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AUTOMATION OF THE NATIONAL WATER QUALITY LABORATORIES, U. S. GEOLOGICAL SURVEY 1. DESCRIPTION OF LABORATORY FUNCTIONS AND DEFINITION OF THE AUTOMATION PROJECT

W. F. Morris

H. S. Ames

July 1, 1977

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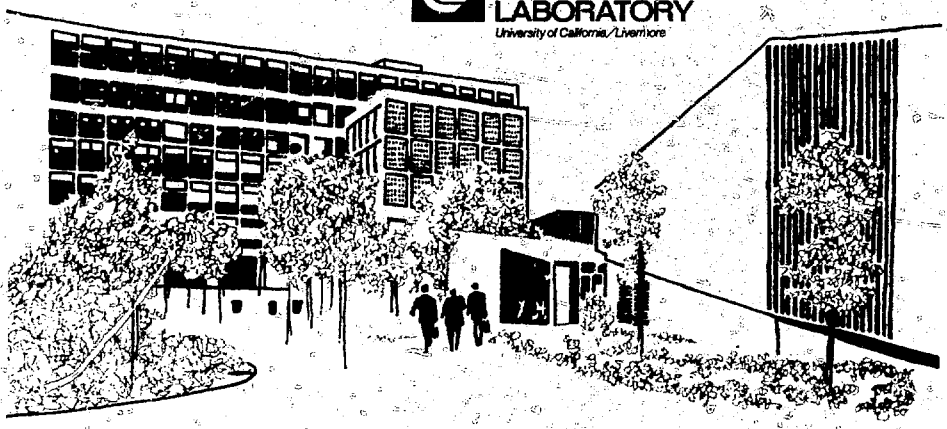

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Abstract

In January 1976, the Water Resources Division of the U.S. Geological Survey asked Lawrence Livermore Laboratory to conduct a feasibility study for automation of the National Water Quality (NWQ) Laboratory in Denver, Colorado (formerly Denver Central Laboratory). Results of the study were published in the *Feasibility Study for Automation of the Central Laboratories*, Lawrence Livermore Laboratory, Rept. UCRL-52001 (1976). Because the present system for processing water samples was found inadequate to meet the demands of a steadily increasing workload, new automation was recommended. In this document we present details necessary for future implementation of the new system, as well as descriptions of current laboratory automatic data processing and analytical facilities to better define the scope of the project and illustrate what the new system will accomplish. All pertinent inputs, outputs, and other operations that define the project are shown in functional designs. The new system will accelerate each stage involved in processing a water sample. All sample-related data produced in the laboratory will be acquired either directly on-line, in real time, or by off-line entry mode. The system will also process and store the data and generate reports. Twenty-nine on-line data sources from eight different types of analytical instruments will be interfaced, providing 190 of the approximately 400 different parameters determined each day as well as 70% of the average daily data flow. Although the information presented here pertains specifically to the Denver laboratory, the same renovations will eventually be instituted at the NWQ laboratory in Atlanta, Georgia.

1. Introduction

Water quality analyses throughout the United States are conducted by regional National Water Quality (NWQ) laboratories of the Water Resources Division, U.S. Geological Survey (USGS). The NWQ laboratory in Denver, Colorado (formerly Denver Central Laboratory) services the 16 states that comprise the western region, and currently processes approximately 40,000 samples and 1,000,000 determinations annually. In the past, the NWQ laboratories have been able to meet the demands of the heavy workload through systematic operation, incorporation of modern laboratory instrumentation, and the use of remote data processing facilities in Reston, Virginia. However, the sample load is increasing, creating large backlogs of outstanding samples. At the same time, the new instruments generate more parameter determinations in less time thereby, increasing the data handling problems.

In an attempt to alleviate these problems, the USGS requested that Lawrence Livermore Laboratory (LLL) examine the overall operations at the Denver facility and recommend a course of action. In January 1976, LLL conducted a feasibility study for further automating the NWQ laboratories, concluding that they could benefit from increased automation and the acquisition of in-house computer facilities. The USGS has approved plans to comply with the feasibility study recommendations; this document is the next step in that process.

One of our primary purposes is to define the scope of the automation project by presenting an overall view of the NWQ laboratories operations as well as detailed descriptions of the Denver laboratory operations and data processing system. We also include system performance characteristics, advantages and disadvantages of the system, needed improvements, and the goals of the NWQ laboratories. Because of certain constraints, not all the desired improvements and goals can be attained. These constraints and their effect on the automation project will be explained.

The information we present is intended to provide enough details to allow the designer to fully understand the scope of the project and then design the required automation.

2. Overall View of the Present NWQ Laboratories Operations

2-1. DESCRIPTION OF THE NETWORK

The USGS NWQ laboratories are located in Atlanta, Georgia and Denver, Colorado. They can determine over 400 chemical and physical water-sample parameters[1] daily. Figure 1 presents a simplified schematic of the network joining the NWQ laboratories with district offices requesting analyses and with the USGS facility in Reston, Virginia that performs data processing for the laboratories.* Samples are shipped to the laboratories accompanied by log-inventory sheets that describe the samples and indicate parameters to be determined. The information is transmitted to Reston where sample data files and work schedules are established. The NWQ laboratories

*Communications with Reston are conducted using a Data-100 terminal and Bell System 208B modem at Denver. The Reston system has 201A (2000 baud), 201C (2400 baud), and 208B (4200 baud) modem ports.

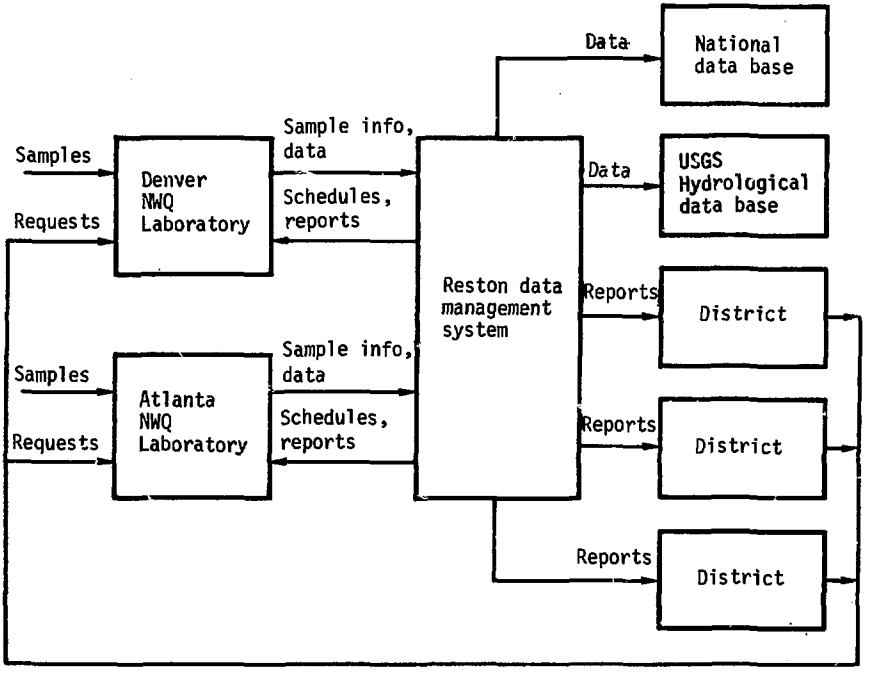


Fig. 1. Analytical services network of the NWQ laboratories.

conduct analyses according to work schedules, and the Reston computer programs process the data and generate reports.

2-2. PRESENT OPERATIONS OF THE DENVER NWQ LABORATORY

A simplified schematic of Denver laboratory operations is shown in Fig. 2. Samples received in the laboratory are accompanied by log-inventory sheets. The samples are stored and the log-inventory information is keypunched on cards and transmitted to Reston. The Reston system returns job sheets to the laboratories, listing sample identities and parameters to be determined. When the determinations are completed, the data are keypunched and transmitted to Reston. Reston returns the analysis report to the Denver laboratory where the quality control section approves or rejects the data; final results are given to the requester after Reston receives approval from Denver.

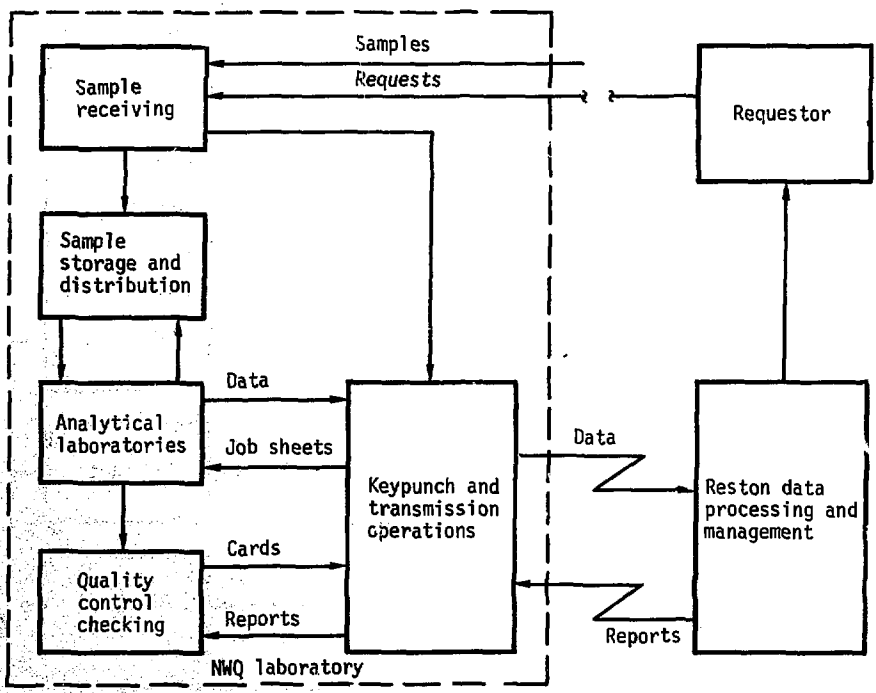


Fig. 2. Functional schematic of NWQ laboratory operations.

2-3. OVERALL PERFORMANCE

The NWQ laboratories were first linked with the Reston computer in 1971, enabling them to schedule complex jobs, reduce data, and formulate consolidated reports. Since 1971, new analytical techniques have made it possible to process even more samples and determine more parameters. This, in turn, has placed a greater burden on the remote system and emphasized the need for faster turnaround times.

Several problems discussed in the original feasibility study[2] preclude further development of the Reston system; an alternative solution incorporating an in-house computer system has been recommended.

3. Denver NWQ Laboratory Facilities

The work of the Denver NWQ Laboratory is currently divided into nine sections. Figure 3 presents a schematic representation of each section and its function, and Fig. 4 shows the laboratory floor plan.

Sample receiving and the keypunching and transmission facilities of automatic data processing (ADP) are located in section 1. Analyses using several different methods and instruments are performed in sections 2 through 9. Information and data are submitted to ADP from sample receiving on log-inventory sheets and from the analytical sections on printed digital tapes or data summary sheets.

Water sample analyses and automatic data processing are the two main functions of the Denver laboratory. They will be described in detail in the following sections.

3-1. ANALYTICAL FUNCTIONS

The original feasibility study[2] recommended that certain analytical methods should be automated, especially those most frequently used or for which there are existing applicable automation packages.[3-5] In the following sections we present these methods; we also list all other analysis methods and the data that they enter into ADP. It is essential to include this latter category to insure a system design that provides for the entry of all data regardless of whether or not the methods are automated.

3-1.1. Routine Operations

To perform the analyses, certain routine operations are always conducted by the analyst irrespective of the laboratory section or the

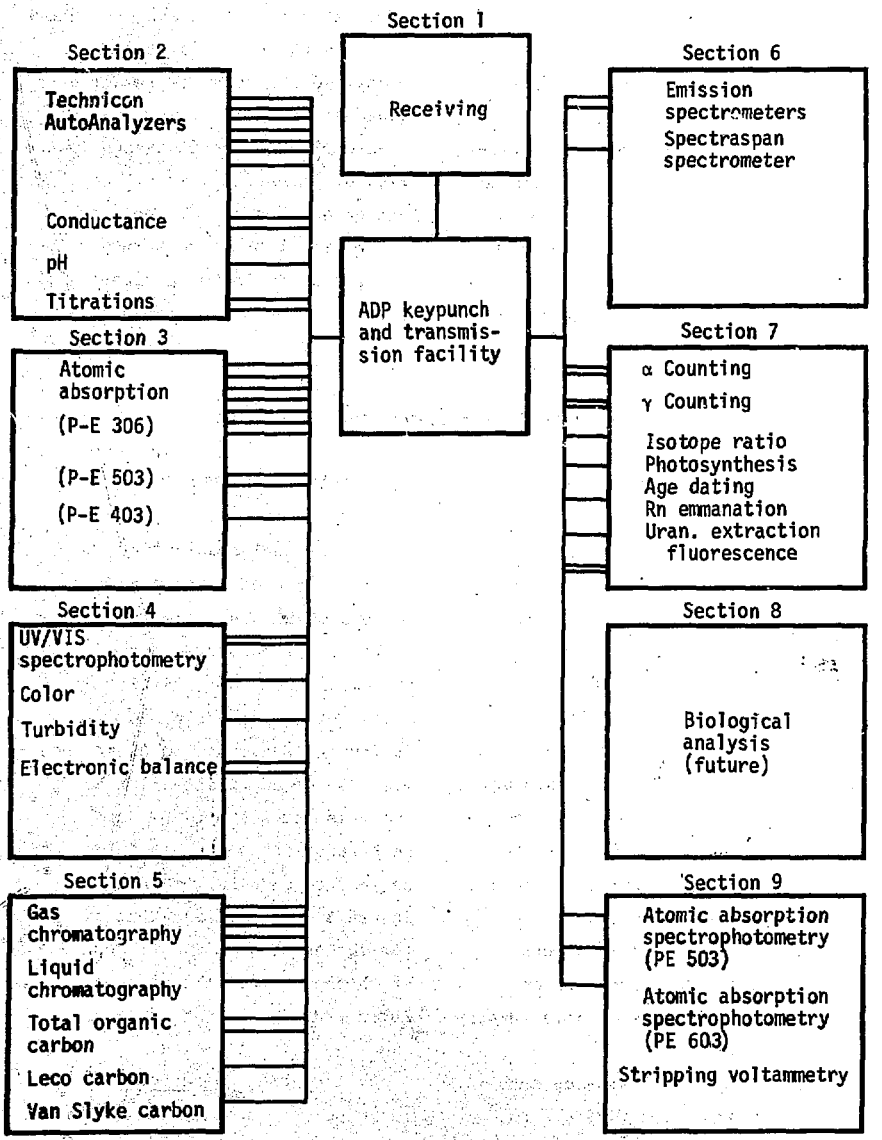


Fig. 3. Denver NWQ laboratory sections.

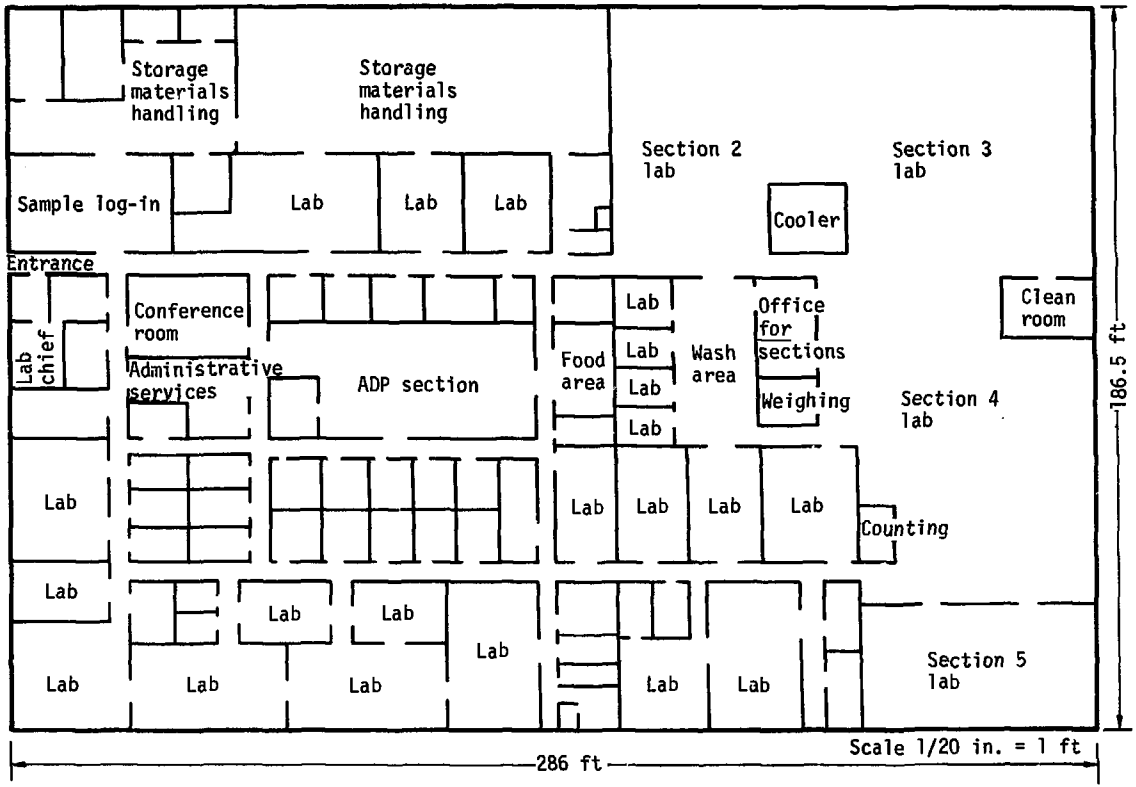


Fig. 4. Denver NWQ laboratory floor plan.

analytical technique employed. These common operations provide a uniform and orderly means of scheduling and performing the analytical work as well as entering the data into the remote data processing facilities for data reduction and report generation. The operations and their interactions are shown on the flow chart in Fig. 5. More specifically, the utility of the various inputs and the disposition of the resulting outputs are shown on the functional schematic in Fig. 6. The functional schematic also shows analyst function categories 1 through 5. In both figures we refer to the Job sheets and Big Brother sheets. These are compiled

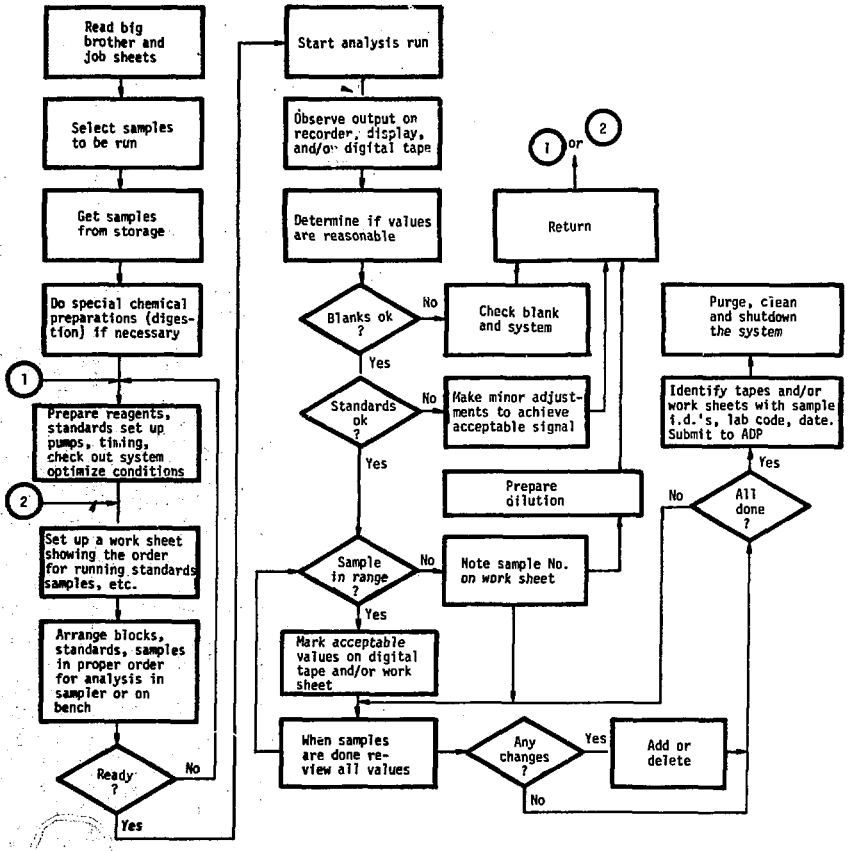


Fig. 5. Flow chart of routine operations.

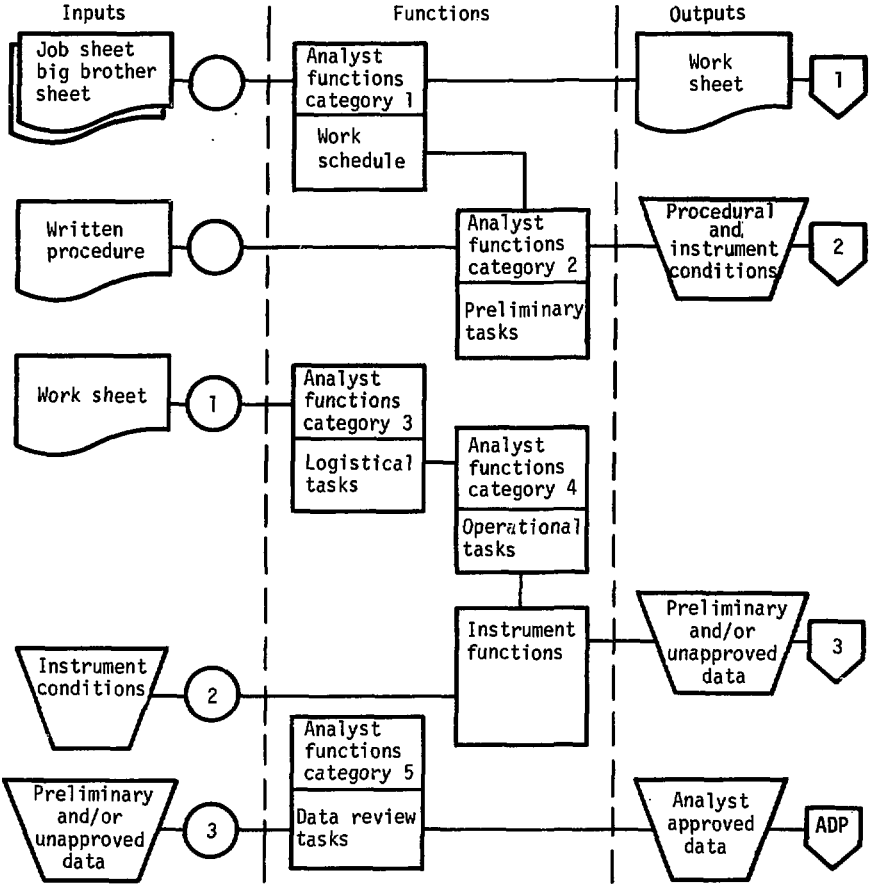


Fig. 6. Functional schematic of routine operations.

and generated by the ADP system and will be described in detail in Section 3-2.

It is apparent from Fig. 6 that the analyst performs many functions throughout the course of the analytical procedure. Many of these functions consist of preparing samples and standards as well as insuring proper instrument operation prior to the actual running of samples. Details of these procedures for specific parameters can be found in Ref. 6.

In the following sections we describe the major analytical instruments and the procedural steps associated with these operations. Instruments included are those that handle a major portion of the laboratory workload and that are operated routinely in the various sections of the Denver laboratory.

3-1.2. Technicon Autoanalysis System

The Technicon AutoAnalyzer (TAA) performs continuous-flow, simultaneous chemical analyses. The system aspirates multiple samples in sequence, brings the samples and reagents together for reaction, and continuously moves the sequence of samples through perdetermined analysis steps to produce a colored solution. The analyzer pumps the solution through a colorimeter, where light absorption by the solution is measured. The concentration of the analyte of interest, which is related to the light absorption, can be displayed on a recorder or a digital printer.

Table 1. Technicon AutoAnalyzer systems and parameters determined.

System No.	No. of channels	Parameters determined	Sampling rate	Detector	Method[a] reference
1	1	Chemical Oxygen Demand (COD)	40/hr	Colorimeter	Provisional
2	1	Cyanide	20/hr	Colorimeter	I-2302-76
3	1	Fluoride (total)	20/hr	Ion selective Electrode (ISE)	I-1327-77
4	1	Nitrogen (Kjeldahl)	60/hr	Colorimeter	I-2552-77
5	2	Iron (total)	40	Colorimeter	I-6379-76
		Phosphorus (total dissolved)	40	Colorimeter	I-2600-76
6	4	Sulfate (low)	30/hr	Colorimeter	I-2822-76
		Sulfate (high)	30/hr	Colorimeter	I-2822-76
		Chloride (low)	30/hr	Colorimeter	I-2187-76
		Chloride (high)	30/hr	Colorimeter	
7	6	Nitrogen (NO_3+NO_2)	40/hr	Colorimeter	I-4545-77
		Nitrogen (NO_2)	40/hr	Colorimeter	I-6540-76
		Nitrogen (NH_4+)	40/hr	Colorimeter	I-2523-77
		Fluoride (diss.)	40/hr	Ion selective electrode	I-1327-77
		Phosphorus (PO_4)	40/hr	Colorimeter	I-2600-76
		Silica (SiO_2)	40/hr	Colorimeter	I-2700-77

[a]See Ref. 6, Ch. A-1.

The NWQ laboratories are equipped with AutoAnalyzer II systems that are used in single and multi-channel modes to determine a variety of analytes. Table 1 summarizes the current capabilities. The physical layout of a multi-channel AutoAnalyzer system as well as the approximate location and characteristics of the colorimeter signals are shown in Fig. 7.

Specific TAA Functions

Analyses performed using the TAA require that the analyst proceed according to the general routine described earlier in Section 3-1.1. Detailed steps specific to AutoAnalyzer system operation are given below.

Analyst Functions: Preliminary Set-up, Category 2 — The analyst

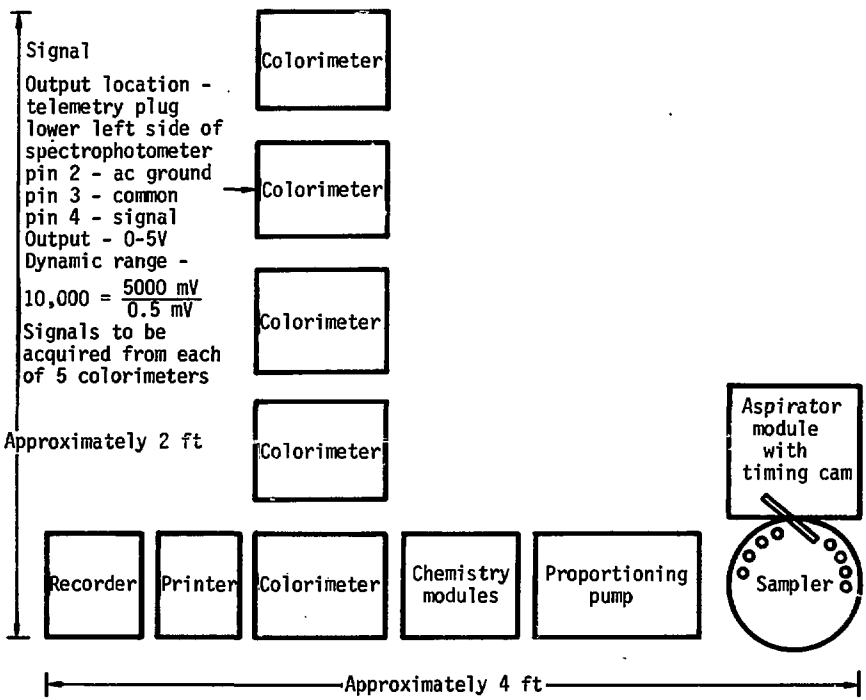


Fig. 7. Layout of Technicon AutoAnalyzer.

performs preliminary chemistry independent of the AutoAnalyzer, e.g., sample digestion required for Kjeldahl nitrogen determination. He prepares reagents needed for the specific parameters to be determined and sets up the appropriate reagent reservoirs, tubing, connections and AutoAnalyzer components. He then inserts the appropriate sample timing cam to establish the number of samples to be sequenced per hour and the relative times for aspiration of sample and wash. Using a known standard or sample, he adjusts the colorimeter amplifier gain settings, signal span, and damping. He then indexes the printer to output the appropriate sequence of indentification numbers.

Instrument Functions — The AutoAnalyzer automatically aspirates the sample and wash, and then pumps the reagents and air segments into the system. It performs the chemistry and pumps the reacted, colored solution through the colorimeter flow-through cell. As the samples pass by the detector system, the signals are automatically read and relayed to the strip chart recorder and printer tape.

Analyst Functions: Data Approval, Category 5 — The analyst observes the signal on the strip chart to determine its acceptability. If, for example, two sample dilutions are being run in two separate channels as in sulfate determination, the analyst will designate as acceptable one of the two results that falls in the optimum range of the detection system. He marks the acceptable value on the digital printer tape. If a signal is out-of-range or distorted, he notes the sample identification on the work sheet and digital tape as a required rerun. He conducts the above functions as the results appear. When convenient, he prepares a rerun sample, places it in the next available sample tray position, and notes the position on his work sheet. When every sample has been run, the analyst edits the digital printer tape. He identifies on tape the parameters determined by the laboratory code and enters the sample identification numbers either individually or in sets, depending on whether the samples were run in sequence. The digital printer tape is then submitted to the data processing section.

Calculations — Parameter concentrations are usually determined by referencing sample absorbance values to a standard calibration curve that relates absorbance to concentration. The calibration curves may be stored from a previous run or are generated

from standard data accumulated in the current run. More details regarding the calculations may be found in the method descriptions referenced in Table 1.

TAA Performance Characteristics

A timing chart presented in Fig. 8 shows the sequence of operations and the times required for operating the TAA.

Approximately 70 samples can be processed through a TAA in an 8-hr period, considering the time spent in selecting samples, preparing the system, and running blanks, calibration standards, standard reference samples, and periodic check standards. Checking over the strip charts and data tapes for reasonableness of the data is also taken into account. However, special preparations such as sample digestion for kjeldahl nitrogen are not considered.

Thus, in single-channel operation (see system 1, Table 1) approximately 70 parameters can be determined and as many as 140 in two-channel operation. Multi-channel operation, however, does not necessarily mean that the number of parameters determined is 70 times the number of channels. For example, in system 6, Table 1 (4 channels), although 280 actual determinations are made, only 140 optimum Cl^- and $SO_4^=$ results are selected for the final report to ADP.

Examples of typical strip chart recordings from the TAA are shown in Figs. 9 and 10. Superimposed on these are several types of anomalous signals. A typical digital tape, before and after editing, is shown in Fig. 11.

Desired Improvements and Additions to the TAA Systems

To improve the analytical results and make the operation of the TAA system more efficient, it would be advantageous to process standard calibration data as soon as the standards have been run. In this way, the operator can quickly determine if the standard data is appropriate for use in subsequent analyses.

In addition, more efficient operation is possible if the standard reference sample (SRS) data (indicating the accuracy of the method) are made available as soon as the SRS is run. Thus, corrections can be made immediately and costly errors can be avoided.

In the near future, additional AutoAnalyzer systems will be operative. For example, on Table 1, system 4 (Kjeldahl nitrogen) and system 6 ($SO_4^=$ and Cl^-) are candidates for replication. Also, four channels of system 7 ($NO_3 + NO_2$, NO_2, NH_4^+ and P) will be replicated with a separate system.

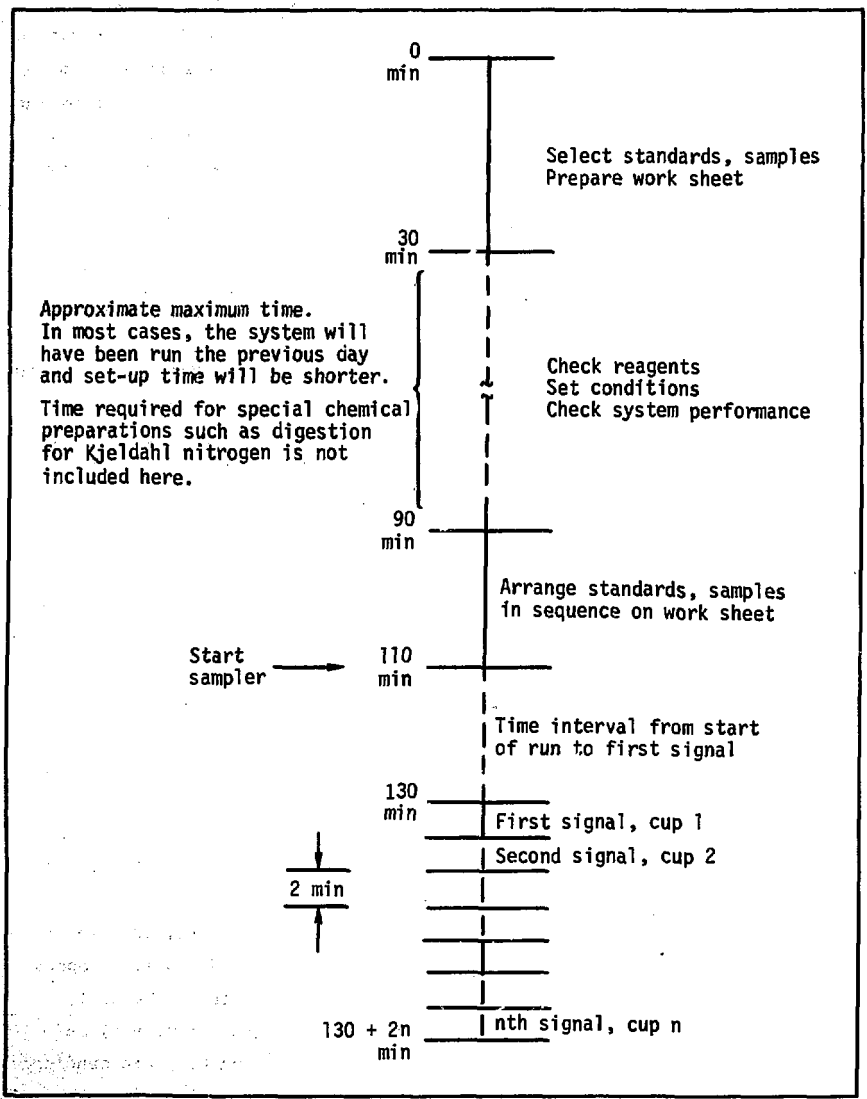


Fig. 8. Timing chart for Technicon AutoAnalyzer operations.

