**The MAP3S Precipitation
Chemistry Network:
First Periodic Summary Report
(September 1976 - June 1977)**

October 1977

Prepared for the
U.S. Department of Energy
under Contract EY-76-C-06-1830

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THE MAP3S PRECIPITATION CHEMISTRY NETWORK:
FIRST PERIODIC SUMMARY REPORT
(SEPTEMBER 1976 - JUNE 1977)*

October 1977

BATTELLE
Pacific Northwest Laboratoies
Richland, Washington 99352

Prepared for the Department of Energy under
Contract EY-76-C-06-1830.

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should be directed to M. Terry Dana of Battelle.

ABSTRACT

The MAP3S Precipitation Chemistry Network consists of four sites (to be expanded to 8 to 12) located in a north-south line from northern New York State to northwestern Virginia. Precipitation event samples are collected by cooperating site operators, using specially developed sampling equipment. The concentration data collected over the period September 22, 1976 (first collected sample) to July 1, 1977, are listed as a summary of the data reported monthly throughout the year.

Samples were chemically analyzed at a central laboratory for 11 pollutant species -- pH, conductivity, SO_2 , $\text{SO}_4^{=}$, NH_4^+ , NO_2^- , NO_3^- , Cl^- , PO_4^{3-} , Na^+ , and K^+ -- using ion chromatography, automated wet chemistry, atomic absorption spectrophotometry, and other standard techniques. Other species to be analyzed when the procedures are available are: Mg^{++} , Al^{3+} , Ca^{++} , and acidity/alkalinity (titration).

The new precipitation collector equipment was evaluated by comparing the concentrations measured with those from a proven type of collector, operated simultaneously at all four sites. Preliminary results indicate a favorable comparison, but there were insufficient data to ascertain whether the newer collector was more effective in collecting volatile species such as SO_2 and NH_4^+ and the oxidation product $\text{SO}_4^{=}$, as it was designed to do. Analyses of rinses of the Battelle collector funnel indicated that in-the-field deionized water rinses are effective, but there are indications that this collector may not fairly sample very small precipitation events (collected volume less than about 100 ml). The need for special handling and chemical treatment of samples for analysis of dissolved SO_2 was recognized through laboratory experimentation.

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PREFACE

The contributors to this report are the MAP3S Precipitation Chemistry Network site operators and laboratory organization personnel. The cooperating organizations and individuals are listed below. Inquiries should be directed to M. Terry Dana.

The report contains a listing of precipitation chemistry data collected from September 22, 1976 (the date of the first sample collected) through June 30, 1977. It is expected that similar summary reports will be issued on a semi-annual or annual basis throughout the duration of MAP3S. The text on this first summary report is probably somewhat longer than that which will accompany future summaries, and is intended to provide a background to acquaint the reader with the organization and procedures of the Network.

The primary objective of the project is to collect the concentration data and distribute it promptly; further analysis of the data and use of the data as an aid in precipitation chemistry research is generally left to the reader, but analyses and interesting applications of the results may appear in future summary reports or in the open literature authored by the persons listed below. Other users of the data herein may credit: "The MAP3S Precipitation Network".

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SECTION 1

INTRODUCTION

The Multi-State Atmospheric Power Production Pollution Study (MAP3S) is a large-scale atmospheric research effort, sponsored by ERDA Division of Biomedical and Environmental Research and involving the ERDA National Laboratories, universities and contract research organizations throughout the United States.¹ The overall goal of the project is to develop the means for modeling and predicting the effect - on atmospheric concentrations and precipitation chemistry - of present and future pollutant emissions from power production processes. Because of the present circumstance where the short-to-medium term emphasis on electric power expansion is in the area of coal burning, and because of the present density of such sources in the upper midwest and northeastern United States, MAP3S is concerned primarily with emissions resulting from coal burning and the research is focused on the northeastern United States.

The major pollutants - resulting from fossil-fuel energy production - of interest are the sulfur and nitrogen oxides and their reaction products, hydrocarbons, trace elements, and particulates. The present phase of MAP3S is focused on the sulfur oxides and their reaction products because of the wide-spread recognition that sulfur dioxide is the major pollutant from coal. Specifically, the health effects of SO₂ and the resultant sulfate are of great concern and are actively studied for the purpose of establishing a sulfate standard and possibly revised SO₂ standards. It is expected that concentration on the sulfur pollutants, in MAP3S, during

the initial stages of the program will provide the framework for study and transferable methodology for treatment of the other environmental pollutants resulting from fossil-fuel processes. In addition, this effort will be coordinated with other research efforts concerned with sulfur pollution, such as those of the Electric Power Research Institute and the Atmospheric Environment Service of Canada.

The precipitation chemistry aspect of MAP3S is divided into two areas of study: the basic mechanisms of removal of pollutants by precipitation (precipitation scavenging), and the continuous measurement of precipitation chemistry at ground level at established permanent regional collection sites. The latter effort is the work of the MAP3S Precipitation Chemistry Network.

It was clear from the beginning of planning of MAP3S that there would be a need to carefully observe the effects of fossil-fuel emissions on precipitation quality. This effort should provide high-quality chemistry data for use in developing and confirming regional-scale scavenging models, as well as in documenting trends in precipitation quality as the use of coal as power production fuel increases. Background results (e.g., from continuously operating reliable networks) were unfortunately lacking, and certain data required by MAP3S had not and were not being provided by existing precipitation chemistry monitoring networks.²

One of the requirements of MAP3S for precipitation chemistry data was that the sites for collection be regional sites, i.e., that they be unaffected by local sources of pollution. Measurement of fossil-fuel pollutants' effects on the entire region (the northeast United States), in the absence of a very large number of sites (practically impossible), requires that the measurement sites provide precipitation samples that are typical of the areas in which the sites are

centered. This precludes urban areas for sites, and rural areas affected by large sources of pollution.

To serve the purpose of providing data for modelers, who often desire supporting data from particular storm systems, the network should provide *event* samples, that is, individual precipitation samples for each period of precipitation at each site. Past monitoring networks and the existing EPA/WMO network have provided only monthly average samples on a long-term basis.³ In addition, event samples can provide data to support intensive field experiment periods foreseen to occur occasionally throughout the duration of MAP3S, and can also serve the basic purpose of examining how differing synoptic situations affect precipitation quality.

A major failing of past networks has been excessive delays in performing chemical analyses and reporting the results. A major objective of the MAP3S Precipitation Chemistry Network is to conduct analyses quickly and report the results in a timely manner. This implies an efficient system of sample handling, a dedicated laboratory, and a formalized and scheduled reporting format.

Two more technical requirements of the Network emerged from the planning. First, it must provide wet deposition-only data for precipitation chemistry purposes. While dry deposition is of equal importance to MAP3S, means of measuring this on the same basis (event samples and *every* event) as for precipitation have not been effectively devised. Precipitation samples collected in always-open collectors will contain some component of the dry deposition, and are practically useless as wet deposition samples. This requirement necessitates the use of an automatic wet deposition-only sampler -- one which opens only during the time of precipitation events.

The second technical requirement involves the emphasis of MAP3S on sulfur compounds. On the basis of the chemical properties of sulfur dioxide, it has been predicted that a significant portion of the depositing sulfur oxides could be in the form of dissolved sulfur dioxide or sulfite, rather than exclusively of the more chemically stable sulfate.⁴ Very little experimental data exist to establish in fact whether sulfite is a significant contributor to precipitation chemistry, at the time of deposition, as typical collection and sample handling practices have heretofore precluded the examination of sulfite concentrations. This requirement led to the development and use of a new type of collector for the MAP3S Network, which is intended to preserve deposition concentrations of sulfite and other volatile and/or reactive species.

There is one very important objective of the Network which in a sense goes beyond MAP3S. This is to establish a network of sufficient quality and stability of operation that the results derived will compel its being maintained as a permanent network (or core thereto) for monitoring of the precipitation quality of the region beyond the conclusion of MAP3S. In addition, the establishment of such a network, with careful handling and rapid processing of samples, makes it eminently reasonable to use it to provide as much data as possible on pollutant species of interest to precipitation chemistry researchers, both in and out of the MAP3S program. Thus, the chemical analyses are as extensive as is practical (even beyond species of immediate concern to MAP3S), and the results are distributed to any interested researchers.

Table 1 is a summary of the requirements of MAP3S for, and the objectives of, the MAP3S Precipitation Chemistry Network, and briefly the efforts made to implement them. The following sections of this report describe the current status

of the fulfillment of these objectives, and the Appendix is the first periodic summary of the collected precipitation chemistry data.

TABLE 1

Requirements and Objectives of the
MAP3S Precipitation Chemistry Network

<u>Need/Objective</u>	<u>Implementation</u>
Regional Collection Sites	Careful selection to avoid urban and nearby source effects
Precipitation Event Sampling	Individual samples collected for each precipitation event (minimum of 24 hours duration)
Rapid Chemical Analysis and Reporting of Results	Samples delivered to laboratory within one week, chemical analyses performed, and data distributed to interested parties normally within two months of sample collection
Technical:	
Wet deposition-only samples	Use of automatic, wet deposition-only collectors
Preservation of sulfite and other volatile species	Use of specially-developed samplers which prevent desorption (funnel-and-bottle collector) and slow chemical reaction by on-site refrigeration
Future Monitoring of Precipitation Quality (beyond MAP3S)	Establishment of a high-quality and stable network such that it may form a core for a permanent national or regional monitoring network

SECTION 2

THE NETWORK COLLECTION SITES

Selection of the initial collection sites was accomplished during the first year of the precipitation chemistry network program, during which equipment and laboratory and field procedures were also developed.⁵ The precipitation chemistry sampling experience of the Air Resources Laboratory (ARL), NOAA, was utilized, and coordination between that organization and Battelle, Pacific Northwest Laboratories, resulted in the selection of four sites.

The primary criteria used in making this selection were that the cooperating institutions have a genuine interest of their own in precipitation chemistry (to assure effective and careful sampling), that the sites be well distributed geographically over the northeast U.S. region, and that the sites not be located too near existing sites of other operating networks. The resulting array, shown in Figure 1, formed a north-south line across the region, an effective core for the projected more extensive network of 8 to 12 sites.

Once the four cooperating institutions -- listed in Table 2 -- were selected, the job of exact location of collection sites was undertaken. This was done under the supervision of ARL during early 1976, using agreed-upon criteria to assure the "regionality" of the sites, as required by the objectives listed in Section 1. Geographical details of the sites are listed in Table 2, and the following paragraphs briefly describe them individually.

Figure 1. MAP3S Precipitation Chemistry Network -
Initial Array

TABLE 2

Network Cooperating Institutions and Site Details

<u>Institution</u>	<u>Site No.</u>	<u>Site Location</u>	<u>Longitude and Latitude</u>
Atmospheric Sciences Research Center, State University of New York, Albany	1	Whiteface Mtn., near Wilmington, NY	44° 23.5', 73° 51.5'
Department of Ecology and Systematics, Cornell University	2	~15 km west of Ithaca, NY	~42° 50', ~75° 30'
Department of Meteorology, Pennsylvania State University	3	5.5 km west of State College, PA	40° 47.5', 77° 57.5'
Department of Environmental Sciences, University of Virginia	4	~1 km west of Charlottesville, VA	~38° 05', ~78° 30'

WHITEFACE MOUNTAIN, NY (SITE NO. 1)

The collection site is located at the Whiteface Mountain Field Station of the Atmospheric Sciences Research Center, State University of New York at Albany, at the approximately 600 m elevation level of Whiteface Mountain. The site is a 75 by 20 meter clearing in a forest of 5 to 10 m high trees, with a steep slope on one side. The Field Station buildings are located about 75 m downslope from the site, where oil and propane furnaces are the major potential pollutant sources. No other buildings or unnatural sources are located within about 5 km of the site. A careful examination of the potential effects of the buildings on the collected precipitation (i.e., by comparison with samples collected at other locations nearby, but far from buildings) has not been done, chiefly because of the rather dense forest in the area with few clearings suitable for collection. Past work, comparing rain and cloud water pH between the site and at the top of Whiteface Mountain (elevation 1480 m) indicates considerable apparent elevation differences in the character of the precipitation chemistry in the area.⁶ Thus, evaluation of the site by comparisons with nearby collections may be difficult. The site contains a complete weather station with recorded wind, temperature and precipitation data; a comparison of collected sample concentrations with wind direction during sampling (whether the site was upwind or downwind of the buildings) is planned.

ITHACA, NY (SITE NO. 2)

The selected site was one of the three potential sites located a few miles from one another about 15 km west (normal upwind direction) of the Ithaca urban area. The general character of the area is rolling, wooded hills with occasional non-commercial farms; roads nearest the sites (within

about 100 m) are infrequently traveled country roads. Bulk sampling (of both dry and wet deposition) was conducted at the three sites, and pH and conductivities compared. The site selected for the network was chosen on the basis of agreeability with local precipitation chemistry (considerable experience in the area exists⁷) and accessibility and availability of electric power. The network site is located in a clearing on a slope surrounded by about 10 m high trees. The nearest house is downslope (and generally downwind) about 300 m away.

PENN. STATE, PA (SITE NO. 3)

The network site is located 5.5 km west of State College (and Pennsylvania State University campus) and about 1 km south of the nearest small residential communities. The predominant wind direction is from the SSW, the direction of least agrarian or developed activity (state forest land). The nearest often-used road is about 3 km north, separated from the site by forested terrain.

The site is a clear-cut area of 150 by 150 m surrounded by forested state game preserve land. On the site is located a grid network of 15 m high masts used to support radio antenna cables; the exact location of the collection equipment was chosen to be least affected by eddying about the radio masts. No satellite sampling has been performed in the area. The selection was based on a careful study of wind conditions and potential local sources of pollution.

VIRGINIA (SITE NO. 4)

The permanent network site chosen is located within 2 km of the city of Charlottesville, but the influence of the city is deemed to be small because of the lack of industry. The nearby terrain is a farm owned by the University of Virginia.

The selection of the site was based on an examination of three years of wind trajectories, its removal from local pollution sources, accessibility, and no prospects for land development in the area. Satellite sampling with bulk collectors at six surrounding sites was performed to test the assumption that the network site is suitably unaffected by local sources. Results of these tests show that the assumption is correct.

SITE ACTIVATION

The collector equipment operated at the network sites is described in detail in Section 3. Table 3 is a list of the times of commencement of sampling with the two types of collectors. The delay in beginning sampling at Site 2 was due to difficulties in installation of electric power at the site. Site 4 was not activated until December because of a decision to select a new site after the initial installation was made, plus delays in installing power. The BNW collectors were installed in August 1976; the HASL wet-dry collectors were delivered at later dates. One collector comparison study was conducted at Site 4 only, where two Battelle collectors were installed -- one with a water rinse of the funnel between samples, and one with complete acid washing and water rinsing of the funnel between samples. Results of the HASL-BNW concentration and other comparison tests, and an examination of the chemistry of the water rinses at all sites are described in Section 7.

TABLE 3
Dates of Sampling Commencement

Site	Date of First Sample	
	BNW Collector	HASL Collector
Whiteface (#1)	October 11, 1976	December 21, 1976
Ithaca (#2)	October 26, 1976	January 4, 1977
Penn. State (#3)	September 22, 1976	January 26, 1977
Virginia (#4)	December 12, 1976	January 18, 1977

SECTION 3

PRECIPITATION SAMPLING EQUIPMENT

One of the earliest priorities of the precipitation chemistry network program was the selection of basic collection equipment. Review of a comprehensive precipitation collector-comparison study⁸ and inspection of some of the available collector configurations led to a decision to develop a new type of collector for use on the MAP3S network. None of the existing units appeared to satisfy the particular requirements of the MAP3S network (listed in Section 1), in particular the focus on the sulfur compounds, which include the volatile species sulfur dioxide.

In the past, too little consideration has been given the possibility for significant deposition of dissolved sulfur dioxide (sulfite^{*}) in the northeast U.S. region. All previous regional precipitation chemistry monitoring projects have, at least implicitly, assumed that at the time of deposition, the exclusive sulfur oxide was sulfate, as sampling procedures have not allowed for the preservation of the sulfite species until chemical analysis was performed. An extensive power-plant plume study at the Keystone plant in Pennsylvania⁹ and additional experiments and modeling of SO₂ scavenging^{10,11} have resulted in the conclusion that significant sulfite can be found in precipitation where significant air concentrations of SO₂ exist, with or without the presence of a distinct plume of SO₂. More recent monitoring of sulfur levels in rain in an industrial area of England has led to similar findings¹².

* In its dissolved form, SO₂ exists as several distinct species, including SO₂, HSO₃⁻, and SO₃⁼. The terms "dissolved SO₂" and "sulfite" herein refer to the total of all sulfur species in the reduced or +4 oxidation state.

Under conditions where the vertical gradient of SO_2 concentration is small (generally beyond a few km from the source), the concentration in rainwater is the product of the air concentration and a solubility parameter ("equilibrium scavenging"). For the case of low-concentration SO_2 , laboratory experiments¹³ have shown that the solubility parameter is not a constant, but is a rather complicated function of air concentration, precipitation free acidity (pH), and temperature. Knowledge of these variables in a region -- such as the northeast U.S. -- allows estimation of the sulfite concentrations in precipitation over the region. Unfortunately, there are few of the above data for the MAP3S region, but a rough estimate was made, shown in Figure 2, where sulfite deposition is expressed as the fraction of deposited sulfur.⁴

To sample volatile pollutants in precipitation, there are several processes which may go on to affect preservation of the at-deposition character of the precipitation chemistry. The pollutant of interest may:

- Dry deposit from, or revolatilize to the gas phase;
- React chemically prior to analysis; or
- Attach to collection surfaces.

The ways which these processes may be avoided in precipitation sampling are discussed in detail elsewhere.⁴ Specifically, the Battelle wet deposition-only collector was designed to handle these problems better than other sampler units readily available at the time.⁸

BNW COLLECTOR DESIGN AND CONFIGURATION

Attempts to solve the volatile-species collection problems listed above took the form, in the present BNW unit, of the following features:

Figure 2. The estimated ratio (expressed as percent) of sulfite to total sulfur in rainfall, for $T = 25^{\circ}\text{C}$ and ($T = 0^{\circ}\text{C}$). The air concentration of SO_2 is taken as $10 \mu\text{g}/\text{m}^3$, and the total sulfur content of rainfall as $25 \mu\text{moles}/\ell$. The contours are the pH contours of Likens⁷, drawn from 1972-1973 precipitation data.

- Funnel and bottle collector assembly (with a narrow passage for gaseous transfer) to essentially eliminate desorption and absorption effects on the volatile species content of the collected sample.
- Provision for conditioning the collected sample (either freezing or cooling below ambient) to preserve the dissolved species; i.e., an internal controlled environment for the collector bottle.
- Use of polyethylene sample-contact surfaces. (This follows from considerable evidence that such surfaces were the best for collection of inorganic species,^{4,8} rather than any original considerations.)

In addition, since the project objectives apparently required development of a new type of collector, every effort was made to avoid the mechanical operation problem areas and generally unsatisfactory design features of existing sampler types.

Figure 3 is a schematic of the basic structure of the collector, and Figures 4-8 are various views of the components and the unit in operation. For purposes of description, the collector can be separated into three functional systems: the rain sensor and controls (electronic), the lid mechanism (mechanical), and the precipitation collection and housing (collection).

The electronic system consists of the rain sensor unit, mounted at the side of the collector, and the electronic circuitry, located inside the lower housing. The rain sensor (Figure 4), which is of the same design as that used by the HASL collector (see below), has two stainless steel grids mounted parallel with -- at a spacing of about 1 mm -- stainless steel plates. Bridging of the gap between plate and grid by liquid water completes a circuit which activates the lid opening mechanism. Subsequent drying of the gap after

Figure 3. Schematic of the Battelle Precipitation Collector

Figure 4. Rain sensor unit of Battelle collector.

Figure 5. Interior of mechanical housing of Battelle collector.

Figure 6. Exploded view of mechanical system of Battelle collector

Figure 7. Battelle collector with lid open.

Figure 8. Battelle collector with lid closed.

the precipitation event results in closing of the lid. Two thermostatically controlled heaters inside the sensor box facilitate sampling of frozen precipitation and rapid drying of the grids at the end of precipitation. Under fair weather conditions (lid closed), a temperature of about +2C is maintained. This temperature will allow frozen precipitation alighting on the grid to melt, but is not so high that the water will vaporize before the gap is bridged. Once the lid is opened, a second heater is activated. This heater maintains a temperature of about 38C, which is sufficient to melt accumulating frozen precipitation; thus the grids do not become so overloaded with solid that the lower temperature heater could not melt. After the end of precipitation, the higher temperature clears the grids until the sensor circuit can be opened, leading to lid closure. Then the lower temperature condition is restored. The sensor is mounted about 75 cm from the main structure of the collector so that splash from the sensor does not enter the collector, and so that the sensor is not generally sheltered from precipitation.

The electronic circuit which controls the above operation has been designed to include a time delay (about 60 seconds). This eliminates the effect of a momentary grid short which would put the lid opening mechanism out of phase. This delay works only on the opening cycle of the mechanism. When one of the sensor grid pairs is shorted, the electronic circuit applies power to the lid opening motor and activates the higher temperature sensor heat. After the precipitation event (or immediately, if the grid shorting was momentary), the circuit activates the motor in the closing mode. Micro-switches in the mechanical system (see below) dictate either opening or closing phase. A more detailed description of this improved and updated rain sensor circuit will be available in a forthcoming report.

The mechanical system in place is shown in Figure 5, and in exploded view in Figure 6. The lid is opened by a chain drive and sprockets, one of which contains a clutch to prevent overloading of the motor in the event of a freeze-up. The power is transmitted through a shaft to the lever arms which move the lid. The microswitches stop the lid motion in either direction, and phase the operation through relays in the control circuit. A third microswitch mounted on the shaft provides an event signal to record the times of lid opening and closing. The lower limit of the lid's travel is set as low as possible, to limit the chance that splash from the opened lid will enter the collector (see Figure 7). The inner surface of the lid is also positioned so that precipitation will run off during the sampling. The lid is padded to make a firm seal with the funnel and is covered with a replaceable polyethylene cover for cleanliness.

The sample is collected in a 25 cm diameter polyethylene funnel. The funnel has a relatively long (33 cm) vertical extension so that the collection surface will be sufficiently above all horizontal surfaces to reduce the chance of contamination by splashing. The top of the funnel has a lip which covers the top of the metal funnel housing when in place. The polyethylene bottle is attached tightly to the funnel with a threaded TFE connector. A laboratory jack supports the bottle and allows smooth vertical motion for bottle replacement.

The entire unit is enclosed and fabricated around a commercially available fiberglass rain gauge shell purchased from the Weather Measure Corporation. The enclosure has been modified extensively to accommodate the large polyethylene funnel and the lid opening hardware. The lower, cylindrical section of the housing (detachable) is insulated with 3.5 - 5 cm of expanded polystyrene, and the access door is

weatherstripped to allow control of the sample bottle environment.

As noted above, it is desirable for the preservation of volatile and reactive species in the collected sample to provide a cooling mechanism during the warm seasons. Initially, a freezing mechanism was designed and partially developed to provide this special environment. Considerable progress was made in the development of a thermoelectric freezer, but it was found to be largely impractical for routine Network use because of the large power requirements and the need for a massive heat sink maintaining precise thermal contact with the collector bottle. At any rate, the experiments described in a later section of this report showed that cooling to near freezing temperature would probably be as good as freezing.

Accordingly, a refrigeration mechanism, shown in schematic in Figure 3, was developed and tested, and at the time of this writing, installed at a limited number of the sites for field testing. The system consists of a standard refrigeration-type compressor, connecting hoses, and a specially built coil mounted in the sample bottle section of the collector. Early tests showed that a temperature range between 3.5 and 5.5C could be easily maintained in the chamber when ambient temperatures were in excess of 38C for long periods.

The Battelle collector is built with operating components in a modular structure so that repairs of malfunctioning parts can be accomplished by simple replacement of components. Nearly a year's experience has shown that down time can be held to a minimum in this way, as long as replacement components are available at the sites.

ADDITIONAL SITE EQUIPMENT

At each of the four network sites are located, in addition to the Battelle collector, a HASL-type collector and a tipping bucket precipitation gauge. The HASL collector, shown in Figure 9, has been judged one of the most reliable wet-dry deposition collectors.⁸ Because of the new design and (at the time) untested reliability of the Battelle collector, it was deemed desirable to use the HASL collector at each site, as a backup collector, and also for direct comparisons of concentration data from the two collectors under precipitation-event sampling conditions. Results of the comparisons are described in a later section of this report. The precipitation gauges at the sites provided time records of precipitation events, and a standard precipitation measurement for evaluation of the collectors' collection efficiencies.

Figure 9. The ERDA Health and Safety Laboratory (HASL) precipitation collector.

SECTION 4

FIELD PROCEDURES

The participating groups at the network sites (listed in Table 2) maintain the sampling equipment, collect precipitation event samples, and ship aliquots of the samples to the Battelle laboratory for chemical analysis. Considerable latitude is allowed the individual site operators in defining a precipitation event. In general, it means a period of precipitation which is isolated in time in terms of synoptic weather patterns. These events can be quite clearcut during wintertime frontal storm situations, but in the case of convective activity, where showers may be isolated but frequent and of short duration, it becomes impractical to sample each short-term event. Thus, a 24-hour minimum as a period for sampling has been set. Site operators have the option of sampling more frequently if desired, or extending the sample beyond the normal daily pickup time if precipitation is continuing or apparently only briefly suspended.

The procedure for collecting a sample and preparing for the next at the collection site is as follows. The operator carries to the site replacement containers for BNW collector sample collection and collection of the funnel rinse, a replacement HASL collector container, and wash bottle(s) with about 2 l of deionized water for funnel rinsing. If any measurable precipitation has occurred since the last visit, and/or if the BNW collector has opened (whether or not there is visible collected precipitation), the sample containers are changed on both the HASL and BNW collectors. The site raingauge record and the event record of BNW collector lid opening provide the information for this decision. The BNW collection bottle (1.9 l) is removed, immediately capped and marked with the collection date, time and site code. A

similar container is attached to the funnel, and the funnel is rinsed thoroughly with about 2 l of deionized water. The collected water is saved. Then a new collector bottle (pre-rinsed with deionized water) is attached, the lid cover is replaced if soiled or torn, and the BNW collector is returned to the automatic sampling mode. The HASL wet-deposition collection bucket is replaced with a new, pre-rinsed one. Information required for the field data log form (see below) is recorded.

For snow or other frozen precipitation collection, the procedure is the same, except that if the funnel contains a significant amount of snow or ice (relative to that collected in the bottle) the funnel is covered by a plastic bag, and the entire funnel-bottle assembly is taken to the site laboratory for room-temperature melting into the bottle and subsequent funnel rinsing.

At the site laboratory after weighing of the samples, aliquots of each sample and the funnel rinse - of sufficient volume for pH measurement - are taken and the pH and temperature of pH measurement are recorded. At this time, or later, when sufficient samples are collected to make a shipment (the samples stored in the meantime at refrigerator temperature), additional aliquots of the samples are placed in 250 ml polyethylene shipping bottles. The amount shipped is determined according to the following scheme: if the total sample volume (after pH measurement) is less than about 10 ml, it is discarded or used locally. If the sample volume is between 20 and about 750 ml, 250 ml is sent (one bottle). If the sample is larger than about 750 ml, 500 ml (2 bottles) are sent. Any remaining sample is used for local analyses or discarded. Only 250 ml of the BNW funnel rinse are shipped. Shipments are made approximately weekly, or when a shipping boxful is accumulated (about four precipitation events).

At the time of shipment, which is made by air freight, the site operator mails separately an "Embarkation Form", a sample of which is shown in Figure 10. This form informs the laboratory that a shipment has been made, so that any lost shipments may be traced. At about the same time, the site operator also mails a filled-out data log form such as that shown in Figure 11.

The site operators also are responsible for routine maintenance of collector equipment, and for informing Battelle personnel of any needed repairs, replacement parts, or sampling equipment.

Form Date October 15, 1976

MAP3S PRECIPITATION CHEMISTRY NETWORK

SHIPPING EMBARKATION FORM [ATTACH COPY OF LOGBOOK ENTRIES]

Site NAME and NUMBER VIRGINIA - SITE 4

Date of Shipment 8/8/77 Name of Shipper JACK COSBY JESS PARKER

Carrier Piedmont Air Freight Number of Sample Boxes 2

Period Covered by Samples 7/26/77 (2100Z) - 8/4/77 (1230Z)

Sample I.D.*	Volume ml	Volume Of Aliquot ml	Remarks
080340	171	~ 150	
080341	260	~ 240	
080342	176	~ 150	
080343	~1000	250	
080344	~1000	250	
080440	622	500	in two 8g bottles
080441	890	500	"
080442	623	500	"
080443	~1000	250	
080444	~1000	250	

* Site # - Sample #, Code
e.g., 1-23 BR

Codes B - Battelle Wet-only
BR - " " " Rinse
HW - HASL Wet
HD - HASL Dry
BL - Lid Integrity Sample

Total no bottles = 13

Figure 10. Sample filled-out Embarkation Form

Site # 3 Date 20 JUL 77

Sample Number (Site # - code)	3-96B	3-97B	3-98B	071830	072030
Date/Time ^a Setout	9 JUL 77 / 1638Z	10 JUL 77 / 1424Z	12 JUL 77 / 1803Z	18 JUL 77 / 1326Z	19 JUL 77 / 1322Z
Date/Time ^a Recovered	10 JUL 77 / 1424Z	12 JUL 77 / 1324Z	13 JUL 77 / 1725Z	18 JUL 77 / 1308Z	20 JUL 77 / 1253Z
	77071030	77071230	77071330	✓	✓
Sample Volume Collected, ml	193.8	190.2	284.0	549.9	524.9
Total Time of Precipitation, hrs.	0.25	1.17	0.67	1.33	2.67
Precipitation, cm	0.61	0.48	1.12	2.01	1.88
Predicted Volume ^b , ml	299.4	235.6	549.8	986.7	922.9
Number of Lid Openings	2 #	2	2	8	2
pH	3.98	4.01	3.58	3.57	3.58
pH Temperature, °C	25	25	25	25	25
Approximate Rinse Volume, ml	~2000	NSC	~2000	~2000	~2000
Rinse pH	6.40	NSC	5.44	5.21	5.58
Rinse pH Temp. °C	25	NSC	25	25	25

REMARKS (and on back, if necessary):

- 1) BNW SAMPLER W/ LIGHTNING DAMAGE INDIRECT @ ~1804Z, 11 JUL 77 & OUT OF OPERATION — RAIN EVENTS NOT SAMPLED: 21 12 JUL 77: 7.4 MM, INTERMITTENT SHOWERS: 0530Z — 0915Z
 - 2) 3-98B W/ SOME INSOLUBLE PARTICLES
 - 3) SAMPLE # 071730 — ISA
 - 4) SAMPLE # 071930 — ISA
 - * 5) SAMPLE # 072030 W/ INSECT REMAINS
- AUG 30 1977

Figure 11. Sample filled-out Collector Site Data Log Form

SECTION 5

LABORATORY PROCEDURES

The responsibilities of the laboratory organization, Battelle, Pacific Northwest Laboratories, include: receipt and cataloging, chemical analysis and storage of precipitation samples; maintenance of quality control records; and coding and reporting of concentration results on a monthly and annual basis. In addition, all sampling equipment is ultimately maintained (by exchange of components with the sites), and sampling materials are precleaned and distributed by the laboratory organization.

SAMPLE HANDLING

Precipitation samples are shipped by air freight to the Battelle Laboratory in Richland, Washington, in commercial-type insulated shipping boxes. Under normal conditions, the samples arrive from 2 to 5 days after departure from the sites. Of the approximately 75 separate shipments during the period September 1976 - July 1977, only 1 was lost, and none of the others arrived in such a condition that the samples were unusable.

Shipments received are recorded on a "Debarkation Form" similar to the Embarkation Form illustrated in Figure 10. These forms then provide assurance of receipt of all samples and a record of the transit time. The samples are recorded on an "Analysis Checklist" which contains a numbered "Group" of 20 samples. The samples are listed in the order of their arrival; subsequently, chemical analyses are performed and data are logged and reported in the same order. The arrival; subsequently, chemical analyses are performed and data are logged and reported in the same order. The Analysis Checklist form contains sample volumes, dates of analyses, and (on a duplicate) results of chemical analyses. A sample of one such filled-out form is shown in Figure 12.

CIRCUIT #: PC28 INITIATOR: 7/27 DATE: 7/27/77

PC NETWORK CHECKLIST

SITE #	I.D.	BOTTLE TYPE	START Vol (ml)	pH	CONDUCTIVITY	SO ₃ ⁼	SO ₄ ⁼	NH ₄ ⁺	NO ₂ ⁻	NO ₃ ⁻	Cl ⁻	PO ₄ ³⁻	Na ⁺	Mg ²⁺	Al ³⁺	K ⁺	Ca ²⁺	TTT (mg/L)	END Vol.	THROWN OUT?
3	988	A	~210	3.68	80		99	31.		51	12	4.4					7707	1330		
074	1830	A	Full	3.56	110		125	26.		61	19									
07	2030	A	"	3.58	100		123	31.		56	15									
071	140	A	~90	3.58	110		116	50.		90	15									
071	141	A	125	3.55	120		120	42.		97	34									
071	142	A	~80	3.57	120		122	55.		93	24									
072	240	A	Full	3.68	80		138	24.		37	30									
072	241	A	"	—	—		90	25.		37	8.6									
072	242	A	"	3.66	86		99	30.		36	25									
072	220	A	~125	—	—		41	26.		35	8.6									
072	221	A	~200	4.09	39		46	29.		45	6.1									
072	621	A	~200	3.88	54		55	13.		31	12									
071	820	A	75/370	3.68	90		127	18.		54	13									
071	821	A	175/540	3.68	86		127	23.		58	12									
072	020	A	150/480	3.46	140		233	45.		60	18									
072	021	A	200/480	3.46	120		233	45.		63	17									
072	110	A	265/530	4.02	46		70	31.		39	5.4									
072	111	A	265/530	3.97	50		71	33.		39	23									
072	510	A	89/89	3.70	85		91	28.		58	21	1.1								
072	511	A	132/132	3.77	76		81	23.		50	14	4.4								

A A-302 (3g) 3/2/77
 B-1602 (6g)
 C-3202 (10g)

LEGENDS:

X	Anal. Done on Date at Top
(Date)	" " " This Date
-	Not Done yet
NE	Not Enough
-	Don't Do

NEW FORM FEB 16 1977 Amu

Freezer Location: _____

Date Frozen _____
 " Recovered _____
 " _____

Figure 12. Sample filled-out Analysis Checklist Form

For samples contained in more than one shipping bottle, one is placed in frozen storage; duplicates and single-bottle samples are refrigerated in the assigned groups. Samples then are maintained at refrigerator temperature until all analyses have been performed, then remaining volumes are frozen for long-term storage.

Chemical Analyses

The pollutant species routinely analyzed are listed in Table 4, along with the general methods used and status of the analysis procedure. The complete list was chosen originally to represent the major inorganic species to be found in northeastern United States precipitation. The need for extraordinary sampling methods⁸ and the desire for promptness of analysis did not allow for examination of trace metals or organic species. All remaining samples are maintained, however, for possible future analyses. Some of the species originally intended to be examined were not done or only partially done on the samples collected during the first year. Some Na^+ and K^+ were done using flame emission mode atomic absorption spectrophotometry. The sensitivities obtained were not satisfactory, and these analyses were suspended pending repair of the Perkin-Elmer Model 306 unit and adaptation to the absorption mode. For these reasons also, Ca^{+2} , Al^{+3} , and Mg^{+2} were not examined for any samples. It is anticipated that some of the stored samples will be so studied later. In addition, a second ion chromatograph was obtained at the close of the report period which is intended to analyze the cations NH_4^+ , Na^+ , and K^+ . The titration methodology was not developed to a stage where analyses could be performed routinely at the time of this writing.

