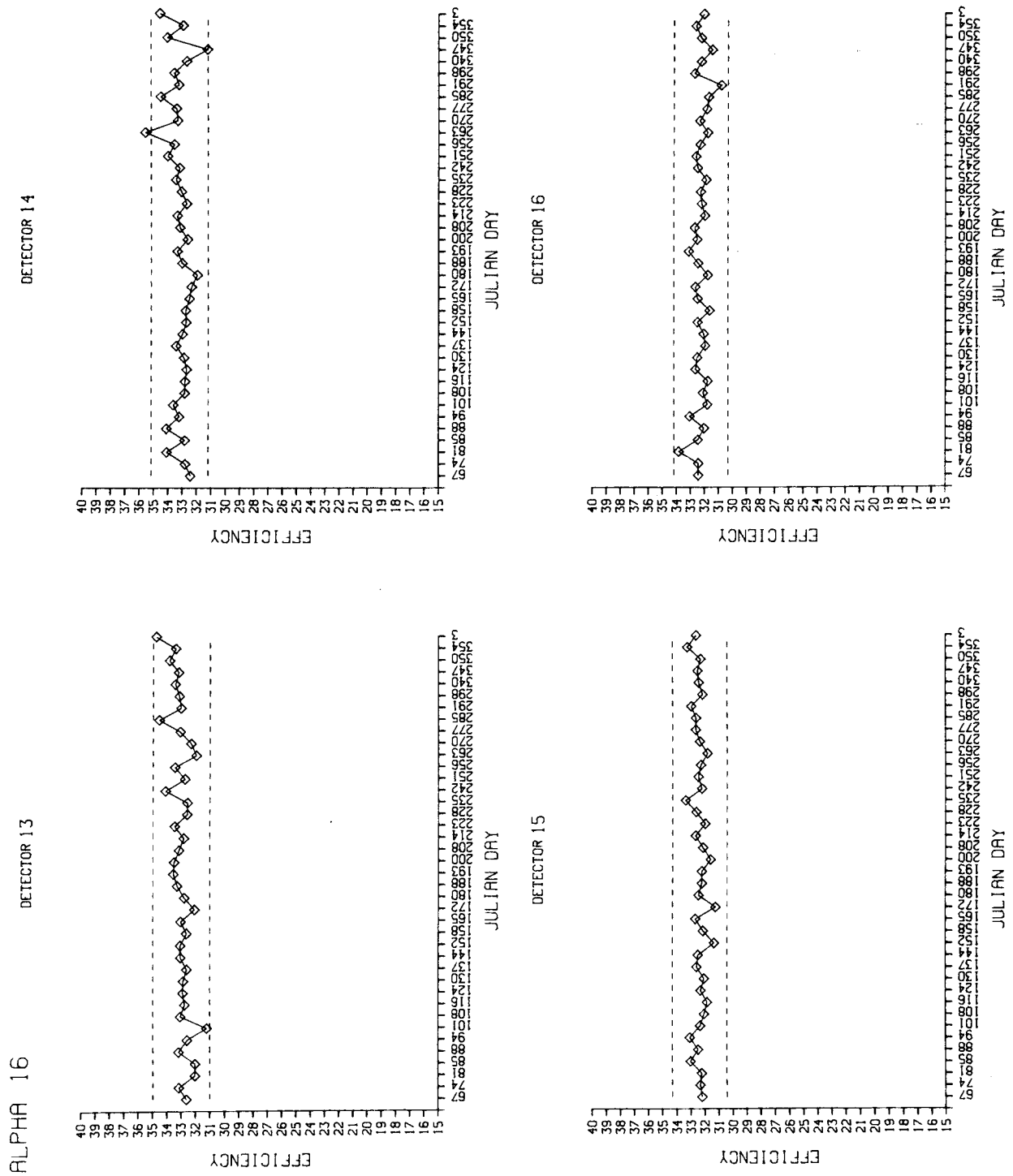
DETECTOR 9
DETECTOR 10
DETECTOR 11
DETECTOR 12
EFFICIENCY
JULIAN DAY

Fig. E-2. (cont)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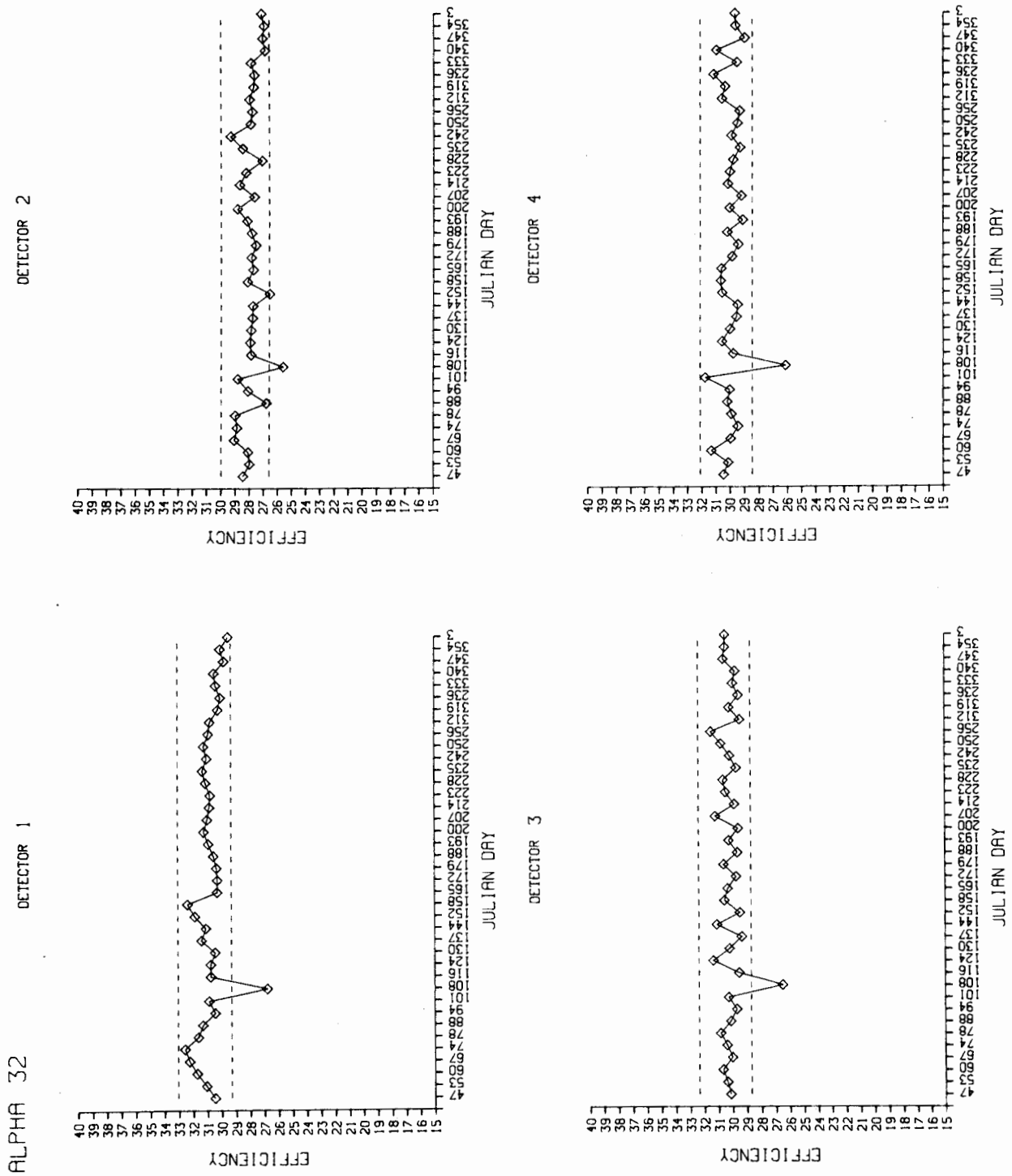
DETECTOR 13
DETECTOR 14
DETECTOR 15
DETECTOR 16
EFFICIENCY
JULIAN DAY

Fig. E-2. (cont)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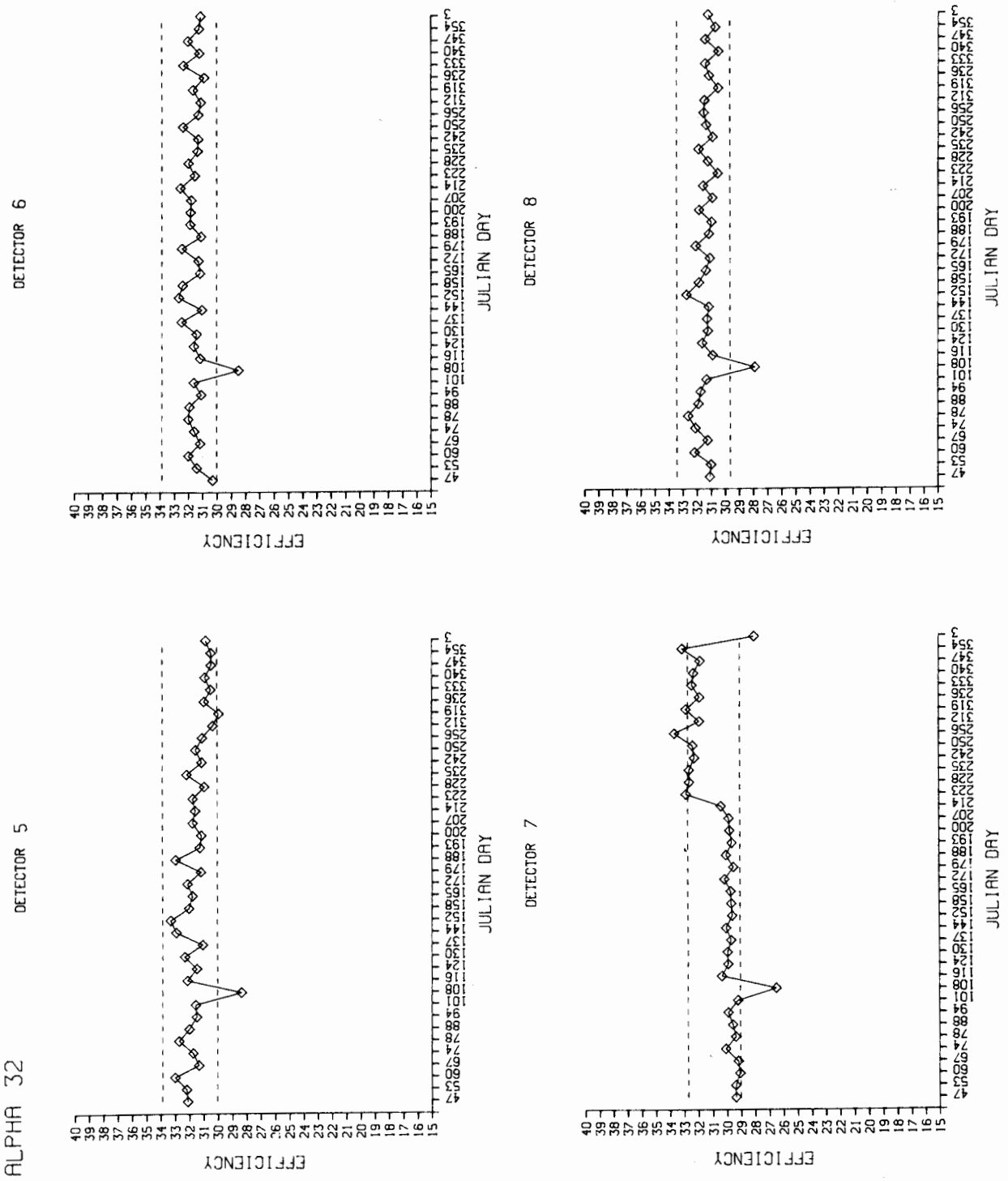
DETECTOR 1
DETECTOR 2
DETECTOR 3
DETECTOR 4
EFFICIENCY
JULIAN DAY

Fig. E-2. (cont)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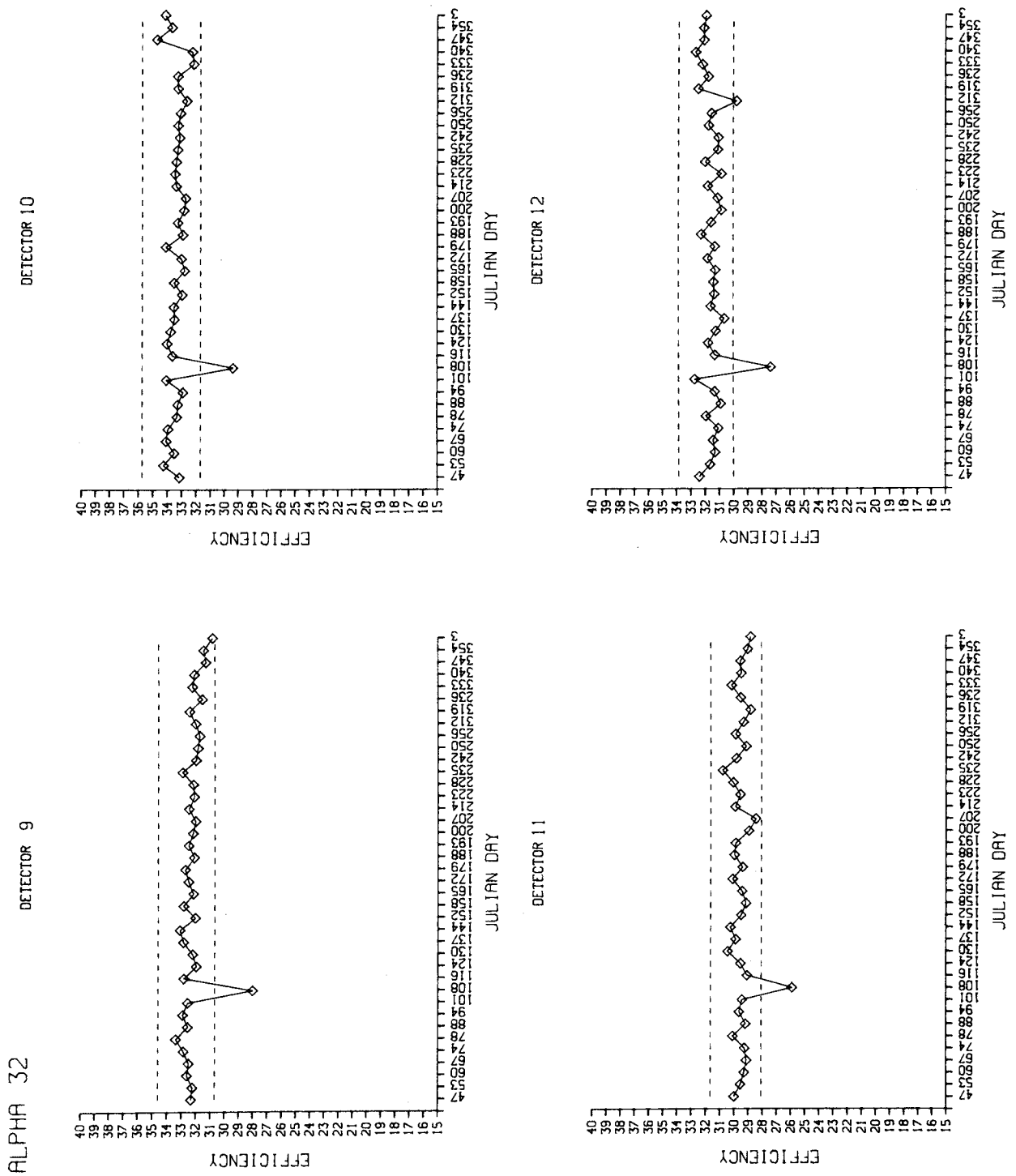
DETECTOR 7
DETECTOR 8
EFFICIENCY
JULIAN DAY

Fig. E-2. (cont)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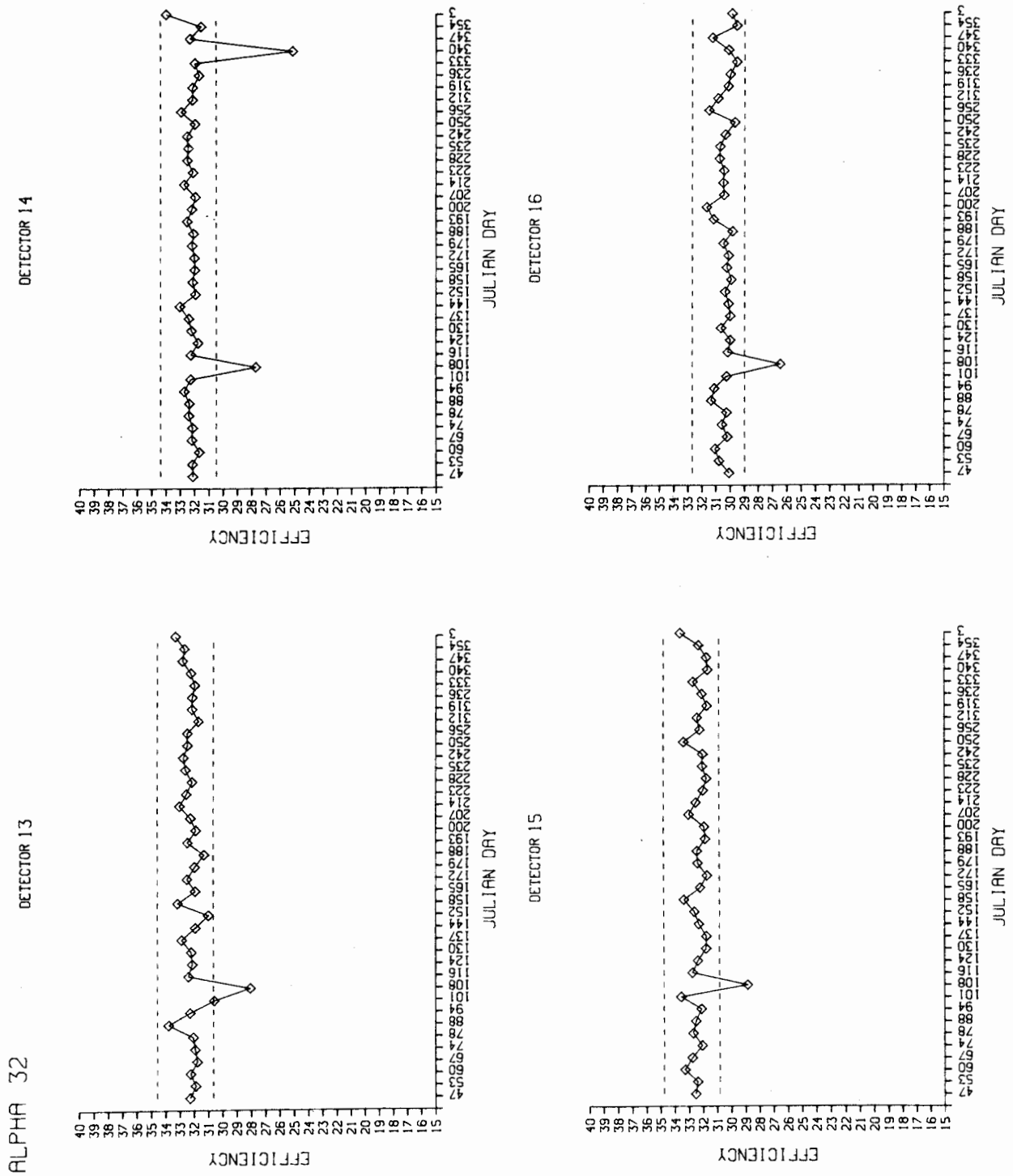
DETECTOR 10
DETECTOR 11
DETECTOR 12
EFFICIENCY
JULIAN DAY

Fig. E-2. (cont)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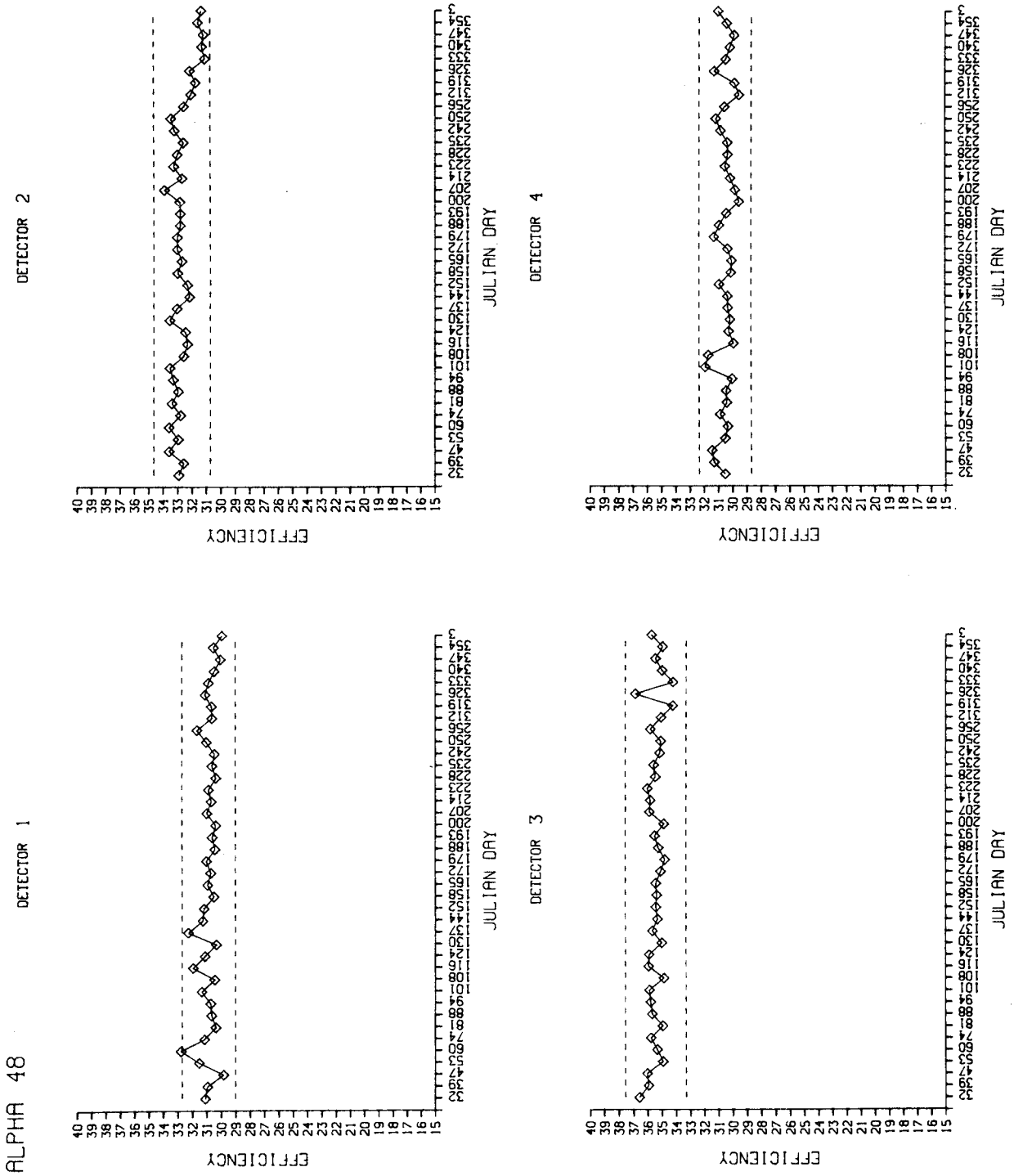
EFFICIENCY
JULIAN DAY

Fig. E-2. (cont)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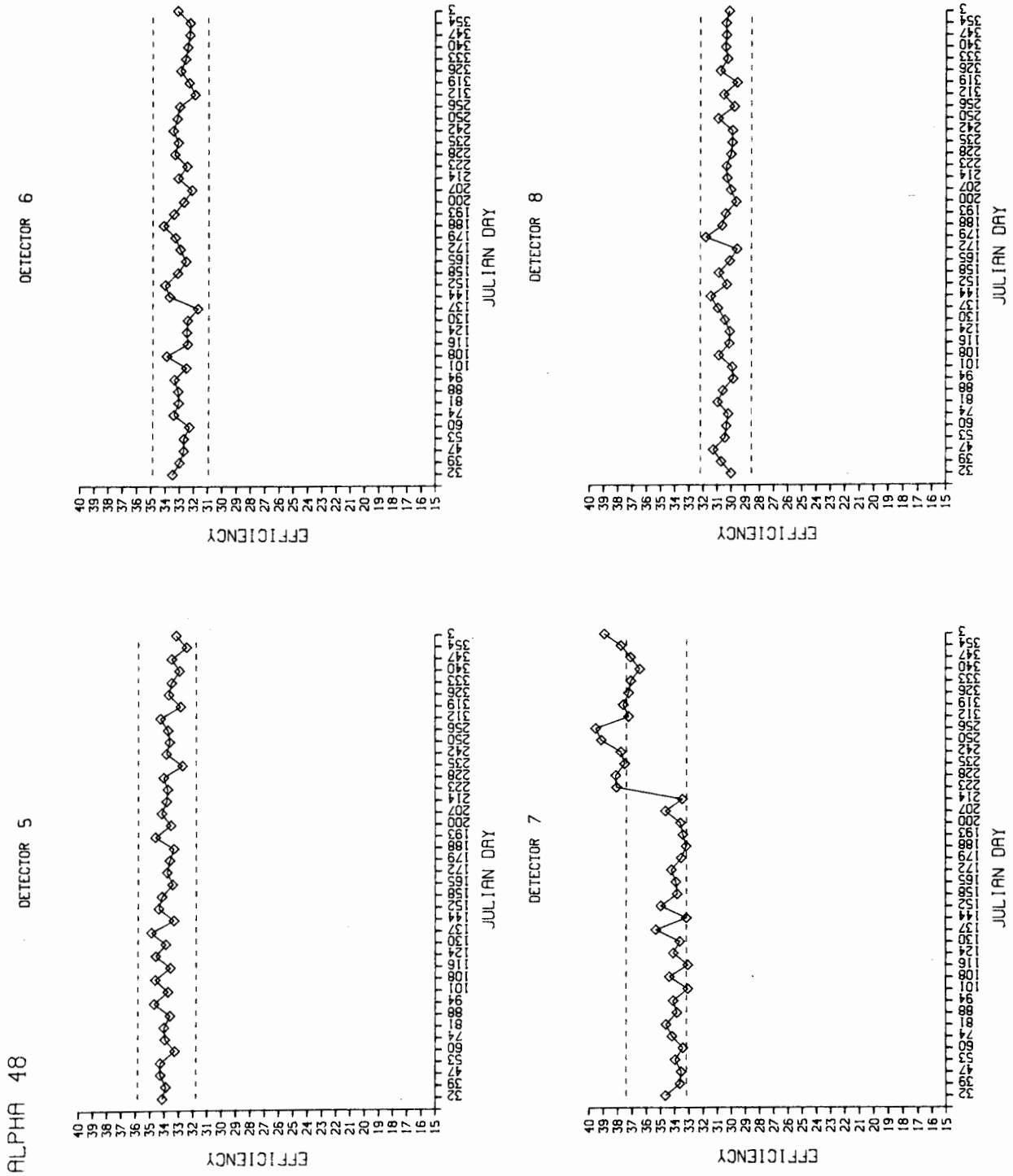
DETECTOR 1
DETECTOR 2
DETECTOR 3
DETECTOR 4
EFFICIENCY
JULIAN DAY

Fig. E-2. (cont)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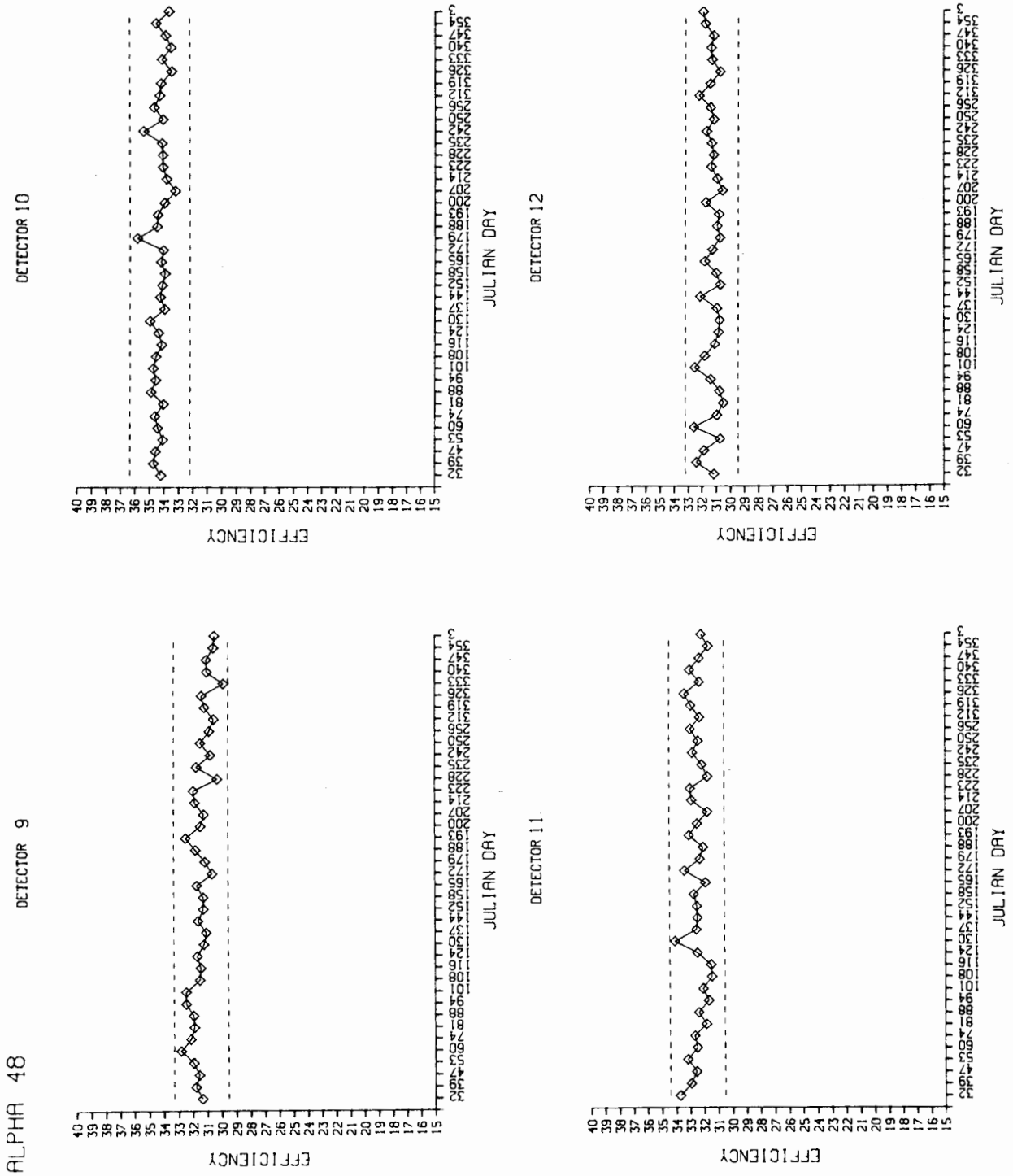
DETECTOR 6
DETECTOR 7
DETECTOR 8
EFFICIENCY
JULIAN DAY