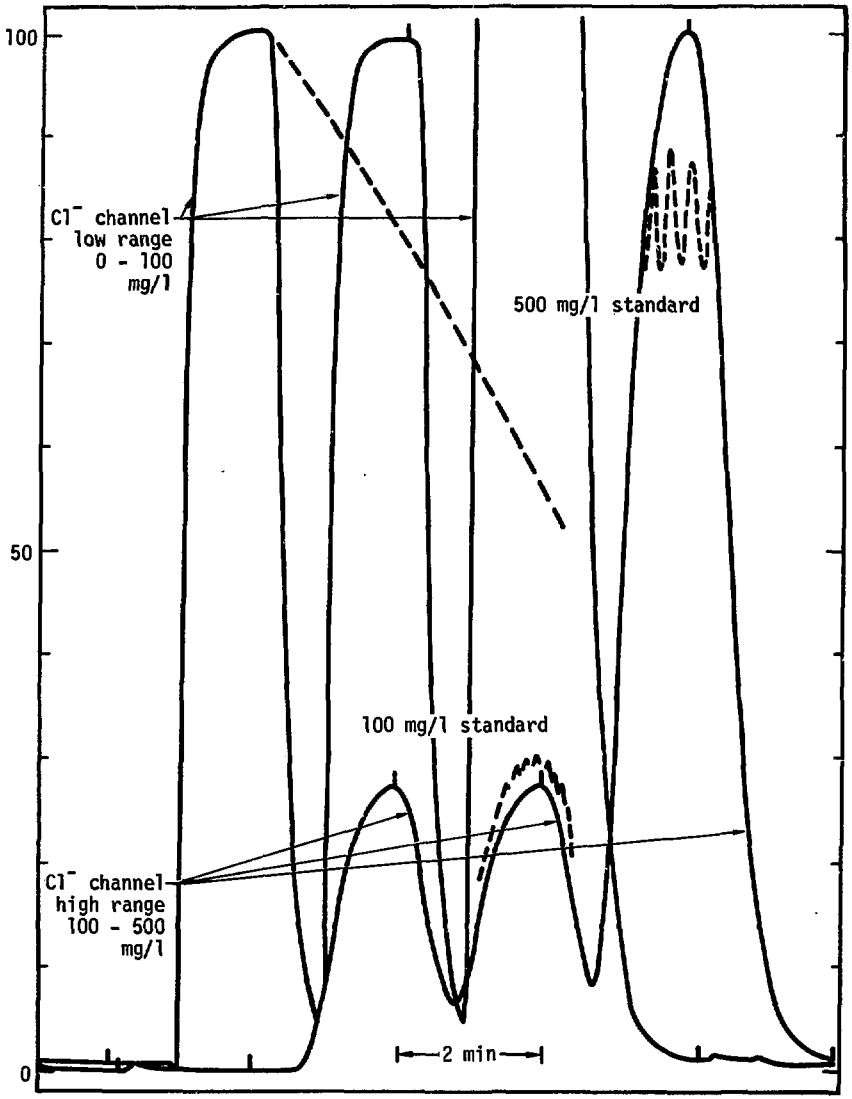


Fig. 9. Strip chart recordings: Two channels: Cl low and high levels.

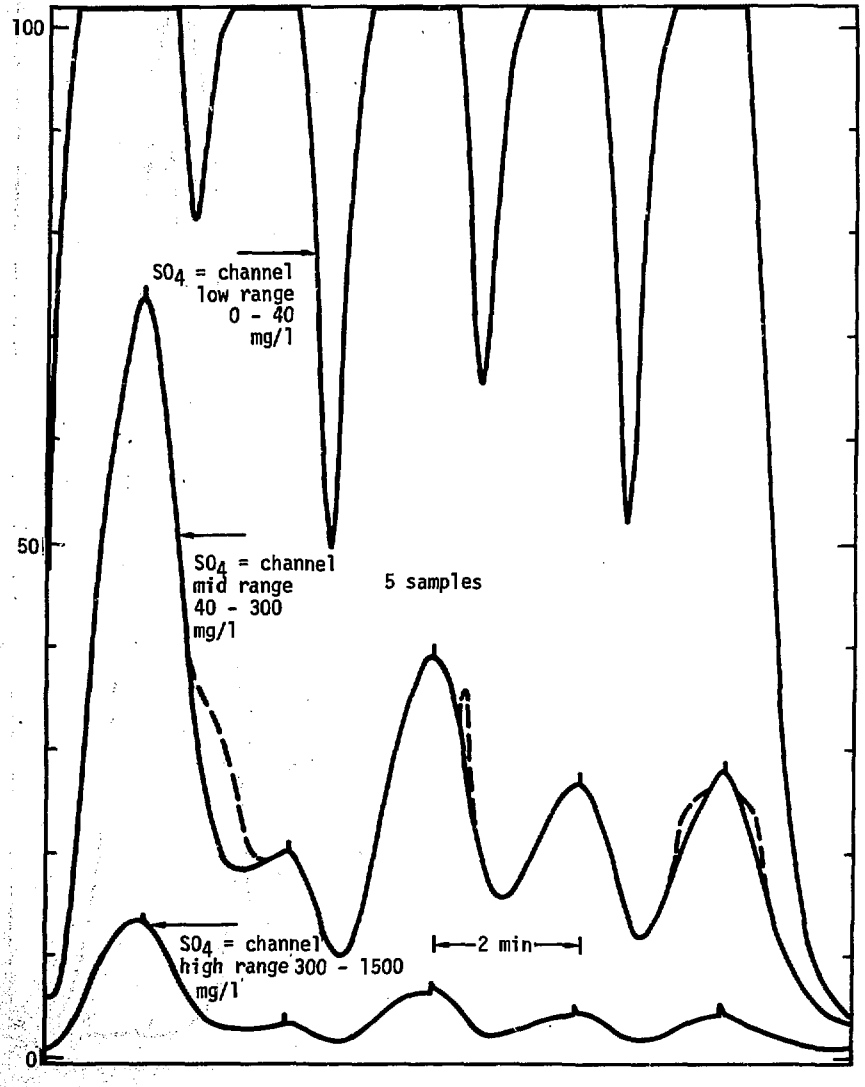


Fig. 10. Strip chart recordings. Three channels: SO_4 low, medium, and high levels.

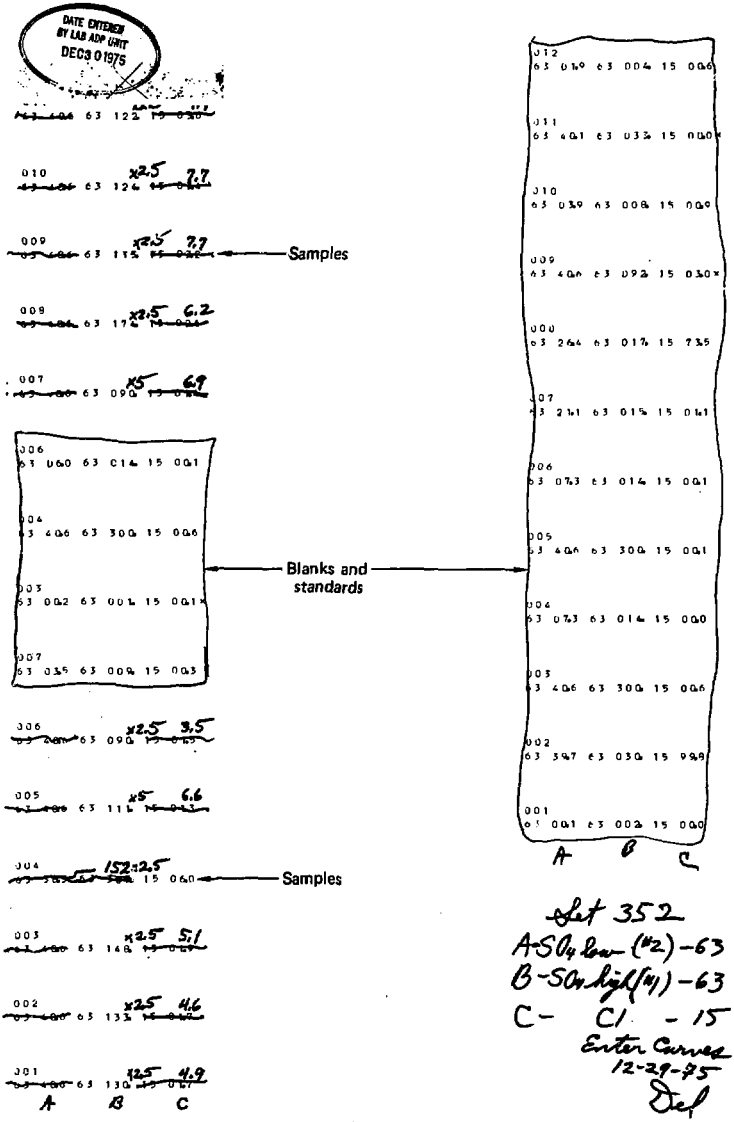


Fig. 11. Typical digital tape from TAA-II analysis after editing.

3-1.3. Conductance and pH Measurement System

Conductance and pH are presently measured with manually operated specific conductance and pH meters. However, a more automatic system using Technicon sampling and pumping units is being designed. The system will be a flow-through design incorporating a Technicon 40-position sampler and a Technicon ion selective electrode module for pH measurements. Two Radiometer-Copenhagen conductivity meters (model CDM3) will be included in the flow-through system for measuring two ranges of conductivity, 0-1500 and 150-15000 µmho. A recorder and digital printer will readout measured parameters. A physical layout of the system as well as locations and characteristics of the signals from the pH and conductivity meters are shown in Fig. 12.

Specific Functions of the Conductance and pH System

Measurements conducted with the conductance pH instrumentation require that the analyst proceed according to the general routine presented in section 3-1.1. Following are detailed steps specific to conductance and pH measurements.

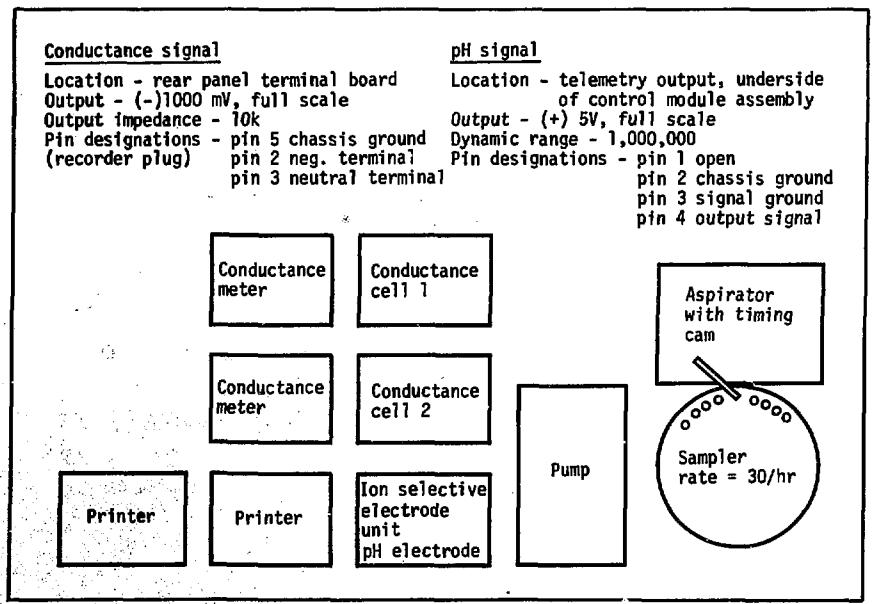


Fig. 12. Layout of pH and conductivity system.

Analyst Functions: Preliminary Set-up, Category 2 — Buffer solutions covering the pH range of samples to be measured are made available. A standard kCl solution, 0.01000 normal, is prepared for checking the cell constant of the conductivity meter. No sample preparation is required, and prior to running the unknowns, the system is checked out with the appropriate buffers and the standard kCl solution. Appropriate conductivity meter settings may be found in Ref. 7.

Instrument Functions — The AutoAnalyzer sampler uses dual aspirator tubes to aspirate aliquots of samples into the system. The samples are segmented with air and pumped through the pH and conductivity modules. Conductivity and pH are measured in the flow-through modules and the signals are read out on the strip chart recorder and digital tape.

Analyst Functions: Data Approval, Category 5 — The analyst observes the strip chart and printed digital tape output looking for unusual signals. He also checks the values of standards included in the series of samples to insure satisfactory system operation. When every sample has been run, the analyst edits the digital tape for submission to ADP. He uses the laboratory code to identify the parameters measured, and enters the sample numbers that correspond to the data on the tape.

Calculations — Calculations relative to specific conductance measurements can be found in Chapter A-1 of Ref. 6 as well as in the Radiometer-Copenhagen CDM3 Manual.[7]

Expected Performance Characteristics of the Conductance and pH Measurement System

A timing chart of conductance and pH measurement operations is shown in Fig. 13.

Although the sampler for this system is expected to sequence 30 samples per hr, the number of actual determinations per 8-hr period will not be a direct multiple because of the time required to perform preliminary tasks such as sample selection, system set-up, standardization, and inclusion of blanks, checks, etc. Time will also be required to review the data. Therefore, it is expected that the conductivity and pH channels will each yield a net of 150 determinations per 8-hr period.

3-1.4 Automatic Titration System

The NWQ Laboratory is equipped with two model ATS-1 Radiometer-Copenhagen automatic titration systems that are most frequently used

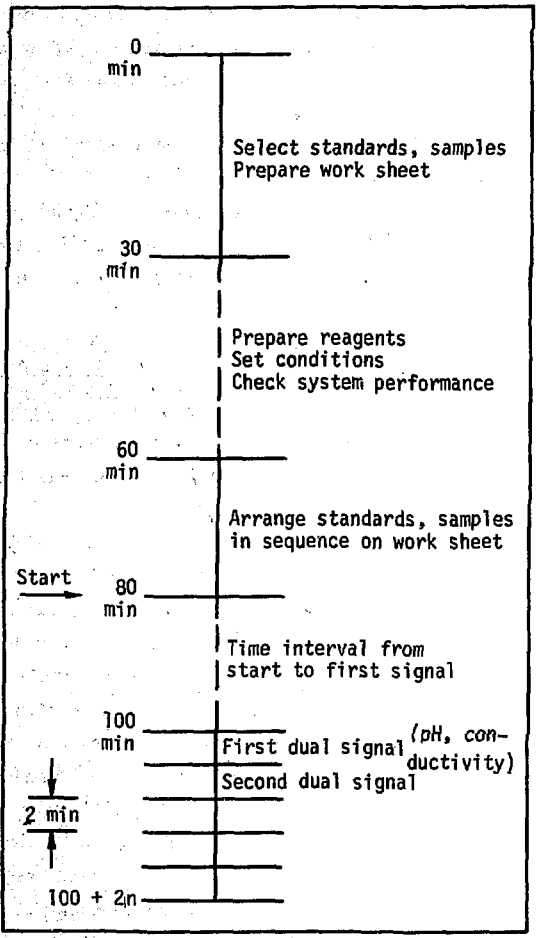


Fig. 13. Timing chart for pH and conductivity measurements.

to determine water alkalinity as a function of carbonate, bicarbonate, and (or) hydroxide concentration. The physical layout of the ATS-1 titration system is shown in Fig. 14, as well as the location and characteristics of the digital buret output signal.

The system sequences a series of samples into position for titration. The sample is transferred into a titration vessel using an automatic

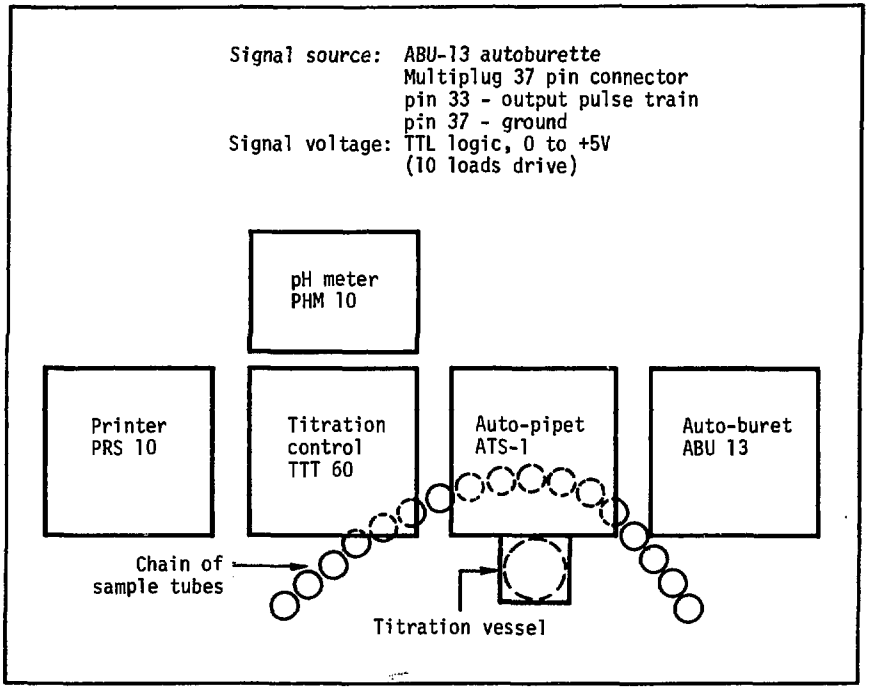


Fig. 14. Automatic titration system.

pipet, titrant is added by digital buret, the volume of titrant added at the end point is measured, and the value is printed on a digital tape. The system automatically empties the titration vessel, cleans the pipet, introduces the next sample in sequence, and repeats the titration process.

Specific Functions of the Automatic Titration System

Use of the automatic titration system requires that the analyst follow the general routine described in section 3-1.1. Details specific to the system are given below.

Analyst Functions: Preliminary Set-up, Category 2 — The analyst prepares standard solutions of NaOH, Na_2CO_3 and H_2SO_4 for use in the appropriate parameter determination. In setting up the system, air bubbles are removed from the auto-buret and the titration end point is set on the pH meter to 4.5 for bicarbonate or 8.3 for carbonate. Three replicate

standards are placed in covered sample tubes in the automatic sample sequencer and the system is started up. When the titrations for the three standards are completed, the analyst observes the results to determine if the values (volumes of titrant) are within the required agreement. If the second and third values differ by more than 0.5%, the system and standards are checked and the process is repeated. When satisfactory agreement has been obtained, samples and standard reference samples are placed in the sampler and the series of automatic titrations is initiated.

Instrument Functions — Each sample tube is sequenced into position. The auto-pipet pierces the sample tube cover, pipets the sample, and transfers it to the titration vessel. The auto-buret delivers enough titrant to achieve the preset pH end point. The volume of titrant is converted to electronic pulses using an optical-photo-detector system. The pulses are counted and the titrant value is printed on a paper tape.

Analyst Functions: Data Approval, Category 5 — When all samples are completed, the data on the tape are checked and the sample numbers corresponding to the data are recorded. The tape is also marked with the laboratory parameter code, the parameter symbol, and the dilution factors calculated from the standards data.

Calculations — Calculations for determining carbonate, bicarbonate, and hydroxide can be found in Chapter A-1 of Ref. 6.

Performance Characteristics of the Automatic Titration System

A timing chart of automatic titration system operations is shown in Fig. 15. The two systems can be operated simultaneously by one analyst. The time required for a single titration depends on the concentration of the carbonate or bicarbonate being determined. Approximately 200-250 samples can be processed on the two units in an 8-hr shift, allowing for setup and system standardization initially and during the run, as well as review of parameter results. A typical digital data tape of bicarbonate determinations is shown in Fig. 16.

3-1.5. Atomic Absorption Spectrophotometry

Atomic absorption spectrophotometers (AAS) determine metals in water samples. Table 2 lists the most frequent determinations and gives other details relative to the procedures and spectrophotometers that

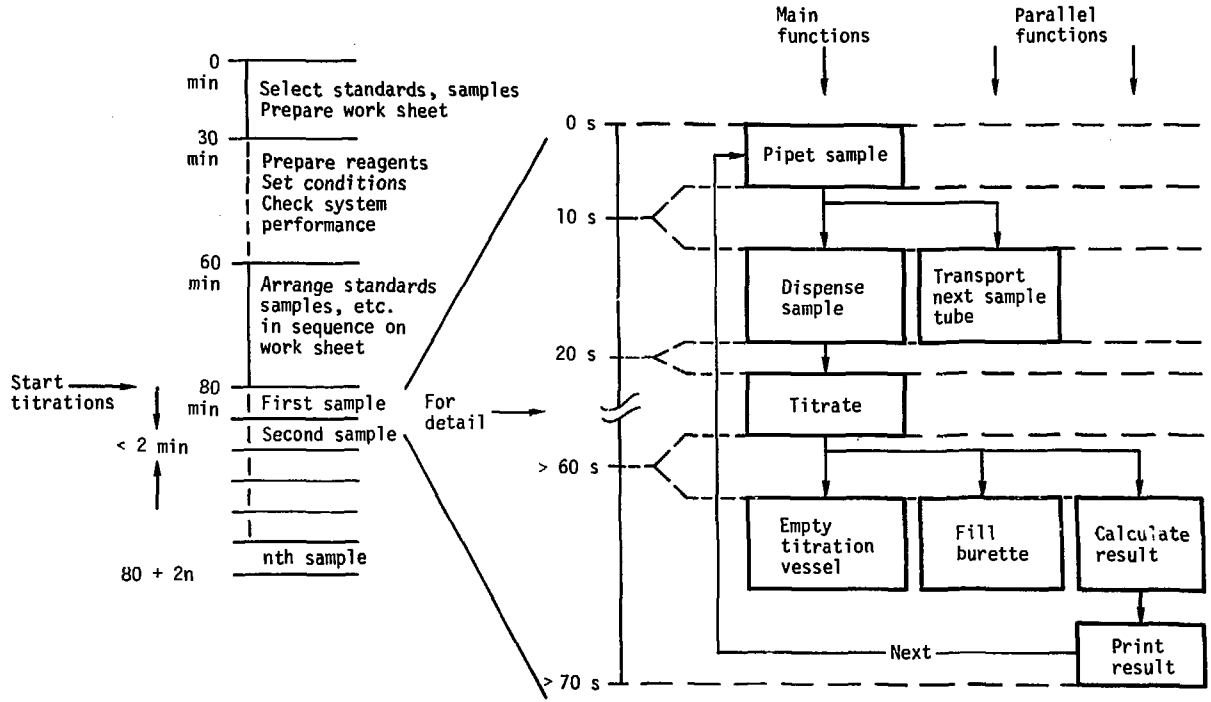


Fig. 15. Timing chart for the automatic titration system.

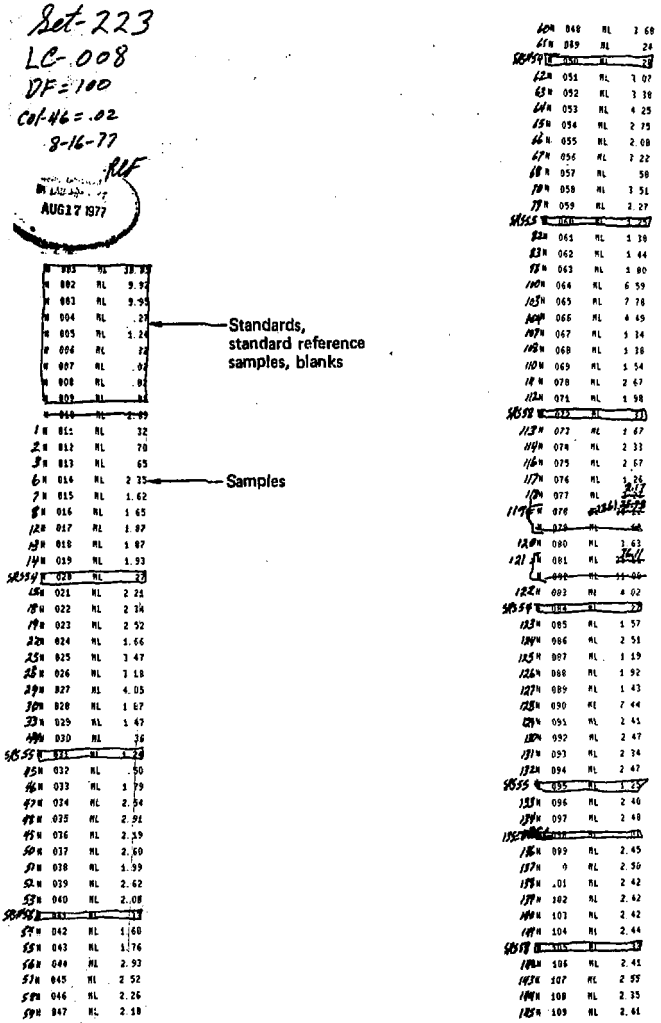


Fig. 16. Typical digital tape of the bicarbonate determination by titration system.

Table 2. Atomic absorption spectrophotometers and parameters determined.

Spectrophotometer	Parameter determined	Sample introduction	Method[a] reference
Perkin Elmer Model 306	Ca	40-position sampler, flame	I-2470-77
	Mg	40-position sampler, flame	I-2470-77
	K	40-position sampler, flame	I-1630-77
	Na	40-position sampler, flame	I-1735-77
	Hg	Flameless, direct	I-2462-77
Perkin Elmer Model 403	As	Flameless, direct	I-2062-77
	Ag	Single sample, flame	I-1720-77
	Cd	Single sample, flame	I-1136-77
	Co	Single sample, flame	I-1240-77
	Cu	Single sample, flame	I-1271-77
	Ni	Single sample, flame	I-1500-77
	Pb	Single sample, flame	I-1400-77
	Al	Single sample, flame	I-1052-77
	Mo	Single sample, flame	I-1400-77
	Ba	Single sample, flame	I-1054-77
	Be	Single sample, flame	I-1005-77
	Cr	Single sample, flame	I-1232-77
	Sr	Single sample, flame	I-1800-77
Perkin Elmer Model 503	Trace metals[b]	Single sample, graphite furnace	—
Perkin Elmer Model 603	Trace metals[b]	Single sample or multiple samples[c] graphite furnace	—

[a] See Ref. 6, Ch. A-1.

[b] Trace metals are: Al, Cd, Co, Cr, Cu, Ni, Pb, Zn.

[c] The Perkin Elmer AS-1 Automatic Sampler is available for this unit.

are used. The typical instrument consists of a characteristic atomic-line source (hollow-cathode lamp) containing the metal to be determined, a flame source for atomizing the metals in the sample, a monochromator to select light of the appropriate wavelength, and a photomultiplier tube to detect that light. Water samples are aspirated into the flame, which stands between the hollow cathode lamp and the monochromator-detector. Neutral atoms of the metal in the flame absorb the characteristic light from the hollow-cathode source, and the decrease in light

energy (absorption) is detected and measured. The value can be read on a digital display in absorbance units or directly in concentration, which is closely proportional to absorbance.

Depending on the element being determined, the source apparatus and procedure for introduction of the samples may be different than the flame technique. For example, mercury determinations require a vapor generation system in which mercury compounds are decomposed and reduced to metal. The metal is removed by aeration from the water sample into an absorption cell that replaces the flame source. The mercury absorbs light from the hollow cathode and the absorption is measured by the monochromator-detector system. (See the reference in Table 2 for more details of the method.)

Arsenic determinations also involve a decomposition process. The arsenic separated by decomposition is reduced to arsine which in turn is purged from solution by nitrogen. The arsine is then decomposed in an absorption cell enclosed in a tube furnace in the optical path of an atomic absorption spectrophotometer. Details of this method are given in the reference in Table 2.

The graphite furnace source replaces the flame technique for directly determining trace elements. It is widely used and is described extensively in the literature.[8] Because it is a sub-parts-per-million technique, the graphite furnace apparatus and atomic absorption spectrophotometer are operated in a clean room facility.

The physical layout of a typical AAS as well as the location and characteristics of the detector signal are shown in Fig. 17.

Specific AAS Functions

Analyses performed with the atomic absorption spectrophotometer require that the analyst proceed according to the general routine shown earlier in section 3-1.1. Detailed steps specific to AAS and to the parameters being determined are given below.

Analyst Functions: Preliminary Set-up Category 2 — With many parameters determined by AAS, it is essential for the analyst to perform chemical separations to achieve the required sensitivity. Most of these separations are chelation extractions, the details of which are found in the references in Table 2. Depending on the parameter to be determined, the analyst must set up and check the flame or graphite furnace source or the absorption cell as well as prepare the appropriate standards to calibrate the system for the parameter of interest. He adjusts the

Signal source

Model 603 - Teletypewriter output
Model 503 - Demodulated signal separation board, card cage.
pin 1 - reference source
pin 2 - sample source
Model 306 - Same as model 503

Signal characteristics

Model 603 - Signal, digital current loop, 20 mA
Model 503 - Signal, 8V full scale (from operational amplifier)
Model 306 - Same as model 503

Filtering

Model 603 - None
Model 503 - Low pass, 4 pole, 10 HZ
Model 306 - Same as model 503

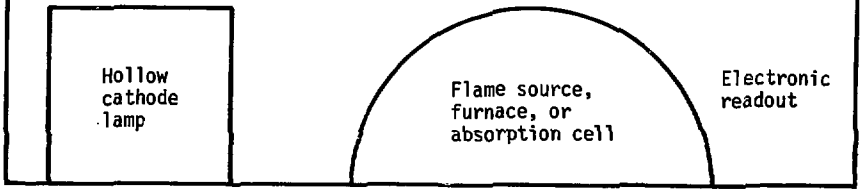


Fig. 17. Overhead view of a typical atomic absorption spectrophotometer layout.

wavelength setting, sets the baseline with a blank solution, and runs a known sample or reference to determine if the spectrophotometer is performing properly. Each spectrophotometer model has different features that may or may not be used for a particular parameter determination. These features include automatic zero, automatic concentration, and deuterium background correction. See Ref. 9 for a description of these features.

Analyst Functions: Sample Line-Up and Introduction, Categories 3 and 4 — Automatic samplers are used only on the instruments that determine Ca, Mg, Na, and K. For all other AAS parameter determinations, samples are introduced singly. The analyst usually lines up the samples on the work bench or laboratory cart in the sequence given on his work sheet, manually introduces the sample (to the aspirator, graphite furnace, or mercury generation system), views the absorbance on the digital readout display, and records the value on the work sheet.

Instrument Functions — The instrument reads the absorbance signal and displays it on a four-digit tube display.

Analyst Functions: Data Approval, Category 5 — After the samples are analyzed, the data are reviewed. If concentrations are calculated from curves in the analyst's file, he records the values on the work sheet. If dilutions have been made, he insures that the factors have been noted. He also notes any deletions of results that are out-of-range or otherwise unacceptable. Calibration data to be entered with the results are included on a separate sheet that notes the standard concentration and corresponding absorbance. All data sheets are identified by sample numbers, laboratory code, and parameter symbol.

Calculations — All concentrations are determined by reference to standard calibration curves relating concentration vs absorbance.

AAS Performance Characteristics

Timing charts that show the operations associated with the various types of atomic absorption spectrophotometers are given in Fig. 18, 19 and 20.

The number of samples that can be processed depends on the parameter being determined, the sample preparation required, the method of sample introduction, and the frequency of dilutions required. For example, parameter determinations that require chelate extractions take considerable time (approximately 10 hr per 100-sample extractions). The samples can then be run on the AAS at a maximum rate of 60 per hr.

The mercury determination has been semiautomated by incorporating a Technicon sampler and reagent proportioning pump. With the Technicon system, 20 samples per hr can be processed. The addition of reagents, decomposition and reduction of the samples, and aeration of mercury through the atomic absorption cell

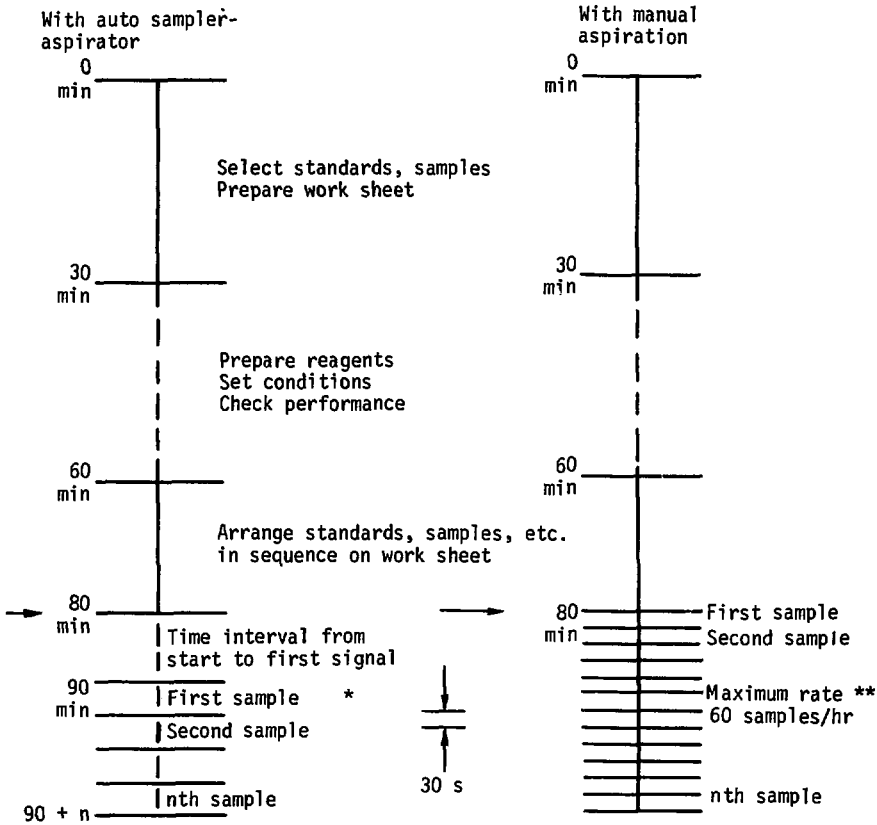


Fig. 18. Timing chart for atomic absorption spectrophotometry (flame mode).

are all automatic after the analyst sets up the system, loads the samples, and starts the sampler. A typical recording of a series of standards is shown in Fig. 21.