Table 4

Chemical Species and Analysis Methods

Species	Method ^a	Reference	Minimum Detection Limit ^b μmoles/l	Instruments	Samples Completed ^c
H ⁺ (free)	Electrode	---	---	Orion 801A, Combination Electrode	All
Conductivity	Conductivity Bridge & Cell	---	---	Beckman RC-16C Bridge, Yellow Springs 3403 Cell	All
SO ₃ ⁼	AWC	14	0.1	Technicon Auto Analyzer	All
SO ₄ ⁼	IC	---	0.2	Dionex System 10	All
NH ₄ ⁺	AWC ^d	15	0.6	Technicon Auto Analyzer	All
NO ₂ ⁻	AWC	16	0.07	Technicon Auto Analyzer	All
NO ₃ ⁻	IC	---	0.2	Dionex System 10	All
Cl ⁻	IC	---	2	Dionex System 10	All
PO ₄ ³⁻	IC	---	0.2	Dionex System 10	All
Na ⁺	AA ^{de}	17	0.2	Perkin-Elmer 306	Part

Table 4 (Continued)

Species	Method ^a	Reference	Minimum Detection Limit ^b moles/l	Instruments	Samples Completed ^c
Mg ⁺⁺	AA	---	---	Perkin-Elmer 306	None
Al ³⁺	AA	---	---	Perkin-Elmer 306	None
K ⁺	AA ^{de}	17	0.2	Perkin-Elmer 306	Part
Ca ⁺⁺	AA	---	---	Perkin-Elmer 306	None
Acidity/ Alkalinity	Titration		---	Orion 801A Combination Electrode	None

^aAWC, Automated Wet Chemistry; IC, Ion Chromatography; AA, Atomic Absorption Spectrophotometry.

^bBest obtained - Some analysis sessions result in higher minimum detection limits. These are noted, where relevant, in the Appendix.

^c"All" - Essentially all samples collected through June 30, 1977.

"Part" - Some of the above group analyzed.

"None" - None of the above group analyzed.

^dAnalysis by IC expected by the time of this report publication.

^eFlame Emission Mode for concentrations listed in the Appendix. Change to absorption mode is being done at the time of this report.

Ion Chromatography

The major anions $\text{SO}_4^{=}$, NO_3^- , and Cl^- , plus PO_4^{3-} , are analyzed using a Model 10 Ion Chromatograph (Durrum-Dionex, Sunnyvale, California). A brief description of the instrument and the technique will be given here to help familiarize the reader with this new instrument.

The Dionex Model 10 ion chromatograph combines the widely used ion-exchange method of analysis with liquid chromatography and conductometric detection techniques. It consists of a separator or analytical column which separates each of the species present in the sample according to its affinity for the solid support in the column, the charge of the ionic species, and the eluent. This part of the system is basic liquid chromatography with water being the solvent for the eluent and samples. Beyond this, the difficulty in doing ion chromatography is not the separation of the species but their detection and analysis after removal from the separator column. In the Dionex ion chromatograph, the second column suppresses the eluent to a low background level by converting the charged eluent ions into a salt. Once the background eluent is suppressed and adjusted for on the conductivity meter, the conductance measured is due to sample ionic species being eluted from the analytical column. The concentration of these individual species is directly proportional to their conductivity. The conductivities of the samples and standards are graphically recorded using a 1-volt output recorder. From these graphs the peak heights are measured from the baseline and then converted into concentrations by the method discussed below. There are other methods for determining concentration besides peak height, but this method has been proven to be the best, quickest, and most reproducible by several laboratories in the United States.¹⁸

The detection ranges for the species of ions of interest to the MAP3S precipitation program using the ion chromatograph are better than or equal to other methods of analysis. The upper range for most species is approximately 50 ppm. At this point the conductivity reaches a plateau and, for higher concentrations, standards must be used for frequent calibrations. The lower detection limits for NO_3^- , SO_4^{2-} , PO_4^{3-} , and Cl^- are $0.2 \mu\text{mol/l}$, $0.2 \mu\text{mol/l}$, $0.2 \mu\text{mol/l}$, and $2 \mu\text{mol/l}$ or approximately 10 ppb, 10 ppb, 10 ppb, and 50 ppb, respectively. These lower limits are obtained using the eluent 0.003 M NaHCO_3 and $0.0025 \text{ M Na}_2\text{CO}_3$. The pump pressure is 450-500 PSIG, the flow rate is 2 ml/min, and the conductivity scale is $0.3 \mu\text{mho/cm}$.

There is little or no sample preparation necessary. The one preparation recommended is to add a measured amount of $0.003 \text{ M HCO}_3^- / 0.0025 \text{ M CO}_3^{2-}$ to 2 ml of sample to bring the background conductivity of the sample to that of the eluent being used. If this is not done, immediately before the Cl^- peak, and sometimes totally covering it, there is a negative water peak. This is caused by the sample water going through the detector but not mixing with the eluent. If this is not controlled, the Cl^- ion concentration obtained can be totally different from its true value. No other sample preparations have been found necessary for analysis of the four species of concern here.

With the samples are run standards for daily calibration. A series of standards covering the expected range of sample concentration, usually 0.5 ppm to 5 ppm, is used. The concentration as a function of peak height is graphed and/or a regression analysis is used to find the slope and intercept of each standard species. From this graph or least square fit slope and intercept, the sample concentrations are calculated using their peak heights. Using some of the slopes

tabulated in the above manner during the current analysis period, the averages have been 0.32 ± 0.02 for NO_3^- and 0.26 ± 0.01 for $\text{SO}_4^{=}$, for approximately 50 random standards. Deviations occur in the slopes relative to the age of the columns and their condition on any given day. The same samples analyzed 3 months apart showed negligible deviation in concentration using the above method. For example, on 22 July 1977, a sample was determined to contain 12 ppm $\text{SO}_4^{=}$, 9.6 ppm NO_3^- and 0.36 ppm Cl^- . Previously on 11 April 1977, the concentrations were calculated to be 12 ppm $\text{SO}_4^{=}$, 10 ppm NO_3^- , and 0.37 ppm Cl^- .

In Figure 13 a typical chromatogram of a precipitation sample is given; this one is the sample from Site 3 for 6 May 1977. The concentrations of the species present are 91 $\mu\text{mol}/\ell$ $\text{SO}_4^{=}$, 84 $\mu\text{mol}/\ell$ NO_3^- , and 4 $\mu\text{mol}/\ell$ Cl^- . Figure 14 is a chromatogram of a standard containing 0.1 ppm Cl^- , 0.5 ppm PO_4^{-3} , 0.5 ppm NO_3^- , and 0.5 ppm $\text{SO}_4^{=}$. Figure 15 is a chromatogram of higher concentration standards; these are 5 ppm F^- , 10 ppm Cl^- , 10 ppm NO_2^- , 50 ppm PO_4^{-3} , 30 ppm NO_3^- , and 50 ppm $\text{SO}_4^{=}$.

Automated Wet Chemistry

Standard automated methods are used with Technicon Auto-analyzers for analysis of NH_4^+ , NO_2^- , and $\text{SO}_3^{=}$. These methods, referenced in Table 4, all involve colorimetry; the Beers law relationship holds:

$$C = -b \ln T \quad , \quad (1)$$

where C is concentration, T is the transmissivity, and b is normally a constant. Typical values for b in $\mu\text{moles}/\ell$ are 60, 7, and 20 for NH_4^+ , NO_2^- , and $\text{SO}_3^{=}$, respectively. These values vary from day to day, mainly because of reagent variations. For a nominal maximum detectable transmissivity of 0.99, the above typical b's translate into minimum detectable

Figure 13. Sample ion chromatogram for precipitation sample of Site 3, 6 May 1977.

Figure 14. Sample ion chromatogram for low concentration standard (see text for concentrations).

Figure 15. Sample ion chromatogram for high concentration standard (see text for concentrations).

concentrations of 0.6, 0.07, and 0.2 $\mu\text{moles}/\ell$, or 10 ppb NH_4^+ , 3 ppb NO_2^- , and 15 ppb $\text{SO}_3^{=}$.

There are three main sources of uncertainty in determination of concentrations by colorimetry: reproducibility, baseline drift, and changes in chemistry due to reagent aging. These are of course not independent, but generally the first results in a $\pm 5\%$ uncertainty in b , the second limits accuracy of determinations of low concentrations to $\pm$ the minimum detectable value, and the third results in a variable uncertainty which is determinable, but not often practical to do so. Therefore, the uncertainty in concentration values is conservatively placed at $\pm 10\%$, or the minimum detectable value, whichever is larger.

pH and Conductivity

The free hydrogen ion concentration is determined by use of a digital specific-ion meter and a combination pH electrode, calibrated with standard buffers at pH 4 and 7. Because of the generally poorly buffered nature of precipitation samples, it is important that a well-defined method be consistently followed. The method used here is adopted from Galloway and Likens.¹⁹ The electrode is inserted into an approximately 20 ml aliquot of the sample (not used for any subsequent analysis) and allowed to stand without agitation until a stable reading is obtained. The length of time required has varied from 1 to 20 minutes, and the final reading taken is that which remains steady for about one minute, or is the center reading of oscillations, generally $< \pm 0.02$ pH units. Because of the time consuming nature of this analysis, and need for continuous monitoring of the meter, readings are often taken at random after the drift of the reading has slowed, but not necessarily stopped. Thus, the uncertainty in pH reading is set conservatively at ± 0.05 pH unit, or $\pm 10\%$ at pH = 4. Most samples with pH < 4 come to a stable reading

in a short time, so $\pm 10\%$ is considered a fair uncertainty for these samples as well.

The total conductivity is read with a standard bridge and platinum conductivity cell. Calibration of the cell is done with a KCl stock solution of about 1400 $\mu\text{mho/cm}$, diluted to about 10, 20, 30, and 40 $\mu\text{mho/cm}$, plus the conductivity of the deionized water used. This analysis is performed on the pH aliquot, before pH measurement. Occasional samples are rechecked for conductivity (especially those with a long pH determination time) to ascertain if any significant chemical change has resulted from the pH measurement.

Atomic Absorption Spectrophotometry

A Perkin-Elmer Model 306 Atomic Absorption instrument was used for the analysis of Na^+ and K^+ . The flame emission mode of the instrument was used for both elements. The most sensitive emission wavelength for sodium is 5890.0Å and for potassium is 7664.9Å. An air-acetylene flame was used for both elements. A recorder with a 10mV input was used. Both Na^+ and K^+ can have decreased sensitivity due to ionization of the element in the flame. This can be almost eliminated by addition of other alkali salts in concentrations of 1000-2000 ppm to both sample and standard. In this case, 1000 ppm K^+ was added for Na^+ analysis, and 1000 ppm Na^+ was added for K^+ analysis. The standards were prepared using solutions of the appropriate salt. To 2 ml of sample was added 0.020 ml of 10% salt solution, either K^+ or Na^+ , depending on what was being analyzed. Standards were analyzed every 5-10 samples, and sample concentrations determined from peak height. Due to sensitivity problems with the instrument being used, the lower detection limit for both elements was 0.05 ppm.

SECTION 6

DATA REPORTING

A FORTRAN computer code (PRENET) has been written to process the data from the laboratory analyses of precipitation samples collected on the MAP3S network. The raw data, which are entered in a somewhat random manner, are ordered by collector location and by date. Once this has been done, the data are listed in tables, and may also be punched on cards in a more compact format. The printed output can be obtained either on a standard line printer or on microfiche. The program-produced ("reduced") data cards are more convenient to store than the original ("raw") data cards. In addition, they can also be used as input to the program to obtain data lists covering specific time periods and to perform any desired calculations on the data.

Figure 16 is a schematic flowchart of the code. The mode of operation of the program is determined by whether the data input is "raw" or "reduced". This determination is made automatically by the program on the basis of the format of the first card read; subsequent cards are then read according to the appropriate format. The basic operations performed are similar for both modes except for this difference in the READ format used and the option to punch reduced data cards after raw data has been processed.

The data storage array is currently 10 by 21 by 31, allowing data storage for as many as 10 sampling locations, 21 species, and 31 days. This array can be easily redimensioned to accommodate more data if necessary.

The program code is broken into a number of subroutines, both for efficiency in handling the data and to make it easy to change various aspects of the routine. If, for instance, a modification is desired in the way the data are printed,

Figure 16. Schematic flowchart of PRENET Code.

the changes can be encoded in a subroutine and simply substituted for the current one of the same name. Communication between the various subprograms is done using several labeled COMMON blocks. Those parameters which the user may wish to change under various conditions are set in a BLOCK DATA subprogram. For instance, the collector location names and the names of the species are set in this section, as is the parameter which determines whether cards will be punched or not.

The printing of the data in tables is handled by five subroutines: TABLE1, TABLE2,...,TABLE5. A card placed before the data cards in the input deck gives values for five parameters which each determine whether a specific TABLE subroutine will be called. TABLE4 and TABLE5 are presently dummy subroutines which do nothing; as such, they could be replaced at some later date by subroutines which produce data tables in new formats. TABLE3 produces full tables of all data entered, by location, by date, and/or by species. The other two subroutines produce smaller tables showing what data are available but not giving actual values. The monthly reports issued to date in this program have included a table showing the locations and dates for which samples are available and tables of the actual analysis results by location and by species. More complete descriptions of the printout format will be given in the introduction to the Appendix.

SECTION 7

PRECIPITATION SAMPLING RESEARCH

During the first year of active sampling of precipitation on the Network, several special studies were conducted, investigating the properties of pollutant species relevant to sample collection and storage, and evaluation of the newly-developed Battelle collector. The procedures and results (some preliminary) of these studies are described in the following paragraphs.

VOLATILE POLLUTANT SAMPLING

As described in Section 3, the BNW collector was designed in large part as a more effective sampler for volatile species than alternative existing sampling equipment. A simple experiment was performed which confirmed the desirability of the use of funnel-and-bottle type collectors over open collectors. Distilled water, spiked to a concentration of about 10μ moles/l of SO_2 and adjusted to $\text{pH} \sim 4$ with HCl , was placed in containers of two types: one, a bucket of the same physical shape as that used in the HASL collector (Figure 9), and the other, a funnel and bottle arrangement similar to that of the BNW collector (Figure 3). These were allowed to stand in the outside environment at Hanford, Washington, where the atmospheric concentration of SO_2 was essentially zero, and the remaining SO_2 content of the solutions was measured at various times. Figure 17 is a plot of the ratio of subsequent concentration to initial concentration for one of three experiments, all of which had similar results. A decrease in sulfite concentration of 30% within the first hour is indicated for the open bucket, but a much slower rate for the funnel-and-bottle.

The rate of decrease is expected to vary widely with temperature, pH, and ventilation factors. The present experiments

Figure 17. Decrease in SO₃⁼ concentration in standard pH = 4.0 water with time for two types of precipitation collector. Samples initially spiked with 16.8 μmoles/l of SO₃⁼. Other data: temperature, 14°C; wind speed, less than 2.5 m/sec. After 24 hours, 63% of the original SO₃⁼ remained in the "funnel and bottle" sampler.

were conducted in essentially calm conditions at temperature about 15C. No determinations of sulfate levels were done to establish whether the decrease was due to conversion to sulfate or predominantly due to desorption of SO₂ gas. Later experiments examining preservation of sulfite in samples (see below) indicate, however, that the conversion rate under similar conditions is somewhat slower than the rate of decrease of sulfite observed for the open bucket.

Apparently the collector to be used on a regional network must be closed during dry periods, and the HASL collector has this feature, so that the fair-weather desorption of SO₂ in the experiments above should not occur with bucket-type open-close collectors. However, it is clear that rainfall collected with a certain level of SO₂ absorbed could be subject to desorption if the collector is opened for a subsequent rain event where the conditions are suitable (e.g., higher temperature, decreased pH, lower air concentration of SO₂). Similarly, conditions suitable for additional absorption of SO₂ could occur during the second and subsequent opened periods. It is likely that equilibrium will be reached during each opening of the collector, thus destroying any measure of the SO₂ concentration of the preceding precipitation events. The relatively large air volume of the bucket, compared with the bottle type collector, could lead to a variation in the equilibrium conditions inside the closed bucket between events (e.g., heating in the sun and subsequent increase in the gas-phase concentration) and a sudden change in SO₂ content of the collector on opening again (e.g., loss of gas-phase SO₂ previously collected as dissolved SO₂ if the ambient SO₂ level is low). These comments can be generalized to apply to other volatile species such as NH₃ and NO₂⁻ as well. A more complete discussion of sulfite and volatile species in general sampling can be found elsewhere.⁴

SULFITE PRESERVATION

Recognition of the transitory nature of the SO_2 -water situation requires also a consideration of proper conditions for preservation of the collected level of dissolved SO_2 . Desorption of SO_2 can apparently be controlled by confining the sample after collection, but conversion to sulfate can occur rapidly -- in a matter of hours under the proper conditions -- in untreated samples. Several experiments were performed to examine the conditions under which sulfite could be preserved in collected samples. It was expected that temperature of storage (given a fixed overall sample chemistry) is the most important variable to consider. Two samples, collected at the Network site in Pennsylvania, were doped with SO_2 gas. The chemistry of the samples is listed in Table 5. They were then stored in closed polyethylene bottles (about 100 ml in 250 ml bottles) at three temperatures -- $+23^\circ\text{C}$, $+2^\circ\text{C}$, and -20°C -- and analyzed for SO_3^- content at later times. Figure 18 is a plot of percentage of initial concentration for the various conditions.

TABLE 5
Chemistry of Rain Samples Used in
Sulfite Preservation Tests

Sample	Original Concentration ^a , moles/liter x 10^6					Sulfite added $\mu\text{moles/l} \times 10^6$
	H^+ ^b	NH_4^+	NO_3^-	SO_3^-	SO_4^-	
1	70	5.8	26	<.1	27	17.0
2	39	3.5	15	6.5	13	16.6

^aFrom analyses conducted December 1976. The actual original SO_3^- concentrations were possibly higher, as the preservation test results indicate.

^bFree hydrogen ions from pH measurement.

Figure 18. Results of sulfite preservation tests. Bars represent extremes of measurements on separate original aliquots. Lines drawn on +2C and -20C curves are best fit exponential decay.

The room temperature decay rate is quite fast, and unacceptable, but there appears to be little difference in the preservation of sulfite between the +2 and -20C cases. The reasons for the decrease in SO_3^- level for the frozen case were not clearly determined: a particular feature was the apparently rapid decrease at the beginning, indicating that the initial change of phase has a greater effect than length of time frozen. No effect was observed on the thawing end, as several identical samples were thawed and refrozen several times, thawed and frozen at various rates, and the time of initial thawing varied. The brackets represent the extremes of the measurements on these samples. Analysis of the samples for sulfate at the end of the experiments indicated that the decrease in sulfite for all temperature storage cases was due to conversion to sulfate, rather than SO_2 desorption.

The appearance that storage at refrigerator temperatures is just as good for preservation as freezing (at least for these particular samples) indicates the importance of cooling the samples immediately after collection, as normal Network operations do not allow for analysis within about two weeks. However, there is significant decrease within that period even for the refrigerated samples.

This present level of understanding of the sulfite preservation problem resulted in the following conclusions and resultant changes to Network operations:

- Samples must be cooled below ambient temperature immediately on collection. A BNW collector refrigeration method was developed and in use on the Network by the time of this report. The original more complicated freezing mechanism was scrapped, since handling of frozen samples is much more difficult and apparently unnecessary.

- Chemical fixing of sulfite is also required, in spite of the cooling. Aliquots of the samples are treated with tetrachloromercurate (TCM) solution immediately on collection of the sample. This fixes the SO_3^- in a mercury complex which is stable for a suitable period. Because of the length of time (up to 24 hours) between the precipitation event and sample collection, the cooling is still required. The aliquots are handled separately from the rest of the sample, and analyzed only for sulfite.

Experience with these procedures (expected to begin at about the time of this report's publication) will dictate whether they will need to be continued (i.e., if significant SO_3^- appears in the samples), or even similarly extended to other species whose post-collection chemical properties require them.

BATTELLE COLLECTOR RINSE ANALYSES

Approximately 50 of the deionized-water Battelle collector funnel rinse samples were analyzed for the major ionic species. The concentration levels of the rinses for all species were generally low, near the detection limits, so only the data for the most prevalent pollutant species, $\text{SO}_4^{=}$ and NO_3^- , were further analyzed. The ratio of *mass* of pollutant, in moles, collected in the rinse, to the total mass, in moles, collected (sample plus rinse) was calculated for each of the samples for which the concentrations had been determined to be significantly above detection limits for both sample and rinse. These ratios were plotted *vs.* sample volume. Although there is considerable scatter among these data -- mostly arising from the normal uncertainties in near-detection limit concentrations -- it was clear that there is little overall difference between the two species'

"rinsability", nor were there any systematic differences among the sites. The least squares fit to the data, for 56 sample pairs, was

$$R \sim 0.05 V_s^{-0.5} , \quad (2)$$

where R is the ratio of rinse mass to total mass, and V_s is the sample volume in liters. This represents an increase in the relative mass of pollutant left on the funnel as the volume of the sample decreases. This is expected, as the funnel's rather large surface area (cf. Figure 3) will collect an amount of precipitation before any is collected in the bottle, and this amount will be left on the funnel after the precipitation event ends. The mass of pollutant left on the funnel is larger than 10% of the total mass for samples of collected volume less than about 100 ml, or about 0.25 cm of precipitation.

If it is assumed that the *concentration* of pollutant in the water residing on the funnel at the end of an event is equal to that of the collected sample (in general, this means that the rain chemistry at the end of the event is the same as that of the whole event averaged -- obviously far from always the case), the volume of water residing on the funnel V_f would be

$$V_f = \frac{R V_s}{1 - R} \approx \frac{V_s}{20 V_s^{0.5} - 1} , \quad (3)$$

a slightly increasing function of the collected sample volume V_s . This is not surprising, as one would expect a slightly larger area of the funnel to be covered, as by splashing or variable winds, as the total amount of precipitation increases. For a sample of volume 100 ml, about 20 ml is

predicted to reside on the funnel; this increases to about 50 ml for a collected sample of 1 l. V_f should level off for some large V_s , but little data were collected for such large samples.

A laboratory experiment was conducted where a BNW collector funnel was wetted by simulated rain (from a hand sprayer), on one side -- simulating the effect of wind. The volume collected (runoff from the funnel) was measured and the volume remaining on the funnel was determined from the difference between total sprayed water and collected water. The results were surprisingly -- perhaps fortuitously -- close to those determined from the field data above, within about 10% for all V_s between 0.040 and 0.800 l.

Of course, one should not expect that the mean concentrations of pollutants will remain constant throughout precipitation events. This is probably the reason for the large scatter in the field data. It is clear, however, that there is a significant amount of precipitation remaining on the funnel when the volume of sample collected is below about 100 ml. If the precipitation concentrations of pollutants change widely during such a small event, it is possible that the collected sample will not represent the mean concentrations of the pollutants for the whole event.

The apparent efficacy of the rinse at removing pollutants from the funnel was further tested by doing several double rinses -- two consecutive one-liter rinses of the funnel -- at one of the sites. Both rinses were analyzed and the second always showed insignificant remaining pollutant material. Thereafter, all rinses were done as a single 2-liter rinse. The rinses were saved, but not analyzed except in the case of some particular interest.

BATTELLE-HASL COLLECTOR COMPARISONS

Samples collected concurrently with both the HASL and Battelle samplers were chemically analyzed for all the species according to Table 4. The results have been reported on the monthly data reports, but, because of space limitations, the HASL collector results are not listed in this summary (with a few exceptions, see the Appendix). The HASL collectors were not generally deployed until mid-winter (cf. Table 3), but there exist a sufficient number of concurrent samples at two sites for the months February-June to allow a preliminary statistical study of how the resulting concentrations compare.

First, only the four major ionic species were examined: H^+ (laboratory pH measurement), $SO_4^{=}$, NH_4^+ , and NO_3^- . Generally, the concentrations of these are sufficiently large that measurement uncertainty is 10% or less. Of the sample pairs for Sites 1 and 3, the numbers in each month, the number of these where the percent difference between HASL and Battelle exceeded 10%, and the percent difference

$$\Delta\% = \frac{\text{Concentration (HASL)} - \text{Concentration (Battelle)}}{\text{Concentration (Battelle)}} \times 100, \quad (4)$$

were calculated. Two classes of samples were eliminated from this analysis: those where one or the other of the pair had a sample volume less than 100 ml, and those where the "predicted" volume (from raingauge measurements) of one or the other was greater than a factor of 2 different from the sample volume. In the former case, it was observed that considerable differences can occur for low-volume samples. This is discussed above in connection with the funnel rinse analyses. In general, the HASL concentrations of the four species are much greater than those of the Battelle collector in these cases. The reasons for this may be deducible from more detailed study of the individual events; in any case, the apparent "edge

effects" involved with low-volume samples make it unfair to include them in the percent difference calculations. For samples where one of the collectors diverges too much from expected volume collection, there is a likelihood that the two collectors did not sample an identical precipitation event; therefore, these situations were eliminated.

The results of this analysis are listed in Table 6. While individual event $\Delta\%$'s were calculated according to (4), those listed in the table are calculated by using the sum of the concentrations for the month or total period. That is, the $\Delta\%$ shown is the $\Delta\%$ for the monthly (simple) average concentrations, rather than the average of the $\Delta\%$'s for the sample pairs. This was done to reduce the effect of the low-concentration sample concentration differences, where a large percent difference may appear, but a relatively small concentration difference compared to the higher concentration events. It should be emphasized that the monthly averages shown in the table are *simple* averages, and are not weighted according to sample volume or deposition.

The only definitely anticipated difference, if any, between the collectors was in sampling of the volatile species SO_3^- and NH_4^+ , and the oxidation product, SO_4^- . No comparison of SO_3^- was made because nearly all sulfite concentrations were near the detection limit, and sulfite preservation procedures were not in effect for the collection of these samples. The greatest differences between the two collectors' concentrations appear with SO_4^- and NH_4^+ , especially for Site 3, where greater concentrations of atmospheric SO_2 are expected. There is no particular seasonal pattern apparent; however, no discrimination between snow and rain samples was done in this analysis.

In general, the two collectors appear to sample alike in terms of the four major species, with the only possibly statistically significant difference being the appearance of

TABLE 6

Comparison of Concentration Differences
Between HASL and Battelle Collectors

Site	Month(s)	H^+			$\text{SO}_4^{=}$			NH_4^+			NO_3^-		
		N ^a	N ₁₀ ^b	$\Delta\%$ ^c	N	N ₁₀	$\Delta\%$	N	N ₁₀	$\Delta\%$	N	N ₁₀	$\Delta\%$
1	February 1977	5	2	+8.7	6	1	0	0	-	-	6	1	+5.6
	March 1977	11	8	-3.3	11	2	+1.2	6	1	-5.7	11	1	-6.0
	April 1977	7	3	-3.3	7	1	+1.5	7	1	-7.7	7	1	-2.2
	May 1977	5	2	+1.2	5	1	0	5	3	+0.9	5	1	0
	June 1977	9	2	+1.7	9	1	+4.8	9	2	+9.0	9	1	+1.7
	Feb-June 1977	37	17	+0.7	38	6	+2.1	27	7	-0.5	38	5	-1.6
3	February 1977	4	2	+9.4	4	2	+15.	4	3	+10.	4	0	+5.6
	March 1977	6	2	+3.5	6	2	+1.6	6	1	+2.7	6	0	+0.4
	April 1977	4	0	+4.8	4	3	+13.	4	3	+16.	4	1	-4.7
	June 1977	3	0	-1.8	3	0	+1.3	3	1	-12.	3	2	+16.
	Feb-June 1977	17	4	-1.2	17	7	+7.0	17	8	+6.3	17	3	+1.9
1+3	Feb-June 1977	54	21	0	55	13	+3.7	44	15	+1.6	55	8	-0.5

^a Number of sample pairs considered (see text for qualifications).

^b Number of sample pairs where the percent difference in concentration exceeded 10.

^c See (4), and accompanying text.

higher $\text{SO}_4^{=}$ concentrations in the HASL samples collected at Site 3. The possibility of increased sulfite collection and subsequent higher sulfate concentration in the HASL samples will be examined as the data from special sulfite-preserved samples begin to appear during the late summer of 1977.

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APPENDIX

PRECIPITATION CHEMISTRY DATA: SEPTEMBER 1976 - JUNE 1977

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INTRODUCTION

The results of the analysis of precipitation samples collected on the MAP3S network from September 1976 through June 1977 are listed in the following tables. During this period there were four sites in operation (Whiteface and Ithaca in New York, Pennsylvania State University in Pennsylvania, and the University of Virginia in Virginia). Three types of tables are presented. The first table (three pages) shows sample availability. The presence of "S" in the table signifies that a sample was collected at the corresponding site (column heading) on the corresponding date (row heading). Further information concerning these samples may be found in the other two types of tables.

The next four tables are of the second type; each lists the data for a given site as indicated in the heading. The tables for Whiteface, Ithaca, Penn. State, and Virginia are 9, 6, 12, and 6 pages long, respectively. Each row corresponds to a date, and each column to one of the species analyzed. Since there are 21 species and room for only seven columns, however, these tables are broken down into three sub-tables as follows:

<u>Sub-Table</u>	<u>Species</u>
1	Sample time, hours (total time container was in collector)
	Precipitation time, hours (estimated total duration of precipitation)
	Time removed, Z
	Sample volume, ml
	Predicted volume, ml (based on raingauge data)
	Lid openings (number of times Battelle collector opened during event)

<u>Sub-Table</u>	<u>Species</u>
1 (Cont.)	Field (H^+), $\mu\text{moles/liter}$ (from field pH measurements)
2	(H^+) , $\mu\text{moles/liter}$ (laboratory pH measurements) Conductivity, $\mu\text{mho/cm}$ (SO_2) , $\mu\text{moles/liter}$ $(SO_4^{=})$, " (NH_4^+) , " (NO_2^-) , " (NO_3^-) , "
3	(Cl^-) , $\mu\text{moles/liter}$ $(PO_4^{=})$, " (Na^+) , " (Mg^{++}) , " (Al^{3+}) , " (K^+) , " (Ca^{++}) , "

The first seven "species" are data collected and reported to the laboratory organization by the field operators (cf. Table 2), and with the exception of "Field (H^+)", are data which locate the event in time, define the volume and comparison of volume with that expected from raingauge measurements, and record the number of lid openings of the Battelle collector during the time period. The amount of precipitation may be determined from the sample volume (or predicted volume) by dividing by the Battelle collector

funnel area, which is about 490 cm². The predicted volume is listed only to give a rough indication of whether the sample represents the whole event. There is, in fact, no reason to believe that the raingauge -- which is of similar design to the Battelle collector, but shorter and with less collecting area -- yields any more accurate a measure of precipitation than the Battelle collector. Many wintertime samples are frozen precipitation; the raingauge is the heated type, but comparisons of sample volume to predicted volume are of lesser significance because of the normal uncertainties in collection of frozen precipitation in any container.

The field pH measurements are often made at sample temperatures different from that of the laboratory measurement, which is 25C (for conductivity also). Comparison of the two H⁺ values may give some indication of chemical changes in the sample between collection and laboratory analysis. The main difference noted, if any, is in the direction of a higher pH (lower free H⁺ concentration) in the later measurement. This may be an indication of neutralizing reactions taking place. Detailed analysis of such chemical changes should take into account the temperature of initial pH measurement and the exact dates of analysis of the various species; all of these data were recorded, but are not listed here.

Consideration of the concentrations listed for the ostensibly volatile or transitory species, such as, SO₂, NO₂⁻ and NH₄⁺, should take into account that special efforts to preserve these species have not been taken for these samples. In particular, little significance should be attributed to the SO₂ data, except that an above-detection level concentration should be evidence that there was probably more SO₂ in the sample on collection. As noted in the main text, SO₂ or sulfite ion is being preserved for analysis beginning with late summer 1977 samples.

Symbols indicating either an insufficient volume for analysis, no analysis, or no sample collected are defined at the foot of each table. The symbol "<" before the concentration indicates less than or equal to the detection limit for analysis. These are listed for the various methods in Section 5; it should be noted that these limits vary from one analysis session to another.

A few of the collected and analyzed samples were eliminated from this listing. The major reason for elimination was the presence of apparent organic material or excessive particulate matter. There are very few such samples eliminated because generally only one of the pair of samples (Battelle and HASL collectors) was so affected. In nearly all cases, the concentrations of the "clean" sample compared well with those of the "dirty" sample, so no action was taken. Where only one sample of the event was present, and it was dirty, it was eliminated.

All the data listed here are from the Battelle collector samples, with the exception of the samples listed in Table 7. In these cases, there was no Battelle sample, either because of insufficient volume collected or the Battelle collector being out of service. The accompanying HASL sample data are listed.

No exact analysis of missed precipitation events or "down time" for either collector was performed. The data listed here can be used to determine (roughly) down time for the Battelle collector, however, by comparing the "Sample Time" (Column 1) with the time since the date of the previous sample for the site. Because of the duplication of samplers used during this first year, there are very few, if any, missed events. In the future, when only one precipitation collector is used at each site, careful recording and reporting of missed events will be part of the Network procedure.

TABLE 7
Samples Listed which were
Collected by the HASL Collector

Date	Site Number
February 13, 1977	3
March 20, 1977	4
March 21, 1977	2
March 25, 1977	2
April 6, 1977	2
June 3, 1977	4
June 26, 1977	3

The last 18 tables are each six pages long, and each presents the data for a different species in the order listed above. The column headings are the four site names, and the rows are the dates of sample collection. No species tables are included for Mg^{++} , Al^{3+} , and Ca^{++} , since no analyses were performed for these species.

SAMPLES AVAILABLE

	H I T E F A C E				H I T A C R				P E N N				S T A T E				V I R G I N I A			
22 SEP 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27 SEP 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28 SEP 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30 SEP 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 OCT 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2 OCT 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7 OCT 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9 OCT 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10 OCT 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11 OCT 1976	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14 OCT 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15 OCT 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16 OCT 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18 OCT 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19 OCT 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20 OCT 1976	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21 OCT 1976	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22 OCT 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25 OCT 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26 OCT 1976	-	-	-	-	-	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29 OCT 1976	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31 OCT 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 NOV 1976	S	-	-	-	-	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 NOV 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8 NOV 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9 NOV 1976	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10 NOV 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11 NOV 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27 NOV 1976	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28 NOV 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30 NOV 1976	-	-	-	-	-	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3 DEC 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 DEC 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6 DEC 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7 DEC 1976	S	-	-	-	-	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8 DEC 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12 DEC 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	S	-	-
14 DEC 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17 DEC 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20 DEC 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21 DEC 1976	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22 DEC 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24 DEC 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28 DEC 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30 DEC 1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	S	-	-
2 JAN 1977	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 JAN 1977	-	-	-	-	-	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8 JAN 1977	-	-	-	-	-	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10 JAN 1977	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11 JAN 1977	-	-	-	-	-	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15 JAN 1977	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

18 JAN 1977	-	-	-	S
22 JAN 1977	-	S	-	-
25 JAN 1977	S	-	S	-
26 JAN 1977	-	-	S	-
27 JAN 1977	-	S	S	-
31 JAN 1977	-	S	-	-
1 FEB 1977	S	-	S	-
4 FEB 1977	-	-	S	-
5 FEB 1977	-	S	S	-
6 FEB 1977	S	-	-	-
12 FEB 1977	S	-	-	-
13 FEB 1977	-	-	S	-
14 FEB 1977	S	S	-	-
15 FEB 1977	-	-	S	S
18 FEB 1977	-	S	-	-
19 FEB 1977	S	-	-	-
21 FEB 1977	S	S	S	-
25 FEB 1977	S	-	S	S
1 MAR 1977	S	-	-	S
5 MAR 1977	S	-	S	S
8 MAR 1977	S	-	-	-
13 MAR 1977	S	-	-	S
14 MAR 1977	S	-	S	-
15 MAR 1977	-	S	-	-
16 MAR 1977	-	-	S	-
17 MAR 1977	S	-	-	-
19 MAR 1977	-	-	S	S
20 MAR 1977	-	-	-	S
21 MAR 1977	S	S	S	-
23 MAR 1977	S	-	S	-
24 MAR 1977	-	-	S	S
25 MAR 1977	S	S	-	-
29 MAR 1977	S	-	S	S
31 MAR 1977	S	-	S	-
3 APR 1977	S	S	-	-
5 APR 1977	S	-	S	-
6 APR 1977	S	S	S	S
7 APR 1977	-	-	S	-
8 APR 1977	S	-	S	-
14 APR 1977	S	-	-	-
20 APR 1977	-	-	S	-
23 APR 1977	S	-	-	-
24 APR 1977	-	-	-	S
25 APR 1977	S	-	S	-
28 APR 1977	S	-	-	-
29 APR 1977	-	S	S	-
30 APR 1977	-	-	-	S
2 MAY 1977	S	-	-	-
3 MAY 1977	-	-	S	-
5 MAY 1977	-	-	-	S
6 MAY 1977	-	S	S	-
7 MAY 1977	-	-	S	-
9 MAY 1977	S	-	-	-
10 MAY 1977	-	S	-	-
13 MAY 1977	S	-	-	-
19 MAY 1977	S	-	-	-
20 MAY 1977	-	-	S	-
26 MAY 1977	-	-	-	S
27 MAY 1977	-	S	-	-
29 MAY 1977	S	-	-	-
31 MAY 1977	-	-	-	S
1 JUN 1977	S	-	-	-
2 JUN 1977	S	-	S	-
3 JUN 1977	-	-	-	S

6 JUN 1977	3	-	-	-
7 JUN 1977	-	-	-	-
8 JUN 1977	3	-	-	-
10 JUN 1977	3	-	-	-
11 JUN 1977	-	-	-	-
13 JUN 1977	-	-	-	-
14 JUN 1977	3	-	-	-
15 JUN 1977	-	-	-	-
16 JUN 1977	-	-	-	-
18 JUN 1977	-	-	-	-
19 JUN 1977	-	-	-	-
20 JUN 1977	3	-	-	-
21 JUN 1977	-	-	-	-
22 JUN 1977	3	-	-	-
26 JUN 1977	-	-	-	-
27 JUN 1977	3	-	-	-
28 JUN 1977	-	-	-	-
29 JUN 1977	-	-	-	-

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DATA FROM WHITEFACE

	SAMPLE TIME (HOURS)	PRECIPITATION TIME (HOURS)	THROW TIME (Z)	SAMPLE VOLUME (ML)	PRECIPITATION VOLUME (ML)	LID OPEN	FILTRATE (UMOL/L)
11 OCT 1976	96.00	NAP	NAP	510.00	NAP	NAP	NAP
20 OCT 1976	216.00	NAP	NAP	225.00	NAP	NAP	11.00
21 OCT 1976	18.00	NAP	1521.00	535.00	1590.00	NAP	10.00
29 OCT 1976	194.00	62.00	1840.00	NAP	870.00	NAP	NAP
1 NOV 1976	54.00	16.00	100.00	NAP	390.00	NAP	NAP
9 NOV 1976	212.00	42.00	2100.00	NAP	690.00	NAP	NAP
27 NOV 1976	424.00	40.00	1300.00	NAP	610.00	NAP	NAP
7 DEC 1976	248.00	26.50	1930.00	NAP	1030.00	NAP	NAP
21 DEC 1976	334.00	21.00	1730.00	440.00	560.00	NAP	63.00
10 JAN 1977	476.00	22.00	1330.00	580.00	450.00	NAP	62.00
25 JAN 1977	336.50	NAP	1400.00	284.00	145.00	NAP	225.00
1 FEB 1977	168.00	32.00	1400.00	107.00	175.00	NAP	63.00
6 FEB 1977	118.50	56.00	1230.00	330.00	55.00	NAP	63.00
12 FEB 1977	144.50	47.00	1300.00	49.00	25.00	NAP	224.00
14 FEB 1977	50.50	31.00	1530.00	145.00	90.00	NAP	79.00
19 FEB 1977	128.50	14.00	2400.00	60.00	46.00	24.00	220.00
21 FEB 1977	41.00	41.00	1700.00	298.00	212.00	1.00	160.00
25 FEB 1977	93.00	30.00	1400.00	1055.00	1060.00	4.00	25.00
1 MAR 1977	96.50	28.00	1430.00	157.00	165.00	9.00	105.00
5 MAR 1977	98.50	14.00	1700.00	645.00	585.00	10.00	38.00
8 MAR 1977	69.00	67.00	1400.00	162.00	145.00	95.00	150.00
12 MAR 1977	128.00	13.00	2200.00	363.00	270.00	4.00	16.00
14 MAR 1977	17.50	17.00	1530.00	981.00	905.00	5.00	25.00

DATA FROM WHITEFACE (CONT.)