Fig. E-2. (cont)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DETECTOR 11
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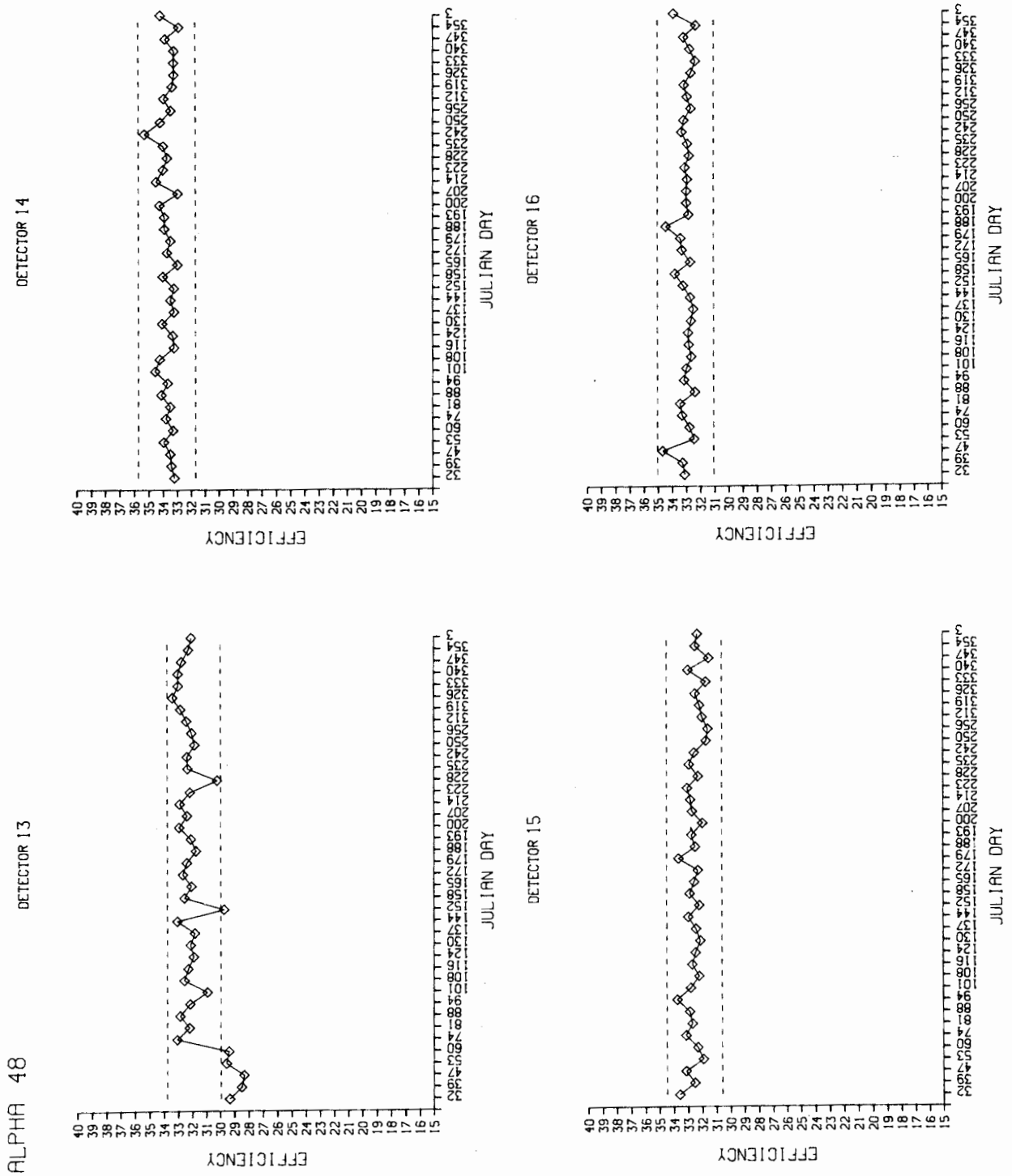
EFFICIENCY
JULIAN DAY

Fig. E-2. (cont)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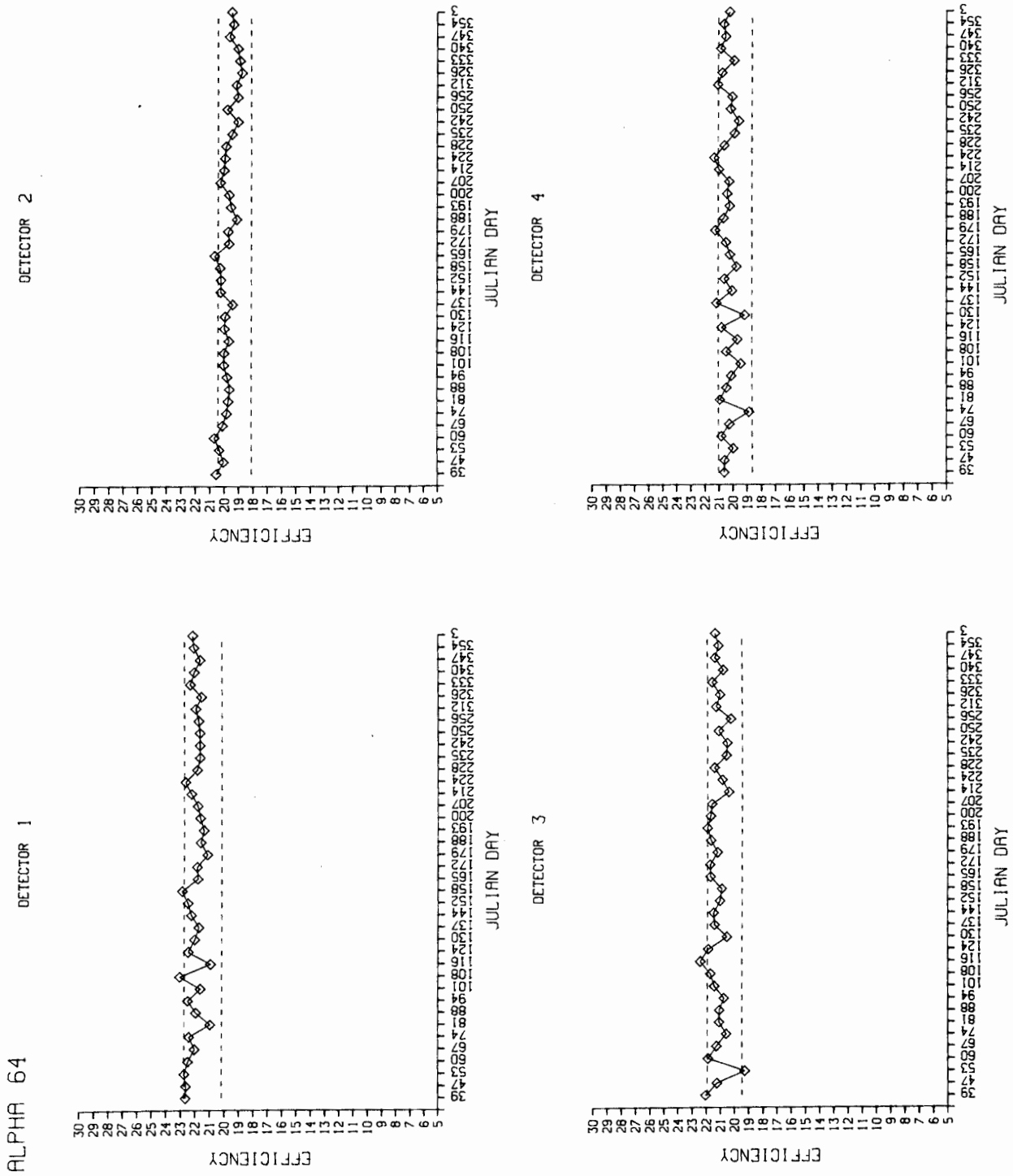
DETECTOR 16
EFFICIENCY
JULIAN DAY

Fig. E-2. (cont)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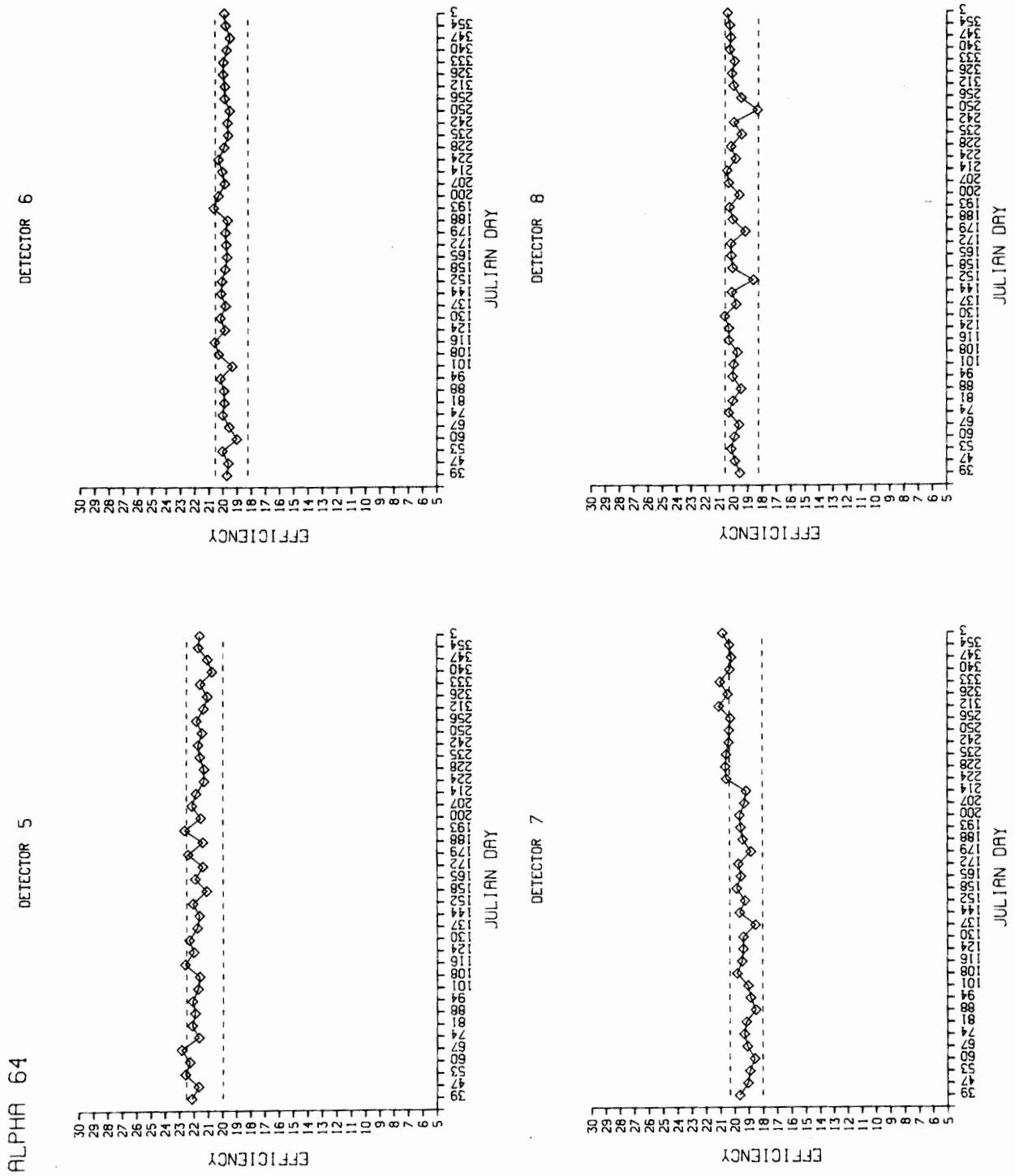
DETECTOR 3
DETECTOR 4
EFFICIENCY
JULIAN DAY

Fig. E-2. (cont)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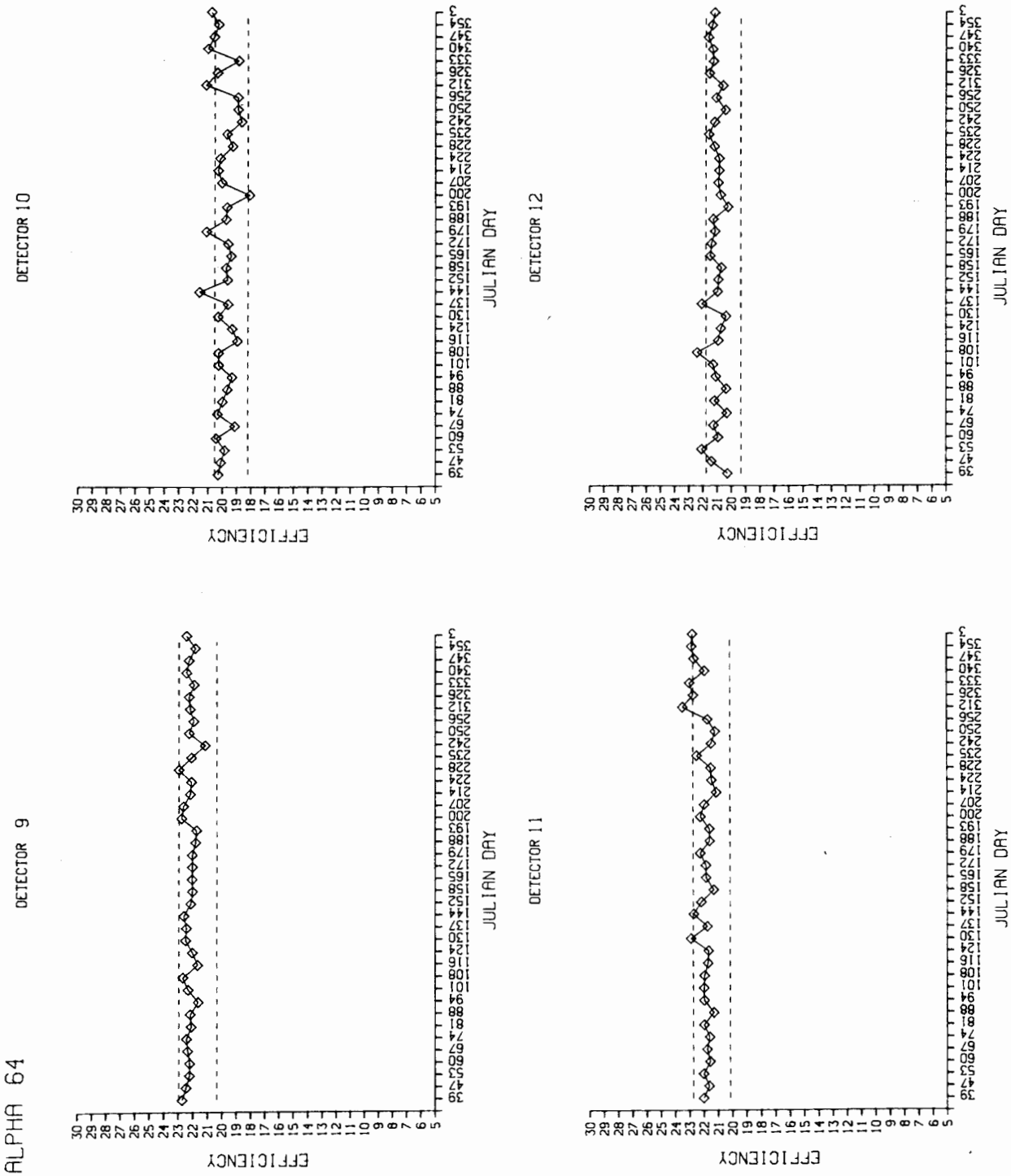
EFFICIENCY
JULIAN DAY

Fig. E-2. (cont)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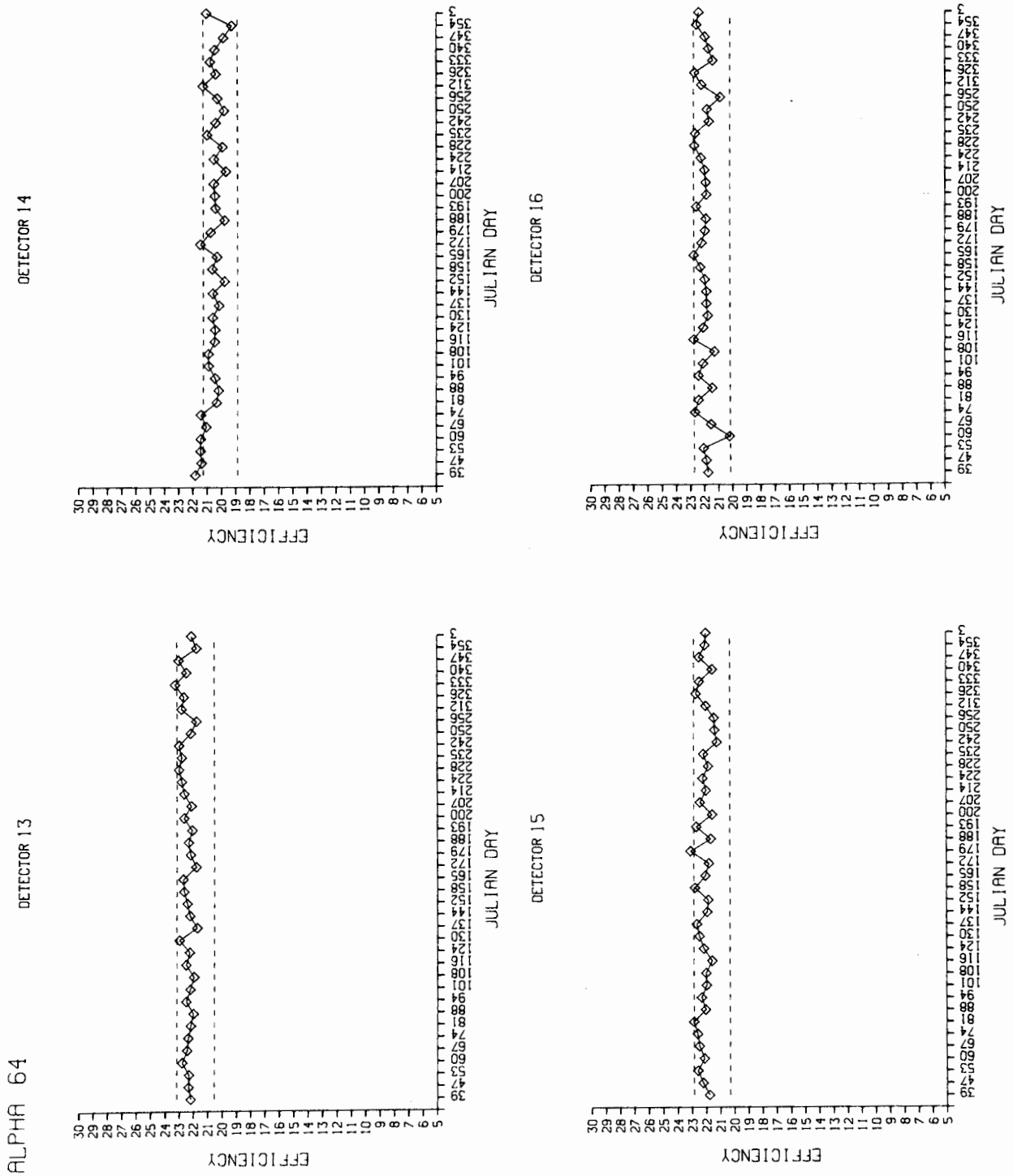
EFFICIENCY
JULIAN DAY

Fig. E-2. (cont)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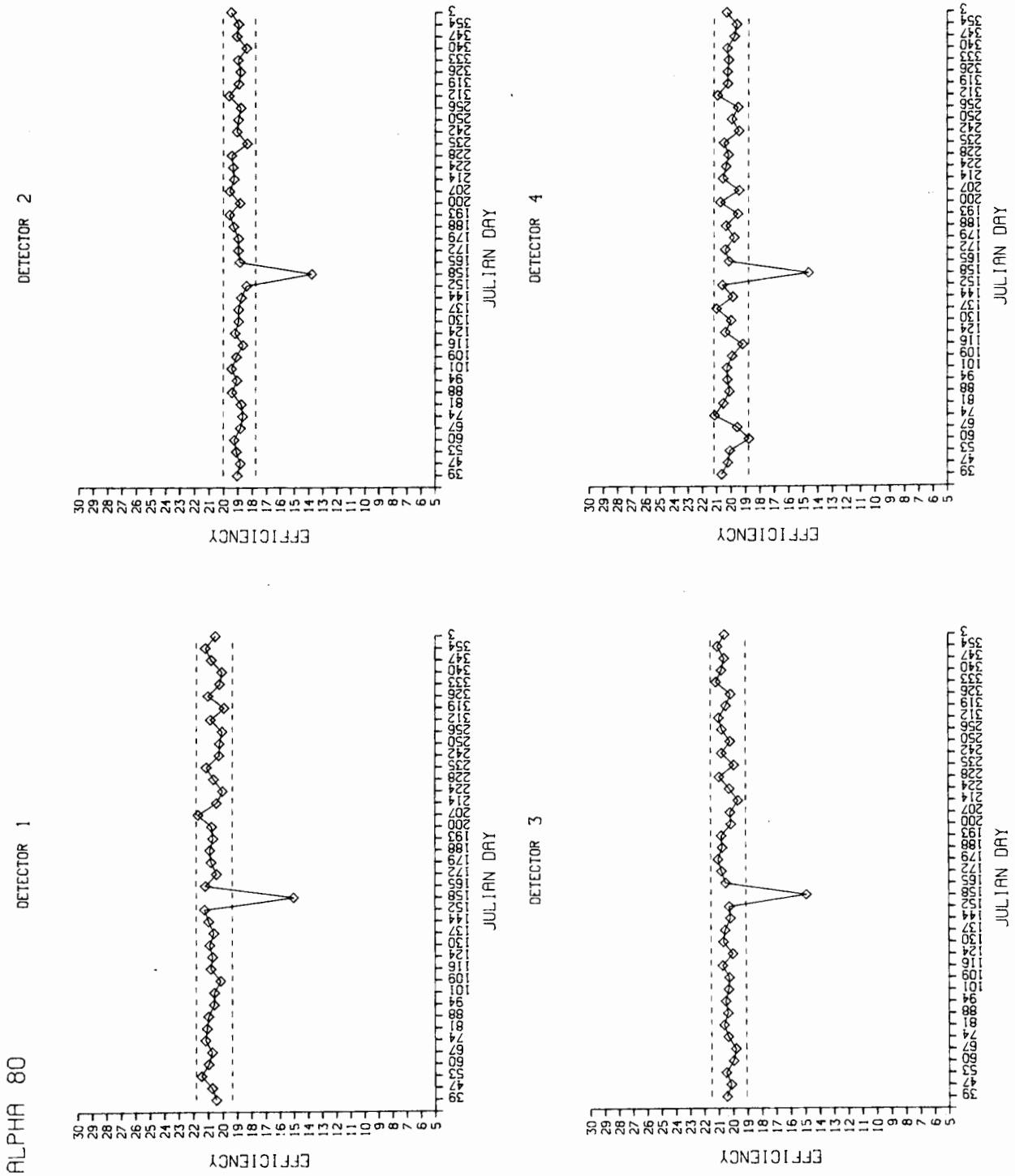
EFFICIENCY
JULIAN DAY

Fig. E-2. (cont)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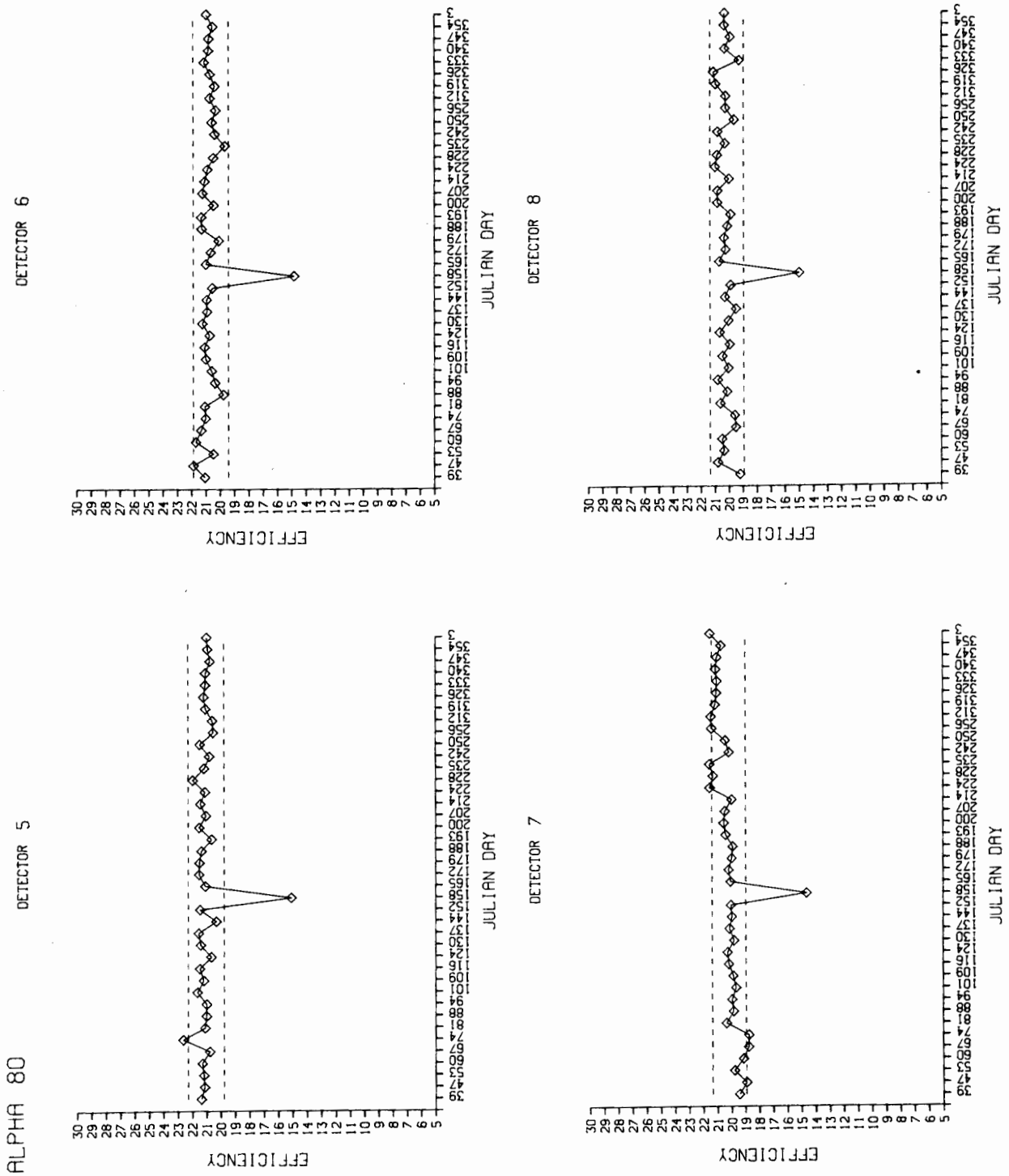
EFFICIENCY
JULIAN DAY

Fig. E-2. (cont)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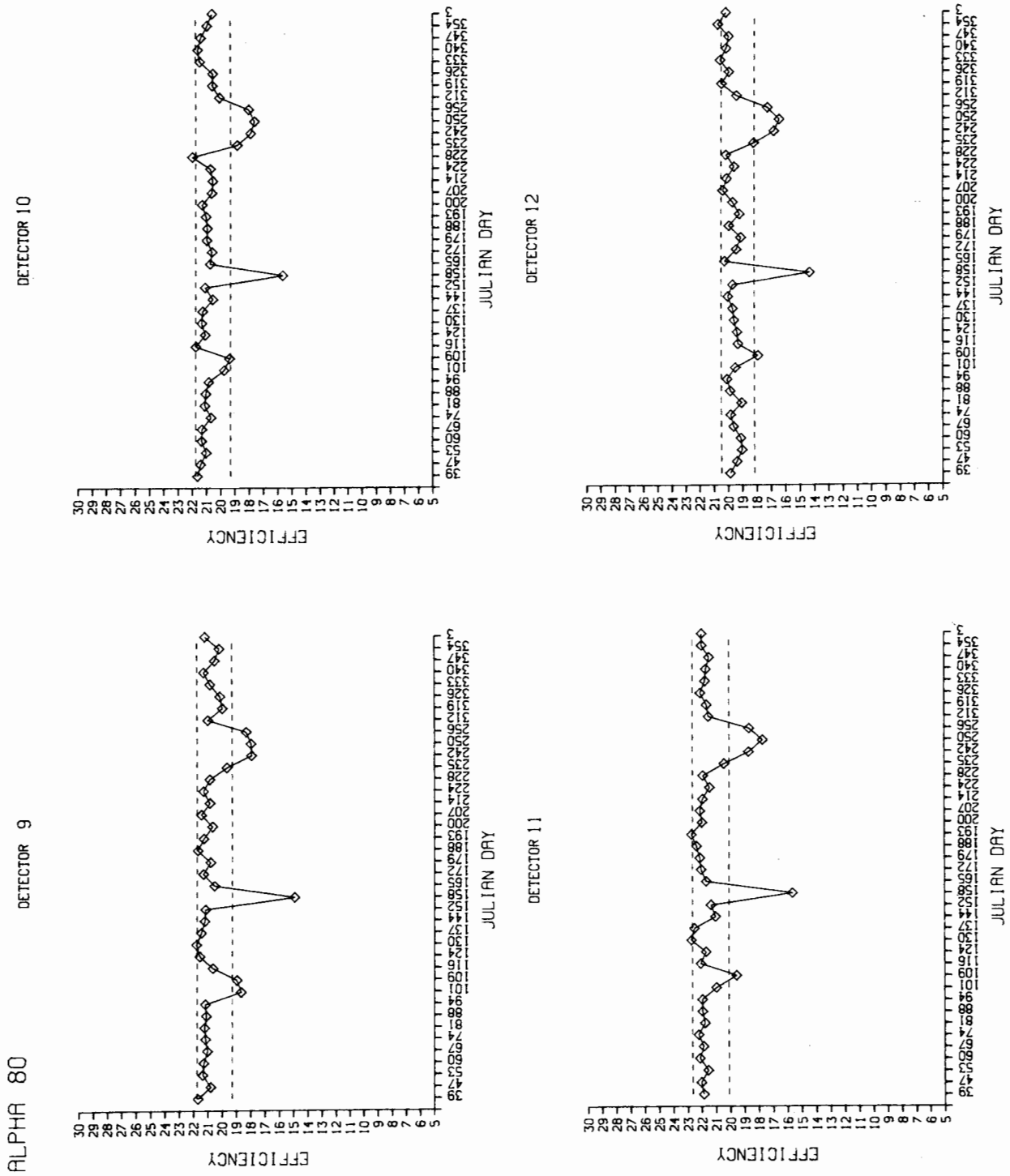
DETECTOR 8
EFFICIENCY
JULIAN DAY

Fig. E-2. (cont)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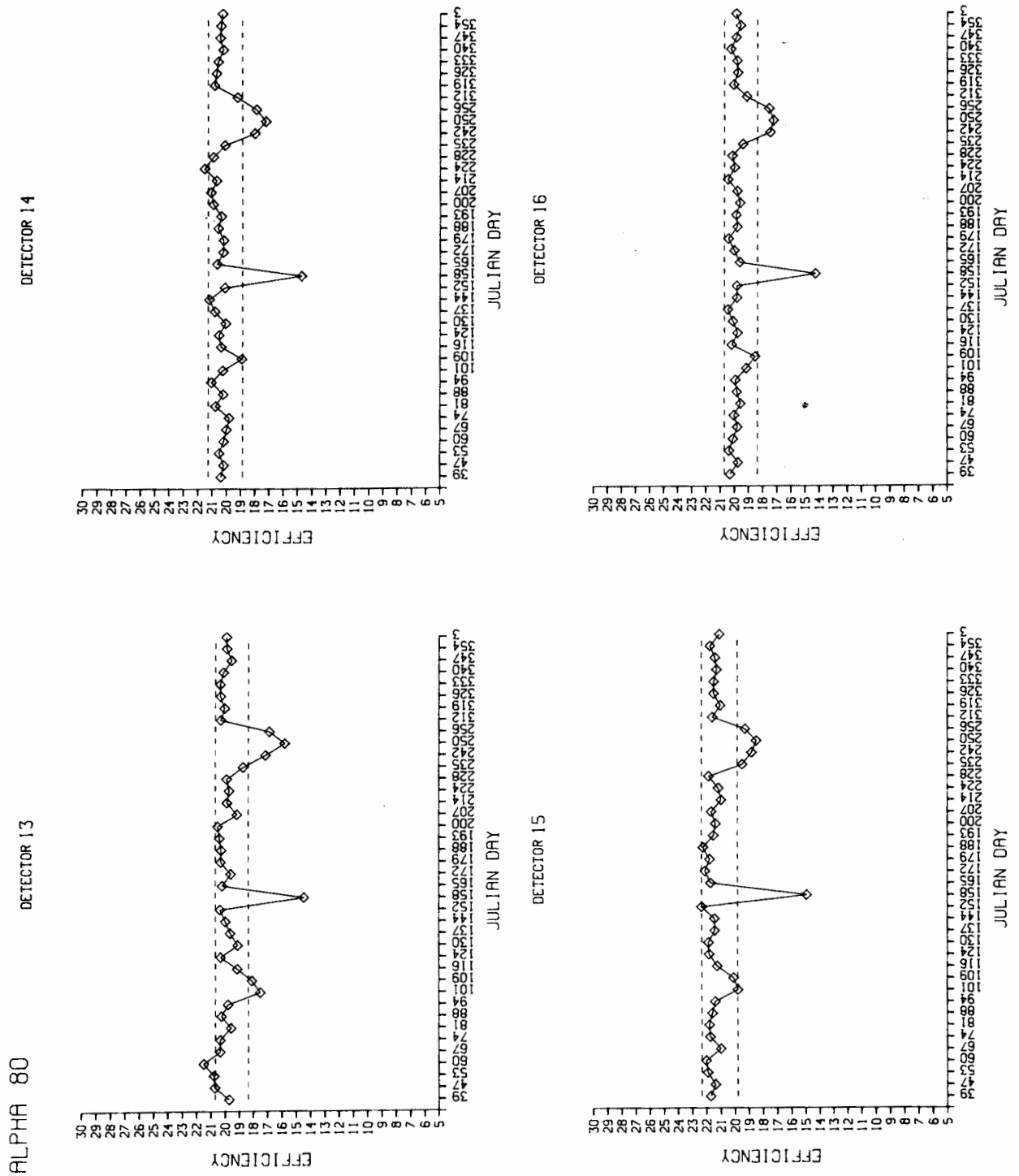
DETECTOR 10
DETECTOR 11
DETECTOR 12
EFFICIENCY
JULIAN DAY