The arsenic determination is semi-automated in much the same way as the mercury determination. The sampling rate for the system is 30 samples per hr. Typical peak recordings are shown in Fig. 22.

Trace level determinations using the graphite furnace technique require more time than conventional

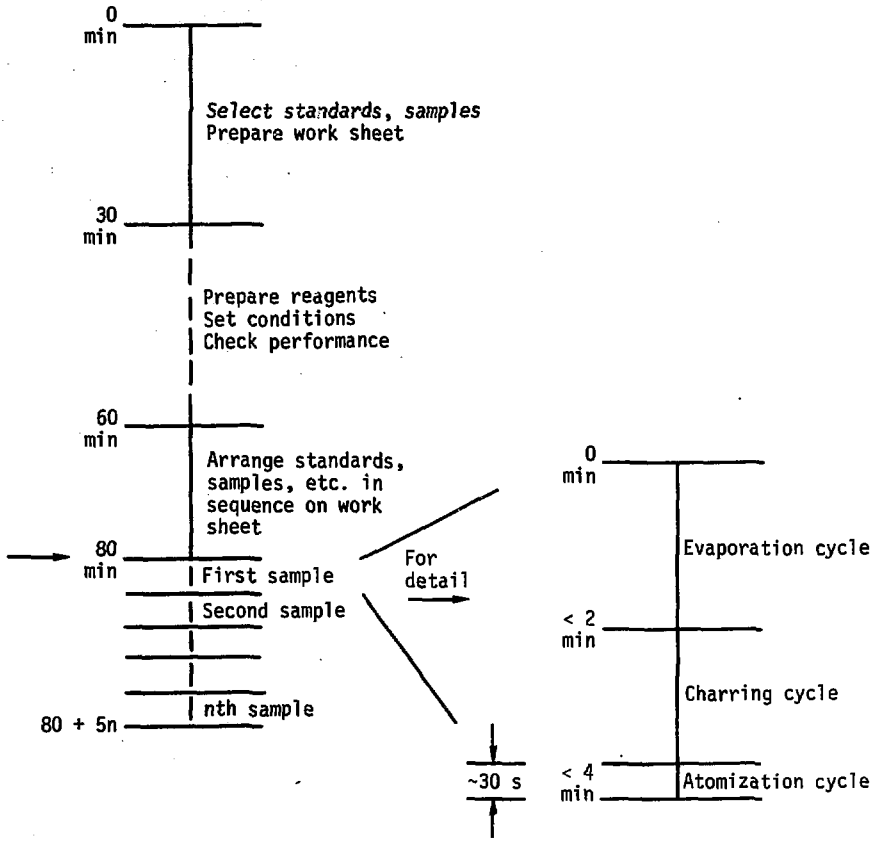


Fig. 19. Timing chart for atomic absorption spectrophotometry (furnace mode).

flame aspiration. The length of time depends on the programmed temperature treatment of the sample after it has been injected into the furnace. On the average, 8 to 10 samples/hr can be run. Use of the AS-1 automatic sampler does not increase this rate appreciably but does release the analyst from the task of manually injecting the sample.

3-1.6. Ultraviolet and Visible Spectrophotometry

Two Coleman Model 55 spectrophotometers are used to determine B, Br, I, V, as well as several other

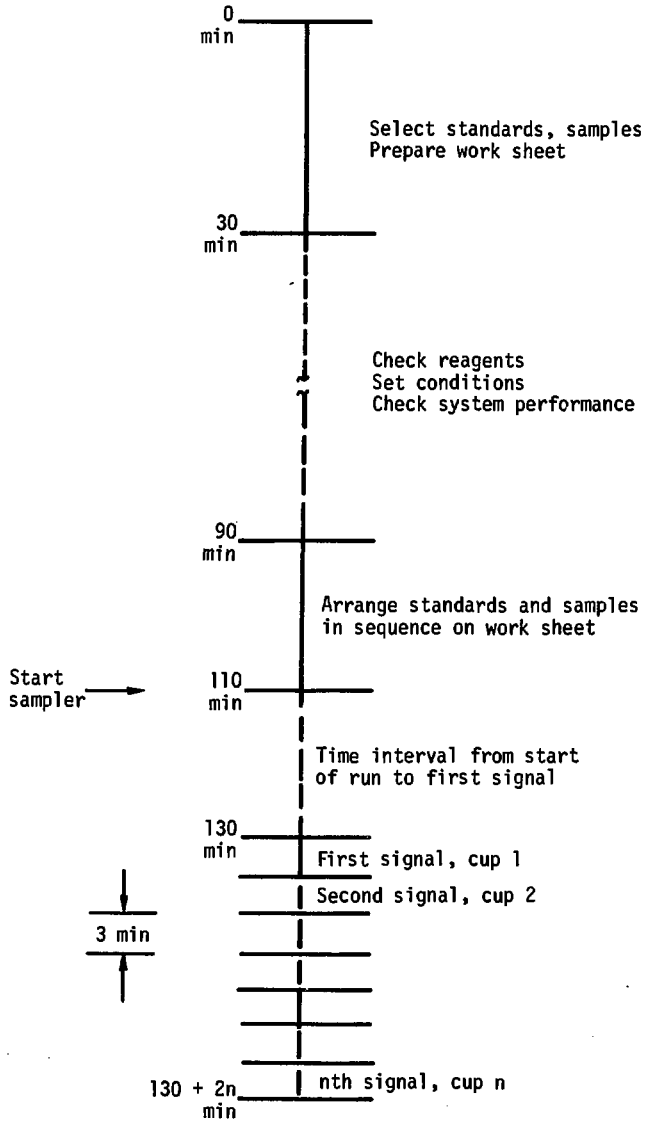


Fig. 20. Timing chart for atomic absorption spectrophotometry (Hg cold vapor) with Technicon sampler.

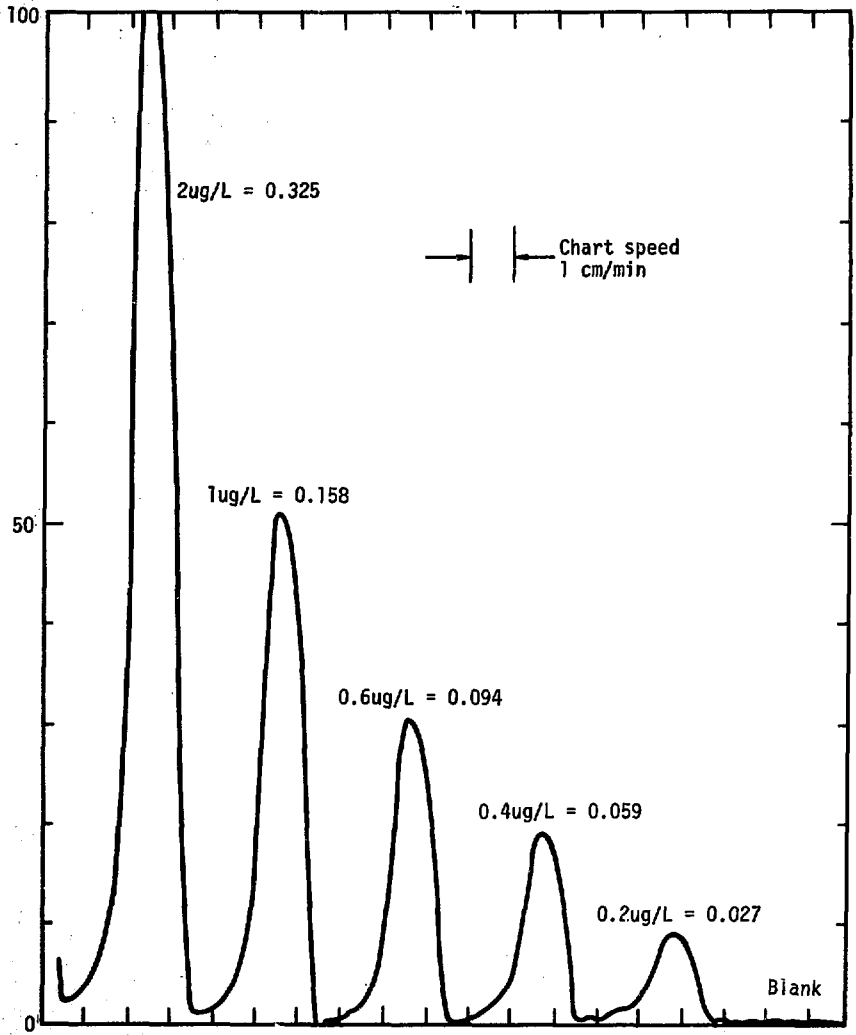


Fig. 21. Typical strip chart of Hg by AAS (cold vapor method).

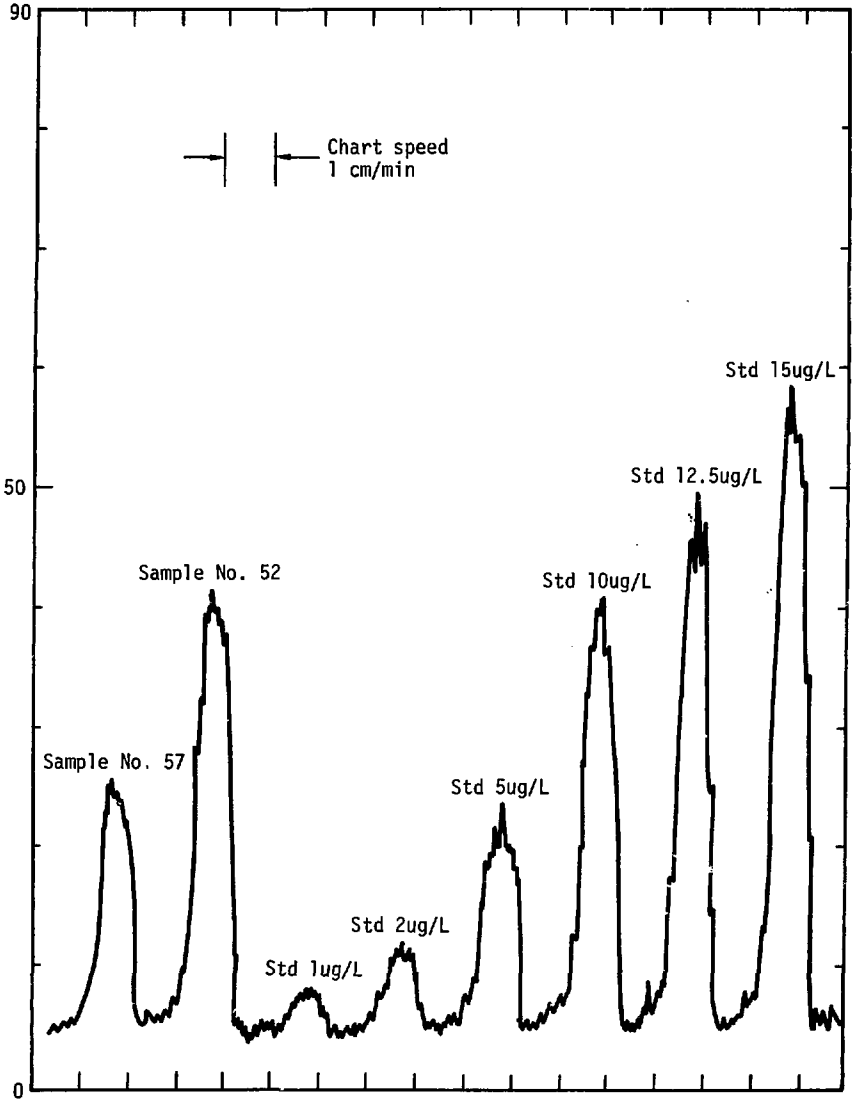


Fig. 22. Typical strip chart of As by AAS (hydride method).

parameters. The components of the spectrophotometer include the light source (either a tungsten or a deuterium lamp), a grating monochromotor, absorption cell compartment, a photodetector amplifier unit, and a digital readout. Samples may be placed in the absorption cell compartment manually or can be aspirated into the cell in the compartment by means of a special "lever arm" aspiration device.

To spectrophotometrically determine parameters, preliminary chemical preparations are necessary. For some parameters a chemical complex is formed that absorbs radiant energy; in other cases, the parameter being determined catalyzes the formation of an absorbing species.

Table 3 lists the parameters most frequently determined and references for the methods; Table 4 describes the spectrophotometer signal.

Table 3. Parameters determined on the Coleman Model 55 spectrophotometer.

Parameter	Reference[a]
B (dissolved)	I-1110-77
Br (total)	I-3110-77
I	I-1127-77
V	I-1371-77
Phenol	I-1880-77
Detergents (MBAS)	p 11[b]

[a] See Ref. 6. Ch. A-1.

[b] See Ref. 6, Ch. A-3.

Specific Spectrophotometer Functions

Analyses using spectrophotometry require that the analyst proceed according to the general routine shown in Section 3-1.1. Following are detailed steps specific to spectrophotometry.

Table 4. Spectrophotometer signal.

Signal source	Signal voltage	Noise	Filtering
Photodetector board No. 23666	0.5 V dc at 100% T	+0.1 V at 1 s	Low pass filter, 4 pole, 10 Hz
Pin No. 3 — signal	0.12 V dc at 7.5% T		
Pin No. 4 — ground			

Notes

1. Amplifier function pot (0% control) will affect signal output.
2. Buffer card is required to isolate automation computer.
3. Software is necessary to synchronize signal.

Analyst Functions: Preliminary Set-up, Category 2 — Preliminary chemistry is required for all parameters to produce an absorbing species. Details can be found in the references on Table 3. After the samples and standards have been prepared, the analyst selects the appropriate absorption cells and sets the proper wavelength; he then checks the spectrophotometer with a blank and known sample.

Analyst Functions: Sample Sequence and Introduction, Categories 3 and 4 — Standards and samples are arranged in the sequence on the work sheet and are then introduced singly into the spectrophotometer by one of the following two methods:

- The sample is manually placed into an absorption cell that is subsequently inserted into the spectrophotometer cell compartment.

- The prepared sample is first placed in a beaker and is then placed against the arm of a "lever arm" aspirator that automatically aspirates the sample into an absorption cell already located in the spectrophotometer.

Instrument Functions — The instrument reads the absorbance signal and prints the value on tape.

Analyst Functions: Data Approval, Category 5 — The analyst reviews the data and enters all calibration data on a calibration sheet; the calibration sheet and printer tape of sample data are submitted to ADP.

Calculations — Parameter concentrations are determined by referring to standard calibration data that relate absorbance readings to concentrations. More details are available in the referenced methods on Table 3.

UV and Visible Spectrophotometry Performance Characteristics

A timing chart showing operations associated with parameter determinations on the UV/visible spectrophotometer is shown in Fig. 23.

The number of samples that can be processed depends on the parameter being determined. Sample preparation expends most of the time required for each determination. After preparation, samples can be run on the spectrophotometer at a rate of 20 to 30 per hr, depending on whether samples are aspirated into the absorption cell or individual sample cells are placed in the absorption cell compartment.

3-1.7. Electronic Balance Measurements

Two Mettler electronic balance systems are used to determine a

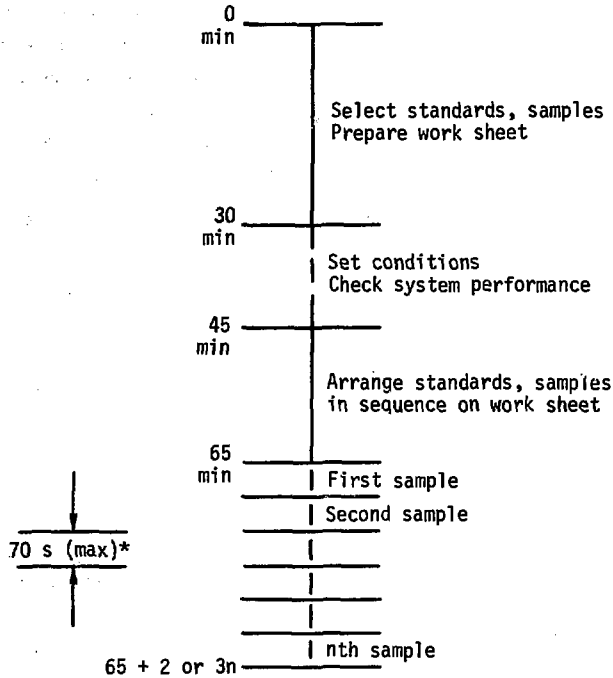


Fig. 23. Timing chart for ultraviolet-visible spectrophotometry.

variety of parameters, the most frequent of which are listed in Table 5. Each balance system is composed of the balance (Model HE20), the balance control (Model BE20), and an electronic digital readout (Model BA28). A physical layout of the system is shown in Fig. 24. One of the balance systems is linked to

Table 5. Parameters determined by electronic balance weighings.

Parameter	Reference
Residue, 180°C, dissolved solids (ROE)	I-1750-77
Residue, 110°C, suspended solids	I-3765-77
Residue, 105°C, total	I-3750-77
Residue, volatile, filterable solids	I-3435-77
Residue, total volatile solids	I-3753-77
Oil and grease	Ref. 2[a]

[a]Provisional method 5555-72P.

Signal characteristics

1. Signal type, analog -10V to +10V.
2. Signal location, 5 way binding post of BE20 control chassis.
3. Tenths BCD scale switch monitored from pins 2,3,4,5 of HE20 chassis.
4. Unit BCD scale switch monitored from pin 6,7,8,9 of HE20 chassis.
5. Tens BCD scale switch monitored from pin 10,11,12,13 of HE20 chassis.
6. Hundreds BCD scale switch monitored from pin 14 of Head chassis.
7. Signal dynamic range = $\frac{10{,}000 \text{ mV}}{1 \text{ mV}}$.
8. Required filtering - low pass, 4 pole roll off, 0.1,1,10 Hz suggested.
9. Connector - Y connector to monitor scale switches.
10. Input control - switch to input information from Mettler balance to computer:
    a. Most significant bits from switching contacts on the balance, 0 to 160.0 grams; 13 bits of BCD data.
    b. Least significant bits from analog to digital conversion of the signal from the controller; 10V full scale.
    c. Range contacts to tell the computer the sensitivity setting of the controller.

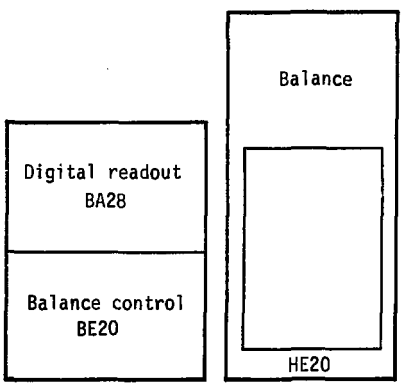


Fig. 24. Layout of Mettler electronic balance.

an Olivetti programmable calculator; the calculator acquires the weight from the balance and makes appropriate calculations, depending on the parameter being determined.

Specific Electronic Balance Functions

For analyses with the electronic balance, the analyst must proceed in a somewhat different manner than that

described in section 3-1.1. Samples are selected in the same way, but the analyst will also select weighing containers (e.g., evaporating dishes) to be associated with the samples. He may perform several intermediate weighings before the final value is determined. Between each weighing a laboratory operation will be performed (e.g., evaporation, ignition) and the operation may take several hours.

The parameters listed in Table 5 require at least two weighings. For example, to determine Residue on Evaporation (ROE), an evaporating dish is weighed and the value recorded (tare). A volume of water sample (determined by the magnitude of the conductivity value) is pipetted into the evaporation dish where it is completely evaporated on a steam bath and dried at 180°C in an oven for 2 hr. When cool, the dish is weighed again and the value recorded. With the Olivetti system, the identities of the dishes, samples, and volumes are keyed in and stored before the dishes are tared. When the ROE is weighed, the analyst identifies the first dish in the sequence, weighs it, and the Olivetti printer serially outputs the sample and dish numbers, the sample volume, and the tare and ROE weights. The remaining ROE samples are weighed in the same sequence as that set up for the original tare weighings.

The Olivetti printer outputs the values after each weighing. The printer tape is identified by laboratory code and sample set, and then sent to ADP. If the Olivetti-linked system is not used, then the identities of samples and dishes, the volumes, and the tare and final weights must be entered on a data sheet that is sent to ADP when a sample series is completed.

Electronic Balance Operations Performance Characteristics

Timing charts for the electronic balance operations with and without the Olivetti calculator are shown in Fig. 25. Sample preparation and intermediate weighings use most of the time required to determine parameters with the electronic balance. A series of final weighings (final parameter values) can be done at the rate of 20 to 60 per hr, depending on whether the Olivetti calculator is used.

Partial tapes from the Olivetti calculator for ROE determinations are shown in Fig. 26. They show the format of input data when dishes were tared and output data for samples that were weighed after being evaporated.

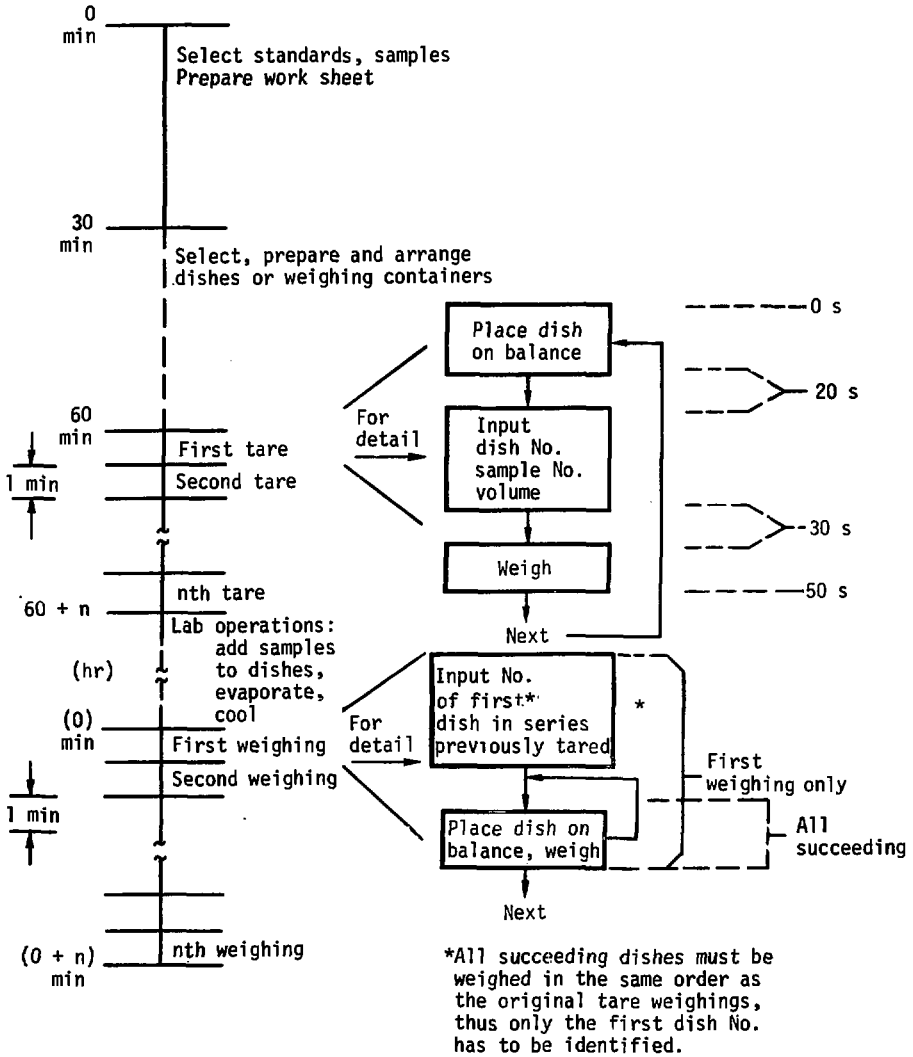


Fig. 25. Timing chart for electronic balance operations (with Olivetti).

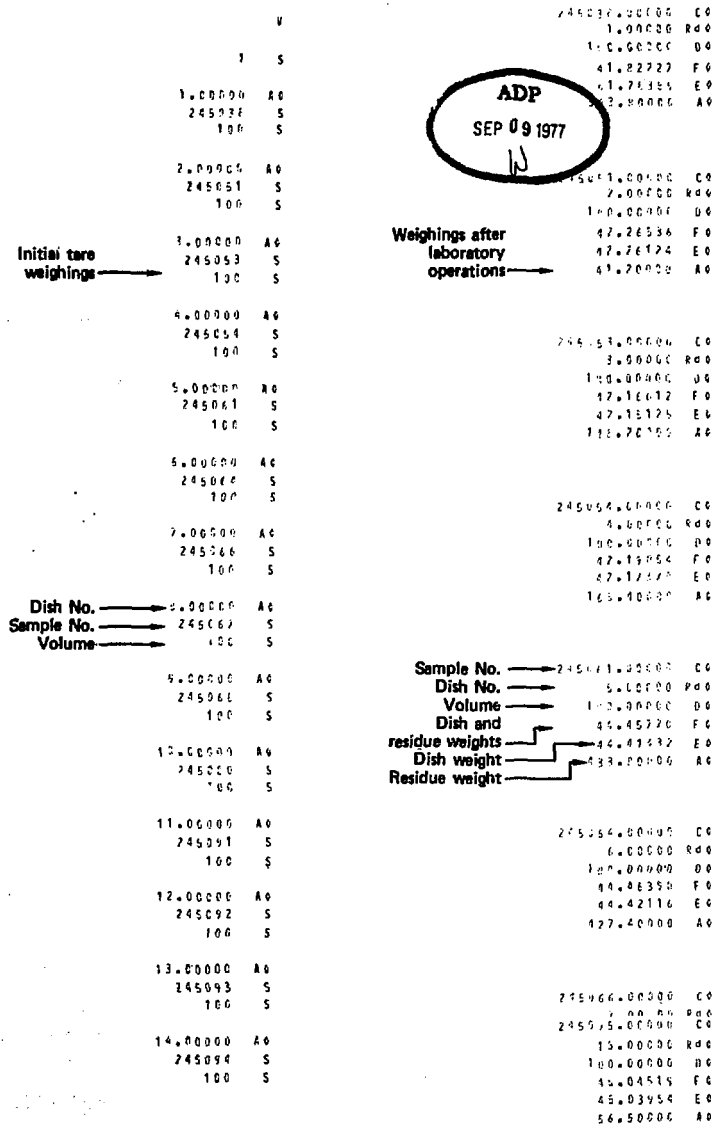


Fig. 26. Residue determination by electronic balance (Olivetti tapes).

3-1.8. Total Organic Carbon Analysis

Two Oceanography International carbon analyzers determine total organic carbon (TOC). Each analyzer consists of ampule sealing and breaking units as well as an infrared carbon dioxide analyzer. Samples are prepared in glass ampules that contain appropriate reagents. The reactants are purged, sealed in the ampules, and digested at high temperatures for 24 hr to oxidize the organic matter to carbon dioxide. The ampules are then transferred to the analyzer unit where the seal is broken and carbon dioxide is measured by the infrared analyzer. The analyzer signal is directed to a strip chart recorder and to a digital integrator where the integrated absorbance value is printed on paper tape. A physical layout of the TOC system is shown in Fig. 27.

Specific Functions of TOC Analysis

With the TOC analyzer, the analyst proceeds according to the general routine described in section 3-1.1. Detailed steps for TOC analysis are given below.

Analyst Functions: Preliminary Set-up, Category 2 — The analyst prepares phosphoric acid and potassium persulfate reagents that are used to convert the inorganic and

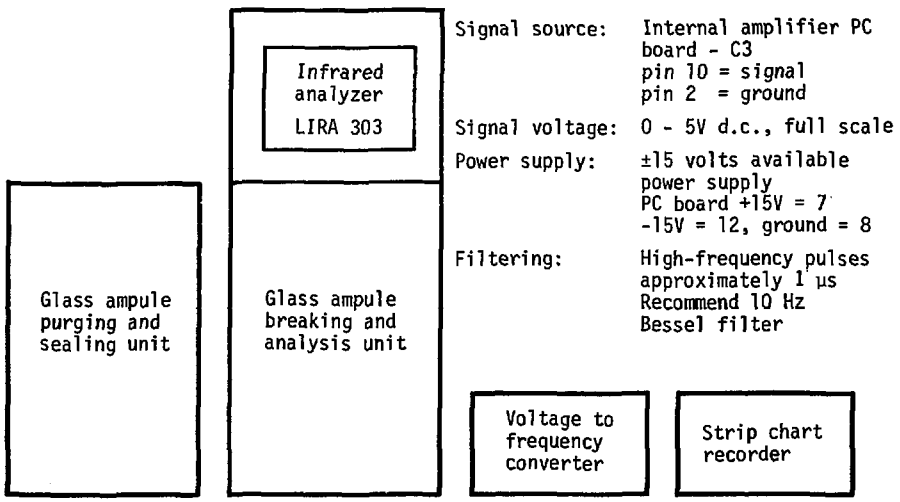


Fig. 27. Layout of total organic carbon analyzer.

organic forms of carbon to carbon dioxide in the glass ampules. He also prepares water standards containing organic carbon (potassium biphthalate) in a graded series of concentrations. Blanks, standards, and samples are prepared in duplicate by the glass ampule technique described above. Before the samples are tested, the analyst sets the span and gain controls of the infrared analyzer to accommodate the concentration range of the organic carbon standards.

Analyst Functions: Sample Arrangement and Introduction, Categories 3 and 4 — The samples and standards are arranged in an ampule-holding rack in the sequence on the work sheet. A duplicate of each standard and sample is individually placed into the ampule-breaking unit for introduction into the infrared analyzer.

Instrument Functions — After a sample or standard ampule is broken (in the sample introduction unit), carbon dioxide is released into the infrared analyzer where the carbon dioxide-related absorption is detected and measured on a strip chart recorder and digital integrator.

Analyst Functions: Data Approval, Category 5 — As each sample is tested, the analyst checks the strip chart recorder to determine if there is reasonable agreement between duplicates. If not, he notes that fact on the strip chart. After all standards and samples have been tested, the analyst compares the tape of digital integrated values to the corresponding peak values on the strip chart, choosing the acceptable values and samples that must be rerun. Final results are submitted to ADP.

Calculations — The analyst prepares the standard calibration curve of integrated peak area in counts vs mg/l of carbon. The unknown sample concentrations of organic carbon are determined by referring to the standard curve. A new curve is prepared each day samples are run.

Performance Characteristics of TOC Analyzers

A timing chart of TOC operations is shown in Fig. 28. Preparing the sample ampules and allowing the samples to oxidize (usually overnight) is a major part of a TOC analysis. Samples are prepared in batches for efficiency. Once prepared, each sample ampule can be processed and the organic carbon determined relatively quickly. The time required to break the ampule seal and measure the signal depends on the amount of carbon present, and ranges from

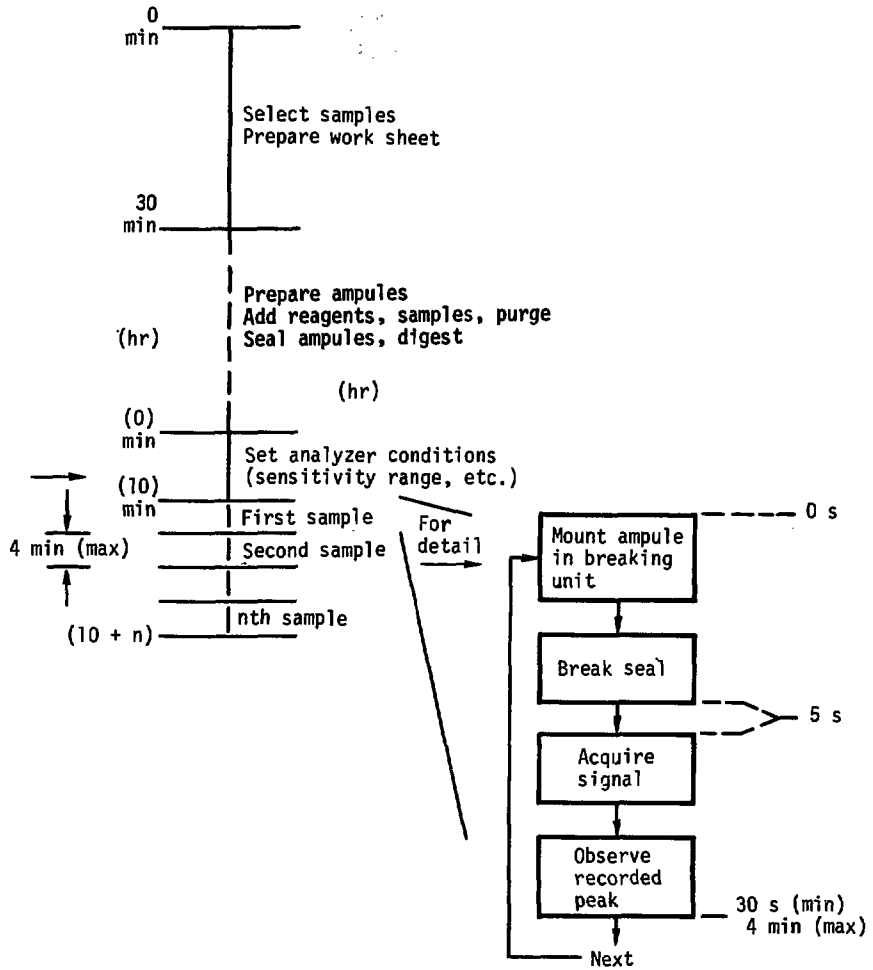


Fig. 28. Timing chart for TOC operations.

approximately 30 s for low levels of carbon to 3.5 min for samples containing 50 mg/liter. Approximately 60 samples (120 ampules, 2 ampules/sample) can be run on two TOC units during an 8-hr shift. This includes the initial calibration standards and the inclusion of standard reference samples. It does not include the preparation of sample ampules.