	P M T (HOURS)	P E C T (HOURS)	E M V D T (Z)	P M V O L S (ML)	P E D V O L P (ML)	L I D O P E N	F I E L D (UMOL/L)
17 MAR 1977	73.00	10.00	1630.00	232.00	390.00	20.00	89.00
21 MAR 1977	93.50	15.00	1400.00	130.00	115.00	11.00	59.00
23 MAR 1977	45.50	19.00	1130.00	1088.00	1090.00	2.00	14.00
25 MAR 1977	50.00	17.00	1330.00	326.00	410.00	6.00	40.00
29 MAR 1977	96.00	6.00	1330.00	437.00	390.00	2.00	43.00
31 MAR 1977	48.00	5.00	1330.00	533.00	520.00	6.00	89.00
3 APR 1977	72.00	8.00	1330.00	263.00	280.00	10.00	56.00
5 APR 1977	54.50	7.00	2000.00	179.00	170.00	11.00	60.00
6 APR 1977	24.00	14.00	2000.00	132.00	267.00	12.00	17.00
8 APR 1977	41.50	10.00	1330.00	202.00	304.00	9.00	66.00
14 APR 1977	144.00	6.00	1330.00	840.00	820.00	5.00	38.00
23 APR 1977	215.00	17.00	1200.00	1110.00	1100.00	11.00	66.00
25 APR 1977	52.00	34.00	1600.00	2195.00	2080.00	13.00	26.00
28 APR 1977	74.00	8.00	1800.00	231.00	175.00	27.00	60.00
2 MAY 1977	96.00	4.00	1800.00	196.00	165.00	4.00	110.00
9 MAY 1977	168.00	17.00	1800.00	480.00	460.00	27.00	26.00
13 MAY 1977	91.00	2.50	1300.00	143.00	140.00	3.00	39.00
19 MAY 1977	144.00	2.00	1300.00	103.00	105.00	1.00	50.00
29 MAY 1977	246.00	8.00	1900.00	680.00	640.00	4.00	150.00
1 JUN 1977	72.00	2.00	1900.00	329.00	320.00	5.00	160.00
2 JUN 1977	20.00	15.00	1500.00	535.00	500.00	1.00	79.00
6 JUN 1977	94.00	6.00	1300.00	87.00	130.00	7.00	96.00
8 JUN 1977	48.00	14.00	1300.00	530.00	470.00	10.00	24.00

DATA FROM WHITEFACE (CONT.)

	SAMPLE TIME (HOURS)	PREP TIME (HOURS)	TIME REM V.D. (Z)	SAMPLE VOL. (ML)	PREP VOL. (ML)	LID OPEN	FIELD H ⁺ (UMOL/L)
10 JUN 1977	54.00	7.00	1900.00	90.00	115.00	12.00	100.00
14 JUN 1977	96.00	6.00	1900.00	262.00	280.00	10.00	51.00
20 JUN 1977	138.00	8.50	1300.00	790.00	750.00	10.00	69.00
22 JUN 1977	48.00	7.00	1300.00	415.00	430.00	8.00	42.00
27 JUN 1977	120.00	16.00	1300.00	1130.00	1130.00	22.00	130.00

NSC MEANS NO SAMPLE COLLECTED
 ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
 NAP MEANS NO ANALYSIS PERFORMED
 MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FROM WHITEFACE (CONT.)

	H^+ (UMOL/L)	C^0 (UMHO/CM)	S^0 (UMOL/L)	S^0 (UMOL/L)	H^+ (UMOL/L)	N^0 (UMOL/L)	N^0 (UMOL/L)
11 OCT 1976	NAP	5.50	< .25	7.60	< 1.00	< .10	5.00
20 OCT 1976	NAP	21.00	< .25	44.00	53.00	.20	44.00
21 OCT 1976	NAP	6.00	< .25	5.60	< 1.00	< .10	8.10
29 OCT 1976	100.00	42.00	< .20	3.00	12.00	< .10	74.00
1 NOV 1976	NAP	22.00	< .20	14.00	< .70	< .10	9.00
9 NOV 1976	110.00	45.00	< .20	2.40	9.80	< .10	6.00
27 NOV 1976	NAP	20.00	< .20	48.00	38.00	.50	45.00
7 DEC 1976	22.00	9.00	NAP	16.00	1.20	NAP	11.00
21 DEC 1976	55.00	24.00	.13	16.00	11.00	.20	33.00
10 JAN 1977	16.00	9.00	< .10	4.50	3.20	.14	29.00
25 JAN 1977	NAP	NAP	< .13	4.10	2.60	< .08	49.00
1 FEB 1977	NAP	NAP	< .13	9.80	6.20	.12	49.00
6 FEB 1977	55.00	30.00	< .10	9.00	11.00	.15	77.00
12 FEB 1977	ISA	ISA	.15	81.00	ISA	.37	190.00
14 FEB 1977	70.00	35.00	< .10	31.00	NAP	.13	51.00
19 FEB 1977	90.00	ISA	< .10	16.00	NAP	.27	130.00
21 FEB 1977	110.00	60.00	< .10	28.00	NAP	.25	120.00
25 FEB 1977	22.00	9.40	< .10	8.70	NAP	.11	15.00
1 MAR 1977	80.00	42.00	< .10	31.00	NAP	.24	83.00
5 MAR 1977	45.00	15.00	< .10	9.90	NAP	.21	21.00
8 MAR 1977	110.00	49.00	< .10	77.00	NAP	.23	50.00
13 MAR 1977	15.00	5.80	< .10	4.60	NAP	.34	5.70
14 MAR 1977	15.00	8.40	< .10	6.20	NAP	.11	10.00

DATA FROM WHITEFACE (CONT.)

	H^+ ($\mu\text{MOL/L}$)	$\text{C}_2\text{O}_4^{2-}$ ($\mu\text{MOL/L}$)	NO_3^- ($\mu\text{MOL/L}$)	SO_4^{2-} ($\mu\text{MOL/L}$)	NH_4^+ ($\mu\text{MOL/L}$)	NO_2^- ($\mu\text{MOL/L}$)	NO_3^- ($\mu\text{MOL/L}$)
17 MAR 1977	110.00	47.00	.20	43.00	36.00	.33	90.00
21 MAR 1977	60.00	23.00	< .10	14.00	7.50	< .08	44.00
23 MAR 1977	23.00	8.30	< .10	7.20	5.80	.15	7.80
25 MAR 1977	58.00	18.00	< .10	22.00	11.00	.13	10.00
29 MAR 1977	28.00	9.30	< .10	8.20	3.10	.21	9.10
31 MAR 1977	89.00	36.00	.19	43.00	31.00	.28	53.00
3 APR 1977	38.00	22.00	< .10	26.00	11.00	.17	21.00
5 APR 1977	55.00	27.00	< .10	31.00	11.00	.13	26.00
6 APR 1977	15.00	16.00	< .10	30.00	6.30	.21	31.00
8 APR 1977	53.00	27.00	< .10	13.00	15.00	.14	53.00
14 APR 1977	17.00	19.00	< .10	32.00	42.00	.23	30.00
23 APR 1977	50.00	23.00	< .10	26.00	8.80	.09	12.00
25 APR 1977	21.00	10.00	< .10	9.80	3.00	.09	9.00
28 APR 1977	43.00	33.00	.16	46.00	64.00	.32	75.00
2 MAY 1977	96.00	44.00	< .10	49.00	23.00	.11	45.00
9 MAY 1977	22.00	16.00	< .10	21.00	14.00	.16	35.00
13 MAY 1977	16.00	22.00	.16	53.00	26.00	.42	48.00
19 MAY 1977	16.00	13.00	.18	16.00	13.00	.34	21.00
29 MAY 1977	100.00	52.00	.20	65.00	39.00	.29	30.00
1 JUN 1977	140.00	66.00	< .10	70.00	24.00	.24	44.00
2 JUN 1977	68.00	30.00	< .20	32.00	13.00	.17	19.00
6 JUN 1977	85.00	43.00	< .20	56.00	33.00	.10	27.00
8 JUN 1977	19.00	9.00	< .20	6.50	3.10	.13	7.70

DATA FROM WHITEFACE (CONT.)

	H^+ (UMOL/L)	CO_3^{2-} (UMOL/L)	SO_4^{2-} (UMOL/L)	SC^{4-} (UMOL/L)	NH_4^+ (UMOL/L)	NO_3^- (UMOL/L)	NO_2^- (UMOL/L)
10 JUN 1977	96.00	39.00	< .20	40.00	19.00	.30	32.00
14 JUN 1977	48.00	23.00	< .20	22.00	12.00	.24	16.00
20 JUN 1977	68.00	32.00	< .20	38.00	32.00	.28	32.00
22 JUN 1977	22.00	11.00	< .20	7.90	2.90	.18	7.40
27 JUN 1977	110.00	49.00	NAP	47.00	11.00	NAP	34.00

NSC MEANS NO SAMPLE COLLECTED
 ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
 NAP MEANS NO ANALYSIS PERFORMED
 MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FROM WHITEFACE (CONT.)

	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)
11 OCT 1976	< .20	< .10	.09	NAP	NAP	< .20	NAP
20 OCT 1976	< .20	< .10	.26	NAP	NAP	1.30	NAP
21 OCT 1976	< .20	< .10	.13	NAP	NAP	< .20	NAP
29 OCT 1976	1.10	< .40	.09	NAP	NAP	2.80	NAP
1 NOV 1976	< .30	< .40	.04	NAP	NAP	< .20	NAP
9 NOV 1976	< .30	< .40	.09	NAP	NAP	.41	NAP
27 NOV 1976	< .30	.95	.44	NAP	NAP	.36	NAP
7 DEC 1976	< .30	< .40	< .04	NAP	NAP	NAP	NAP
21 DEC 1976	8.10	< .37	NAP	NAP	NAP	NAP	NAP
10 JAN 1977	< .30	< .40	NAP	NAP	NAP	NAP	NAP
25 JAN 1977	2.20	< .40	2.20	NSC	NSC	< .30	NSC
1 FEB 1977	< .30	< .40	4.40	NSC	NSC	2.40	NSC
6 FEB 1977	< .50	< .40	3.10	NAP	NAP	< .30	NAP
12 FEB 1977	14.00	.66	7.30	NAP	NAP	3.70	NAP
14 FEB 1977	1.40	< .40	5.10	NSC	NSC	2.90	NSC
19 FEB 1977	16.00	< .40	1.10	NAP	NAP	.64	NAP
21 FEB 1977	5.60	< .40	1.70	NAP	NAP	< .30	NAP
25 FEB 1977	1.70	< .40	NAP	NAP	NAP	NAP	NAP
1 MAR 1977	7.20	< .40	NAP	NAP	NAP	NAP	NAP
5 MAR 1977	< .40	< .40	NAP	NAP	NAP	NAP	NAP
8 MAR 1977	< .40	< .40	NAP	NAP	NAP	NAP	NAP
13 MAR 1977	< .40	< .40	NAP	NAP	NAP	NAP	NAP
14 MAR 1977	< .40	< .40	NAP	NAP	NAP	NAP	NAP

DATA FROM WHITEFACE (CONT.)

	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)
17 MAR 1977	< .40	< .40	NAP	NAP	NAP	NAP	NAP
21 MAR 1977	< .40	< .40	NAP	NAP	NAP	NAP	NAP
23 MAR 1977	1.60	< .40	NAP	NAP	NAP	NAP	NAP
25 MAR 1977	1.90	< .40	NAP	NAP	NAP	NAP	NAP
29 MAR 1977	3.30	< .40	NAP	NAP	NAP	NAP	NAP
31 MAR 1977	3.90	< .40	NAP	NAP	NAP	NAP	NAP
3 APR 1977	< .40	< .40	NAP	NAP	NAP	NAP	NAP
5 APR 1977	4.90	< .40	NAP	NAP	NAP	NAP	NAP
6 APR 1977	< 4.00	< .40	NAP	NAP	NAP	NAP	NAP
8 APR 1977	< 4.00	< .40	NAP	NAP	NAP	NAP	NAP
14 APR 1977	< 4.00	< .40	NAP	NAP	NAP	NAP	NAP
23 APR 1977	< 4.00	< .40	NAP	NAP	NAP	NAP	NAP
25 APR 1977	< 4.00	< .40	NAP	NAP	NAP	NAP	NAP
28 APR 1977	< .30	< .40	NAP	NAP	NAP	NAP	NAP
2 MAY 1977	< .30	< .40	NAP	NAP	NAP	NAP	NAP
9 MAY 1977	< .30	< .40	NAP	NAP	NAP	NAP	NAP
13 MAY 1977	< .30	< .40	NAP	NAP	NAP	NAP	NAP
19 MAY 1977	< 3.00	< .40	NAP	NAP	NAP	NAP	NAP
29 MAY 1977	4.20	< .40	NAP	NAP	NAP	NAP	NAP
1 JUN 1977	14.00	< .40	NAP	NAP	NAP	NAP	NAP
2 JUN 1977	2.80	< .40	NAP	NAP	NAP	NAP	NAP
6 JUN 1977	3.20	< .40	NAP	NAP	NAP	NAP	NAP
8 JUN 1977	3.10	< .40	NAP	NAP	NAP	NAP	NAP

DATA FROM WHITEFACE (CONT.)

	CL (UMOL/L)	PO (UMOL/L)	NA (UMOL/L)	MG (UMOL/L)	LA (UMOL/L)	FA (UMOL/L)	CA (UMOL/L)
10 JUN 1977	33.00	< .40	NAP	NAP	NAP	NAP	NAP
14 JUN 1977	8.50	< .40	NAP	NAP	NAP	NAP	NAP
20 JUN 1977	6.60	< .40	NAP	NAP	NAP	NAP	NAP
22 JUN 1977	17.00	< .40	NAP	NAP	NAP	NAP	NAP
27 JUN 1977	8.50	< .40	NAP	NAP	NAP	NAP	NAP

NSC MEANS NO SAMPLE COLLECTED
ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
NAP MEANS NO ANALYSIS PERFORMED
MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FROM ITHACA

	S A M P L E T I M E (HOURS)	P R E C I P I T A T I O N (HOURS)	T I M E R M I N A L (Z)	S A M P L E V O L (ML)	P R E D I C T E D V O L (ML)	L I D O P E N	F I L T E R E D C O N C N T R A C T I O N (UMOL/L)
26 OCT 1976	72.00	NAP	NAP	920.00	NAP	NAP	NAP
1 NOV 1976	96.00	21.00	NAP	1020.00	1990.00	NAP	NAP
30 NOV 1976	456.00	NAP	NAP	980.00	1110.00	NAP	NAP
6 DEC 1976	NAP	NAP	NAP	1090.00	1030.00	NAP	41.00
4 JAN 1977	NAP	NAP	NAP	660.00	560.00	NAP	68.00
8 JAN 1977	NAP	NAP	NAP	500.00	505.00	NAP	60.00
11 JAN 1977	NAP	NAP	NAP	520.00	550.00	NAP	35.00
22 JAN 1977	NAP	NAP	NAP	150.00	505.00	NAP	81.00
27 JAN 1977	NAP	NAP	NAP	130.00	285.00	NAP	87.00
31 JAN 1977	NAP	NAP	NAP	150.00	75.00	NAP	49.00
5 FEB 1977	NAP	NAP	NAP	160.00	90.00	NAP	91.00
14 FEB 1977	NAP	NAP	NAP	200.00	215.00	NAP	138.00
18 FEB 1977	96.50	8.00	1600.00	40.00	129.00	5.00	115.00
21 FEB 1977	75.00	18.00	1900.00	495.00	870.00	45.00	160.00
15 MAR 1977	240.00	25.00	1400.00	1050.00	1060.00	20.00	23.00
21 MAR 1977	140.00	18.00	1500.00	1400.00	1460.00	NAP	29.00
25 MAR 1977	99.00	14.00	1800.00	1640.00	2320.00	NAP	26.00
3 APR 1977	221.00	30.00	1300.00	520.00	770.00	24.00	79.00
6 APR 1977	74.00	14.00	1500.00	360.00	430.00	NAP	35.00
29 APR 1977	212.00	68.00	1500.00	2100.00	2070.00	14.00	96.00
6 MAY 1977	MOE	MOE	MOE	MOE	MOE	MOE	MOE
10 MAY 1977	MOE	MOE	MOE	MOE	MOE	MOE	MOE
27 MAY 1977	142.00	50	1400.00	50.00	115.00	4.00	200.00

DATA FROM ITHACA

(CONT.)

	SAMPLE TIME (HOURS)	PERCENT (HOURS)	TEMPERATURE (Z)	SAMPLE VOLUME (ML)	PERCENT DILUTION (ML)	LID OPEN	FILTRATE (UMOL/L)
11 JUN 1977	95.00	10.00	2000.00	1410.00	1570.00	53.00	78.00
19 JUN 1977	190.00	50.00	1800.00	410.00	1200.00	64.00	160.00
21 JUN 1977	74.00	3.00	1500.00	210.00	230.00	8.00	87.00
26 JUN 1977	124.00	20.00	1900.00	710.00	890.00	19.00	78.00

NSC MEANS NO SAMPLE COLLECTED
 ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
 NAP MEANS NO ANALYSIS PERFORMED
 MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FROM ITHACA (CONT.)

	H^+ ($\mu\text{MOL/L}$)	CO_3^{2-} ($\mu\text{MHO/CM}$)	SO_4^{2-} ($\mu\text{MOL/L}$)	SO_4^{2-} ($\mu\text{MOL/L}$)	NH_4^+ ($\mu\text{MOL/L}$)	NO_2^- ($\mu\text{MOL/L}$)	NO_3^- ($\mu\text{MOL/L}$)
26 OCT 1976	NAP	34.00	< .25	32.00	13.00	.21	36.00
1 NOV 1976	NAP	22.00	< .20	23.00	3.40	< .10	23.00
30 NOV 1976	NAP	20.00	< .20	20.00	12.00	.17	37.00
6 DEC 1976	NAP	NAP	< .10	13.00	4.00	< .08	27.00
4 JAN 1977	NAP	NAP	< .10	10.00	8.30	< .08	40.00
8 JAN 1977	NAP	NAP	< .10	8.20	5.60	< .08	56.00
11 JAN 1977	NAP	NAP	< .10	10.00	5.00	< .08	22.00
22 JAN 1977	NAP	NAP	< .10	47.00	9.20	.10	24.00
27 JAN 1977	71.00	36.00	< .10	19.00	< 1.00	< .08	63.00
31 JAN 1977	50.00	26.00	< .13	18.00	15.00	.20	53.00
5 FEB 1977	80.00	43.00	< .13	13.00	3.20	.37	89.00
14 FEB 1977	110.00	63.00	.44	41.00	38.00	.45	120.00
18 FEB 1977	ISA	ISA	< .10	53.00	71.00	.15	120.00
21 FEB 1977	110.00	54.00	< .10	20.00	13.00	.24	110.00
15 MAR 1977	20.00	9.00	< .10	12.00	4.40	.18	11.00
21 MAR 1977	32.00	17.00	< .10	19.00	13.00	.22	32.00
25 MAR 1977	33.00	13.00	< .10	12.00	6.90	.09	19.00
3 APR 1977	100.00	37.00	.12	42.00	23.00	.39	48.00
6 APR 1977	58.00	26.00	< .10	33.00	9.50	.13	36.00
29 APR 1977	100.00	43.00	< .10	45.00	7.90	.10	32.00
6 MAY 1977	MOE	MOE	MOE	MOE	MOE	MOE	MOE
10 MAY 1977	MOE	MOE	MOE	MOE	MOE	MOE	MOE
27 MAY 1977	NAP	NAP	NAP	NAP	NAP	NAP	NAP

DATA FROM THERMOCOAT (CONT)

	CHLORIDE (UMOL/L)	CONDUCTIVITY (UMHO/CM)	SULFATE (UMOL/L)	SILICA (UMOL/L)	NITRATE (UMOL/L)	NITRATE (UMOL/L)	NITRATE (UMOL/L)
11 JUN 1977	88.00	33.00	< .20	32.00	17.00	.39	28.00
19 JUN 1977	130.00	75.00	< .20	81.00	23.00	.20	52.00
21 JUN 1977	98.00	47.00	< .20	53.00	33.00	.46	42.00
26 JUN 1977	85.00	36.00	< .20	34.00	8.50	.38	42.00

NSC MEANS NO SAMPLE COLLECTED
ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
NAP MEANS NO ANALYSIS PERFORMED
MOE MEANS MALFUNCTION OF OPERATOR ERROR

DATA FROM ITHACA (CONT.)

	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)
26 OCT 1976	14.00	3.40	6.50	NAP	NAP	< .20	NAP
1 NOV 1976	< .30	< .40	.17	NAP	NAP	4.40	NAP
30 NOV 1976	< .30	< .40	.17	NAP	NAP	< .20	NAP
6 DEC 1976	< .30	< .40	17.00	NAP	NAP	1.50	NAP
4 JAN 1977	< .30	< .40	5.30	NAP	NAP	< .30	NAP
8 JAN 1977	16.00	< .40	NAP	NSC	NSC	.31	NSC
11 JAN 1977	7.90	< .40	4.20	NSC	NSC	< .30	NSC
22 JAN 1977	13.00	.67	9.40	NAP	NAP	.46	NAP
27 JAN 1977	11.00	< .40	NAP	NSC	NSC	< .30	NSC
31 JAN 1977	17.00	< .40	6.30	NAP	NAP	1.40	NAP
5 FEB 1977	16.00	< .40	4.10	NSC	NSC	2.30	NSC
14 FEB 1977	12.00	< .40	11.00	NAP	NAP	1.90	NAP
18 FEB 1977	13.00	< .40	12.00	NAP	NAP	2.20	NAP
21 FEB 1977	1.50	< .40	1.90	NSC	NSC	< .30	NSC
15 MAR 1977	3.60	< .40	NAP	NAP	NAP	NAP	NAP
21 MAR 1977	4.00	< .40	NAP	NAP	NAP	NAP	NAP
25 MAR 1977	2.70	< .40	NAP	NAP	NAP	NAP	NAP
3 APR 1977	< .40	< .40	NAP	NAP	NAP	NAP	NAP
6 APR 1977	< .40	< .40	NAP	NAP	NAP	NAP	NAP
29 APR 1977	6.70	< .40	NAP	NAP	NAP	NAP	NAP
6 MAY 1977	MOE	MOE	NAP	NAP	NAP	NAP	NAP
10 MAY 1977	MOE	MOE	NAP	NAP	NAP	NAP	NAP
27 MAY 1977	NAP	NAP	NAP	NAP	NAP	NAP	NAP

DATA FROM ITHACA (CONT.)

	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)
11 JUN 1977	7.20	< 40	NAP	NAP	NAP	NAP	NAP
19 JUN 1977	4.90	< 40	NAP	NAP	NAP	NAP	NAP
21 JUN 1977	2.80	< 40	NAP	NAP	NAP	NAP	NAP
26 JUN 1977	4.70	< 40	NAP	NAP	NAP	NAP	NAP

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 ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
 NAP MEANS NO ANALYSIS PERFORMED
 MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FROM PENN STATE

	S A M P L E T I M E (HOURS)	P R E C I P I T A T I O N (HOURS)	T I M E R M V O L (Z)	S A M P L E V O L (ML)	P R E D I C T E D V O L (ML)	L I D O P E N	F I L T E R E D (μ MOL/L)
22 SEP 1976	24.00	NAP	1216.00	2.50	NAP	NAP	NAP
27 SEP 1976	120.00	12.00	1219.00	485.00	1440.00	6.00	140.00
28 SEP 1976	24.00	11.00	1232.00	400.00	440.00	3.00	120.00
30 SEP 1976	48.00	1.00	1226.00	31.00	41.00	1.00	120.00
2 OCT 1976	24.00	12.00	1306.00	174.00	NAP	4.00	54.00
3 OCT 1976	24.00	.50	1220.00	1.00	9.00	2.00	NAP
7 OCT 1976	96.00	2.00	1242.00	14.00	28.00	2.00	NAP
9 OCT 1976	48.00	NAP	1403.00	530.00	NAP	13.00	25.00
10 OCT 1976	24.00	NAP	1213.00	370.00	NAP	2.00	19.00
14 OCT 1976	96.00	2.00	1214.00	165.00	170.00	3.00	54.00
15 OCT 1976	24.00	NAP	1210.00	1.00	NAP	1.00	NAP
16 OCT 1976	24.00	NAP	1205.00	104.00	115.00	1.00	110.00
18 OCT 1976	48.00	NAP	1213.00	8.40	NAP	NAP	NAP
19 OCT 1976	NAP	.50	NAP	NAP	14.00	4.00	NAP
21 OCT 1976	72.00	13.00	1207.00	530.00	1320.00	5.00	30.00
22 OCT 1976	24.00	NAP	1723.00	1.00	NAP	1.00	ISA
25 OCT 1976	67.00	NAP	1212.00	290.00	NAP	12.00	62.00
26 OCT 1976	24.00	NAP	1201.00	230.00	NAP	4.00	65.00
31 OCT 1976	122.00	NAP	1307.00	794.00	NAP	4.00	39.00
1 NOV 1976	24.00	NAP	1304.00	1.00	NAP	3.00	ISA
4 NOV 1976	72.00	NAP	1316.00	160.00	220.00	1.00	110.00
8 NOV 1976	100.00	NAP	1707.00	101.00	37.00	6.00	35.00
10 NOV 1976	44.00	NAP	1316.00	135.00	150.00	1.00	78.00

DATA FROM PENN STATE (CONT.)

	TIME SAMPLE (HOURS)	TIME PREP (HOURS)	TIME REMOVED (Z)	VOLUME SAMPLE (ML)	VOLUME PREP (ML)	OPEN LID	FINAL (UMOL/L)
11 NOV 1976	24.00	NAP	1318.00	1.50	ISA	1.00	ISA
28 NOV 1976	60.00	2.50	36.00	71.00	83.00	3.00	42.00
30 NOV 1976	38.00	NAP	1435.00	415.00	360.00	2.00	41.00
3 DEC 1976	70.00	NAP	1315.00	21.00	32.00	3.00	81.00
5 DEC 1976	48.00	3.50	1315.00	27.00	37.00	2.00	130.00
8 DEC 1976	72.00	15.00	1312.00	1760.00	1650.00	1.00	33.00
14 DEC 1976	24.00	NAP	1331.00	53.00	NAP	2.00	19.00
20 DEC 1976	47.00	2.50	1309.00	28.00	41.00	3.00	120.00
22 DEC 1976	54.00	16.50	1903.00	201.00	250.00	11.00	38.00
24 DEC 1976	42.00	2.00	1342.00	13.00	18.00	5.00	ISA
28 DEC 1976	103.50	NAP	2102.00	414.00	NAP	8.00	32.00
30 DEC 1976	43.00	3.50	1542.00	27.00	28.00	5.00	NAP
2 JAN 1977	70.00	7.00	1335.00	78.00	74.00	2.00	42.00
4 JAN 1977	48.00	5.00	1331.00	149.00	133.00	1.00	38.00
8 JAN 1977	96.50	10.00	1400.00	179.00	166.00	2.00	76.00
11 JAN 1977	72.50	15.50	1435.00	573.00	630.00	6.00	51.00
15 JAN 1977	95.50	NAP	1351.00	158.00	150.00	NAP	32.00
25 JAN 1977	239.50	9.00	1318.00	140.00	120.00	NAP	54.00
26 JAN 1977	23.50	NAP	1308.00	12.00	14.00	NAP	ISA
27 JAN 1977	24.00	NAP	1310.00	21.00	32.00	NAP	65.00
1 FEB 1977	120.50	NAP	1342.00	18.00	NAP	3.00	42.00
4 FEB 1977	71.50	NAP	1318.00	111.00	120.00	3.00	102.00
5 FEB 1977	24.00	NAP	1333.00	178.00	NAP	4.00	79.00

DATA FROM PENN STATE (CONT.)

	S A M P L E T I M E (HOURS)	P R E C I P I T A T I O N (HOURS)	T I M E R M O V E D (Z)	S A M P L E V O L (ML)	P R E D I C T E D V O L (ML)	L I D O P E N	F I E L D (μ MOL/L)
13 FEB 1977	192.00	10.00	1357.00	297.00	250.00	NAP	151.00
15 FEB 1977	24.00	NAP	1305.00	40.00	34.00	5.00	98.00
21 FEB 1977	97.00	NAP	1328.00	356.00	370.00	10.00	79.00
25 FEB 1977	96.00	7.00	1317.00	893.00	995.00	3.00	39.00
5 MAR 1977	120.50	18.00	1340.00	1518.00	1645.00	2.00	42.00
14 MAR 1977	219.00	13.00	1706.00	1020.00	1670.00	8.00	27.00
16 MAR 1977	44.00	1.00	1256.00	79.00	88.00	3.00	79.00
19 MAR 1977	72.00	11.10	1322.00	1453.00	1530.00	4.00	52.00
21 MAR 1977	48.00	8.10	1325.00	434.00	450.00	3.00	54.00
23 MAR 1977	48.00	9.40	1329.00	385.00	620.00	2.00	56.00
24 MAR 1977	24.00	NAP	1315.00	10.00	15.00	2.00	ISA
29 MAR 1977	120.00	9.50	1310.00	658.00	670.00	4.00	76.00
31 MAR 1977	48.00	.70	1318.00	70.00	64.00	2.00	63.00
3 APR 1977	73.50	13.30	1448.00	2436.00	2460.00	4.00	47.00
6 APR 1977	75.00	9.80	1736.00	841.00	860.00	14.00	65.00
7 APR 1977	20.00	1.80	1310.00	12.00	25.00	1.00	ISA
8 APR 1977	28.00	.90	1649.00	96.00	88.00	1.00	50.00
20 APR 1977	24.00	.70	1320.00	148.00	160.00	3.00	310.00
25 APR 1977	119.00	11.00	1235.00	944.00	1010.00	11.00	100.00
29 APR 1977	MOE	MOE	MOE	MOE	MOE	NAP	MOE
3 MAY 1977	MOE	MOE	MOE	MOE	MOE	NAP	MOE
6 MAY 1977	70.00	12.40	1230.00	359.00	470.00	10.00	230.00
7 MAY 1977	29.50	4.50	1800.00	438.00	460.00	2.00	96.00

DATA FROM PENN STATE (CONT)

	TIME SAMPLING (HOURS)	TIME PERCENT (HOURS)	TIME MILLIMETERS (Z)	VOLUME SAMPLING (ML)	VOLUME PERCENT (ML)	OPEN LITERS (L)	HEAVY FUEL (UMOL/L)
20 MAY 1977	167.00	1.60	1200.00	115.00	125.00	4.00	160.00
2 JUN 1977	314.00	.20	1400.00	56.00	64.00	4.00	190.00
7 JUN 1977	119.50	2.80	1328.00	1475.00	1460.00	10.00	83.00
10 JUN 1977	71.00	7.60	1236.00	722.00	760.00	9.00	56.00
13 JUN 1977	76.00	.25	1635.00	35.00	39.00	1.00	100.00
15 JUN 1977	52.50	1.20	1208.00	8.50	ISA	2.00	ISA
18 JUN 1977	73.00	.60	1257.00	317.00	360.00	1.00	220.00
26 JUN 1977	119.50	3.60	1453.00	2903.00	5200.00	NAP	130.00
29 JUN 1977	46.00	1.10	1316.00	402.00	400.00	6.00	120.00

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DATA FROM PENN STATE (CONT.)

	H^+ ($\mu\text{MOL/L}$)	$\text{C}_2\text{O}_4^{2-}$ ($\mu\text{MHO/CM}$)	$\text{S}_2\text{O}_3^{2-}$ ($\mu\text{MOL/L}$)	$\text{S}_4\text{O}_6^{2-}$ ($\mu\text{MOL/L}$)	NH_4^+ ($\mu\text{MOL/L}$)	NO_2^- ($\mu\text{MOL/L}$)	NO_3^- ($\mu\text{MOL/L}$)
22 SEP 1976	ISA	ISA	ISA	ISA	ISA	ISA	ISA
27 SEP 1976	141.00	38.00	< .25	49.00	31.00	.23	27.00
28 SEP 1976	120.00	41.00	< .25	42.00	12.00	.12	34.00
30 SEP 1976	123.00	ISA	< .25	7.70	ISA	< .10	16.00
2 OCT 1976	54.00	NAP	< .25	21.00	< .80	< .10	11.00
3 OCT 1976	ISA	ISA	ISA	ISA	ISA	ISA	ISA
7 OCT 1976	ISA	ISA	ISA	ISA	ISA	ISA	ISA
9 OCT 1976	25.00	9.50	< .25	14.00	14.00	< .10	8.40
10 OCT 1976	19.00	7.30	< .25	4.50	< .80	< .10	6.60
14 OCT 1976	54.00	ISA	.40	36.00	49.00	.49	49.00
15 OCT 1976	ISA	ISA	ISA	ISA	ISA	ISA	ISA
16 OCT 1976	107.00	ISA	< .25	58.00	42.00	< .10	53.00
18 OCT 1976	ISA	ISA	ISA	ISA	ISA	ISA	ISA
19 OCT 1976	NAP	NAP	NAP	NAP	NAP	NAP	NAP
21 OCT 1976	30.00	14.00	.40	14.00	< .80	.23	7.60
22 OCT 1976	ISA	ISA	ISA	ISA	ISA	ISA	ISA
25 OCT 1976	62.00	27.00	< .25	28.00	14.00	.11	21.00
26 OCT 1976	72.00	30.00	< .25	27.00	5.80	.22	26.00
31 OCT 1976	39.00	17.00	6.50	13.00	3.50	< .20	15.00
1 NOV 1976	ISA	ISA	ISA	ISA	ISA	ISA	ISA
4 NOV 1976	160.00	71.00	.20	38.00	54.00	.78	175.00
8 NOV 1976	NAP	NAP	< .20	21.00	44.00	NAP	34.00
10 NOV 1976	74.00	47.00	< .20	30.00	36.00	.54	85.00

DATA FROM PENN STATE (CONT.)