Fig. E-2. (cont)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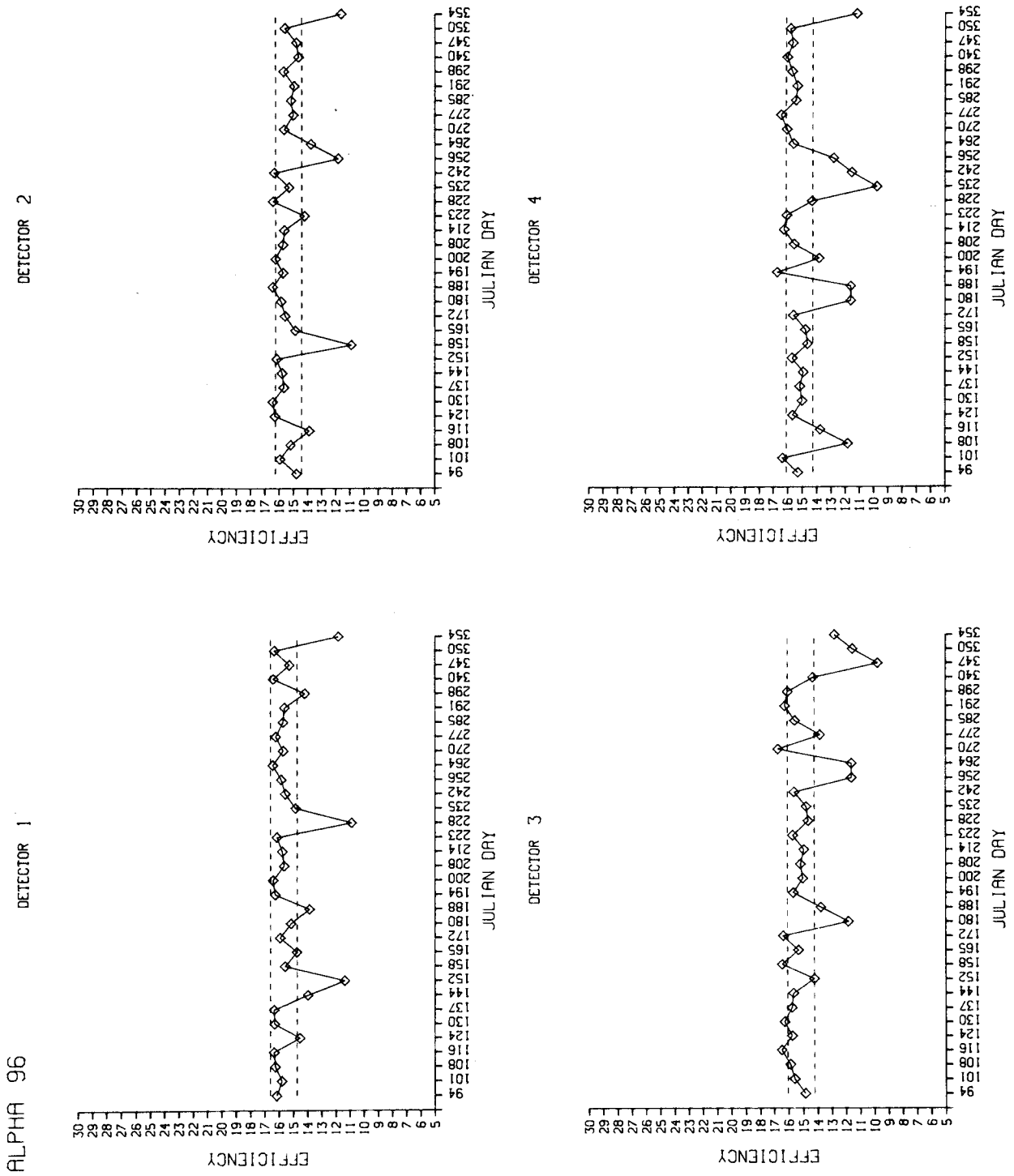
DETECTOR 14
DETECTOR 15
DETECTOR 16
EFFICIENCY
JULIAN DAY

Fig. E-2. (cont)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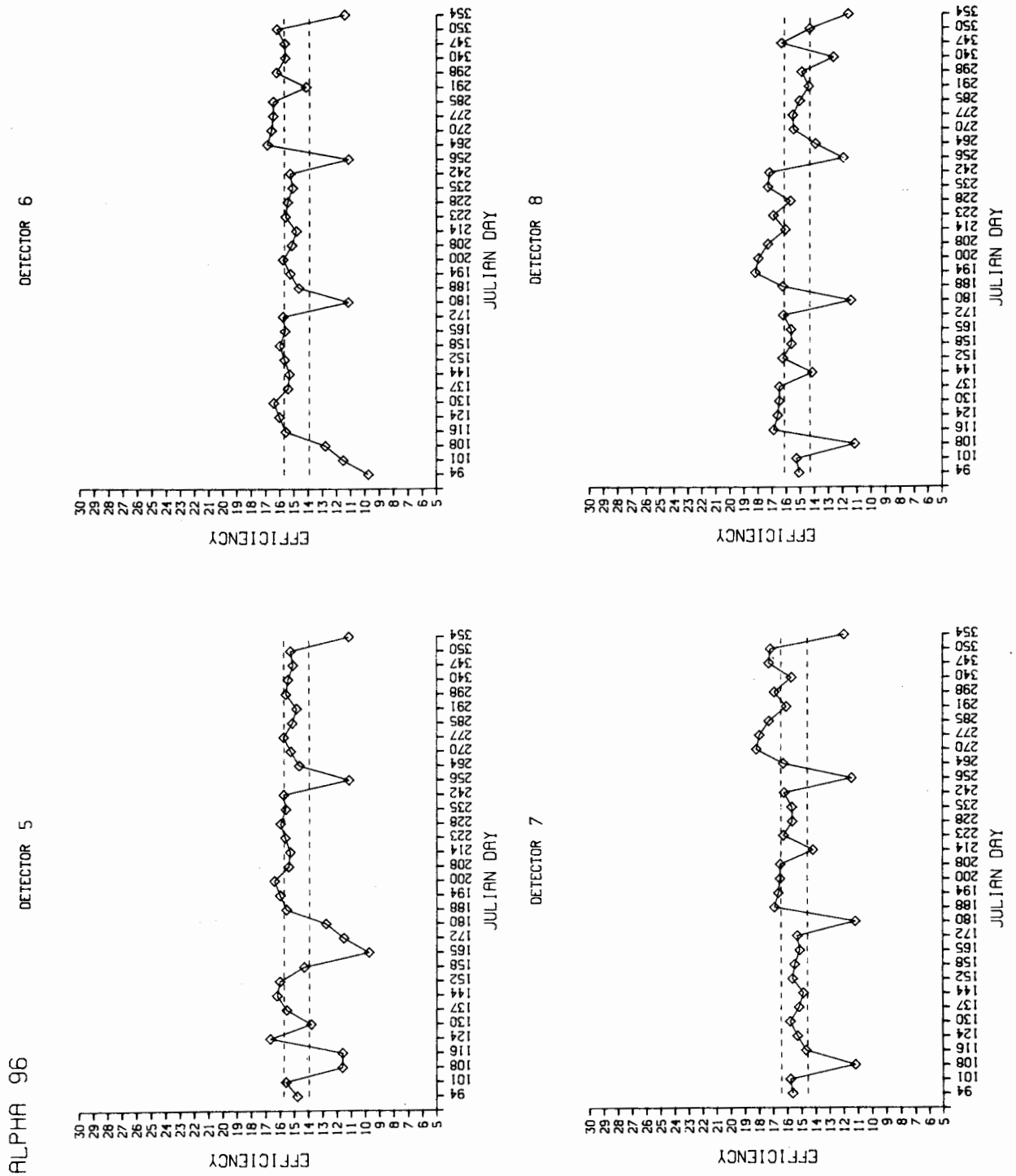
DETECTOR 1
DETECTOR 2
DETECTOR 3
DETECTOR 4
EFFICIENCY
JULIAN DAY

Fig. E-2. (cont)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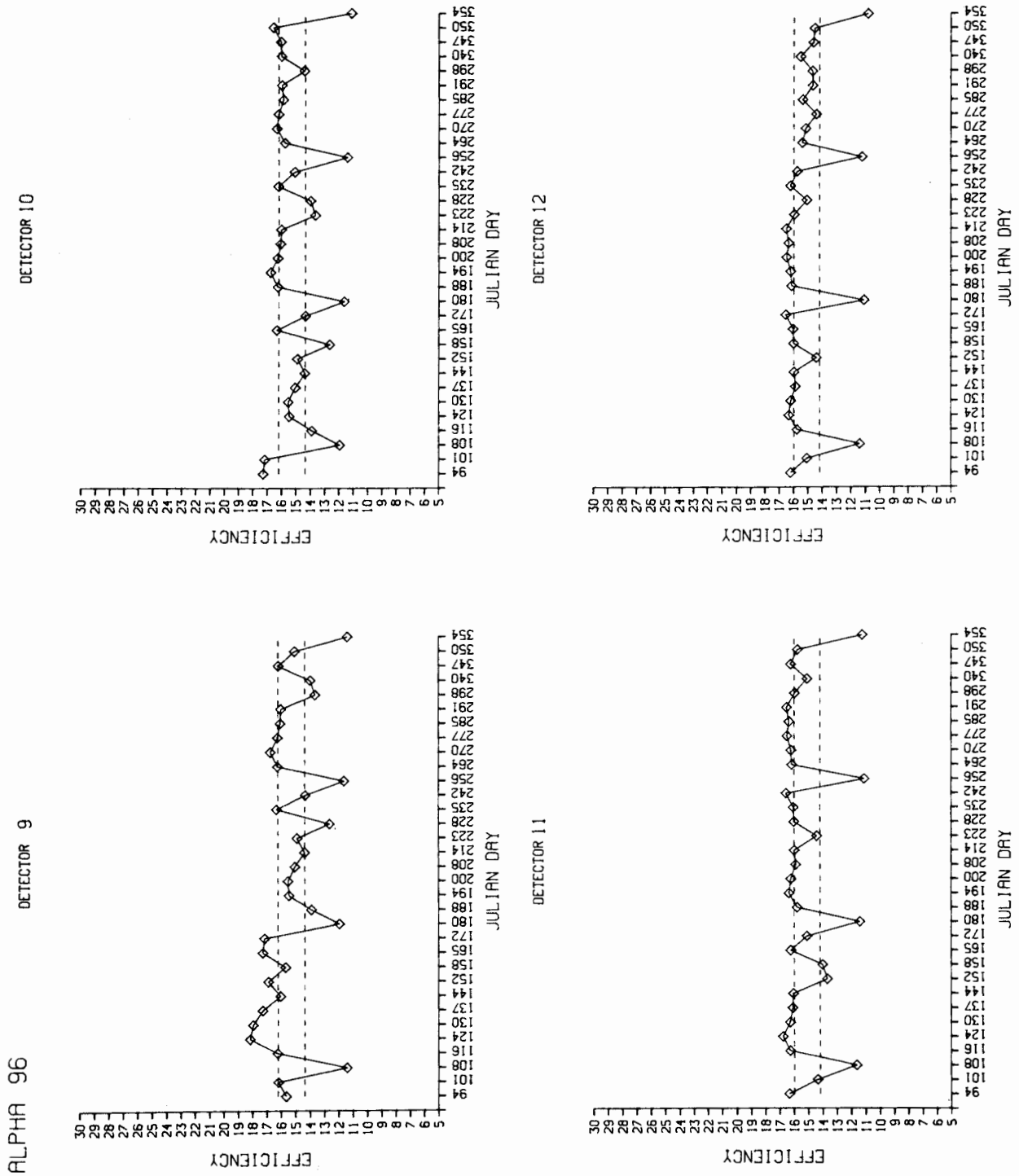
DETECTOR 6
DETECTOR 7
DETECTOR 8
EFFICIENCY
JULIAN DAY

Fig. E-2. (cont)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DETECTOR 9
DETECTOR 10
DETECTOR 11
DETECTOR 12
EFFICIENCY
JULIAN DAY

Fig. E-2. (cont)

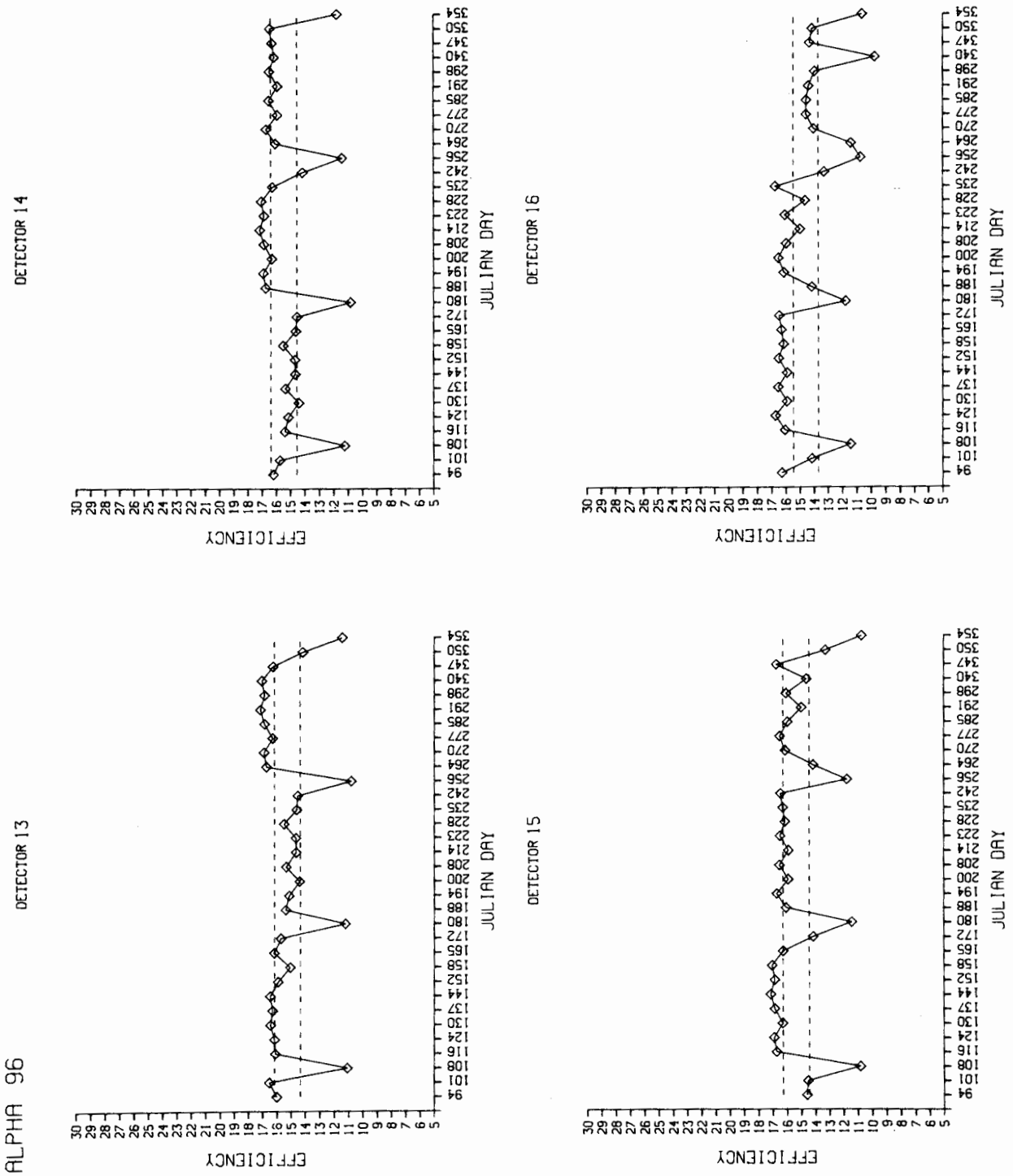
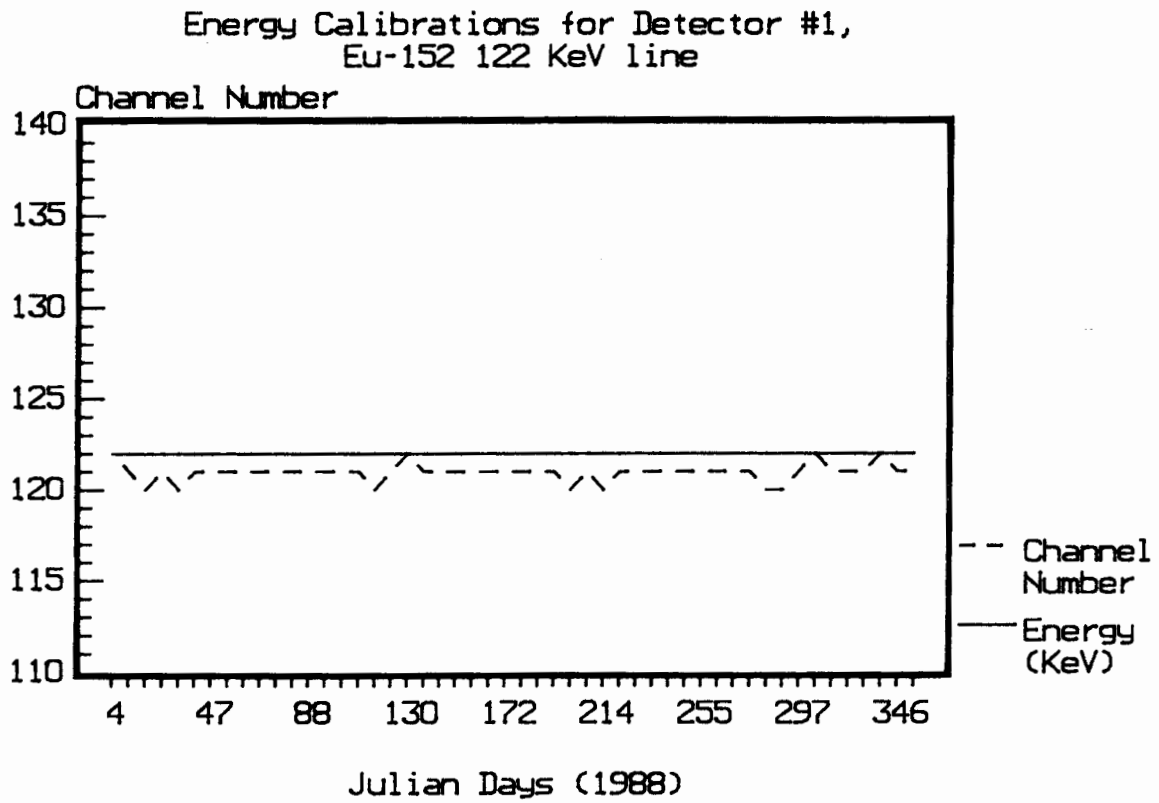


Fig. E-2. (cont)

NOTE: Fluctuations in these data are documented in Laboratory notebook A6487 and are generally due to a detector being replaced or needing cleaning, electrical power surges and failures, vacuum system leaks, electronic noise, and special studies in which samples were counted without using the detector pedestals. The following detectors were replaced during 1988: 16 Alpha System, detector No. 5 on 6-16-88; 64 Alpha System, detector No. 2 on 6-16-88; and 80 Alpha System, detector No. 2 on 9-26-88.

Gamma Spectrometer Energy and Efficiency Calibration Data for 1988



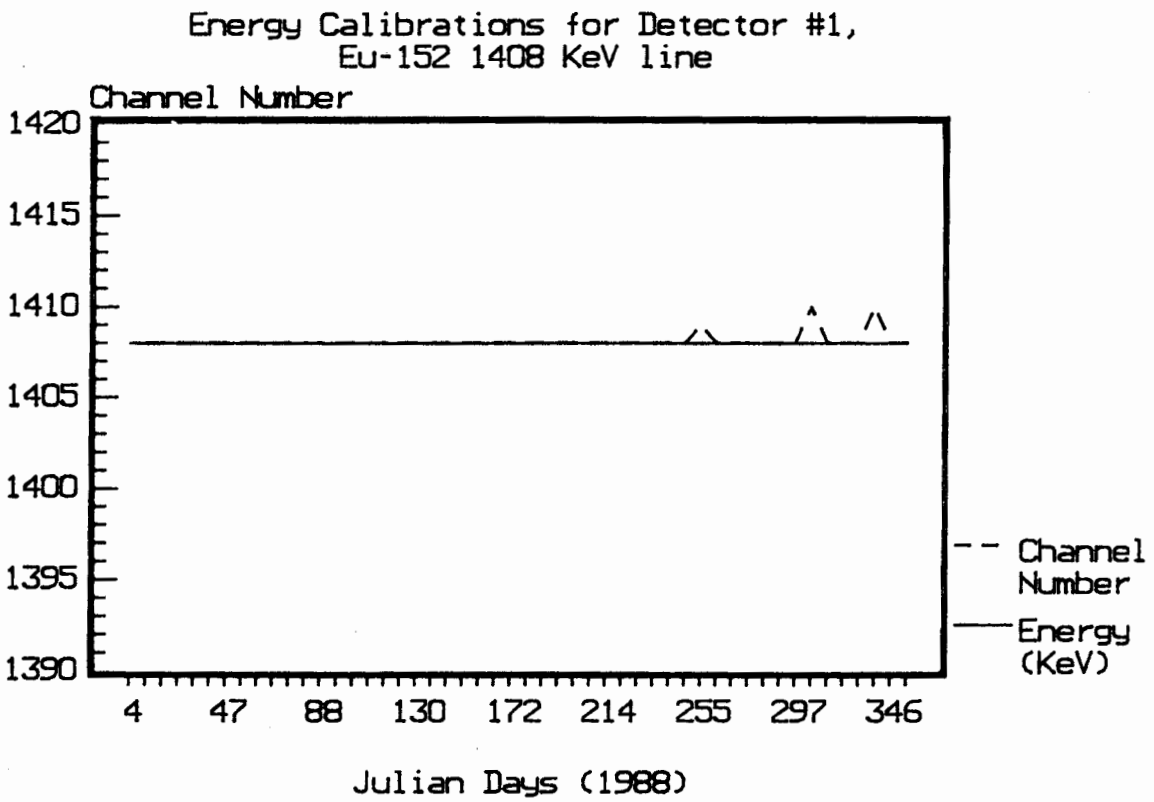
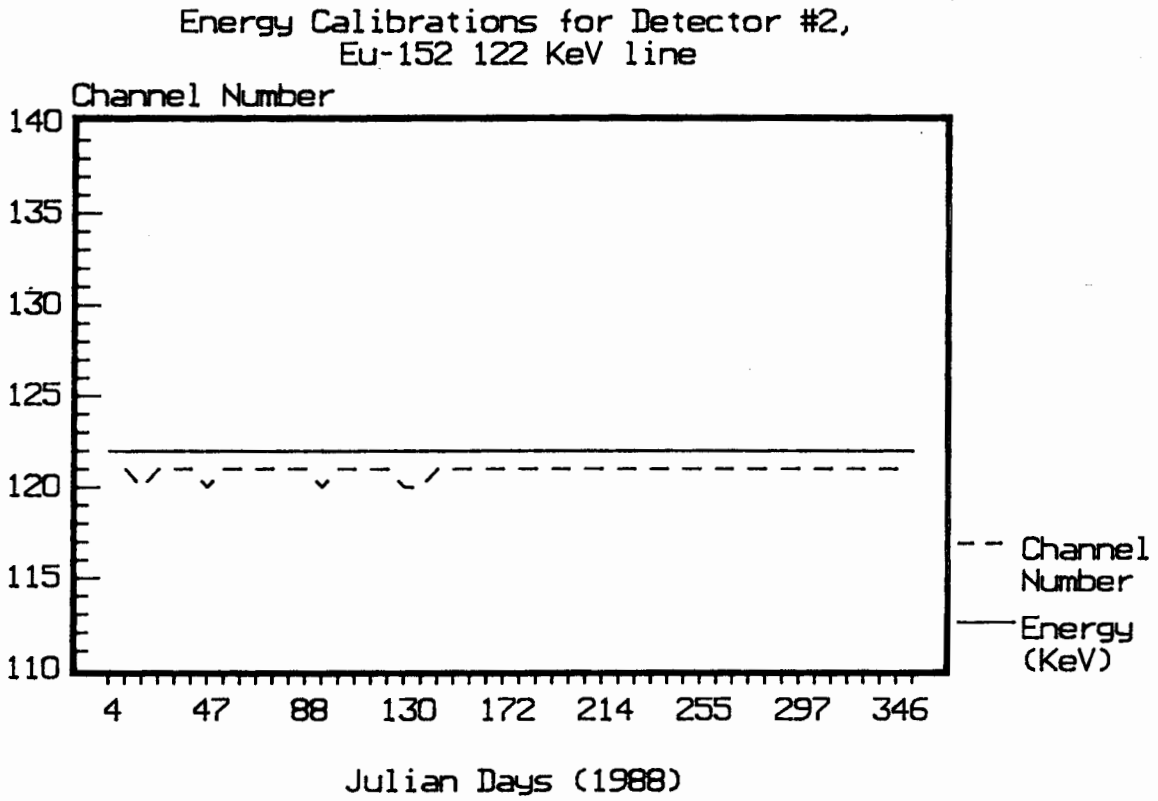


Fig. E-3. Energy calibrations for gamma detectors.


Energy Calibrations for Detector #2,
Eu-152 122 KeV line
Channel Number
140
135
130
125
120
115
110
4
47
88
130
172
214
255
297
346
Julian Days (1988)
Channel Number
Energy (KeV)

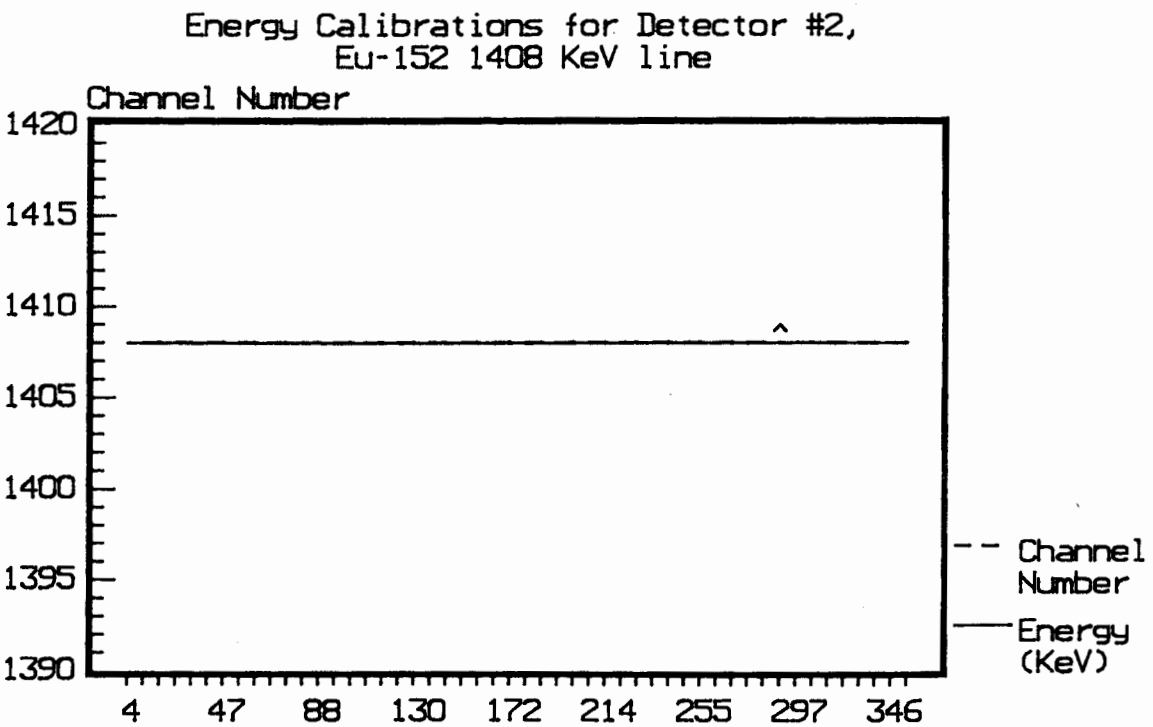
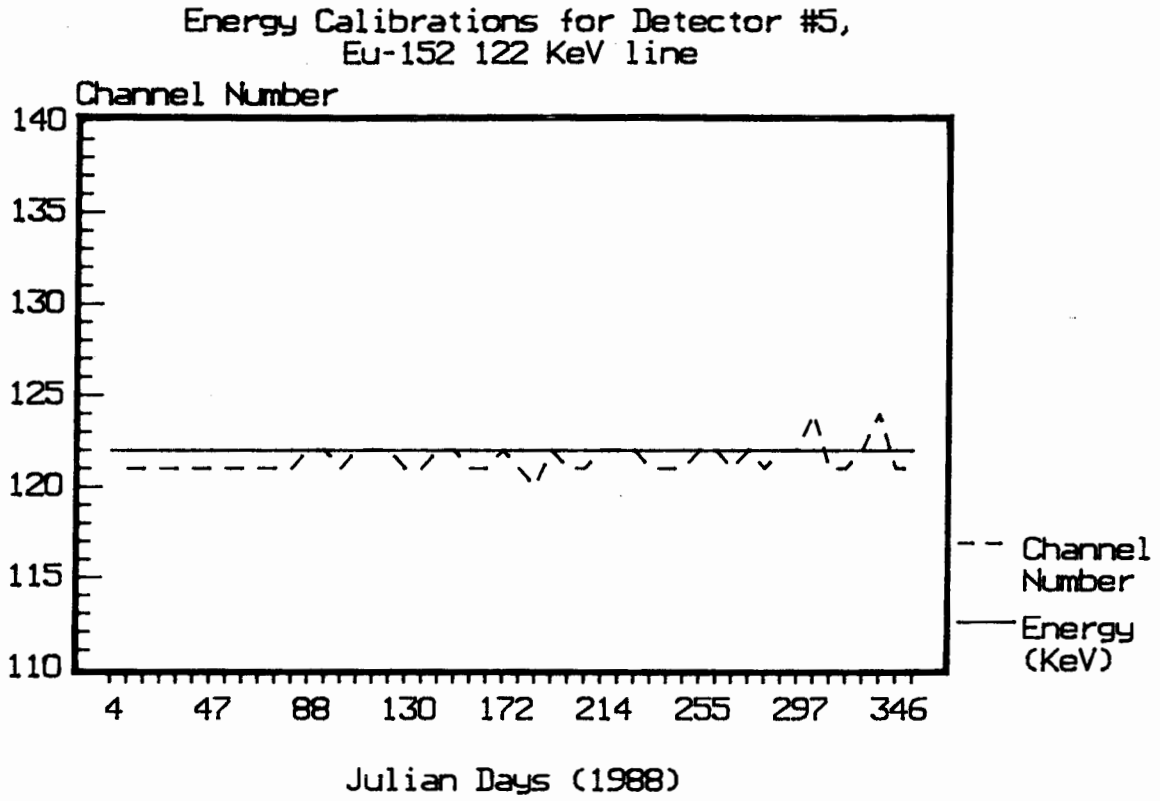