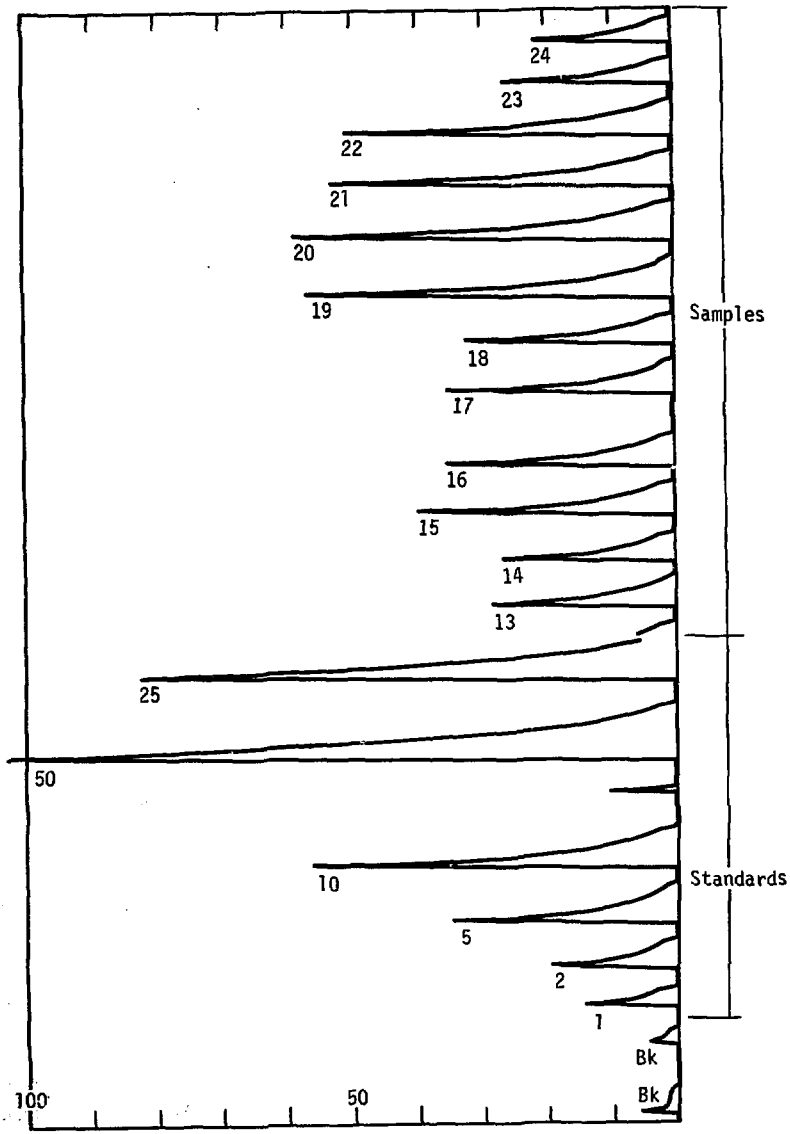


Fig. 29. TOC strip charts.

Examples of some typical strip chart recordings and digital tapes from the TOC are shown in Figs. 29 and 30.

3-1.9. Other Methods Suppyling Analysis Data to ADP

The following methods provide analytical data to the ADP section. In all cases the analysts follow the general routine described in section 3-1.1. A summary of the number of parameter determinations is given in section 3-1.10.

Color Measurements

A Hach color comparator determines water-sample colors. (Details of the method may be found on p. 82 of Ref. 6, Ch. A1.) The data are submitted to ADP on data sheets (see Fig. 31 for an example). The data include the instrument reading (IR), the dilution factor (DLU), and the concentration and reported values (reported to the nearest whole number).

Turbidity Measurements

Water turbidity is determined by the Hach Model 2100 turbidimeter. (Details of the method may be found on p. 156 of Ref. 6, Ch. A1.) The data are submitted in the same format as the color measurements shown above.

Leco Carbon Analysis

This method applies, in most cases, to the determination of total carbon (TC) sediment samples (see Ref. 10 for details). The value obtained from this method is intermediate and is used in the calculations of organic carbon (OC) as follows: OC = TC - IC. Inorganic carbon, IC, is determined by Van Slyke carbon analysis.

Van Slyke Carbon Analysis

The Van Slyke method is used to determine the inorganic carbon (IC) content of sediment samples (see Ref. 10 for details). The value obtained from this method is intermediate, and is used in the calculation of organic carbon shown above.

Calculations are made by the analyst and the final concentrations, usually in g of carbon/kg of sediment, are submitted to ADP.

Gas Chromatography

Gas chromatography (GC) is used to determine herbicides, pesticides and explosive traces in water samples. The laboratory schedules listing the identifiable compounds are shown in the NWQ Laboratory Parameter List, Appendix B. Table 6 lists the GC instruments and their characteristics (see Ref. 6, Ch. A3 for details). A typical data work sheet submitted to ADP is shown in Fig. 32.

The ADP section handles only the final concentrations that appear in the column immediately following the lab code and parameter identity.

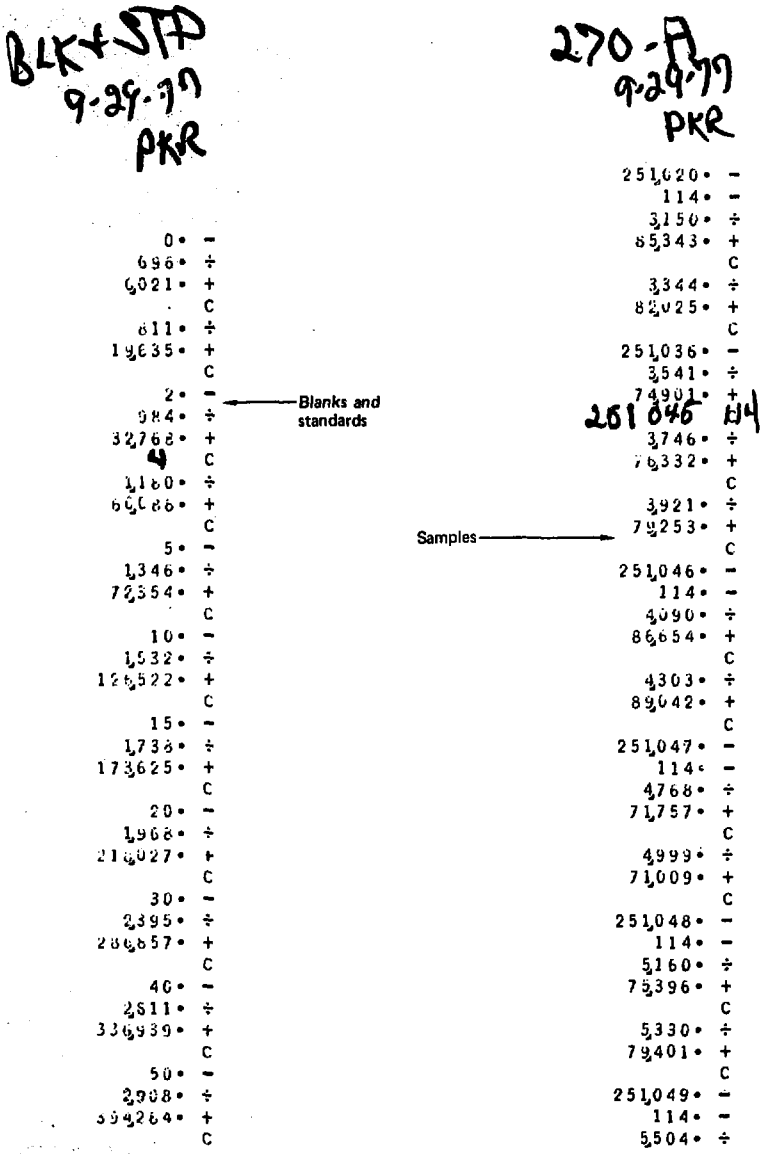


Fig. 30. TOC digital tapes of standards and samples.

LAB CODE = 20 PARAMETER = COLOR SECTION = 4

THESE ARE DIRECT ENTRIES DATE April 3, 1977 ANALYST R.L

SAMPLE	REPORTED	RMK	IR		DLU		CONC	SAMPLE	REPORTED	RMK	IR	DLU
273018	7		7	x	1	=	7					
273026	18		18	x	1	=	18					
273035	100		25	x	4	=	100					
273036	22		22	x	1	=	22					
273037	70		35	x	2	=	70					
273038	100		25	x	4	=	100					
273039	17		17	x	1	=	17					
273040				x		=						
273044				x		=						

ADP APR 03 1977

Fig. 31. Color measurement data sheet.

Table 6. Gas chromatography instruments.

Type	No. of columns	Detector type
Tracor 222	1	Hall conductivity
Tracor 222	2	2-^{63}Ni electron capture
Tracor 222	4	2-^{63}Ni electron capture 2-flame photometer
Tracor 550	2	2-^{63}Ni electron capture
Tracor 550	2	2-^{63}Ni electron capture
Microtech 160	1	^{63}Ni electron capture
Tracor 970 lig. chrom.	1	

Concentrations are reported in µg/liter.

To facilitate data acquisition and processing, a Hewlett-Packard 3352 data system has been installed in the GC laboratory. Each chromatograph is equipped with an A/D converter and is connected to a Hewlett-Packard 2100 general purpose computer. Software is provided with the system for peak detection and integration, computation of sample composition, and report generation.

Gas Chromatography/Mass Spectrometry

The Denver laboratory recently acquired a Finnigan Gas Chromatography/Mass Spectrometer (GC/MS)

Geological Survey
River Basin

UNITED STATES DEPARTMENT OF THE INTERIOR
PESTICIDES BOTTOM DEPOSITS ANALYSIS

Water Resources Division
Austin, Texas
State Code: 48
District Code: 48

Sta. Ident. No. | Date of collection | Time

Station name | Project | Collected by | Temp. °C

Discharge (cfs) | Gage Ht. | Appearance

Pesticide	Conc. (µg/kg)	R	Column	Detected	Measured area	Atten.	Oper. cond. corr.	Response factor	Quantity (pico-grams)	Pesticide	Conc. (µg/kg)	R	Column	Detected	Measured area	Atten.	Oper. cond. corr.	Response factor	Quantity (pico-grams)
Aldrin			1																
39333			2																
DDD			1																
39363			2																
DDE			1																
39368			2																
DDT			1																
39373			2																
Dieldrin			1																
39383			2																
Endrin			1																
39393			2																
Heptachlor			1																
39413			2																
Heptachlor epoxide			1																
39423			2																
Lindane			1																
39343			2																
Chlordane			1																
39351			2																

Sample dry weight:
(_____ % moisture)
Insecticide _____ g

Concentrated volume:
Insecticide _____ ml

Volume injected:
Insecticide
Column No. 1 _____ _____ µl
Column No. 2 _____ _____ µl

Date extracted:
Insecticide _____

Pesticides Analysis No. and Date:
Insecticide _____

Chemist _____
Checked by _____

Fig. 32. Typical data sheet (GC).

system to determine complex organic species in water samples. The instrument incorporates its own interactive data system that performs a variety of tasks including control, data acquisition, interpretation and identification of spectra, as well as data reduction for quantitative analyses.

Applications for the system are now being developed. Because it can deliver a wide variety and large quantity of chromatographic and mass spectral data and spectral plots, a GC/MS report can be quite extensive. At this time, it is planned to send the sample identities, GC retention times, and significant mass peaks to Reston. Each district can obtain the more extensive reports by mail from the NWQ laboratory.

Emission Spectrometry

Emission spectrometry is used to determine dissolved and total metals in water samples and bottom deposits. A complete listing of the metals in each of the three sample categories can be found in the NWQ laboratory parameter list, Appendix B. In the past, much of this work has been performed on a photographic instrument; during the next several months virtually all of it will be transferred to two photodetector spectrometers. A Lab Tester Model 71 spectrometer (Lab Test Equipment Co., Los Angeles) will handle the bottom deposit samples and a Jarrell-Ash Atom Comp spectrometer with an inductively coupled plasma source (Jarrell Ash Co., Waltham, MA) will handle the water samples. Both instruments will produce final concentrations for approximately 23 metals in each sample. (Current emission spectrometer methods are described in Ref. 6, Ch. A2.)

Radiochemistry Methods

Several parameters are determined using ion exchange and solvent extraction techniques, fluorimetry, and radiochemical counting methods. A full listing is included in the central laboratory parameter list, Appendix B (see Ref. 6, Ch. A4 for details).

With radiochemical analysis, the analyst follows the general routine described in section 3-1.1. For most of the radiochemical methods, the analyst uses the Hewlett-Packard 9830 data system to perform calculations and to generate the data report to be submitted to ADP. The calculation and report program for gross alpha and beta is given in Appendix F. Before submitting the report, the data are checked by another member of the radiochemistry section to insure that sample identifications and inputs are consistent and the resulting parameter values are

```
                    RADIUM-226 (L.C. 449)                    USGS - WRD
                    DATE 7601.01                             CENTRAL LAB
                                                             SECTION 7
IF THE VOLUME OF ANY SAMPLE IS OTHER THAN 1000ML
PUNCH 'STOP, EXECUTE,V=---,EXECUTE,CONT,EXECUTE'BEFORE ENTERING
ITS NUMBER

      SAMPLE 257041 VOLUME 1000
      DEEM   DAY   HOUR   MINUTE
      FIRST  266     10      59
      SECOND 274      9      18
      COUNT  274     13      47
      CELL 1     IN INSTRUMENT 1
       681.0   COUNTS IN 1102.0 MINUTES
VALUE  0.17    PC/L

      SAMPLE 257042 VOLUME 1000
      DEEM   DAY   HOUR   MINUTE
      FIRST  268     11      17
      SECOND 274      9      48
      COUNT  274     13      47
      CELL 21    IN INSTRUMENT 2
       626.0   COUNTS IN 1102.0 MINUTES
VALUE  0.16    PC/L

      SAMPLE 257043 VOLUME 1000
      DEEM   DAY   HOUR   MINUTE
      FIRST  268     11      35
      SECOND 274     10       9
      COUNT  274     13      47
      CELL 25    IN INSTRUMENT 3
       600.0   COUNTS IN 1102.0 MINUTES
VALUE  0.15    PC/L


                    EXTRACTABLE URANIUM (L.C. 454)
                                                             USGS - WRD
                    DATE 7610.05                             CENTRAL LAB
                                                             SECTION 7
IF ANY SAMPLE HAS A VOLUME OTHER THAN 400 ML,
PUNCH 'STOP EXECUTE V=--- EXECUTE CONT EXECUTE' BEFORE ENTERIND
     ITS NUMBER

     XB 12.30                 S-1 39.00   S-2 40.00

     SAMPLE 263054.00  READING 19.50
VALUE   0.05    UG/L          (VOLUME 400.00 )

     SAMPLE 263078.00  READING 13.50
VALUE   0.01    UG/L          (VOLUME 400.00 )

     SAMPLE 263079.00  READING 15.00
VALUE   0.02    UG/L          (VOLUME 400.00 )

     SAMPLE 265049.00  READING 20.00
VALUE   0.08    UG/L          (VOLUME 400.00 )

     SAMPLE 265050     READING 12.50
VALUE   LESS THAN .01 UG/L    (VOLUME 400.00 )

     SAMPLE 265055     READING 84.00
VALUE   0.50    UG/L          (VOLUME 400.00 )
```

Fig. 33. Partial radiochemistry data sheets.

reasonable. Examples of typical data reports are shown in Fig. 33.

Anodic Stripping Voltammetry

The technique of anodic stripping voltammetry will be investigated in the Denver laboratory as an alternative to atomic absorption spectrophotometry and emission spectroscopy. The method consists of concentrating the metal of interest through reduction onto a working electrode, and then stripping it back into solution by systematically changing the electrode potential in the direction required for oxidation. The oxidation potential indicates the species that is stripped, and the faradic current produced by oxidation is proportional to the concentration of the metal species.

Unlike atomic absorption spectrophotometry, anodic stripping voltammetry offers a multielement capability and the possibility to discriminate between various metal oxidation states.

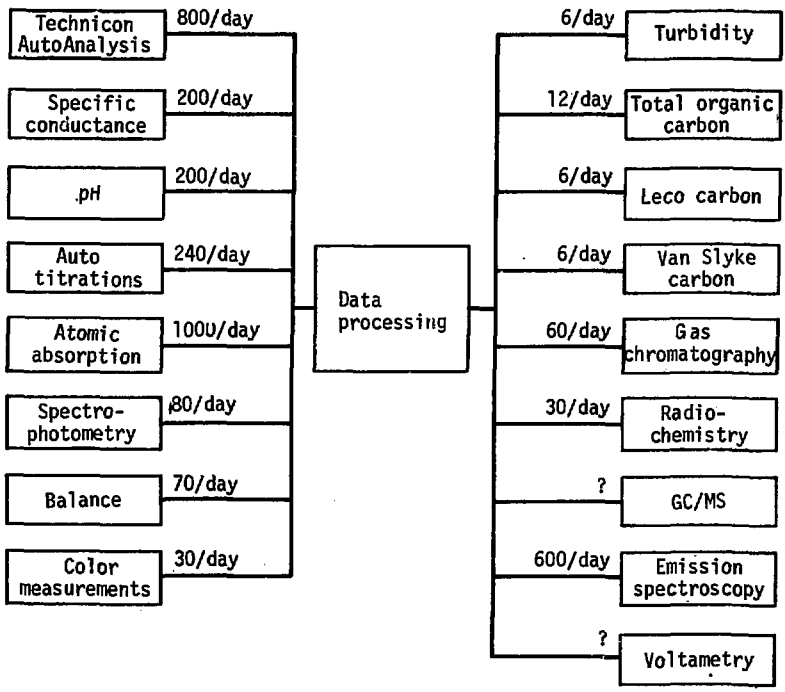


Fig. 34. Parameter data rate to ADP.

Table 7. Data flow of parameters most frequently determined.

Method and parameter	Average determinations/day
Technicon AutoAnalysis	
Chloride	120
Sulfate	110
Nitrogen, $NO_3 + NO_2$	110
Fluoride, dissolved	90
Silica	90
Iron	70
Phosphorus, Ortho	50
Phosphorus, PO_4	40
Phosphorus, total	40
Nitrogen, NH_3	30
Nitrogen, NO_2	20
Nitrogen, Kjaldahl	15
Phosphorus, dissolved	15
Atomic absorption spectrophotometry	
Magnesium	115
Calcium	115
Sodium	110
Potassium	110
Manganese	30
Mercury	20
Lead	20
Zinc	20
Copper	20
Extracted metals	200
Trace metals (furnace mode)	40
Spectrophotometry	
Boron	60
Detergents (methylene blue active substances)	
Cyanide	
Bromine	20
Iodine	
Phenol	
Electronic balance weighings	
Residue, dissolved, 180°C	60
Residue, suspended, 110°C	
Residue, total, filterable	
Residue, volatile, filterable	10
Residue, total, filterable	

Method and parameter	Average determinations/day
Automatic titration system	
Carbonate	120
Bicarbonate	120
Direct measurements	
Conductance	200
pH	200
Color	30
Turbidity	6
Carbon analyzers	
Total organic carbon (TOC)	12
Leco carbon	6
Van Slyke carbon	6
Gas chromatography	
Insecticides	
Herbicides	60
Industrial compounds	
Emission spectrometry	
Bottom deposit, for 23 elements[a]	230
Water, total concentration 23 elements[a]	230
Water, concentration of 23 dissolved elements[a]	140
Radiochemistry	
See parameter list (Results from any of 17 determinations)	30

[a]See parameter list.

The Denver laboratory recently acquired a Princeton Applied Research, model 374 polarographic analyzer for voltammetry investigations. Research is expected to continue for several months, and if applicable analytical techniques are developed, they will probably not be implemented until early 1978.

3-1.10. Summary of Data Flow from the Analytical Laboratories

The Denver NWQ laboratory performs over 1,000,000 parameter determinations annually. Of these, approximately 680,000 are values from actual laboratory tests, 120,000 are blanks or standards and standard reference sample values, and approximately 325,000 are additional sample parameters calculated from related laboratory determinations. The distribution of the data flow in relation to the major analytical techniques is shown in Fig. 34; a more detailed distribution relative to major specific parameters is given in Table 7.

4. The NWQ Laboratories Automatic Data Processing System

In this section we describe the automatic data processing (ADP) system and its performance characteristics. Examples of the various data sheets, report sheets and keypunch cards and their formats are compiled in Appendices A through E; they are all used or generated by the ADP system.

The system shown in Fig. 35 consists of the ADP and analytical sections of the NWQ Laboratory, the management codes and computer system (IBM 370/155) in Reston, Virginia and the district offices.

In the figures that accompany the following text, the relationships of the ADP systems components and their inputs, outputs, and functions are illustrated. The key to understanding the figures and the relationships is shown in Fig. 36.

4-1. DISTRICT OFFICES

As shown in Fig. 35, the district offices perform project definition and data review.

4-1.1. Project Definition

In Fig. 37 the inputs and outputs required for project definition are shown. As part of the project definition function, the district offices can request chemistry supplies from the NWQ laboratory, and request creation of new parameters or schedules.

4-1.2. Data Review

To review data, the district offices can use the Reston computer codes LABPRIM (Appendix A-2) and LABUDG (Appendix A-4) to retrieve data. After reviewing the data the district can either request that samples be rerun (Appendix E-30), request that the data base be checked, or request that specific analysis values be changed (Appendix E-41).

4-2. DETAILED FUNCTIONS

The ADP operations (see Appendix A-1) of the Denver laboratory can be divided into five sections as shown in Fig. 35. These are sample log-in, data handling, quality control reports, and accounting. The functions of these sections are described below.

4-2.1. Sample Log-in

In Fig. 38, the detailed inputs and outputs for sample log-in are shown. In addition, it is observed that the sample log-in involves verification of the log sheet (Fig. 39) and sample disposition (Fig. 40).

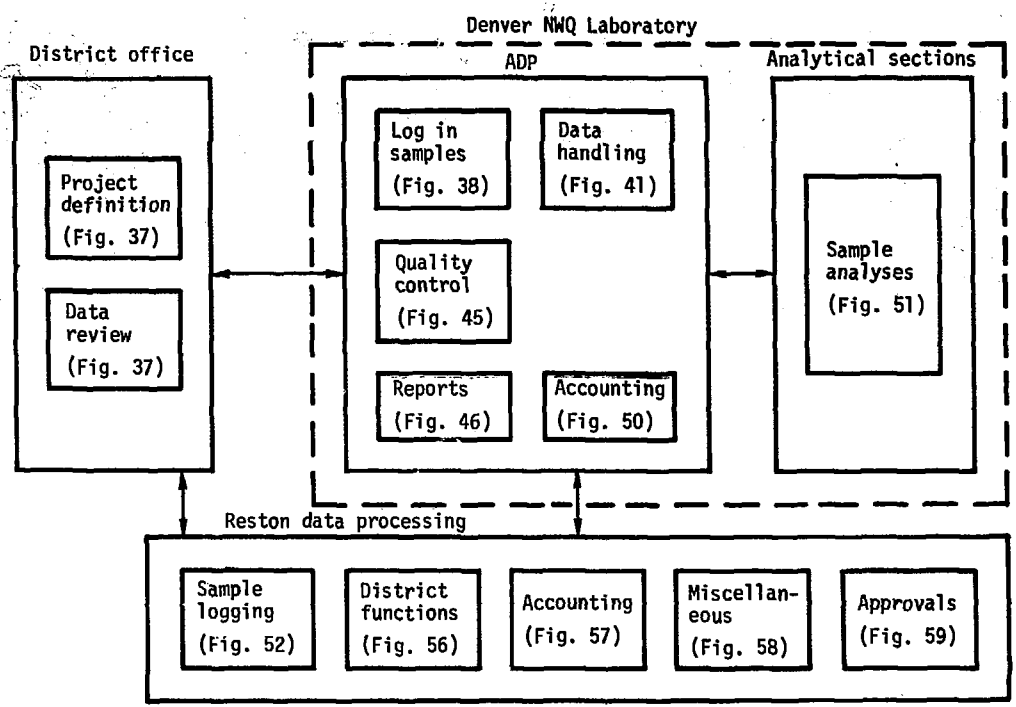
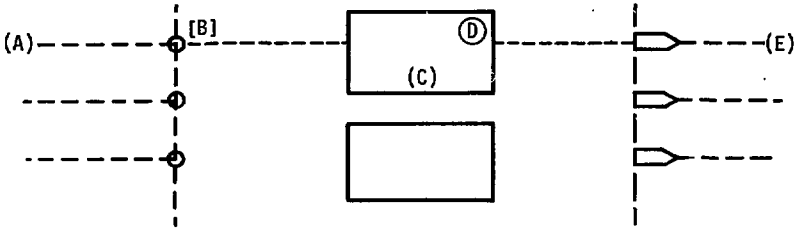


Fig. 35. USGS sample processing system overview.



(A) - Number of the figure from which the input is traced.
[B] - JCL number.
(C) - Figure reference to more expanded version of this function.
Ⓓ - Functional step number.
(E) - Number of the figure to which the output is traced.

Fig. 36. Key to ADP system figures.

Log Sheet Verification

This function is shown in Fig. 39 and includes the following steps:

1. The initial log inventory is verified and a log sheet is completed (Appendix E-24); if not, the district office is called.

2. The parameter listing (Log) (Appendix E-4) is used to convert the 5-digit parameter code if used in lab code.

3. The completed log inventory sheet (Appendix E-24A) is sent to ADP for keypunching.

4. A cover sheet (Appendix E-25) is filled out indicating the bottle types received.

Sample Disposition

Figure 40 shows the following sample disposition functions:

1. The samples are unpacked.

2. The schedule listing (Appendix E-1) is used to verify that the proper amount of sample is received.

3. The bottle is labeled with the lab i.d. (6-digit number). The first 3 digits are a Julian date and the last 3 digits are sequence numbers. Examples of the sequence numbers are: 3XX for military sample, 5XX for rush sample, and 9XX for special sample.

4. Bottles are checked for type by lab code and then separated. The sample type listing (Appendix E-2) and bottle type listing (Appendix E-39) are used to check bottle type.

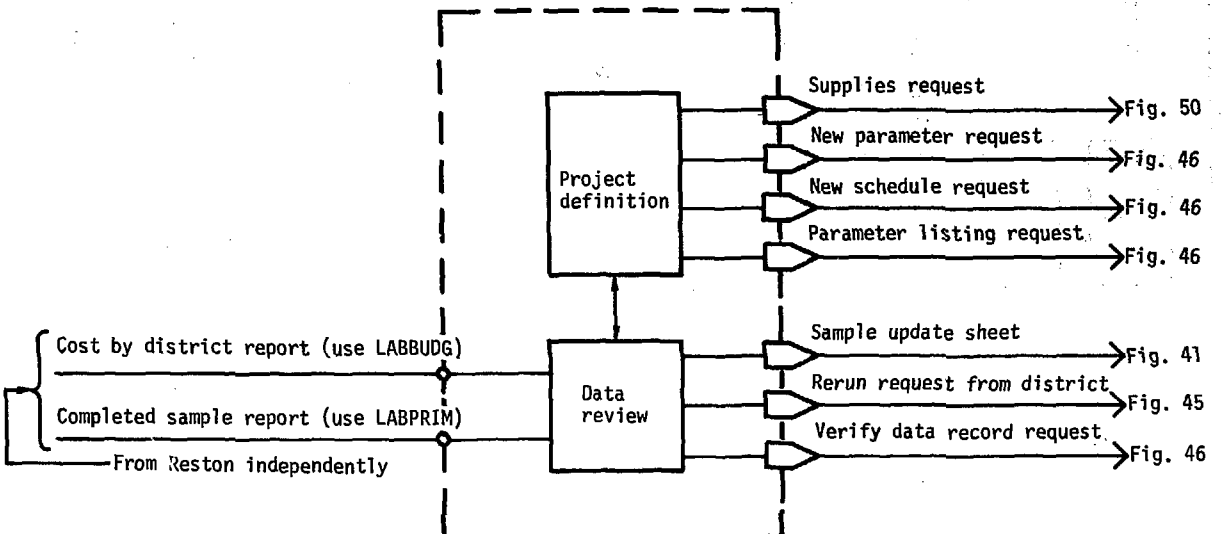


Fig. 37. District office.

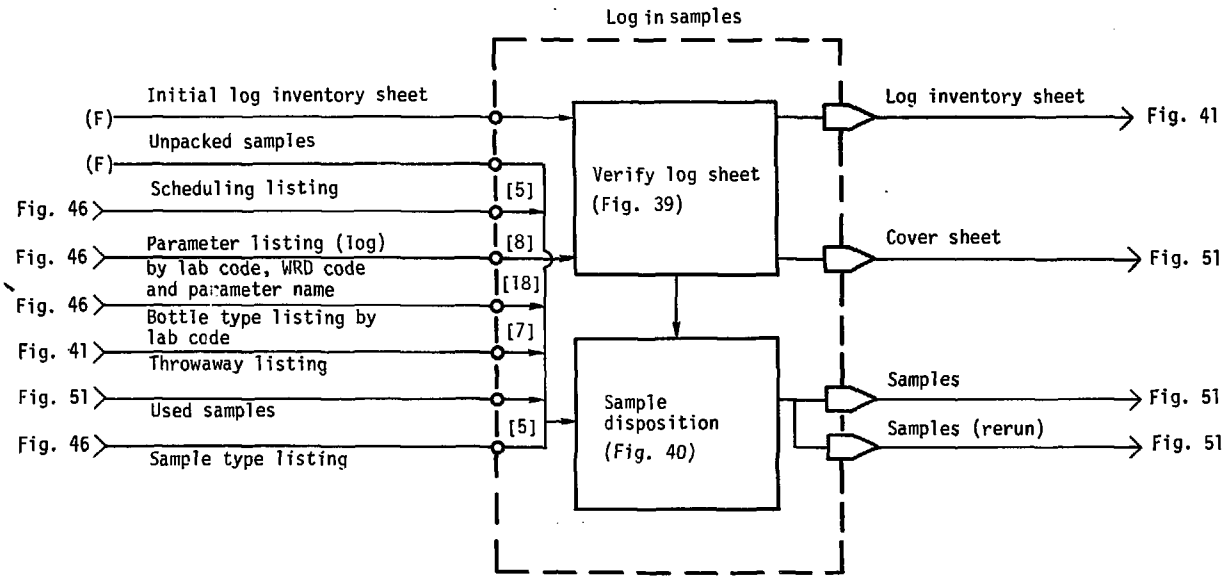


Fig. 38. ADP LOGIN samples.

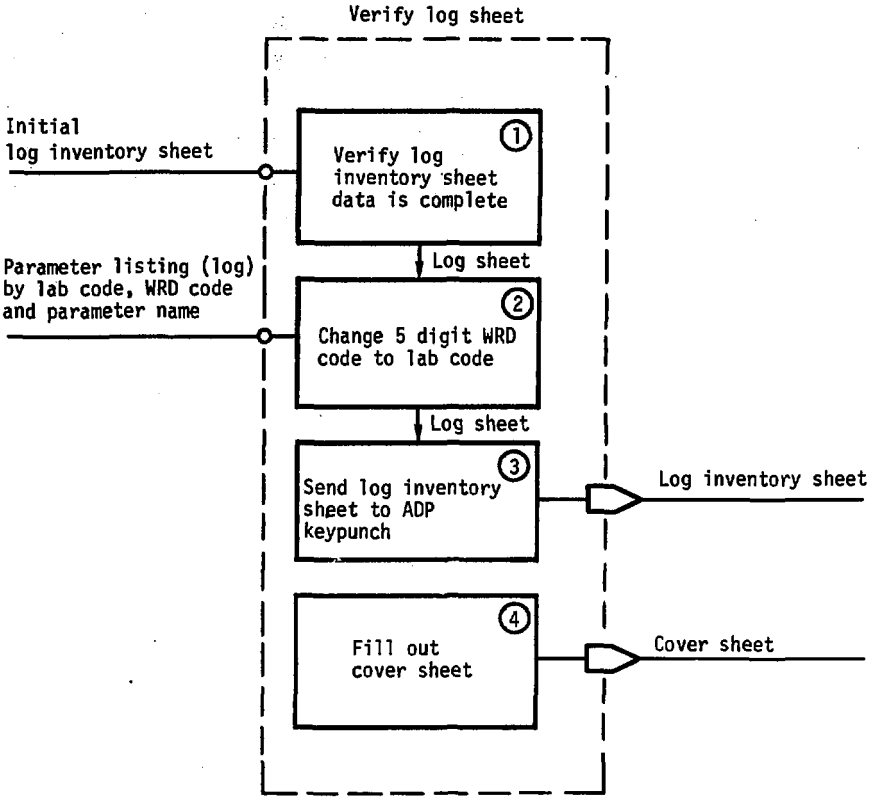


Fig. 39. ADP LOGIN samples (verify log sheet).

5. Samples are stored on a tray by types and lab code.

6. Samples returned by chemists are stored.

7. Samples whose analyses have been retrieved by the district for at least 15 days are eligible to be thrown away. The throw-away listing (Appendix E-3) is used to determine which samples to discard.

4-2.2. Data Handling

In Fig. 41 data handling is divided into keypunching data cards, processing approval cards, and reruns. The inputs and outputs are shown on the figure.

Keypunch Data Cards

In Fig. 42 the keypunch function is shown with the required inputs and

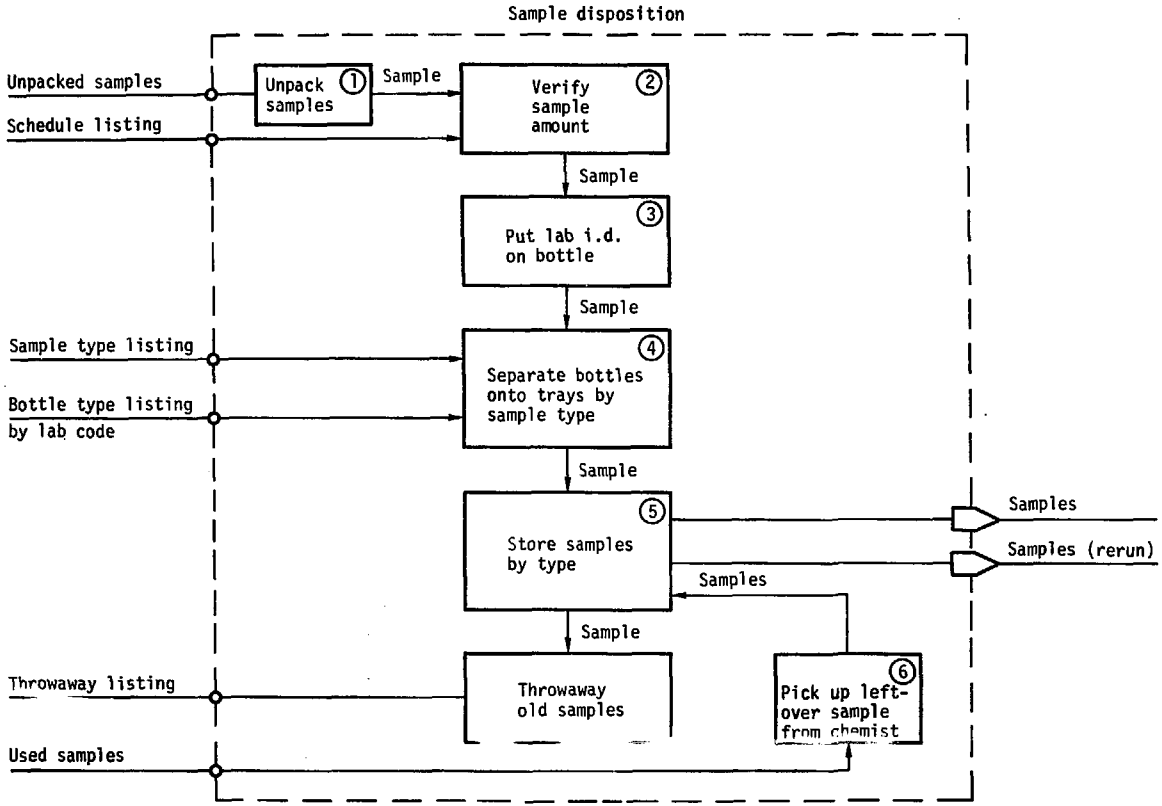


Fig. 40. ADP LOGIN samples (Sample disposition).