	H^+ ($\mu\text{MOL/L}$)	$\text{C} \begin{smallmatrix} \text{O} \\ \text{N} \\ \text{D} \\ \text{U} \\ \text{C} \end{smallmatrix} \text{T}$ ($\mu\text{MHO/CM}$)	$\text{S} \begin{smallmatrix} \text{O}^2 \end{smallmatrix}$ ($\mu\text{MOL/L}$)	$\text{S} \begin{smallmatrix} \text{O}^4 \end{smallmatrix}$ ($\mu\text{MOL/L}$)	$\text{N} \begin{smallmatrix} \text{H}^4 \end{smallmatrix}$ ($\mu\text{MOL/L}$)	$\text{N} \begin{smallmatrix} \text{O}^2 \end{smallmatrix}$ ($\mu\text{MOL/L}$)	$\text{N} \begin{smallmatrix} \text{O}^3 \end{smallmatrix}$ ($\mu\text{MOL/L}$)
11 NOV 1976	ISA	ISA	ISA	ISA	ISA	ISA	ISA
28 NOV 1976	NAP	NAP	NAP	10.00	NAP	NAP	14.00
30 NOV 1976	56.00	22.00	< .20	16.00	8.90	.10	20.00
3 DEC 1976	NAP	NAP	NAP	29.00	NAP	NAP	96.00
5 DEC 1976	NAP	NAP	NAP	45.00	NAP	NAP	147.00
8 DEC 1976	45.00	17.00	2.30	11.00	5.70	.27	18.00
14 DEC 1976	20.00	9.80	ISA	8.60	ISA	ISA	12.00
20 DEC 1976	140.00	59.00	ISA	49.00	ISA	ISA	85.00
22 DEC 1976	55.00	22.00	.33	21.00	12.00	.20	21.00
24 DEC 1976	70.00	34.00	ISA	22.00	ISA	ISA	104.00
28 DEC 1976	55.00	24.00	< .10	10.00	9.30	.28	65.00
30 DEC 1976	100.00	43.00	ISA	23.00	ISA	ISA	99.00
2 JAN 1977	55.00	40.00	.29	30.00	35.00	.88	140.00
4 JAN 1977	45.00	17.00	< .10	5.10	2.00	.21	28.00
8 JAN 1977	NAP	NAP	< .10	13.00	7.20	.19	61.00
11 JAN 1977	NAP	NAP	< .10	12.00	4.00	.16	29.00
15 JAN 1977	NAP	NAP	< .10	4.50	3.00	.22	28.00
25 JAN 1977	NAP	NAP	< .10	3.90	3.90	.20	43.00
26 JAN 1977	ISA	ISA	.18	26.00	ISA	.34	140.00
27 JAN 1977	ISA	ISA	ISA	12.00	ISA	ISA	74.00
1 FEB 1977	ISA	ISA	ISA	25.00	ISA	ISA	43.00
4 FEB 1977	80.00	42.00	NAP	13.00	9.10	< .08	79.00
5 FEB 1977	65.00	32.00	< .10	8.60	9.40	.10	63.00

DATA FROM PENN STATE (CONT.)

	H^+ ($\mu\text{MOL/L}$)	CO_3^{2-} ($\mu\text{MHO/CM}$)	SO_4^{2-} ($\mu\text{MOL/L}$)	SO_4^{2-} ($\mu\text{MOL/L}$)	NH_4^+ ($\mu\text{MOL/L}$)	NO_2^- ($\mu\text{MOL/L}$)	NO_3^- ($\mu\text{MOL/L}$)
13 FEB 1977	110.00	64.00	NAP	59.00	NAP	NAP	84.00
15 FEB 1977	ISA	ISA	ISA	26.00	40.00	ISA	72.00
21 FEB 1977	70.00	38.00	< .10	12.00	18.00	.15	72.00
25 FEB 1977	40.00	17.00	.33	18.00	11.00	.10	15.00
5 MAR 1977	35.00	15.00	< .10	17.00	7.50	.19	13.00
14 MAR 1977	20.00	8.80	< .10	8.60	7.40	.29	11.00
16 MAR 1977	ISA	ISA	.52	84.00	ISA	1.00	170.00
19 MAR 1977	65.00	25.00	.28	27.00	19.00	.20	38.00
21 MAR 1977	60.00	23.00	.14	20.00	15.00	.35	33.00
23 MAR 1977	66.00	25.00	.47	21.00	13.00	.30	29.00
24 MAR 1977	ISA	ISA	.14	43.00	ISA	.11	190.00
29 MAR 1977	83.00	32.00	.21	22.00	5.30	.42	30.00
31 MAR 1977	ISA	ISA	.30	51.00	31.00	.51	49.00
3 APR 1977	48.00	17.00	< .10	17.00	9.30	.24	12.00
6 APR 1977	58.00	28.00	.19	21.00	10.00	.20	38.00
7 APR 1977	ISA	ISA	.28	49.00	ISA	.66	97.00
8 APR 1977	15.00	15.00	.68	21.00	ISA	.08	30.00
20 APR 1977	280.00	130.00	< .10	140.00	86.00	.37	160.00
25 APR 1977	110.00	49.00	< .10	45.00	16.00	.11	45.00
29 APR 1977	MOE	MOE	MOE	MOE	MOE	MOE	MOE
3 MAY 1977	MOE	MOE	MOE	MOE	MOE	MOE	MOE
6 MAY 1977	190.00	110.00	< .10	90.00	45.00	.17	76.00
7 MAY 1977	96.00	43.00	< .10	43.00	25.00	.10	45.00

DATA FROM PENN STATE (CONT.)

	H^+ (UMOL/L)	CO_2 (UMHO/CM)	SO_4^{2-} (UMOL/L)	SO_4^{2-} (UMOL/L)	NH_4^+ (UMOL/L)	NO_3^- (UMOL/L)	NO_3^- (UMOL/L)
20 MAY 1977	ISA	ISA	22	85.00	48.00	.19	62.00
2 JUN 1977	ISA	ISA	16	75.00	55.00	.63	89.00
7 JUN 1977	81.00	37.00	20	38.00	17.00	.22	22.00
10 JUN 1977	52.00	23.00	20	18.00	5.00	.49	19.00
13 JUN 1977	ISA	ISA	ISA	49.00	3.40	.33	25.00
15 JUN 1977	ISA	ISA	ISA	150.00	ISA	ISA	150.00
18 JUN 1977	200.00	87.00	20	110.00	42.00	.26	39.00
26 JUN 1977	120.00	49.00	20	59.00	25.00	.38	35.00
29 JUN 1977	110.00	47.00	NAP	48.00	9.50	NAP	28.00

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DATA FROM PENN STATE (CONT.)

	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)
22 SEP 1976	ISA	ISA	ISA	NAP	NAP	ISA	NAP
27 SEP 1976	.85	< .10	.26	NAP	NAP	.77	NAP
28 SEP 1976	< .20	< .10	.87	NAP	NAP	< .20	NAP
30 SEP 1976	11.00	< .10	ISA	NAP	NAP	< .20	NAP
2 OCT 1976	2.50	1.30	.09	NAP	NAP	< .20	NAP
3 OCT 1976	ISA	ISA	ISA	NAP	NAP	ISA	NAP
7 OCT 1976	ISA	ISA	ISA	NAP	NAP	ISA	NAP
9 OCT 1976	< .20	< .10	.09	NAP	NAP	.30	NAP
10 OCT 1976	< .20	< .10	.17	NAP	NAP	.30	NAP
14 OCT 1976	8.20	< .10	.35	NAP	NAP	.50	NAP
15 OCT 1976	ISA	ISA	ISA	NAP	NAP	ISA	NAP
16 OCT 1976	22.00	< .10	.44	NAP	NAP	.30	NAP
18 OCT 1976	ISA	ISA	ISA	NAP	NAP	ISA	NAP
19 OCT 1976	NAP	NAP	NAP	NAP	NAP	NAP	NAP
21 OCT 1976	5.10	< .10	.61	NSC	NSC	< .20	NSC
22 OCT 1976	ISA	ISA	ISA	NAP	NAP	ISA	NAP
25 OCT 1976	< .20	1.80	.17	NAP	NAP	< .20	NAP
26 OCT 1976	< .20	< .10	.09	NSC	NSC	< .20	NSC
31 OCT 1976	< .20	< .10	.17	NAP	NAP	< .20	NAP
1 NOV 1976	ISA	ISA	ISA	NAP	NAP	ISA	NAP
4 NOV 1976	3.10	1.00	.09	NAP	NAP	.31	NAP
8 NOV 1976	1.70	31.00	.39	NAP	NAP	< .20	NAP
10 NOV 1976	55.00	4.30	2.30	NAP	NAP	< .20	NAP

DATA FROM PENN STATE (CONT.)

	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)
11 NOV 1976	ISA	ISA	ISA	ISA	ISA	ISA	ISA
25 NOV 1976	48.00	< .40	2.40	NAP	NAP	1.20	NAP
30 NOV 1976	< .30	< .40	.04	NAP	NAP	< .20	NAP
3 DEC 1976	19.00	< .40	1.10	NAP	NAP	.36	NAP
5 DEC 1976	14.00	.42	.09	NAP	NAP	.51	NAP
8 DEC 1976	.30	< .40	NAP	NAP	NAP	NAP	NAP
14 DEC 1976	8.70	< .40	NAP	NAP	NAP	NAP	NAP
20 DEC 1976	13.00	< .40	NAP	NAP	NAP	NAP	NAP
22 DEC 1976	7.60	< .40	NAP	NAP	NAP	NAP	NAP
24 DEC 1976	45.00	.59	NAP	NAP	NAP	NAP	NAP
28 DEC 1976	9.90	.41	NAP	NAP	NAP	NAP	NAP
30 DEC 1976	39.00	< .40	NAP	NAP	NAP	NAP	NAP
2 JAN 1977	49.00	.64	NAP	NAP	NAP	NAP	NAP
4 JAN 1977	12.00	< .40	NAP	NAP	NAP	NAP	NAP
8 JAN 1977	< .30	< .40	6.10	NAP	NAP	7.00	NAP
11 JAN 1977	< .30	< .40	18.00	NAP	NAP	.20	NAP
15 JAN 1977	< .30	< .40	2.60	NAP	NAP	< .30	NAP
25 JAN 1977	< .30	< .40	3.00	NAP	NAP	< .30	NAP
26 JAN 1977	33.00	< .40	14.00	NAP	NAP	1.90	NAP
27 JAN 1977	9.90	< .40	5.00	NAP	NAP	2.50	NAP
1 FEB 1977	7.80	< .40	5.30	NAP	NAP	2.40	NAP
4 FEB 1977	11.00	< .40	< .40	NAP	NAP	< .30	NAP
5 FEB 1977	10.00	< .40	< .40	NAP	NAP	< .30	NAP

DATA FROM PENN STATE (CONT.)

	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)
13 FEB 1977	12.00	< .40	8.00	NAP	NAP	4.40	NAP
15 FEB 1977	2.60	< .40	2.60	NAP	NAP	< .30	NAP
21 FEB 1977	2.00	< .40	2.20	NSC	NSC	3.70	NSC
25 FEB 1977	6.60	< .40	NAP	NAP	NAP	NAP	NAP
5 MAR 1977	< .40	< .40	NAP	NAP	NAP	NAP	NAP
14 MAR 1977	3.40	< .40	NAP	NAP	NAP	NAP	NAP
16 MAR 1977	18.00	< .40	NAP	NAP	NAP	NAP	NAP
19 MAR 1977	< .30	< .40	NAP	NAP	NAP	NAP	NAP
21 MAR 1977	2.50	< .40	NAP	NAP	NAP	NAP	NAP
23 MAR 1977	4.80	< .40	NAP	NAP	NAP	NAP	NAP
24 MAR 1977	3.60	< .40	NAP	NAP	NAP	NAP	NAP
29 MAR 1977	.56	< .40	NAP	NAP	NAP	NAP	NAP
31 MAR 1977	11.00	< .40	NAP	NAP	NAP	NAP	NAP
3 APR 1977	< .40	< .40	NAP	NAP	NAP	NAP	NAP
6 APR 1977	< .40	< .40	NAP	NAP	NAP	NAP	NAP
7 APR 1977	76.00	< .40	NAP	NAP	NAP	NAP	NAP
8 APR 1977	< .40	< .40	NAP	NAP	NAP	NAP	NAP
20 APR 1977	14.00	< .40	NAP	NAP	NAP	NAP	NAP
25 APR 1977	5.50	< .40	NAP	NAP	NAP	NAP	NAP
29 APR 1977	MOE	MOE	NAP	NAP	NAP	NAP	NAP
3 MAY 1977	MOE	MOE	NAP	NAP	NAP	NAP	NAP
6 MAY 1977	2.70	< .40	NAP	NAP	NAP	NAP	NAP
7 MAY 1977	7.00	< .40	NAP	NAP	NAP	NAP	NAP

DATA FROM PENN STATE (CONT.)

	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)
20 MAY 1977	< 3.00	< .40	NAP	NAP	NAP	NAP	NAP
2 JUN 1977	16.00	< .40	NAP	NAP	NAP	NAP	NAP
7 JUN 1977	NAP	< .40	NAP	NAP	NAP	NAP	NAP
10 JUN 1977	NAP	< .40	NAP	NAP	NAP	NAP	NAP
13 JUN 1977	5.70	< .40	NAP	NAP	NAP	NAP	NAP
15 JUN 1977	21.00	< .40	NAP	NAP	NAP	NAP	NAP
18 JUN 1977	1.80	< .40	NAP	NAP	NAP	NAP	NAP
26 JUN 1977	6.00	NAP	NAP	NAP	NAP	NAP	NAP
29 JUN 1977	4.50	< .40	NAP	NAP	NAP	NAP	NAP

NSC MEANS NO SAMPLE COLLECTED
 ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
 NAP MEANS NO ANALYSIS PERFORMED
 MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FROM VIRGINIA

	SAMPLE TIME (HOURS)	PREPARED TIME (HOURS)	REMOVED TIME (Z)	SAMPLE VOLUME (ML)	PREPARED VOLUME (ML)	LIOPEN	FIELD CONCENTRATION (UMOL/L)
12 DEC 1976	99.00	18.50	2100.00	255.00	60.00	NAP	NAP
17 DEC 1976	116.00	20.00	1700.00	112.00	28.00	NAP	NAP
20 DEC 1976	72.00	18.00	1700.00	227.00	55.00	NAP	NAP
30 DEC 1976	237.00	10.00	1410.00	108.00	28.00	NAP	NAP
18 JAN 1977	98.00	9.00	1900.00	325.00	NAP	NAP	69.00
15 FEB 1977	669.00	3.00	1530.00	39.00	NAP	NAP	ISA
25 FEB 1977	247.50	4.50	2300.00	495.00	NAP	NAP	25.00
1 MAR 1977	138.00	5.00	1700.00	46.00	NAP	NAP	ISA
5 MAR 1977	101.00	7.00	2200.00	480.00	NAP	NAP	98.00
13 MAR 1977	190.00	19.00	1430.00	1530.00	NAP	NAP	11.00
19 MAR 1977	144.00	1.00	1400.00	175.00	NAP	NAP	23.00
20 MAR 1977	26.50	12.00	1630.00	338.00	NAP	NAP	72.00
24 MAR 1977	92.00	6.00	1200.00	72.00	NAP	NAP	30.00
29 MAR 1977	119.00	10.00	1100.00	23.00	NAP	NAP	100.00
6 APR 1977	194.00	NAP	1300.00	2255.00	NAP	NAP	66.00
24 APR 1977	433.00	10.00	1400.00	270.00	NAP	NAP	20.00
30 APR 1977	137.00	13.00	1200.00	35.00	NAP	NAP	58.00
5 MAY 1977	129.00	26.00	2100.00	411.00	NAP	NAP	110.00
26 MAY 1977	141.00	24.00	1200.00	850.00	NAP	NAP	23.00
31 MAY 1977	120.00	12.00	1200.00	1920.00	NAP	NAP	190.00
3 JUN 1977	73.00	1.00	1300.00	395.00	NAP	NAP	79.00
10 JUN 1977	167.00	18.00	1200.00	155.00	NAP	NAP	89.00
16 JUN 1977	141.00	24.00	900.00	720.00	NAP	NAP	140.00

DATA FROM VIRGINIA

(CONT.)

	TIME (HOURS)	TIME (HOURS)	TIME (Z)	SAMPLE (ML)	RECEIVED (ML)	RECEIVED (ML)	RECEIVED (UMOL/L)
28 JUN 1977	287.50	1.00	1230.00	215.00	NAP	NAP	68.00

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 MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FROM VIRGINIA (CONT.)

	H^+ ($\mu\text{MOL/L}$)	CONDUCT ($\mu\text{MHO/CM}$)	SO_4^{2-} ($\mu\text{MOL/L}$)	SO_4^{2-} ($\mu\text{MOL/L}$)	NH_4^+ ($\mu\text{MOL/L}$)	NO_2^- ($\mu\text{MOL/L}$)	NO_3^- ($\mu\text{MOL/L}$)
12 DEC 1976	90.00	40.00	< .10	40.00	12.00	.31	33.00
17 DEC 1976	30.00	10.00	< .10	6.70	.90	.39	8.20
20 DEC 1976	30.00	12.00	< .10	11.00	3.40	.37	10.00
30 DEC 1976	ISA	ISA	< .10	9.10	< .80	.10	6.20
18 JAN 1977	50.00	21.00	.10	22.00	1.90	.17	13.00
15 FEB 1977	ISA	ISA	< .10	35.00	6.70	.29	34.00
25 FEB 1977	20.00	13.00	< .10	13.00	9.20	.20	12.00
1 MAR 1977	ISA	ISA	< .10	25.00	11.00	.45	27.00
5 MAR 1977	110.00	67.00	< .10	71.00	32.00	.35	53.00
13 MAR 1977	7.80	6.10	< .10	5.90	5.40	.12	4.10
19 MAR 1977	7.60	17.00	.16	32.00	25.00	.43	30.00
20 MAR 1977	71.00	33.00	< .10	26.00	16.00	.22	40.00
24 MAR 1977	26.00	12.00	< .10	13.00	7.50	.27	11.00
29 MAR 1977	ISA	ISA	< .10	72.00	ISA	.14	70.00
6 APR 1977	56.00	27.00	< .10	23.00	13.00	.30	23.00
24 APR 1977	25.00	13.00	< .20	9.40	3.60	.14	11.00
30 APR 1977	ISA	ISA	.66	42.00	54.00	.18	44.00
5 MAY 1977	110.00	51.00	< .20	58.00	36.00	.12	48.00
26 MAY 1977	15.00	7.20	< .20	5.50	3.50	.20	7.50
31 MAY 1977	170.00	72.00	< .20	86.00	41.00	.64	59.00
3 JUN 1977	56.00	41.00	< .20	63.00	56.00	.67	61.00
10 JUN 1977	100.00	47.00	.25	50.00	20.00	.08	49.00
16 JUN 1977	110.00	50.00	< .20	58.00	25.00	.17	33.00

DATA FROM VIRGINIA (CONT.)

	(UMOL/L)	(UMHO/CM)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)
28 JUN 1977	65.00	28.00	NAP	29.00	< .70	NAP	24.00

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 MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FROM VIRGINIA (CONT.)

	(C L) (UMOL/L)	(P O 4) (UMOL/L)	(N R) (UMOL/L)	(M G) (UMOL/L)	(A L) (UMOL/L)	(K) (UMOL/L)	(C A) (UMOL/L)
12 DEC 1976	37.00	< .40	NAP	NAP	NAP	NAP	NAP
17 DEC 1976	6.10	< .40	NAP	NAP	NAP	NAP	NAP
20 DEC 1976	1.70	< .40	NAP	NAP	NAP	NAP	NAP
30 DEC 1976	NAP	< .40	NAP	NAP	NAP	NAP	NAP
18 JAN 1977	< .40	< .40	NAP	NAP	NAP	NAP	NAP
15 FEB 1977	5.60	< .40	NAP	NAP	NAP	NAP	NAP
25 FEB 1977	15.00	< .40	NAP	NAP	NAP	NAP	NAP
1 MAR 1977	28.00	< .40	NAP	NAP	NAP	NAP	NAP
5 MAR 1977	210.00	< .40	NAP	NAP	NAP	NAP	NAP
13 MAR 1977	MOE	< .40	NAP	NAP	NAP	NAP	NAP
19 MAR 1977	MOE	< .40	NAP	NAP	NAP	NAP	NAP
20 MAR 1977	MOE	< .40	NAP	NAP	NAP	NAP	NAP
24 MAR 1977	MOE	< .40	NAP	NAP	NAP	NAP	NAP
29 MAR 1977	MOE	< .40	NAP	NAP	NAP	NAP	NAP
6 APR 1977	MOE	< .40	NAP	NAP	NAP	NAP	NAP
24 APR 1977	8.10	< .40	NAP	NAP	NAP	NAP	NAP
30 APR 1977	14.00	< .40	NAP	NAP	NAP	NAP	NAP
5 MAY 1977	4.80	< .40	NAP	NAP	NAP	NAP	NAP
26 MAY 1977	4.00	< .40	NAP	NAP	NAP	NAP	NAP
31 MAY 1977	NAP	< .40	NAP	NAP	NAP	NAP	NAP
3 JUN 1977	12.00	< .40	NAP	NAP	NAP	NAP	NAP
10 JUN 1977	13.00	< .40	NAP	NAP	NAP	NAP	NAP
16 JUN 1977	3.40	< .40	NAP	NAP	NAP	NAP	NAP

DATA FROM VIRGINIA (CONT.)

	(C L -)	(P O 4 -)	(N A +)	(M G +)	(A L +)	(K +)	(C A +)
	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)	(UMOL/L)
28 JUN 1977	10.00	< .40	NAP	NAP	NAP	NAP	NAP

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 NAP MEANS NO ANALYSIS PERFORMED
 MOE MEANS MALFUNCTION OP OPERATOR ERROR

DATA FOR SAMP. TIME (HOURS)

	H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
22 SEP 1976	NSC	NSC	24.00	NSC
27 SEP 1976	NSC	NSC	120.00	NSC
28 SEP 1976	NSC	NSC	24.00	NSC
30 SEP 1976	NSC	NSC	48.00	NSC
2 OCT 1976	NSC	NSC	24.00	NSC
3 OCT 1976	NSC	NSC	24.00	NSC
7 OCT 1976	NSC	NSC	96.00	NSC
9 OCT 1976	NSC	NSC	48.00	NSC
10 OCT 1976	NSC	NSC	24.00	NSC
11 OCT 1976	96.00	NSC	NSC	NSC
14 OCT 1976	NSC	NSC	96.00	NSC
15 OCT 1976	NSC	NSC	24.00	NSC
16 OCT 1976	NSC	NSC	24.00	NSC
18 OCT 1976	NSC	NSC	48.00	NSC
19 OCT 1976	NSC	NSC	NAP	NSC
20 OCT 1976	216.00	NSC	NSC	NSC
21 OCT 1976	18.00	NSC	72.00	NSC
22 OCT 1976	NSC	NSC	24.00	NSC
25 OCT 1976	NSC	NSC	67.00	NSC
26 OCT 1976	NSC	72.00	24.00	NSC
29 OCT 1976	194.00	NSC	NSC	NSC
31 OCT 1976	NSC	NSC	122.00	NSC
1 NOV 1976	54.00	96.00	24.00	NSC
4 NOV 1976	NSC	NSC	72.00	NSC

DATA FOR SAMP. TIME (HOURS)

(CONT.)

	H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
8 NOV 1976	NSC	NSC	100.00	NSC
9 NOV 1976	212.00	NSC	NSC	NSC
10 NOV 1976	NSC	NSC	44.00	NSC
11 NOV 1976	NSC	NSC	24.00	NSC
27 NOV 1976	424.00	NSC	NSC	NSC
28 NOV 1976	NSC	NSC	60.00	NSC
30 NOV 1976	NSC	456.00	38.00	NSC
3 DEC 1976	NSC	NSC	70.00	NSC
5 DEC 1976	NSC	NSC	48.00	NSC
6 DEC 1976	NSC	NAP	NSC	NSC
7 DEC 1976	248.00	NSC	NSC	NSC
8 DEC 1976	NSC	NSC	72.00	NSC
12 DEC 1976	NSC	NSC	NSC	99.00
14 DEC 1976	NSC	NSC	24.00	NSC
17 DEC 1976	NSC	NSC	NSC	116.00
20 DEC 1976	NSC	NSC	47.00	72.00
21 DEC 1976	334.00	NSC	NSC	NSC
22 DEC 1976	NSC	NSC	54.00	NSC
24 DEC 1976	NSC	NSC	42.00	NSC
28 DEC 1976	NSC	NSC	103.50	NSC
30 DEC 1976	NSC	NSC	43.00	237.00
2 JAN 1977	NSC	NSC	70.00	NSC
4 JAN 1977	NSC	NAP	48.00	NSC
8 JAN 1977	NSC	NAP	96.50	NSC

DATA FOR SAMP. TIME (HOURS)

(CONT.)

H I T E F A C
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T H A C
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P E N S T A T E
V I R G I N I A

10 JAN 1977	476.00	NSC	NSC	NSC
11 JAN 1977	NSC	NAP	72.50	NSC
15 JAN 1977	NSC	NSC	95.50	NSC
18 JAN 1977	NSC	NSC	NSC	98.00
22 JAN 1977	NSC	NAP	NSC	NSC
25 JAN 1977	336.50	NSC	239.50	NSC
26 JAN 1977	NSC	NSC	23.50	NSC
27 JAN 1977	NSC	NAP	24.00	NSC
31 JAN 1977	NSC	NAP	NSC	NSC
1 FEB 1977	168.00	NSC	120.50	NSC
4 FEB 1977	NSC	NSC	71.50	NSC
5 FEB 1977	NSC	NAP	24.00	NSC
6 FEB 1977	118.50	NSC	NSC	NSC
12 FEB 1977	144.50	NSC	NSC	NSC
13 FEB 1977	NSC	NSC	192.00	NSC
14 FEB 1977	50.50	NAP	NSC	NSC
15 FEB 1977	NSC	NSC	24.00	669.00
18 FEB 1977	NSC	96.50	NSC	NSC
19 FEB 1977	128.50	NSC	NSC	NSC
21 FEB 1977	41.00	75.00	97.00	NSC
25 FEB 1977	93.00	NSC	96.00	247.50
1 MAR 1977	96.50	NSC	NSC	138.00
5 MAR 1977	98.50	NSC	120.50	101.00
8 MAR 1977	69.00	NSC	NSC	NSC

DATA FOR SAMP. TIME (HOURS)

(CONT.)

H I T E F A C
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P E N S T A T E
V I R G I N I A

13 MAR 1977	128.00	NSC	NSC	190.00
14 MAR 1977	17.50	NSC	219.00	NSC
15 MAR 1977	NSC	240.00	NSC	NSC
16 MAR 1977	NSC	NSC	44.00	NSC
17 MAR 1977	73.00	NSC	NSC	NSC
19 MAR 1977	NSC	NSC	72.00	144.00
20 MAR 1977	NSC	NSC	NSC	26.50
21 MAR 1977	93.50	140.00	48.00	NSC
23 MAR 1977	45.50	NSC	48.00	NSC
24 MAR 1977	NSC	NSC	24.00	92.00
25 MAR 1977	50.00	99.00	NSC	NSC
29 MAR 1977	96.00	NSC	120.00	119.00
31 MAR 1977	48.00	NSC	48.00	NSC
3 APR 1977	72.00	221.00	73.50	NSC
5 APR 1977	54.50	NSC	NSC	NSC
6 APR 1977	24.00	74.00	75.00	194.00
7 APR 1977	NSC	NSC	20.00	NSC
8 APR 1977	41.50	NSC	28.00	NSC
14 APR 1977	144.00	NSC	NSC	NSC
20 APR 1977	NSC	NSC	24.00	NSC
23 APR 1977	215.00	NSC	NSC	NSC
24 APR 1977	NSC	NSC	NSC	433.00
25 APR 1977	52.00	NSC	119.00	NSC
28 APR 1977	74.00	NSC	NSC	NSC

DATA FOR SAMP. TIME (HOURS) (CONT.)

	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
29 APR 1977	NSC	212.00	MOE	NSC
30 APR 1977	NSC	NSC	NSC	137.00
2 MAY 1977	96.00	NSC	NSC	NSC
3 MAY 1977	NSC	NSC	MOE	NSC
5 MAY 1977	NSC	NSC	NSC	129.00
6 MAY 1977	NSC	MOE	70.00	NSC
7 MAY 1977	NSC	NSC	29.50	NSC
9 MAY 1977	168.00	NSC	NSC	NSC
10 MAY 1977	NSC	MOE	NSC	NSC
13 MAY 1977	91.00	NSC	NSC	NSC
19 MAY 1977	144.00	NSC	NSC	NSC
20 MAY 1977	NSC	NSC	167.00	NSC
26 MAY 1977	NSC	NSC	NSC	141.00
27 MAY 1977	NSC	142.00	NSC	NSC
29 MAY 1977	246.00	NSC	NSC	NSC
31 MAY 1977	NSC	NSC	NSC	120.00
1 JUN 1977	72.00	NSC	NSC	NSC
2 JUN 1977	20.00	NSC	314.00	NSC
3 JUN 1977	NSC	NSC	NSC	73.00
6 JUN 1977	94.00	NSC	NSC	NSC
7 JUN 1977	NSC	NSC	119.50	NSC
8 JUN 1977	48.00	NSC	NSC	NSC
10 JUN 1977	54.00	NSC	71.00	167.00
11 JUN 1977	NSC	95.00	NSC	NSC

DATA FOR SAMP. TIME (HOURS) (CONT.)

	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
13 JUN 1977	NSC	NSC	76.00	NSC
14 JUN 1977	96.00	NSC	NSC	NSC
15 JUN 1977	NSC	NSC	52.50	NSC
16 JUN 1977	NSC	NSC	NSC	141.00
18 JUN 1977	NSC	NSC	73.00	NSC
19 JUN 1977	NSC	190.00	NSC	NSC
20 JUN 1977	138.00	NSC	NSC	NSC
21 JUN 1977	NSC	74.00	NSC	NSC
22 JUN 1977	48.00	NSC	NSC	NSC
26 JUN 1977	NSC	124.00	119.50	NSC
27 JUN 1977	120.00	NSC	NSC	NSC
28 JUN 1977	NSC	NSC	NSC	287.50
29 JUN 1977	NSC	NSC	46.00	NSC

NSC MEANS NO SAMPLE COLLECTED
ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
NAP MEANS NO ANALYSIS PERFORMED
MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FOR PREC. TIME (HOURS)

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DATA FOR PREC. TIME (HOURS)

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22 SEP 1976	NSC	NSC	NAP	NSC	8 NOV 1976	NSC	NSC	NAP	NSC
27 SEP 1976	NSC	NSC	12. 00	NSC	9 NOV 1976	42. 00	NSC	NSC	NSC
28 SEP 1976	NSC	NSC	11. 00	NSC	10 NOV 1976	NSC	NSC	NAP	NSC
30 SEP 1976	NSC	NSC	1. 00	NSC	11 NOV 1976	NSC	NSC	NAP	NSC
2 OCT 1976	NSC	NSC	12. 00	NSC	27 NOV 1976	40. 00	NSC	NSC	NSC
3 OCT 1976	NSC	NSC	. 50	NSC	28 NOV 1976	NSC	NSC	2. 50	NSC
7 OCT 1976	NSC	NSC	2. 00	NSC	30 NOV 1976	NSC	NAP	NAP	NSC
9 OCT 1976	NSC	NSC	NAP	NSC	3 DEC 1976	NSC	NSC	NAP	NSC
10 OCT 1976	NSC	NSC	NAP	NSC	5 DEC 1976	NSC	NSC	3. 50	NSC
11 OCT 1976	NAP	NSC	NSC	NSC	6 DEC 1976	NSC	NAP	NSC	NSC
14 OCT 1976	NSC	NSC	2. 00	NSC	7 DEC 1976	26. 50	NSC	NSC	NSC
15 OCT 1976	NSC	NSC	NAP	NSC	8 DEC 1976	NSC	NSC	15. 00	NSC
16 OCT 1976	NSC	NSC	NAP	NSC	12 DEC 1976	NSC	NSC	NSC	18. 50
18 OCT 1976	NSC	NSC	NAP	NSC	14 DEC 1976	NSC	NSC	NAP	NSC
19 OCT 1976	NSC	NSC	. 50	NSC	17 DEC 1976	NSC	NSC	NSC	20. 00
20 OCT 1976	NAP	NSC	NSC	NSC	20 DEC 1976	NSC	NSC	2. 50	18. 00
21 OCT 1976	NAP	NSC	13. 00	NSC	21 DEC 1976	21. 00	NSC	NSC	NSC
22 OCT 1976	NSC	NSC	NAP	NSC	22 DEC 1976	NSC	NSC	16. 50	NSC
25 OCT 1976	NSC	NSC	NAP	NSC	24 DEC 1976	NSC	NSC	2. 00	NSC
26 OCT 1976	NSC	NAP	NAP	NSC	28 DEC 1976	NSC	NSC	NAP	NSC
29 OCT 1976	62. 00	NSC	NSC	NSC	30 DEC 1976	NSC	NSC	3. 50	10. 00
31 OCT 1976	NSC	NSC	NAP	NSC	2 JAN 1977	NSC	NSC	7. 00	NSC
1 NOV 1976	16. 00	21. 00	NAP	NSC	4 JAN 1977	NSC	NAP	5. 00	NSC
4 NOV 1976	NSC	NSC	NAP	NSC	8 JAN 1977	NSC	NAP	10. 00	NSC

DATA FOR PREC. TIME (HOURS) (CONT.)

	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
10 JAN 1977	22.00	NSC	NSC	NSC
11 JAN 1977	NSC	NAP	15.50	NSC
15 JAN 1977	NSC	NSC	NAP	NSC
18 JAN 1977	NSC	NSC	NSC	9.00
22 JAN 1977	NSC	NAP	NSC	NSC
25 JAN 1977	NAP	NSC	9.00	NSC
26 JAN 1977	NSC	NSC	NAP	NSC
27 JAN 1977	NSC	NAP	NAP	NSC
31 JAN 1977	NSC	NAP	NSC	NSC
1 FEB 1977	32.00	NSC	NAP	NSC
4 FEB 1977	NSC	NSC	NAP	NSC
5 FEB 1977	NSC	NAP	NAP	NSC
6 FEB 1977	56.00	NSC	NSC	NSC
12 FEB 1977	47.00	NSC	NSC	NSC
13 FEB 1977	NSC	NSC	10.00	NSC
14 FEB 1977	31.00	NAP	NSC	NSC
15 FEB 1977	NSC	NSC	NAP	3.00
18 FEB 1977	NSC	8.00	NSC	NSC
19 FEB 1977	14.00	NSC	NSC	NSC
21 FEB 1977	41.00	18.00	NAP	NSC
25 FEB 1977	30.00	NSC	7.00	4.50
1 MAR 1977	28.00	NSC	NSC	5.00
5 MAR 1977	14.00	NSC	18.00	7.00
8 MAR 1977	67.00	NSC	NSC	NSC

DATA FOR PREC. TIME (HOURS) (CONT.)

	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
13 MAR 1977	13.00	NSC	NSC	19.00
14 MAR 1977	17.00	NSC	13.00	NSC
15 MAR 1977	NSC	25.00	NSC	NSC
16 MAR 1977	NSC	NSC	1.00	NSC
17 MAR 1977	10.00	NSC	NSC	NSC
19 MAR 1977	NSC	NSC	11.10	1.00
20 MAR 1977	NSC	NSC	NSC	12.00
21 MAR 1977	15.00	18.00	8.10	NSC
23 MAR 1977	19.00	NSC	9.40	NSC
24 MAR 1977	NSC	NSC	NAP	6.00
25 MAR 1977	17.00	14.00	NSC	NSC
29 MAR 1977	6.00	NSC	9.50	10.00
31 MAR 1977	5.00	NSC	.70	NSC
3 APR 1977	8.00	30.00	13.30	NSC
5 APR 1977	7.00	NSC	NSC	NSC
6 APR 1977	14.00	14.00	9.80	NAP
7 APR 1977	NSC	NSC	1.80	NSC
8 APR 1977	10.00	NSC	.90	NSC
14 APR 1977	6.00	NSC	NSC	NSC
20 APR 1977	NSC	NSC	.70	NSC
23 APR 1977	17.00	NSC	NSC	NSC
24 APR 1977	NSC	NSC	NSC	10.00
25 APR 1977	34.00	NSC	11.00	NSC
28 APR 1977	8.00	NSC	NSC	NSC

DATA FOR PREC. TIME (HOURS) (CONT.)