Energy Calibrations for Detector #2,
Eu-152 1408 KeV line
Channel Number
1420
1415
1410
1405
1400
1395
1390
4
47
88
130
172
214
255
297
346
Channel Number
Energy (KeV)

Fig. E-3. (cont)


Energy Calibrations for Detector #5,
Eu-152 122 KeV line
Channel Number
140
135
130
125
120
115
110
4
47
88
130
172
214
255
297
346
Julian Days (1988)
Channel Number
Energy (KeV)

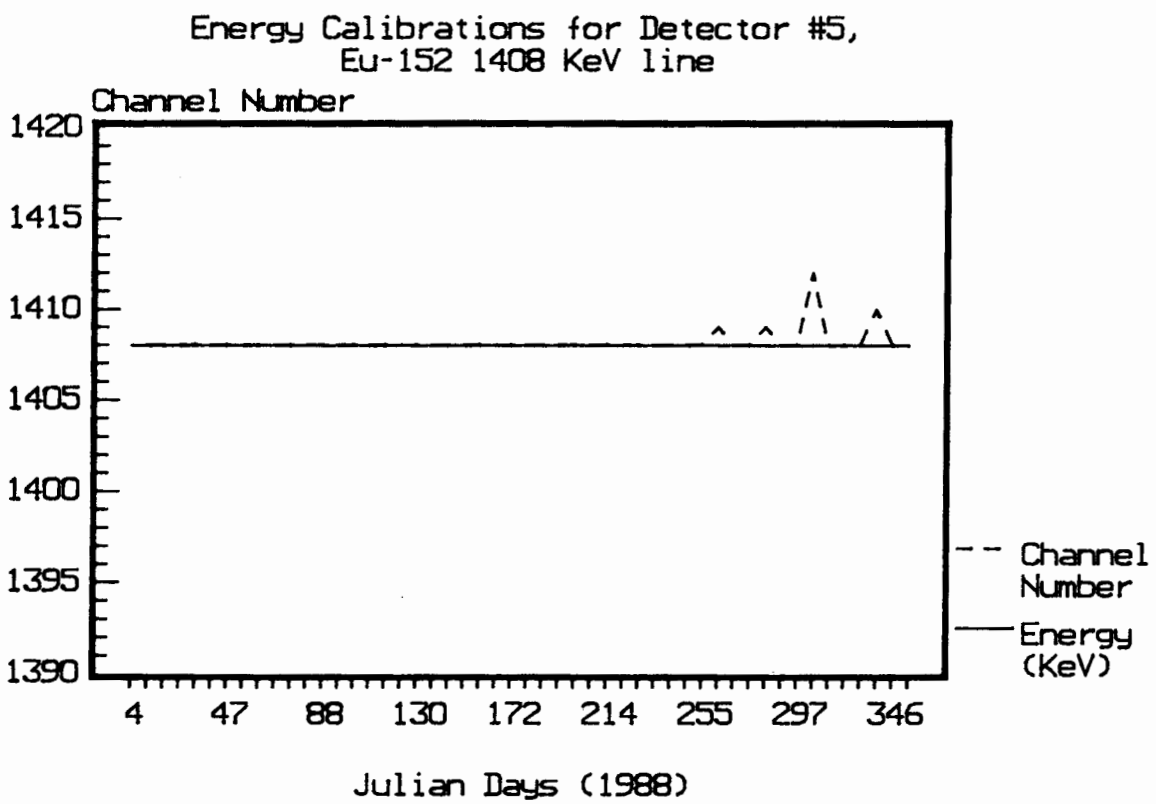
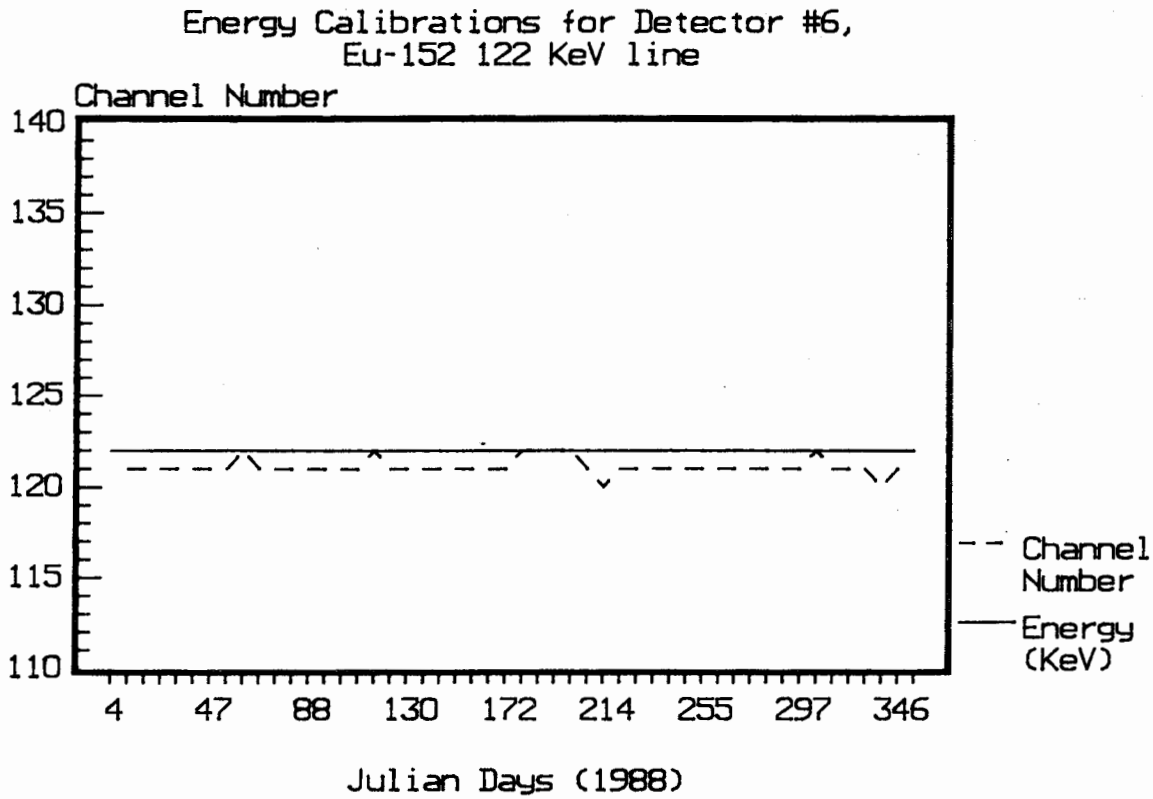

Energy Calibrations for Detector #5,
Eu-152 1408 KeV line
Channel Number
1420
1415
1410
1405
1400
1395
1390
4
47
88
130
172
214
255
297
346
Julian Days (1988)
Channel Number
Energy (KeV)

Fig. E-3. (cont)


Energy Calibrations for Detector #6,
Eu-152 122 KeV line
Channel Number
140
135
130
125
120
115
110
4
47
88
130
172
214
255
297
346
Julian Days (1988)
Channel Number
Energy (KeV)

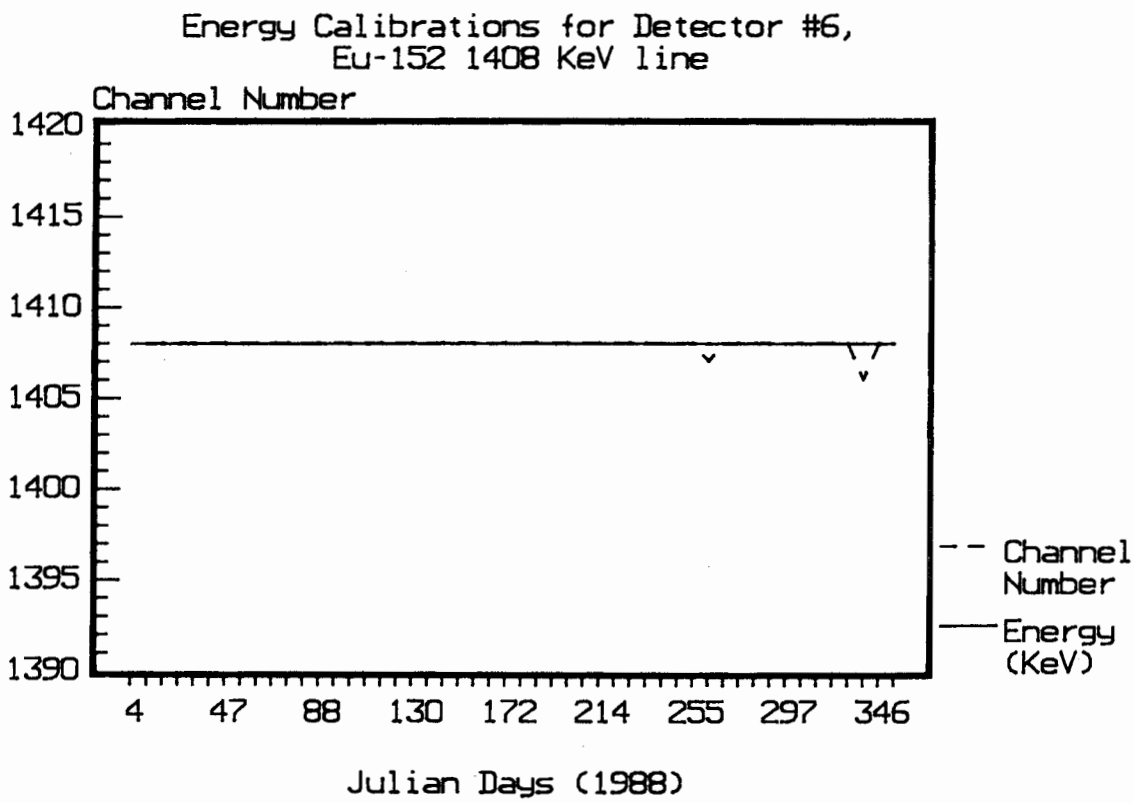
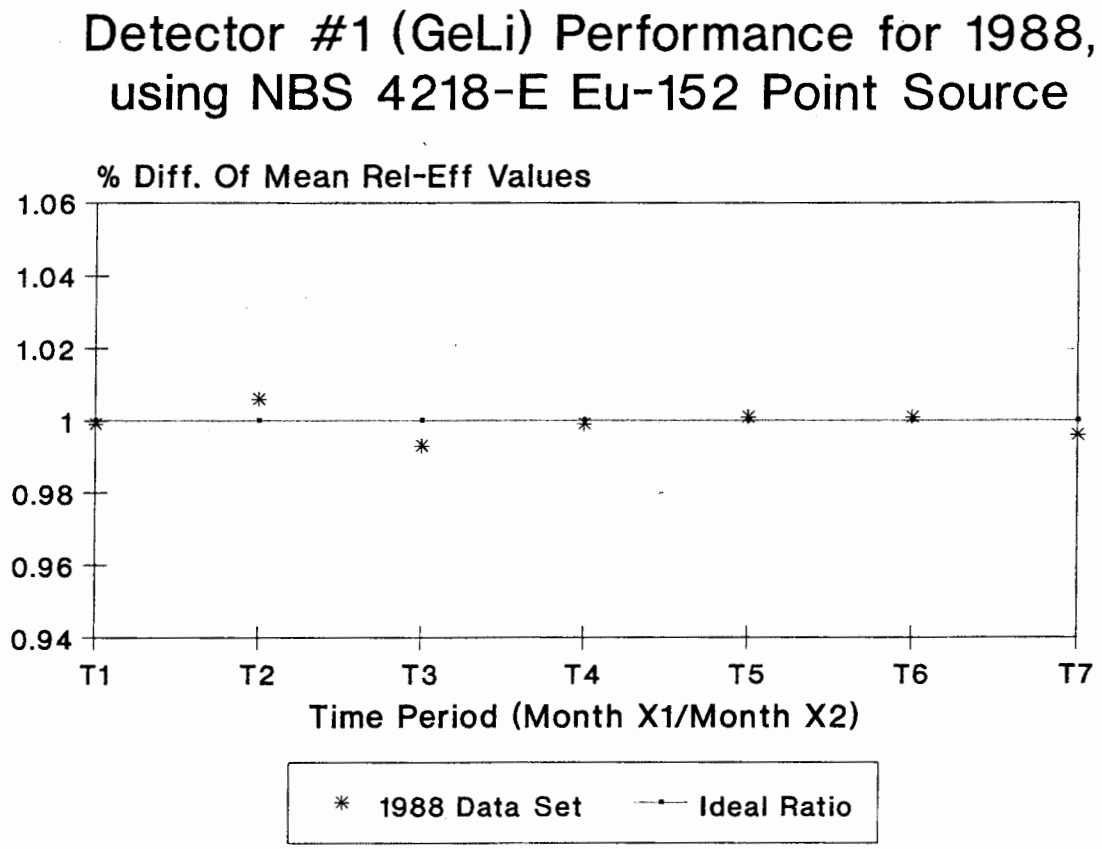

Energy Calibrations for Detector #6,
Eu-152 1408 KeV line
Channel Number
1420
1415
1410
1405
1400
1395
1390
4
47
88
130
172
214
255
297
346
Julian Days (1988)
Channel Number
Energy (KeV)

Fig. E-3. (cont)



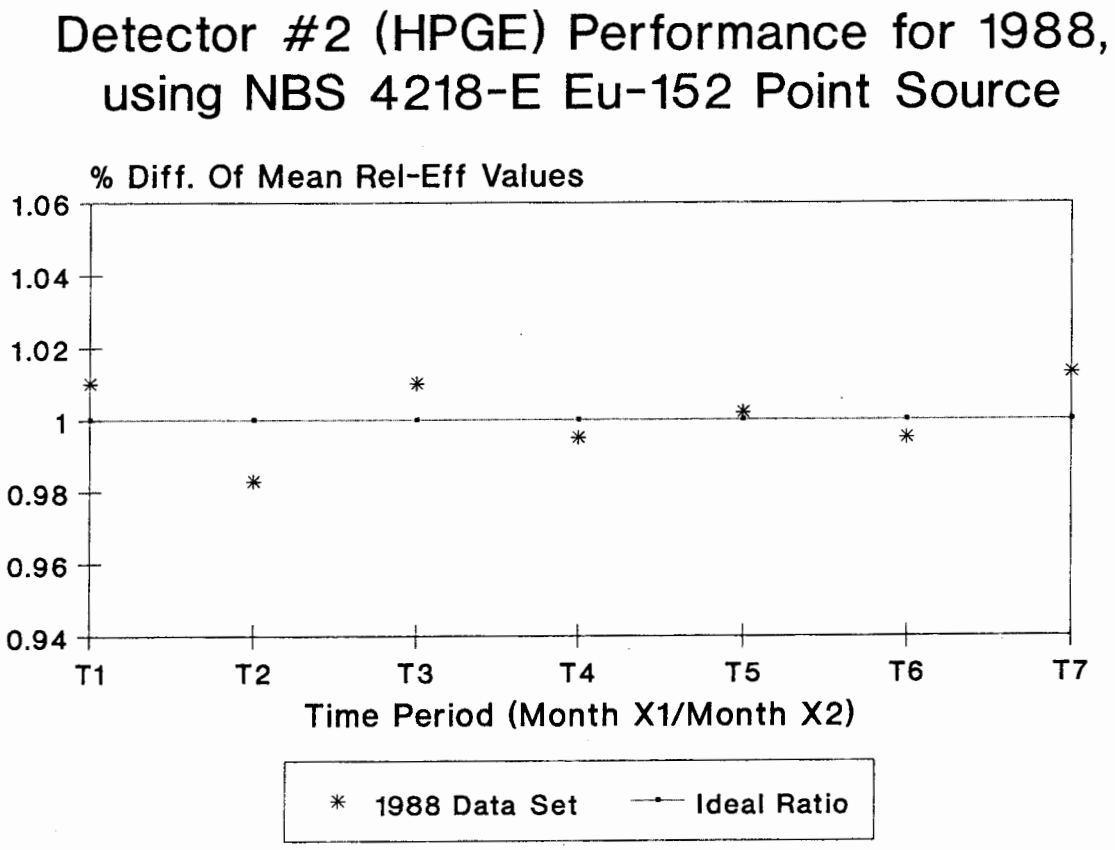
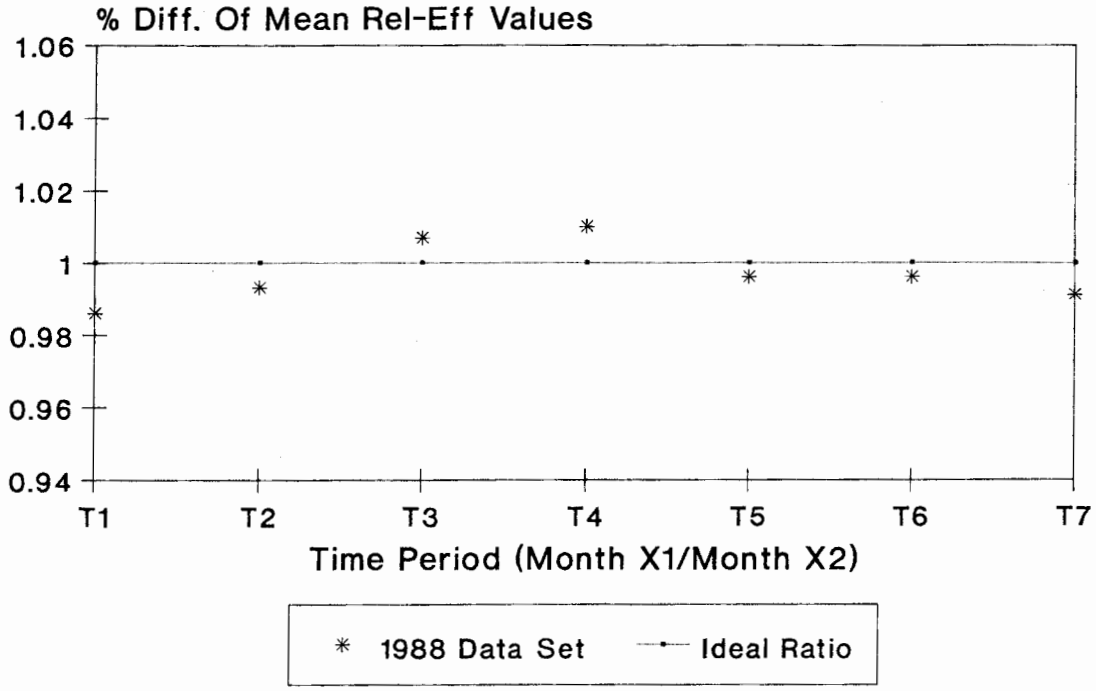


Fig. E-4. GeLi detectorperformance for 1988.

Detector #5 (GeLi) Performance for 1988, using NBS 4218-E Eu-152 Point Source



Detector #6 (HPGE) Performance for 1988, using NBS 4218-E Eu-152 Point Source

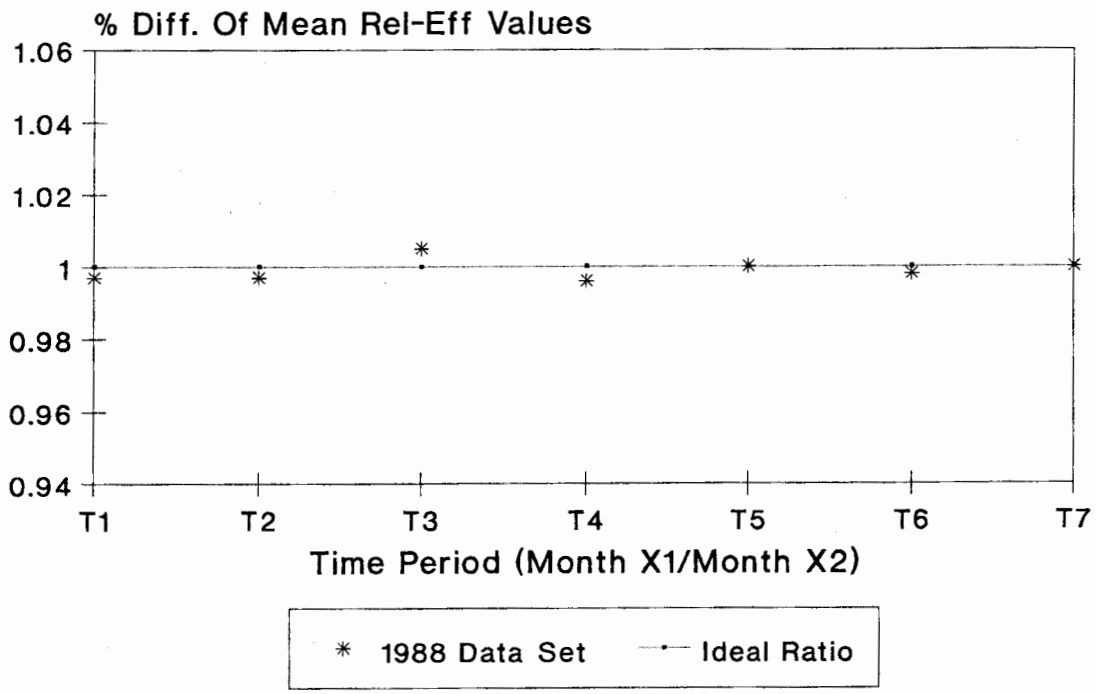


Fig. E-4. (cont)

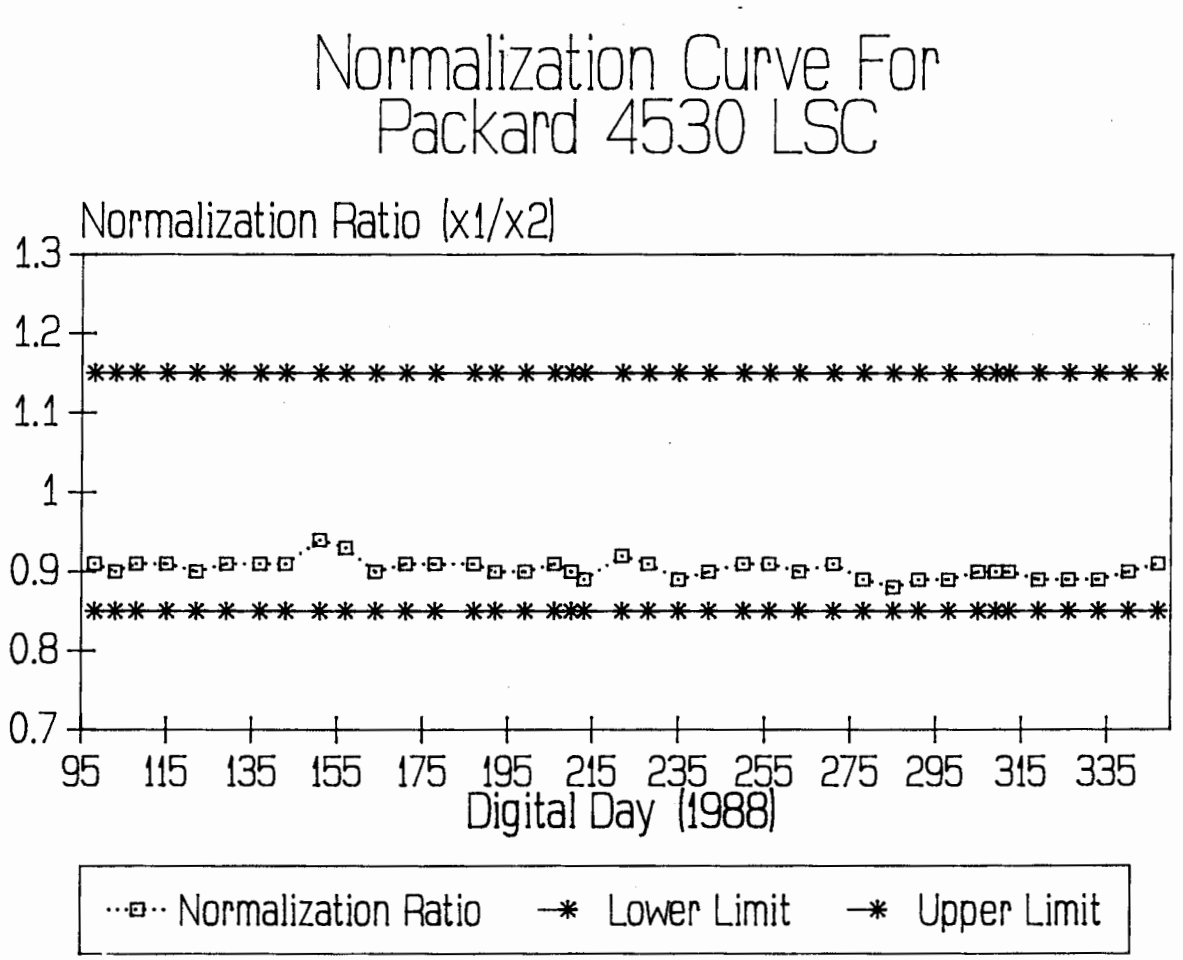


Fig. E-5. Liquid scintillation normalization curve for 1988.

APPENDIX F

SUMMARY OF SPIKE RECOVERY DATA FOR 1988

TABLE F-I

PLUTONIUM-238 SPIKE RECOVERY IN URINE AS A FUNCTION OF CONCENTRATION AFTER CORRECTION FOR PLUTONIUM-242 RECOVERY

Spike Level pCi/Sample	Mean ± Std Dev	No. of Samples	RSD (%)
0.06	102 ± 22	13	22
0.12	97 ± 7	13	7
0.19	102 ± 10	14	10
0.39	100 ± 8	13	8

TABLE F-II

PLUTONIUM-239 SPIKE RECOVERY IN URINE AS A FUNCTION OF CONCENTRATION AFTER CORRECTION FOR PLUTONIUM-242 RECOVERY

Spike Level pCi/Sample	Mean ± Std Dev	No. of Samples	RSD (%)
0.06	99 ± 22	16	22
0.15	96 ± 6	13	6
0.22	99 ± 12	15	12
0.44	103 ± 8	12	8

TABLE F-III

TRITIUM SPIKE RECOVERY IN URINE AS A FUNCTION OF CONCENTRATION

Spike Level uCi/L	Mean ± Std Dev	No. of Samples	RSD (%)
0.13	84 ± 23	16	27
0.52	103 ± 10	41	10
0.87	105 ± 8	41	8
5.07	111 ± 8	41	7
10.14	111 ± 7	39	6

TABLE F-IV

URANIUM-235 SPIKE RECOVERY IN URINE AS A FUNCTION OF CONCENTRATION

Spike Level pCi/L	Mean ± Std Dev	No. of Samples	RSD (%)
5.14	84 ± 7	7	8
7.71	87 ± 9	10	10
10.28	90 ± 9	12	10
15.42	90 ± 8	12	9
20.56	93 ± 9	14	10
25.70	89 ± 4	11	4

TABLE F-V

URANIUM-238 SPIKE RECOVERY IN URINE AS A FUNCTION OF CONCENTRATION

Spike Level ug/L	Mean ± Std Dev[a]	No. of Samples	RSD (%)
8.48	99 ± 27	13	27
12.72	115 ± 22	8	19
16.96	93 ± 15	10	16
21.20	105 ± 10	8	10
25.44	98 ± 11	13	11
33.92	99 ± 15	11	15

[a]The large standard deviation associated with the U-238 analysis is related to the measurement of depleted uranium and its corresponding low production of delayed neutron counts. The U-238 standard in use is 0.18% U-235.

TABLE F-VI

SPIKE RECOVERIES FOR U.S. TRANSURANIUM REGISTRY TISSUE ANALYSES

FIRST QUARTER 1988

Analyte	No. of Samples	Spike Level	Mean ± Std Dev
Am-243	212	1.83 pCi	94 ± 4
Pu-242	169	3.95 pCi	79 ± 12

SECOND QUARTER 1988

Analyte	No. of Samples	Spike Level	Mean ± Std Dev
Am-243	157	1.83 pCi	96 ± 5
Pu-242	150	3.95 pCi	91 ± 10

THIRD QUARTER 1988

Analyte	No. of Samples	Spike Level	Mean ± Std Dev
Am-243	85	1.83 pCi	90 ± 6
Pu-242	98	3.95 pCi	84 ± 9

FOURTH QUARTER 1988

Analyte	No. of Samples	Spike Level	Mean ± Std Dev
Am-243	9	1.83 pCi	92 ± 4
Pu-242	45	3.95 pCi	81 ± 22

TABLE F-VII

REAGENT BLANK DATA FOR U.S. TRANSURANIUM REGISTRY TISSUE ANALYSES

Quarter	Am-241 D/M	Pu-238 D/M	Pu-239 D/M
First	0.010 ± 0.008 (16)[a]	-0.002 ± 0.006 (12)	0.004 ± 0.006 (12)
Second	0.010 ± 0.006 (11)	-0.001 ± 0.004 (11)	0.003 ± 0.004 (11)
Third	0.040 ± 0.049 (10)	0.003 ± 0.008 (10)	0.005 ± 0.007 (10)
Fourth	± (0)	± (0)	± (0)

[a]( )=number of analyses.

TABLE F-VIII

ROUTINE QC SAMPLES FOR TISSUE ANALYSES

The Tissue Section is routinely analyzing 2g aliquots of NBS SRM 4352, Human Liver. The QA Section overspikes these aliquots with Pu-238. Notable scatter in the % Recovery of the Pu-239 results suggests that there is inhomogeneity in the 2g samples due primarily to fine particles containing Pu-239.