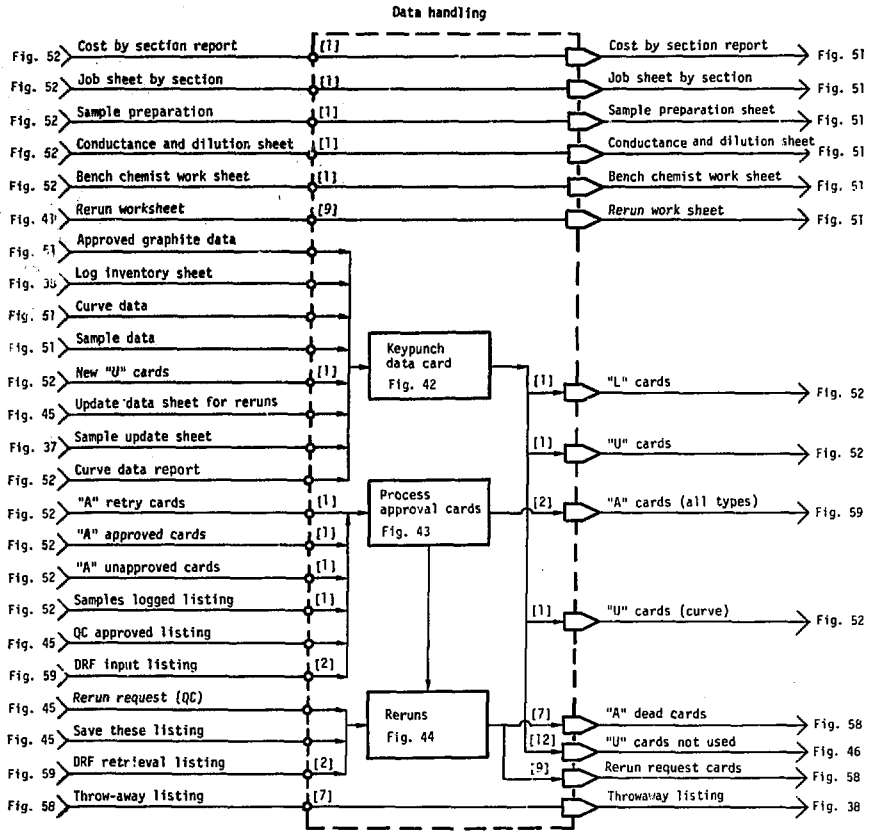


Fig. 41. ADP data handling.

outputs and involves the following operations:

1. The log-in ("L") cards are keypunched. Data from the log inventory sheet (Appendix E-24A) is punched on the "L" cards. The formats of the "L" cards are described in Appendix B-1. A maximum of 100 parameters can be requested for any sample.

2. "L" cards are stored in the "L" card file.

3. Data cards ("U") are keypunched. Analysis data from each section are punched on "U" cards; there is one card for each requested

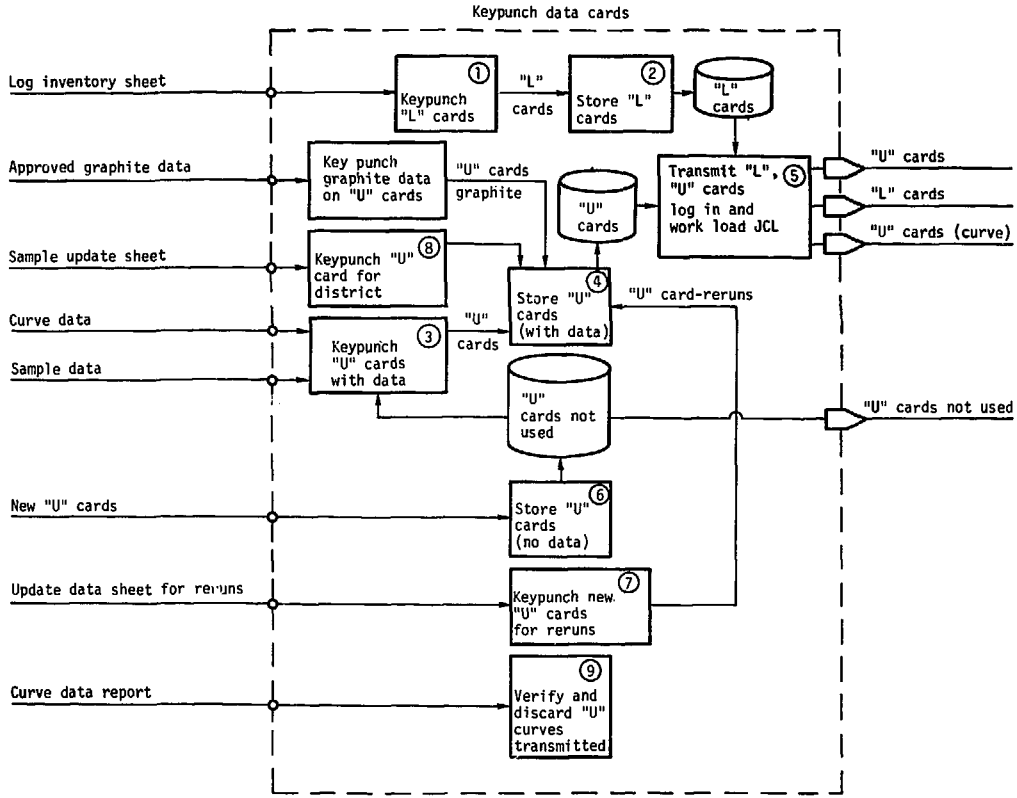


Fig. 42. ADP data handling (Key punch data cards).

parameter. The format of the "U" card is shown in Appendix B-2. Column 1 of "U" card curve is quote "1". Separate data cards are used for sample and curve data (Appendix B-2A). All punched cards are verified by a second punching and comparison.

4. "U" curve cards are stored in the "U" cards file. This function stores all "U" cards, including those for reruns and the district direct update.

5. The daily Job Control Language (JCL) is executed. The daily JCL shown in Appendix C-1 is used to send "L", "U", and "U" (Graphite) cards to programs at Reston. The control card, shown in Appendix B-11, must be the first card. This JCL covers several reports to be generated, e.g., cost by Section Report (Appendix E-16), Job Sheet by Section (Appendix E-8), Sample Prep Sheet (Appendix E-9), Conductance and Dilution Sheet (Appendix E-10), Bench Chemist Work Sheet (Appendix E-11) and Rerun Work Sheet (Appendix E-29).

6. New "U" cards received from Reston as a result of daily JCL (Appendix C-1) are stored.

7. "U" cards with data from reruns are keypunched. Data arrives on the Update Data Sheet for reruns (Appendix E-29A).

8. The "U" card for direct entry of data from district offices is keypunched. Data arrives on the Sample Update Sheet (Appendix E-41).

9. The Curve Report (Appendix E-35) verifies that "U" curve cards were transmitted properly.

10. Graphite data approved by analytical sections is keypunched onto "U" cards (graphite).

Process Approval Cards

In Fig. 43 the process approval card function is shown and involves the following functions:

1. Samples for which an "A" card (any type) has been received are noted on the Sample Logged Listing (Appendix E-7).

2. "A" unapproved cards (Appendix B-3 with "U" in Col. 63) are stored in the approved smaple file.

3. "A" approved cards (Appendix B-3 with "A" in Col. 63) are stored in the approved sample file.

4. The QC Approved Listing (Appendix E-27) is used to remove from the unapproved samples those "U" cards of samples approved by the QC section. These sample "A" cards are stored in the approved file.

5. The "A" Retry card (Appendix B-3) with "A" in Col. 63 and D in Col. 80 is used to remove the unapproved "A" card from the unapproved sample file.

6. "A" Retry cards are stored in the approved sample file.

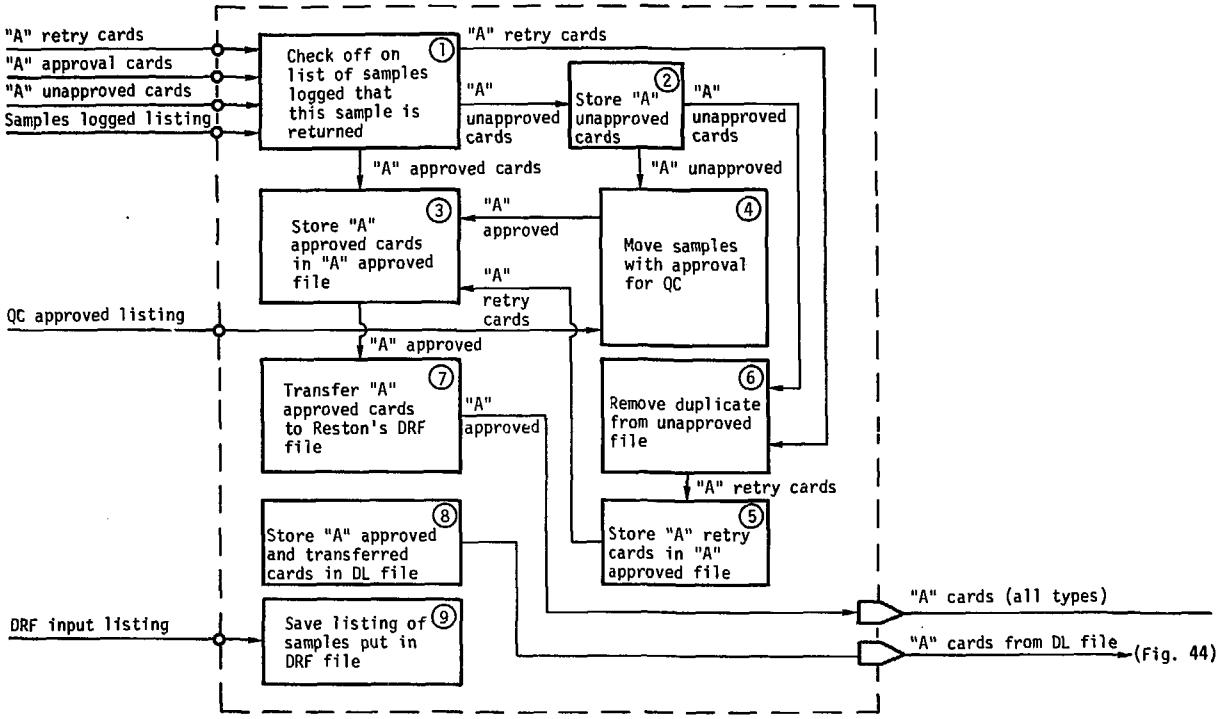


Fig. 43. ADP data handling (Process approval cards).

7. All "A" cards in the approved file are transferred using DRF JCL (Appendix C-2) to Reston's DRF file (Appendix D-8).

8. "A" cards approved into the DL card file are stored.

9. The list of samples in the DRF file (DRF Input Listing Appendix E-5) is saved.

Reruns

In Fig. 44 the functions of Rerun are shown. They are as follows:

1. Rerun requests from QC (Appendix E-28) are keypunched onto Rerun Request Cards (Appendix B-7).

2. "A" cards of samples in the approved sample file that have been retrieved by the district are removed. The DRF Retrieval Listing (Appendix E-6) is used. These "A" cards become "A" dead cards.

3. The "A" dead cards are stored in the TAL card file.

4. The "A" dead cards appearing on the Save-These List (Appendix E-26) are removed and put at the front of the TAL file (i.e., restart 2-week counter).

5. Cards stored for 2 weeks are removed from the TAL file.

6. The "A" dead 2-week cards are sent to Reston to generate the Throw-Away Listing (Appendix E-3). The JCL Throw Away (Appendix C-7) is used.

4-2.3. Quality Control

The next ADP function (Fig. 35), Quality Control, is illustrated in Fig. 45 and described below:

1. Quality control receives a completed sample report (Appendix E-12) for computer approved or unapproved samples. The unapproved samples have quality control messages displayed on the report. In the Denver laboratory, the completed sample report is generated only for unapproved samples.

2. QC stores the completed sample reports for computer-approved samples. Denver does not perform this step.

3. The quality control section reviews the QC information printed on the Completed Sample Report and can decide to rerun an analysis or override the computer's decision. The process of checking QC involves two other reports, Standard Reference Sample Report (Appendix E-14) and Blind Standard Reference Report (Appendix E-15). If the sample is rerun, the data for the rerun are sent to QC for review.

4. If the QC section decides to rerun a sample, it will send a Rerun Request (QC) (Appendix E-28) to ADP keypunch.

5. If a previously unapproved sample is approved by the QC section, the sample identification number is

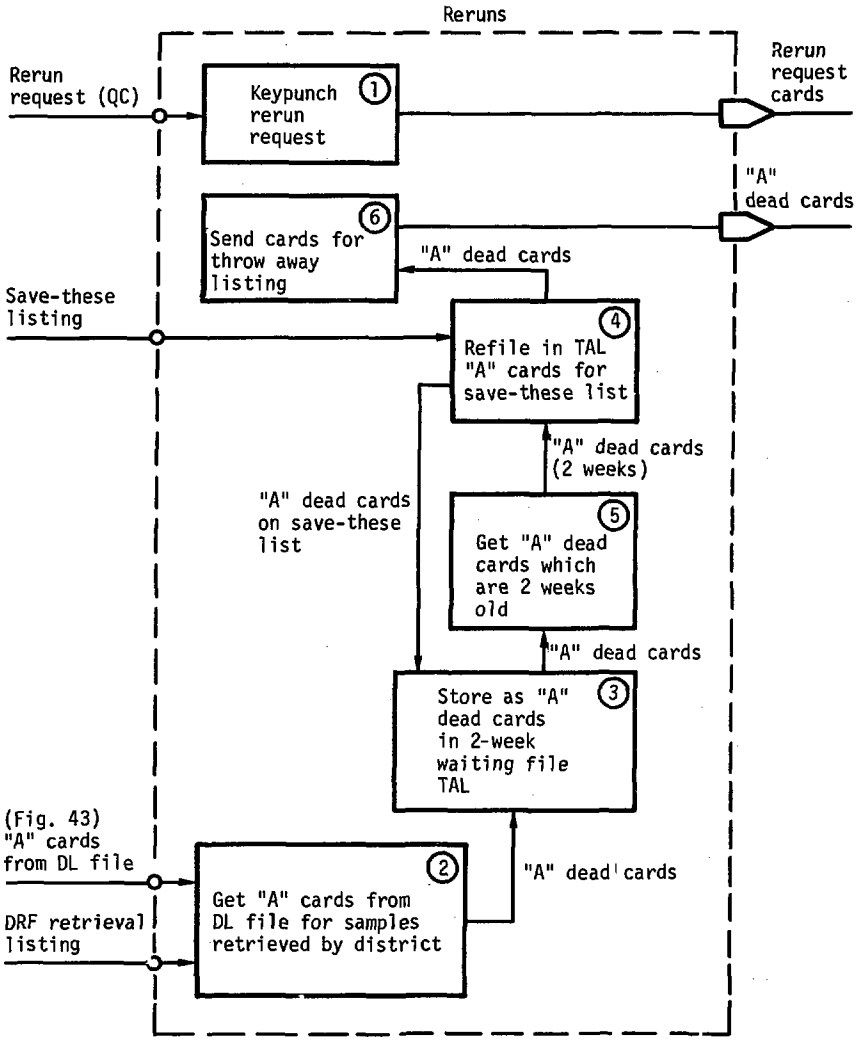


Fig. 44. ADP data handling (RERUNS).

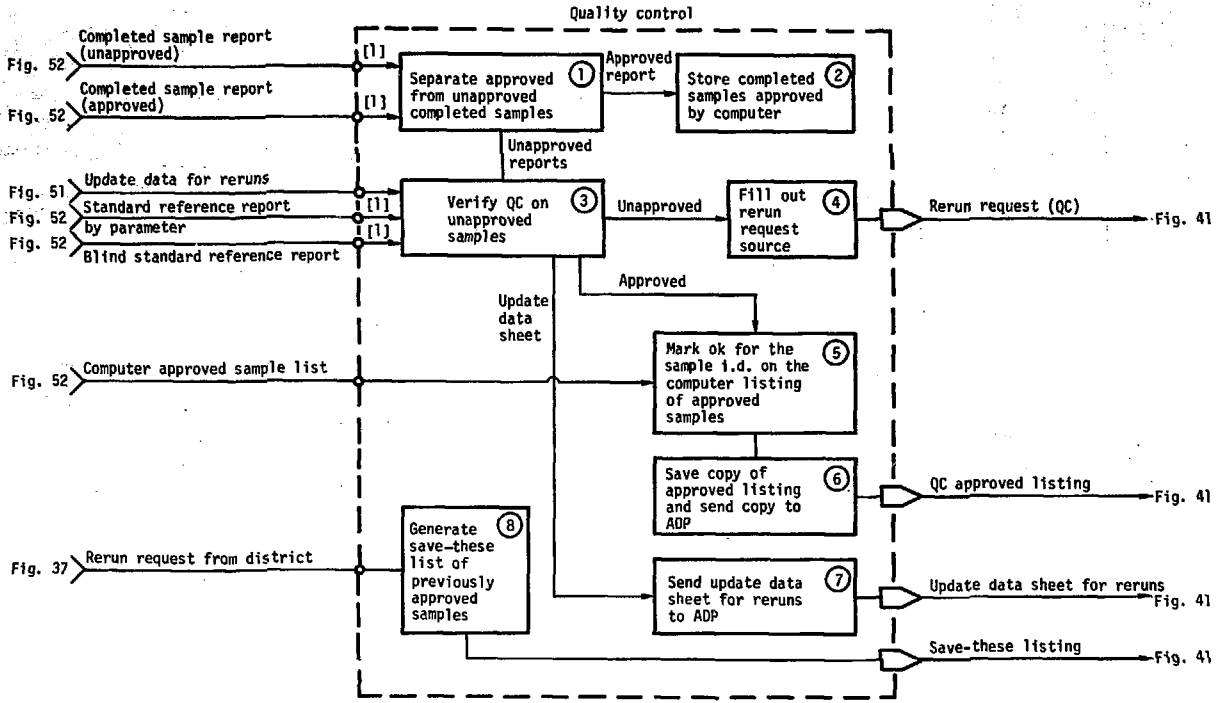


Fig. 45. ADP quality control.

annotated on the computer Approval Sample List (Appendix E-13). At Atlanta, the sample i.d. is annotated on the unapproved Completed Sample Report.

6. The QC section saves a copy of the listing of Approved Samples and sends to ADP a QC Approved listing (Appendix E-27).

7. If the QC section approves the data acquired on a sample rerun, the data are sent to ADP keypunching on an Update Data Sheet for reruns (Appendix E-29A).

8. Occasionally, the district will request that a previously Approved Sample be rerun. The district sends a Rerun Request (Appendix E-30) to the QC section where a Save-These Listing (Appendix E-26) is generated and sent to ADP.

4-2.4. Reports

The next of the ADP functions (shown in Fig. 35) is Reports. The Reports function is shown with inputs and outputs in Fig. 46 and consists of three functions: Labprim, Graphite and Files.

Labprim

The Labprim function is shown in detail in Fig. 47 and is conducted in the following manner:

1. The LABPRIM program is executed using the Labprim JCL. (Appendix C-14) to generate a special completed Sample Report (Appendix E-21) for districts without terminals for retrieval, including Hawaii and Alaska.

2. After LABPRIM program execution, the special Completed Sample Report is mailed to the special districts.

3. After the LABPRIM program execution, a WRD Data Verify Report (Appendix E-31) is generated to verify that the data from the DRF were properly moved into the WRD file. If the program LABPRIM attempts to move data into the WRD for a station with no header, a WRD Station Header Report (Appendix E-32) will be generated. This report indicates either that a new station header was generated or that such a station header could not be generated from data in the Analfyr file.

4. If necessary, the DRF file can be quizzed to determine which samples have been retrieved by the districts; the DRF Quizz Report (Appendix E-33) is generated.

5. Occasionally, it may be necessary to store data directly in the WRD file using WRD cards (format not known).

6. The Districts can request to verify that a Data Record is properly stored in the database (Analfyr file). The ADP section can retrieve a Basic Data Record (Appendix E-20).

7. The ADP section uses a Basic Data Record to verify that data are properly stored.

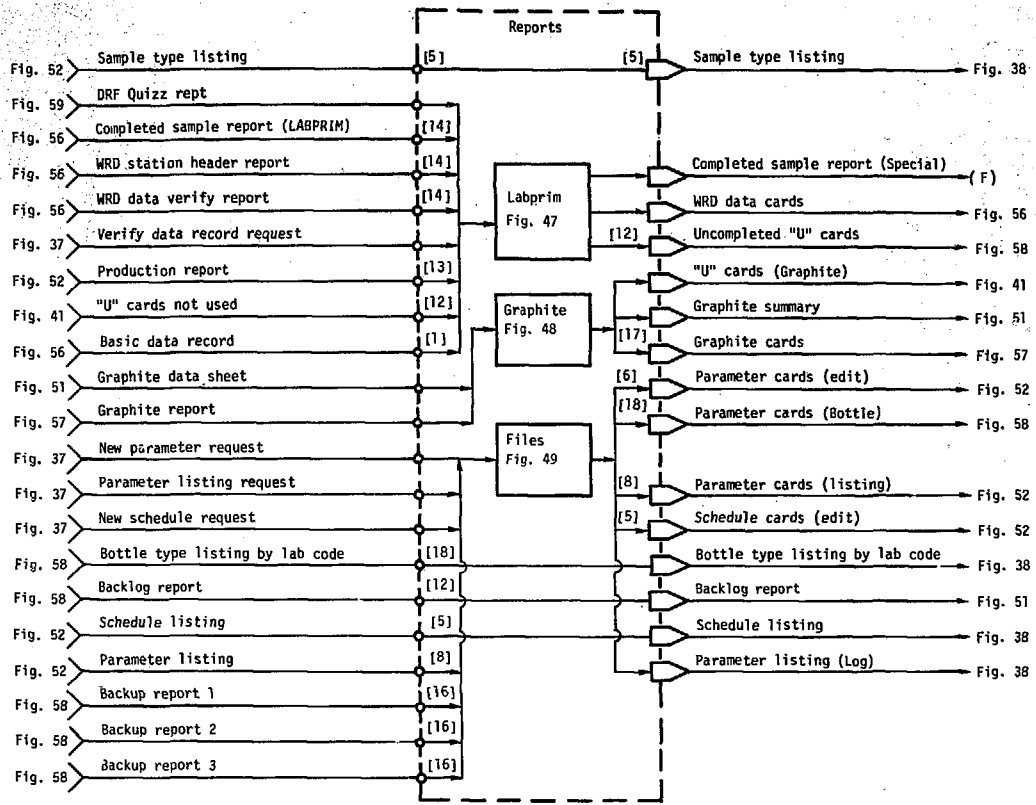


Fig. 46. ADP reports.

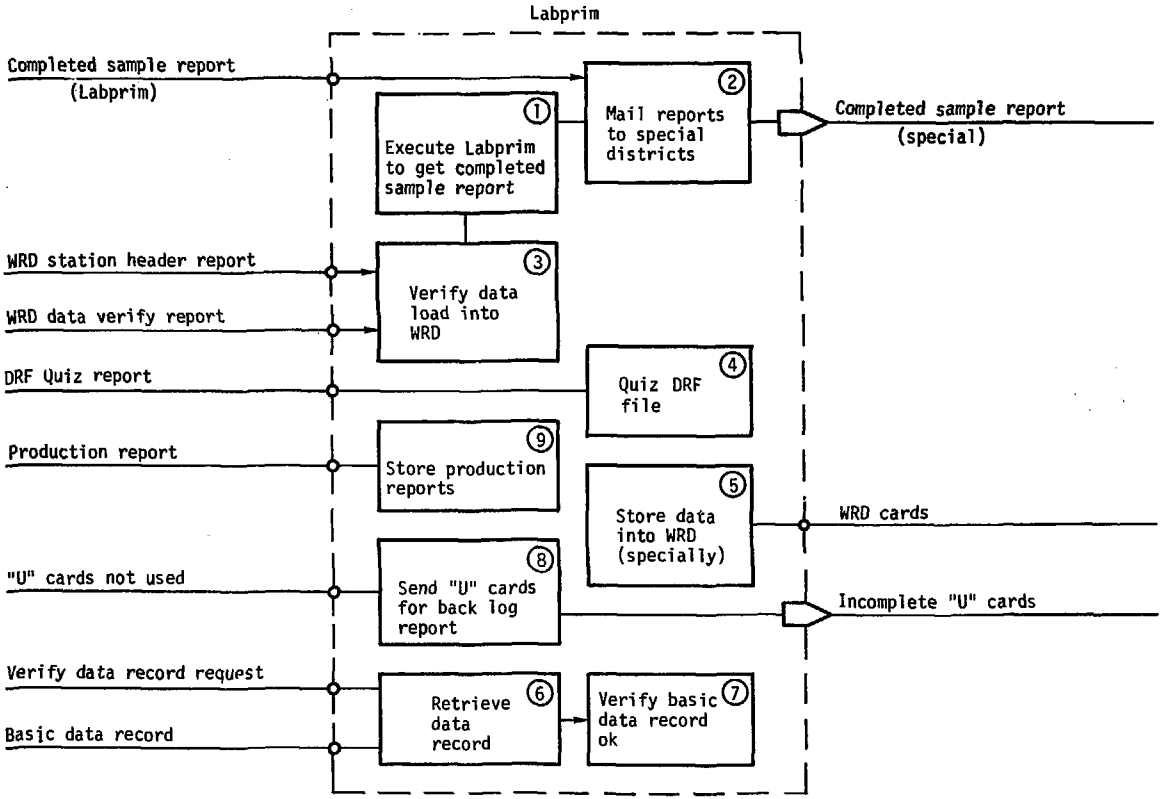


Fig. 47. ADP reports (Labrim).

8. The ADP section uses "U" cards that have not been keypunched with data ("U" cards not used) to generate a Backlog Report (Appendix E-22) that is sent to the analytical chemistry sections.

9. A Production Report (Appendix E-23) is generated and stored weekly using Production JCL (Appendix C-13).

Graphite

The operation labeled Graphite is shown in Fig. 48 and discussed below:

1. The data from the AA graphite furnaces is sent to the ADP section on Graphite Data Sheets (Appendix E-40). ADP keypunches the data on graphite cards (Appendix B-9).

2. The graphite cards are stored in the "U" graphite card file.

3. Periodically, as needed, the graphite cards are sent to Reston to generate a Graphite Report (Appendix E-38).

4. The Graphite Report consists of three parts. The list of unapproved sample i.d.'s and summarized data are sent to the analytical sections.

Files

The function labeled Files is shown in Fig. 49 and discussed below:

1. When necessary, a new parameter card is generated (Appendix B-8).

2. The parameter cards are stored in the Parmfyr file.

3. To create new parameters in the Reston Parmfyr file, all cards in the Parmfyr file are sent using JCL (Appendix C-5). Cards sent are labeled Parameter Cards (Edit).

4. The parameter cards are sent to Reston as parameter cards (listing) to generate a Parameter Listing (Appendix E-4).

5. A special program can be executed (JCL Appendix C-18) to generate a Bottle-Type Listing by Labcode (Appendix E-39). The listing is sent to the logging section. The parameter cards are labeled "Bottle" in Fig. 49.

6. When a request to generate a new schedule is received, a schedule card is keypunched (Appendix B-10).

7. The schedule cards are stored in the Schedule File.

8. A new schedule is created by sending the schedule cards (edit) to Reston. The Schedule Listing (Appendix E-1) is sent to the logging section.

9. The parameter listing is verified by the ADP section.

10. The Parameter Listing is sent to logging as Parameter Listing (Log).

11. The backup JCL (Appendix C-16) is used to backup the files. As a result of the backup operation, three backup reports are generated: Backup Report No. 1 (Appendix E-35),

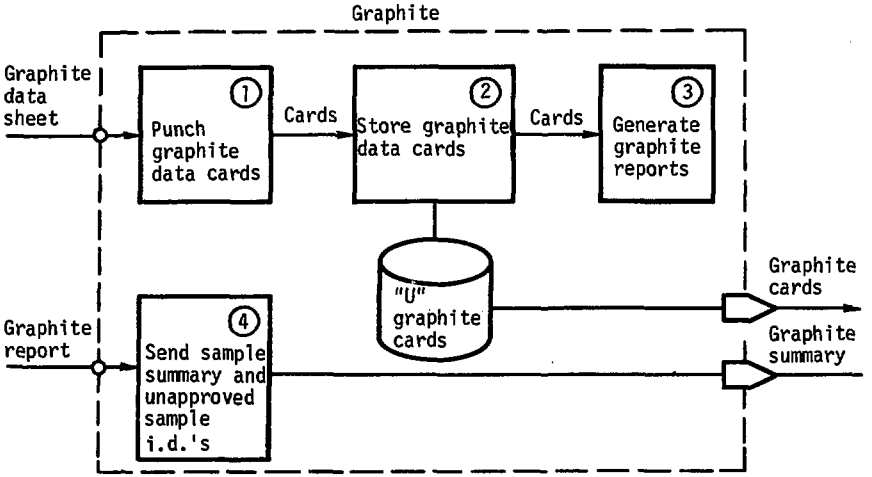


Fig. 48. ADP reports (Graphite).

Backup Report No. 2 (Appendix E-36) and Backup Report No. 3 (Appendix E-37).

4-2.5. Accounting

The next of the ADP functions (Fig. 35) is Accounting. Accounting is detailed in Fig. 50 and follows these procedures:

1. The "T" cards (Appendix B-5) and "Z" cards (Appendix B-6) are generated during daily JCL (Appendix C-1) and stored for later transmission.

2. The "A" adjust cards (Appendix B-3) with Cols. 79 and 80 containing "AT" are stored.

3. When a district requests analytical supplies, the costs are keypunched on "M" cards (Appendix B-4).

4. The "M" cards are stored.

5. The load Labbudg JCL (Appendix C-3) is used to transfer the "T", "Z", "A" adjust, and "M" cards to Reston for later execution by the LABBUDG program (Appendix C-11). An Acct Cards Logged Listing (Appendix E-19) is returned to indicate which accounting cards were loaded into the Labbudg file.

6. The Labweek loader (Appendix C-4) weekly loads the "T" and "Z" cards generated for the week. The program LABWEEK is used later to generate reports.

7. Execution of the LABWEEK program (Appendix C-10) causes generation of two reports that are stored in ADP: Weekly Accounting

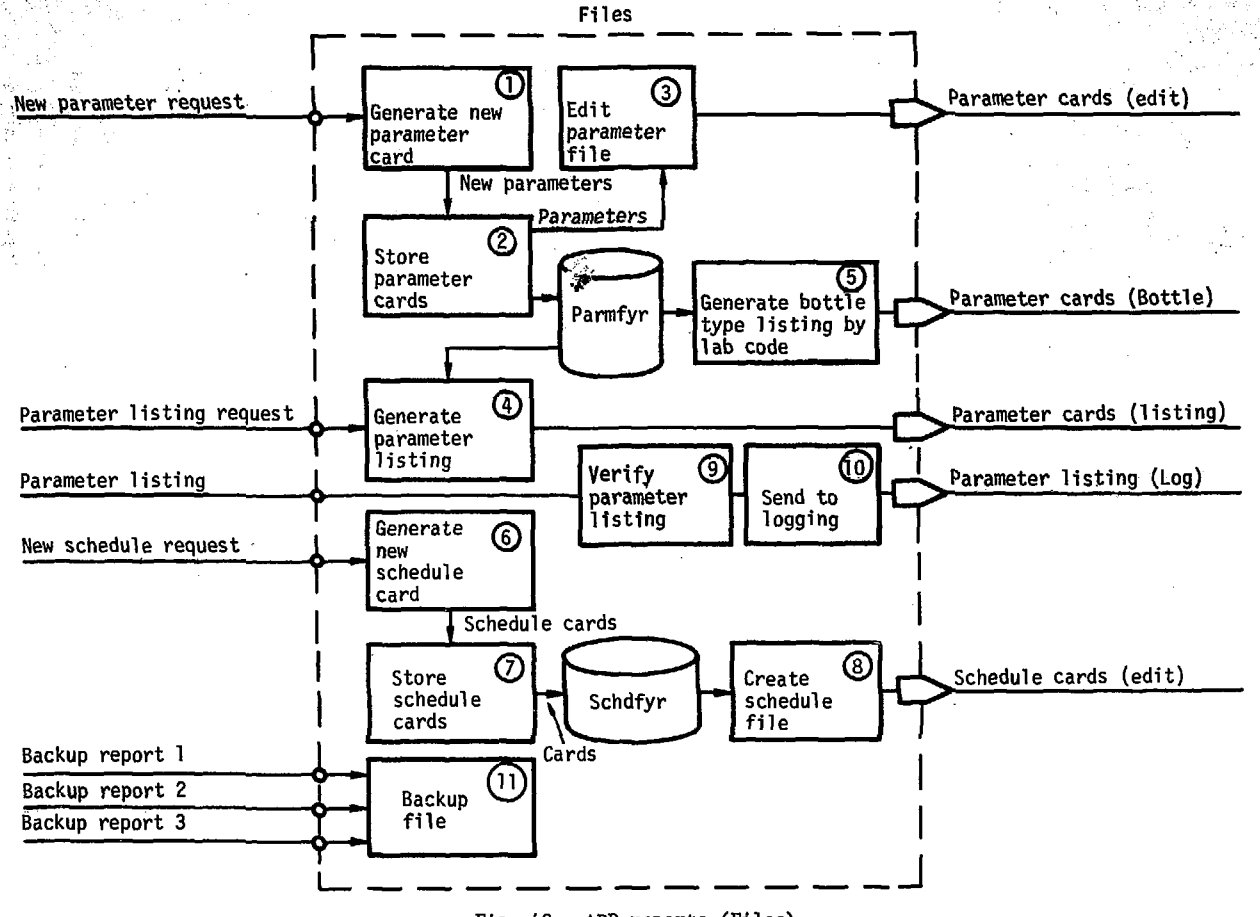


Fig. 49. ADP reports (Files).