W H I T E F A C E
I T H A C A
P E N N S T A T E
V I P G I N I A

29 APR 1977	NSC	68.00	MOE	NSC
30 APR 1977	NSC	NSC	NSC	13.00
2 MAY 1977	4.00	NSC	NSC	NSC
3 MAY 1977	NSC	NSC	MOE	NSC
5 MAY 1977	NSC	NSC	NSC	26.00
6 MAY 1977	NSC	MOE	12.40	NSC
7 MAY 1977	NSC	NSC	4.50	NSC
9 MAY 1977	17.00	NSC	NSC	NSC
10 MAY 1977	NSC	MOE	NSC	NSC
13 MAY 1977	2.50	NSC	NSC	NSC
19 MAY 1977	2.00	ISC	NSC	NSC
20 MAY 1977	NSC	NSC	1.60	NSC
26 MAY 1977	NSC	NSC	NSC	24.00
27 MAY 1977	NSC	.50	NSC	NSC
29 MAY 1977	8.00	NSC	NSC	NSC
31 MAY 1977	NSC	NSC	NSC	12.00
1 JUN 1977	2.00	NSC	NSC	NSC
2 JUN 1977	15.00	NSC	.20	NSC
3 JUN 1977	NSC	NSC	NSC	1.00
6 JUN 1977	6.00	NSC	NSC	NSC
7 JUN 1977	NSC	NSC	3.80	NSC
8 JUN 1977	14.00	NSC	NSC	NSC
10 JUN 1977	7.00	NSC	7.60	18.00
11 JUN 1977	NSC	10.00	NSC	NSC

DATA FOR PREC. TIME (HOURS) (CONT.)

W H I T E F A C E
I T H A C A
P E N N S T A T E
V I R G I N I A

13 JUN 1977	NSC	NSC	.25	NSC
14 JUN 1977	6.00	NSC	NSC	NSC
15 JUN 1977	NSC	NSC	1.20	NSC
16 JUN 1977	NSC	NSC	NSC	24.00
18 JUN 1977	NSC	NSC	.60	NSC
19 JUN 1977	NSC	50.00	NSC	NSC
20 JUN 1977	8.50	NSC	NSC	NSC
21 JUN 1977	NSC	3.00	NSC	NSC
22 JUN 1977	7.00	NSC	NSC	NSC
26 JUN 1977	NSC	20.00	3.60	NSC
27 JUN 1977	16.00	NSC	NSC	NSC
28 JUN 1977	NSC	NSC	NSC	1.00
29 JUN 1977	NSC	NSC	1.10	NSC

NSC MEANS NO SAMPLE COLLECTED
ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
NAP MEANS NO ANALYSIS PERFORMED
MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FOR TIME RMVD. (Z)

	H I T E F A C E	T H A C A	P E N S T A T E	V I R G I N A
22 SEP 1976	NSC	NSC	1216.00	NSC
27 SEP 1976	NSC	NSC	1219.00	NSC
28 SEP 1976	NSC	NSC	1232.00	NSC
30 SEP 1976	NSC	NSC	1226.00	NSC
2 OCT 1976	NSC	NSC	1306.00	NSC
3 OCT 1976	NSC	NSC	1220.00	NSC
7 OCT 1976	NSC	NSC	1242.00	NSC
9 OCT 1976	NSC	NSC	1403.00	NSC
10 OCT 1976	NSC	NSC	1213.00	NSC
11 OCT 1976	NAP	NSC	NSC	NSC
14 OCT 1976	NSC	NSC	1214.00	NSC
15 OCT 1976	NSC	NSC	1210.00	NSC
16 OCT 1976	NSC	NSC	1205.00	NSC
18 OCT 1976	NSC	NSC	1213.00	NSC
19 OCT 1976	NSC	NSC	NAP	NSC
20 OCT 1976	NAP	NSC	NSC	NSC
21 OCT 1976	1521.00	NSC	1207.00	NSC
22 OCT 1976	NSC	NSC	1723.00	NSC
25 OCT 1976	NSC	NSC	1212.00	NSC
26 OCT 1976	NSC	NAP	1201.00	NSC
29 OCT 1976	1840.00	NSC	NSC	NSC
31 OCT 1976	NSC	NSC	1307.00	NSC
1 NOV 1976	100.00	NAP	1304.00	NSC
4 NOV 1976	NSC	NSC	1316.00	NSC

DATA FOR TIME RMVD. (Z)

(CONT.)

	H I T E F A C E	T H A C A	P E N S T A T E	V I R G I N A
8 NOV 1976	NSC	NSC	1707.00	NSC
9 NOV 1976	2100.00	NSC	NSC	NSC
10 NOV 1976	NSC	NSC	1316.00	NSC
11 NOV 1976	NSC	NSC	1318.00	NSC
27 NOV 1976	1300.00	NSC	NSC	NSC
28 NOV 1976	NSC	NSC	36.00	NSC
30 NOV 1976	NSC	NAP	1435.00	NSC
3 DEC 1976	NSC	NSC	1315.00	NSC
5 DEC 1976	NSC	NSC	1315.00	NSC
6 DEC 1976	NSC	NAP	NSC	NSC
7 DEC 1976	1930.00	NSC	NSC	NSC
8 DEC 1976	NSC	NSC	1312.00	NSC
12 DEC 1976	NSC	NSC	NSC	2100.00
14 DEC 1976	NSC	NSC	1331.00	NSC
17 DEC 1976	NSC	NSC	NSC	1700.00
20 DEC 1976	NSC	NSC	1309.00	1700.00
21 DEC 1976	1730.00	NSC	NSC	NSC
22 DEC 1976	NSC	NSC	1903.00	NSC
24 DEC 1976	NSC	NSC	1342.00	NSC
28 DEC 1976	NSC	NSC	2102.00	NSC
30 DEC 1976	NSC	NSC	1542.00	1410.00
2 JAN 1977	NSC	NSC	1335.00	NSC
4 JAN 1977	NSC	NAP	1331.00	NSC
8 JAN 1977	NSC	NAP	1400.00	NSC

DATA FOR TIME RMVD. (Z)

(CONT.)

	H I T E R A C E	T H A C A	P E N S T A T E	V I R G I N I A
10 JAN 1977	1330.00	NSC	NSC	NSC
11 JAN 1977	NSC	NAP	1435.00	NSC
15 JAN 1977	NSC	NSC	1351.00	NSC
18 JAN 1977	NSC	NSC	NSC	1900.00
22 JAN 1977	NSC	NAP	NSC	NSC
25 JAN 1977	1400.00	NSC	1318.00	NSC
26 JAN 1977	NSC	NSC	1308.00	NSC
27 JAN 1977	NSC	NAP	1310.00	NSC
31 JAN 1977	NSC	NAP	NSC	NSC
1 FEB 1977	1400.00	NSC	1342.00	NSC
4 FEB 1977	NSC	NSC	1318.00	NSC
5 FEB 1977	NSC	NAP	1333.00	NSC
6 FEB 1977	1230.00	NSC	NSC	NSC
12 FEB 1977	1300.00	NSC	NSC	NSC
13 FEB 1977	NSC	NSC	1357.00	NSC
14 FEB 1977	1530.00	NAP	NSC	NSC
15 FEB 1977	NSC	NSC	1305.00	1530.00
18 FEB 1977	NSC	1600.00	NSC	NSC
19 FEB 1977	2400.00	NSC	NSC	NSC
21 FEB 1977	1700.00	1900.00	1328.00	NSC
25 FEB 1977	1400.00	NSC	1317.00	2300.00
1 MAR 1977	1430.00	NSC	NSC	1700.00
5 MAR 1977	1700.00	NSC	1340.00	2200.00
8 MAR 1977	1400.00	NSC	NSC	NSC

DATA FOR TIME RMVD. (Z)

(CONT.)

	H I T E R A C E	T H A C A	P E N S T A T E	V I R G I N I A
13 MAR 1977	2200.00	NSC	NSC	1430.00
14 MAR 1977	1530.00	NSC	1706.00	NSC
15 MAR 1977	NSC	1400.00	NSC	NSC
16 MAR 1977	NSC	NSC	1256.00	NSC
17 MAR 1977	1630.00	NSC	NSC	NSC
19 MAR 1977	NSC	NSC	1322.00	1400.00
20 MAR 1977	NSC	NSC	NSC	1630.00
21 MAR 1977	1400.00	1500.00	1325.00	NSC
23 MAR 1977	1130.00	NSC	1329.00	NSC
24 MAR 1977	NSC	NSC	1315.00	1200.00
25 MAR 1977	1330.00	1800.00	NSC	NSC
29 MAR 1977	1330.00	NSC	1310.00	1100.00
31 MAR 1977	1330.00	NSC	1318.00	NSC
3 APR 1977	1330.00	1300.00	1448.00	NSC
5 APR 1977	2000.00	NSC	NSC	NSC
6 APR 1977	2000.00	1500.00	1736.00	1300.00
7 APR 1977	NSC	NSC	1310.00	NSC
8 APR 1977	1330.00	NSC	1649.00	NSC
14 APR 1977	1330.00	NSC	NSC	NSC
20 APR 1977	NSC	NSC	1320.00	NSC
23 APR 1977	1200.00	NSC	NSC	NSC
24 APR 1977	NSC	NSC	NSC	1400.00
25 APR 1977	1600.00	NSC	1235.00	NSC
28 APR 1977	1800.00	NSC	NSC	NSC

DATA FOR TIME RMVD. (Z) (CONT.)

	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
29 APR 1977	NSC	1500.00	MOE	NSC
30 APR 1977	NSC	NSC	NSC	1200.00
2 MAY 1977	1800.00	NSC	NSC	NSC
3 MAY 1977	NSC	NSC	MOE	NSC
5 MAY 1977	NSC	NSC	NSC	2100.00
6 MAY 1977	NSC	MOE	1230.00	NSC
7 MAY 1977	NSC	NSC	1800.00	NSC
9 MAY 1977	1800.00	NSC	NSC	NSC
10 MAY 1977	NSC	MOE	NSC	NSC
13 MAY 1977	1300.00	NSC	NSC	NSC
19 MAY 1977	1300.00	NSC	NSC	NSC
20 MAY 1977	NSC	NSC	1200.00	NSC
26 MAY 1977	NSC	NSC	NSC	1200.00
27 MAY 1977	NSC	1400.00	NSC	NSC
29 MAY 1977	1900.00	NSC	NSC	NSC
31 MAY 1977	NSC	NSC	NSC	1200.00
1 JUN 1977	1900.00	NSC	NSC	NSC
2 JUN 1977	1500.00	NSC	1400.00	NSC
3 JUN 1977	NSC	NSC	NSC	1300.00
6 JUN 1977	1300.00	NSC	NSC	NSC
7 JUN 1977	NSC	NSC	1328.00	NSC
8 JUN 1977	1300.00	NSC	NSC	NSC
10 JUN 1977	1900.00	NSC	1236.00	1200.00
11 JUN 1977	NSC	2000.00	NSC	NSC

DATA FOR TIME RMVD. (Z) (CONT.)

	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
13 JUN 1977	NSC	NSC	1635.00	NSC
14 JUN 1977	1900.00	NSC	NSC	NSC
15 JUN 1977	NSC	NSC	1208.00	NSC
16 JUN 1977	NSC	NSC	NSC	900.00
18 JUN 1977	NSC	NSC	1257.00	NSC
19 JUN 1977	NSC	1800.00	NSC	NSC
20 JUN 1977	1300.00	NSC	NSC	NSC
21 JUN 1977	NSC	1500.00	NSC	NSC
22 JUN 1977	1300.00	NSC	NSC	NSC
26 JUN 1977	NSC	1900.00	1453.00	NSC
27 JUN 1977	1300.00	NSC	NSC	NSC
28 JUN 1977	NSC	NSC	NSC	1230.00
29 JUN 1977	NSC	NSC	1316.00	NSC

NSC MEANS NO SAMPLE COLLECTED
 ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
 NAP MEANS NO ANALYSIS PERFORMED
 MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FOR SAMP. VOL. (ML)

	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
22 SEP 1976	NSC	NSC	2.50	NSC
27 SEP 1976	NSC	NSC	485.00	NSC
28 SEP 1976	NSC	NSC	400.00	NSC
30 SEP 1976	NSC	NSC	31.00	NSC
2 OCT 1976	NSC	NSC	174.00	NSC
3 OCT 1976	NSC	NSC	1.00	NSC
7 OCT 1976	NSC	NSC	14.00	NSC
9 OCT 1976	NSC	NSC	530.00	NSC
10 OCT 1976	NSC	NSC	370.00	NSC
11 OCT 1976	510.00	NSC	NSC	NSC
14 OCT 1976	NSC	NSC	165.00	NSC
15 OCT 1976	NSC	NSC	1.00	NSC
16 OCT 1976	NSC	NSC	104.00	NSC
18 OCT 1976	NSC	NSC	8.40	NSC
19 OCT 1976	NSC	NSC	NAP	NSC
20 OCT 1976	225.00	NSC	NSC	NSC
21 OCT 1976	535.00	NSC	530.00	NSC
22 OCT 1976	NSC	NSC	1.00	NSC
25 OCT 1976	NSC	NSC	290.00	NSC
26 OCT 1976	NSC	920.00	830.00	NSC
29 OCT 1976	NAP	NSC	NSC	NSC
31 OCT 1976	NSC	NSC	794.00	NSC
1 NOV 1976	NAP	1020.00	1.00	NSC
4 NOV 1976	NSC	NSC	160.00	NSC

DATA FOR SAMP. VOL. (ML)

(CONT.)

	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
8 NOV 1976	NSC	NSC	101.00	NSC
9 NOV 1976	NAP	NSC	NSC	NSC
10 NOV 1976	NSC	NSC	135.00	NSC
11 NOV 1976	NSC	NSC	1.50	NSC
27 NOV 1976	NAP	NSC	NSC	NSC
28 NOV 1976	NSC	NSC	71.00	NSC
30 NOV 1976	NSC	980.00	415.00	NSC
3 DEC 1976	NSC	NSC	21.00	NSC
5 DEC 1976	NSC	NSC	27.00	NSC
6 DEC 1976	NSC	1090.00	NSC	NSC
7 DEC 1976	NAP	NSC	NSC	NSC
8 DEC 1976	NSC	NSC	1760.00	NSC
12 DEC 1976	NSC	NSC	NSC	255.00
14 DEC 1976	NSC	NSC	53.00	NSC
17 DEC 1976	NSC	NSC	NSC	112.00
20 DEC 1976	NSC	NSC	28.00	227.00
21 DEC 1976	440.00	NSC	NSC	NSC
22 DEC 1976	NSC	NSC	201.00	NSC
24 DEC 1976	NSC	NSC	13.00	NSC
28 DEC 1976	NSC	NSC	414.00	NSC
30 DEC 1976	NSC	NSC	27.00	108.00
2 JAN 1977	NSC	NSC	78.00	NSC
4 JAN 1977	NSC	660.00	149.00	NSC
8 JAN 1977	NSC	500.00	179.00	NSC

DATA FOR SAMP. VOL. (ML)

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10 JAN 1977	580.00	NSC	NSC	NSC
11 JAN 1977	NSC	520.00	573.00	NSC
15 JAN 1977	NSC	NSC	158.00	NSC
18 JAN 1977	NSC	NSC	NSC	325.00
22 JAN 1977	NSC	150.00	NSC	NSC
25 JAN 1977	284.00	NSC	140.00	NSC
26 JAN 1977	NSC	NSC	12.00	NSC
27 JAN 1977	NSC	130.00	21.00	NSC
31 JAN 1977	NSC	150.00	NSC	NSC
1 FEB 1977	107.00	NSC	18.00	NSC
4 FEB 1977	NSC	NSC	111.00	NSC
5 FEB 1977	NSC	160.00	178.00	NSC
6 FEB 1977	330.00	NSC	NSC	NSC
12 FEB 1977	49.00	NSC	NSC	NSC
13 FEB 1977	NSC	NSC	297.00	NSC
14 FEB 1977	145.00	200.00	NSC	NSC
15 FEB 1977	NSC	NSC	40.00	39.00
18 FEB 1977	NSC	40.00	NSC	NSC
19 FEB 1977	60.00	NSC	NSC	NSC
21 FEB 1977	398.00	495.00	356.00	NSC
25 FEB 1977	1055.00	NSC	893.00	495.00
1 MAR 1977	157.00	NSC	NSC	46.00
5 MAR 1977	645.00	NSC	1518.00	480.00
8 MAR 1977	163.00	NSC	NSC	NSC

DATA FOR SAMP. VOL. (ML)

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13 MAR 1977	363.00	NSC	NSC	1530.00
14 MAR 1977	881.00	NSC	1020.00	NSC
15 MAR 1977	NSC	1050.00	NSC	NSC
16 MAR 1977	NSC	NSC	79.00	NSC
17 MAR 1977	232.00	NSC	NSC	NSC
19 MAR 1977	NSC	NSC	1453.00	175.00
20 MAR 1977	NSC	NSC	NSC	338.00
21 MAR 1977	130.00	1400.00	434.00	NSC
23 MAR 1977	1088.00	NSC	385.00	NSC
24 MAR 1977	NSC	NSC	10.00	72.00
25 MAR 1977	326.00	1640.00	NSC	NSC
29 MAR 1977	437.00	NSC	658.00	23.00
31 MAR 1977	533.00	NSC	70.00	NSC
3 APR 1977	263.00	520.00	2436.00	NSC
5 APR 1977	179.00	NSC	NSC	NSC
6 APR 1977	132.00	360.00	841.00	2255.00
7 APR 1977	NSC	NSC	12.00	NSC
8 APR 1977	202.00	NSC	96.00	NSC
14 APR 1977	840.00	NSC	NSC	NSC
20 APR 1977	NSC	NSC	148.00	NSC
23 APR 1977	1110.00	NSC	NSC	NSC
24 APR 1977	NSC	NSC	NSC	270.00
25 APR 1977	2195.00	NSC	944.00	NSC
28 APR 1977	231.00	NSC	NSC	NSC

DATA FOR SAMP VOL. (ML)

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29 APR 1977	NSC	2100.00	MOE	NSC
30 APR 1977	NSC	NSC	NSC	35.00
2 MAY 1977	196.00	NSC	NSC	NSC
3 MAY 1977	NSC	NSC	MOE	NSC
5 MAY 1977	NSC	NSC	NSC	411.00
6 MAY 1977	NSC	MOE	359.00	NSC
7 MAY 1977	NSC	NSC	428.00	NSC
9 MAY 1977	480.00	NSC	NSC	NSC
10 MAY 1977	NSC	MOE	NSC	NSC
13 MAY 1977	143.00	NSC	NSC	NSC
19 MAY 1977	103.00	NSC	NSC	NSC
20 MAY 1977	NSC	NSC	115.00	NSC
26 MAY 1977	NSC	NSC	NSC	850.00
27 MAY 1977	NSC	50.00	NSC	NSC
29 MAY 1977	680.00	NSC	NSC	NSC
31 MAY 1977	NSC	NSC	NSC	1920.00
1 JUN 1977	329.00	NSC	NSC	NSC
2 JUN 1977	535.00	NSC	56.00	NSC
3 JUN 1977	NSC	NSC	NSC	395.00
6 JUN 1977	87.00	NSC	NSC	NSC
7 JUN 1977	NSC	NSC	1475.00	NSC
8 JUN 1977	530.00	NSC	NSC	NSC
10 JUN 1977	90.00	NSC	722.00	155.00
11 JUN 1977	NSC	1410.00	NSC	NSC

DATA FOR SAMP. VOL. (ML)

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13 JUN 1977	NSC	NSC	35. 00	NSC
14 JUN 1977	262. 00	NSC	NSC	NSC
15 JUN 1977	NSC	NSC	8. 50	NSC
16 JUN 1977	NSC	NSC	NSC	720. 00
18 JUN 1977	NSC	NSC	317. 00	NSC
19 JUN 1977	NSC	410. 00	NSC	NSC
20 JUN 1977	790. 00	NSC	NSC	NSC
21 JUN 1977	NSC	210. 00	NSC	NSC
22 JUN 1977	415. 00	NSC	NSC	NSC
26 JUN 1977	NSC	710. 00	2903. 00	NSC
27 JUN 1977	1130. 00	NSC	NSC	NSC
28 JUN 1977	NSC	NSC	NSC	215. 00
29 JUN 1977	NSC	NSC	402. 00	NSC

NSC MEANS NO SAMPLE COLLECTED
ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
NAP MEANS NO ANALYSIS PERFORMED
MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FOR PRED. VOL. (ML)

	W H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
22 SEP 1976	NSC	NSC	NAP	NSC
27 SEP 1976	NSC	NSC	1440.00	NSC
28 SEP 1976	NSC	NSC	440.00	NSC
30 SEP 1976	NSC	NSC	41.00	NSC
2 OCT 1976	NSC	NSC	NAP	NSC
3 OCT 1976	NSC	NSC	9.00	NSC
7 OCT 1976	NSC	NSC	28.00	NSC
9 OCT 1976	NSC	NSC	NAP	NSC
10 OCT 1976	NSC	NSC	NAP	NSC
11 OCT 1976	NAP	NSC	NSC	NSC
14 OCT 1976	NSC	NSC	170.00	NSC
15 OCT 1976	NSC	NSC	NAP	NSC
16 OCT 1976	NSC	NSC	115.00	NSC
18 OCT 1976	NSC	NSC	NAP	NSC
19 OCT 1976	NSC	NSC	14.00	NSC
20 OCT 1976	NAP	NSC	NSC	NSC
21 OCT 1976	1590.00	NSC	1320.00	NSC
22 OCT 1976	NSC	NSC	NAP	NSC
25 OCT 1976	NSC	NSC	NAP	NSC
26 OCT 1976	NSC	NAP	NAP	NSC
29 OCT 1976	870.00	NSC	NSC	NSC
31 OCT 1976	NSC	NSC	NAP	NSC
1 NOV 1976	390.00	1990.00	NAP	NSC
4 NOV 1976	NSC	NSC	220.00	NSC

DATA FOR PRED. VOL. (ML)

(CONT.)

	W H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
8 NOV 1976	NSC	NSC	37.00	NSC
9 NOV 1976	690.00	NSC	NSC	NSC
10 NOV 1976	NSC	NSC	150.00	NSC
11 NOV 1976	NSC	NSC	15A	NSC
27 NOV 1976	610.00	NSC	NSC	NSC
28 NOV 1976	NSC	NSC	83.00	NSC
30 NOV 1976	NSC	1110.00	360.00	NSC
3 DEC 1976	NSC	NSC	32.00	NSC
5 DEC 1976	NSC	NSC	37.00	NSC
6 DEC 1976	NSC	1030.00	NSC	NSC
7 DEC 1976	1030.00	NSC	NSC	NSC
8 DEC 1976	NSC	NSC	1650.00	NSC
12 DEC 1976	NSC	NSC	NSC	60.00
14 DEC 1976	NSC	NSC	NAP	NSC
17 DEC 1976	NSC	NSC	NSC	28.00
20 DEC 1976	NSC	NSC	41.00	55.00
21 DEC 1976	560.00	NSC	NSC	NSC
22 DEC 1976	NSC	NSC	250.00	NSC
24 DEC 1976	NSC	NSC	18.00	NSC
28 DEC 1976	NSC	NSC	NAP	NSC
30 DEC 1976	NSC	NSC	28.00	28.00
2 JAN 1977	NSC	NSC	74.00	NSC
4 JAN 1977	NSC	560.00	133.00	NSC
8 JAN 1977	NSC	505.00	166.00	NSC

DATA FOR PRED. VOL. (ML)

(CONT.)

	W H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
10 JAN 1977	450.00	NSC	NSC	NSC
11 JAN 1977	NSC	550.00	630.00	NSC
15 JAN 1977	NSC	NSC	150.00	NSC
18 JAN 1977	NSC	NSC	NSC	NAP
22 JAN 1977	NSC	505.00	NSC	NSC
25 JAN 1977	145.00	NSC	120.00	NSC
26 JAN 1977	NSC	NSC	14.00	NSC
27 JAN 1977	NSC	285.00	32.00	NSC
31 JAN 1977	NSC	75.00	NSC	NSC
1 FEB 1977	175.00	NSC	NAP	NSC
4 FEB 1977	NSC	NSC	120.00	NSC
5 FEB 1977	NSC	90.00	NAP	NSC
6 FEB 1977	55.00	NSC	NSC	NSC
12 FEB 1977	25.00	NSC	NSC	NSC
13 FEB 1977	NSC	NSC	250.00	NSC
14 FEB 1977	90.00	215.00	NSC	NSC
15 FEB 1977	NSC	NSC	34.00	NAP
18 FEB 1977	NSC	129.00	NSC	NSC
19 FEB 1977	46.00	NSC	NSC	NSC
21 FEB 1977	212.00	870.00	370.00	NSC
25 FEB 1977	1060.00	NSC	995.00	NAP
1 MAR 1977	165.00	NSC	NSC	NAP
5 MAR 1977	585.00	NSC	1645.00	NAP
8 MAR 1977	145.00	NSC	NSC	NSC

DATA FOR PRED. VOL. (ML)

(CONT.)

	W H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
13 MAR 1977	270.00	NSC	NSC	NAP
14 MAR 1977	805.00	NSC	1670.00	NSC
15 MAR 1977	NSC	1060.00	NSC	NSC
16 MAR 1977	NSC	NSC	88.00	NSC
17 MAR 1977	390.00	NSC	NSC	NSC
19 MAR 1977	NSC	NSC	1530.00	NAP
20 MAR 1977	NSC	NSC	NSC	NAP
21 MAR 1977	115.00	1460.00	450.00	NSC
23 MAR 1977	1090.00	NSC	620.00	NSC
24 MAR 1977	NSC	NSC	15.00	NAP
25 MAR 1977	410.00	2320.00	NSC	NSC
29 MAR 1977	390.00	NSC	670.00	NAP
31 MAR 1977	520.00	NSC	64.00	NSC
3 APR 1977	280.00	770.00	2460.00	NSC
5 APR 1977	170.00	NSC	NSC	NSC
6 APR 1977	267.00	430.00	860.00	NAP
7 APR 1977	NSC	NSC	25.00	NSC
8 APR 1977	304.00	NSC	88.00	NSC
14 APR 1977	820.00	NSC	NSC	NSC
20 APR 1977	NSC	NSC	160.00	NSC
23 APR 1977	1100.00	NSC	NSC	NSC
24 APR 1977	NSC	NSC	NSC	NAP
25 APR 1977	2080.00	NSC	1010.00	NSC
28 APR 1977	175.00	NSC	NSC	NSC

DATA FOR PRED. VOL. (ML)

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29 APR 1977	NSC	2070.00	MOE	NSC
30 APR 1977	NSC	NSC	NSC	NAP
2 MAY 1977	165.00	NSC	NSC	NSC
3 MAY 1977	NSC	NSC	MOE	NSC
5 MAY 1977	NSC	NSC	NSC	NAP
6 MAY 1977	NSC	MOE	470.00	NSC
7 MAY 1977	NSC	NSC	460.00	NSC
9 MAY 1977	460.00	NSC	NSC	NSC
10 MAY 1977	NSC	MOE	NSC	NSC
13 MAY 1977	140.00	NSC	NSC	NSC
19 MAY 1977	105.00	NSC	NSC	NSC
20 MAY 1977	NSC	NSC	125.00	NSC
26 MAY 1977	NSC	NSC	NSC	NAP
27 MAY 1977	NSC	115.00	NSC	NSC
29 MAY 1977	640.00	NSC	NSC	NSC
31 MAY 1977	NSC	NSC	NSC	NAP
1 JUN 1977	320.00	NSC	NSC	NSC
2 JUN 1977	500.00	NSC	64.00	NSC
3 JUN 1977	NSC	NSC	NSC	NAP
6 JUN 1977	130.00	NSC	NSC	NSC
7 JUN 1977	NSC	NSC	1460.00	NSC
8 JUN 1977	470.00	NSC	NSC	NSC
10 JUN 1977	115.00	NSC	760.00	NAP
11 JUN 1977	NSC	1570.00	NSC	NSC

DATA FOR PRED. VOL. (ML)

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13 JUN 1977	NSC	NSC	39.00	NSC
14 JUN 1977	280.00	NSC	NSC	NSC
15 JUN 1977	NSC	NSC	ISA	NSC
16 JUN 1977	NSC	NSC	NSC	NAP
18 JUN 1977	NSC	NSC	360.00	NSC
19 JUN 1977	NSC	1200.00	NSC	NSC
20 JUN 1977	750.00	NSC	NSC	NSC
21 JUN 1977	NSC	230.00	NSC	NSC
22 JUN 1977	430.00	NSC	NSC	NSC
26 JUN 1977	NSC	890.00	5200.00	NSC
27 JUN 1977	1130.00	NSC	NSC	NSC
28 JUN 1977	NSC	NSC	NSC	NAP
29 JUN 1977	NSC	NSC	400.00	NSC

NSC MEANS NO SAMPLE COLLECTED
ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
NAP MEANS NO ANALYSIS PERFORMED
MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FOR LID OPEN

W H I T E F A C E
I T H A C A
P E N N S T A T E
V I R G I N I A

22 SEP 1976	NSC	NSC	NAP	NSC
27 SEP 1976	NSC	NSC	6.00	NSC
28 SEP 1976	NSC	NSC	3.00	NSC
30 SEP 1976	NSC	NSC	1.00	NSC
2 OCT 1976	NSC	NSC	4.00	NSC
3 OCT 1976	NSC	NSC	2.00	NSC
7 OCT 1976	NSC	NSC	2.00	NSC
9 OCT 1976	NSC	NSC	13.00	NSC
10 OCT 1976	NSC	NSC	2.00	NSC
11 OCT 1976	NAP	NSC	NSC	NSC
14 OCT 1976	NSC	NSC	3.00	NSC
15 OCT 1976	NSC	NSC	1.00	NSC
16 OCT 1976	NSC	NSC	1.00	NSC
18 OCT 1976	NSC	NSC	NAP	NSC
19 OCT 1976	NSC	NSC	4.00	NSC
20 OCT 1976	NAP	NSC	NSC	NSC
21 OCT 1976	NAP	NSC	5.00	NSC
22 OCT 1976	NSC	NSC	1.00	NSC
25 OCT 1976	NSC	NSC	12.00	NSC
26 OCT 1976	NSC	NAP	4.00	NSC
29 OCT 1976	NAP	NSC	NSC	NSC
31 OCT 1976	NSC	NSC	4.00	NSC
1 NOV 1976	NAP	NAP	3.00	NSC
4 NOV 1976	NSC	NSC	1.00	NSC

DATA FOR LID OPEN

(CONT.)

W H I T E F A C E
I T H A C A
P E N N S T A T E
V I R G I N I A

8 NOV 1976	NSC	NSC	6.00	NSC
9 NOV 1976	NAP	NSC	NSC	NSC
10 NOV 1976	NSC	NSC	1.00	NSC
11 NOV 1976	NSC	NSC	1.00	NSC
27 NOV 1976	NAP	NSC	NSC	NSC
28 NOV 1976	NSC	NSC	3.00	NSC
30 NOV 1976	NSC	NAP	2.00	NSC
3 DEC 1976	NSC	NSC	3.00	NSC
5 DEC 1976	NSC	NSC	2.00	NSC
6 DEC 1976	NSC	NAP	NSC	NSC
7 DEC 1976	NAP	NSC	NSC	NSC
8 DEC 1976	NSC	NSC	1.00	NSC
12 DEC 1976	NSC	NSC	NSC	NAP
14 DEC 1976	NSC	NSC	2.00	NSC
17 DEC 1976	NSC	NSC	NSC	NAP
20 DEC 1976	NSC	NSC	3.00	NAP
21 DEC 1976	NAP	NSC	NSC	NSC
22 DEC 1976	NSC	NSC	11.00	NSC
24 DEC 1976	NSC	NSC	5.00	NSC
28 DEC 1976	NSC	NSC	8.00	NSC
30 DEC 1976	NSC	NSC	5.00	NAP
2 JAN 1977	NSC	NSC	2.00	NSC
4 JAN 1977	NSC	NAP	1.00	NSC
8 JAN 1977	NSC	NAP	2.00	NSC

DATA FOR LID OPEN

(CONT.)

	H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
10 JAN 1977	NAP	NSC	NSC	NSC
11 JAN 1977	NSC	NAP	6.00	NSC
15 JAN 1977	NSC	NSC	NAP	NSC
18 JAN 1977	NSC	NSC	NSC	NAP
22 JAN 1977	NSC	NAP	NSC	NSC
25 JAN 1977	NAP	NSC	NAP	NSC
26 JAN 1977	NSC	NSC	NAP	NSC
27 JAN 1977	NSC	NAP	NAP	NSC
31 JAN 1977	NSC	NAP	NSC	NSC
1 FEB 1977	NAP	NSC	3.00	NSC
4 FEB 1977	NSC	NSC	3.00	NSC
5 FEB 1977	NSC	NAP	4.00	NSC
6 FEB 1977	NAP	NSC	NSC	NSC
12 FEB 1977	NAP	NSC	NSC	NSC
13 FEB 1977	NSC	NSC	NAP	NSC
14 FEB 1977	NAP	NAP	NSC	NSC
15 FEB 1977	NSC	NSC	5.00	NAP
18 FEB 1977	NSC	5.00	NSC	NSC
19 FEB 1977	24.00	NSC	NSC	NSC
21 FEB 1977	1.00	45.00	10.00	NSC
25 FEB 1977	4.00	NSC	3.00	NAP
1 MAR 1977	9.00	NSC	NSC	NAP
5 MAR 1977	10.00	NSC	2.00	NAP
8 MAR 1977	95.00	NSC	NSC	NSC

DATA FOR LID OPEN

(CONT.)

	H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
13 MAR 1977	4.00	NSC	NSC	NAP
14 MAR 1977	5.00	NSC	8.00	NSC
15 MAR 1977	NSC	20.00	NSC	NSC
16 MAR 1977	NSC	NSC	3.00	NSC
17 MAR 1977	20.00	NSC	NSC	NSC
19 MAR 1977	NSC	NSC	4.00	NAP
20 MAR 1977	NSC	NSC	NSC	NAP
21 MAR 1977	11.00	NAP	3.00	NSC
23 MAR 1977	2.00	NSC	2.00	NSC
24 MAR 1977	NSC	NSC	2.00	NAP
25 MAR 1977	6.00	NAP	NSC	NSC
29 MAR 1977	2.00	NSC	4.00	NAP
31 MAR 1977	6.00	NSC	2.00	NSC
3 APR 1977	10.00	24.00	4.00	NSC
5 APR 1977	11.00	NSC	NSC	NSC
6 APR 1977	12.00	NAP	14.00	NAP
7 APR 1977	NSC	NSC	1.00	NSC
8 APR 1977	9.00	NSC	1.00	NSC
14 APR 1977	5.00	NSC	NSC	NSC
20 APR 1977	NSC	NSC	3.00	NSC
23 APR 1977	11.00	NSC	NSC	NSC
24 APR 1977	NSC	NSC	NSC	NAP
25 APR 1977	13.00	NSC	11.00	NSC
28 APR 1977	27.00	NSC	NSC	NSC

DATA FOR LID OPEN

(CONT.)

	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N A
29 APR 1977	NSC	14.00	NAP	NSC
30 APR 1977	NSC	NSC	NSC	NAP
2 MAY 1977	4.00	NSC	NSC	NSC
3 MAY 1977	NSC	NSC	NAP	NSC
5 MAY 1977	NSC	NSC	NSC	NAP
6 MAY 1977	NSC	MOE	10.00	NSC
7 MAY 1977	NSC	NSC	2.00	NSC
9 MAY 1977	27.00	NSC	NSC	NSC
10 MAY 1977	NSC	MOE	NSC	NSC
13 MAY 1977	3.00	NSC	NSC	NSC
19 MAY 1977	1.00	NSC	NSC	NSC
20 MAY 1977	NSC	NSC	4.00	NSC
26 MAY 1977	NSC	NSC	NSC	NAP
27 MAY 1977	NSC	4.00	NSC	NSC
29 MAY 1977	4.00	NSC	NSC	NSC
31 MAY 1977	NSC	NSC	NSC	NAP
1 JUN 1977	5.00	NSC	NSC	NSC
2 JUN 1977	1.00	NSC	4.00	NSC
3 JUN 1977	NSC	NSC	NSC	NAP
6 JUN 1977	7.00	NSC	NSC	NSC
7 JUN 1977	NSC	NSC	10.00	NSC
8 JUN 1977	10.00	NSC	NSC	NSC
10 JUN 1977	12.00	NSC	9.00	NAP
11 JUN 1977	NSC	53.00	NSC	NSC

DATA FOR LID OPEN

(CONT.)