	First Quarter		Second Quarter	
	HSE-9 Pu-238	NBS Pu-239	HSE-9 Pu-238	NBS Pu-239
	83	75	100	87
	110	107	97	108
	97	109	87	111
	97	131	103	97
	97	97	100	102
	100	111	90	97
	84	65	87	113
	97	84	71	89
	107	119	74	119
$\bar{X}$	97 ± 9	100 ± 21	90 ± 12	103 ± 11

	Third Quarter		Fourth Quarter	
	HSE-9 Pu-238	NBS Pu-239	HSE-9 Pu-238	NBS Pu-239
	-	96	-	-
	-	114		
	-	90		
$\bar{X}$		105 ± 9		

TABLE F-IX

SPIKE RECOVERIES FOR WASTE-WATER ANALYSES

Analyte	No. of Samples	Technique	Spike Level	Mean% ± RSD	Range
Ag	3	ETVAA	5	69 ± 8	62 - 78
Ag	155	FAA	200 - 500	93 ± 7	72 - 122
Ag	30	ICPMS	100 - 200	92 ± 12	69 - 120
As	66	ETVAA	10 - 500	87 ± 12	64 - 125
As	3	FAA	1000	93 ± 10	84 - 104
As	20	ICPMS	100 - 200	100 ± 12	80 - 117
B	2	FIA	2000	99	98 - 100
Ba	114	FAA	100 - 30000	94 ± 13	44 - 140
Ba	33	ICPMS	100 - 200	96 ± 8	80 - 120
Be	1	FAA	200	99	-
Ca	1	FAA	40000	88	-
Ca	1	IC	20000	88	-
Cd	23	ETVAA	5 - 100	96 ± 18	70 - 150
Cd	134	FAA	5 - 8000	95 ± 10	71 - 112
Cd	33	ICPMS	100 - 200	98 ± 5	91 - 110
Cl	15	FIA	40000	101 ± 6	89 - 111
Cl	1	IC	2500	92	-
CN	23	ACOLR	200 - 4000	98 ± 3	87 - 104
Co	1	FAA	10	99	-
COD	18	COLOR	40000	99 ± 7	98 - 112
Cr	33	ETVAA	20 - 500	95 ± 9	65 - 112
Cr	146	FAA	100 - 63000	102 ± 11	74 - 120
Cr	24	ICPMS	100 - 200	98 ± 6	82 - 118
Cr(+6)	36	FIA	200	93 ± 2	86 - 105
Cu	87	FAA	100 - 500	95 ± 10	69 - 117
F	1	IC	2000	87	-
F	9	ISE	300	94 ± 18	77 - 127
Fe	6	ETVAA	10	92 ± 24	77 - 140
Fe	81	FAA	100 - 1000	93 ± 20	15 - 255
Hg	92	CVAA	0.1 - 20	102 ± 12	69 - 135
Hg	1	FAA	1	95	-
Hg	11	ICPMS	0.10 - 0.17	90 ± 21	49 - 130
K	2	FAA	40000	102	-
Li	3	FAA	2500 - 10000	97 ± 10	86 - 104
Mg	2	FAA	10000	92	90 - 93
Mg	1	IC	10000	91	-
Na	4	FAA	400	92 ± 7	81 - 96
NH3-N	16	ACOLR	800 - 8000	96 ± 3	88 - 100
NH3-N	27	FIA	800 - 8000	96 ± 8	80 - 112
Ni	55	FAA	100 - 1000	94 ± 8	76 - 114
Ni	16	ICPMS	200	95 ± 7	76 - 104
NO2-N	13	FIA	400	103 ± 6	93 - 112
NO3-N	14	FIA	400 - 40000	97 ± 9	82 - 115
P	17	ACOLR	200 - 1000	85 ± 10	82 - 118
Pb	17	ETVAA	20 - 100	90 ± 19	66 - 122
Pb	124	FAA	100 - 40000	98 ± 9	56 - 123
Pb	30	ICPMS	100 - 200	96 ± 8	81 - 114
Se	120	ETVAA	5 - 500	91 ± 12	57 - 119
Se	27	ICPMS	100 - 200	97 ± 13	81 - 127
Si	7	FIA	10000 - 40000	97 ± 6	84 - 102
SO3	26	TITR	41000 - 61000	96 ± 5	79 - 101
SO4	12	FIA	40000	98 ± 9	86 - 118
Sr-89	7	PC	0.5 - 1.4 nCi/L	89 ± 9	80 - 104
Sr-90	9	PC	1.62 nCi/L	93 ± 6	82 - 101
TALK	7	TITR	64000 - 68000	96 ± 4	88 - 102
TDS	8	GRAV	1000	100 ± 1	99 - 101
Tl	9	ETVAA	10 - 100	69 ± 8	58 - 83
Tl	3	FAA	40 - 100	81 ± 8	72 - 86
Tl	21	ICPMS	100 - 200	99 ± 8	88 - 120
TSS	1	GRAV	5500	100	-
V	1	FAA	10	95	-
Zn	50	FAA	100 - 500	100 ± 7	89 - 117
Zn	27	ICPMS	100 - 200	98 ± 8	73 - 116

TABLE F-X

COMPARISON OF HSE-9 SPIKED SAMPLES WITH NIOSH PAT SAMPLES

ROUND 92 - FIRST QUARTER 1988

METALS

	Lead		Cadmium		Zinc	
	HSE-9[a]	PAT	HSE-9	PAT	HSE-9	PAT
	112	101	109	80	102	96
	102	79	104	87	99	103
	101	98	103	83	99	95
	102	100	82	83	98	118
$\bar{X}$	104 ± 5	95 ± 10	100 ± 12	83 ± 3	98 ± 4	103 ± 11

SOLVENTS

	Carbon Tetrachloride		1,2-Dichloroethane		Trichloroethylene	
	HSE-9	PAT	HSE-9	PAT	HSE-9	PAT
	101	99	100	102	100	103
	104	102	98	103	99	100
	104	99	100	102	101	102
	100	101	98	104	100	97
$\bar{X}$	102 ± 2	102 ± 7	99 ± 1	103 ± 1	100 ± 1	101 ± 3

ROUND 93 - SECOND QUARTER 1988

METALS

	Lead		Cadmium		Zinc	
	HSE-9	PAT	HSE-9	PAT	HSE-9	PAT
	92	109	95	102	106	98
	100	104	94	100	103	101
	101	101	94	100	101	100
	95	105	102	105	95	104
$\bar{X}$	97 ± 4	105 ± 3	96 ± 4	102 ± 2	101 ± 5	101 ± 3

SOLVENTS

	Cellosolve Acetate		o-Xylene		p-Dioxane	
	HSE-9	PAT	HSE-9	PAT	HSE-9	PAT
	74	84	87	94	87	93
	82	87	96	97	97	94
	81	81	87	90	97	97
	80	90	86	100	93	94
$\bar{X}$	102 ± 2	102 ± 7	99 ± 1	103 ± 1	100 ± 1	101 ± 3

[a]The listed Pb, Cd, and Zn results are from a second set ofQC samples. The original HSE-9 samples were not good indicators of control conditions for Round 92. They were prepared from aliquots of standard that had apparently evaporated and concentrated and gave the following % Recovery: Pb-164 ± 5, Cd-247 ± 14, and Zn-135 ± 8.

TABLE F-X (cont)

ROUND 94 - THIRD QUARTER 1988

METALS

	Lead		Cadmium		Zinc	
	HSE-9	PAT	HSE-9	PAT	HSE-9	PAT
	98	110	88	109	101	100
	94	132	94	95	109	101
	97	97	98	88	110	102
	112	107	95	94	107	102
$\bar{X}$	100 ± 8	112 ± 15	94 ± 4	97 ± 9	107 ± 4	101 ± 1

SOLVENTS

	Chloroform		Carbon Tetrachloride		1,2-Dichloroethane	
	HSE-9	PAT	HSE-9	PAT	HSE-9	PAT
	107	78	99	93	100	92
	109	86	109	93	97	116
	84	77	88	71	-	70
	95	80	96	93	103	90
$\bar{X}$	99 ± 12	80 ± 4	98 ± 9	88 ± 11	100 ± 3	92 ± 19

ROUND 95 - FOURTH QUARTER 1988

METALS

	Lead		Cadmium		Zinc	
	HSE-9	PAT	HSE-9	PAT	HSE-9	PAT
	85	96	89	93	101	101
	109	100	100	92	103	101
	97	96	90	91	98	101
	102	99	95	93	103	103
$\bar{X}$	98 ± 10	98 ± 2	94 ± 5	92 ± 1	101 ± 2	102 ± 2

SOLVENTS

	Benzene		o-Xylene		Toluene	
	HSE-9	PAT	HSE-9	PAT	HSE-9	PAT
	78	89	85	95	85	93
	79	85	88	83	86	90
	92	91	88	95	88	92
	84	89	92	98	85	98
$\bar{X}$	83 ± 6	89 ± 3	88 ± 3	93 ± 7	86 ± 1	93 ± 3

APPENDIX G

QC DATA ON WATER SAMPLE QUALITY PARAMETERS FOR NATURAL WATER SAMPLES FOR 1988

TABLE G-I

QA DATA ON WATER SAMPLE QUALITY PARAMETERS FOR NATURAL WATER SAMPLES FOR 1988

Richard Robinson

Sample No.	Source	C/A	Hard/Ca+Mg	Cond/C	Cond/A	TDS/DCS	TCOND/SI
88.02700	Chamita	1.074	1.031	0.939	1.008	1.092	0.893
88.02701	Embudo	1.085	1.044	0.957	1.038	1.091	0.952
88.02702	Otowi	1.098	1.041	0.975	1.071	1.066	0.980
88.02703	Cochiti	1.082	1.028	0.963	1.042	1.099	0.951
88.02704	Bernallio	1.057	1.068	0.972	1.027	1.010	0.949
88.02705	Jemez	1.096	1.069	1.012	1.109 J	1.066	1.024
88.02706	LA Resevoir	0.972	1.004	1.081	1.051	1.003	1.027
88.02707	Guaje	1.091	0.949	1.011	1.104	1.044	1.048
88.02708	Frijoles	0.983	1.023	1.089	1.070	1.067	1.023
88.02709	La Mesita	1.100	1.066	0.997	1.097	1.056	1.034
88.02710	Sacred Spr	1.053	1.165	0.965	1.016	1.100	1.014
88.02711	Indian Spr	1.024	1.081	1.073	1.099	1.008	1.075
88.02739	TW-1	1.114	1.011	0.975	1.086	1.047	0.945
88.02741	TW-3	1.043	1.003	1.026	1.070	1.137	1.022
88.02742	DT-5A	1.083	1.067	0.939	1.017	1.585	1.009
88.02743	TW-8	1.150	1.123	0.981	1.128	0.869	1.082
88.02744	DT-9	1.083	1.053	0.954	1.034	1.018	1.026
88.02745	DT-10	1.104	1.086	0.945	1.043	0.968	1.027
88.02746	Canada del B	1.094	1.026	1.101 J	1.204 J	1.248	1.018
88.02747	Pajarito	1.433	0.954	0.969	1.388	1.110	1.052
88.02748	Water B	1.055	1.101	0.979	1.033	0.969	0.975
88.02749	PCO-1	1.026	1.140	1.015	1.041	0.950	1.008
88.02750	PCO-2	1.043	1.117	1.026	1.070	1.123	1.028
88.02751	PCO-3	1.039	1.130	1.017	1.056	1.156	1.019
88.02752	Acid Weir	0.955	1.072	1.145	1.094	1.019	0.909
88.02753	Pueblo 1	1.078	1.093	1.065	1.148 J	1.085	0.932
88.02754	Pueblo 2	0.997	1.049	1.075	1.072	0.977	0.914
88.02755	Pueblo 3	1.106	1.122	0.991	1.095	0.923	0.953
88.02757	TW-1A	1.057	1.073	1.034	1.092	0.874	0.981
88.02758	TW-2A	1.019	1.106	1.096	1.117 J	1.111	0.996
88.02759	Basalt Sp	1.016	1.077	1.076	1.093	1.049	1.031
88.02760	DPS-1	1.091	1.048	1.071	1.167 J	1.055	0.973
88.02761	DPS-4	1.027	1.080	1.098	1.127 J	1.046	0.955
88.02762	LAOC	1.004	1.123	1.134 J	1.139 J	1.114	0.974
88.02763	LAO-1	1.024	1.045	1.050	1.074	1.058	0.923
88.02764	LAO-2	1.041	1.147	1.063	1.107 J	1.098	0.967
88.02765	LAO-3	1.055	1.042	1.102 J	1.163 J	1.082	0.971
88.02768	SCS-1	0.964	1.012	1.116 J	1.076	1.004	0.935
88.02769	SCS-2	1.034	1.030	1.044	1.080	1.006	0.941
88.02770	SCS-3	1.048	1.023	1.048	1.098	1.027	0.956
88.02771	Mort GS1	1.031	1.089	1.098	1.132 J	0.966	1.037
88.02772	MCO-3	0.985	1.095	1.100	1.083	1.015	1.008
88.02773	MCO-4	0.963	1.064	1.095	1.054	0.965	0.915
88.02774	MCO-5	1.061	1.064	1.065	1.130 J	1.075	0.944

TABLE G-I (cont)

Sample No.	Source	C/A	Hard/Ca+Mg	Cond/C	Cond/A	TDS/DCS	Cond/SI
88.02775	MCO-6	0.990	1.141	1.076	1.065	0.973	0.972
88.02776	MCO-7	0.999	1.069	1.050	1.049	0.985	0.909
88.02777	MCO7.5	1.014	1.101	1.083	1.098	0.959	0.946
88.02798	FS-1	1.023	1.076	1.030	1.054	0.949	1.063
88.02799	FS-2	1.069	1.086	0.996	1.064	0.983	1.045
88.02800	FS-3	1.072	1.084	0.976	1.046	0.966	1.025
88.02801	FS-4	1.085	1.084	0.970	1.053	0.914	1.025
88.02802	FS-5	1.040	1.113	1.002	1.042	0.894	1.048
88.02804	Fenton Hill	0.418	4.339	2.657	1.111	1.296	1.483
88.02883	TW-1	1.054	1.077	1.045	1.101	1.092	0.984
88.05551		0.943	1.042	0.965	0.911	0.996	0.97
88.05552		0.976	1.109	0.936	0.914	1.047	0.96
88.05553		0.832	1.270	1.131	0.941	1.132	1.07
88.05554		1.048	1.025	0.892	0.936	1.062	0.94
88.05555		0.949	1.063	1.011	0.960	1.098	1.02
88.05556		0.969	1.725	0.962	0.932	1.033	0.97
88.05557		0.770	3.573	1.224	0.943	1.083	1.10
88.05558		1.218	1.334	0.776	0.945	0.947	0.88
88.05560		0.840	0.574	1.119	0.940	1.169	1.06
88.05561		1.032	0.995	0.910	0.939	1.087	0.95
88.05562		1.059	0.614	0.888	0.940	0.996	0.94
88.05563		0.988	1.037	0.924	0.913	1.016	0.95
88.05564		1.050	0.986	0.890	0.935	1.084	0.93
88.05565		0.968	1.046	0.968	0.938	1.008	0.98
88.05566		0.979	1.026	0.958	0.938	0.975	0.97
88.05568		0.961	1.047	0.967	0.929	1.088	0.98

Summary of Water Quality Ratios:

n =	70	70	70	70	70	70
Average =	1.026	1.149	1.0419	1.0525	1.046	0.9939
Std. Dev. =	0.110	0.501	0.2082	0.0821	0.100	0.0765
Outliers =	8	18	10	14	13	3
Justified (J) =			4	11		

C/A = meq Cation/meq Anion Ratio
Hard/Ca+Mg = meq Hardness/Sum meq Ca + Mg Ratio
Cond/C = Conductivity/meq Cations Ratio
Cond/A = Conductivity/meq Anions Ratio
Cond/SICond = Conductivity/Sum of Individual Conductivities Ratio
TDS/DCS = Total Dissolved Solids/Defined Calculated Solids Ratio

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Reference

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SOIL PLUTONIUM IN THE LOS ALAMOS ENVIRONS AND AT THE TRINITY SITE

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INTRODUCTION

The first plutonium was sent to the Los Alamos Scientific Laboratory (LASL) in 1944 from the Oak Ridge and Hanford reactors for use in synthesizing the first atomic bomb, which was subsequently detonated at Trinity Site in New Mexico. During the last 32 years the LASL has developed an outstanding capability in many scientific fields required to support re-research in weapons technology and in other uses of nuclear energy. The fabrication and experimental activities required for this effort have resulted in additions of plutonium in industrial effluents to Los Alamos soils, just as the Trinity soils received fallout plutonium after the 1945 Trinity detonation.

Formal radioecology-soils studies were initiated at the LASL in 1972 with the establishment of an ERDA-funded Ecology Section within the Environmental Studies Group. Our research relative to soil-actinide relationships has been mainly field-oriented and complements transuranic research dealing with the biota of several study areas. The objective of this paper is to summarize the current soil actinide research performed within three liquid effluent-receiving areas at Los Alamos and along the fallout pathway of Trinity, the first nuclear detonation.

SITE DESCRIPTIONS AND HISTORIES

In the process of treating the low level liquid wastes generated at the Los Alamos Scientific Laboratory, sodium carbonate, calcium hydroxide, and ferric sulfate are added to the wastes to concentrate plutonium activity in a ferric hydroxide floc at a relatively high pH. The resulting supernatant, containing low levels of plutonium, is then filtered and discharged to the intermittent streams in nearby canyons. Thus far, a limited amount of data indicate that about 60% of the plutonium in these liquid wastes is in a "particulate" form, in that it did not pass a 0.45 μm filter. In addition, the chemical composition of the effluents varies considerably as evidenced by highly variable chelate and hydrogen ion concentrations.

Effluent-Mortandad, DP-Los Alamos, and Acid-Pueblo Canyons (Figure 1) have been used as disposal areas for plutonium-containing liquid effluents for varying lengths of time at Los Alamos. Acid-Pueblo Canyon received untreated liquid wastes from 1944 to 1951, and treated waste products from 1951-1963 (2.1±1.8 [SD] millicuries [mCi] plutonium/year). Treated wastes have been discharged into DP-Los Alamos Canyon since 1953 (1.6±1.2 [SD] mCi plutonium/year) and into Effluent-Mortandad Canyon since 1963 (4.2±2.3 [SD] mCi plutonium/year).

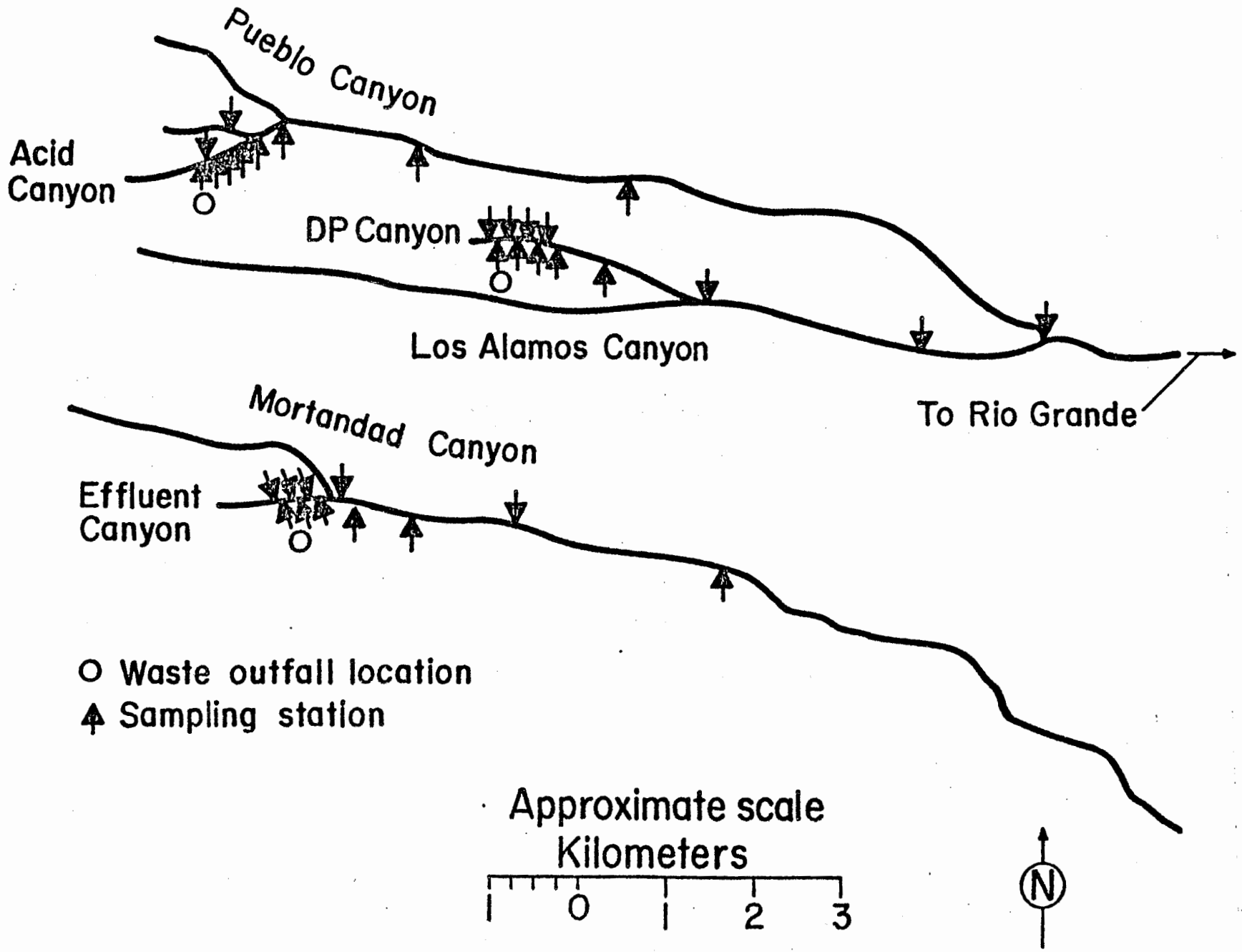

FIGURE 1. Location of Sampling Stations in Canyon Study Areas

The alluvium of the intermittent streams in Effluent-Mortandad, DP and Acid Canyons formed from the rhyolitic volcanic rocks of the Bandelier Tuff. The alluvial soils in Pueblo and Los Alamos Canyons were derived from the latite and quartz latite rocks of the Tschicoma Formation and from tuff particles from Acid and DP Canyons. The lower reaches of Pueblo Canyon also contain basaltic rocks in the stream channel matrix. Whereas the upper reaches of the canyons have stream channel widths of less than 1 m and alluvium depths of less than 0.15 m, stream channels in the lower canyon areas are about 3 m wide and 0.15-30 m deep at the sampling locations.

Trinity Site, a fenced area immediately around Ground Zero, is located in a semiarid region of central New Mexico on the White Sands Missile Range. Intensive study areas were established outside of and within the reported fallout pathway of the nuclear debris from the detonation (Figure 2), based on radiological survey data collected in 1948 (Bellamy et al., 1949), approximately 3 years after the first nuclear detonation.

The climate, physiography, geology and biota of the Trinity environs were previously reported (Bellamy et al., 1949; Blair, 1943; Hakonson and Johnson, 1974; Larson et al., 1951a, 1951b, and 1951c; Shields, 1956). Although a few soil profiles were described by Bellamy et al., in 1949, a comprehensive

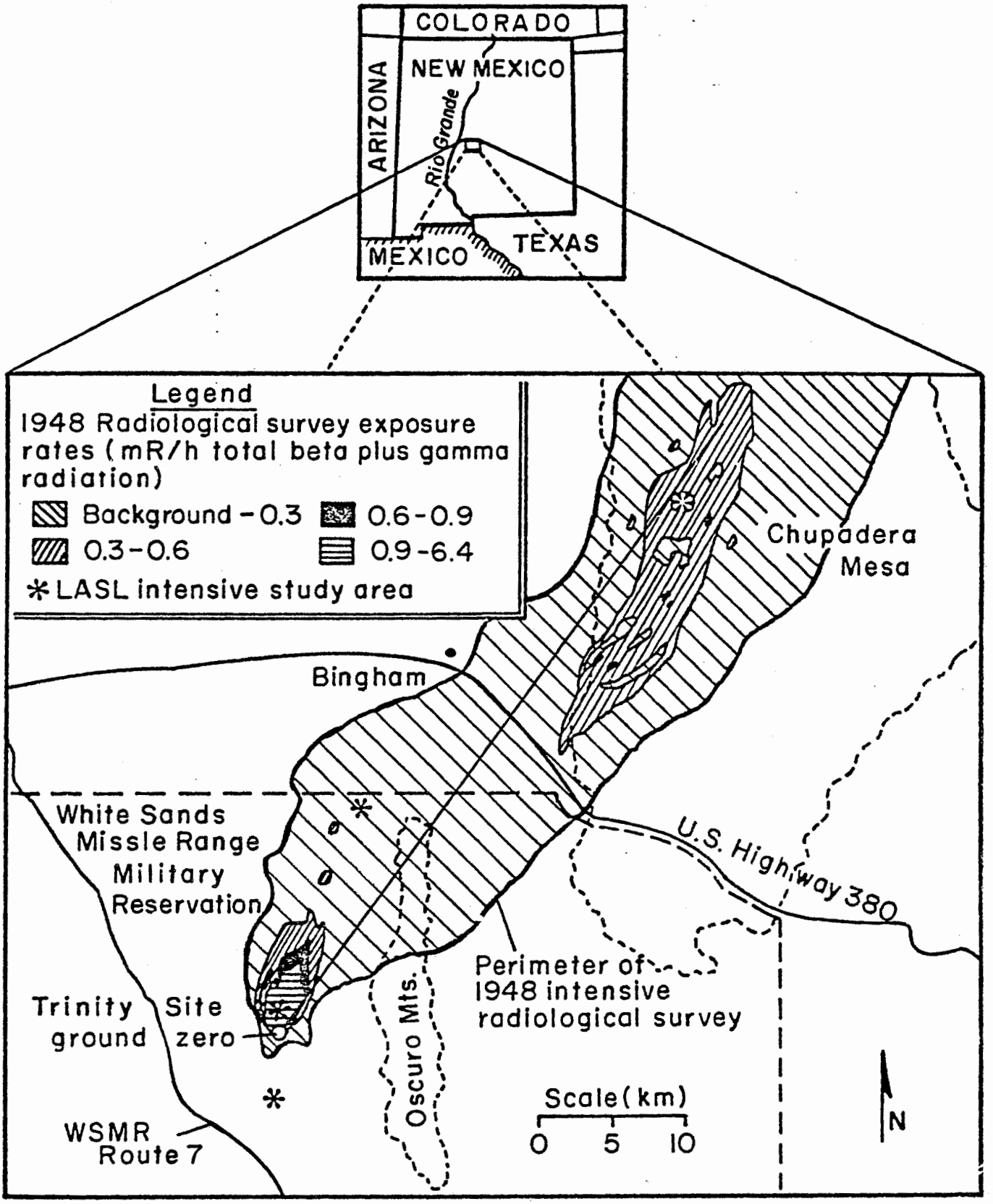

FIGURE 2. Location of Intensive Study Areas at Trinity Site Relative to Areas Involved in the 1948 Intensive Radiological Survey (Bellamy et al., 1949)

inventory of the soils of the entire White Sands Missile Range was only recently assembled using updated taxonomic procedures (Neher and Bailey, 1970).

SAMPLING AND ANALYTICAL METHODS

Soil samples were taken 100 m above each waste outfall at Los Alamos and at distances of 0, 20, 40, 80, 160, 320, 640, 1280, 2560, 5120 and 10,240 m below the outfall (Figure 1) and as far as 56 km from Ground Zero along the fallout pathway at Trinity Site (Figure 2). Soil core samples were collected with a polyvinyl chloride coring tube (2.4-cm i.d.) placed in a plastic bag, frozen, and cut up into segments corresponding to either 0-2.5, 2.5-7.5, 7.5-12.5, and 12.5-30 cm soil depths at Los Alamos or 0-2.5, 2.5-5.0, 5.0, 5.0-10, 10-15, 15-20, 20-25, 25-33, 33-40, and 40-50 cm soil depths at Trinity Site. A partial core section was obtained when the coring tube could not be completely driven into the soil, and its length also measured. At Trinity Site, surface samples of trinitite (large particles of soil and plutonium formed by the intense heat given off during the 1945 Trinity detonation) were collected at Ground Zero for plutonium analysis in 1972.

Soil samples were mechanically separated into six size fractions using a Model L3P sonic sifter (ATM Corporation, Milwaukee, WI): <53 μm, 53-100 μm, 100-500 μm, 500-1000 μm,

1-2 mm and 2-23 mm. Small soil particles were blown off of the larger soil separates with an air hose during the soil separations to minimize contamination of large soil particles with smaller particles. Soil samples were also analyzed for levels of calcium carbonate and organic carbon, as well as cation exchange capacity, pH, clay mineralogy and particle size distribution (U.S. Department of Agriculture, 1972). The surface area of the samples was calculated from the particle size distribution data.

The physical transport of plutonium was investigated at Los Alamos in a study of the runoff from a rainstorm occurring in Effluent-Mortandad Canyon. Data were gathered on the association of actinides with the suspended sediment and liquid fractions and the total activities transported by the event. A DH-48 stream flow sampler equipped with a 6 mm intake nozzle was used to collect duplicate water samples in the center of the stream about 6 cm below the surface of the flow and 6 cm above the stream bed. Samples were collected in 500 ml glass containers and prefiltered through Whatman Number 40 paper prior to filtration through a 0.45 μm Millipore membrane filter. The resulting filtrates were then acidified with 7.2 N HNO_3.

Fractionated and whole soil samples and filtered water samples were assayed for their ^{238}Pu and $^{239,240}Pu$ content

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(the term "total plutonium" used herein designates the sum of these three isotopes) as previously described (Hakonson et al., 1973). Liquid and particulate samples were dissolved in HNO_3 and HF, and the plutonium was isolated on an anion exchange column, electrodeposited on a stainless steel disc and determined by alpha-particle spectrometry. Absolute amounts of ^{238}Pu and $^{239,240}Pu$ were obtained by correcting the counting data for chemical recovery, which was determined from the level of ^{242}Pu initially added to the sample.

RESULTS AND DISCUSSION

DISTRIBUTION AND TRANSPORT OF SOIL PLUTONIUM IN LOS ALAMOS EFFLUENT-RECEIVING AREAS

Plutonium in Unfractionated Soils

Preliminary studies of the horizontal and vertical distribution of soil plutonium within the three effluent-receiving areas were performed from 1965 to 1971 (Purtymun et al., 1966; Purtymun, 1971) and 1972 (Hakonson et al., 1973; Hakonson et al., 1974; Hakonson and Bostick, 1976 and 1973 (Nyhan et al., 1976b and 1976c).

Maximum concentrations of plutonium generally occurred within 2.56 km of the liquid waste outfalls (Table 1). Elevated levels of plutonium were found in the alluvium 5.12 and 10 km

TABLE 1. Total Plutonium Concentration of Alluvial Soils of the Waste Disposal Areas in 1973

Distance from Waste Outfall	Total Plutonium Concentration (pCi/g) 0 - 2.5	2.5 - 7.5	7.5 - 12.5	Remainder[a]
Effluent-Mortandad Canyon				
-100 m[b]	2.69	.771	.117	
0	129	274	390	
20 m	158	189	70.9	
40 m	259	234	116	
80 m	61.6	33.3	16.9	
160 m	104	84.6	12.5	
320 m	70.8	59.0	27.4	6.68
640 m	32.7	31.4	31.3	
1.28 km	13.8	18.2	13.0	9.64
2.56 km	--[c]	9.04	6.97	2.26
5.12 km	.114	.079	.065	.105
DP-Los Alamos Canyon				
-100 m	.036	.036	.044	.051
0	957	1640		
20 m	24.8	16.4	2.63	
40 m	18.2	--	11.4	.488
80 m	--	10.4	1.87	.831
160 m	.332	2.25	.369	.328
320 m	.196	.252	.225	2.34
640 m	.344	.481	.445	
1.28 km	.864	.878	.644	1.78
2.56 km	.183	.0904	.114	
5.12 km	.599	.186		
Acid-Pueblo Canyon				
-100 m	.122	.137		
0	16.6	6.52		
20 m	16.8			
40 m	5.78	8.72	11.4	28.7
80 m	6.21	6.60	21.1	505
160 m	6.61	10.1	--	20.4
320 m	8.28	7.92	10.8	12.3
640 m	7.86	12.4	10.4	19.1
2.56 km	36.3	369	2250	
5.12 km	1.39	--	.617	1.65
10.2 km	.401	.518	.435	

[a] The depth of the remainder section varied from 12.5-30 cm maximum.

[b] Negative distances represent background locations upstream from the waste outfalls.

[c] Missing data.

from the DP-Los Alamos and Acid-Pueblo outfalls, reflecting translocation of small amounts of laboratory wastes as far as 10 km away from their point of discharge. Since stream channel segments further than about 2 km from the outfalls are normally dry except during periods of storm runoff, the horizontal distribution of plutonium in these intermittent streams reflects periods of intense runoff from late summer rainstorms, which move soil and plutonium considerable distances downstream.

Levels of plutonium in Acid-Pueblo Canyon soils generally increased with depth at most sampling locations (Table 1), reflecting either dilution or loss of plutonium from the topsoil since liquid effluents were last added to this canyon in 1963. Soil plutonium concentrations did not exhibit a consistent relationship with soil depth at all of the sampling locations in Effluent-Mortandad and DP-Los Alamos Canyons (Table 1). In some cases, plutonium concentrations decreased steadily with depth and at other locations exhibited just the opposite pattern. Thus, this pattern reflects considerable vertical mixing of plutonium during runoff events from snowmelt and rainstorms in canyons currently receiving treated effluents.

Comparisons of the horizontal and vertical distributions of ^{238}Pu and $^{239,240}Pu$ were made to provide information on the rates of mixing of the individual isotopes as a function of

canyon use history. Since the first appreciable amounts of ^{238}Pu appeared in laboratory liquid wastes in 1968, the horizontal-vertical distribution of the $^{239,240}Pu/^{238}Pu$ ratio is indicative of mixing-migration rates of ^{238}Pu in soils (Table 2). Relatively complete mixing of ^{238}Pu into the soils in less than 4 years was indicated by a $^{239,240}Pu/^{238}Pu$ activity ratio of 0.26±0.16 (SD) for Effluent-Mortandad (n = 27) and DP-Los Alamos (n = 29) samples collected as deep as 30 cm and as far as 2560 m from the outfalls. These ratios were not significantly different from the ratios in the treatment plant effluents in 1972 and 1973 (Schiager et al., 1974). It is also noteworthy that the soils 40-80 m from the DP waste outfall have plutonium ratios similar to the rest of the canyon, a distribution which took place in less than a year since the effluent discharge pathway was redirected to this previously uncontaminated segment in early 1972.