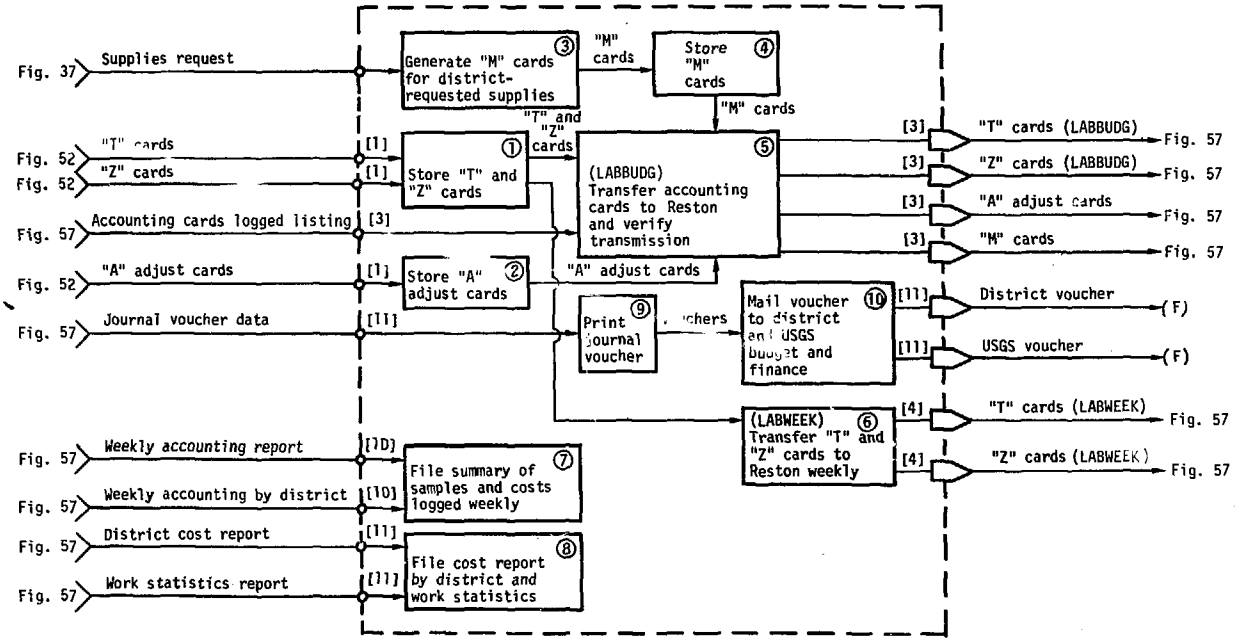


Fig. 50. ADP accounting.

Report (Appendix E-17) and Weekly Account by District (Appendix E-17A).

8. When the LABBUDG program is executed (Appendix C-11), two reports are generated: District Cost Report (Appendix E-18) and Work Statistic Report.

9. Journal vouchers are printed.

10. Journal vouchers are mailed to the district and USGS finance and budget offices.

4-3. DETAILED FUNCTIONS OF THE ANALYTICAL LABORATORY

Also included in the ADP system are the functions of the analytical laboratory. These step-wise functions are shown in Fig. 51 and are described below:

1. The chemist selects the samples to be run by using the Job Sheet (Appendix E-8) and the Backlog Report (Appendix E-22). The Bench Chemist Work Sheet (Appendix E-11) is sent to the chemist assigned to do the analysis.

2. The chemist retrieves the desired samples and cover sheet (Appendix E-25) from the sample storage room.

3. He prepares the sample using the Sample Preparation Sheet (Appendix E-9) and Conductance and Dilution Sheet (Appendix E-10).

4. He processes the samples and standards by specified analytical methods. The sample and curve data are sent to the ADP section for keypunching. If AA graphite furnace analyses are done, the data are sent to the ADP section on the Graphite Data Sheet (Appendix E-41).

5. The unused portions of the samples are returned to sample storage.

6. The chemist uses the Rerun Work Sheet (Appendix E-29) to determine the samples to be rerun and retrieves them from storage.

7. He prepares the samples for rerun.

8. The samples are rerun and the data on the Rerun Update Data Sheet (Appendix E-29A) are sent to quality control.

9. The chemist reviews the results of the graphite data processed by the computer. If the sample data are approved, the results are sent to ADP for keypunching as approved graphite data.

10. The chemist reviews and files the cost sheet for his section (Appendix E-16).

4-4. RESTON DATA PROCESSING SYSTEM

Reston data processing (Fig. 35) also constitutes a part of the ADP system. It is divided into five functions: Logging Samples, District Functions, Accounting, Miscellaneous Functions, and Approvals. Each is described in the following sections.

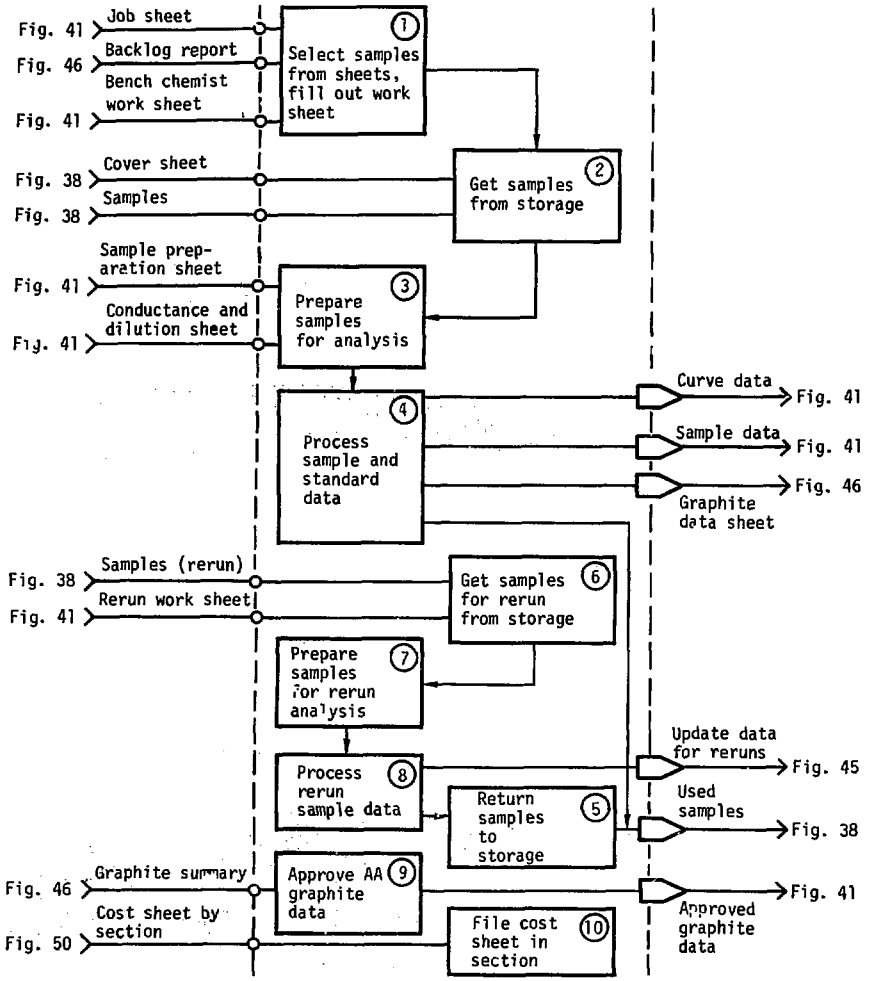


Fig. 51. Sample analysis.

4-4.1. Sample Logging

The Sample Logging process is detailed in Fig. 52.

Logging

The logging function is shown in Fig. 53 and consists of the following steps:

1. Cards received from the NWQ laboratories are sorted.

2. A Samples-Logged Listing (Appendix E-7) and the Curve Data Report (Appendix E-34) are generated.

3. Data from Parmfyr file are used to create storage space in the Analfyr file (Appendix D-11) for each sample and the analyses to be performed on the sample.

4. New "U" cards for samples being logged in (card form is Appendix B-2) are created.

5. Predicted costs are created and "T" and "Z" (federal) cost cards are punched. Predicted costs are stored in Analfyr file. Data from the Federal file and Schdfyr file are used.

6. Several reports are generated: Cost by Section Report (Appendix E-16), Conductance and Dilution Sheet (Appendix E-10), Sample Preparation Sheet (Appendix E-9), Bench Chemist Work Sheet (Appendix E-11), and Job Sheet (Appendix E-8).

Approval Cards

The function labeled Approval Cards is shown in detail in Fig. 54 and follows these procedures:

1. For each sample completed as "U" card data and entered into Analfyr file, the quality control checking is performed.

2. A completed Sample Report (Appendix E-12) for each completed sample is generated. The quality-control results for unapproved samples are also printed on this report. Biological samples require a different report (Appendix E-12A). Notice that the Denver laboratory generates completed sample reports only for unapproved samples and does not generate biological reports.

3. A Computer Approved Sample Listing (Appendix E-13) is generated.

4. For each completed sample, either an "A" approved card (Col. 60 contains "A"), "A" unapproved card (Col. 60 contains "U"), or "A" card (Col. 60 contains "D") is generated (Appendix B-3).

5. For completed samples, the costs are recalculated and checked against predicted costs in the Analfyr file.

6. If costs differ from predicted costs by more than 50 cents, an "A" adjust (Cols. 79 and 80 contain "AT") is generated (Appendix B-3).

7. New costs are stored in the Analfyr file.

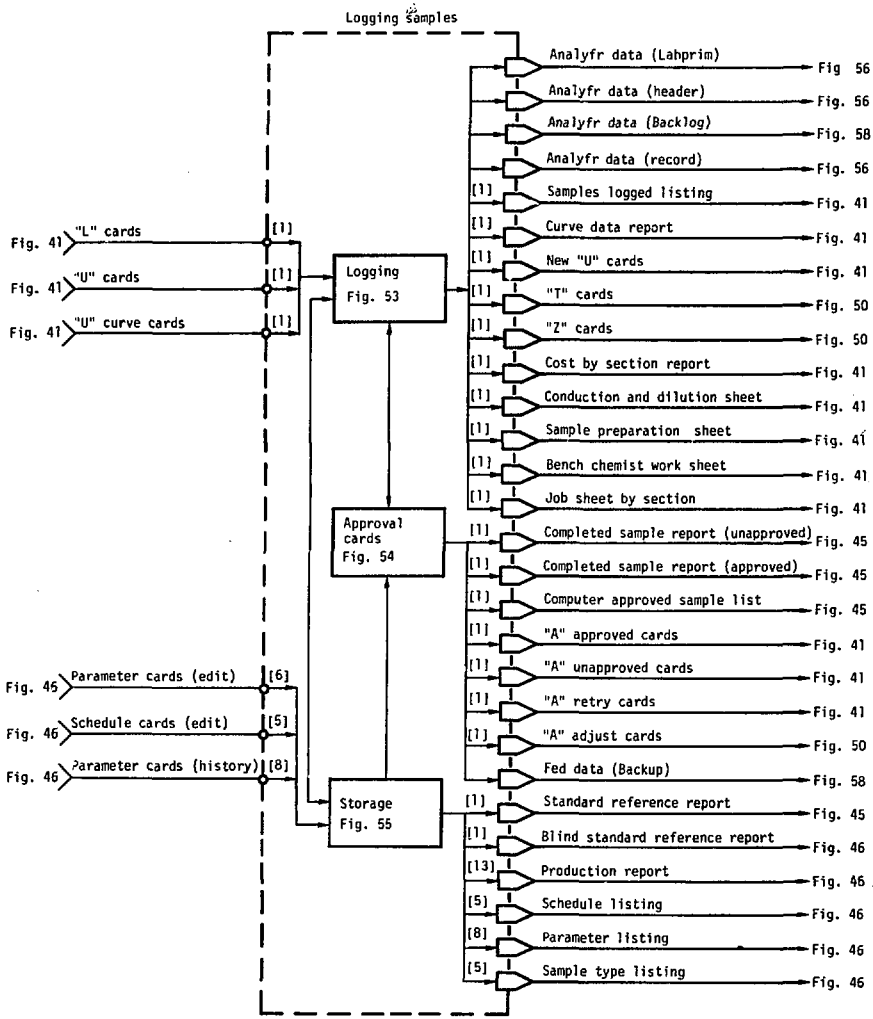


Fig. 52. Reston data processing Logging samples.

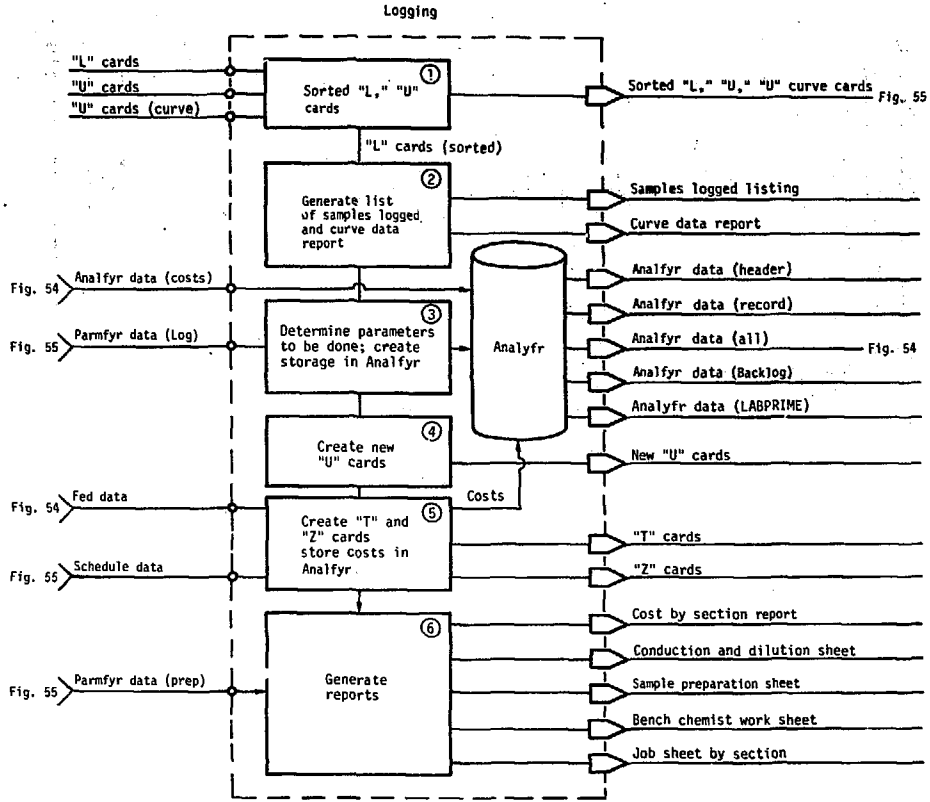


Fig. 53. Reston data processing logging samples (Logging).

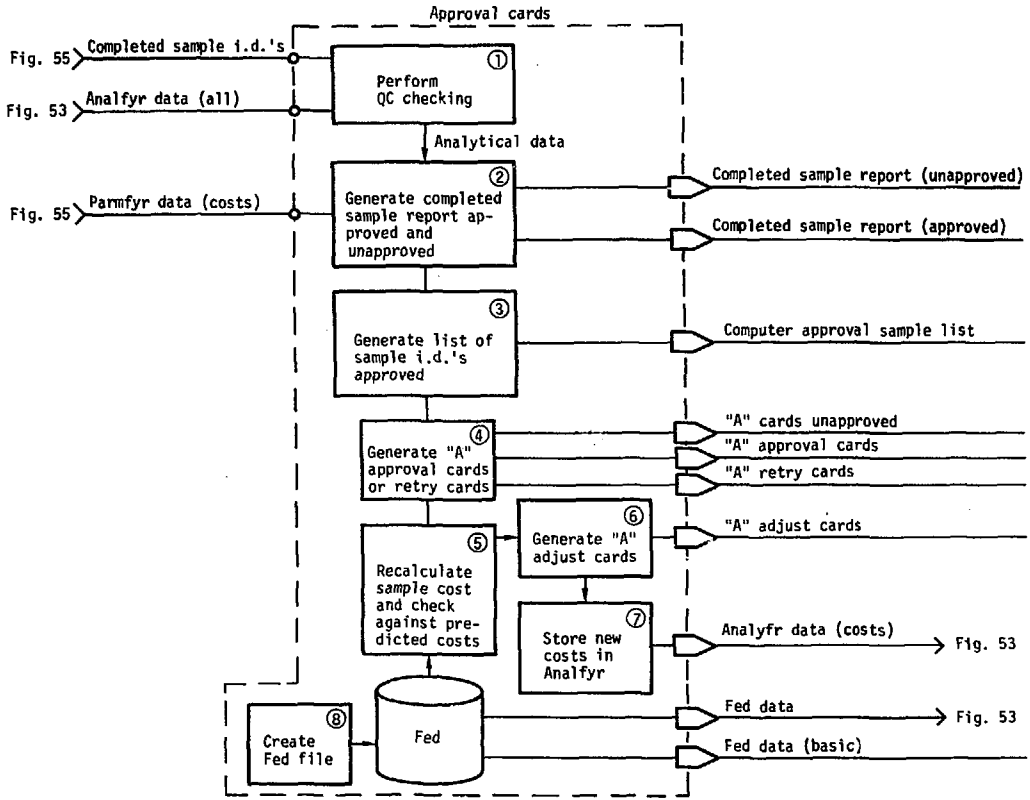


Fig. 54. Reston data processing logging samples (Approval cards).

8. The Federal file is created or modified.

Storage

The Reston data processing storage functions are shown in Fig. 55 and described below:

1. If necessary, incoming data "U" cards are used to generate a Standard Reference Report (Appendix E-14).

2. Standard reference data are stored in a Standard Reference File (Appendix D-5).

3. If necessary, incoming data "U" cards are used to generate the Blind Sample Report (Appendix E-15).

4. Blind sample reference data are stored in a Blind Standard Reference File (Appendix D-4).

5. Incoming cards are counted and work statistics performed.

6. Statistical data are stored in the Production File (Appendix D-6).

7. Data reduction is performed on incoming "U" card data.

8. Analytical results are stored in the Analfyr file (Appendix D-9).

9. A Production Report (Appendix E-23) is generated.

10. New parameters are added to the Parmfyr file (Appendix D-1).

11. A new schedule is added to the Schdfyr file (Appendix D-2) and the Schedule Listing (Appendix E-1) and Sample-Type Listing (Appendix E-2) are generated.

12. A Parameter Listing (Appendix E-4) is generated.

4-4.2. District Functions

The district functions shown in Fig. 35 as part of Reston data processing are illustrated and described in more detail in Fig. 56 and in the following text:

1. When the LABPRIM program is executed (JCL Appendix C-14), the DRF file (Appendix D-8) is searched for completed samples. LABPRIM is executed by the districts to retrieve data and by the NWQ laboratories for special districts.

2. For each sample in the DRF file, the sample data are retrieved from the Analfyr file.

3. The sample data are used to generate a Completed Sample Report.

4. If the sample data are to be put in the WRD file (Appendix D-12), the Station Header file (Appendix D-5) is checked for a header.

5. If no header exists, LABPRIM attempts to generate one from the data in the Analfyr file. A WRD Station Header Report (Appendix E-32) is generated to indicate no header or that the new header was created.

6. When the header exists, the analytical sample data are loaded into the Analfyr file.

7. A WRD Data Verify Report is generated when the data are loaded

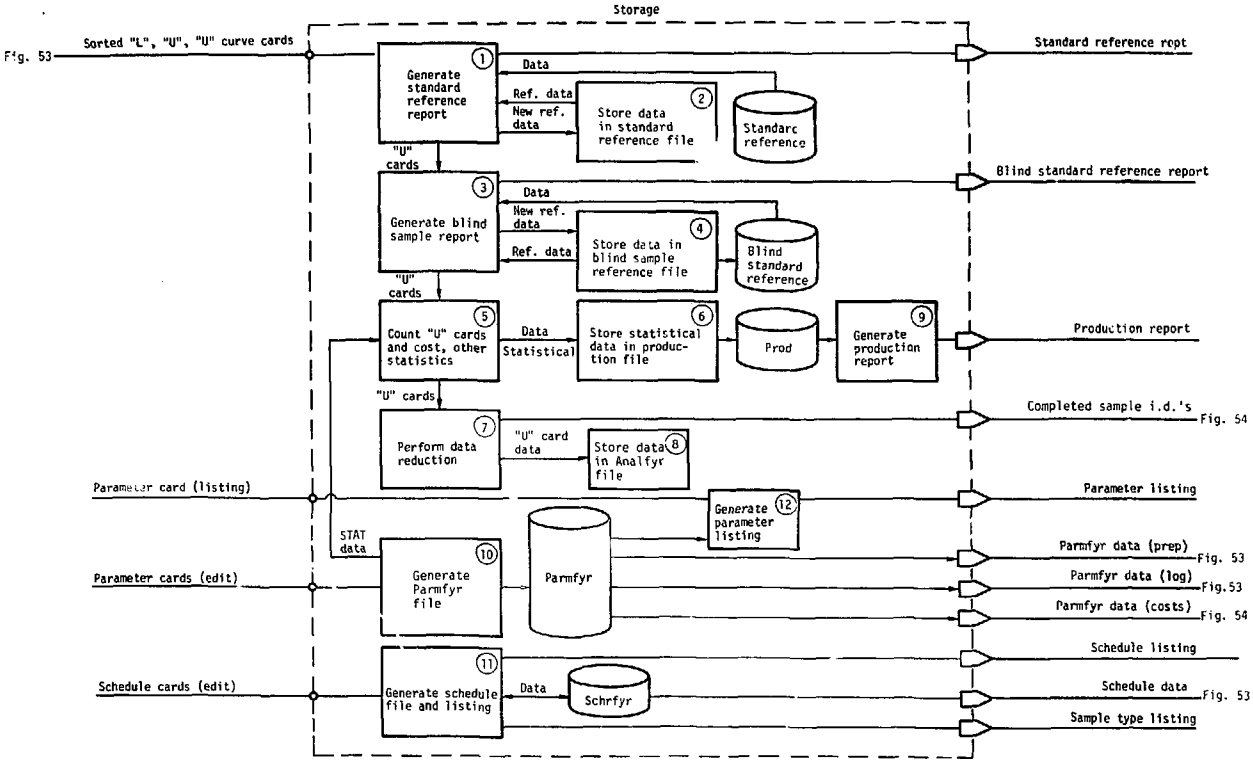


Fig. 55. Reston data processing logging samples (Storage).

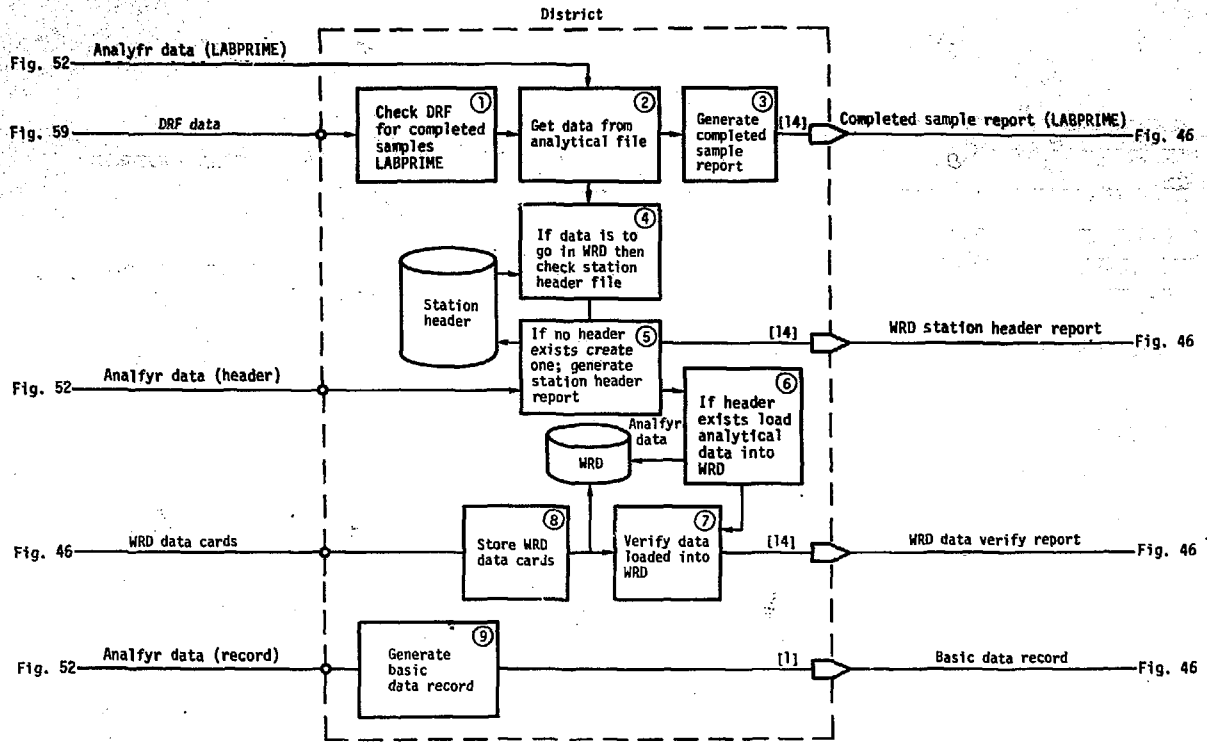


Fig. 56. Reston data processing (District).

into the WRD file to indicate that the data was properly loaded.

8. If necessary, the laboratory can send data directly into the WRD file using WRD data cards.

9. If necessary, the laboratory can retrieve any record from the Analfyr file and generate a Basic Data Record (Appendix E-20).

4-4.3. Accounting

Reston data processing, shown previously in Fig. 35, also includes the accounting functions detailed in Fig. 57 and listed as follows:

1. The "T" and "Z" cards are stored in the Labweek file as received for use by the LABWEEK program (each laboratory has one LABWEEK file).

2. When the LABWEEK program is executed weekly (JCL Appendix C-10), the Weekly Accounting Report (Appendix E-17) and Weekly Account by District (Appendix E-17A) reports are generated.

3. The "T", "Z", "A" adjust, and "M" cards are stored in the Labbudg file when the JCL load (Appendix C-3) is executed.

4. An Acct Cards Logged Listing is generated when the accounting cards are loaded by the Labbudg JCL (Appendix C-3) into the Labbudg file (each laboratory has one Labbudg file).

5. A District Cost Report (Appendix E-18) is generated when the LABBUDG program is executed (Appendix C-11).

6. Journal voucher data are generated when LABBUDG is executed.

7. A Work Statistics Report is generated when LABBUDG is executed.

8. Reduction of data on graphite data cards (format Appendix B-9) is performed.

9. A graphite report (Appendix E-38) is generated.

4-4.4 Miscellaneous

Miscellaneous functions in the Reston data processing system (Fig. 35) include a variety of tasks illustrated in detail in Fig. 58 and described below:

1. A Backlog Listing (Appendix E-22) is generated using incomplete "U" cards.

2. Backlog data are stored in the Backlog File.

3. The data and program files for Atlanta and Denver (JCL Appendix C-12) are backed up. This process generates Backup Reports No. 1 and No. 2 (Appendices E-35 and E-36).

4. The Federal (Fed) file (Appendix D-3) is backed up and Backup Report No. 3 (Appendix E-37) is generated.

5. A Throwaway Listing (Appendix E-3) is generated from "A" dead cards. These are all types of "A"

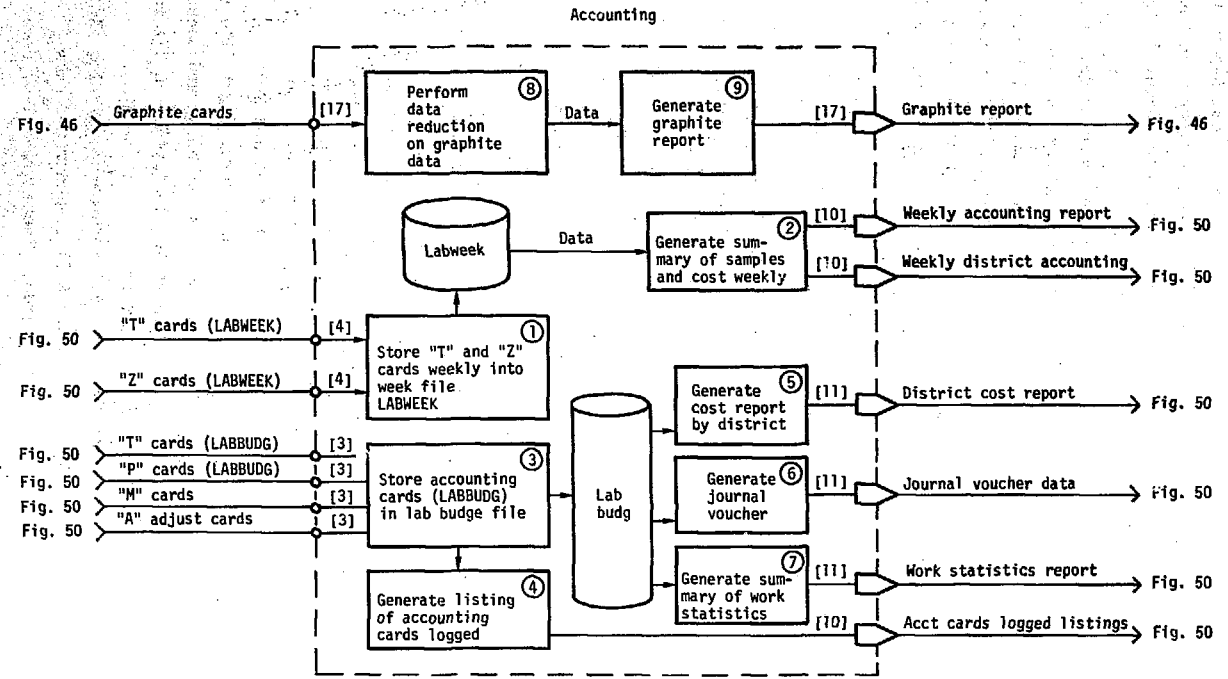


Fig. 57. Reston data processing (Accounting).

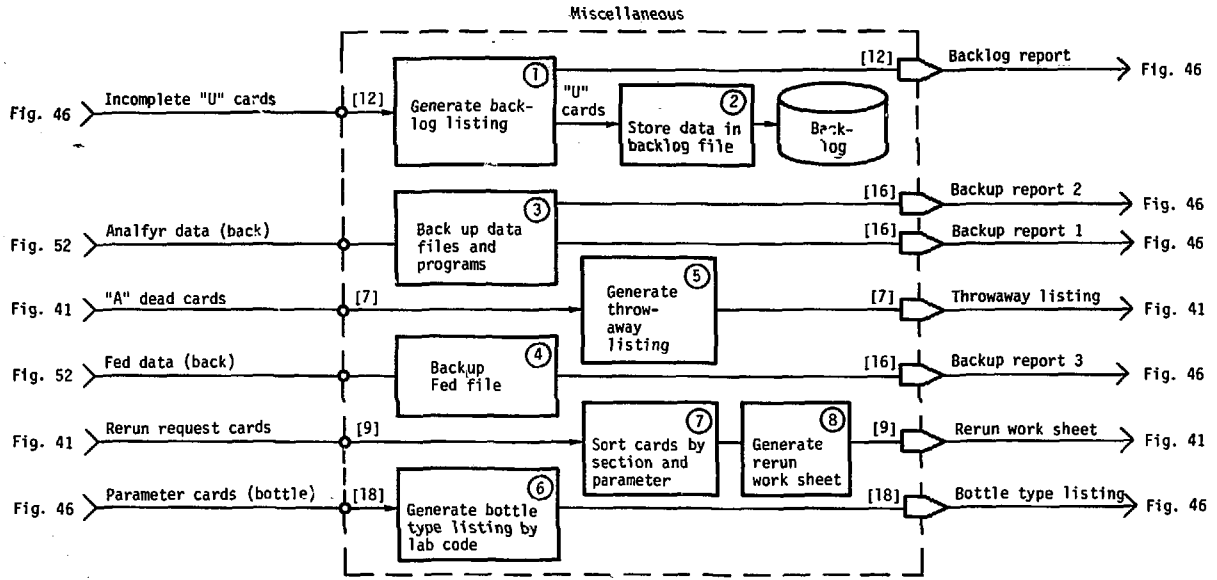


Fig. 58. Reston data processing (Miscellaneous).

cards for which approved data has been moved to the DRF file (Appendix D-8) for more than 15 days.

6. A Bottle-Type Listing by Labcode (Appendix E-39) is generated using parameter cards.

7. Rerun Request cards (Appendix B-7) are sorted by section and parameter.

8. A Rerun Work Sheet (Appendix E-29) is generated.

4-4.5. Approvals

The approvals functions of the Reston data processing system are shown in Fig. 59 and include the following steps:

1. The "A" cards (all types) are used to store completed sample identifications in the DRF file (Appendix D-8) for retrieval by the districts from their terminals (each laboratory has one DRF file).

2. As the samples are flagged as completed in the DRF file, a DRF Input Listing (Appendix E-5) is generated to indicate which samples are available to the districts.

3. The DRF file is used to generate a DRF Retrieval Listing (Appendix E-6) to indicate which samples have been retrieved by the districts.