	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N A
13 JUN 1977	NSC	NSC	1.00	NSC
14 JUN 1977	10.00	NSC	NSC	NSC
15 JUN 1977	NSC	NSC	2.00	NSC
16 JUN 1977	NSC	NSC	NSC	NAP
18 JUN 1977	NSC	NSC	1.00	NSC
19 JUN 1977	NSC	64.00	NSC	NSC
20 JUN 1977	10.00	NSC	NSC	NSC
21 JUN 1977	NSC	8.00	NSC	NSC
22 JUN 1977	8.00	NSC	NSC	NSC
26 JUN 1977	NSC	19.00	NAP	NSC
27 JUN 1977	22.00	NSC	NSC	NSC
28 JUN 1977	NSC	NSC	NSC	NAP
29 JUN 1977	NSC	NSC	6.00	NSC

NSC MEANS NO SAMPLE COLLECTED
 ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
 NAP MEANS NO ANALYSIS PERFORMED
 MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FOR FIELD (H+) (UMOL/L)

	H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
22 SEP 1976	NSC	NSC	NAP	NSC
27 SEP 1976	NSC	NSC	140.00	NSC
28 SEP 1976	NSC	NSC	120.00	NSC
30 SEP 1976	NSC	NSC	120.00	NSC
2 OCT 1976	NSC	NSC	54.00	NSC
3 OCT 1976	NSC	NSC	NAP	NSC
7 OCT 1976	NSC	NSC	NAP	NSC
9 OCT 1976	NSC	NSC	25.00	NSC
10 OCT 1976	NSC	NSC	19.00	NSC
11 OCT 1976	NAP	NSC	NSC	NSC
14 OCT 1976	NSC	NSC	54.00	NSC
15 OCT 1976	NSC	NSC	NAP	NSC
16 OCT 1976	NSC	NSC	110.00	NSC
18 OCT 1976	NSC	NSC	NAP	NSC
19 OCT 1976	NSC	NSC	NAP	NSC
20 OCT 1976	11.00	NSC	NSC	NSC
21 OCT 1976	10.00	NSC	30.00	NSC
22 OCT 1976	NSC	NSC	ISA	NSC
25 OCT 1976	NSC	NSC	62.00	NSC
26 OCT 1976	NSC	NAP	65.00	NSC
29 OCT 1976	NAP	NSC	NSC	NSC
31 OCT 1976	NSC	NSC	39.00	NSC
1 NOV 1976	NAP	NAP	ISA	NSC
4 NOV 1976	NSC	NSC	110.00	NSC

DATA FOR FIELD (H+) (UMOL/L) (CONT.)

	H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
8 NOV 1976	NSC	NSC	38.00	NSC
9 NOV 1976	NAP	NSC	NSC	NSC
10 NOV 1976	NSC	NSC	78.00	NSC
11 NOV 1976	NSC	NSC	ISA	NSC
27 NOV 1976	NAP	NSC	NSC	NSC
28 NOV 1976	NSC	NSC	42.00	NSC
30 NOV 1976	NSC	NAP	41.00	NSC
3 DEC 1976	NSC	NSC	81.00	NSC
5 DEC 1976	NSC	NSC	130.00	NSC
6 DEC 1976	NSC	41.00	NSC	NSC
7 DEC 1976	NAP	NSC	NSC	NSC
8 DEC 1976	NSC	NSC	33.00	NSC
12 DEC 1976	NSC	NSC	NSC	NAP
14 DEC 1976	NSC	NSC	19.00	NSC
17 DEC 1976	NSC	NSC	NSC	NAP
20 DEC 1976	NSC	NSC	120.00	NAP
21 DEC 1976	63.00	NSC	NSC	NSC
22 DEC 1976	NSC	NSC	38.00	NSC
24 DEC 1976	NSC	NSC	ISA	NSC
28 DEC 1976	NSC	NSC	32.00	NSC
30 DEC 1976	NSC	NSC	NAP	NAP
2 JAN 1977	NSC	NSC	42.00	NSC
4 JAN 1977	NSC	68.00	38.00	NSC
8 JAN 1977	NSC	60.00	76.00	NSC

DATA FOR FIELD (H+) (UMOL/L) (CONT.)

	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
10 JAN 1977	62.00	NSC	NSC	NSC
11 JAN 1977	NSC	35.00	51.00	NSC
15 JAN 1977	NSC	NSC	32.00	NSC
18 JAN 1977	NSC	NSC	NSC	69.00
22 JAN 1977	NSC	81.00	NSC	NSC
25 JAN 1977	225.00	NSC	54.00	NSC
26 JAN 1977	NSC	NSC	ISA	NSC
27 JAN 1977	NSC	87.00	65.00	NSC
31 JAN 1977	NSC	49.00	NSC	NSC
1 FEB 1977	63.00	NSC	42.00	NSC
4 FEB 1977	NSC	NSC	102.00	NSC
5 FEB 1977	NSC	91.00	79.00	NSC
6 FEB 1977	63.00	NSC	NSC	NSC
12 FEB 1977	224.00	NSC	NSC	NSC
13 FEB 1977	NSC	NSC	151.00	NSC
14 FEB 1977	79.00	138.00	NSC	NSC
15 FEB 1977	NSC	NSC	98.00	ISA
18 FEB 1977	NSC	115.00	NSC	NSC
19 FEB 1977	220.00	NSC	NSC	NSC
21 FEB 1977	160.00	160.00	79.00	NSC
25 FEB 1977	25.00	NSC	39.00	25.00
1 MAR 1977	105.00	NSC	NSC	ISA
5 MAR 1977	38.00	NSC	42.00	98.00
8 MAR 1977	150.00	NSC	NSC	NSC

DATA FOR FIELD (H+) (UMOL/L) (CONT.)

	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
13 MAR 1977	16.00	NSC	NSC	11.00
14 MAR 1977	25.00	NSC	27.00	NSC
15 MAR 1977	NSC	23.00	NSC	NSC
16 MAR 1977	NSC	NSC	79.00	NSC
17 MAR 1977	89.00	NSC	NSC	NSC
19 MAR 1977	NSC	NSC	52.00	23.00
20 MAR 1977	NSC	NSC	NSC	72.00
21 MAR 1977	59.00	29.00	54.00	NSC
23 MAR 1977	14.00	NSC	56.00	NSC
24 MAR 1977	NSC	NSC	ISA	30.00
25 MAR 1977	40.00	26.00	NSC	NSC
29 MAR 1977	43.00	NSC	76.00	100.00
31 MAR 1977	89.00	NSC	63.00	NSC
3 APR 1977	56.00	79.00	47.00	NSC
5 APR 1977	60.00	NSC	NSC	NSC
6 APR 1977	17.00	35.00	65.00	66.00
7 APR 1977	NSC	NSC	ISA	NSC
8 APR 1977	66.00	NSC	50.00	NSC
14 APR 1977	38.00	NSC	NSC	NSC
20 APR 1977	NSC	NSC	310.00	NSC
23 APR 1977	66.00	NSC	NSC	NSC
24 APR 1977	NSC	NSC	NSC	20.00
25 APR 1977	26.00	NSC	100.00	NSC
28 APR 1977	60.00	NSC	NSC	NSC

DATA FOR FIELD (H+) (UMOL/L) (CONT.)

	W H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
29 APR 1977	NSC	96.00	MOE	NSC
30 APR 1977	NSC	NSC	NSC	58.00
2 MAY 1977	110.00	NSC	NSC	NSC
3 MAY 1977	NSC	NSC	MOE	NSC
5 MAY 1977	NSC	NSC	NSC	110.00
6 MAY 1977	NSC	MOE	230.00	NSC
7 MAY 1977	NSC	NSC	96.00	NSC
9 MAY 1977	26.00	NSC	NSC	NSC
10 MAY 1977	NSC	MOE	NSC	NSC
13 MAY 1977	39.00	NSC	NSC	NSC
19 MAY 1977	50.00	NSC	NSC	NSC
20 MAY 1977	NSC	NSC	160.00	NSC
26 MAY 1977	NSC	NSC	NSC	23.00
27 MAY 1977	NSC	200.00	NSC	NSC
29 MAY 1977	150.00	NSC	NSC	NSC
31 MAY 1977	NSC	NSC	NSC	190.00
1 JUN 1977	160.00	NSC	NSC	NSC
2 JUN 1977	79.00	NSC	190.00	NSC
3 JUN 1977	NSC	NSC	NSC	79.00
6 JUN 1977	96.00	NSC	NSC	NSC
7 JUN 1977	NSC	NSC	83.00	NSC
8 JUN 1977	24.00	NSC	NSC	NSC
10 JUN 1977	100.00	NSC	56.00	89.00
11 JUN 1977	NSC	78.00	NSC	NSC

DATA FOR FIELD (H+) (UMOL/L) (CONT.)

	W H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
13 JUN 1977	NSC	NSC	100.00	NSC
14 JUN 1977	51.00	NSC	NSC	NSC
15 JUN 1977	NSC	NSC	ISA	NSC
16 JUN 1977	NSC	NSC	NSC	140.00
18 JUN 1977	NSC	NSC	220.00	NSC
19 JUN 1977	NSC	160.00	NSC	NSC
20 JUN 1977	69.00	NSC	NSC	NSC
21 JUN 1977	NSC	87.00	NSC	NSC
22 JUN 1977	42.00	NSC	NSC	NSC
26 JUN 1977	NSC	78.00	130.00	NSC
27 JUN 1977	130.00	NSC	NSC	NSC
28 JUN 1977	NSC	NSC	NSC	68.00
29 JUN 1977	NSC	NSC	120.00	NSC

NSC MEANS NO SAMPLE COLLECTED
 ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
 NAP MEANS NO ANALYSIS PERFORMED
 MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FOR (H+)

(UMOL/L)

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22 SEP 1976	NSC	NSC	ISA	NSC
27 SEP 1976	NSC	NSC	141.00	NSC
28 SEP 1976	NSC	NSC	120.00	NSC
30 SEP 1976	NSC	NSC	123.00	NSC
2 OCT 1976	NSC	NSC	54.00	NSC
3 OCT 1976	NSC	NSC	ISA	NSC
7 OCT 1976	NSC	NSC	ISA	NSC
9 OCT 1976	NSC	NSC	25.00	NSC
10 OCT 1976	NSC	NSC	19.00	NSC
11 OCT 1976	NAP	NSC	NSC	NSC
14 OCT 1976	NSC	NSC	54.00	NSC
15 OCT 1976	NSC	NSC	ISA	NSC
16 OCT 1976	NSC	NSC	107.00	NSC
18 OCT 1976	NSC	NSC	ISA	NSC
19 OCT 1976	NSC	NSC	NAP	NSC
20 OCT 1976	NAP	NSC	NSC	NSC
21 OCT 1976	NAP	NSC	30.00	NSC
22 OCT 1976	NSC	NSC	ISA	NSC
25 OCT 1976	NSC	NSC	62.00	NSC
26 OCT 1976	NSC	NAP	72.00	NSC
29 OCT 1976	100.00	NSC	NSC	NSC
31 OCT 1976	NSC	NSC	39.00	NSC
1 NOV 1976	NAP	NAP	ISA	NSC
4 NOV 1976	NSC	NSC	160.00	NSC

DATA FOR (H+)

(UMOL/L)

(CONT.)

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8 NOV 1976	NSC	NSC	NAP	NSC
9 NOV 1976	110.00	NSC	NSC	NSC
10 NOV 1976	NSC	NSC	74.00	NSC
11 NOV 1976	NSC	NSC	ISA	NSC
27 NOV 1976	NAP	NSC	NSC	NSC
28 NOV 1976	NSC	NSC	NAP	NSC
30 NOV 1976	NSC	NAP	56.00	NSC
3 DEC 1976	NSC	NSC	NAP	NSC
5 DEC 1976	NSC	NSC	NAP	NSC
6 DEC 1976	NSC	NAP	NSC	NSC
7 DEC 1976	22.00	NSC	NSC	NSC
8 DEC 1976	NSC	NSC	45.00	NSC
12 DEC 1976	NSC	NSC	NSC	90.00
14 DEC 1976	NSC	NSC	20.00	NSC
17 DEC 1976	NSC	NSC	NSC	30.00
20 DEC 1976	NSC	NSC	140.00	30.00
21 DEC 1976	55.00	NSC	NSC	NSC
22 DEC 1976	NSC	NSC	55.00	NSC
24 DEC 1976	NSC	NSC	70.00	NSC
28 DEC 1976	NSC	NSC	55.00	NSC
30 DEC 1976	NSC	NSC	100.00	ISA
2 JAN 1977	NSC	NSC	55.00	NSC
4 JAN 1977	NSC	NAP	45.00	NSC
8 JAN 1977	NSC	NAP	NAP	NSC

DATA FOR (H+)	(UMOL/L)	(CONT.)	STATE	VELOCITY	DATA FOR (H+)	(UMOL/L)	(CONT.)	STATE	VELOCITY
	W H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A		W H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
10 JAN 1977	16.00	NSC	NSC	NSC	13 MAR 1977	15.00	NSC	NSC	7.80
11 JAN 1977	NSC	NAP	NAP	NSC	14 MAR 1977	15.00	NSC	20.00	NSC
15 JAN 1977	NSC	NSC	NAP	NSC	15 MAR 1977	NSC	20.00	NSC	NSC
18 JAN 1977	NSC	NSC	NSC	50.00	16 MAR 1977	NSC	NSC	ISA	NSC
22 JAN 1977	NSC	NAP	NSC	NSC	17 MAR 1977	110.00	NSC	NSC	NSC
25 JAN 1977	NAP	NSC	NAP	NSC	19 MAR 1977	NSC	NSC	65.00	7.60
26 JAN 1977	NSC	NSC	ISA	NSC	20 MAR 1977	NSC	NSC	NSC	71.00
27 JAN 1977	NSC	71.00	ISA	NSC	21 MAR 1977	60.00	32.00	60.00	NSC
31 JAN 1977	NSC	50.00	NSC	NSC	23 MAR 1977	23.00	NSC	66.00	NSC
1 FEB 1977	NAP	NSC	ISA	NSC	24 MAR 1977	NSC	NSC	ISA	26.00
4 FEB 1977	NSC	NSC	80.00	NSC	25 MAR 1977	58.00	33.00	NSC	NSC
5 FEB 1977	NSC	80.00	65.00	NSC	29 MAR 1977	28.00	NSC	83.00	ISA
6 FEB 1977	55.00	NSC	NSC	NSC	31 MAR 1977	89.00	NSC	ISA	NSC
12 FEB 1977	ISA	NSC	NSC	NSC	3 APR 1977	38.00	100.00	48.00	NSC
13 FEB 1977	NSC	NSC	110.00	NSC	5 APR 1977	55.00	NSC	NSC	NSC
14 FEB 1977	70.00	110.00	NSC	NSC	6 APR 1977	15.00	58.00	58.00	56.00
15 FEB 1977	NSC	NSC	ISA	ISA	7 APR 1977	NSC	NSC	ISA	NSC
18 FEB 1977	NSC	ISA	NSC	NSC	8 APR 1977	53.00	NSC	15.00	NSC
19 FEB 1977	90.00	NSC	NSC	NSC	14 APR 1977	17.00	NSC	NSC	NSC
21 FEB 1977	110.00	110.00	70.00	NSC	20 APR 1977	NSC	NSC	280.00	NSC
25 FEB 1977	22.00	NSC	40.00	20.00	23 APR 1977	50.00	NSC	NSC	NSC
1 MAR 1977	80.00	NSC	NSC	ISA	24 APR 1977	NSC	NSC	NSC	25.00
5 MAR 1977	45.00	NSC	35.00	110.00	25 APR 1977	21.00	NSC	110.00	NSC
8 MAR 1977	110.00	NSC	NSC	NSC	28 APR 1977	43.00	NSC	NSC	NSC

DATA FOR (H+)	(UMOL/L)	(CONT.)		
W	I	T	H	A
29 APR 1977	NSC	100.00	MOE	NSC
30 APR 1977	NSC	NSC	NSC	ISA
2 MAY 1977	96.00	NSC	NSC	NSC
3 MAY 1977	NSC	NSC	MOE	NSC
5 MAY 1977	NSC	NSC	NSC	110.00
6 MAY 1977	NSC	MOE	190.00	NSC
7 MAY 1977	NSC	NSC	96.00	NSC
9 MAY 1977	22.00	NSC	NSC	NSC
10 MAY 1977	NSC	MOE	NSC	NSC
13 MAY 1977	16.00	NSC	NSC	NSC
19 MAY 1977	16.00	NSC	NSC	NSC
20 MAY 1977	NSC	NSC	ISA	NSC
26 MAY 1977	NSC	NSC	NSC	15.00
27 MAY 1977	NSC	NAP	NSC	NSC
29 MAY 1977	100.00	NSC	NSC	NSC
31 MAY 1977	NSC	NSC	NSC	170.00
1 JUN 1977	140.00	NSC	NSC	NSC
2 JUN 1977	68.00	NSC	ISA	NSC
3 JUN 1977	NSC	NSC	NSC	56.00
6 JUN 1977	85.00	NSC	NSC	NSC
7 JUN 1977	NSC	NSC	81.00	NSC
8 JUN 1977	19.00	NSC	NSC	NSC
10 JUN 1977	96.00	NSC	52.00	100.00
11 JUN 1977	NSC	68.00	NSC	NSC

DATA FOR (H+)	(UMOL/L)	(CONT.)		
W	I	T	H	A
13 JUN 1977	NSC	NSC	ISA	NSC
14 JUN 1977	48.00	NSC	NSC	NSC
15 JUN 1977	NSC	NSC	ISA	NSC
16 JUN 1977	NSC	NSC	NSC	110.00
18 JUN 1977	NSC	NSC	200.00	NSC
19 JUN 1977	NSC	180.00	NSC	NSC
20 JUN 1977	68.00	NSC	NSC	NSC
21 JUN 1977	NSC	98.00	NSC	NSC
22 JUN 1977	22.00	NSC	NSC	NSC
26 JUN 1977	NSC	85.00	120.00	NSC
27 JUN 1977	110.00	NSC	NSC	NSC
28 JUN 1977	NSC	NSC	NSC	65.00
29 JUN 1977	NSC	NSC	110.00	NSC

NSC MEANS NO SAMPLE COLLECTED
 ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
 NAP MEANS NO ANALYSIS PERFORMED
 MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FOR CONDUCT. (UMHO/CM)

	W H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
22 SEP 1976	NSC	NSC	ISA	NSC
27 SEP 1976	NSC	NSC	38.00	NSC
28 SEP 1976	NSC	NSC	41.00	NSC
30 SEP 1976	NSC	NSC	ISA	NSC
2 OCT 1976	NSC	NSC	NAP	NSC
3 OCT 1976	NSC	NSC	ISA	NSC
7 OCT 1976	NSC	NSC	ISA	NSC
9 OCT 1976	NSC	NSC	9.50	NSC
10 OCT 1976	NSC	NSC	7.30	NSC
11 OCT 1976	5.50	NSC	NSC	NSC
14 OCT 1976	NSC	NSC	ISA	NSC
15 OCT 1976	NSC	NSC	ISA	NSC
16 OCT 1976	NSC	NSC	ISA	NSC
18 OCT 1976	NSC	NSC	ISA	NSC
19 OCT 1976	NSC	NSC	NAP	NSC
20 OCT 1976	21.00	NSC	NSC	NSC
21 OCT 1976	6.00	NSC	14.00	NSC
22 OCT 1976	NSC	NSC	ISA	NSC
25 OCT 1976	NSC	NSC	27.00	NSC
26 OCT 1976	NSC	34.00	30.00	NSC
29 OCT 1976	42.00	NSC	NSC	NSC
31 OCT 1976	NSC	NSC	17.00	NSC
1 NOV 1976	22.00	22.00	ISA	NSC
4 NOV 1976	NSC	NSC	71.00	NSC

DATA FOR CONDUCT. (UMHO/CM) (CONT.)

	W H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
8 NOV 1976	NSC	NSC	NAP	NSC
9 NOV 1976	45.00	NSC	NSC	NSC
10 NOV 1976	NSC	NSC	47.00	NSC
11 NOV 1976	NSC	NSC	ISA	NSC
27 NOV 1976	20.00	NSC	NSC	NSC
28 NOV 1976	NSC	NSC	NAP	NSC
30 NOV 1976	NSC	20.00	22.00	NSC
3 DEC 1976	NSC	NSC	NAP	NSC
5 DEC 1976	NSC	NSC	NAP	NSC
6 DEC 1976	NSC	NAP	NSC	NSC
7 DEC 1976	9.00	NSC	NSC	NSC
8 DEC 1976	NSC	NSC	17.00	NSC
12 DEC 1976	NSC	NSC	NSC	40.00
14 DEC 1976	NSC	NSC	9.80	NSC
17 DEC 1976	NSC	NSC	NSC	10.00
20 DEC 1976	NSC	NSC	59.00	12.00
21 DEC 1976	24.00	NSC	NSC	NSC
22 DEC 1976	NSC	NSC	22.00	NSC
24 DEC 1976	NSC	NSC	34.00	NSC
28 DEC 1976	NSC	NSC	24.00	NSC
30 DEC 1976	NSC	NSC	43.00	ISA
2 JAN 1977	NSC	NSC	40.00	NSC
4 JAN 1977	NSC	NAP	17.00	NSC
8 JAN 1977	NSC	NAP	NAP	NSC

DATA FOR CONDUCT. (UMHO/CM) (CONT.)

	W H I T E F A C E	I T H A C	P E N S T A T E	V I R G I N I A
10 JAN 1977	9.00	NSC	NSC	NSC
11 JAN 1977	NSC	NAP	NAP	NSC
15 JAN 1977	NSC	NSC	NAP	NSC
18 JAN 1977	NSC	NSC	NSC	21.00
22 JAN 1977	NSC	NAP	NSC	NSC
25 JAN 1977	NAP	NSC	NAP	NSC
26 JAN 1977	NSC	NSC	ISA	NSC
27 JAN 1977	NSC	36.00	ISA	NSC
31 JAN 1977	NSC	26.00	NSC	NSC
1 FEB 1977	NAP	NSC	ISA	NSC
4 FEB 1977	NSC	NSC	42.00	NSC
5 FEB 1977	NSC	43.00	32.00	NSC
6 FEB 1977	30.00	NSC	NSC	NSC
12 FEB 1977	ISA	NSC	NSC	NSC
13 FEB 1977	NSC	NSC	64.00	NSC
14 FEB 1977	35.00	63.00	NSC	NSC
15 FEB 1977	NSC	NSC	ISA	ISA
18 FEB 1977	NSC	ISA	NSC	NSC
19 FEB 1977	ISA	NSC	NSC	NSC
21 FEB 1977	60.00	54.00	38.00	NSC
25 FEB 1977	9.40	NSC	17.00	13.00
1 MAR 1977	42.00	NSC	NSC	ISA
5 MAR 1977	15.00	NSC	15.00	67.00
8 MAR 1977	49.00	NSC	NSC	NSC

DATA FOR CONDUCT. (UMHO/CM) (CONT.)

	W H I T E F A C E	I T H A C	P E N S T A T E	V I R G I N I A
13 MAR 1977	5.80	NSC	NSC	6.10
14 MAR 1977	8.40	NSC	8.80	NSC
15 MAR 1977	NSC	9.00	NSC	NSC
16 MAR 1977	NSC	NSC	ISA	NSC
17 MAR 1977	47.00	NSC	NSC	NSC
19 MAR 1977	NSC	NSC	25.00	17.00
20 MAR 1977	NSC	NSC	NSC	33.00
21 MAR 1977	23.00	17.00	23.00	NSC
23 MAR 1977	8.30	NSC	25.00	NSC
24 MAR 1977	NSC	NSC	ISA	12.00
25 MAR 1977	18.00	13.00	NSC	NSC
29 MAR 1977	9.30	NSC	32.00	ISA
31 MAR 1977	36.00	NSC	ISA	NSC
3 APR 1977	22.00	37.00	17.00	NSC
5 APR 1977	27.00	NSC	NSC	NSC
6 APR 1977	16.00	26.00	28.00	27.00
7 APR 1977	NSC	NSC	ISA	NSC
8 APR 1977	27.00	NSC	15.00	NSC
14 APR 1977	19.00	NSC	NSC	NSC
20 APR 1977	NSC	NSC	130.00	NSC
23 APR 1977	23.00	NSC	NSC	NSC
24 APR 1977	NSC	NSC	NSC	13.00
25 APR 1977	10.00	NSC	49.00	NSC
28 APR 1977	33.00	NSC	NSC	NSC

DATA FOR CONDUCT. (UMHO/CM) (CONT.)

	H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
29 APR 1977	NSC	43.00	MOE	NSC
30 APR 1977	NSC	NSC	NSC	ISA
2 MAY 1977	44.00	NSC	NSC	NSC
3 MAY 1977	NSC	NSC	MOE	NSC
5 MAY 1977	NSC	NSC	NSC	51.00
6 MAY 1977	NSC	MOE	110.00	NSC
7 MAY 1977	NSC	NSC	43.00	NSC
9 MAY 1977	16.00	NSC	NSC	NSC
10 MAY 1977	NSC	MOE	NSC	NSC
13 MAY 1977	22.00	NSC	NSC	NSC
19 MAY 1977	13.00	NSC	NSC	NSC
20 MAY 1977	NSC	NSC	ISA	NSC
26 MAY 1977	NSC	NSC	NSC	7.20
27 MAY 1977	NSC	NAP	NSC	NSC
29 MAY 1977	52.00	NSC	NSC	NSC
31 MAY 1977	NSC	NSC	NSC	72.00
1 JUN 1977	66.00	NSC	NSC	NSC
2 JUN 1977	30.00	NSC	ISA	NSC
3 JUN 1977	NSC	NSC	NSC	41.00
6 JUN 1977	43.00	NSC	NSC	NSC
7 JUN 1977	NSC	NSC	33.00	NSC
8 JUN 1977	9.00	NSC	NSC	NSC
10 JUN 1977	39.00	NSC	23.00	47.00
11 JUN 1977	NSC	33.00	NSC	NSC

DATA FOR CONDUCT. (UMHO/CM) (CONT.)

	H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
13 JUN 1977	NSC	NSC	ISA	NSC
14 JUN 1977	23.00	NSC	NSC	NSC
15 JUN 1977	NSC	NSC	ISA	NSC
16 JUN 1977	NSC	NSC	NSC	50.00
18 JUN 1977	NSC	NSC	87.00	NSC
19 JUN 1977	NSC	75.00	NSC	NSC
20 JUN 1977	32.00	NSC	NSC	NSC
21 JUN 1977	NSC	47.00	NSC	NSC
22 JUN 1977	11.00	NSC	NSC	NSC
26 JUN 1977	NSC	36.00	49.00	NSC
27 JUN 1977	49.00	NSC	NSC	NSC
28 JUN 1977	NSC	NSC	NSC	28.00
29 JUN 1977	NSC	NSC	47.00	NSC

NSC MEANS NO SAMPLE COLLECTED
 ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
 NAP MEANS NO ANALYSIS PERFORMED
 MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FOR (SO2) (UMOL/L)

	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
22 SEP 1976	NSC	NSC	ISA	NSC
27 SEP 1976	NSC	NSC	< .25	NSC
28 SEP 1976	NSC	NSC	< .25	NSC
30 SEP 1976	NSC	NSC	< .25	NSC
2 OCT 1976	NSC	NSC	< .25	NSC
3 OCT 1976	NSC	NSC	ISA	NSC
7 OCT 1976	NSC	NSC	ISA	NSC
9 OCT 1976	NSC	NSC	< .25	NSC
10 OCT 1976	NSC	NSC	< .25	NSC
11 OCT 1976	< .25	NSC	NSC	NSC
14 OCT 1976	NSC	NSC	.40	NSC
15 OCT 1976	NSC	NSC	ISA	NSC
16 OCT 1976	NSC	NSC	< .25	NSC
18 OCT 1976	NSC	NSC	ISA	NSC
19 OCT 1976	NSC	NSC	NAP	NSC
20 OCT 1976	< .25	NSC	NSC	NSC
21 OCT 1976	< .25	NSC	.40	NSC
22 OCT 1976	NSC	NSC	ISA	NSC
25 OCT 1976	NSC	NSC	< .25	NSC
26 OCT 1976	NSC	< .25	< .25	NSC
29 OCT 1976	< .20	NSC	NSC	NSC
31 OCT 1976	NSC	NSC	6.50	NSC
1 NOV 1976	< .20	< .20	ISA	NSC
4 NOV 1976	NSC	NSC	.20	NSC

DATA FOR (SO2) (UMOL/L) (CONT.)

	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
8 NOV 1976	NSC	NSC	< .20	NSC
9 NOV 1976	< .20	NSC	NSC	NSC
10 NOV 1976	NSC	NSC	< .20	NSC
11 NOV 1976	NSC	NSC	ISA	NSC
27 NOV 1976	< .20	NSC	NSC	NSC
28 NOV 1976	NSC	NSC	NAP	NSC
30 NOV 1976	NSC	< .20	< .20	NSC
3 DEC 1976	NSC	NSC	NAP	NSC
5 DEC 1976	NSC	NSC	NAP	NSC
6 DEC 1976	NSC	< .10	NSC	NSC
7 DEC 1976	NAP	NSC	NSC	NSC
8 DEC 1976	NSC	NSC	2.30	NSC
12 DEC 1976	NSC	NSC	NSC	< .10
14 DEC 1976	NSC	NSC	ISA	NSC
17 DEC 1976	NSC	NSC	NSC	< .10
20 DEC 1976	NSC	NSC	ISA	< .10
21 DEC 1976	.13	NSC	NSC	NSC
22 DEC 1976	NSC	NSC	.33	NSC
24 DEC 1976	NSC	NSC	ISA	NSC
28 DEC 1976	NSC	NSC	< .10	NSC
30 DEC 1976	NSC	NSC	ISA	< .10
2 JAN 1977	NSC	NSC	.29	NSC
4 JAN 1977	NSC	< .10	< .10	NSC
8 JAN 1977	NSC	< .10	< .10	NSC

DATA FOR (S02)	(UMOL/L)	(CONT.)		
	W H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
10 JAN 1977	< .10	NSC	NSC	NSC
11 JAN 1977	NSC	< .10	< .10	NSC
15 JAN 1977	NSC	NSC	< .10	NSC
18 JAN 1977	NSC	NSC	NSC	.10
22 JAN 1977	NSC	< .10	NSC	NSC
25 JAN 1977	< .13	NSC	< .10	NSC
26 JAN 1977	NSC	NSC	.18	NSC
27 JAN 1977	NSC	< .10	ISA	NSC
31 JAN 1977	NSC	< .13	NSC	NSC
1 FEB 1977	< .13	NSC	ISA	NSC
4 FEB 1977	NSC	NSC	NAP	NSC
5 FEB 1977	NSC	< .13	< .10	NSC
6 FEB 1977	< .10	NSC	NSC	NSC
12 FEB 1977	.15	NSC	NSC	NSC
13 FEB 1977	NSC	NSC	NAP	NSC
14 FEB 1977	< .10	.44	NSC	NSC
15 FEB 1977	NSC	NSC	ISA	< .10
18 FEB 1977	NSC	< .10	NSC	NSC
19 FEB 1977	< .10	NSC	NSC	NSC
21 FEB 1977	< .10	< .10	< .10	NSC
25 FEB 1977	< .10	NSC	.33	< .10
1 MAR 1977	< .10	NSC	NSC	< .10
5 MAR 1977	< .10	NSC	< .10	< .10
8 MAR 1977	< .10	NSC	NSC	NSC

DATA FOR (S02)	(UMOL/L)	(CONT.)		
	W H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
13 MAR 1977	< .10	NSC	NSC	< .10
14 MAR 1977	< .10	NSC	< .10	NSC
15 MAR 1977	NSC	< .10	NSC	NSC
16 MAR 1977	NSC	NSC	.52	NSC
17 MAR 1977	.20	NSC	NSC	NSC
19 MAR 1977	NSC	NSC	.28	.16
20 MAR 1977	NSC	NSC	NSC	< .10
21 MAR 1977	< .10	< .10	.14	NSC
23 MAR 1977	< .10	NSC	.47	NSC
24 MAR 1977	NSC	NSC	.14	< .10
25 MAR 1977	< .10	< .10	NSC	NSC
29 MAR 1977	< .10	NSC	.21	< .10
31 MAR 1977	.19	NSC	.30	NSC
3 APR 1977	< .10	.12	< .10	NSC
5 APR 1977	< .10	NSC	NSC	NSC
6 APR 1977	< .10	< .10	.19	< .10
7 APR 1977	NSC	NSC	.28	NSC
8 APR 1977	< .10	NSC	.68	NSC
14 APR 1977	< .10	NSC	NSC	NSC
20 APR 1977	NSC	NSC	< .10	NSC
23 APR 1977	< .10	NSC	NSC	NSC
24 APR 1977	NSC	NSC	NSC	< .20
25 APR 1977	< .10	NSC	< .10	NSC
28 APR 1977	.16	NSC	NSC	NSC

DATA FOR (SO2)	(UMOL/L)	(CONT.)		
W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A	
29 APR 1977	NSC	< .10	MOE	NSC
30 APR 1977	NSC	NSC	NSC	.66
2 MAY 1977	< .10	NSC	NSC	NSC
3 MAY 1977	NSC	NSC	MOE	NSC
5 MAY 1977	NSC	NSC	NSC	< .20
6 MAY 1977	NSC	MOE	< .10	NSC
7 MAY 1977	NSC	NSC	< .10	NSC
9 MAY 1977	< .10	NSC	NSC	NSC
10 MAY 1977	NSC	MOE	NSC	NSC
13 MAY 1977	.16	NSC	NSC	NSC
19 MAY 1977	.18	NSC	NSC	NSC
20 MAY 1977	NSC	NSC	.22	NSC
26 MAY 1977	NSC	NSC	NSC	< .20
27 MAY 1977	NSC	NAP	NSC	NSC
29 MAY 1977	.20	NSC	NSC	NSC
31 MAY 1977	NSC	NSC	NSC	< .20
1 JUN 1977	< .10	NSC	NSC	NSC
2 JUN 1977	< .20	NSC	.16	NSC
3 JUN 1977	NSC	NSC	NSC	< .20
6 JUN 1977	< .20	NSC	NSC	NSC
7 JUN 1977	NSC	NSC	< .20	NSC
8 JUN 1977	< .20	NSC	NSC	NSC
10 JUN 1977	< .20	NSC	< .20	.25
11 JUN 1977	NSC	< .20	NSC	NSC

DATA FOR (SO2)	(UMOL/L)	(CONT.)		
W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A	
13 JUN 1977	NSC	NSC	ISA	NSC
14 JUN 1977	< .20	NSC	NSC	NSC
15 JUN 1977	NSC	NSC	ISA	NSC
16 JUN 1977	NSC	NSC	NSC	< .20
18 JUN 1977	NSC	NSC	< .20	NSC
19 JUN 1977	NSC	< .20	NSC	NSC
20 JUN 1977	< .20	NSC	NSC	NSC
21 JUN 1977	NSC	< .20	NSC	NSC
22 JUN 1977	< .20	NSC	NSC	NSC
26 JUN 1977	NSC	< .20	< .20	NSC
27 JUN 1977	NAP	NSC	NSC	NSC
28 JUN 1977	NSC	NSC	NSC	NAP
29 JUN 1977	NSC	NSC	NAP	NSC

NSC MEANS NO SAMPLE COLLECTED
 ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
 NAP MEANS NO ANALYSIS PERFORMED
 MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FOR (S04--)

(UMOL/L)

H I T E F A C E
 I T H A C A
 P E N N S T A T E
 V P G I N I A

22 SEP 1976	NSC	NSC	ISA	NSC
27 SEP 1976	NSC	NSC	49.00	NSC
28 SEP 1976	NSC	NSC	42.00	NSC
30 SEP 1976	NSC	NSC	7.70	NSC
2 OCT 1976	NSC	NSC	21.00	NSC
3 OCT 1976	NSC	NSC	ISA	NSC
7 OCT 1976	NSC	NSC	ISA	NSC
9 OCT 1976	NSC	NSC	14.00	NSC
10 OCT 1976	NSC	NSC	4.50	NSC
11 OCT 1976	7.60	NSC	NSC	NSC
14 OCT 1976	NSC	NSC	36.00	NSC
15 OCT 1976	NSC	NSC	ISA	NSC
16 OCT 1976	NSC	NSC	58.00	NSC
18 OCT 1976	NSC	NSC	ISA	NSC
19 OCT 1976	NSC	NSC	NAP	NSC
20 OCT 1976	44.00	NSC	NSC	NSC
21 OCT 1976	5.60	NSC	14.00	NSC
22 OCT 1976	NSC	NSC	ISA	NSC
25 OCT 1976	NSC	NSC	28.00	NSC
26 OCT 1976	NSC	32.00	27.00	NSC
29 OCT 1976	3.00	NSC	NSC	NSC
31 OCT 1976	NSC	NSC	13.00	NSC
1 NOV 1976	14.00	23.00	ISA	NSC
4 NOV 1976	NSC	NSC	38.00	NSC

DATA FOR (S04--)

(UMOL/L)

(CONT.)