Soil physical and chemical properties were compared with the distribution of plutonium in the alluvium to elucidate soil-actinide interactions (Nyhan et al., 1976b). Since absorption and exchange reactions of radionuclides with soil colloids was previously shown to influence the distribution of radionuclides in soils (Carrigan et al., 1967; Kornegay et al., 1963; Pickering, 1969), the distribution of plutonium was compared with the soil cation exchange capacity (CEC) and levels of organic carbon in the canyon soils. The log of CEC was

TABLE 2. Ratios of $^{239,240}Pu/^{238}Pu$ in Alluvial Soils of Waste Disposal Areas in 1973

Distance from Waste Outfall	$^{239,240}Pu/^{238}Pu$ Soil Depth (cm) 0 - 2.5	2.5 - 7.5	7.5 - 12.5	Remainder[a]
Effluent-Mortandad Canyon				
-100 m[b]	20	13	3.5	
0	.16	.16	.44	
20 m	.25	.36	.30	
40 m	.33	.84	.66	
80 m	.12	.13	.13	
160 m	.15	.17	.25	
320 m	.16	.20	.31	.25
640 m	.12	.16	.24	
1.28 km	.17	.18	.19	.33
2.56 km	--	.24	.28	.50
5.12 km	1.1	4.2	1.7	1.9
DP-Los Alamos Canyon				
-100 m	1.4	.93	.55	.49
0	15	14		
20 m	4.9	4.3	.41	
40 m	4.1	--	3.0	2.0
80 m	--	2.9	2.0	1.9
160 m	3.7	11	1.6	2.0
320 m	2.0	3.1	1.9	11
640 m	2.7	2.9	3.1	
1.28 km	3.4	3.2	3.0	8.5
2.56 km	17	11	4.5	
5.12 km	.39	11		
Acid-Pueblo Canyon				
-100 m	1.2	.56		
0	390	200		
20 m	83			
40 m	210	200	190	95
80 m	140	130	76	49
160 m	130	170	--	190
320 m	190	180	190	170
640 m	130	140	140	126
2.56 km	230	163	82	
5.12 km	120	--	18	43
10.2 km	81	100	62	

[a]The depth of the remainder section varied from 12.5-30 cm maximum.

[b]Negative distances represent background locations upstream from the waste outfalls.

[c]Missing data.

significantly correlated with the log of plutonium concentrations in Effluent-Mortandad and DP-Los Alamos Canyons (Figure 3), whereas the plutonium levels of Acid-Pueblo soils were exponentially related to CEC (Table 3). The CEC of these alluvial soils was directly related to percentages of fine particles (less than 53-μm diameters) in the alluvium (Nyhan et al., 1976c). Plutonium concentrations were also exponentially related to levels of soil organic carbon in Effluent-Mortandad (Figure 4) and Acid-Pueblo (Table 3) Canyons and were correlated with organic carbon concentrations in DP-Los Alamos Canyon (Table 3). Thus, specific reactions may have occurred between plutonium and the organic constituents of the alluvial soils independent of CEC reactions. This observation could be partially explained by the fact that algae, a constituent of the soil organic carbon complex, have been shown to contain elevated levels of Pu in these ecosystems (Hakonson et al., 1974).

An attempt was also made to relate plutonium concentrations to the pH and levels of carbonates in the canyon soils. The average pH of the alluvium in the upper 1.28 km of Acid-Pueblo Canyon was 7.5 (range of 6.4 to 8.2), whereas the corresponding values for Effluent-Mortandad and DP-Los Alamos outfalls was 8.9 (range of 8.0 to 9.7), reflecting substantial additions of sodium and carbonates to the canyons in the liquid effluents (Schiager et al., 1974). No significant pH-radionuclide correlations were detected in any canyon because a large portion

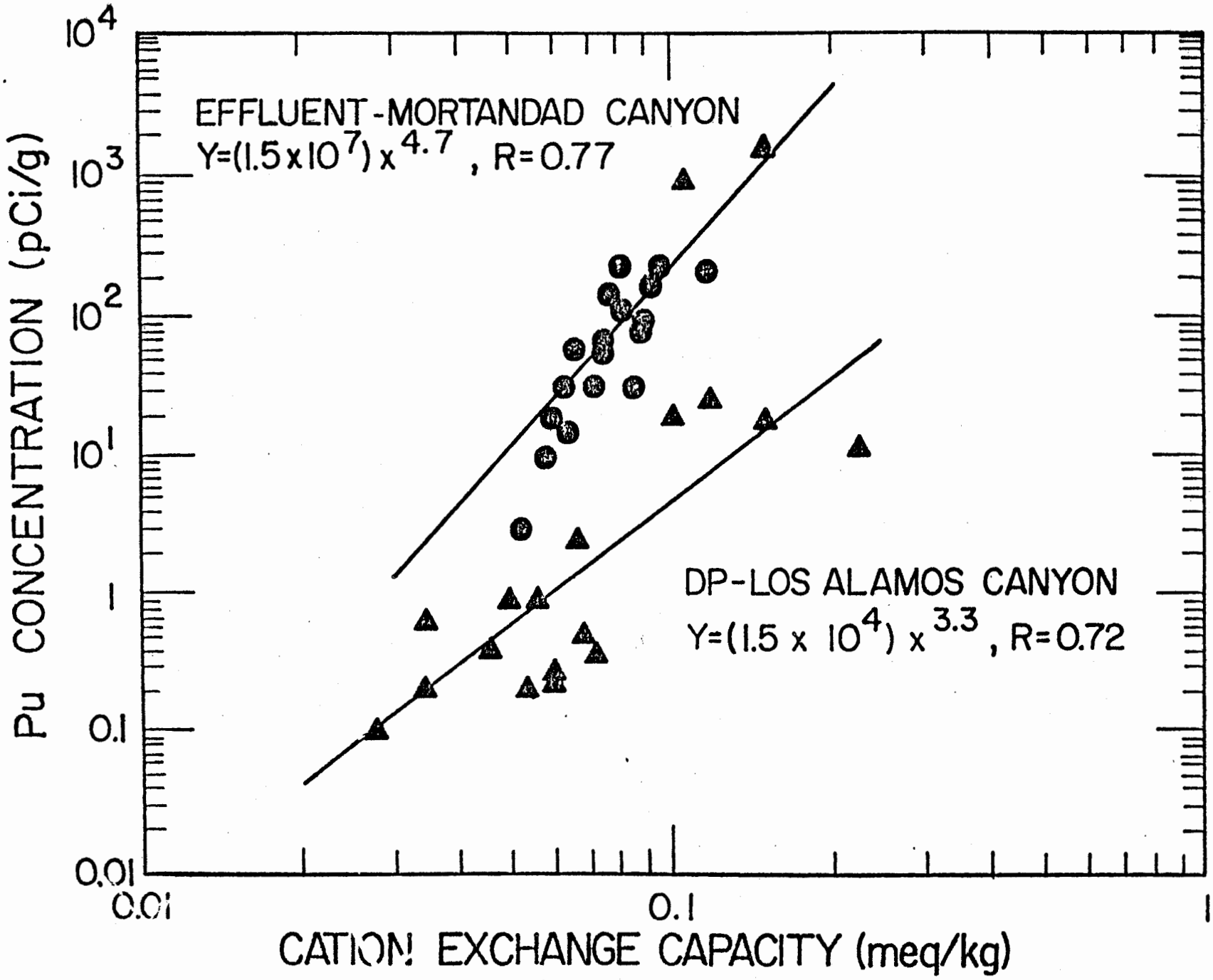

FIGURE 3. Relationship of Soil Cation Exchange Capacity to Levels of Plutonium in Alluvial Soils of Waste Discharge Areas

TABLE 3. Statistical Correlations of Soil Radionuclide Concentrations with Physical-Chemical Properties of the Soils of the Waste Discharge Areas in 1973

Dependent Variable: Radionuclide Concentration (pCi/g soil)	Independent Variable	Correlation Coefficient	Locations and Numbers of Samples Used in Comparison
DP-Los Alamos Canyon:			
Pu	Inverse of % Organic Carbon	0.75	0-5.12 km,[a] n = 31
Acid Pueblo Canyon:			
Log Pu	Cation Exchange	0.82	0-10.2 km, n = 31
Log Pu	% Organic	0.57	0-10.2 km, n = 31

[a]Represents distance from waste outfall.

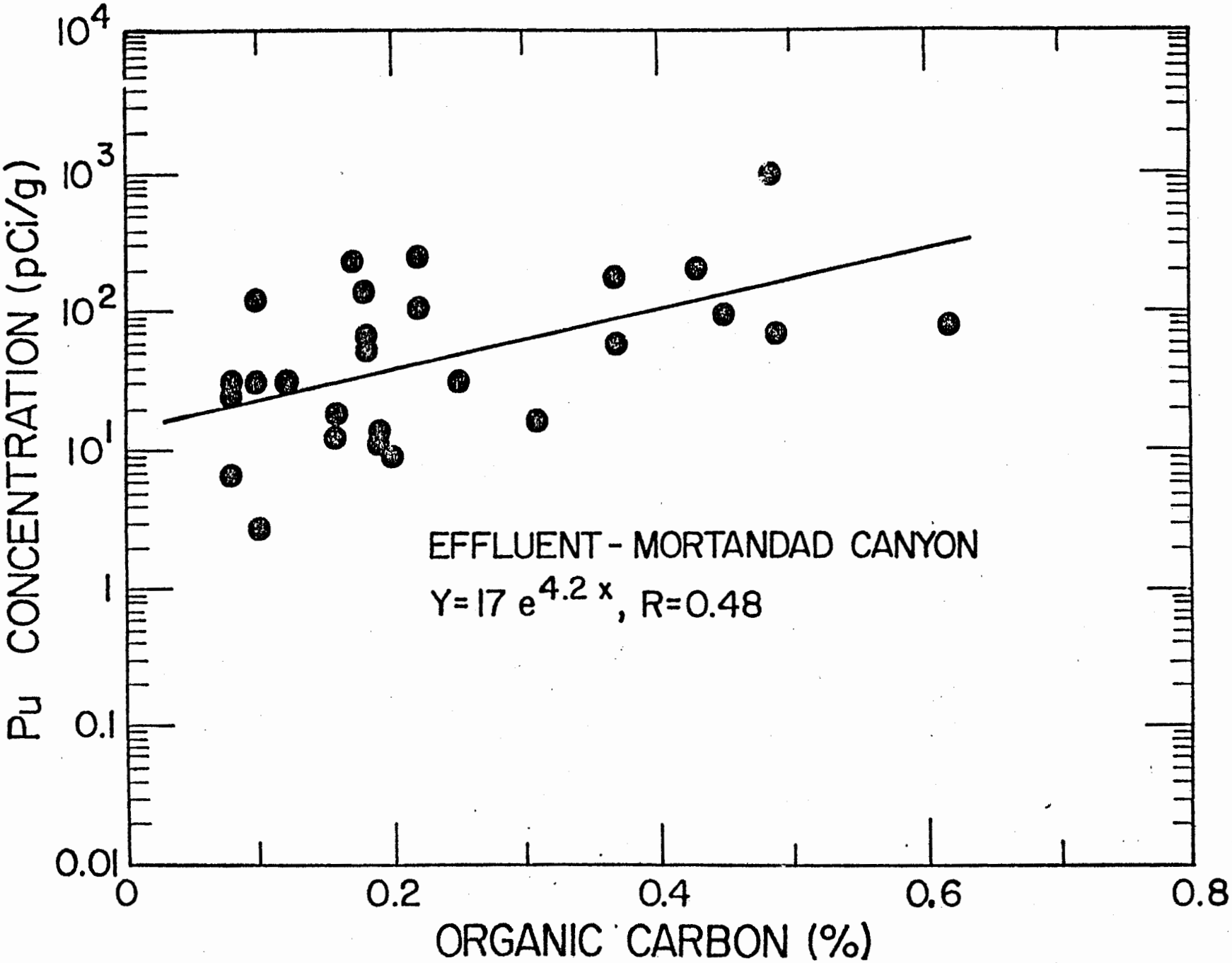

FIGURE 4. Relationship of Soil Organic Carbon Content to Levels of Plutonium Found in Alluvial Soils of Effluent-Mortandad Canyon

of the samples exhibited relatively high Pu concentrations and pH values. However, the log of the plutonium concentrations were significantly correlated with log of calcium carbonate levels in Effluent-Mortandad and DP-Los Alamos Canyons (Figure 5). Radionuclide concentrations were not significantly correlated with carbonate levels in Acid-Pueblo Canyon because most of the soil samples contained background levels of carbonates and plutonium, making a statistically-significant relationship nondetectable. However, the samples collected deep in the soil profiles in Acid Canyon did demonstrate high levels of carbonates where residual pockets of radionuclides were found.

Plutonium in Soil Size Fractions

Maximum total plutonium concentrations were generally associated with small soil particles in Effluent-Mortandad (Table 4), DP-Los Alamos (Table 5) and Acid-Pueblo Canyon (Table 6) soils (Nyhan et al., 1976c). The <53 μm soil size fractions, which were previously shown to contain <2 μm particles with amorphous clay mineralogy (Nyhan et al., 1976c), had an average of 10-fold higher total plutonium concentrations than the 2-23 mm particle sizes in the 0-2.56 km postoutfall segment of all the canyons.

Highest total plutonium concentrations were generally found in size fractions less than 105 μm; however, the largest

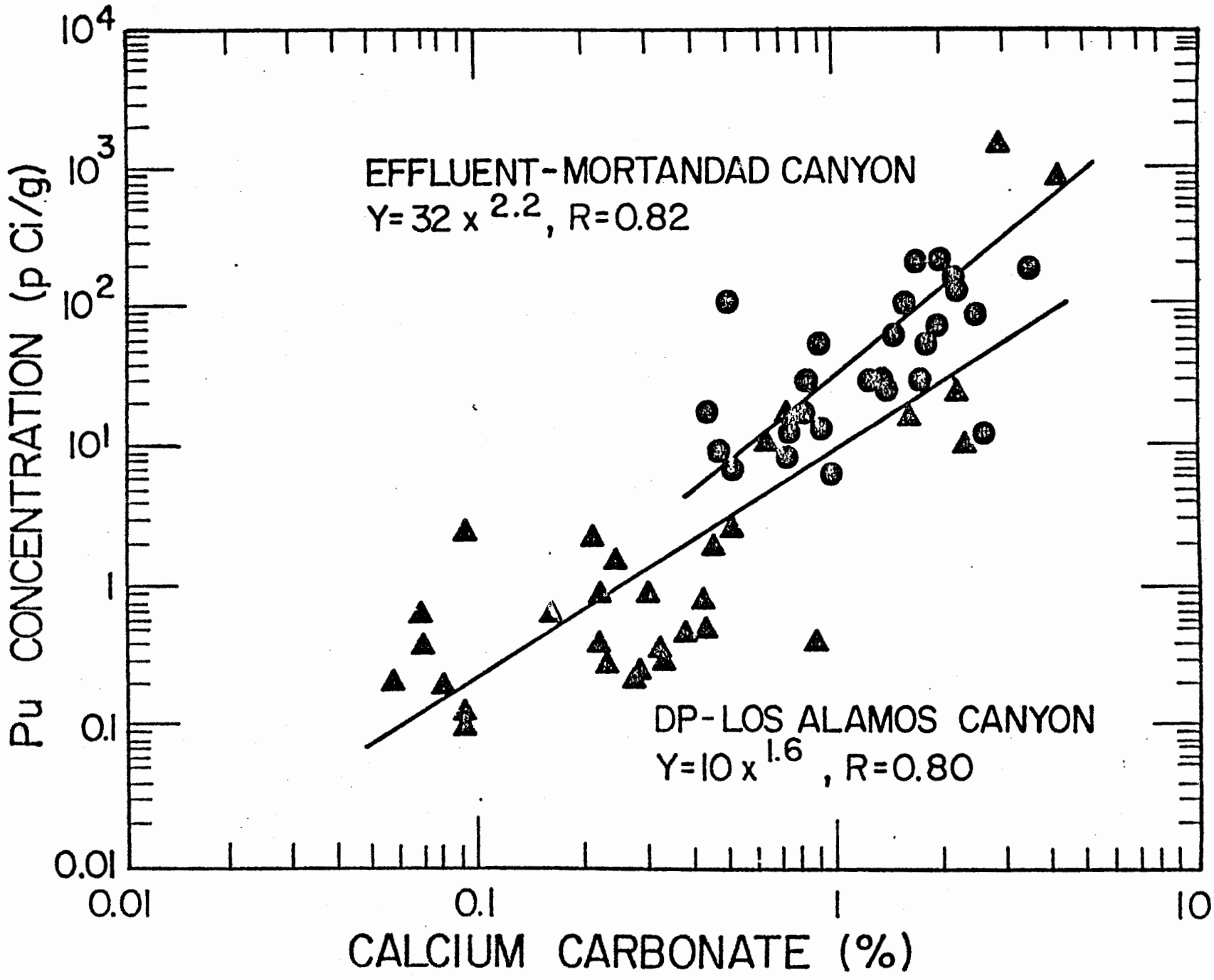

FIGURE 5. Relationship of Calcium Carbonate Content to Levels of Plutonium in Study Area Soils

TABLE 4. Total Plutonium Concentrations in Soil Separates from Effluent-Mortandad Canyon in 1973

Soil Depth (cm)	Total Plutonium Concentration in Size Fraction (pCi/g)[a]					
	<53 μm	53-105 μm	105-500 μm	500-1000 μm	1-2 mm	2-23 mm
			100 m Pre-Outfall			
0 - 2.5	1.5	1.9	5.5	0.66	2.3	2.6
2.5 - 7.5	1.1	1.2	1.0	0.57	0.15	0.29
7.5 - 12.5	0.32	0.26	0.15	0.69	0.046	0.047
			0-40 m From Outfall			
0 - 2.5	1500 (250)[a]	1300 (360)	610 (140)	310 (150)	87 (57)	69 (39)
2.5 - 7.5	1400 (610)	1200 (350)	540 (130)	230 (80)	230 (68)	91 (39)
7.5 - 12.5	1100 (720)	710 (430)	420 (360)	320 (360)	90 (87)	68 (65)
			80-1280 m From Outfall			
0 - 2.5	380 (320)	390 (190)	140 (110)	62 (40)	45 (29)	27 (13)
2.5 - 7.5	240 (140)	140 (75)	76 (47)	43 (25)	27 (25)	29 (18)
7.5 - 12.5	120 (46)	94 (46)	39 (17)	20 (13)	12 (5.5)	11 (6.1)
12.5 - 22.1	39 (17)	31 (11)	16 (2.1)	7.4 (.85)	4.5 (.71)	3.6 (1.8)
			2.56 km From Outfall			
0 - 2.5	24	16	7.6	2.4	1.5	---[c]
2.5 - 7.5	49	32	18	6.4	3.9	6.2
7.5 - 12.5	37	20	8.3	7.1	2.9	2.9
12.5 - 24	13	7.1	2.5	1.5	1.4	1.0
			5.12 km From Outfall			
0 - 2.5	1.1	1.0	0.18	0.080	0.045	0.015
2.5 - 7.5	0.25	0.63	0.088	0.079	0.028	0.0063
7.5 - 12.5	0.30	0.38	0.11	0.062	0.034	0.0063
12.5 - 22.4	0.41	0.39	0.17	0.056	0.047	0.017

[a]Each value represents the total plutonium concentration in a composite of five soil core segments.
[b]Numbers in parentheses represent the standard deviation of the mean total plutonium concentrations.
[c]Missing data.

TABLE 5. Total Plutonium Concentrations in Soil Separates from DP-LOS Alamos Canyon in 1973

Soil Depth (cm)	Total Plutonium Concentration in Size Fraction (pCi/g)[a]					
	<53 μm	53-105 μm	105-500 μm	500-1000 μm	1-2 mm	2-23 mm
			100 m Pre-Outfall			
0 - 2.5	9.1	0.68	0.050	0.021	0.022	0.015
2.5 - 7.5	1.7	0.91	0.041	0.028	0.022	0.0091
7.5 - 12.5	0.23	0.16	0.055	0.028	0.038	0.0094
12.5 - 22.4	0.12	0.18	0.047	0.059	0.032	0.0068
			0 m From Outfall			
0 - 2.5	650	720	1000	1000	1000	930
2.5 - 7.5	2000	4300	2600	80	2000	1500
7.5 - 12.8	730	420	--[b]	1100	220	53
			20-80 m From Outfall			
0 - 2.5	38 (21)[c]	33 (15)	50 (6.4)	26 (13)	9.4 (4.7)	19 (6.8)
2.5 - 7.5	22 (11)	24 (10)	39 (23)	19 (19)	8.5 (5.7)	4.9 (6.5)
7.5 - 12.5	5.0 (5.2)	13 (13)	7.3 (9.3)	2.8 (3.3)	2.4 (2.8)	4.3 (6.7)
12.5 - 22.4	0.90 (0.86)	0.83 (0.24)	0.69 (0.20)	0.27 (0.07)	0.21 (0.13)	0.32 (0.26)
			160-1280 m From Outfall			
0 - 2.5	1.1 (0.45)	1.4 (0.77)	0.90 (0.43)	0.47 (0.34)	0.24 (0.20)	0.41 (0.40)
2.5 - 7.5	2.0 (0.80)	1.7 (0.30)	1.3 (0.59)	0.47 (0.25)	0.31 (0.16)	2.6 (4.0)
7.5 - 12.5	1.9 (0.29	1.8 (0.62)	1.1 (0.45)	0.50 (0.13)	0.24 (0.08)	0.36 (0.17)
12.5 - 22.6	3.6 (2.7)	3.4 (3.0)	2.1 (1.7)	2.2 (3.0)	0.67 (0.40)	0.43 (0.27)
			2.56 km From Outfall			
0 - 2.5	0.61	1.1	0.23	0.23	0.28	0.060
2.5 - 7.5	0.46	0.49	0.28	0.075	0.035	0.041
7.5 - 11.6	0.77	0.36	0.28	0.099	0.069	0.049
			5.12 km From Outfall			
0 - 2.5	0.05	0.45	0.76	0.058	0.052	0.83
2.5 - 7.5	0.94	0.71	0.46	0.14	0.13	0.084

[a]Each value represents the total plutonium concentration in a composite of five soil core segments.
[b]Missing data.
[c]Numbers in parentheses represent the standard deviation of the mean total plutonium concentrations.

TABLE 6. Total Plutonium Concentrations in Soil Separates from Acid-Pueblo Canyon in 1973

Soil Depth (cm)	Total Plutonium Concentrations in Size Fraction (pCi/g)[a]					
	<53 μm	53-105 μm	105-500 μm	500-1000 μm	1-2 mm	2-23 mm
			100 m Pre-Outfall			
0 - 2.5	2.7	2.2	0.50	0.18	0.099	0.035
2.5 - 7.5	1.7	2.1	0.58	0.23	0.16	0.024
			0-40 m From Outfall			
0 - 2.5	84 (74)[b]	60 (25)	25 (9.1)	8.8 (3.7)	7.9 (4.2)	25 (31)
2.5 - 7.5	90 (78)	45 (26)	41 (48)	13 (11)	14 (11)	19 (26)
7.5 - 12.5	33	39	21	8.7	6.1	5.6
12.5 - 21	110	79	39	21	16	5.8
			80 m From Outfall			
0 - 2.5	42	56	17	4.3	4.9	3.5
2.5 - 7.5	26	25	15	5.4	3.3	3.1
7.5 - 12.5	20	60	39	16	11	24
12.5 - 22	1700	1500	900	340	190	110
			160-640 m From Outfall			
0 - 2.5	50 (38)	53 (28)	10 (9.6)	8.2 (1.6)	6.7 (2.5)	5.5 (2.3)
2.5 - 7.5	46 (12)	46 (6.0)	20 (1.5)	9.5 (2.7)	6.1 (0.95)	8.9 (6.2)
7.5 - 12.5	42 (4.2)	67 (16)	25 (3.5)	7.9 (0.57)	6.6 (2.3)	12 (4.6)
12.5 - 21	57 (12)	58 (9.6)	35 (6.8)	13 (3.7)	10 (0.58)	12 (6.3)
			2.56 km From Outfall			
0 - 2.5	97	110	110	44	21	6.7
2.5 - 7.5	10	110	1000	160	350	195
7.5 - 12.5	2300	2000	2000	3100	3200	1600
			5.12 km From Outfall			
0 - 2.5	77	38	3.1	0.84	0.46	0.54
2.5 - 7.5	14	4.5	2.1	0.34	0.028	--[c]
7.5 - 12.5	4.8	3.6	1.3	0.14	0.49	0.50
12.5 - 22	3.5	3.5	1.8	0.48	0.35	3.7
			10.2 km From Outfall			
0 - 2.5	2.7	1.6	1.1	<0.0025	0.30	0.44
2.5 - 7.5	3.8	2.9	1.1	0.65	0.31	<0.0025
7.5 - 12.5	3.2	2.4	0.54	0.24	0.42	0.47
12.5 - 22	4.1	6.3	--	1.1	0.39	0.43

[a]Each value represents the total plutonium concentration in a composite of five soil core segments.
[b]Numbers in parentheses represent the standard deviation of the mean total plutonium concentrations.
[c]Missing data.

percentage of the plutonium was usually found in coarser size fractions, which accounted for the largest amounts of soil mass in the alluvium (Table 7). Nearly 80% of the plutonium and 96% of the mass of Effluent-Mortandad Canyon soils was associated with soil particles >105 μm. The stream channel soils from Acid-Pueblo Canyon and from most of DP-Los Alamos Canyon followed this same pattern. An exception to this pattern was found for samples collected 40 and 80 m from the DP-Los Alamos outfall in that 45% of the alluvium consisted of <105 μm soil particles, which accounted for 50% of the plutonium inventory in these soils (Table 7).

The plutonium concentrations of the soil separates were compared with the surface area and CEC of the size fractions collected in each effluent disposal area, in order to identify factors important in the fractional distribution of plutonium. The calculated surface area of the size fractions ranged from 1.7 to 12.5 cm^2/g as the mean effective particle diameter varied from 12.5 mm (2-23 mm size fraction) to 26.5 μm (<53 μm size fraction). Plutonium levels were expressed as a percentage of plutonium concentrations in the 2-23 mm size fraction in these comparisons to minimize the effect of the horizontal and vertical plutonium concentration gradients on these comparisons. The log of these relative ^{238}Pu (Effluent-Mortandad Canyon) or $^{239,240}Pu$ (DP-Los Alamos and Acid-Pueblo Canyons) concentrations was significantly correlated ($P<0.05$)

TABLE 7. Particle Size Distribution Data and Total Plutonium Inventories of Soil Fractions (Average of Values from Each Soil Depth per Sampling Location) in 1973

Distance From Waste Outfall and Parameter Studied	Size Fraction <53 μm	53-105 μm	105-500 μm	500-1000 μm	1-2 mm	2-23 mm
Effluent-Mortandad Canyon						
100 m pre-outfall:						
Weight percent soil	23	9.[illegible]	24	17	17	9.7
% plutonium in fraction	28	12	39	8.8	7.4	4.8
0-2.56 km:						
Weight percent soil	2.2	1.8	14	21	26	35
% plutonium in fraction	14	6.0	27	21	16	16
5.12 km:						
Weight percent soil	2.9	1.0	23	35	33	5.1
% plutonium in fraction	16	7.4	34	28	14	.61
DP-Los Alamos Canyon						
100 m pre-outfall:						
Weight percent soil	2.0	2.0	24	34	27	11
% plutonium in fraction	60	9.5	11	11	7.3	1.1
0-20 m and 160-5120 m:						
Weight percent soil	1.9	1.1	13	26	32	26
% plutonium fraction	5.7	7.3	24	22	20	21
40-80 m:						
Weight percent soil	30	15	26	12	12	5.0
% plutonium fraction	30	20	36	7.0	5.0	2.0
Acid-Pueblo Canyon						
100 m pre-outfall:						
Weight percent soil	.72	0.85	8.4	18	26	46
% plutonium in fraction	7.0	6.0	26	22	27	12
0-5.12 km:						
Weight percent soil	3.0	3.0	16	26	28	24
% plutonium in fraction	7.0	7.0	31	19	17	19
10.2 km:						
Weight percent soil	0.60	1.4	16	31	26	25
% plutonium in fraction	4.4	5.6	35	19	22	14

with the log of the particle surface areas in Effluent-Mortandad ($r = 0.82$, $n = 198$), DP-Los Alamos ($r = 0.46$, $n = 186$), and portions of Acid-Pueblo Canyons (80-2560 m from the outfall; $r = 0.57$, $n = 132$).

The CEC of size fractions which were arbitrarily collected at sampling locations in Effluent-Mortandad (320 m and 2.56 km from the waste outfall) Canyons was also compared with the fractional distribution of plutonium and particle surface areas. The average cation exchange capacities of the 1-2 mm and <53 μm size fractions were 0.060 and 0.21 eq/kg, respectively. Thus, the smaller soil size fractions contained about 3-fold greater cation exchange capacities and 7-fold larger surface areas (Nyhan et al., 1976c) than the largest soil particles. Although the surface area and CEC of a particle size fraction are important in determining how plutonium reacts with a soil separate, the ratio of plutonium concentrations in small versus large size fractions was usually larger than the ratio of CEC's in small versus large soil separates. This may imply that surface area is more important than the CEC of the alluvium in determining the fractional distribution of plutonium.

The spatial distributions of ^{238}Pu and $^{239,240}Pu$ in the alluvium were compared with one another for the soil size fractions from each canyon. Statistically significant differences

($P<0.01$) in the distribution of $^{239,240}Pu$ and ^{238}Pu were found as functions of distance from the waste outfall, soil depth and soil size fractions. In Effluent-Mortandad Canyon, the $^{239,240}Pu/^{238}Pu$ ratios of size fractions collected 40 m from the waste outfall were higher than samples collected in the upper 2.56 km of this canyon (Figure 6) and higher $^{239,240}Pu/^{238}Pu$ ratios were also found in several size fractions with increasing depth (Figure 7). These observed spatial differences in the $^{239,240}Pu/^{238}Pu$ activity ratios in soil samples collected at various locations may be due to: (1) a change in the isotopic ratios or chemical forms of plutonium in liquid wastes added to the canyons since 1968, with subsequent re-location of plutonium-contaminated soil particles during runoff events in the canyons and/or (2) differential solubility, adsorption and physical mixing of plutonium isotopes in the soils of these intermittent streams. The latter possibility has been previously suggested and may account for the enhanced solubility and mobility of ^{238}Pu in soils compared to $^{239,240}Pu$ (Hanson, 1975).