4. When necessary, the status of the DRF file can be quizzed and a DRF Quizz Report is generated (Appendix E-33).

4-5. PERFORMANCE CHARACTERISTICS OF THE NWQ LABORATORY RESTON ADP SYSTEM

In this section the more important performance characteristics of the system are specified.

The response time of the entire system depends heavily on data processing operations at Reston. The ADP system is currently remote-batch. Therefore each function performed at the laboratory is limited by the availability of the IBM 370 at Reston and the amount of money available for communications time. To reduce CPU charges, much of the processing is performed overnight.

Some functions performed at Reston are critical to continuing operations in the NWQ laboratories. If the Reston system goes down, operations in the laboratories are essentially halted. Downtime of the Reston system has been estimated at approximately 5 hr per mo.

The total number of parameters for one sample cannot exceed 100. The sample must be split if the number of parameters requested exceeds 100. Samples normally are available for analysis approximately 24 hr after being received in the NWQ laboratory. They can be processed without a job sheet. A Sample Preparation or Work Assignment Sheet is usually generated about one day after the sample is received.

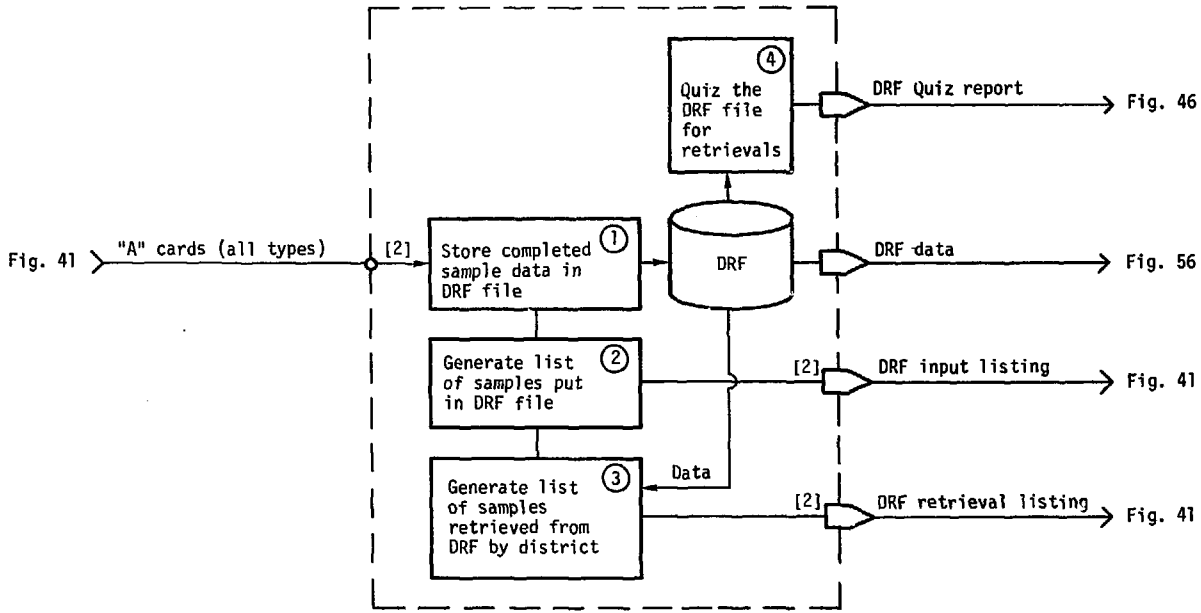


Fig. 59. Reston data processing (Approvals).

Once storage has been allocated for a requested parameter, the allocation cannot be enlarged. Parameters are stored in records three times as long as that of the parameter. Deleting a parameter does not free the space for additions. The transcription of data from log-inventory sheets or instrument output tapes is limited by the availability of keypunch operators and the backlog of data to be transcribed.

The minimum turnaround time to process data for a sample is about three days (rush); normal turnaround time without reruns is 20 days.

It requires about three additional days if a sample has to be rerun for quality control checks, and quality control results are not available for approval for at least one day. After the sample is completed the summary report is normally available in one day.

Accounting data is currently sent weekly from "T" and "Z" card files, and billing is currently performed monthly at Reston from data updated by "T" and "Z" cards.

5. Evaluation of Existing Operations

5-1. ADVANTAGES AND DEFICIENCIES

Because the Denver laboratory is divided into sections, samples can be analyzed for several parameters simultaneously thereby reducing the overall sample analysis time. The use of Reston computer facilities has given the laboratory the ability to conduct complex work scheduling, data reduction, collation, and report generation. However, some deficiencies must be pointed out with regard to use of the Reston system. They are as follows:

- Transcribing analytical data to forms and keypunching it on cards is time-consuming and error-prone.
- Card-file maintenance is time-consuming. (Key-to-disc systems can replace the card system to alleviate this problem.)
- Sample parameter results and quality control data are available in a minimum time of one overnight cycle after transmission of the analytical data to Reston. Thus, malfunctions or other errors go undetected leading to the possible compounding of errors and a greater incidence of sample reruns.

- To insure an acceptable answer in one overnight cycle, many samples are diluted to two or more concentrations to insure that at least one dilution will fall within the range of the method. This increases the sample load of the laboratory.
- Samples are backlogged if the Reston system goes down.
- Sample analyses cannot be started until a job sheet is obtained from Reston.
- Output from the remote system takes a minimum of one overnight cycle.
- The NWQ laboratories depend on the Reston computer system over which they have no direct control.

6. Desired Improvements and Goals

The evaluation of the existing operations in the Denver laboratory has shown advantages and deficiencies of the system. Elimination of these deficiencies will lead to improved performance. A summary of the desired goals follows, and are presented as a guide to the further design of the automation system. They are not intended to limit the design to any particular hardware. The desired goals are:

- To decrease the time required for logging in samples and compiling files of parameters to be determined, both at the NWQ laboratories and at Reston.
- To make available probable values for the parameters to be determined, thus minimizing reruns resulting from out-of-range analyses.
- To incorporate on-line automated analysis methods capable of real-time data acquisition, data processing, and quality control screening.
- To eliminate punched cards as a method of computer communication and provide, at the same time, efficient techniques for the off-line entry of data from low-use methods and instruments, nonautomated instruments, and instrument systems containing computers.
- To provide a means of introducing and processing rerun samples quickly.
- To incorporate automated sample-changer and dilution systems that can be applied to a variety of instrumental methods.

- To establish an effective automated method for distributing samples.
- To maintain data backup so laboratory operations will not be interrupted, and accumulated data will not be lost in the event of a component malfunction within the system.
- To provide methods for promptly assessing laboratory performance, examining the status of an analysis, and reporting routine analytical data.

6-1. CONSTRAINTS THAT AFFECT THE DESIRED GOALS

We have stated the desired goals that are expected to improve the performance of the NWQ Laboratory. Several constraints will affect attainment of these goals. They are: applicable technology, available funds, and time. A limited area of computer technology including both software and hardware is applicable to NWQ laboratory needs. In the initial feasibility study,[2] specific hardware and software were recommended because they were known to apply and would yield substantial cost benefits. The software includes BASIC language programs and the required assembly language routines applicable in whole or in part to NWQ laboratory instruments (e.g., ultraviolet and atomic absorption spectrometers, Technicon AutoAnalyzers, the total organic carbon analyzer, and the Mettler electronic balance). The hardware includes interface designs for linking the above instruments to a computer system. It is important to remember that software and hardware interfaces are designed for use with a specific computer system (Data General) employing a specific operating system (MRDOS). If the NWQ laboratories choose to gain the cost benefits and development time savings from the above software and hardware designs, they are then constrained to use a specific computer system or acquire a system that provides comparable hardware interfaces and software at no additional cost.

We choose not to pursue certain goals at this time or until preliminary investigations have been completed. For example, a sample distribution system will not be defined until laboratory automation is completed. Automatic sample changing and dilution will be pursued as a separate development project, and complete elimination of the need for Data 100 terminal will not be realized immediately.

7. Scope of the Automation Project

7-1. DEFINITION OF THE AUTOMATION PROJECT AND FUNCTIONAL DESIGN OF THE SYSTEM

In defining the automation project, we have considered the desired goals, the constraints that affect the attainment of those goals, and attempted to state as accurately as possible the real objectives that will be pursued in the project.

The automation project for the USGS NWQ laboratories has the following objectives:

- To provide computer interactive procedures for processing incoming samples (Sample Log-In).
- To provide work schedules as soon as possible after sample log-in.
- To incorporate on-line automated analysis including data acquisition, data processing and quality control screening for the analytical instruments shown in Table 8, and in the functional designs to follow.
- To provide the means to enter data from methods that are not interfaced on-line to the automation system as well as to incorporate calculational routines such as those developed for radiochemical methods (see Appendix E). These off-line instruments and methods are listed in section 3-1.9. Of these methods, it is expected that gas chromatography, gas chromatography/mass spectrometry, emission spectrometry, and voltammetry measurement will soon be automated on-line.
- To provide storage of sample data locally in the NWQ laboratory.
- To provide reports locally to the analyst.
- To provide the ability to transfer and store analysis results in the Reston system.
- To provide cost accounting functions that are currently being performed through the execution of a daily JCL by the ADP section.
- To provide continued service in the event of a hardware failure within the automation system.

7-2. FUNCTIONAL SCHEMATICS OF THE AUTOMATION SYSTEM

The functional schematics presented here are intended to give a concise picture of what is to be accomplished by the automation system. The schematics are independent of hardware and will provide assistance in the conceptual and implementation designs that are the next steps of this project.

Table 8. Instruments to be automated on-line.

Instrument type	No. of instruments
Atomic absorption spectrophotometer	
Perkin Elmer model 306 (flame)	4
Perkin Elmer model 503 (graphite furnace)	3
Perkin Elmer model 603 (flame)	1
Sampler technicon, 40 position with Model 306	2
Sampler P.E. AS-1, with model 503	1
Technicon AutoAnalyzer	
Technicon AAII with 40 position sampler	7
Conductance meter	
Radiometer-Copenhagen, model CDM3	2
pH measurement	
Technicon ISE flow through system	1
Sampler	
Technicon, 40 position (to be used with system combining pH and conductance measurements)	1
Spectrophotometer (UV and visible)	
Perkin Elmer Coleman, model 55[a]	1
Electronic Balance	
Mettler, model HE20, BA28, BE20	2
Total organic carbon analyzer	
Oceanography International, model 0524A	2
Automatic titration system	
Radiometer-Copenhagen system with ATS-1 auto-pipet, ABU-12 auto-buret, TTT-60 titration control, PHM-10 pH meter, and PRS-10 printer	2

[a]The instrument is equipped with a lever arm sipper.

All the candidate instrumental methods for on-line automation employ similar routine procedures (described in section 3-1.1) for selecting samples, setting up analysis runs, acquiring data, and calculating and reporting results. The functional schematics for these common procedures are shown in Figs. 60 through 66. The incorporation of these procedures in a specific analytical method, Technicon AutoAnalysis (TAA), is shown in the overall functional schematic

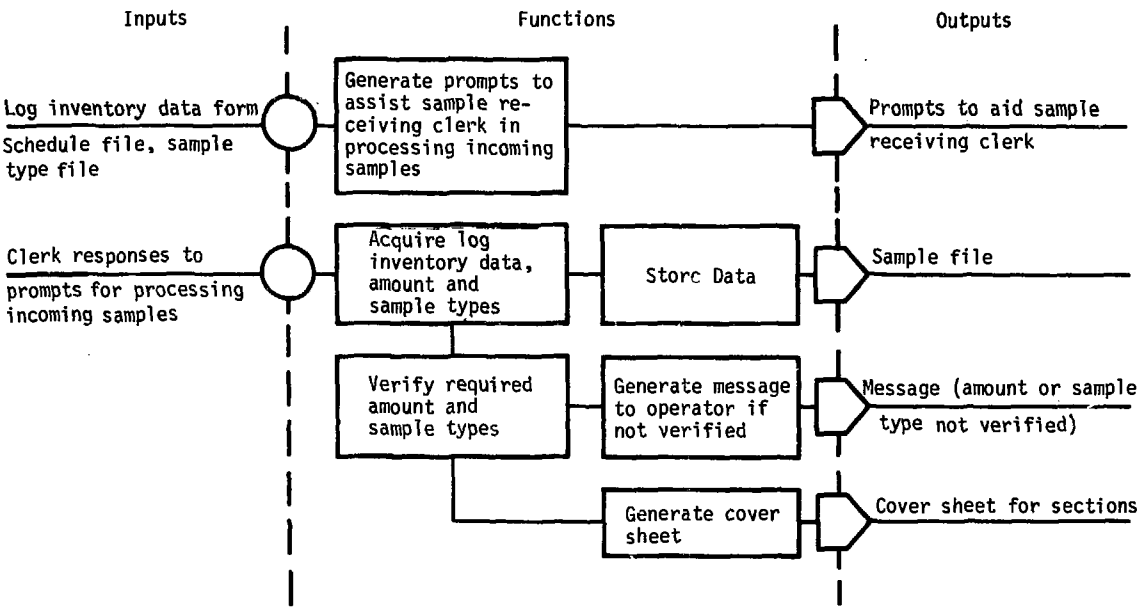


Fig. 60. Sample receiving.

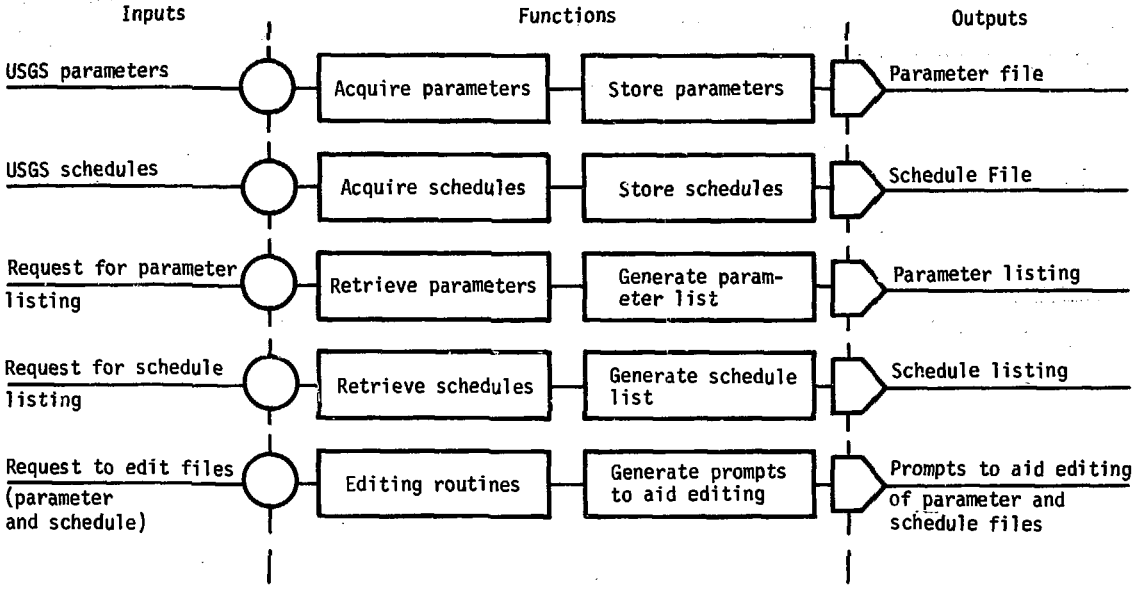
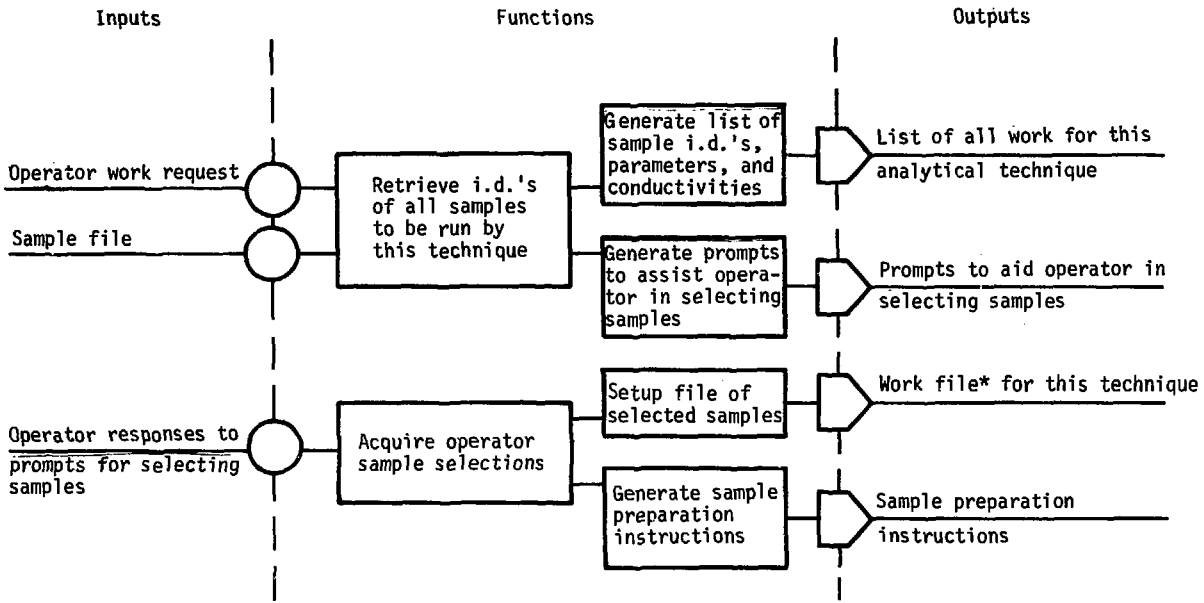


Fig. 61. Files and lists required for sample receiving.



*Work File - This file must be maintained for several days or time required for analyst to complete a run and report final approved results.

Fig. 62. Work scheduling.

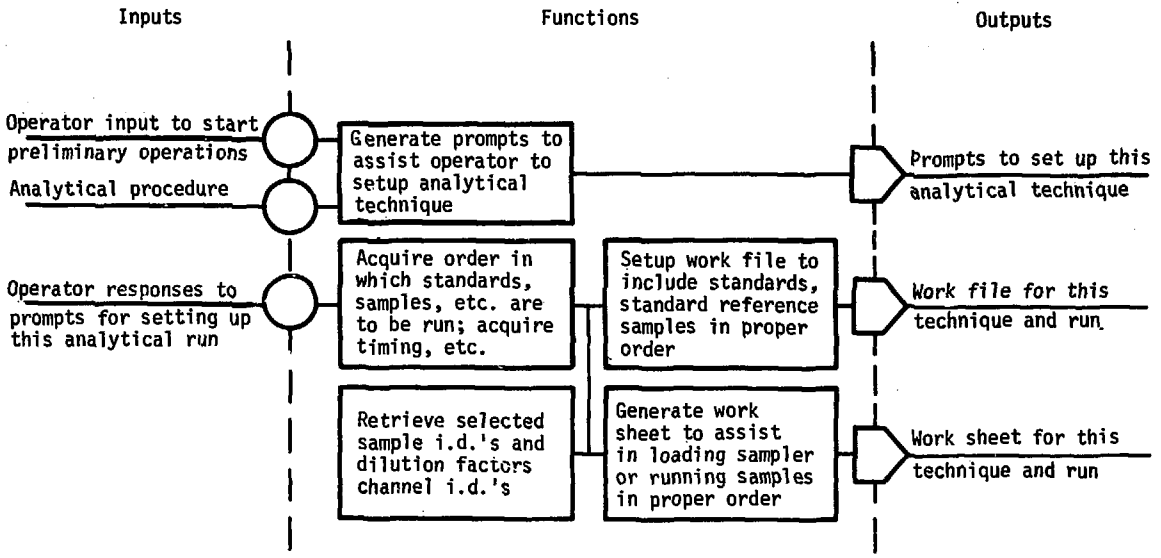


Fig. 63. Preliminary cperations.

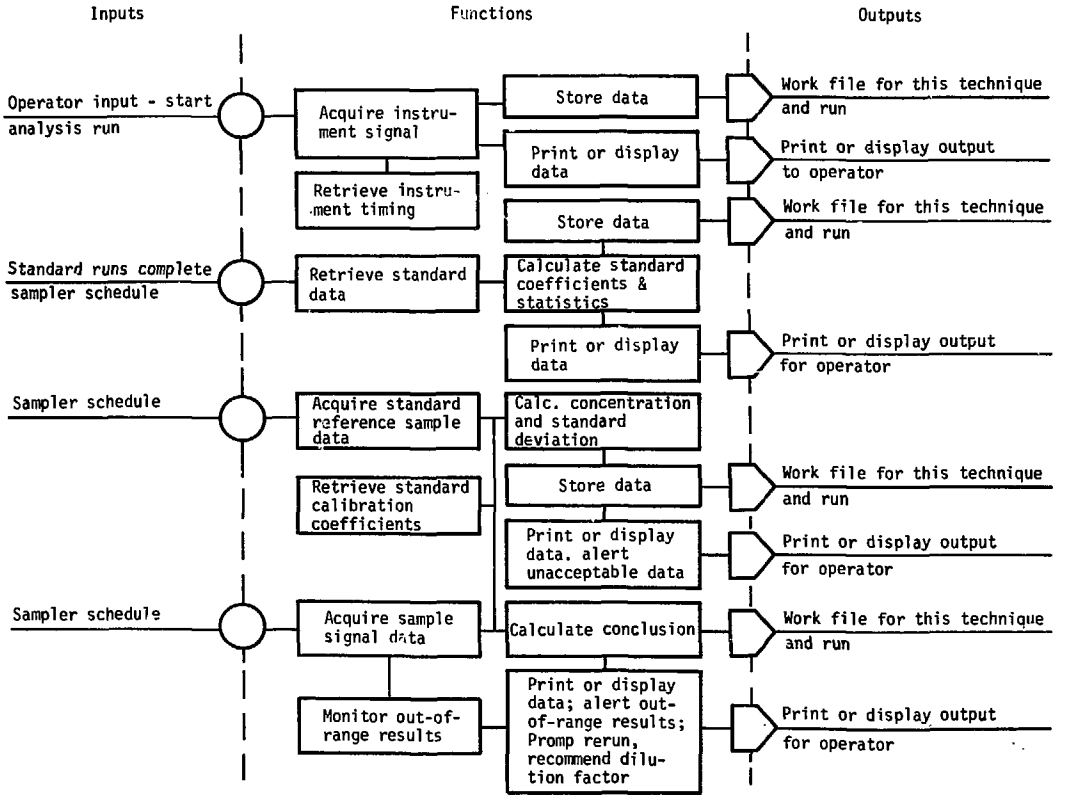


Fig. 64. General data acquisition and processing.

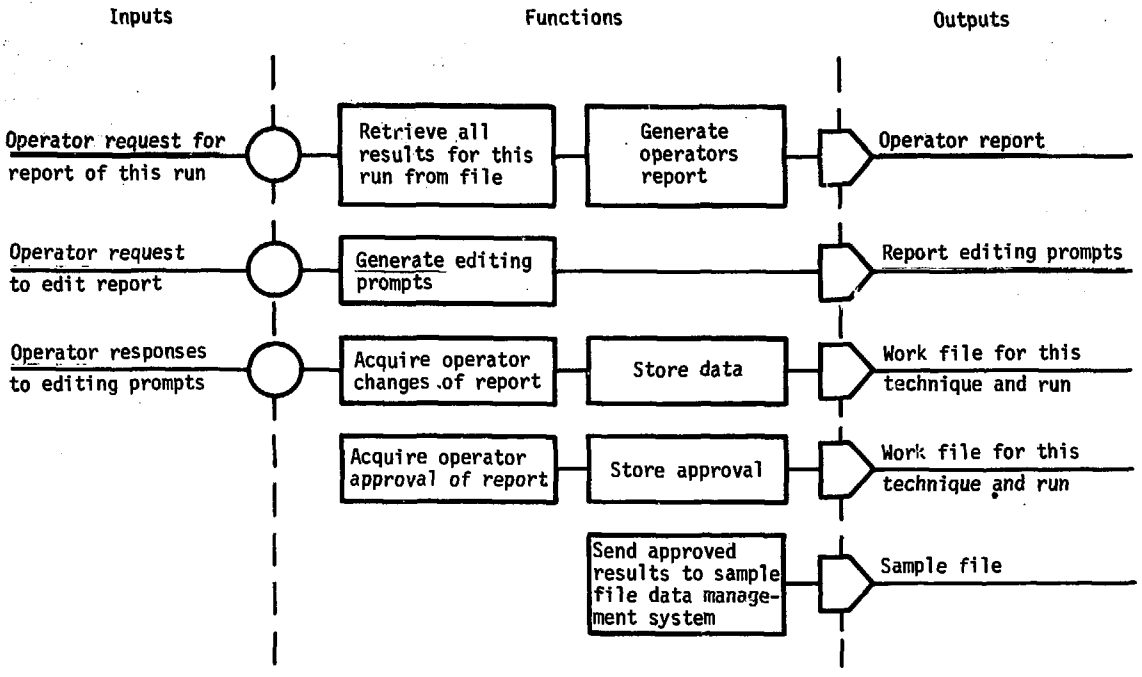


Fig. 65. Operator report and approval of results.

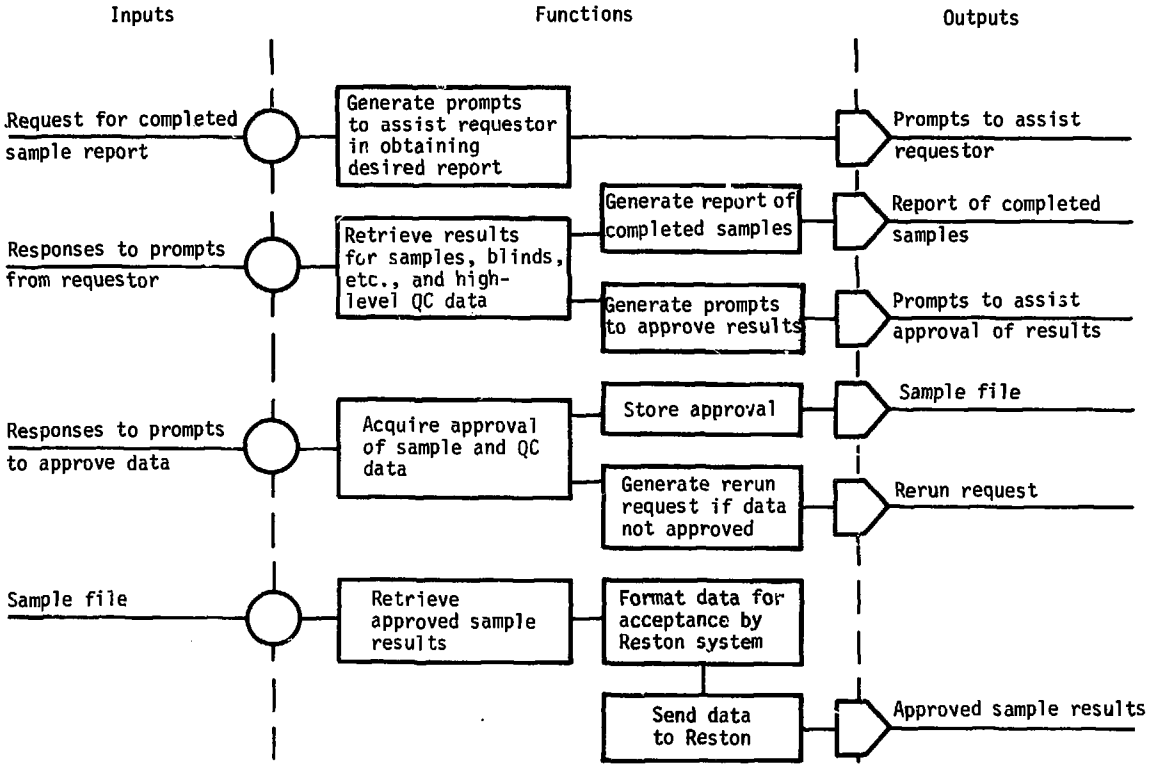


Fig. 66. Completed sample report and management approval.

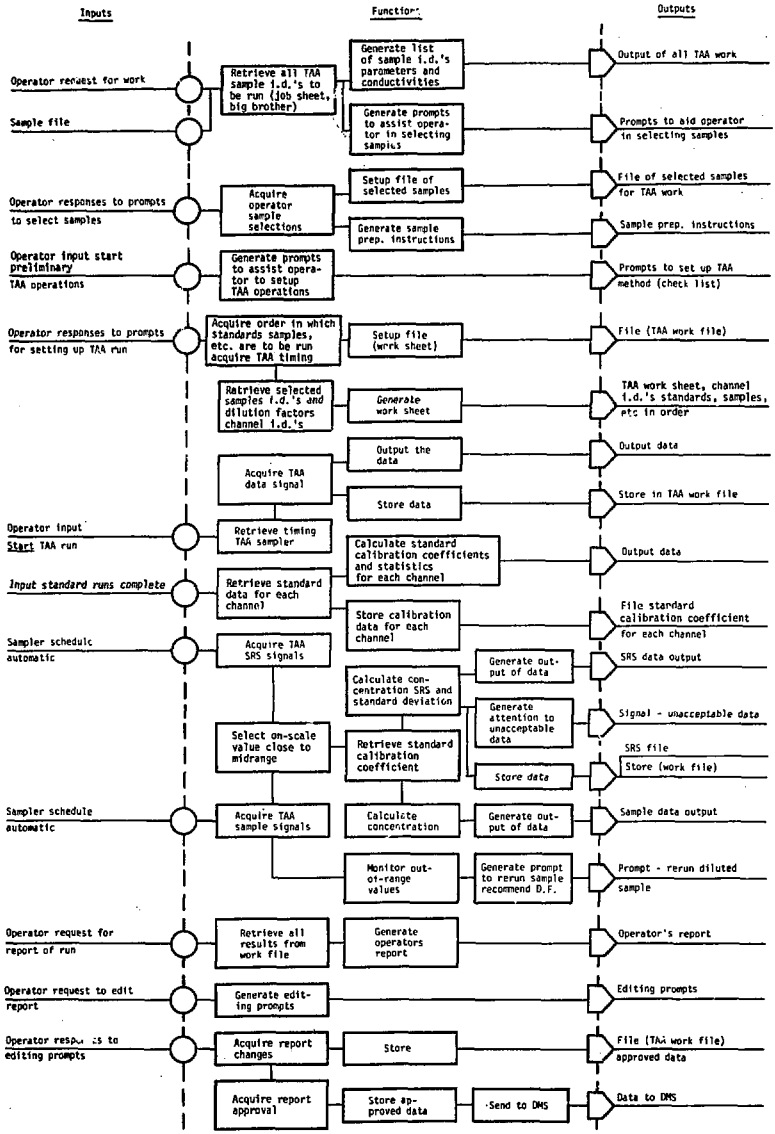


Fig. 67. Functional schematic of the Technicon AutoAnalyzer.

in Fig. 67. Because all other candidate instrumental methods are similar to the TAA in their functional steps, only the TAA schematic is shown. Specific functional innovations for the other on-line instruments can be deduced from the specifications text.

Acknowledgments

This automation project is a cooperative effort of many people. We especially wish to acknowledge the helpful advice of G. W. Barton, Jr., W. G. Boyle, R. W. Crawford, E. R. Fisher, and A. M. Kray of Lawrence Livermore Laboratory and R. L. McAvoy and his staff of the USGS National Water Quality Laboratory.

References

1. National Water Quality Parameter List, Water Resources Division, U.S. Geological Survey (1976).
2. W. F. Morris, E. S. Peck, E. R. Fisher, and G. W. Barton, Jr., *Feasibility Study for Automation of the Central Laboratories, Water Resources Division, U.S. Geological Survey*, Lawrence Livermore Laboratory, Rept. UCRL-52001 (1976).
3. R. I. Bystroff, W. G. Boyle, and G. W. Barton, Jr., *Atomic Absorption Instrument Functional Description*, Lawrence Livermore Laboratory, Rept. UCRL-52065 (1976).
4. R. W. Crawford and G. W. Barton, Jr., *Technicon AutoAnalysis: Functional Description*, Lawrence Livermore Laboratory, Rept. UCRL-52046 (1976).
5. R. W. Crawford and L. P. Rigdon, *Total Organic Carbon Analyzer: Functional Description*, Lawrence Livermore Laboratory, Rept. UCRL-52045 (19.6).
6. Techniques of Water Resources Investigations of the United States Geological Survey, Book 5.
7. Operation Manual, Specific Conductance Meter, CDM-3, Radiometer-Copenhagen Manual 982-653, 5090.
8. W. B. Barnett and J. D. Kerber, Instrumental Electronics for Use with Flameless Atomic Absorption Sampling Device, *American Laboratory* 7, 43 (1975).
9. Operations Manual, Atomic Absorption Spectrophotometer, Models 306, 403, 503, and 603, Perkin-Elmer Corporation.
10. NWQ Laboratory Methods Manual, U.S. Geological Survey.

MLD/lc/jcn/vt

Appendix A
ADP Documentation

1. NWQ Laboratories ADP OPERATIONS

Introduction:

Ruben E. Gust
Computer programer
Denver Central Laboratory
FTS 234-4992

Subject: CENTRAL LABS ADP OPERATIONS

During this period of discussion I will cover the Central Laboratories ADP operations, primarily those areas from the time a sample reaches the laboratory until the analyses are complete, and the results of the sample are returned to the requestor. To do this I plan to start with the Log-Inv Information sheet and how the sample is established in our files, and then follow the sample through to completion. I will also discuss the weekly Log-Inv Information report (LABWEEK), the analytical retrieval programs (LABPRIM), and with Harry's help, the budget (LABBUDG). When a sample is sent to the lab it has to be accompanied by a Log-Inv Information sheet as shown here.