H I T E F A C E
 I T H A C A
 P E N N S T A T E
 V P G I N I A

8 NOV 1976	NSC	NSC	21.00	NSC
9 NOV 1976	2.40	NSC	NSC	NSC
10 NOV 1976	NSC	NSC	30.00	NSC
11 NOV 1976	NSC	NSC	ISA	NSC
27 NOV 1976	48.00	NSC	NSC	NSC
28 NOV 1976	NSC	NSC	10.00	NSC
30 NOV 1976	NSC	20.00	16.00	NSC
3 DEC 1976	NSC	NSC	29.00	NSC
5 DEC 1976	NSC	NSC	45.00	NSC
6 DEC 1976	NSC	13.00	NSC	NSC
7 DEC 1976	16.00	NSC	NSC	NSC
8 DEC 1976	NSC	NSC	11.00	NSC
12 DEC 1976	NSC	NSC	NSC	40.00
14 DEC 1976	NSC	NSC	8.60	NSC
17 DEC 1976	NSC	NSC	NSC	6.70
20 DEC 1976	NSC	NSC	49.00	11.00
21 DEC 1976	16.00	NSC	NSC	NSC
22 DEC 1976	NSC	NSC	21.00	NSC
24 DEC 1976	NSC	NSC	22.00	NSC
28 DEC 1976	NSC	NSC	10.00	NSC
30 DEC 1976	NSC	NSC	23.00	9.10
2 JAN 1977	NSC	NSC	30.00	NSC
4 JAN 1977	NSC	10.00	5.10	NSC
8 JAN 1977	NSC	8.20	13.00	NSC

DATA FOR (S04--) (UMOL/L) (CONT.)

	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
10 JAN 1977	4.50	NSC	NSC	NSC
11 JAN 1977	NSC	10.00	12.00	NSC
15 JAN 1977	NSC	NSC	4.50	NSC
18 JAN 1977	NSC	NSC	NSC	22.00
22 JAN 1977	NSC	47.00	NSC	NSC
25 JAN 1977	4.10	NSC	3.90	NSC
26 JAN 1977	NSC	NSC	26.00	NSC
27 JAN 1977	NSC	19.00	12.00	NSC
31 JAN 1977	NSC	18.00	NSC	NSC
1 FEB 1977	9.80	NSC	25.00	NSC
4 FEB 1977	NSC	NSC	13.00	NSC
5 FEB 1977	NSC	13.00	8.60	NSC
6 FEB 1977	9.00	NSC	NSC	NSC
12 FEB 1977	81.00	NSC	NSC	NSC
13 FEB 1977	NSC	NSC	59.00	NSC
14 FEB 1977	31.00	41.00	NSC	NSC
15 FEB 1977	NSC	NSC	26.00	35.00
18 FEB 1977	NSC	53.00	NSC	NSC
19 FEB 1977	16.00	NSC	NSC	NSC
21 FEB 1977	28.00	20.00	12.00	NSC
25 FEB 1977	8.70	NSC	18.00	13.00
1 MAR 1977	31.00	NSC	NSC	25.00
5 MAR 1977	9.90	NSC	17.00	71.00
8 MAR 1977	77.00	NSC	NSC	NSC

DATA FOR (S04--) (UMOL/L) (CONT.)

	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
13 MAR 1977	4.60	NSC	NSC	5.90
14 MAR 1977	6.20	NSC	8.60	NSC
15 MAR 1977	NSC	12.00	NSC	NSC
16 MAR 1977	NSC	NSC	84.00	NSC
17 MAR 1977	43.00	NSC	NSC	NSC
19 MAR 1977	NSC	NSC	27.00	32.00
20 MAR 1977	NSC	NSC	NSC	26.00
21 MAR 1977	14.00	19.00	20.00	NSC
23 MAR 1977	7.20	NSC	21.00	NSC
24 MAR 1977	NSC	NSC	43.00	13.00
25 MAR 1977	22.00	12.00	NSC	NSC
29 MAR 1977	8.20	NSC	22.00	72.00
31 MAR 1977	43.00	NSC	51.00	NSC
3 APR 1977	26.00	42.00	17.00	NSC
5 APR 1977	31.00	NSC	NSC	NSC
6 APR 1977	30.00	33.00	21.00	23.00
7 APR 1977	NSC	NSC	49.00	NSC
8 APR 1977	13.00	NSC	21.00	NSC
14 APR 1977	32.00	NSC	NSC	NSC
20 APR 1977	NSC	NSC	140.00	NSC
23 APR 1977	26.00	NSC	NSC	NSC
24 APR 1977	NSC	NSC	NSC	9.40
25 APR 1977	9.80	NSC	45.00	NSC
28 APR 1977	46.00	NSC	NSC	NSC

DATA FOR (S04--)

(UMOL/L)

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29 APR 1977	NSC	45.00	MOE	NSC
30 APR 1977	NSC	NSC	NSC	42.00
2 MAY 1977	49.00	NSC	NSC	NSC
3 MAY 1977	NSC	NSC	MOE	NSC
5 MAY 1977	NSC	NSC	NSC	58.00
6 MAY 1977	NSC	MOE	90.00	NSC
7 MAY 1977	NSC	NSC	43.00	NSC
9 MAY 1977	21.00	NSC	NSC	NSC
10 MAY 1977	NSC	MOE	NSC	NSC
13 MAY 1977	53.00	NSC	NSC	NSC
19 MAY 1977	16.00	NSC	NSC	NSC
20 MAY 1977	NSC	NSC	85.00	NSC
26 MAY 1977	NSC	NSC	NSC	5.50
27 MAY 1977	NSC	NAP	NSC	NSC
29 MAY 1977	65.00	NSC	NSC	NSC
31 MAY 1977	NSC	NSC	NSC	86.00
1 JUN 1977	70.00	NSC	NSC	NSC
2 JUN 1977	32.00	NSC	95.00	NSC
3 JUN 1977	NSC	NSC	NSC	63.00
6 JUN 1977	56.00	NSC	NSC	NSC
7 JUN 1977	NSC	NSC	38.00	NSC
8 JUN 1977	6.80	NSC	NSC	NSC
10 JUN 1977	40.00	NSC	18.00	50.00
11 JUN 1977	NSC	32.00	NSC	NSC

DATA FOR (S04--)

(UMOL/L)

(CONT.)

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13 JUN 1977	NSC	NSC	49.00	NSC
14 JUN 1977	22.00	NSC	NSC	NSC
15 JUN 1977	NSC	NSC	150.00	NSC
16 JUN 1977	NSC	NSC	NSC	58.00
18 JUN 1977	NSC	NSC	110.00	NSC
19 JUN 1977	NSC	81.00	NSC	NSC
20 JUN 1977	38.00	NSC	NSC	NSC
21 JUN 1977	NSC	53.00	NSC	NSC
22 JUN 1977	7.90	NSC	NSC	NSC
26 JUN 1977	NSC	34.00	59.00	NSC
27 JUN 1977	47.00	NSC	NSC	NSC
28 JUN 1977	NSC	NSC	NSC	29.00
29 JUN 1977	NSC	NSC	48.00	NSC

NSC MEANS NO SAMPLE COLLECTED
 ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
 NAP MEANS NO ANALYSIS PERFORMED
 MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FOR (NH4+)

(UMOL/L)
 W H I T E F A C E
 I T H A C A
 P E N N S T A T E
 V I R G I N I A

22 SEP 1976	NSC	NSC	ISA	NSC
27 SEP 1976	NSC	NSC	31.00	NSC
28 SEP 1976	NSC	NSC	12.00	NSC
30 SEP 1976	NSC	NSC	ISA	NSC
2 OCT 1976	NSC	NSC	< .80	NSC
3 OCT 1976	NSC	NSC	ISA	NSC
7 OCT 1976	NSC	NSC	ISA	NSC
9 OCT 1976	NSC	NSC	14.00	NSC
10 OCT 1976	NSC	NSC	< .80	NSC
11 OCT 1976	< 1.00	NSC	NSC	NSC
14 OCT 1976	NSC	NSC	49.00	NSC
15 OCT 1976	NSC	NSC	ISA	NSC
16 OCT 1976	NSC	NSC	42.00	NSC
18 OCT 1976	NSC	NSC	ISA	NSC
19 OCT 1976	NSC	NSC	NAP	NSC
20 OCT 1976	53.00	NSC	NSC	NSC
21 OCT 1976	< 1.00	NSC	< .80	NSC
22 OCT 1976	NSC	NSC	ISA	NSC
25 OCT 1976	NSC	NSC	14.00	NSC
26 OCT 1976	NSC	13.00	5.80	NSC
29 OCT 1976	12.00	NSC	NSC	NSC
31 OCT 1976	NSC	NSC	3.50	NSC
1 NOV 1976	< .70	3.40	ISA	NSC
4 NOV 1976	NSC	NSC	54.00	NSC

DATA FOR (NH4+)

(UMOL/L) (CONT.)
 W H I T E F A C E
 I T H A C A
 P E N N S T A T E
 V I R G I N I A

8 NOV 1976	NSC	NSC	44.00	NSC
9 NOV 1976	9.80	NSC	NSC	NSC
10 NOV 1976	NSC	NSC	36.00	NSC
11 NOV 1976	NSC	NSC	ISA	NSC
27 NOV 1976	38.00	NSC	NSC	NSC
28 NOV 1976	NSC	NSC	NAP	NSC
30 NOV 1976	NSC	12.00	8.90	NSC
3 DEC 1976	NSC	NSC	NAP	NSC
5 DEC 1976	NSC	NSC	NAP	NSC
6 DEC 1976	NSC	4.00	NSC	NSC
7 DEC 1976	1.20	NSC	NSC	NSC
8 DEC 1976	NSC	NSC	5.70	NSC
12 DEC 1976	NSC	NSC	NSC	12.00
14 DEC 1976	NSC	NSC	ISA	NSC
17 DEC 1976	NSC	NSC	NSC	.90
20 DEC 1976	NSC	NSC	ISA	3.40
21 DEC 1976	11.00	NSC	NSC	NSC
22 DEC 1976	NSC	NSC	12.00	NSC
24 DEC 1976	NSC	NSC	ISA	NSC
28 DEC 1976	NSC	NSC	9.30	NSC
30 DEC 1976	NSC	NSC	ISA	< .80
2 JAN 1977	NSC	NSC	35.00	NSC
4 JAN 1977	NSC	8.30	2.00	NSC
8 JAN 1977	NSC	5.60	7.20	NSC

DATA FOR (NH4+) (UMOL/L) (CONT.)

W H I T E F A C E
I T H A C A
P E N N S T A T E
V I R G I N I A

10 JAN 1977	3.20	NSC	NSC	NSC
11 JAN 1977	NSC	5.00	4.00	NSC
15 JAN 1977	NSC	NSC	3.00	NSC
18 JAN 1977	NSC	NSC	NSC	1.90
22 JAN 1977	NSC	9.20	NSC	NSC
25 JAN 1977	2.60	NSC	3.90	NSC
26 JAN 1977	NSC	NSC	ISA	NSC
27 JAN 1977	NSC	< 1.00	ISA	NSC
31 JAN 1977	NSC	15.00	NSC	NSC
1 FEB 1977	6.20	NSC	ISA	NSC
4 FEB 1977	NSC	NSC	9.10	NSC
5 FEB 1977	NSC	3.20	9.40	NSC
6 FEB 1977	11.00	NSC	NSC	NSC
12 FEB 1977	ISA	NSC	NSC	NSC
13 FEB 1977	NSC	NSC	NAP	NSC
14 FEB 1977	NAP	38.00	NSC	NSC
15 FEB 1977	NSC	NSC	40.00	6.70
18 FEB 1977	NSC	71.00	NSC	NSC
19 FEB 1977	NAP	NSC	NSC	NSC
21 FEB 1977	NAP	13.00	18.00	NSC
25 FEB 1977	NAP	NSC	11.00	9.20
1 MAR 1977	NAP	NSC	NSC	11.00
5 MAR 1977	NAP	NSC	7.50	32.00
8 MAR 1977	NAP	NSC	NSC	NSC

DATA FOR (NH4+) (UMOL/L) (CONT.)

W H I T E F A C E
I T H A C A
P E N N S T A T E
V I R G I N I A

13 MAR 1977	NAP	NSC	NSC	5.40
14 MAR 1977	NAP	NSC	7.40	NSC
15 MAR 1977	NSC	4.40	NSC	NSC
16 MAR 1977	NSC	NSC	ISA	NSC
17 MAR 1977	36.00	NSC	NSC	NSC
19 MAR 1977	NSC	NSC	19.00	25.00
20 MAR 1977	NSC	NSC	NSC	16.00
21 MAR 1977	7.50	13.00	15.00	NSC
23 MAR 1977	5.80	NSC	13.00	NSC
24 MAR 1977	NSC	NSC	ISA	7.50
25 MAR 1977	11.00	6.90	NSC	NSC
29 MAR 1977	3.10	NSC	5.30	ISA
31 MAR 1977	31.00	NSC	31.00	NSC
3 APR 1977	11.00	23.00	9.30	NSC
5 APR 1977	11.00	NSC	NSC	NSC
6 APR 1977	6.30	9.50	10.00	13.00
7 APR 1977	NSC	NSC	ISA	NSC
8 APR 1977	15.00	NSC	ISA	NSC
14 APR 1977	42.00	NSC	NSC	NSC
20 APR 1977	NSC	NSC	86.00	NSC
23 APR 1977	8.80	NSC	NSC	NSC
24 APR 1977	NSC	NSC	NSC	3.60
25 APR 1977	3.00	NSC	16.00	NSC
28 APR 1977	64.00	NSC	NSC	NSC

DATA FOR (NH₄+) (UMOL/L) (CONT.)

	W H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
29 APR 1977	NSC	7.90	MOE	NSC
30 APR 1977	NSC	NSC	NSC	54.00
2 MAY 1977	23.00	NSC	NSC	NSC
3 MAY 1977	NSC	NSC	MOE	NSC
5 MAY 1977	NSC	NSC	NSC	36.00
6 MAY 1977	NSC	MOE	45.00	NSC
7 MAY 1977	NSC	NSC	25.00	NSC
9 MAY 1977	14.00	NSC	NSC	NSC
10 MAY 1977	NSC	MOE	NSC	NSC
13 MAY 1977	26.00	NSC	NSC	NSC
19 MAY 1977	13.00	NSC	NSC	NSC
20 MAY 1977	NSC	NSC	48.00	NSC
26 MAY 1977	NSC	NSC	NSC	3.50
27 MAY 1977	NSC	NAP	NSC	NSC
29 MAY 1977	39.00	NSC	NSC	NSC
31 MAY 1977	NSC	NSC	NSC	41.00
1 JUN 1977	24.00	NSC	NSC	NSC
2 JUN 1977	13.00	NSC	55.00	NSC
3 JUN 1977	NSC	NSC	NSC	56.00
6 JUN 1977	33.00	NSC	NSC	NSC
7 JUN 1977	NSC	NSC	17.00	NSC
8 JUN 1977	3.10	NSC	NSC	NSC
10 JUN 1977	19.00	NSC	5.00	20.00
11 JUN 1977	NSC	17.00	NSC	NSC

DATA FOR (NH₄+) (UMOL/L) (CONT.)

	W H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
13 JUN 1977	NSC	NSC	3.40	NSC
14 JUN 1977	12.00	NSC	NSC	NSC
15 JUN 1977	NSC	NSC	ISA	NSC
16 JUN 1977	NSC	NSC	NSC	25.00
18 JUN 1977	NSC	NSC	42.00	NSC
19 JUN 1977	NSC	23.00	NSC	NSC
20 JUN 1977	22.00	NSC	NSC	NSC
21 JUN 1977	NSC	33.00	NSC	NSC
22 JUN 1977	2.90	NSC	NSC	NSC
26 JUN 1977	NSC	8.50	25.00	NSC
27 JUN 1977	11.00	NSC	NSC	NSC
28 JUN 1977	NSC	NSC	NSC	70
29 JUN 1977	NSC	NSC	9.50	NSC

NSC MEANS NO SAMPLE COLLECTED
 ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
 NAP MEANS NO ANALYSIS PERFORMED
 MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FOR (NO2-) (UMOL/L)

W H I T E F A C E
I T H A C A
P E N N S Y L V A N I A

22 SEP 1976	NSC	NSC	ISA	NSC
27 SEP 1976	NSC	NSC	.23	NSC
28 SEP 1976	NSC	NSC	.12	NSC
30 SEP 1976	NSC	NSC	< .10	NSC
2 OCT 1976	NSC	NSC	< .10	NSC
3 OCT 1976	NSC	NSC	ISA	NSC
7 OCT 1976	NSC	NSC	ISA	NSC
9 OCT 1976	NSC	NSC	< .10	NSC
10 OCT 1976	NSC	NSC	< .10	NSC
11 OCT 1976	< .10	NSC	NSC	NSC
14 OCT 1976	NSC	NSC	.49	NSC
15 OCT 1976	NSC	NSC	ISA	NSC
16 OCT 1976	NSC	NSC	< .10	NSC
18 OCT 1976	NSC	NSC	ISA	NSC
19 OCT 1976	NSC	NSC	NAP	NSC
20 OCT 1976	.20	NSC	NSC	NSC
21 OCT 1976	< .10	NSC	.23	NSC
22 OCT 1976	NSC	NSC	ISA	NSC
25 OCT 1976	NSC	NSC	.11	NSC
26 OCT 1976	NSC	.21	.22	NSC
29 OCT 1976	< .10	NSC	NSC	NSC
31 OCT 1976	NSC	NSC	< .20	NSC
1 NOV 1976	< .10	< .10	ISA	NSC
4 NOV 1976	NSC	NSC	.78	NSC

DATA FOR (NO2-) (UMOL/L) (CONT.)

W H I T E F A C E
I T H A C A
P E N N S Y L V A N I A

8 NOV 1976	NSC	NSC	NAP	NSC
9 NOV 1976	< .10	NSC	NSC	NSC
10 NOV 1976	NSC	NSC	.54	NSC
11 NOV 1976	NSC	NSC	ISA	NSC
27 NOV 1976	.50	NSC	NSC	NSC
28 NOV 1976	NSC	NSC	NAP	NSC
30 NOV 1976	NSC	.17	.10	NSC
3 DEC 1976	NSC	NSC	NAP	NSC
5 DEC 1976	NSC	NSC	NAP	NSC
6 DEC 1976	NSC	< .08	NSC	NSC
7 DEC 1976	NAP	NSC	NSC	NSC
8 DEC 1976	NSC	NSC	.27	NSC
12 DEC 1976	NSC	NSC	NSC	.31
14 DEC 1976	NSC	NSC	ISA	NSC
17 DEC 1976	NSC	NSC	NSC	.39
20 DEC 1976	NSC	NSC	ISA	.37
21 DEC 1976	.20	NSC	NSC	NSC
22 DEC 1976	NSC	NSC	.20	NSC
24 DEC 1976	NSC	NSC	ISA	NSC
28 DEC 1976	NSC	NSC	.28	NSC
30 DEC 1976	NSC	NSC	ISA	.10
2 JAN 1977	NSC	NSC	.88	NSC
4 JAN 1977	NSC	< .08	.21	NSC
8 JAN 1977	NSC	< .08	.19	NSC

DATA FOR (NO2-) (UMOL/L) (CONT.)

	W H I T E F A C E	I T H A C A	P E N S T A T E	U I R G I N A
10 JAN 1977	.14	NSC	NSC	NSC
11 JAN 1977	NSC	< .08	.16	NSC
15 JAN 1977	NSC	NSC	.22	NSC
18 JAN 1977	NSC	NSC	NSC	.17
22 JAN 1977	NSC	.10	NSC	NSC
25 JAN 1977	< .08	NSC	.20	NSC
26 JAN 1977	NSC	NSC	.34	NSC
27 JAN 1977	NSC	< .08	ISA	NSC
31 JAN 1977	NSC	.20	NSC	NSC
1 FEB 1977	.12	NSC	ISA	NSC
4 FEB 1977	NSC	NSC	< .08	NSC
5 FEB 1977	NSC	.37	.10	NSC
6 FEB 1977	.15	NSC	NSC	NSC
12 FEB 1977	.37	NSC	NSC	NSC
13 FEB 1977	NSC	NSC	NAP	NSC
14 FEB 1977	.13	.45	NSC	NSC
15 FEB 1977	NSC	NSC	ISA	.29
18 FEB 1977	NSC	.15	NSC	NSC
19 FEB 1977	.27	NSC	NSC	NSC
21 FEB 1977	.25	.24	.15	NSC
25 FEB 1977	.11	NSC	.10	.20
1 MAR 1977	.24	NSC	NSC	.45
5 MAR 1977	.21	NSC	.19	.35
8 MAR 1977	.23	NSC	NSC	NSC

DATA FOR (NO2-) (UMOL/L) (CONT.)

	W H I T E F A C E	I T H A C A	P E N S T A T E	U I R G I N A
13 MAR 1977	.34	NSC	NSC	.12
14 MAR 1977	.11	NSC	.29	NSC
15 MAR 1977	NSC	.18	NSC	NSC
16 MAR 1977	NSC	NSC	1.00	NSC
17 MAR 1977	.33	NSC	NSC	NSC
19 MAR 1977	NSC	NSC	.20	.43
20 MAR 1977	NSC	NSC	NSC	.22
21 MAR 1977	< .08	.22	.35	NSC
23 MAR 1977	.15	NSC	.30	NSC
24 MAR 1977	NSC	NSC	.11	.27
25 MAR 1977	.13	.09	NSC	NSC
29 MAR 1977	.21	NSC	.42	.14
31 MAR 1977	.28	NSC	.51	NSC
3 APR 1977	.17	.39	.24	NSC
5 APR 1977	.13	NSC	NSC	NSC
6 APR 1977	.21	.13	.20	.30
7 APR 1977	NSC	NSC	.66	NSC
8 APR 1977	.14	NSC	.08	NSC
14 APR 1977	.23	NSC	NSC	NSC
20 APR 1977	NSC	NSC	.37	NSC
23 APR 1977	.09	NSC	NSC	NSC
24 APR 1977	NSC	NSC	NSC	.14
25 APR 1977	.09	NSC	.11	NSC
28 APR 1977	.32	NSC	NSC	NSC

DATA FOR (NO2-) (UMOL/L) (CONT.)

	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
29 APR 1977	NSC	.10	MOE	NSC
30 APR 1977	NSC	NSC	NSC	.18
2 MAY 1977	.11	NSC	NSC	NSC
3 MAY 1977	NSC	NSC	MOE	NSC
5 MAY 1977	NSC	NSC	NSC	.12
6 MAY 1977	NSC	MOE	.17	NSC
7 MAY 1977	NSC	NSC	.10	NSC
9 MAY 1977	.16	NSC	NSC	NSC
10 MAY 1977	NSC	MOE	NSC	NSC
13 MAY 1977	.42	NSC	NSC	NSC
19 MAY 1977	.34	NSC	NSC	NSC
20 MAY 1977	NSC	NSC	.19	NSC
26 MAY 1977	NSC	NSC	NSC	.20
27 MAY 1977	NSC	NAP	NSC	NSC
29 MAY 1977	.29	NSC	NSC	NSC
31 MAY 1977	NSC	NSC	NSC	.64
1 JUN 1977	.24	NSC	NSC	NSC
2 JUN 1977	.17	NSC	.63	NSC
3 JUN 1977	NSC	NSC	NSC	.67
6 JUN 1977	.10	NSC	NSC	NSC
7 JUN 1977	NSC	NSC	.22	NSC
8 JUN 1977	.13	NSC	NSC	NSC
10 JUN 1977	.30	NSC	.49	.08
11 JUN 1977	NSC	.39	NSC	NSC

DATA FOR (NO2-) (UMOL/L) (CONT.)

	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
13 JUN 1977	NSC	NSC	.33	NSC
14 JUN 1977	.24	NSC	NSC	NSC
15 JUN 1977	NSC	NSC	ISA	NSC
16 JUN 1977	NSC	NSC	NSC	.17
18 JUN 1977	NSC	NSC	.26	NSC
19 JUN 1977	NSC	.20	NSC	NSC
20 JUN 1977	.28	NSC	NSC	NSC
21 JUN 1977	NSC	.46	NSC	NSC
22 JUN 1977	.18	NSC	NSC	NSC
26 JUN 1977	NSC	.38	.38	NSC
27 JUN 1977	NAP	NSC	NSC	NSC
28 JUN 1977	NSC	NSC	NSC	NAP
29 JUN 1977	NSC	NSC	NAP	NSC

NSC MEANS NO SAMPLE COLLECTED
 ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
 NAP MEANS NO ANALYSIS PERFORMED
 MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FOR (NO3-)

(UMOL/L)

W H I T E F A C E
I T H A C A
P E N N S T A T E
V I R G I N I A

Date	W	H	I	T	E	F	A	C	E
22 SEP 1976	NSC	NSC	ISA	NSC					
27 SEP 1976	NSC	NSC	27.00	NSC					
28 SEP 1976	NSC	NSC	34.00	NSC					
30 SEP 1976	NSC	NSC	16.00	NSC					
2 OCT 1976	NSC	NSC	11.00	NSC					
3 OCT 1976	NSC	NSC	ISA	NSC					
7 OCT 1976	NSC	NSC	ISA	NSC					
9 OCT 1976	NSC	NSC	8.40	NSC					
10 OCT 1976	NSC	NSC	6.60	NSC					
11 OCT 1976	5.00	NSC	NSC	NSC					
14 OCT 1976	NSC	NSC	49.00	NSC					
15 OCT 1976	NSC	NSC	ISA	NSC					
16 OCT 1976	NSC	NSC	53.00	NSC					
18 OCT 1976	NSC	NSC	ISA	NSC					
19 OCT 1976	NSC	NSC	NAP	NSC					
20 OCT 1976	44.00	NSC	NSC	NSC					
21 OCT 1976	8.10	NSC	7.60	NSC					
22 OCT 1976	NSC	NSC	ISA	NSC					
25 OCT 1976	NSC	NSC	21.00	NSC					
26 OCT 1976	NSC	36.00	26.00	NSC					
29 OCT 1976	74.00	NSC	NSC	NSC					
31 OCT 1976	NSC	NSC	15.00	NSC					
1 NOV 1976	9.00	23.00	ISA	NSC					
4 NOV 1976	NSC	NSC	175.00	NSC					

DATA FOR (NO3-)

(UMOL/L)

(CONT.)

W H I T E F A C E
I T H A C A
P E N N S T A T E
V I R G I N I A

Date	W	H	I	T	E	F	A	C	E
8 NOV 1976	NSC	NSC	34.00	NSC					
9 NOV 1976	6.00	NSC	NSC	NSC					
10 NOV 1976	NSC	NSC	85.00	NSC					
11 NOV 1976	NSC	NSC	ISA	NSC					
27 NOV 1976	45.00	NSC	NSC	NSC					
28 NOV 1976	NSC	NSC	14.00	NSC					
30 NOV 1976	NSC	37.00	20.00	NSC					
3 DEC 1976	NSC	NSC	96.00	NSC					
5 DEC 1976	NSC	NSC	147.00	NSC					
6 DEC 1976	NSC	27.00	NSC	NSC					
7 DEC 1976	11.00	NSC	NSC	NSC					
8 DEC 1976	NSC	NSC	18.00	NSC					
12 DEC 1976	NSC	NSC	NSC	33.00					
14 DEC 1976	NSC	NSC	12.00	NSC					
17 DEC 1976	NSC	NSC	NSC	8.20					
20 DEC 1976	NSC	NSC	85.00	10.00					
21 DEC 1976	33.00	NSC	NSC	NSC					
22 DEC 1976	NSC	NSC	21.00	NSC					
24 DEC 1976	NSC	NSC	104.00	NSC					
28 DEC 1976	NSC	NSC	65.00	NSC					
30 DEC 1976	NSC	NSC	99.00	6.20					
2 JAN 1977	NSC	NSC	140.00	NSC					
4 JAN 1977	NSC	40.00	28.00	NSC					
8 JAN 1977	NSC	58.00	61.00	NSC					

DATA FOR (NO3-) (UMOL/L) (CONT.)

	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
10 JAN 1977	29.00	NSC	NSC	NSC
11 JAN 1977	NSC	22.00	29.00	NSC
15 JAN 1977	NSC	NSC	28.00	NSC
18 JAN 1977	NSC	NSC	NSC	13.00
22 JAN 1977	NSC	24.00	NSC	NSC
25 JAN 1977	49.00	NSC	43.00	NSC
26 JAN 1977	NSC	NSC	140.00	NSC
27 JAN 1977	NSC	63.00	74.00	NSC
31 JAN 1977	NSC	53.00	NSC	NSC
1 FEB 1977	49.00	NSC	43.00	NSC
4 FEB 1977	NSC	NSC	79.00	NSC
5 FEB 1977	NSC	89.00	63.00	NSC
6 FEB 1977	77.00	NSC	NSC	NSC
12 FEB 1977	190.00	NSC	NSC	NSC
13 FEB 1977	NSC	NSC	84.00	NSC
14 FEB 1977	51.00	120.00	NSC	NSC
15 FEB 1977	NSC	NSC	72.00	34.00
18 FEB 1977	NSC	120.00	NSC	NSC
19 FEB 1977	130.00	NSC	NSC	NSC
21 FEB 1977	120.00	110.00	72.00	NSC
25 FEB 1977	15.00	NSC	15.00	12.00
1 MAR 1977	83.00	NSC	NSC	27.00
5 MAR 1977	21.00	NSC	13.00	53.00
8 MAR 1977	50.00	NSC	NSC	NSC

DATA FOR (NO3-) (UMOL/L) (CONT.)

	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
13 MAR 1977	5.70	NSC	NSC	4.10
14 MAR 1977	10.00	NSC	11.00	NSC
15 MAR 1977	NSC	11.00	NSC	NSC
16 MAR 1977	NSC	NSC	170.00	NSC
17 MAR 1977	90.00	NSC	NSC	NSC
19 MAR 1977	NSC	NSC	38.00	30.00
20 MAR 1977	NSC	NSC	NSC	40.00
21 MAR 1977	44.00	32.00	33.00	NSC
23 MAR 1977	7.80	NSC	29.00	NSC
24 MAR 1977	NSC	NSC	190.00	11.00
25 MAR 1977	10.00	19.00	NSC	NSC
29 MAR 1977	9.10	NSC	30.00	70.00
31 MAR 1977	53.00	NSC	49.00	NSC
3 APR 1977	21.00	48.00	12.00	NSC
5 APR 1977	26.00	NSC	NSC	NSC
6 APR 1977	31.00	36.00	38.00	23.00
7 APR 1977	NSC	NSC	97.00	NSC
8 APR 1977	53.00	NSC	30.00	NSC
14 APR 1977	30.00	NSC	NSC	NSC
20 APR 1977	NSC	NSC	160.00	NSC
23 APR 1977	12.00	NSC	NSC	NSC
24 APR 1977	NSC	NSC	NSC	11.00
25 APR 1977	9.00	NSC	45.00	NSC
28 APR 1977	75.00	NSC	NSC	NSC

DATA FOR (NO3-) (UMOL/L) (CONT.)

W H I T E F A C E
I T H A C A
P E N N S T A T E
V I R G I N I A

29 APR 1977	NSC	32.00	MOE	NSC
30 APR 1977	NSC	NSC	NSC	44.00
2 MAY 1977	45.00	NSC	NSC	NSC
3 MAY 1977	NSC	NSC	MOE	NSC
5 MAY 1977	NSC	NSC	NSC	48.00
6 MAY 1977	NSC	MOE	76.00	NSC
7 MAY 1977	NSC	NSC	45.00	NSC
9 MAY 1977	35.00	NSC	NSC	NSC
10 MAY 1977	NSC	MOE	NSC	NSC
13 MAY 1977	48.00	NSC	NSC	NSC
19 MAY 1977	21.00	NSC	NSC	NSC
20 MAY 1977	NSC	NSC	63.00	NSC
26 MAY 1977	NSC	NSC	NSC	7.50
27 MAY 1977	NSC	NAP	NSC	NSC
29 MAY 1977	30.00	NSC	NSC	NSC
31 MAY 1977	NSC	NSC	NSC	59.00
1 JUN 1977	44.00	NSC	NSC	NSC
2 JUN 1977	19.00	NSC	89.00	NSC
3 JUN 1977	NSC	NSC	NSC	61.00
6 JUN 1977	27.00	NSC	NSC	NSC
7 JUN 1977	NSC	NSC	22.00	NSC
8 JUN 1977	7.70	NSC	NSC	NSC
10 JUN 1977	32.00	NSC	19.00	49.00
11 JUN 1977	NSC	28.00	NSC	NSC

DATA FOR (NO3-) (UMOL/L) (CONT.)

W H I T E F A C E
I T H A C A
P E N N S T A T E
V I R G I N I A

13 JUN 1977	NSC	NSC	25.00	NSC
14 JUN 1977	16.00	NSC	NSC	NSC
15 JUN 1977	NSC	NSC	150.00	NSC
16 JUN 1977	NSC	NSC	NSC	33.00
18 JUN 1977	NSC	NSC	39.00	NSC
19 JUN 1977	NSC	52.00	NSC	NSC
20 JUN 1977	32.00	NSC	NSC	NSC
21 JUN 1977	NSC	42.00	NSC	NSC
22 JUN 1977	7.40	NSC	NSC	NSC
26 JUN 1977	NSC	42.00	35.00	NSC
27 JUN 1977	34.00	NSC	NSC	NSC
28 JUN 1977	NSC	NSC	NSC	24.00
29 JUN 1977	NSC	NSC	28.00	NSC

NSC MEANS NO SAMPLE COLLECTED
ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
NAP MEANS NO ANALYSIS PERFORMED
MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FOR (CL-)

(UMOL/L)

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22 SEP 1976	NSC	NSC	ISA	NSC
27 SEP 1976	NSC	NSC	.85	NSC
28 SEP 1976	NSC	NSC	< .20	NSC
30 SEP 1976	NSC	NSC	11.00	NSC
2 OCT 1976	NSC	NSC	2.50	NSC
3 OCT 1976	NSC	NSC	ISA	NSC
7 OCT 1976	NSC	NSC	ISA	NSC
9 OCT 1976	NSC	NSC	< .20	NSC
10 OCT 1976	NSC	NSC	< .20	NSC
11 OCT 1976	< .20	NSC	NSC	NSC
14 OCT 1976	NSC	NSC	8.20	NSC
15 OCT 1976	NSC	NSC	ISA	NSC
16 OCT 1976	NSC	NSC	22.00	NSC
18 OCT 1976	NSC	NSC	ISA	NSC
19 OCT 1976	NSC	NSC	NAP	NSC
20 OCT 1976	< .20	NSC	NSC	NSC
21 OCT 1976	< .20	NSC	5.10	NSC
22 OCT 1976	NSC	NSC	ISA	NSC
25 OCT 1976	NSC	NSC	< .20	NSC
26 OCT 1976	NSC	14.00	< .20	NSC
29 OCT 1976	1.10	NSC	NSC	NSC
31 OCT 1976	NSC	NSC	< .20	NSC
1 NOV 1976	< .30	< .30	ISA	NSC
4 NOV 1976	NSC	NSC	3.10	NSC

DATA FOR (CL-)

(UMOL/L)

(CONT.)