Relatively high and statistically similar ($P<0.10$) $^{239,240}Pu/^{238}Pu$ ratios were found in the coarser size fractions (0.5-10 mm, 1-2 mm and 2-23 mm) of Effluent-Mortandad Canyon soils, with progressively lower, statistically different ($P<0.05$) plutonium ratios found in progressively smaller soil separates (Figure 6). Thus, a larger portion of the more

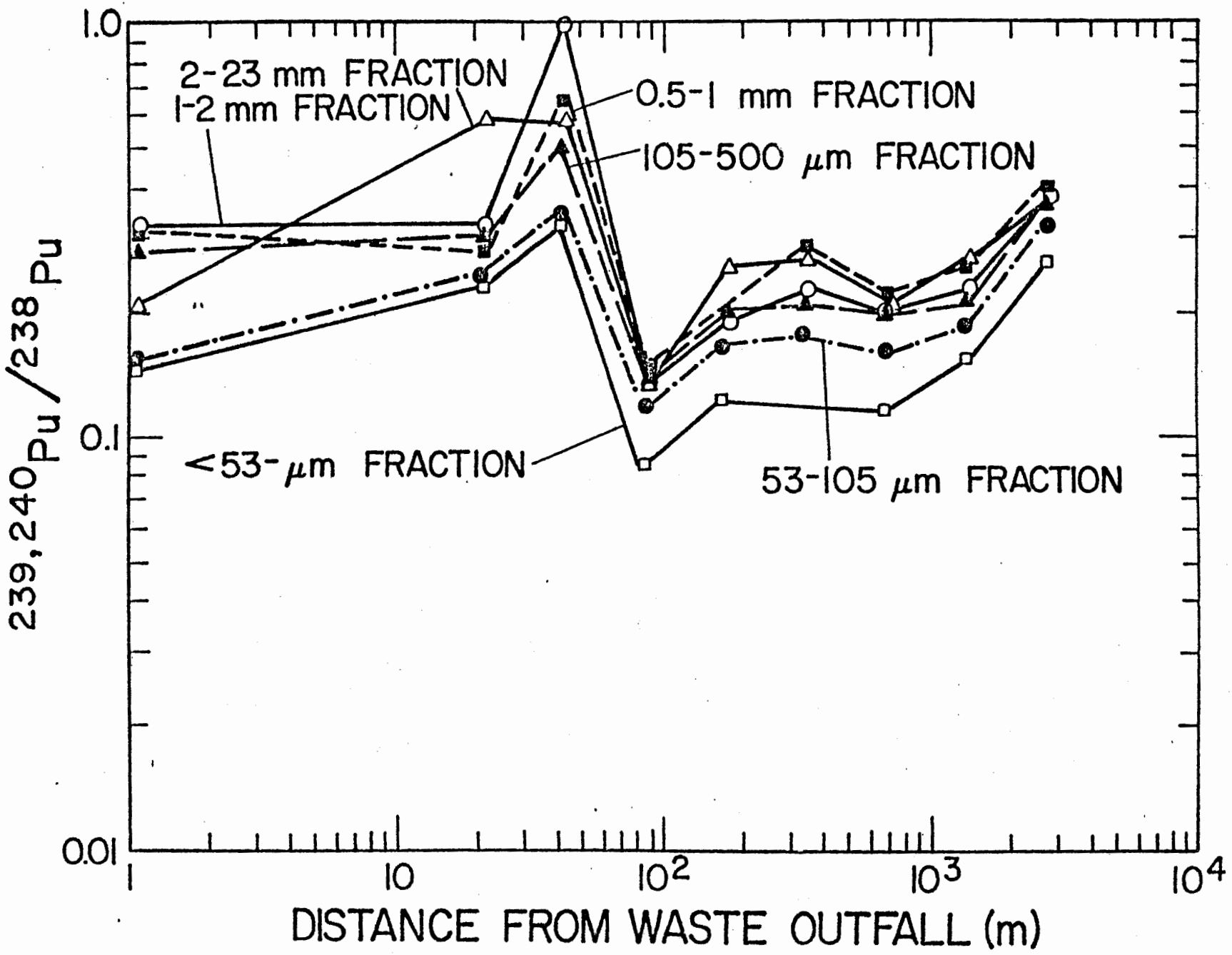

FIGURE 6. Relationship of $^{239,240}Pu$-^{238}Pu Ratios of Soil Size Fractions to Distance from the Waste Outfall in Effluent-Mortandad Canyon

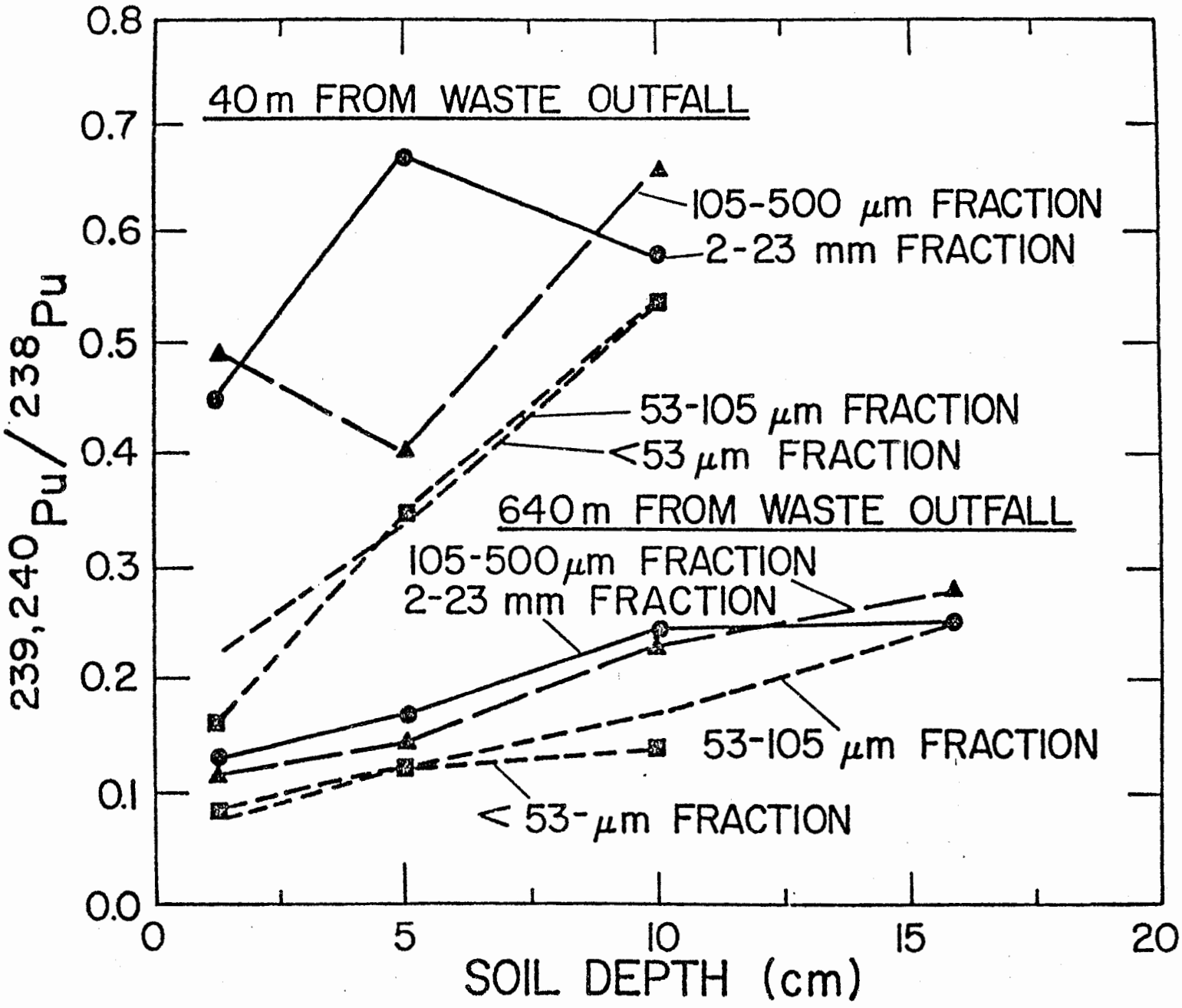

FIGURE 7. Relationship of $^{239,240}Pu$-^{128}Pu Ratio of Particle Size Fractions to Soil Depth for Samples Collected 40 and 640 m from the Waste Outfall in Effluent-Mortandad Canyon

recently added ^{238}Pu was associated with the smaller soil particles than with the larger size fractions of Effluent-Mortandad Canyon soils during the spring months. Although isotopic differences between ^{238}Pu and $^{239,240}Pu$ could result in a distribution pattern such as found in these size fractions, a more comprehensive explanation would take into account the mean residence times of soil particles within each of the discharge areas. The distribution of plutonium isotopes observed in Effluent-Mortandad Canyon soils could also have occurred if large tuff fragments moved through this discharge area more slowly than small soil particles, which would then more nearly reflect the $^{239,240}Pu/^{238}Pu$ ratios in the current effluents.

Transport of Soil Plutonium in Rainstorm Runoff

Information relating to the physical transport of radionuclides down Effluent-Mortandad Canyon was obtained on September 15, 1974, following a rainfall of 2.9 cm on the upper portion of the watershed (Hakonson et al., 1976). A total estimated discharge of 3530 m^3 (3.53×10^6 liters) of water occurred during a 4.5 h period. Samples of water were collected throughout the event to relate the radioactivity transported by the runoff to the aqueous and suspended particulate fractions. Measurements on stream velocity and channel cross-sectional area were used in conjunction with the radionuclide

data to estimate the total radioactivity transported by the runoff event, as previously reported for similar events in DP Canyon (Purtymun, 1974).

The runoff event demonstrated several interesting flow characteristics which seem to be typical of late summer rainstorms in the west. The maximum flow rate through the lower gaging station (1.28 km from the waste outfall) was 0.3 m^3/sec, corresponding to a velocity of 1.5 m/sec (4.8 ft/sec). This waterflow sustained a water depth of 21 cm in the center of the stream channel over a maximum surface flow width of 1.1 m. Maximum suspended sediment concentrations of 17±0.5 (SD) g/ℓ (17,000 ppm) and 74±12 g/ℓ were measured 15 minutes after the event began, in samples from the surface and bottom of the flow, respectively. Higher sediment concentrations were consistently measured in the bottom samples, reflecting the presence of suspended sand size fractions in the sample that probably resulted from turbulent flow. The relative particle size distribution in suspended sediment was not determined, although inspection of the samples confirmed that coarse materials comprised a higher percentage of bottom than surface samples. Sediment concentrations in all samples decreased at a relatively rapid rate from 15 to 55 minutes after the event began, corresponding to the rapid decrease in flow rate.

The concentrations of ^{238}Pu and $^{239,240}Pu$ in runoff samples exhibited very similar patterns with time (Tables 8 and 9). The filtered water contained low concentrations of all radionuclides (about 1% of the radionuclide inventory in each sample); levels ranged from about 2-5 pCi $^{238}Pu/\ell$ and 0.21pCi $^{239,240}Pu/\ell$. Concentrations of the radionuclides in water were variable and did not exhibit a consistent pattern with time. On the other hand, levels of all three radionuclides in the suspended sediments ranged from 10-100 pCi $^{238}Pu/g$ and 1-10 pCi $^{239,240}Pu/g$. Significantly higher ($P<0.05$) concentrations of the radionuclides in the suspended sediment were measured in samples collected near the surface of the flow compared to those from near the bottom. This observation was to be expected since a greater proportion of fine particle sizes comprised the surface samples and higher concentrations of plutonium were associated with relatively small soil size fractions (Table 4).

The relationship between flow rate and mean total radionuclide and suspended sediment concentrations in water samples is presented in Figure 8. The radionuclide and suspended sediment concentrations were relatively constant for flow rates in the range 0.07-0.25 m^3/sec, possibly indicating that all available fine materials were in suspension at these flow rates. However, radionuclide and suspended sediment concentrations were directly correlated with increasing flow

TABLE 8. Mean $^{239,240}Pu$ Concentrations in Runoff Samples Collected from Effluent-Mortandad Canyon

	$^{239,240}Pu$ Concentrations				
	Suspended Sediment				Water
	pCi/g		pCi/ℓ		
Time (min)	Top	Bottom	Top	Bottom	(pCi/ℓ)[a]
5	3.4	1.3	48	73	0.25 (0.10)[b]
15	2.8	1.9 (1.4)	47 (1.4)	131 (84)	0.67 (0.76)
40	4.4 (1.5)	2.9 (2.1)	56 (20)	79 (26)	0.39 (0.29)
55	5.7	4.2 (1.8)	51 (3.5)	51 (29)	0.67 (0.64)
120	5.6 (1.3)	2.9 (2.3)	25 (5.7)	45 (5.7)	0.56 (0.38)
160	6.2 (3.2)	5.1 (1.6)	26	33 (16)	0.51 (0.34)
185	8.3 (0.1)	5.6 (1.0)	28 (0.71)	37 (0.71)	0.17 (0.11)
210	4.9	--	16	--	0.21
233	13	--	22	--	0.22
245	[illegible].8 (0.35)	--	22 (0.71)	--	0.40
260	7.9 (1.7)	--	18 (1.4)	--	1.3 (1.3)

[a]Averages for suspended sediment based on 2 samples; averages for water based on 4 samples (2 top and 2 bottom), filtered through 0.45 μm membrane.

[b]Parenthetic value represents ±1 S.D.

TABLE 9. Mean ^{239}Pu Concentrations in Runoff Water Collected from Effluent-Mortandad Canyon

	^{238}Pu Concentrations				
	Suspended Sediment[a]				Water[a]
	pCi/g		pCi/ℓ		
Time (min)	Top	Bottom	Top	Bottom	(pCi/ℓ)
5	25	7.3	350	410	2.5 (0.14)[b]
15	19 (0.71)	12 (9.3)	310 (2.1)	790 (550)	4.9 (5.5)
40	30 (11)	18 (15)	390 (150)	460 (220)	3.1 (1.6)
55	41 (2.1)	37 (23)	360 (7.1)	460 (340)	5.1 (2.9)
120	41 (17)	18 (15)	190 (80)	270 (20)	3.3 (1.3)
160	44 (21)	33 (9.2)	180 (7.8)	210 (110)	3.9 (3.2)
185	59 (5.0)	36 (3.5)	190 (11)	230 (11)	1.9 (1.0)
210	36	--	120	--	3.0
233	91	--	152	--	2.4
250	67 (0.71)	--	160 (9.9)	--	3.2
260	64 (9.2)	--	150 (2.8)	--	6.2 (3.6)

[a]Averages for suspended sediment based on 2 samples; averages for water based on 4 samples (2 top and 2 bottom), water filtered through 0.45 μm membrane.

[b]Parenthetic value represents ±1 S.D.

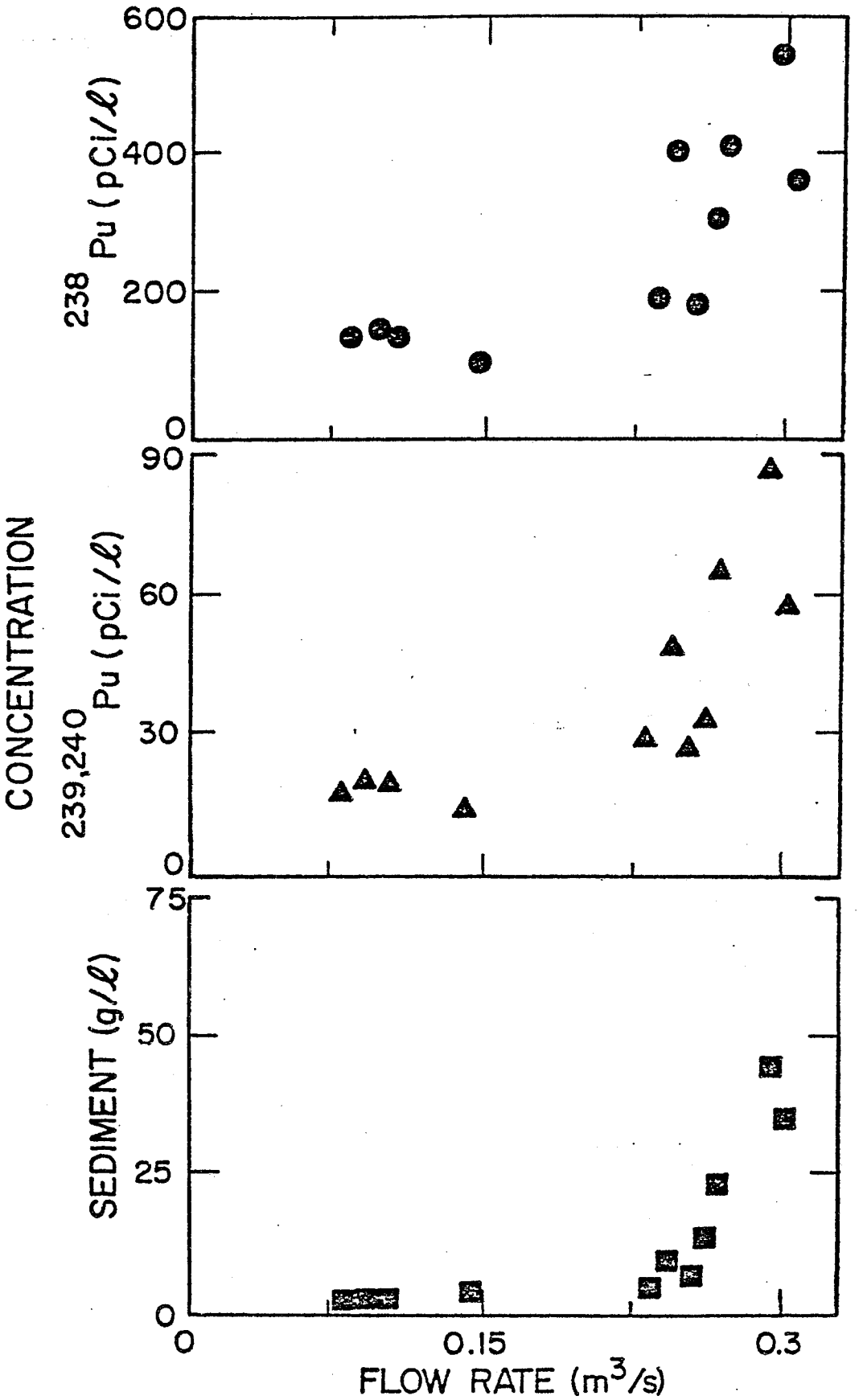

FIGURE 8. Concentration of Sediment and Radioactivity in Unfiltered Runoff Water from Effluent - Mortandad Canyon as a Function of Runnoff Flowrate

in the range 0.25-0.3 m^3/sec. Rates in excess of about 0.25 m^3/sec probably resulted in the suspension of coarse particles (>105 μm), which contained over 95% of the sediment mass and 90% of the radionuclide inventory.

The total amount of radioactivity transported by the event was calculated from average total radionuclide concentrations and cumulative runoff through the event. The estimated transport was 1.1 mCi ^{238}Pu and 0.2 mCi $^{239,240}Pu$, which represented from 1-2% of the total added to the canyon since the first release in 1963. In the 11 years since Effluent-Mortandad Canyon has received contaminated wastes, over 50% of the radioactivity has been transported into the normally dry portion of the canyon by snowmelt and storm runoff (Table 1) indicating that on the average, annual losses of radioactivity to the dry portion of the stream are probably about 50%.

PLUTONIUM IN TRINITY SOILS

Soils investigations of plutonium in the fallout pathway of Trinity, were initiated more than 20 years ago (Larson et al., 1951b and 1951c; Olafson et al., 1957; Olafson and Larson, 1961) and continued in 1972 (Hakonson and Johnson, 1974) and in 1973 (Nyhan et al., 1976a). The primary objective of the 1972 study was to sample the soils and biota inside the fallout study was to sample the soils and biota inside the fallout

pathway at 8-km increments to a distance of 56 km from Ground Zero (Figure 2). The objective of the 1973 studies (Nyhan et al., 1976a) was to determine the distribution and variation of $^{239,240}Pu$ in whole and fractionated soil samples collected along the fallout pathway as a function of soil depth and distance from Ground Zero. Soil radionuclide data from both studies were compared with similar data collected at the Trinity Site nearly 20 years ago and with soil physical-chemical properties influencing the distribution of plutonium in these soils.

Plutonium in Trinitite and Unfractionated Soils

The Trinitite particles collected at Ground Zero (GZ) contained about 2.0 nCi Pu/g and had an average $^{239,240}Pu$-^{238}Pu ratio of 21±0.8 (one SD). Comparable GZ soil samples contained about an order of magnitude lower levels of plutonium than the Trinitite samples (Table 10). The soil plutonium data from the GZ area cannot be compared with the data for the remainder of the transect because the area around GZ was mechanically disturbed shortly after the detonation and covered with at least 15 cm of uncontaminated soil, and the area around the 0.1 km station was scraped to remove the Trinitite lying on the ground surface. The high Pu concentration in the 0-2.5 cm segment of the GZ soil sample (Table 10) indicates either: 1) the overburdening was not successful; 2) that the

TABLE 10. Levels of Pu Found in Trinitite and Soils at Ground Zero of Trinity Site in 1972

Sample Description	Pu Concentration (pCi/g)
Trinitite	2000[a]
Soils:	
0-2.5 cm	250
2.5-7.5 cm	260
7.5-30 cm	62

[a]Average Pu Concentration in 3 samples of Trinitite.

covered Pu had migrated to the soil surface; or 3) that the overburden had blown away over the last 27 years, thus exposing the contaminated soil.

The soils from the fallout pathway (Figures 9-11) generally had higher levels of $^{239,240}Pu$ than the control site soils (Figure 12). The $^{239,240}Pu$ levels found in the surface 0-2.5 cm of soil of the three sites within the fallout pathway averaged 21 times higher than the 9.8 femtocuries per gram (fCi/g) measured in the topsoil of the control site. Plutonium was generally nondetectable below 2.5 cm in the control site soils, whereas elevated levels of plutonium were found to depths of 25, 15, and 33 cm at the 1.6, 16 and 44 km sites, respectively.

The vertical distribution of $^{239,240}Pu$ in Trinity soils collected in 1973 (Figures 9-11) was compared with similar data collected nearly 20 years ago (Olafson et al., 1957; Olafson and Larson, 1961). Whereas the plutonium in the soil along the fallout pathway was detected exclusively in the upper 5 cm of soil nearly 20 years ago, only 42% and 57% of the $^{239,240}Pu$ inventory was found at this depth in 1973 at the 1.6 and 44 km sites, respectively, reflecting considerable downward migration of plutonium into the soil in the intervening 20 years. In contrast, the soils at the 16 km site still contained 78% of their $^{239,240}Pu$ in the upper 5 cm of the profile 28 years after the detonation. The total amount of

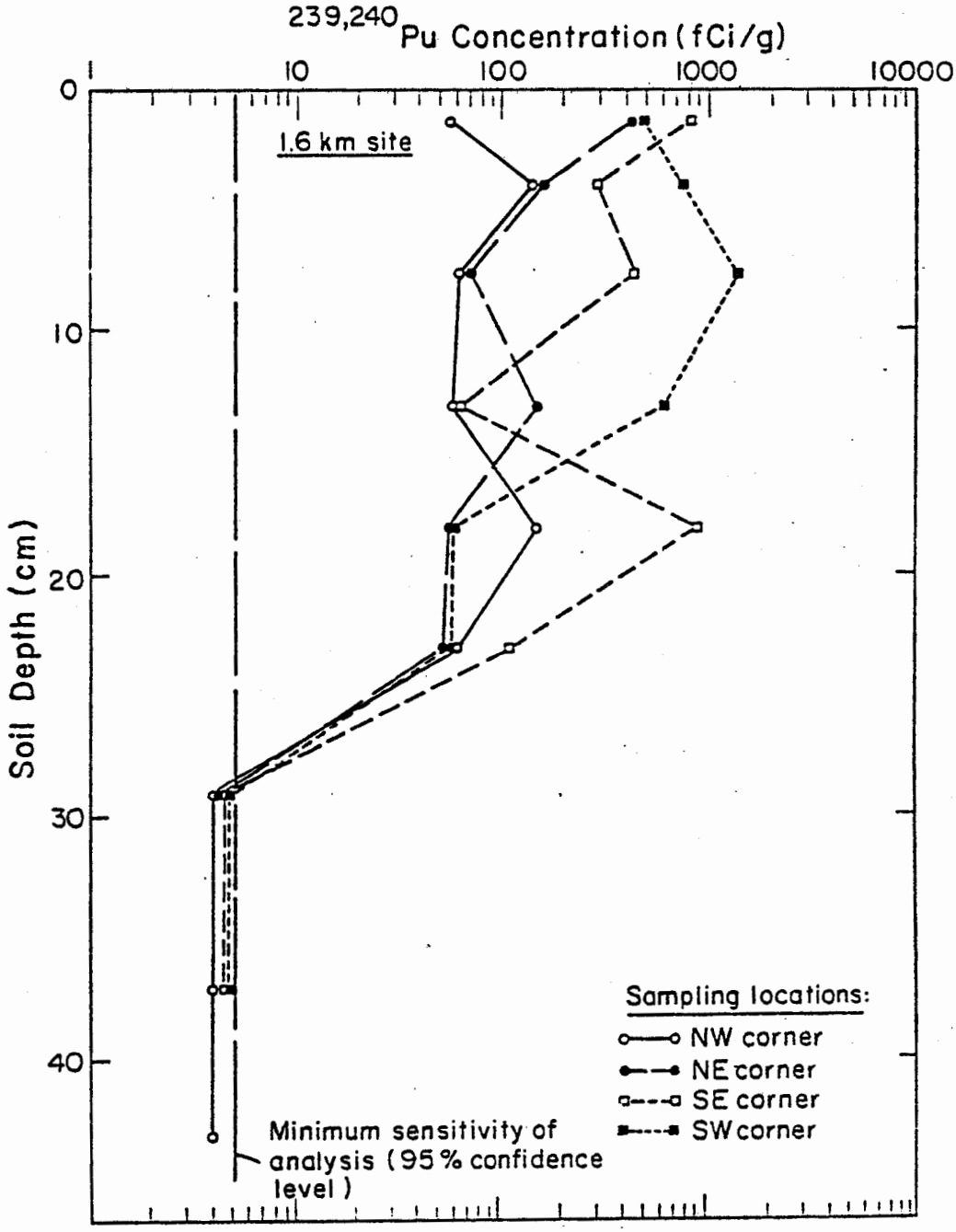

FIGURE 9. Distribution of Soil $^{239,240}Pu$ as a Function of Depth 1.6 km from Ground Zero. Plutonium Concentrations at each Depth Represent the Average of 2 Core Segments

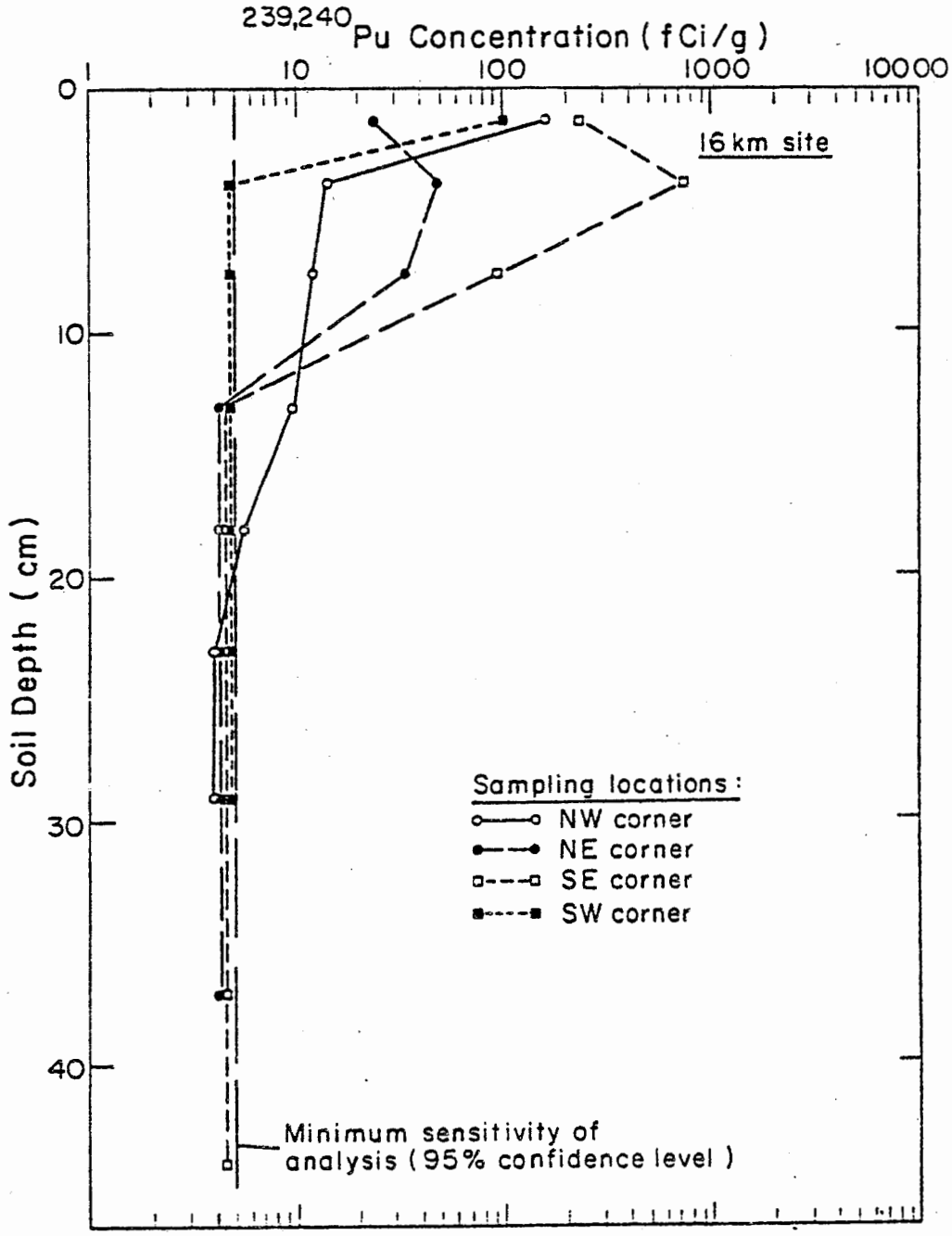

FIGURE 10. Distribution of Soil $^{239,240}Pu$ as a Function of Depth 16 km from Ground Zero. Plutonium Concentrations at Each Depth Represent the Average of 2 Core Segments

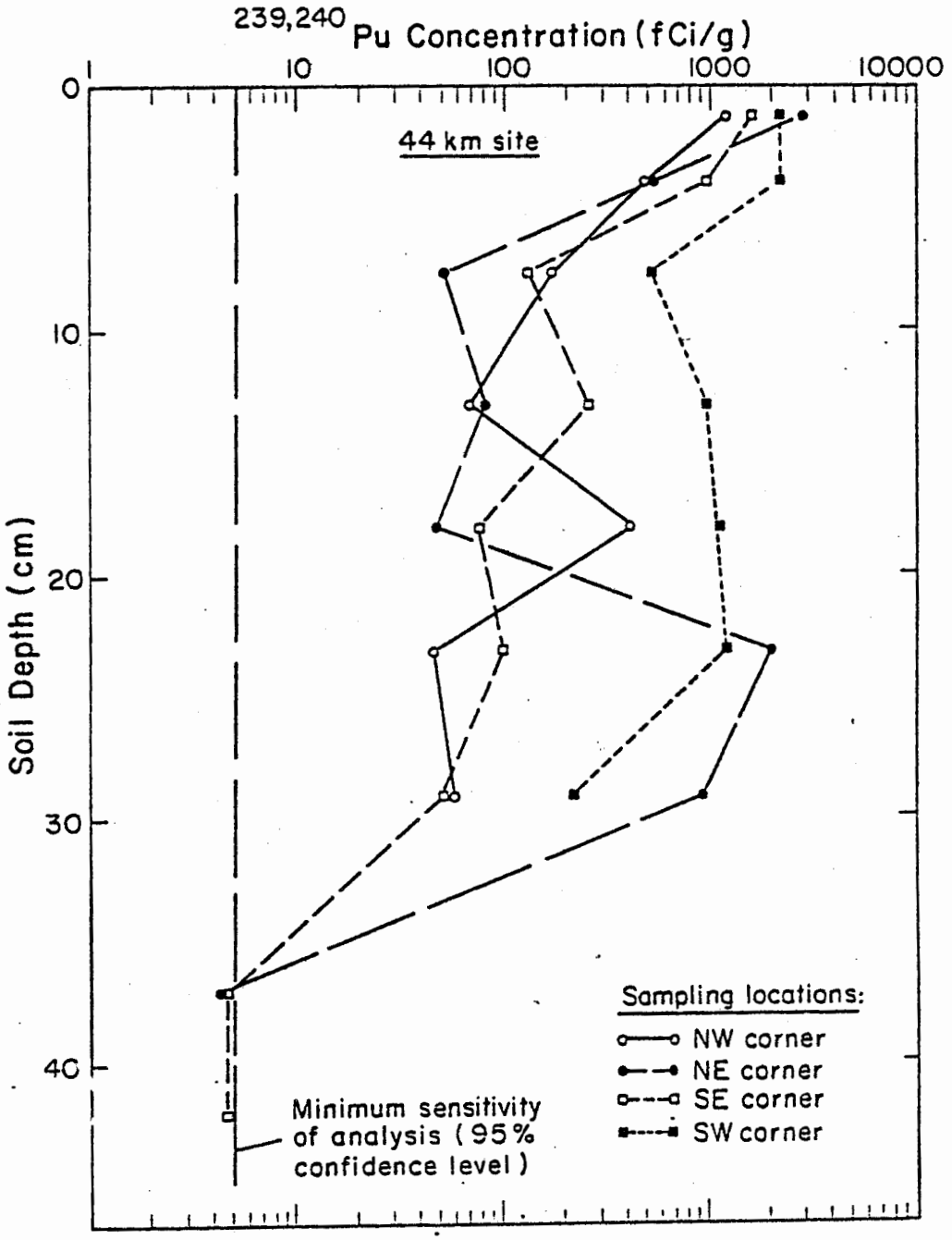

FIGURE 11. Distribution of Soil $^{239,240}Pu$ as a function of Depth 44 km from Ground Zero. Plutonium Concentrations at Each Depth Represent the Average of 2 Core Segments