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8 NOV 1976	NSC	NSC	1.70	NSC
9 NOV 1976	< .30	NSC	NSC	NSC
10 NOV 1976	NSC	NSC	55.00	NSC
11 NOV 1976	NSC	NSC	ISA	NSC
27 NOV 1976	< .30	NSC	NSC	NSC
28 NOV 1976	NSC	NSC	48.00	NSC
30 NOV 1976	NSC	< .30	< .30	NSC
3 DEC 1976	NSC	NSC	19.00	NSC
5 DEC 1976	NSC	NSC	14.00	NSC
6 DEC 1976	NSC	< .30	NSC	NSC
7 DEC 1976	< .30	NSC	NSC	NSC
8 DEC 1976	NSC	NSC	< .30	NSC
12 DEC 1976	NSC	NSC	NSC	37.00
14 DEC 1976	NSC	NSC	8.70	NSC
17 DEC 1976	NSC	NSC	NSC	6.10
20 DEC 1976	NSC	NSC	13.00	1.70
21 DEC 1976	8.10	NSC	NSC	NSC
22 DEC 1976	NSC	NSC	7.60	NSC
24 DEC 1976	NSC	NSC	45.00	NSC
28 DEC 1976	NSC	NSC	9.90	NSC
30 DEC 1976	NSC	NSC	39.00	NAP
2 JAN 1977	NSC	NSC	49.00	NSC
4 JAN 1977	NSC	< .30	12.00	NSC
8 JAN 1977	NSC	16.00	< .30	NSC

DATA FOR (CL-)	(UMOL/L)	(CONT.)		
	H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
10 JAN 1977	< .30	NSC	NSC	NSC
11 JAN 1977	NSC	7.90	< .30	NSC
15 JAN 1977	NSC	NSC	< .30	NSC
18 JAN 1977	NSC	NSC	NSC	< .40
22 JAN 1977	NSC	13.00	NSC	NSC
25 JAN 1977	2.20	NSC	< .30	NSC
26 JAN 1977	NSC	NSC	13.00	NSC
27 JAN 1977	NSC	11.00	9.90	NSC
31 JAN 1977	NSC	17.00	NSC	NSC
1 FEB 1977	< .30	NSC	7.80	NSC
4 FEB 1977	NSC	NSC	11.00	NSC
5 FEB 1977	NSC	16.00	10.00	NSC
6 FEB 1977	< .50	NSC	NSC	NSC
12 FEB 1977	14.00	NSC	NSC	NSC
13 FEB 1977	NSC	NSC	12.00	NSC
14 FEB 1977	1.40	12.00	NSC	NSC
15 FEB 1977	NSC	NSC	2.60	5.60
18 FEB 1977	NSC	13.00	NSC	NSC
19 FEB 1977	16.00	NSC	NSC	NSC
21 FEB 1977	5.60	1.50	2.00	NSC
25 FEB 1977	1.70	NSC	6.60	15.00
1 MAR 1977	7.20	NSC	NSC	28.00
5 MAR 1977	< .40	NSC	< .40	210.00
8 MAR 1977	< .40	NSC	NSC	NSC

DATA FOR (CL-)	(UMOL/L)	(CONT.)		
	H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
13 MAR 1977	< .40	NSC	NSC	MOE
14 MAR 1977	< .40	NSC	3.40	NSC
15 MAR 1977	NSC	3.60	NSC	NSC
16 MAR 1977	NSC	NSC	18.00	NSC
17 MAR 1977	< .40	NSC	NSC	NSC
19 MAR 1977	NSC	NSC	< .30	MOE
20 MAR 1977	NSC	NSC	NSC	MOE
21 MAR 1977	< .40	4.00	2.50	NSC
23 MAR 1977	1.60	NSC	4.80	NSC
24 MAR 1977	NSC	NSC	3.60	MOE
25 MAR 1977	1.90	2.70	NSC	NSC
29 MAR 1977	3.30	NSC	.56	MOE
31 MAR 1977	3.90	NSC	11.00	NSC
3 APR 1977	< .40	< .40	< .40	NSC
5 APR 1977	4.90	NSC	NSC	NSC
6 APR 1977	< 4.00	< .40	< .40	MOE
7 APR 1977	NSC	NSC	76.00	NSC
8 APR 1977	< 4.00	NSC	< .40	NSC
14 APR 1977	< 4.00	NSC	NSC	NSC
20 APR 1977	NSC	NSC	14.00	NSC
23 APR 1977	< 4.00	NSC	NSC	NSC
24 APR 1977	NSC	NSC	NSC	8.10
25 APR 1977	< 4.00	NSC	5.50	NSC
28 APR 1977	< .30	NSC	NSC	NSC

DATA FOR (CL-) (UMOL/L) (CONT.)

	W H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
29 APR 1977	NSC	6.70	MOE	NSC
30 APR 1977	NSC	NSC	NSC	14.00
2 MAY 1977	< .30	NSC	NSC	NSC
3 MAY 1977	NSC	NSC	MOE	NSC
5 MAY 1977	NSC	NSC	NSC	4.80
6 MAY 1977	NSC	MOE	2.70	NSC
7 MAY 1977	NSC	NSC	7.00	NSC
9 MAY 1977	< .30	NSC	NSC	NSC
10 MAY 1977	NSC	MOE	NSC	NSC
13 MAY 1977	< .30	NSC	NSC	NSC
19 MAY 1977	< 3.00	NSC	NSC	NSC
20 MAY 1977	NSC	NSC	< 3.00	NSC
26 MAY 1977	NSC	NSC	NSC	4.00
27 MAY 1977	NSC	NAP	NSC	NSC
29 MAY 1977	4.20	NSC	NSC	NSC
31 MAY 1977	NSC	NSC	NSC	NAP
1 JUN 1977	14.00	NSC	NSC	NSC
2 JUN 1977	2.80	NSC	16.00	NSC
3 JUN 1977	NSC	NSC	NSC	12.00
6 JUN 1977	3.20	NSC	NSC	NSC
7 JUN 1977	NSC	NSC	NAP	NSC
8 JUN 1977	3.10	NSC	NSC	NSC
10 JUN 1977	33.00	NSC	NAP	13.00
11 JUN 1977	NSC	7.20	NSC	NSC

DATA FOR (CL-) (UMOL/L) (CONT.)

	W H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
13 JUN 1977	NSC	NSC	5.70	NSC
14 JUN 1977	8.50	NSC	NSC	NSC
15 JUN 1977	NSC	NSC	21.00	NSC
16 JUN 1977	NSC	NSC	NSC	3.40
18 JUN 1977	NSC	NSC	1.80	NSC
19 JUN 1977	NSC	4.90	NSC	NSC
20 JUN 1977	6.60	NSC	NSC	NSC
21 JUN 1977	NSC	2.80	NSC	NSC
22 JUN 1977	17.00	NSC	NSC	NSC
26 JUN 1977	NSC	4.70	6.00	NSC
27 JUN 1977	8.50	NSC	NSC	NSC
28 JUN 1977	NSC	NSC	NSC	10.00
29 JUN 1977	NSC	NSC	4.50	NSC

NSC MEANS NO SAMPLE COLLECTED
 ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
 NAP MEANS NO ANALYSIS PERFORMED
 MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FOR (P04---) (UMOL/L)

	W H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
22 SEP 1976	NSC	NSC	ISA	NSC
27 SEP 1976	NSC	NSC	< .10	NSC
28 SEP 1976	NSC	NSC	< .10	NSC
30 SEP 1976	NSC	NSC	< .10	NSC
2 OCT 1976	NSC	NSC	1.30	NSC
3 OCT 1976	NSC	NSC	ISA	NSC
7 OCT 1976	NSC	NSC	ISA	NSC
9 OCT 1976	NSC	NSC	< .10	NSC
10 OCT 1976	NSC	NSC	< .10	NSC
11 OCT 1976	< .10	NSC	NSC	NSC
14 OCT 1976	NSC	NSC	< .10	NSC
15 OCT 1976	NSC	NSC	ISA	NSC
16 OCT 1976	NSC	NSC	< .10	NSC
18 OCT 1976	NSC	NSC	ISA	NSC
19 OCT 1976	NSC	NSC	NAP	NSC
20 OCT 1976	< .10	NSC	NSC	NSC
21 OCT 1976	< .10	NSC	< .10	NSC
22 OCT 1976	NSC	NSC	ISA	NSC
25 OCT 1976	NSC	NSC	1.80	NSC
26 OCT 1976	NSC	3.40	< .10	NSC
29 OCT 1976	< .40	NSC	NSC	NSC
31 OCT 1976	NSC	NSC	< .10	NSC
1 NOV 1976	< .40	< .40	ISA	NSC
4 NOV 1976	NSC	NSC	1.00	NSC

DATA FOR (P04---) (UMOL/L) (CONT.)

	W H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
8 NOV 1976	NSC	NSC	31.00	NSC
9 NOV 1976	< .40	NSC	NSC	NSC
10 NOV 1976	NSC	NSC	4.30	NSC
11 NOV 1976	NSC	NSC	ISA	NSC
27 NOV 1976	.95	NSC	NSC	NSC
28 NOV 1976	NSC	NSC	< .40	NSC
30 NOV 1976	NSC	< .40	< .40	NSC
3 DEC 1976	NSC	NSC	< .40	NSC
5 DEC 1976	NSC	NSC	.42	NSC
6 DEC 1976	NSC	< .40	NSC	NSC
7 DEC 1976	< .40	NSC	NSC	NSC
8 DEC 1976	NSC	NSC	< .40	NSC
12 DEC 1976	NSC	NSC	NSC	< .40
14 DEC 1976	NSC	NSC	< .40	NSC
17 DEC 1976	NSC	NSC	NSC	< .40
20 DEC 1976	NSC	NSC	< .40	< .40
21 DEC 1976	< .37	NSC	NSC	NSC
22 DEC 1976	NSC	NSC	< .40	NSC
24 DEC 1976	NSC	NSC	.59	NSC
28 DEC 1976	NSC	NSC	.41	NSC
30 DEC 1976	NSC	NSC	< .40	< .40
2 JAN 1977	NSC	NSC	.64	NSC
4 JAN 1977	NSC	< .40	< .40	NSC
8 JAN 1977	NSC	< .40	< .40	NSC

DATA FOR (P04---) (UMOL/L) (CONT.)

	WHITE FAC E	ITHACA A	PENNSYLVANIA STATE	VIRGINIA
10 JAN 1977	< .40	NSC	NSC	NSC
11 JAN 1977	NSC	< .40	< .40	NSC
15 JAN 1977	NSC	NSC	< .40	NSC
18 JAN 1977	NSC	NSC	NSC	< .40
22 JAN 1977	NSC	.67	NSC	NSC
25 JAN 1977	< .40	NSC	< .40	NSC
26 JAN 1977	NSC	NSC	< .40	NSC
27 JAN 1977	NSC	< .40	< .40	NSC
31 JAN 1977	NSC	< .40	NSC	NSC
1 FEB 1977	< .40	NSC	< .40	NSC
4 FEB 1977	NSC	NSC	< .40	NSC
5 FEB 1977	NSC	< .40	< .40	NSC
6 FEB 1977	< .40	NSC	NSC	NSC
12 FEB 1977	.66	NSC	NSC	NSC
13 FEB 1977	NSC	NSC	< .40	NSC
14 FEB 1977	< .40	< .40	NSC	NSC
15 FEB 1977	NSC	NSC	< .40	< .40
18 FEB 1977	NSC	< .40	NSC	NSC
19 FEB 1977	< .40	NSC	NSC	NSC
21 FEB 1977	< .40	< .40	< .40	NSC
25 FEB 1977	< .40	NSC	< .40	< .40
1 MAR 1977	< .40	NSC	NSC	< .40
5 MAR 1977	< .40	NSC	< .40	< .40
8 MAR 1977	< .40	NSC	NSC	NSC

DATA FOR (P04---) (UMOL/L) (CONT.)

	WHITE FAC E	ITHACA A	PENNSYLVANIA STATE	VIRGINIA
13 MAR 1977	< .40	NSC	NSC	< .40
14 MAR 1977	< .40	NSC	< .40	NSC
15 MAR 1977	NSC	< .40	NSC	NSC
16 MAR 1977	NSC	NSC	< .40	NSC
17 MAR 1977	< .40	NSC	NSC	NSC
19 MAR 1977	NSC	NSC	< .40	< .40
20 MAR 1977	NSC	NSC	NSC	< .40
21 MAR 1977	< .40	< .40	< .40	NSC
23 MAR 1977	< .40	NSC	< .40	NSC
24 MAR 1977	NSC	NSC	< .40	< .40
25 MAR 1977	< .40	< .40	NSC	NSC
29 MAR 1977	< .40	NSC	< .40	< .40
31 MAR 1977	< .40	NSC	< .40	NSC
3 APR 1977	< .40	< .40	< .40	NSC
5 APR 1977	< .40	NSC	NSC	NSC
6 APR 1977	< .40	< .40	< .40	< .40
7 APR 1977	NSC	NSC	< .40	NSC
8 APR 1977	< .40	NSC	< .40	NSC
14 APR 1977	< .40	NSC	NSC	NSC
20 APR 1977	NSC	NSC	< .40	NSC
23 APR 1977	< .40	NSC	NSC	NSC
24 APR 1977	NSC	NSC	NSC	< .40
25 APR 1977	< .40	NSC	< .40	NSC
28 APR 1977	< .40	NSC	NSC	NSC

DATA FOR (P04---) (UMOL/L) (CONT.)

	W H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
29 APR 1977	NSC	< .40	MOE	NSC
30 APR 1977	NSC	NSC	NSC	< .40
2 MAY 1977	< .40	NSC	NSC	NSC
3 MAY 1977	NSC	NSC	MOE	NSC
5 MAY 1977	NSC	NSC	NSC	< .40
6 MAY 1977	NSC	MOE	< .40	NSC
7 MAY 1977	NSC	NSC	< .40	NSC
9 MAY 1977	< .40	NSC	NSC	NSC
10 MAY 1977	NSC	MOE	NSC	NSC
13 MAY 1977	< .40	NSC	NSC	NSC
19 MAY 1977	< .40	NSC	NSC	NSC
20 MAY 1977	NSC	NSC	< .40	NSC
26 MAY 1977	NSC	NSC	NSC	< .40
27 MAY 1977	NSC	NAP	NSC	NSC
29 MAY 1977	< .40	NSC	NSC	NSC
31 MAY 1977	NSC	NSC	NSC	< .40
1 JUN 1977	< .40	NSC	NSC	NSC
2 JUN 1977	< .40	NSC	< .40	NSC
3 JUN 1977	NSC	NSC	NSC	< .40
6 JUN 1977	< .40	NSC	NSC	NSC
7 JUN 1977	NSC	NSC	< .40	NSC
8 JUN 1977	< .40	NSC	NSC	NSC
10 JUN 1977	< .40	NSC	< .40	< .40
11 JUN 1977	NSC	< .40	NSC	NSC

DATA FOR (P04---) (UMOL/L) (CONT.)

	W H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A
13 JUN 1977	NSC	NSC	< .40	NSC
14 JUN 1977	< .40	NSC	NSC	NSC
15 JUN 1977	NSC	NSC	< .40	NSC
16 JUN 1977	NSC	NSC	NSC	< .40
18 JUN 1977	NSC	NSC	< .40	NSC
19 JUN 1977	NSC	< .40	NSC	NSC
20 JUN 1977	< .40	NSC	NSC	NSC
21 JUN 1977	NSC	< .40	NSC	NSC
22 JUN 1977	< .40	NSC	NSC	NSC
26 JUN 1977	NSC	< .40	NAP	NSC
27 JUN 1977	< .40	NSC	NSC	NSC
28 JUN 1977	NSC	NSC	NSC	< .40
29 JUN 1977	NSC	NSC	< .40	NSC

NSC MEANS NO SAMPLE COLLECTED
 ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
 NAP MEANS NO ANALYSIS PERFORMED
 MOE MEANS MALFUNCTION OR OPERATOR ERROR

(UMOL/L)

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VIRGINIA

DATA FOR (NA+)

(UMOL/L) (CONT.)

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22 SEP 1976	NSC	NSC	ISA	NSC
27 SEP 1976	NSC	NSC	. 26	NSC
28 SEP 1976	NSC	NSC	. 87	NSC
30 SEP 1976	NSC	NSC	ISA	NSC
2 OCT 1976	NSC	NSC	. 09	NSC
3 OCT 1976	NSC	NSC	ISA	NSC
7 OCT 1976	NSC	NSC	ISA	NSC
9 OCT 1976	NSC	NSC	. 09	NSC
10 OCT 1976	NSC	NSC	. 17	NSC
11 OCT 1976	. 09	NSC	NSC	NSC
14 OCT 1976	NSC	NSC	. 35	NSC
15 OCT 1976	NSC	NSC	ISA	NSC
16 OCT 1976	NSC	NSC	. 44	NSC
18 OCT 1976	NSC	NSC	ISA	NSC
19 OCT 1976	NSC	NSC	NAP	NSC
20 OCT 1976	. 26	NSC	NSC	NSC
21 OCT 1976	. 13	NSC	. 61	NSC
22 OCT 1976	NSC	NSC	ISA	NSC
25 OCT 1976	NSC	NSC	. 17	NSC
26 OCT 1976	NSC	6. 50	. 09	NSC
29 OCT 1976	. 09	NSC	NSC	NSC
31 OCT 1976	NSC	NSC	. 17	NSC
1 NOV 1976	. 04	. 17	ISA	NSC
4 NOV 1976	NSC	NSC	. 09	NSC

8 NOV 1976	NSC	NSC	. 39	NSC
9 NOV 1976	. 09	NSC	NSC	NSC
10 NOV 1976	NSC	NSC	2. 30	NSC
11 NOV 1976	NSC	NSC	ISA	NSC
27 NOV 1976	. 44	NSC	NSC	NSC
28 NOV 1976	NSC	NSC	2. 40	NSC
30 NOV 1976	NSC	. 17	< . 04	NSC
3 DEC 1976	NSC	NSC	1. 10	NSC
5 DEC 1976	NSC	NSC	. 39	NSC
6 DEC 1976	NSC	17. 00	NSC	NSC
7 DEC 1976	< . 04	NSC	NSC	NSC
8 DEC 1976	NSC	NSC	NAP	NSC
12 DEC 1976	NSC	NSC	NSC	NAP
14 DEC 1976	NSC	NSC	NAP	NSC
17 DEC 1976	NSC	NSC	NSC	NAP
20 DEC 1976	NSC	NSC	NAP	NAP
21 DEC 1976	NAP	NSC	NSC	NSC
22 DEC 1976	NSC	NSC	NAP	NSC
24 DEC 1976	NSC	NSC	NAP	NSC
28 DEC 1976	NSC	NSC	NAP	NSC
30 DEC 1976	NSC	NSC	NAP	NAP
2 JAN 1977	NSC	NSC	NAP	NSC
4 JAN 1977	NSC	5. 30	NAP	NSC
8 JAN 1977	NSC	NAP	6. 10	NSC

DATA FOR (NA+)	(UMOL/L)	(CONT.)		
W H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A	
10 JAN 1977	NAP	NSC	NSC	NSC
11 JAN 1977	NSC	4.20	18.00	NSC
15 JAN 1977	NSC	NSC	2.60	NSC
18 JAN 1977	NSC	NSC	NSC	NAP
22 JAN 1977	NSC	9.40	NSC	NSC
25 JAN 1977	2.20	NSC	3.00	NSC
26 JAN 1977	NSC	NSC	14.00	NSC
27 JAN 1977	NSC	NAP	5.00	NSC
31 JAN 1977	NSC	6.30	NSC	NSC
1 FEB 1977	4.40	NSC	5.30	NSC
4 FEB 1977	NSC	NSC	< .40	NSC
5 FEB 1977	NSC	4.10	< .40	NSC
6 FEB 1977	3.10	NSC	NSC	NSC
12 FEB 1977	7.30	NSC	NSC	NSC
13 FEB 1977	NSC	NSC	8.00	NSC
14 FEB 1977	5.10	11.00	NSC	NSC
15 FEB 1977	NSC	NSC	2.60	NAP
18 FEB 1977	NSC	12.00	NSC	NSC
19 FEB 1977	1.10	NSC	NSC	NSC
21 FEB 1977	1.70	1.90	2.20	NSC
25 FEB 1977	NAP	NSC	NAP	NAP
1 MAR 1977	NAP	NSC	NSC	NAP
5 MAR 1977	NAP	NSC	NAP	NAP
8 MAR 1977	NAP	NSC	NSC	NSC

DATA FOR (NA+)	(UMOL/L)	(CONT.)		
W H I T E F A C E	I T H A C A	P E N N S T A T E	V I R G I N I A	
13 MAR 1977	NAP	NSC	NSC	NAP
14 MAR 1977	NAP	NSC	NAP	NSC
15 MAR 1977	NSC	NAP	NSC	NSC
16 MAR 1977	NSC	NSC	NAP	NSC
17 MAR 1977	NAP	NSC	NSC	NSC
19 MAR 1977	NSC	NSC	NAP	NAP
20 MAR 1977	NSC	NSC	NSC	NAP
21 MAR 1977	NAP	NAP	NAP	NSC
23 MAR 1977	NAP	NSC	NAP	NSC
24 MAR 1977	NSC	NSC	NAP	NAP
25 MAR 1977	NAP	NAP	NSC	NSC
29 MAR 1977	NAP	NSC	NAP	NAP
31 MAR 1977	NAP	NSC	NAP	NSC
3 APR 1977	NAP	NAP	NAP	NSC
5 APR 1977	NAP	NSC	NSC	NSC
6 APR 1977	NAP	NAP	NAP	NAP
7 APR 1977	NSC	NSC	NAP	NSC
8 APR 1977	NAP	NSC	NAP	NSC
14 APR 1977	NAP	NSC	NSC	NSC
20 APR 1977	NSC	NSC	NAP	NSC
23 APR 1977	NAP	NSC	NSC	NSC
24 APR 1977	NSC	NSC	NSC	NAP
25 APR 1977	NAP	NSC	NAP	NSC
28 APR 1977	NAP	NSC	NSC	NSC

DATA FOR (NA+)	(UMOL/L)	(CONT.)		
	WHITEFACE	ITHACA	PENNSYLVANIA	VIRGINIA
29 APR 1977	NSC	NAP	NAP	NSC
30 APR 1977	NSC	NSC	NSC	NAP
2 MAY 1977	NAP	NSC	NSC	NSC
3 MAY 1977	NSC	NSC	NAP	NSC
5 MAY 1977	NSC	NSC	NSC	NAP
6 MAY 1977	NSC	NAP	NAP	NSC
7 MAY 1977	NSC	NSC	NAP	NSC
9 MAY 1977	NAP	NSC	NSC	NSC
10 MAY 1977	NSC	NAP	NSC	NSC
13 MAY 1977	NAP	NSC	NSC	NSC
19 MAY 1977	NAP	NSC	NSC	NSC
20 MAY 1977	NSC	NSC	NAP	NSC
26 MAY 1977	NSC	NSC	NSC	NAP
27 MAY 1977	NSC	NAP	NSC	NSC
29 MAY 1977	NAP	NSC	NSC	NSC
31 MAY 1977	NSC	NSC	NSC	NAP
1 JUN 1977	NAP	NSC	NSC	NSC
2 JUN 1977	NAP	NSC	NAP	NSC
3 JUN 1977	NSC	NSC	NSC	NAP
6 JUN 1977	NAP	NSC	NSC	NSC
7 JUN 1977	NSC	NSC	NAP	NSC
8 JUN 1977	NAP	NSC	NSC	NSC
10 JUN 1977	NAP	NSC	NAP	NAP
11 JUN 1977	NSC	NAP	NSC	NSC

DATA FOR (NA+)	(UMOL/L)	(CONT.)		
	WHITEFACE	ITHACA	PENNSYLVANIA	VIRGINIA
13 JUN 1977	NSC	NSC	NAP	NSC
14 JUN 1977	NAP	NSC	NSC	NSC
15 JUN 1977	NSC	NSC	NAP	NSC
16 JUN 1977	NSC	NSC	NSC	NAP
18 JUN 1977	NSC	NSC	NAP	NSC
19 JUN 1977	NSC	NAP	NSC	NSC
20 JUN 1977	NAP	NSC	NSC	NSC
21 JUN 1977	NSC	NAP	NSC	NSC
22 JUN 1977	NAP	NSC	NSC	NSC
26 JUN 1977	NSC	NAP	NAP	NSC
27 JUN 1977	NAP	NSC	NSC	NSC
28 JUN 1977	NSC	NSC	NSC	NAP
29 JUN 1977	NSC	NSC	NAP	NSC

NSC MEANS NO SAMPLE COLLECTED
 ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
 NAP MEANS NO ANALYSIS PERFORMED
 MOE MEANS MALFUNCTION OR OPERATOR ERROR

DATA FOR (K+)

(UMOL/L)

	W H I T E F A C E	I T H A C	P E N S T A T E	V I R G I N I A
22 SEP 1976	NSC	NSC	ISA	NSC
27 SEP 1976	NSC	NSC	.77	NSC
28 SEP 1976	NSC	NSC	< .20	NSC
30 SEP 1976	NSC	NSC	< .20	NSC
2 OCT 1976	NSC	NSC	< .20	NSC
3 OCT 1976	NSC	NSC	ISA	NSC
7 OCT 1976	NSC	NSC	ISA	NSC
9 OCT 1976	NSC	NSC	.30	NSC
10 OCT 1976	NSC	NSC	.30	NSC
11 OCT 1976	< .20	NSC	NSC	NSC
14 OCT 1976	NSC	NSC	.50	NSC
15 OCT 1976	NSC	NSC	ISA	NSC
16 OCT 1976	NSC	NSC	.30	NSC
18 OCT 1976	NSC	NSC	ISA	NSC
19 OCT 1976	NSC	NSC	NAP	NSC
20 OCT 1976	1.30	NSC	NSC	NSC
21 OCT 1976	< .20	NSC	< .20	NSC
22 OCT 1976	NSC	NSC	ISA	NSC
25 OCT 1976	NSC	NSC	< .20	NSC
26 OCT 1976	NSC	< .20	< .20	NSC
29 OCT 1976	2.80	NSC	NSC	NSC
31 OCT 1976	NSC	NSC	< .20	NSC
1 NOV 1976	< .20	4.40	ISA	NSC
4 NOV 1976	NSC	NSC	.31	NSC

DATA FOR (K+)

(UMOL/L)

(CONT.)

	W H I T E F A C E	I T H A C	P E N S T A T E	V I R G I N I A
8 NOV 1976	NSC	NSC	< .20	NSC
9 NOV 1976	.41	NSC	NSC	NSC
10 NOV 1976	NSC	NSC	< .20	NSC
11 NOV 1976	NSC	NSC	ISA	NSC
27 NOV 1976	.36	NSC	NSC	NSC
28 NOV 1976	NSC	NSC	1.20	NSC
30 NOV 1976	NSC	< .20	< .20	NSC
3 DEC 1976	NSC	NSC	.36	NSC
5 DEC 1976	NSC	NSC	.51	NSC
6 DEC 1976	NSC	1.50	NSC	NSC
7 DEC 1976	NAP	NSC	NSC	NSC
8 DEC 1976	NSC	NSC	NAP	NSC
12 DEC 1976	NSC	NSC	NSC	NAP
14 DEC 1976	NSC	NSC	NAP	NSC
17 DEC 1976	NSC	NSC	NSC	NAP
20 DEC 1976	NSC	NSC	NAP	NAP
21 DEC 1976	NAP	NSC	NSC	NSC
22 DEC 1976	NSC	NSC	NAP	NSC
24 DEC 1976	NSC	NSC	NAP	NSC
28 DEC 1976	NSC	NSC	NAP	NSC
30 DEC 1976	NSC	NSC	NAP	NAP
2 JAN 1977	NSC	NSC	NAP	NSC
4 JAN 1977	NSC	< .30	NAP	NSC
8 JAN 1977	NSC	.31	7.00	NSC

DATA FOR (K+)	(UMOL/L)	(CONT.)		
	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
10 JAN 1977	NAP	NSC	NSC	NSC
11 JAN 1977	NSC	< .30	.20	NSC
15 JAN 1977	NSC	NSC	< .30	NSC
18 JAN 1977	NSC	NSC	NSC	NAP
22 JAN 1977	NSC	.46	NSC	NSC
25 JAN 1977	< .30	NSC	< .30	NSC
26 JAN 1977	NSC	NSC	1.90	NSC
27 JAN 1977	NSC	< .30	2.50	NSC
31 JAN 1977	NSC	1.40	NSC	NSC
1 FEB 1977	2.40	NSC	2.40	NSC
4 FEB 1977	NSC	NSC	< .30	NSC
5 FEB 1977	NSC	2.30	< .30	NSC
6 FEB 1977	< .30	NSC	NSC	NSC
12 FEB 1977	3.70	NSC	NSC	NSC
13 FEB 1977	NSC	NSC	4.40	NSC
14 FEB 1977	2.90	1.90	NSC	NSC
15 FEB 1977	NSC	NSC	< .30	NAP
18 FEB 1977	NSC	2.20	NSC	NSC
19 FEB 1977	.64	NSC	NSC	NSC
21 FEB 1977	< .30	< .30	3.70	NSC
25 FEB 1977	NAP	NSC	NAP	NAP
1 MAR 1977	NAP	NSC	NSC	NAP
5 MAR 1977	NAP	NSC	NAP	NAP
8 MAR 1977	NAP	NSC	NSC	NSC

DATA FOR (K+)	(UMOL/L)	(CONT.)		
	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
13 MAR 1977	NAP	NSC	NSC	NAP
14 MAR 1977	NAP	NSC	NAP	NSC
15 MAR 1977	NSC	NAP	NSC	NSC
16 MAR 1977	NSC	NSC	NAP	NSC
17 MAR 1977	NAP	NSC	NSC	NSC
19 MAR 1977	NSC	NSC	NAP	NAP
20 MAR 1977	NSC	NSC	NSC	NAP
21 MAR 1977	NAP	NAP	NAP	NSC
23 MAR 1977	NAP	NSC	NAP	NSC
24 MAR 1977	NSC	NSC	NAP	NAP
25 MAR 1977	NAP	NAP	NSC	NSC
29 MAR 1977	NAP	NSC	NAP	NAP
31 MAR 1977	NAP	NSC	NAP	NSC
3 APR 1977	NAP	NAP	NAP	NSC
5 APR 1977	NAP	NSC	NSC	NSC
6 APR 1977	NAP	NAP	NAP	NAP
7 APR 1977	NSC	NSC	NAP	NSC
8 APR 1977	NAP	NSC	NAP	NSC
14 APR 1977	NAP	NSC	NSC	NSC
20 APR 1977	NSC	NSC	NAP	NSC
23 APR 1977	NAP	NSC	NSC	NSC
24 APR 1977	NSC	NSC	NSC	NAP
25 APR 1977	NAP	NSC	NAP	NSC
28 APR 1977	NAP	NSC	NSC	NSC

DATA FOR (K+)	(UMOL/L)	(CONT.)		
	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
29 APR 1977	NSC	NAP	NAP	NSC
30 APR 1977	NSC	NSC	NSC	NAP
2 MAY 1977	NAP	NSC	NSC	NSC
3 MAY 1977	NSC	NSC	NAP	NSC
5 MAY 1977	NSC	NSC	NSC	NAP
6 MAY 1977	NSC	NAP	NAP	NSC
7 MAY 1977	NSC	NSC	NAP	NSC
9 MAY 1977	NAP	NSC	NSC	NSC
10 MAY 1977	NSC	NAP	NSC	NSC
13 MAY 1977	NAP	NSC	NSC	NSC
19 MAY 1977	NAP	NSC	NSC	NSC
20 MAY 1977	NSC	NSC	NAP	NSC
26 MAY 1977	NSC	NSC	NSC	NAP
27 MAY 1977	NSC	NAP	NSC	NSC
29 MAY 1977	NAP	NSC	NSC	NSC
31 MAY 1977	NSC	NSC	NSC	NAP
1 JUN 1977	NAP	NSC	NSC	NSC
2 JUN 1977	NAP	NSC	NAP	NSC
3 JUN 1977	NSC	NSC	NSC	NAP
6 JUN 1977	NAP	NSC	NSC	NSC
7 JUN 1977	NSC	NSC	NAP	NSC
8 JUN 1977	NAP	NSC	NSC	NSC
10 JUN 1977	NAP	NSC	NAP	NAP
11 JUN 1977	NSC	NAP	NSC	NSC

DATA FOR (K+)	(UMOL/L)	(CONT.)		
	W H I T E F A C E	I T H A C A	P E N S T A T E	V I R G I N I A
13 JUN 1977	NSC	NSC	NAP	NSC
14 JUN 1977	NAP	NSC	NSC	NSC
15 JUN 1977	NSC	NSC	NAP	NSC
16 JUN 1977	NSC	NSC	NSC	NAP
18 JUN 1977	NSC	NSC	NAP	NSC
19 JUN 1977	NSC	NAP	NSC	NSC
20 JUN 1977	NAP	NSC	NSC	NSC
21 JUN 1977	NSC	NAP	NSC	NSC
22 JUN 1977	NAP	NSC	NSC	NSC
26 JUN 1977	NSC	NAP	NAP	NSC
27 JUN 1977	NAP	NSC	NSC	NSC
28 JUN 1977	NSC	NSC	NSC	NAP
29 JUN 1977	NSC	NSC	NAP	NSC

NSC MEANS NO SAMPLE COLLECTED
 ISA MEANS INSUFF. SAMPLE FOR ANALYSIS
 NAP MEANS NO ANALYSIS PERFORMED
 MOE MEANS MALFUNCTION OR OPERATOR ERROR

GRID REFERENCE

B	1	AD MAP - P
C	1	AD MAP - P
D	1	AD MAP - P
E	1	
F	1	PRECIPITAT
G	1	SAMPLES AV
H	1	7
I	1	7
J	1	WHITEFACE
K	1	WHITEFACE
L	1	WHITEFACE
M	1	WHITEFACE
N	1	WHITEFACE
O	1	WHITEFACE
P	1	WHITEFACE
B	2	WHITEFACE
C	2	WHITEFACE
D	2	ITHACA
E	2	ITHACA
F	2	ITHACA
G	2	ITHACA
H	2	ITHACA
I	2	ITHACA
J	2	PENN STATE
K	2	PENN STATE
L	2	PENN STATE
M	2	PENN STATE
N	2	PENN STATE
O	2	PENN STATE
P	2	PENN STATE
B	3	PENN STATE
C	3	PENN STATE
D	3	PENN STATE
E	3	PENN STATE
F	3	PENN STATE
G	3	VIRGINIA
H	3	VIRGINIA
I	3	VIRGINIA
J	3	VIRGINIA
K	3	VIRGINIA
L	3	VIRGINIA
M	3	SAMP. TIME
N	3	SAMP. TIME
O	3	SAMP. TIME
P	3	SAMP. TIME
B	4	SAMP. TIME
C	4	SAMP. TIME
D	4	PREC. TIME
E	4	PREC. TIME
F	4	PREC. TIME
G	4	PREC. TIME
H	4	PREC. TIME
I	4	PREC. TIME
J	4	TIME RMVD.
K	4	TIME RMVD.
L	4	TIME RMVD.
M	4	TIME RMVD.
N	4	TIME RMVD.
O	4	TIME RMVD.
P	4	SAMP. VOL.

GRID REFERENCE

B	5	SAMP. VOL.
C	5	SAMP. VOL.
D	5	SAMP. VOL.
E	5	SAMP. VOL.
F	5	SAMP. VOL.
G	5	PRED. VOL.
H	5	PRED. VOL.
I	5	PRED. VOL.
J	5	PRED. VOL.
K	5	PRED. VOL.
L	5	PRED. VOL.
M	5	LID OPEN
N	5	LID OPEN
O	5	LID OPEN
P	5	LID OPEN
B	6	LID OPEN
C	6	LID OPEN
D	6	FIELD (H+)
E	6	FIELD (H+)
F	6	FIELD (H+)
G	6	FIELD (H+)
H	6	FIELD (H+)
I	6	FIELD (H+)
J	6	(H+)
K	6	(H+)
L	6	(H+)
M	6	(H+)
N	6	(H+)
O	6	(H+)
P	6	CONDUCT.
B	7	CONDUCT.
C	7	CONDUCT.
D	7	CONDUCT.
E	7	CONDUCT.
F	7	CONDUCT.
G	7	(S02)
H	7	(S02)
I	7	(S02)
J	7	(S02)
K	7	(S02)
L	7	(S02)
M	7	(S04--)
N	7	(S04--)
O	7	(S04--)
P	7	(S04--)
B	8	(S04--)
C	8	(S04--)
D	8	(NH4+)
E	8	(NH4+)
F	8	(NH4+)
G	8	(NH4+)
H	8	(NH4+)
I	8	(NH4+)
J	8	(N02-)
K	8	(N02-)
L	8	(N02-)
M	8	(N02-)
N	8	(N02-)
O	8	(N02-)
P	8	(N03-)

GRID REFERENCE

B	9	(N03-)
C	9	(N03-)
D	9	(N03-)
E	9	(N03-)
F	9	(N03-)
G	9	(CL-)
H	9	(CL-)
I	9	(CL-)
J	9	(CL-)
K	9	(CL-)
L	9	(CL-)
M	9	(P04---)
N	9	(P04---)
O	9	(P04---)
P	9	(P04---)
B	10	(P04---)
C	10	(P04---)
D	10	(NA+)
E	10	(NA+)
F	10	(NA+)
G	10	(NA+)
H	10	(NA+)
I	10	(NA+)
J	10	(MG++)
K	10	(MG++)
L	10	(MG++)
M	10	(MG++)
N	10	(MG++)
O	10	(MG++)
P	10	(AL+++)
B	11	(AL+++)
C	11	(AL+++)
D	11	(AL+++)
E	11	(AL+++)
F	11	(AL+++)
G	11	(K+)
H	11	(K+)
I	11	(K+)
J	11	(K+)
K	11	(K+)
L	11	(K+)
M	11	(CA++)
N	11	(CA++)
O	11	(CA++)
P	11	(CA++)
B	12	(CA++)
C	12	(CA++)

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