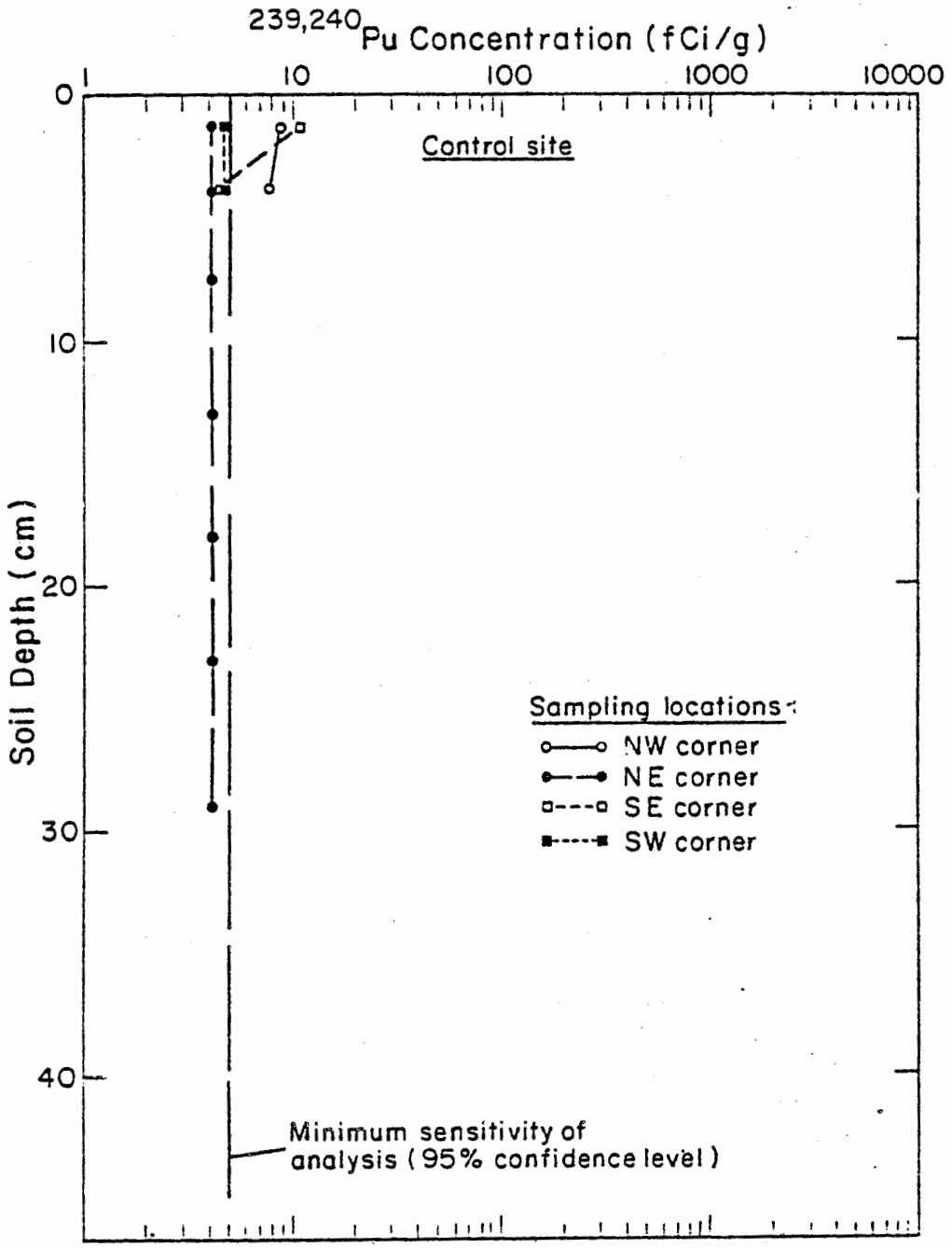

FIGURE 12. Distribution of Soil $^{239,240}Pu$ as a Function of Depth at the Control Site. Plutonium concentrations at Each Depth Represent the Average of 2 Core Segments

$^{239,240}Pu$ measured in the 1.6 and 44 km soil profiles was greater than the inventory found in the profiles at the 16 km site, suggesting that appreciable downward movement of plutonium could only be detected in field locations which were relatively highly contaminated initially (Figure 2). A similar observation was made relative to the downward movement of fission products into these soils in 1949 and 1950 (Larson et al., 1951a and 1951b).

The soil plutonium data were compared with the morphology and classification (Figure 13) of the Aridisols at the 1.6 and 16 km sites and the Entisols located at the 44 km site on the Chupadera Mesa to further elucidate the vertical distribution of $^{239,240}Pu$ in Trinity soils. Plutonium was not detected in either the B_{3ca} horizon of the Dona Ana sandy loam at the 1.6 km site or the B_{2ca} horizon of the La Lande sandy loam at the 16 km site. These soil horizons represent the first strongly calcareous horizons encountered in the subsoil in these areas (Figure 13). The observed relationship between the vertical distribution of $^{239,240}Pu$ and soil horizonation would be expected since the zone of calcium carbonate accumulation is closely related to amounts of rainfall and the average maximum extent of water penetration into the solum (Jenny and Leanord, 1934).

Plutonium concentrations within the soil profiles exhibited considerable variation at all of the intensive study areas.

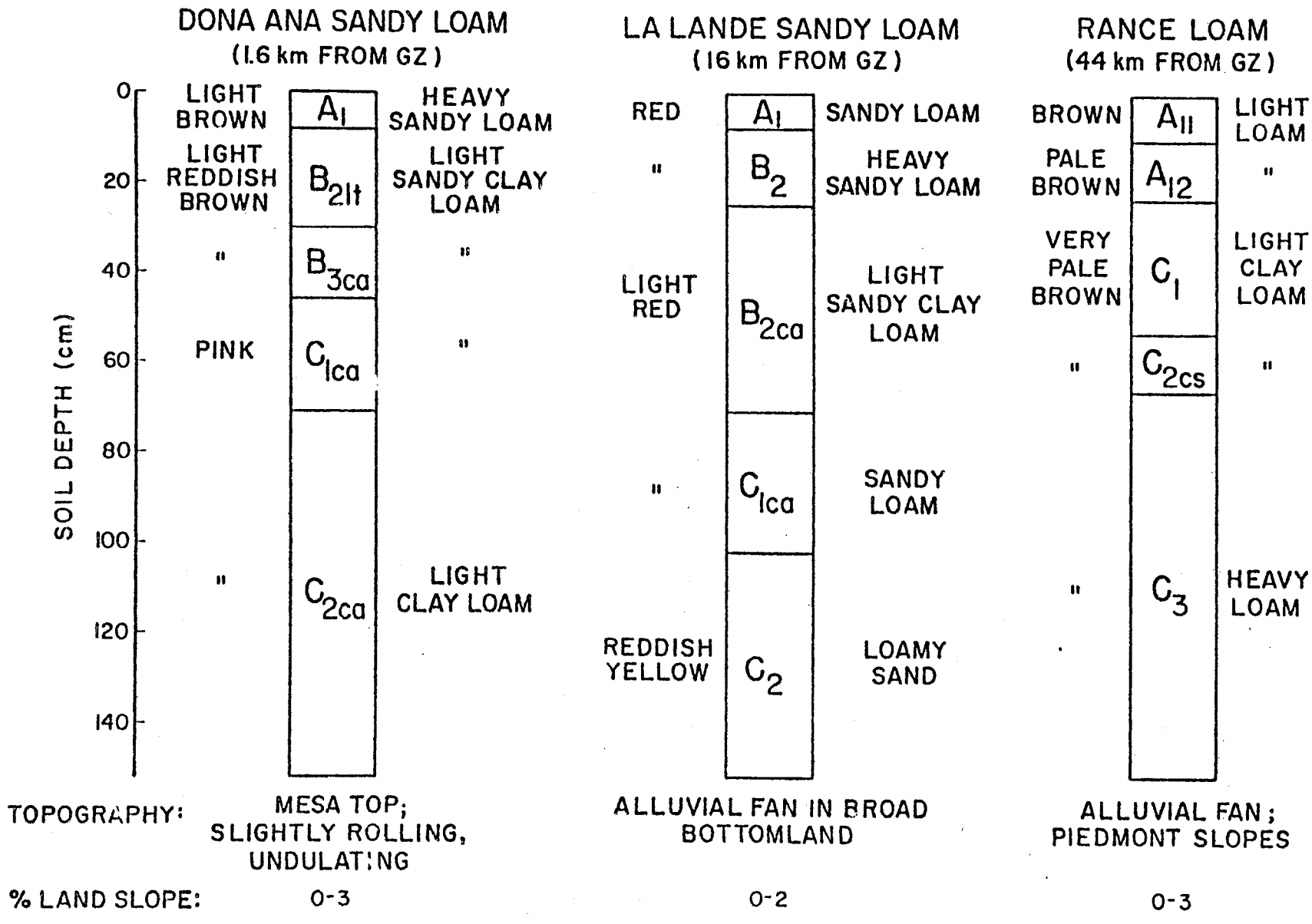

FIGURE 13. Soil Profile and Physiography Descriptions of Trinity

Coefficients of variation (C.V. = SD/mean) of soil plutonium levels varied from 0.48 to 1.9, but were generally greater than 1.2 (Table 11). Variation due to aliquoting procedures generally resulted in C.V.'s of plutonium levels which were less than 0.35 and samples were counted for sufficiently long periods of time such that C.V.'s due to counting were usually less than 0.15. Thus, since most of the samples had C.V.'s > 1.2, the largest component of the variation in soil plutonium levels was generally attributed to spatial variation of plutonium within the soils at each intensive site. Since C.V.'s increased with depth in most cases (Table 11), part of the spatial variation of plutonium in soils may be due to differential penetration depths of plutonium into the soil, even in closely-spaced soil samples.

Plutonium in Soil Size Fractions

The distribution of $^{239,240}Pu$ in various size fractions of the topsoil (Nyhan et al., 1976a) varied considerably between sampling locations (Table 12). The highest plutonium concentrations were found in the <53 μm fraction at the 44 km site, while the 1.0-2.0 mm and 100-500 μm fractions exhibited the highest concentrations at the 1.6 and 16 km sites, respectively (Table 12). The lowest $^{239,240}Pu$ concentrations were consistently found in the 2-23 mm size fraction in soil samples collected in the fallout pathway; this separate

TABLE 11. Mean Concentrations and Coefficients of Variation of $^{239,240}Pu$ Levels in Intensive Site Soils in 1973

Soil Depth (cm)	Mean Soil $^{239,240}Pu$ Concentrations (fCi/g)[a]	Coefficient of Variation of $^{239,240}Pu$ Concentrations[b]	Number of Samples
	1.6 km Site		
0 - 2.5	440	0.82	8
2.5 - 5.0	340	1.0	8
5.0 - 10	510	1.5	8
10 - 15	220	1.7	8
15 - 20	220	1.8	8
20 - 25	200	1.8	7
	16 km Site		
0 - 2.5	130	1.2	8
2.5 - 5.0	380	1.9	4
5.0 - 10	56	1.4	5
	44 km Site		
0 - 2.5	2000	0.48	8
2.5 - 5.0	1000	0.96	8
5.0 - 10	220	1.4	8
10 - 15	340	1.3	8
15 - 20	310	1.5	8
20 - 25	820	1.7	8
25 - 33	350	1.8	7
	Control Site		
0 - 2.5	9.8	1.0	6

[a] Samples containing nondetectable levels of soil plutonium (<5.0 femtocuries/g [fCi/g], 95% confidence level) were not included in the calculation of mean concentration.

[b] Represents standard deviation of mean divided by mean soil plutonium concentration.

TABLE 12. Distribution of Plutonium in Soil Size Fractions of Trinity Soils at the 0-2.5 cm Depth in 1973

Parameter Studied	Soil Size Fraction <53 μm	53-100 μm	100-500 μm	0.5-1.0 mm	1.0-2.0 mm	2.0-23 mm
1.6 km From Ground Zero						
$^{239,240}Pu$ Concentration (fCi/g)	70	50	920	2100	5300	8.9
Weight % Soil	8.9	11	49	23	6.1	2.0
% $^{239,240}Pu$ in Fraction	0.78	0.43	36	38	25	0.01
16 km From Ground Zero						
$^{239,240}Pu$ Concentration (fCi/g)	660	98	790	140	67	20
Weight % Soil	10	19	65	4.0	0.42	1.6
% $^{239,240}Pu$ in Fraction	11	3.0	85	0.92	0.05	0.03
44 km From Ground Zero						
$^{239,240}Pu$ Concentration (fCi/g)	3800	1700	420	640	1600	230
Weight % Soil	36	18	25	4.2	2.9	14
% $^{239,240}Pu$ in Fraction	73	16	5.5	1.4	2.4	1.8
Control Site						
$^{239,240}Pu$ Concentration (fCi/g)	20	25	7.3	56	ND[a]	20
Weight % Soil	13	17	49	13	4.1	4.4
% $^{239,240}Pu$ in Fraction	14	23	19	39	0.0	4.9

[a]Less than minimum sensitivity of analysis (95% confidence level) of 5.0 fCi $^{239,240}Pu$/g soil.

contained from 0.2 to 5% of the maximum $^{239,240}Pu$ concentrations observed in smaller size fractions, reflecting the overall low potential reactivity of the 2-23 mm fraction with fallout plutonium.

The percent of the total $^{239,240}Pu$ in each size fraction of each soil sample was calculated from the $^{239,240}Pu$ concentration data (Table 12) and the mass of the soil in each size fraction for each site. Only 1.2% of the $^{239,240}Pu$ and 20% of the soil mass was found in the <100 μm fractions at the 1.6 km site. The <100 μm size fractions from the 16 km site contained 14% of the $^{239,240}Pu$ inventory and 29% of the soil mass, whereas this fraction contained 89% of the total $^{239,240}Pu$ and 54% of the soil mass at the 44 km site. Thus, relatively larger amounts and high concentrations of plutonium were associated with smaller particles with increasing distance from Ground Zero.

The plutonium data for the single core segments presented in Table 11 should not be compared to the data presented in Tables 12 and 13, where a composite of four soil core segments were fractionated and assayed for plutonium. However, if the products of the plutonium concentration and the fractional soil mass are summed for all six size fractions, a total soil plutonium concentration can be calculated for the fractionated samples (Tables 12 and 13) and compared with the data in

TABLE 13. Distribution of Plutonium in Soil Size Fractions of Trinity Soils at the 5.0-10 cm Depth in 1973

Parameter Studied	Soil Size Fraction					
	<53 μm	53-100 μm	100-500 μm	0.5-1.0 mm	1.0-2.0 mm	2.0-23 mm
			1.6 km From Ground Zero			
^{239,240}Pu Concentration (fCi/g)	11	37	72	27	10	ND[a]
Weight % Soil	10	12	41	21	9.4	6.6
% ^{239,240}Pu in Fraction	2.7	10	71	14	2.3	0.0
			16 km From Ground Zero			
^{239,240}Pu Concentration (fCi/g)	320	76	42	17	ND	ND
Weight % Soil	12	16	58	11	0.55	2.5
% ^{239,240}Pu Fraction	49	17	32	2.0	0.0	0.0
			44 km From Ground Zero			
^{239,240}Pu Concentration (fCi/g)	270	240	89	33	ND	ND
Weight % Soil	28	19	30	8.8	2.2	12
% ^{239,240}Pu in Fraction	50	30	18	2.0	0.0	0.0

[a]Less than minimum sensitivity of analysis (95% confidence level) of 5.0 fCi ^{239,240}Pu/g soil.

SUMMARY

Soil plutonium concentrations were determined as a function of distance from either the liquid effluent outfalls at Los Alamos or from Ground Zero at Trinity Site and soil depth. Although most of the soil plutonium inventory in the intermittent streams at Los Alamos was located within about 2 km of the waste outfalls, runoff events were important in downstream transport of radioactivity beyond this point into the normally dry portion of these intermittent streams. Vertical mixing to the alluvium by hydrologic transport processes at Los Alamos were also responsible for the inconsistent plutonium-soil depth relationships observed at most sampling locations. In contracts, the horizontal distribution of plutonium in Trinity soils was related to the 1945 fallout deposition pattern and plutonium concentrations generally decreased with soil depth.

The distribution of plutonium was determined for a variety of size fractions as large as 2-23 mm in Los Alamos alluvium and Trinity soils. The 2-23 mm fractions of Los Alamos and Trinity soils generally had at least 10-fold lower Pu concentrations than smaller soil size fractions. The <105 μm size fractions in the coarse-textured alluvium at Los Alamos accounted for up to 96% of the soil mass and 80% of the plutonium. Although Trinity soils close to Ground Zero also

fit this pattern, up to 90% of the plutonium was associated with the small (<105 μm) size fractions with increases in soil depth and distance from Ground Zero.

The distribution of plutonium in Los Alamos and Trinity soils was also compared with several physical, chemical and hydrologic properties of soil. Increased cation exchange capacities and levels of soil organic carbon and calcium carbonate were significantly correlated with elevated plutonium levels in the alluvium at Los Alamos. The fractional distribution of plutonium was correlated with surface area in Los Alamos soils, but this relationship did not hold true for most of the Trinity soils, signifying that other unidentified causal factors were influencing the distribution of plutonium in soil separates at Trinity Site. The maximum penetration depths of $^{239,240}Pu$ into Trinity soils were related to carbonate accumulations in the subsoil and the maximum extent of rainwater penetration into these soil profiles.

Temporal changes in the distribution of plutonium in the Los Alamos and Trinity Site soils were also considered. After the isotopic composition of the effluents added to Effluent-Mortandad Canyon was changed in 1968, soil size fractions could still be collected in this canyon 5 years afterwards, which reflected the isotopic composition of the pre-1968 liquid

effluents. The spatial distribution of plutonium in the alluvium of Acid-Pueblo Canyon indicates that dilution and loss of plutonium from the upper soil layers has occurred since the liquid effluents were last added to this canyon in 1963. Whereas the plutonium in Trinity soils was only detected in the upper 5 cm of soil nearly 20 years ago, plutonium had migrated as far as 33 cm into these soils at some sampling locations.

CURRENT SOIL ACTINIDE RESEARCH PROGRAMS

A variety of soil trenching and coring techniques for sampling soils for radionuclides are being evaluated at Los Alamos and the Trinity environs to determine contributions to variation in actinide concentrations observed in the field.

Actinide-related activities within the effluent-receiving areas at Los Alamos currently involve obtaining more comprehensive radionuclide inventory estimates and further evaluating the transport of soil and actinides in these intermittent streams. We have sampled stream bank soils and the alluvium below our previous sampling depths (maximum of 30 cm) to determine inventories of transuranics at these locations. Seasonal changes in radionuclide concentrations and soil movement are being routinely monitored at several locations within Effluent-Mortandad Canyon.

Wind erosion of Trinity soils is being evaluated as an actinide transport vector, as well as the distribution of plutonium on soil size fractions. Bagnold dust collectors have been installed at our intensive study areas to evaluate amounts of soil and plutonium resuspended at each site as a function of distance above the soil surface and season of the year. Individual soil size fractions are being further examined relative to the distribution of plutonium particles on soil particles using alpha-track techniques.

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FOLLOWING J. W. NYHAN'S PRESENTATION

QUESTIONS AND ANSWERS

Wildung: How did you measure particle size distribution?

Nyhan: We used a dry sieving technique. We usually took about 20 g of soil, dry-sieved it into the six fractions and analyzed these fractions for plutonium.

Wildung: How good are you at separating the small particles from the larger particles with the dry-sieving technique?

Nyhan: I suppose there are pretty intricate ways you could do this. After we sieved the materials, we typically ended up with a product on one sieve. In order to minimize contamination we took an air hose and essentially blew the finer particles off of the larger particles. In addition, most of the soils that we were studying were relatively coarse-textured, i.e., about 96% of the weight of the Los Alamos soils comprised particles that were very large. Since we found the highest concentrations of plutonium in the fine soil particles, the latter factor would also help to minimize cross contamination of large soil particles with small soil particles containing large concentrations of plutonium.

Wildung: Of course it wouldn't take too much fine particle contamination at the levels that you are working.

Nyhan: I thought originally that we might not be able to see differences greater than about three orders of magnitude for these samples. However, we used the same technique with Trinity soils as we did with Los Alamos soils, and some of those samples clearly showed nondetectable levels of plutonium in some of the fractions versus a couple thousand femtocuries per gram [fCi/g] in some of the smaller size fractions of the same soil.

Wildung: At the Trinity site at the 30-cm depth, that is, the depth of rainfall penetration, did you have carbonate deposition?

Nyhan: At the 44-km site, at 30 cm, did we have carbonate? No. This soil is classified as an entisol, which has an A and a C horizon, with no accumulation of carbonates in the C horizon. The soil was derived from a gypsum deposit, so calcium sulfate was there, not calcium carbonate.

Wildung: You showed a correlation of plutonium levels with calcium carbonate in. . .

Nyhan: Oh, that was in the Los Alamos soils.

Wildung: I understand that, but you did show a correlation of plutonium with calcium carbonate in the canyons and you stated that this may have some implication with respect to other

ecosystems because at certain concentrations plutonium carbonates are soluble. But I wonder if the real reason you see this correlation is because calcium carbonate is one of the predominant factors involved in plutonium insolubilization. That is the reason I asked if carbonates were present at sites of plutonium localization in the Trinity site profiles.

Nyhan: Yes. Besides you could have a situation where you've got a precipitate which might tend to make plutonium less mobile, but on the other hand, the precipitate is a plutonium compound that's more soluble. Thus, you might expect to see greater vertical penetration of the plutonium with the carbonates present. There are some interesting things that we have seen in one of the effluent-receiving areas that are related to this phenomenon. We've got coarse alluvium on top of the massive tuff which I showed you at the start of this presentation. I think that Acid Pueblo Canyon, which hasn't been used as an effluent-receiving area since 1963, is currently more or less equilibrated with the environment. Many of the plutonium distributions with depth in this particular canyon show a relative increase as soon as you encountered the tuff. The alluvium probably has a half-life of something like two to three years years in the shallow, intermittent streams at Los Alamos, so that there's only a certain depth of alluvium that is exchanged

annually. Indeed, you've got plutonium concentrations in the tuff that are now acting as a reservoir for the plutonium in these soils.

Rai: You mentioned the spatial variation in the plutonium distribution. How heavily can you rely upon comparison based upon the data collected 20 years ago?

Nyhan: The comparisons are made with some of Kermit Larson's work and some work done by UCLA personnel at a Trinity site in the 50's. These people actually collected core samples and had them analyzed for plutonium. Their detection limits were not as good as ours are today, but we have obtained some of these old samples from Kermit Larson and NAEG to help answer this question.

Rai: I was wondering whether it is possible that due to spatial variation the researchers 20 years ago missed a site where plutonium was present down to 30 cm. You might make mention of the spatial distribution.

Nyhan: There is, and it's quite large. I'm not a statistician, but I think you could pretty easily show that there was a significant difference over time. Most of the samples that they took 20 years ago had some signs of activity in the surface inch of soil, but none of the samples taken below this depth showed any detectable levels of activity.

Rai: Did Larson go any deeper than 30 cm in very many places?

Nyhan: He had one set of cores that I think went down to about 60 cm, and here he is only showing significant signs of activity in the top 2 inches. These core samples were broken down into 1-inch increments all the way to about 2 feet.

Price: When you are coring, are you sure that you're not carrying down contamination from the surface, or when you analyze do you take away the portion that has been in contact with the corer? How do you control that possibility?

Nyhan: When we are taking a sample, we drive the core tube down into the soil and then compare the depth of the soil inside the corer with the soil depth outside of the corer. We would typically come out with about 10% compaction integrated over the entire soil core. Immediately upon taking the sample we place a rubber stopper in one end of the core tube, place the tube in a plastic bag, and double wrap this package. This sample would then be placed upright in a freezer chest with dry ice in it.

Price: You don't have anything like smear along the sides?

Nyhan: I can answer that for cesium. I know that if you contaminate the surface of a bucket of sand from one of the effluent-receiving areas with cesium, and then take a core sample in this bucket just like you would do out in the field, there isn't any smearing along the side of the core. I tried tubes that had varying diameters and the 1-inch diamter core that I finally ended up with would hold the soil inside it when you removed the core from the soil, something that I couldn't accomplish with the larger sampling tubes because everything fell out of them. There was no aliquoting error introduced into the analysis because after we froze the sample and cut it up, the total amount of soil that was in each depth segment was analyzed for plutonium.

Rai: It seems to me you could avoid all those problems just be taking sample by standard procedure, like soil scientists do. Just dig a pit and take samples from the side of the pit, that way one could avoid the mixing problems encountered in tube sampling.

Nyhan: That's possible in some locations, but not where I'm sampling at Los Alamos. The trench in the alluvium would immediately collapse, i.e., it would be like digging a hole in a sandbox full of dry sand.

Lini: What is the rainfall at the Trinity Site? How far into the ground does it penetrate?

Nyhan: We're getting about 7 to 9 inches of rain a year at Trinity Site. Typically in the West you get most of that rain occurring in less than 1/10 of an inch rainstorms. Where you reach the depth of maximum carbonate concentrations in a lot of the western soils, that also represents the maximum extent of rainwater penetration into that soil such as at the Trinity Site. Three-inch rainstorms would roughly penetrate about 30 inches into one of the Trinity Site soils. That would be the maximum extent, but you hardly ever get a 3-inch rain.

Serne: You did mention for the site 44-km from Ground Zero, that you felt that the rainwater was reaching 30-cm depth as its maximum penetration. You stated that as you went deeper, more plutonium was found in finer and finer particles, and you hypothesized solubilization at the surface and resorption below. Is there any justification for your hypothesis over a totally physical mechanism in terms of downward movement of fine particles of plutonium oxide with time and water percolation, i.e., just physical transport of fine plutonium particles down to that depth. I wonder if anyone can show that it's actually a chemical dissolution-resorption instead of just the PuO_2 particles finally, through more wettings and dryings, transporting down.

Nyhan: That's a good question. One of the things that we're doing now will answer that question. I don't have the answer right now, but we're looking at alpha-track analysis, and trying to look at the distribution of plutonium particles in the

soil, as compared with the distribution of soil particles that are there. It would seem to me that if there was any type of a surface area-dependent reaction, the pattern that I observed of increased plutonium concentrations in finer size fractions with increasing depth would seem to be reflecting a chemical dissolution rather than a physical absorption.

Serne: Maybe the fine plutonium oxide particles end up in your fine fraction. It could be just a filtering mechanism of the soil profile.

Nyhan: But if it was a filtering mechanism of the soil profile you'd expect a similar concentration of plutonium on each one of the size fractions, wouldn't you?

Serne: Not if they're discrete particles of PuO_2.

Bondietti: With density of 10. Not the same density as your soil. You're using dry sieving. Using wet sieving you'd have that other problem involved, where the Pu would sink faster than a 2.6 g/cm^3 particle.

Nyhan: Like some of Tamura's work.

Rai: In soils, clay particles which are less than 2 micrometers in size may leach down to great depths (60 inches or even down farther than that). Thus, if the plutonium particles are small enough and durable enough, it is possible that these particles would also move down the profile.

Nyhan: Yes, it's possible, however, using that same argument, it has probably taken the Trinity soils about 2 to 3 hundred years or maybe up to a thousand years to develop a B horizon, which results in migration of submicron clay particles from the upper soil layers to a subsoil layer. Along these same lines, if the soil and plutonium particles are migrating at these slow rates, why did I see a change in the vertical distribution of plutonium at Trinity Site in about 20 years?

Glover: I did a preliminary experiment to figure out a way to get a good PuO_2 soil slurry. I mixed some soil and PuO_2 (diameter of 10 μ and less) and put it on top of a soil column. The column was rinsed with 1 liter of distilled water and the water collected in fractions. In the very first fraction of water that came through, high alpha activity was detected which indicated that the PuO_2 particles had passed through. With particles as large as 10 microns I couldn't do a fission track analysis on it because of the amount of radiation associated with it. The PuO_2 particles did, indeed, come out in the effluent. So it's moving, whether it was physical movement or not. PuO_2 in a matter of a couple of days or so moved down through the 3 cm of soil. So it's possible that even in a short period of time that PuO_2 might somehow move through the soil.

Nyhan: We tend to be field oriented, and I had nothing to look at to compare against time except the older analyses that were done at Trinity Site. But all the old vertical distributions of plutonium taken in the late 40's and early 50's had similar vertical distributions of plutonium.

Rogers: That fallout has been there such a long time that these original fallout particles may have attached themselves to the larger size fraction of the soil and therefore are not so mobile any more. I think some of Tamura's data indicate that most of the plutonium is associated with the larger particles and not so much with the smaller particle size batch. Therefore over this period of time maybe the migration process may stop, or becomes more difficult to proceed because of fixation.

Glover: Of course, if you have a system where water is constantly being added, it is possible that the fallout (PuO_2) would move, maybe not very much. In your situation, where you don't have very much rainfall you have a static system. The PuO_2 does have a chance to attach itself to the soil and get to some point where it would stop.

Rai: Like a series of steps . . .

Glover: Yes, but in my situation where I'm constantly running water through the soil column, there is a possibility of a PuO_2 particle that just does not become attached to

anything and moves constantly until it is trapped at some point. So, I agree with you that it would be possible.

Nyhan: What you were just saying is similar to what they found at Argonne with the Los Alamos tuff. That's what they mean by saturated flow.

Glover: So you get both of those things working. This is probably one thing to consider when you look at all different kinds of soils. It would be difficult to actually say this is what will happen all the time, because it would depend on how much rainfall you have in the area, what kind of soil you've got, and what kind of conditions exist to say whether or not the movement is physical or if an ion exchange mechanism influences movement.

Bruns: We're finding some verification of this too, incidentally, in our field studies of Hanford soil. We had a Redox facility. It was the second fuel reprocessing facility established at Hanford and has been down for 15 or 20 years. We were looking at a dried up low level waste pond originating from Redox and at Analytical Laboratory low level wastes, and there the plutonium activity is still increasing at 30 cm depth in a particular region that channeled down through the pond. We haven't gone deeper than that and that's why I was curious as to how far it's going to keep increasing. With

time, it apparently seems to be going down a little bit. Possibly the plutonium polymer species is a fine particle size or possibly a soluble, elutriable species. A lot of liquid went into this pond, and so it has washed down and it still may be going on down with rainfall. In Z-9 that Ms. Sue Price is working on, we found activity at about 30 meters.

Price: At least 30 feet . . .

Bruns: Thirty feet. That's right; 30 feet is the furthest we've core sampled there. It's getting on the nanocurie range at that depth, but it's above 100 nanocuries/gm, so it is a concern.

Rai: It seems to me that one way of resolving this problem is to compare the size of the plutonium particles and the sizes of soil pores and then determine whether it is physically possible for the plutonium particles to go through the soil pores.

Nyhan: For Trinity soils, I calculated this knowing the specific activity of the plutonium particles. I took the maximum concentration of ^{239}Pu (about 1,000 fCi/g ^{239}Pu) and knowing the specific activity of pure $^{239}PuO_2$, I calculated the size of the particle that could be contained in an entire soil sample if all the ^{239}Pu were contained in one particle. This calculation showed that we were looking at soil sizes less

than 53 μ with submicron particles of plutonium on these soil particles. This distribution is not the same as working at higher concentrations where you have what Claude Sills calls the hot particle problem. We're looking at sort of a piggy-back effect where the plutonium particles are "piggy-backing" on much larger soil particles. That is the overall impression you get of almost any size fraction distribution that I looked at under environmental conditions.