Insert 1.--near here

CENTRAL LAB LOG-INV INFORMATION

Card No.						
1	File Disposition* Circle One W....Central Lab & WRD QW File X....Central Lab File Only Col. 18 Laboratory ID No.	Station Identification* Col. 20-34 SITE CODE (Col 51-52) SW....Surface Water GW....Ground Water SP....Spring LK....Lake/Reservoir ES....Estuary PR....Precipitation SS....Other	Yr Mo Day Sample Date* Col. 33-40 State Code* Col. 53-54 Project Code* Col. 60-68	Yr Mo Day Composite End Date,* Col 41-46 Billing Code* Col. 55-56 Cost Factor Col. 69-73	Time* Col. 47-50 County Code* Col. 57-59 Cost Override Col. 74-80
2	NOTE!! Card 2 is OPTIONAL--See reverse side.	STATION NAME* Col. 27-74			
	Latitude* Col. 12-17	Longitude* Col. 18-24	Seq. #* Col. 25-26		
3	MAILING ADDRESS* Col. 12-29	Analysis Schedules* Col. 30-33	Col. 34-37	Col. 38-41	Col. 42-45
	Q,Inst.(cfs)* Col. 46-52	pH* Col. 53	Conductance* Col. 57-62	Temp. in °C Col. 63-66	Depth(ft)* Col. 67-72	Geologic Unit* Col. 73-80
4	VARIABLES TO DELETE OR ADD TO THE ANALYSIS--USE CENTRAL LAB CODES AND A=ADD & D=DELETE* CODE A/D CODE A/D CODE A/D CODE A/D CODE A/D CODE A/D CODE A/D CODE A/D CODE A/D					
5	FIELD VALUES TO ADD TO THE ANALYSIS--USE CENTRAL LAB CODES & CODE VALUES AND REMARKS* CODE VALUE R (28) CODE VALUE R (41) CODE VALUE R (54) CODE VALUE R (67) CODE VALUE R (80)					
6-8	Comments* Limit to 140 Spaces					

As far as the lab is concerned this is where it all starts. If the information is wrong or missing on here it will be wrong or missing on our data files and what comes out may not resemble what was requested. Since this document is so important to our system, and most of the errors are traced back to it, I would like to spend some time going through it.

CARD 1

File Disposition: If neither one are circled the sample will be earmarked for the National QW-file.

Laboratory ID No.: Assigned by lab log-in section.

Station Identification: Something has to be there, if blank we insert the lab ID.

Sample Date: Mandatory. If blank, Denver will enter 99.

Composite End: Only for composite samples.

Time: Optional. If given, should be based on 24 hour clock and four digits - examples: 9:15 AM = 0915

1:30 PM = 1330

4:30 PM = 1630

Site Code: Mandatory. No default. Sample will not be processed until one is received.

If SS is selecced, then a value for LC 310 (WRD Code 72005) should also be given in card 5; if no value is supplied, the lab will enter 40 = special.

State Code: Mandatory. No Default. Sample will not be processed until one is received. Must be the 2 digit numerical number for the State in which the geographic location of the sample site is located.

Billing Code: Mandatory. No Default. Sample will not be processed until one is received. This is the two digit (Alpha/numeric) code assigned by central lab system, and will be the same for QW storage.

County Code: Optional. No Default. If supplied it should be a 3 digit numeric number.

Project Code: Optional. This provides you the opportunity to select the account number to which the cost of the sample will be charged. If left blank, or if the first 4 digits do not match those of the general/default account, or if it is not a nine digit number, then it will default to the general account for that billing code.

Cost factor: Used by lab to adjust the cost of a sample. Example:

<=3 parameters=1.15

4&5 parameters=1.10

Cost override: Used by lab for special cost control. Unusual circumstances requiring special handling.

CARD 2

This card is optional.

Lat-Long-Seq. No.: If blank our programs will enter "* NONE GIVEN *"

Station Name/Location: If blank our programs will enter '"NO INFORMATION IN THE STATION HEADER FILE"'

At this point I would like to mention that we do have an interphase program between the Central Lab programs and the Station Header file. Where that occurs will be covered later. If WRD QW-FILE is selected our programs can establish a header record for you. The information to do so is the data taken from CARD 1 and CARD 2.

CARD 3

Mailing address: There are only 18 spaces provided. Prior to the Districts having the ability to retrieve their own data, the laboratories used this to put in the city and State to assist the administrative section in mailing out the sample analytical sheets.

Since these printouts are now coming out at your terminal, you may use this to designate in-house distribution, i.e., to BLM, TO JOHN DOE.

Analysis Schedules: At least one must be given even if it is zero, up to 4 may be used.

Commonly determined field data:

LC 61 Instantaneous streamflow

LC 51 Field pH

LC 21 Field conductance

LC 64 Water temp. in °C

LC 79 Depth (ft. from surface)

Geologic Unit--see WATSTORE user's guide

CARD 4

For modifications to the schedules requested.

CARD 5

Field values: CODE	Limited to these remarks REMARK
0	Estimated value

Field values: CODE	Limited to these remarks REMARK
1	Actual value is known to be less than value shown
2	Actual value is known to be greater than value shown
3	Presence of material verified but not quantified
4	Presumptive evidence of presence of material
U	Material specifically analyzed for but not detected
B	Results based on colony count outside the acceptable range (non-ideal colony count)

NOTE: The total number of parameters that a sample may have is 100. That is a total of Cards 3,4, & 5, including computer generated calculations.

SAMPLE FLOW

Sample is received by log-in section. Here it is assigned a lab. ID, and checks are made to ensure that the analyses requested and sample type agree--i.e., if you are requesting "DOC" is there a DOC sample, etc.

From the Log-in Section the LCC-INV sheets are brought to the ADP Section and the cards are punched and verified that afternoon.

That evening the data is processed through the Central Lab. Log-In program into data files in Reston, VA. There are two separate data files, 1 for the Denver lab., and 1 for the Atlanta and Albany laboratories. More about this later.

The Log-in program is designed to establish each sample to occupy from two to four records as follows:

a. If the total number of parameters is less than 35 it will have one Basic Data Record (BDR).

b. If the total number of parameters is between 35 and 68 it will occupy two BDR'S.

c. If the total number of parameters is between 69 and 100 it will occupy 3 BDR'S (if there are more than 100 parameters we will receive an error message, and then we will attempt to split the sample into 2 logical parts).

d. The last record for each sample is a descriptive record.

Once a sample is established, additional parameters can be added as long as the additional parameters do not exceed the existing Basic Data Record (BDR) space. For example, if the sample was originally set up with one BDR with 32 entries, the analysis will accept 2 more parameters for that sample.

If you request more parameters than we can add into the existing records, then we would have to do one of the following:

a. Phone the results.

b. Put it into the comments.

c. Establish another sample with only the add-ons.

d. Re-establish the sample.

Processing of the log-in generates output in the form of job sheets, data cards, and budget cards.

a. Job sheets: Distributed to the lab sections for the analyst to perform the determination.

b. Date cards: Kept on file awaiting the results.

c. Budget cards: Cost breakdown for:

(1) State charge ("T" card),

(2) Each federal charge ("Z" card(s)),

The "T" & "Z" cards are normally processed on Tuesday of each week for samples received during Monday through Saturday of the previous week. This information is available for retrieval by the Districts Wednesday through Monday, thereafter the three laboratories will overlay it with new data. I will talk more about the LABWEEK program later.

The analyses are performed on the parameters requested and the data submitted to the ADP group for entry into the file. When all parameters are entered through the laboratory-update and quality-control programs the following output is generated:

a. A laboratory analytical sheet

b. Budget adjustment cards, if the price of the sample differs from that established at the time of log-in, e.g., deletes, add-ons, etc.

c. Sample completion card ("A" card).

Analytical sheets are reviewed and the sample is then either rejected, and selected parameters are rerun until approved—or sample is approved.

When the sample is approved (they all are sooner or later) the sample completion data card is processed through a lab program that loads this sample into the, "Remote Retrieval file." It is now available for District retrieval using the LABPRIM (LABoratory and WRD PRIMary) program. I will go into more detail on the LABPRIM program later.

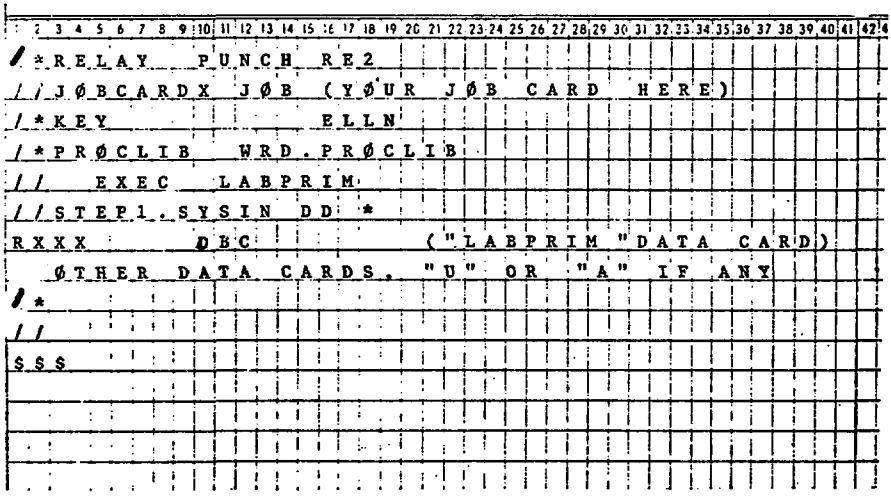
That's it--the sample is now complete and will remain in the Central Lab file until overlaid. Storage in the Denver/Salt Lake City file is presently 12--almost 13 months. Storage in the Atlanta and Albany file is approximately 10 months. Times are from the date the sample was established.

Are there any questions on the processing of the data to this point.

2. LABPRIM

"LABPRIM" provides a means for you to receive laboratory analytical data STATION HEADER INFORMATION, and WRD QW primary printouts (proof of transfer) at your District terminals.

The JCL necessary to execute the retrieval programs has been cataloged for your convenience. It is as follows:



We recommend that you allow up to several minutes Cpu-time and several thousand lines of print on the job card. The upper limit for both will depend on how many analyses you retrieve during the run. The cataloged procedure generates the execution of up to 8 different steps. A discussion about each step follows.

Step 1

This is the remote retrieval program and has the following functions:

(1) Quizzes the remote retrieval file for that district's analyses as requested on the remote retrieval card.

(2) Prepares data input for other programs that follow.

(a) "U" card data card prepared; and

(b) "A" card data card prepared.

(3) Establishes condition codes for execution of following programs.

This is the only program that allows input of data cards in the job stream.

There are 3 types of card input and their functions are described as follows:

"LABPRIM" DATA CARD

This card is mandatory and must be the first input card. The program terminates if it is not present. Card format is as follows:

Column	1	The letter "R".
Columns	2-5	The Remote Number for which you are retrieving data
Columns	6-9	Leave Blank.
Column	10	The letter "D".
Columns	11-12	The District Billing Code for which you are retrieving data

NOTE: the card must contain one or both of the above options. We request that you use the "D" option when ever possible.

"U" CARD

The function of the "U" card is to identify the sample, and the Central Laboratory file where the data is stored. This card is automatically prepared for analyses loaded by the Central laboratories. The card can be created manually, and used to generate additional copies of previously completed analyses. If a request is made for an analysis that has not been completed then that request is ignored. A manual input of this card will not generate the data transfer from the Central Laboratory data files to the WRD QW file. The card format is as follows:

Column	1	The letter "U"
Columns	2-7	The Sample ID
Columns	8-10	Leave blank
Column	11	The number for the laboratory that performed the analysis
		"1" for Salt Lake City
		"2" for Atlanta
		"3" for Albany
		"4" for Denver
Columns	12-68	Leave blank
Columns	69-76	Lab Analysis Record Number
Columns	77-80	Leave blank

Analysis Approval Card

This card is prepared automatically by the program for analyses that are being retrieved by the district. It is not necessary to prepare this card except for the following reasons:

(1) Change the station identification of an analysis and enter the data into the WRD QW file.

(2) Generate data cards for an analysis.

(3) Change file disposition of an analysis; and

(4) Repass an analysis into the WRD QW file.

The primary purpose of this card is to activate preparation of data in the central lab data files into the standard backfile format for entry into the WRD QW file. This card also deactivates the analysis in the central lab data files and sets switches to insure that data is not overwritten when updates are made. If the station identification is changed then it may also be necessary to delete erroneous data entries in the WRD QW file.

Analysis Approval Card

col.	1	*	PUNCH the letter "A"
cols.	2- 7	*	SAMPLE IDENTIFICATION 6 digit Lab Identification number
cols.	8-10		BLANK
col.	11	*	LAB NUMBER code: "1" for SALT LAKE CITY, UTAH "2" for ATLANTA, GEORGIA "3" for ALBANY, NEW YORK "4" for DENVER, COLORADO
cols.	12-24		BLANK
cols.	25-39		STATION IDENTIFICATION
	cols. 25-39		Latitude, Longitude, Sequential #
	cols. 32-39		Downstream order #
cols.	40-49		BLANK
col	50		ANALYSIS APPROVAL
		#	code 'A' - The analysis has been approved 'D' - Same as 'A' except that <u>all</u> determinations will be passed to program A533 regardless of whether any of the values have been previously entered into the WRD QW data files.

For the 'A' option (default), the only determinations passed to A533 will be (1) values that have not been previously entered into the WRD QW data file, and (2) all calculated values with one exception. Dissolved Solids values in Tons/Day will not be passed to A533 if the values have been previously entered into the WRD QW files.

col.	51		DATA OUTPUT DISPOSITION
		+	'D' - Punch QW data cards and enter data into the National QW file.
		+	'C' - Punch QW data cards only. Data not to be placed into the National QW file.
			'X' - Data not to be punched or entered into the National File.
		#	' ' - If the entry is left blank, the disposition request entered on the LOG-INV #1 card will remain in effect.
			Any other non-blank character will cause the data to be transferred to the National QW Data File. In this case, the QW data cards will not be punched.
cols.	52-64		BLANK
cols.	65-70	*	LAB ANALYSIS RECORD NUMBER
cols.	71-72		Station i.d. update request. If i.d. is coded in columns 71-72, the station i.d. entered in cols. 25-39 will be used to update the station i.d. stored in the analysis Data File.
cols.	73-80		BLANK

*Indicates the entry is mandatory.

#Default option if left blank.

+If you request these options and your terminal is not equipped with a card punch, then (1) make arrangements with production control in Reston to mail the cards to you, and (2) immediately following your job card insert a "route punch" card.

Step 2

This program prepares 2 temporary data files and sets condition codes that determine if the following programs will be executed. The two data files are:

U File -- for analyses to be retrieved by the District, and

A File -- for analyses to be deactivated and possibly passed into the WRD QW file.

Step 3

This step uses the "U" file from step 2 to prepare analyses for prin. out.

Step 4

This program takes output from step 3 and performs quality-control checks and prints out the corresponding laboratory analytical printouts.

Step 4A

Step 4A is program G316, and is an interface between the Central Laboratory programs and the Station Header Record. If WRD QW-file was requested step4A will be activated. If a station header record exists for that station then the information in the Station Header Record will overlay the heading information in the Central Laboratory file. If no station header record exists for that station, then an attempt will be made to establish one from the information furnished on the Log-Inv Information form (cards 1 and 2), and the results of that attempt will be printed. If the attempt was not successful you will also receive an error message from program A533 (step 6) where an attempt is made to transfer the data.

Step 5

This program takes output from the "A" file in step 2 and

(1) Prints the "A" card listing and disposition.

(2) Prepares input for entry in the WRD QW file if the file disposition was indicated as such on the log-in sheet.

(3) Generates data cards if that option was requested.

Step 6

This program (A533) inputs completed analyses into the WRD QW file if the data was not established as Type "X". The input will be in ascending order as output from step4 and step5. If the data fails to enter the WRD QW file because of insufficient station heading information a message so indicating will be generated. The Station Header file must be updated and an "A" card repassed through this series of programs. The "A" card has to be prepared as originally documented.

Step 7

This program prepares a biological printout if biological parameters are included in the analysis and likewise will be generated in an ascending order as output from steps 4, 5, and 6.

YOU HAVE REQUESTED A RETRIEVAL FOR REMOTE # 0 DISTRICT BILLING CODE:R8
***YOU WILL NOW RECEIVE THE OUTPUT FOR THAT REMOTE OR DISTRICT, IF ANY.
***PLEASE, IF THIS IS NOT YOUR DATA, MAIL THE OUPUT TO THE CORRECT OFFICE AND WE WILL FORGIVE YOU FOR THIS ERROR.

***IF THE MESSAGE, UPDATE INCLUDED ON PREVIOUSLY APPROVED ANALYSIS, APPEARS TO THE RIGHT OF BELOW STATEMENTS THEN AN UPDATE TO THE
***ANALYSIS HAS BEEN MADE AS YOU REQUESTED. IF YOU CREATED A U CARD FOR AN ANALYSIS THAT IS NOT COMPLETED THEN YOU WILL NOT GET THAT
***ANALYSIS, HOWEVER ANY COMPLETED ANALYSES MAY BE RETRIEVED AS MANY TIMES AS YOU WANT WITH THE U CARD OPTION. ANY U CARD THAT YOU
***CREATE WILL NOT GENERATE PASSAGE OF THAT DATA INTO THE WRD OW FILE, ONLY CREATING AN A CARD WILL ACCOMPLISH THIS.
***A NEW RETRIEVAL OPTION IS AVAILABLE, PUT A D IN COLUMN 10 ON THE R CARD AND YOUR 2 DIGIT BILLING CODE IN COLS, 11-12.
***THIS WILL RESULT IN A RETRIEVAL BY DISTRICT BILLING CODE, IF THE REMOTE # IS NOT KNOWN BY THE CENTRAL LAB.

SINCE YOUR LAST RETRIEVAL,THERE ARE NO NEW ANALYSES IN THE CENTRAL LAB DATA FILE FOR YOU TO RETRIEVE--TRY AGAIN LATER

STEP 1 PROCESSING COMPLETE--PROCESSING TERMINATED

Since the last retrieval, none of the labs have loaded data for that district into the file.

```
 9.52.20 JOB 7365 IEF452I AG417013 JOB NOT RUN-JCL ERROR
 9.52.20 JOB 7365 FLUSHED JCL ERROR


--- HASP-II JOB STATISTICS ----

      10 CARDS READ

      10 SYSOUT PRINT RECORDS

       0 SYSOUT PUNCH RECORDS

    0.03 MINUTES EXECUTION TIME

--- HASP-II JOB STATISTICS ----

      10 CARDS READ

      10 SYSOUT PRINT RECORDS

       0 SYSOUT PUNCH RECORDS

    0.03 MINUTES EXECUTION TIME

AG417013 JOB (469198600,A533,5,15,400),' R E GUST ',CLASS=B          J 7 365
*KEY          ****                                                  D-RET
*PROCLIB  WRD.PROCLIB                                               D-RET
  EXEC  LABPRIN
*6121 PROCEDURE NOT FOUND
STEP1.SYSIN DD                                                      D-RET  4
                                                                    D-RET  6
```

This is what is received if something happens to the cataloged procedure.

```
YOU HAVE REQUESTED A RETRIEVAL FOR REMOTE #  222 DISTRICT BILLING CODE:RG
***YOU WILL NOW RECEIVE THE OUTPUT FOR THAT REMOTE ON DISTRICT. IF ANY.
***PLEASE, IF THIS IS NOT YOUR DATA, MAIL THE OUPUT TO THE CORRECT OFFICE AND WE WILL FORGIVE YOU FOR THIS ERROR.

***IF THE MESSAGE, UPDATE INCLUDED ON PREVIOUSLY APPROVED ANALYSIS, APPEARS TO THE RIGHT OF BELOW STATEMENTS THEN AN UPDATE TO THE
***ANALYSIS HAS BEEN MADE AS YOU REQUESTED. IF YOU CREATED A U CARD FOR AN ANALYSIS THAT IS NOT COMPLETED THEN YOU WILL NOT GET THAT
***ANALYSIS, HOWEVER ANY COMPLETED ANALYSES MAY BE RETRIEVED AS MANY TIMES AS YOU WANT WITH THE U CARD OPTION. ANY U CARD THAT YOU
***CREATE WILL NOT GENERATE PASSAGE OF THAT DATA INTO THE ARO ON FILE, ONLY CREATING AN A CARD WILL ACCOMPLISH THIS.
***A NEW RETRIEVAL OPTION IS AVAILABLE. PUT A D IN COLUMN 10 ON THE R CARD AND YOUR 2 DIGIT BILLING CODE IN COLS. 11-12.
***THIS WILL RESULT IN A RETRIEVAL BY DISTRICT BILLING CODE, IF THE REMOTE # IS NOT KNOWN BY THE CENTRAL LAB.

UUU-YOU HAVE SUBMITTED THIS U CARD--U161155 722 ——— NOTE                                                    17454
UUU-YOU HAVE SUBMITTED THIS U CARD--U133733 724                                                           14121
UUU-YOU HAVE SUBMITTED THIS U CARD--U141732 724                                                           15978
AAA-YOU HAVE SUBMITTED THIS A CARD--A133733   4                                                        14121
UUU-YOU HAVE SUBMITTED THIS U CARD--U161155 724                                                           17454
AAA-YOU HAVE SUBMITTED THIS A CARD--A141732   4                                                        15978
AAA-YOU HAVE SUBMITTED THIS A CARD--A161155 724SR          15667134760610133U X   42.47                  17554
-------------------------------------------------------------------------------------------------------------
ANALYSIS FOR LAB ID--133733 RECORD #-- 14121 PERFORMED BY LAB #--1 WILL BE PULLED,UPDATE INCLUDED ON PREVIOUSLY APPROVED ANALYSIS
ANALYSIS FOR LAB ID-- 83711 RECORD #-- 4898 PERFORMED BY LAB #--1 WILL BE PULLED,UPDATE INCLUDED ON PREVIOUSLY APPROVED ANALYSIS
```

These two were put in by the labs.

```
STEP 1 PROCESSING COMPLETE--TURN THE PAGE FOR FURTHER OUTPUT
```

The cards submitted will appear here.

This is what is received if everything goes well.

SAMPLE ID & REC# DO NOT MATCH ON LAMID 161155 REC. # 17954

STEP 2 PROCESSING COMPLETE--TURN THE PAGE FOR FURTHER OUTPUT

The numbers actually match. The sample was pointed to the wrong file.
Lab 2 should have been lab 4.

STEP 3. THE DISTRICT A579AU PROGRAM WITH THE U OPTION HAS BEEN EXECUTED - DATE 760928 ANY ERROR MESSAGES WILL FOLLOW

THE EXECUTION OF THE DISTRICT A579AU PROGRAM HAS BEEN TERMINATED DUE TO A NORMAL COMPLETION

COMPLETION CODE = 0 STEP 3 PROCESSING COMPLETE--TURN THE PAGE FOR FURTHER OUTPUT

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CENTRAL LABORATORY, DENVER, COLORADO

WATER QUALITY ANALYSIS
LAB ID # 161155 RECORD # 17954

SAMPLE LOCATION: EARLS CREEK
STATION ID: 15067134 LAT.LONG.SEQ.:
DATE OF COLLECTION: BEGIN--760610 END-- TIME--1330
STATE CODE: 49 COUNTY CODE: 050 PROJECT IDENTIFICATION:
DATA TYPE: 2 SOURCE: SURFACE WATER GEOLOGIC UNIT:
COMMENTS:

MAIL TO CENTRAL LAB
SCHEDULES USED: 54 0 0 0
NUMBER OF DETERMINATIONS: 14 NCODE = 0
COST OF ANALYSIS $ 42.47 BILLING CODE: 59
SUBMIT CORRECTIONS TO THE DENVER CENTRAL LAB WITHIN 15 DAYS FROM 09/28/76. INDICATE THE CENTRAL LAB ID # AND RECORD # WITH RESPONSE.
WRD-QW FILE STORAGE WAS NOT REQUESTED FOR THIS ANALYSIS. THE ANALYSIS WILL REMAIN IN THE CENTRAL LAB FILE ONLY.

ALK.TOT (AS CACO3)	MG/L	21	POTASSIUM DISS	MG/L	12
BICARBONATE	MG/L	25	RESIDUE DIS CALC SUM	MG/L	383
BORON DISSOLVED	UG/L	190	RESIDUE DIS TON/AFT		0.53
CALCIUM DISS	MG/L	46	RESIDUE DIS 180C	MG/L	393
CHLORIDE DISS	MG/L	120	SAR		0.8
FLUORIDE DISS	MG/L	2.4	SILICA DISSOLVED	MG/L	7.8
HARDNESS NONCARB	MG/L	210	SODIUM DISS	MG/L	28
HARDNESS TOTAL	MG/L	230	SODIUM PERCENT		20
MAGNESIUM DISS	MG/L	28	SP. CONDUCTANCE LAB		681
NO2+NO3 AS N DISS	MG/L	1.2	STRONTIUM DISSOLVED	UG/L	670
			SULFATE DISS	MG/L	100

CATIONS	(MG/L)	(MEQ/L)	ANIONS	(MG/L)	(MEQ/L)
CALCIUM DISS	46	2.296	BICARBONATE	25	0.410
MAGNESIUM DISS	28	2.304	CHLORIDE DISS	120	3.386
POTASSIUM DISS	12	0.307	FLUORIDE DISS	2.4	0.127
SODIUM DISS	28	1.218	SULFATE DISS	100	2.082
			NO2+NO3 AS N D	1.2	0.086
TOTAL		6.124	TOTAL		6.089

PERCENT DIFFERENCE = 0.28

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CENTRAL LABORATORY: DENVER, COLORADO

WATER QUALITY ANALYSIS
LAB ID # 196049 RECORD # 21190

SAMPLE LOCATION: SULPHUR SPRINGS DOTY MTN
STATION ID: 412934107332401 LAT.LONG.SEQ.: 412934 1073324 01
DATE OF COLLECTION: BEGIN--760622 END-- TIME--1850
STATE CODE: 56 COUNTY CODE: 007 PROJECT IDENTIFICATION: 944001375
DATA TYPE: 2 SOURCE: SPRING GEOLOGIC UNIT:
COMMENTS:
76HSW-261 POOL BY ROAD...100 FT SOUTH

MAIL TO J.K.FELMLEE MS916
SCHEDULES USED: 466 471 0 0
NUMBER OF DETERMINATIONS: 5 HCODE = 17
COST OF ANALYSIS $ 71.93 BILLING CODE: AW
SUBMIT CORRECTIONS TO THE DENVER CENTRAL LAB WITHIN 15 DAYS FROM 11/01/76. INDICATE THE CENTRAL LAB ID # AND RECORD # WITH RESPONSE.
WRD-QW FILE STORAGE REQUESTED. THE NEXT STEP IS THE HEADER INPUT PROGRAM 0316 WHICH WILL TRY TO ESTABLISH THIS STATION IN THE HEADER FILE.

PH FIELD		7.1	SP. CONDUCTANCE FLD	1560
RA-226 BY RN	PCI/L	0.36	U.DIS.EXT.FLUOR-UG/L UG/L	0.07
			WATER TEMP (DEG C)	10.0

***** THE HEADER INPUT PROGRAM G316 WILL IMMEDIATELY FOLLOW. ****

ANALYSES IN THIS STEP THAT HAD THIS MESSAGE.
"WRD-QW FILE STORAGE REQUESTED. THE NEXT STEP IS
THE HEADER INPUT PROGRAM G316 WHICH WILL TRY
TO ESTABLISH THIS STATION IN THE HEADER FILE."
PRINTED AS THE LAST 3 LINES ON THE TOP RIGHT HAND SIDE
OF THE PRINTOUT WILL TRY TO BE ESTABLISHED IN THE
STATION HEADER FILE.

***** PLEASE CHECK TO SEE THAT ALL RECORDS WERE ESTABLISHED *****
***** IF NOT. CREATE THE NECESSARY INPUT FOR G316 AND RUN *****
***** PROGRAM G316 DIRECTLY. *****

STEP4 - THE PRINT-OUT OF LABORATORY ANALYTICAL SHEETS IS COMPLETE. ADDITIONAL DATA FOLLOWS.

UPDATE HEADER RECORD

NOV 01, 1976

AGENCY CODE	STATION IDENTIFICATION NUMBER	STATION LOCATOR LAT-ITUDE	LONG-ITUDE	SEQ NUM.	STATE CODE	DISTRICT CODE	COUNTY CODE	SITE CODES #1 #2 #3	HYDROLOGIC UNIT CODE	DRAINAGE AREA	CONTRIB. DRAINAGE AREA
USGS	412934107332401	412934	1073324	01	56	AW	007	SP			

STATION NAME OR LOCAL WELL NUMBER	GEOLOGIC UNIT CODE	WELL DEPTH	AQUIFER TYPE	DATUM	PASSWORDS UPD	PASSWORDS RTV	INTERNAL USE TDQPUMLER
SULPHUR SPRINGS DOTY MTN					NULL	NULL	100C01000

NEW HEADER RECORD

AGENCY CODE	STATION IDENTIFICATION NUMBER	STATION LOCATOR LAT-ITUDE	LONG-ITUDE	SEQ NUM.	STATE CODE	DISTRICT CODE	COUNTY CODE	SITE CODES #1 #2 #3	HYDROLOGIC UNIT CODE	DRAINAGE AREA	CONTRIB. DRAINAGE AREA
USGS	412934107332401	412934	1073324	01	56	AW	007	SP			

STATION NAME OR LOCAL WELL NUMBER	GEOLOGIC UNIT CODE	WELL DEPTH	AQUIFER TYPE	DATUM	PASSWORDS UPD	PASSWORDS RTV	INTERNAL USE TDQPUMLER
SULPHUR SPRINGS DOTY MTN					NULL	NULL	100001100

```
STEP 5. THE DISTRICT A579AU PROGRAM WITH THE A OPTION HAS BEEN EXECUTED - DATE 76092B A CARD DOCUMENTATION FOLLOWS

FOLLOWING ACCOUNT CARD PROCESSED - A133733 724                                    14121
STATION ID:      15234567 DATE OF COLLECTION:760512 TIME:     BILLING CODE:SR  U
DATA WAS WRITTEN INTO A TEMPORARY WATER QUALITY FILE          . TOTAL NO. LAB CODES IN BASIC DATA RECORD   2
                                                              NO. OF PARAMETERS WRITTEN INTO TEMP. FILE   2

FOLLOWING ACCOUNT CARD PROCESSED - A141732 724                                    15978
STATION ID:141732          DATE OF COLLECTION:760507 TIME:1045 BILLING CODE:78  U
DATA WAS WRITTEN INTO A TEMPORARY QW CARD FILE                . TOTAL NO. LAB CODES IN BASIC DATA RECORD  28
                                                              NO. OF PARAMETERS WRITTEN INTO TEMP. FILE  25

FOLLOWING ACCOUNT CARD PROCESSED - A1o1155 724SR              15067134760610133OU4  42.47  17954
STATION ID:      15067134 DATE OF COLLECTION:760o10 TIME:133U BILLING CODE:SR
                          "X" TYPE DATA

FOLLOWING ACCOUNT CARD PROCESSED - A133733 721                                    14121
STATION ID:      15234567 DATE OF COLLECTION:760512 TIME:     BILLING CODE:SR
DATA WAS WRITTEN INTO A TEMPORARY WATER QUALITY FILE          . TOTAL NO. LAB CODES IN BASIC DATA RECORD   2
                                                              NO. OF PARAMETERS WRITTEN INTO TEMP. FILE   0

########################## CAUTION  THE PREVIOUS DATA TRANSFER REQUEST MAY BE IN ERROR  ##########################

FOLLOWING ACCOUNT CARD PROCESSED - A 83711 721                                    4898
STATION ID:      14679392 DATE OF COLLECTION:760323 TIME:1330 BILLING CODE:SR

THE EXECUTION OF THE DISTRICT A579AU PROGRAM HAS BEEN TERMINATED DUE TO A NORMAL COMPLETION

COMPLETION CODE =      2 STEP 5 PROCESSING COMPLETE--TURN THE PAGE FOR FURTHER OUTPUT
```

This sample may have been transferred before and was loaded again with no new information; check if it is there, if not submit an "A" card for this sample with the next run.

STATION NO. 15234567 HAS NO VALID HEADER RECORD.

THE FOLLOWING ANALYSES WERE NOT STORED AND MUST BE REPROCESSED:

2 760512

Check and update the header record.

**** DISTRICT RETRIEVAL FILE HAS BEEN UPDATED ON THIS DATE--761019 ****

DISTRICT RET.FILE NUMBER	CEN.LAB SAMPLE ID NUMBER	CEN.LAB RECORD NUMBER	LABORATORY 1=SLC,2=ATL 3=ALB,4=DEN	ANALYSIS ROUTED TO REMOTE #	STATION IDENTIFICATION	DATE OF COLL.	TIME	DISTRICT BILLING CODE
3682	246122	31521	4	155	3926111111110401	760818	1230	49
3683	246123	31524	4	155	3940121104958O1	760804	1015	49
3684	246124	31527	4	155	3943341104032O1	760722	1000	49
3685	246125	31529	4	155	3942341103218O1	760715	0830	49
3686	252154	32380	4	155	10224000	760901	1600	49
3687	230092	27430	4	21	470608122020501	760721	1630	53
3688	230101	27449	4	21	12205310	760729	1900	53
3689	241098	29796	4	21	12510500	760820		53
3690	246033	31336	4	21	12121600	760804	1100	53
3691	246034	31338	4	21	12112610	760803	1245	53
3692	246036	31342	4	21	12447305	760811	0900	53
3693	246038	31346	4	21	12472900	760809	1430	53
3694	246050	31370	4	21	12113340	760818	1215	53
3695	252024	32098	4	21	12398600	760901	1115	53
3696	252025	32100	4	21	12400520	760831	1030	53
3697	252141	32344	4	21	482546122314901	760817	1400	53
3698	196042	21174	4	18	4447481055654O1	760708	1200	56
3699	196043	21176	4	18	4434121051345O1	760705	1700	56
3700	196044	21178	4	18	4417001052932O1	760706	1600	56
3701	196045	21180	4	18	4416151053000O1	760706	1200	56
3702	197031	21400	4	18	4427001053420O1	760710	1100	56
3703	233041	27938	4	18	09217000	760818	1130	56
3704	238069	29055	4	18	4212581101004O1	760820	1045	56
3705	240012	29225	4	18	4339391104256O1	760822	1330	56
3706	240013	29227	4	18	4339321104308O1	760822	1200	56

This is what the labs receive when they load data into the Labprim. file.

DATE OF THIS REPORT = 761027. THE NEXT AVAILABLE REGION IN THE DISTRICT RETRIEVAL FILE = 5154
***PLEASE NOTE YOU ARE DEACTIVATING THE FOLLOWING ANALYSES THAT HAVE BEEN RETRIEVED. PLEASE SAVE THIS OUTPUT FOR FUTURE REFERENCE AND YOU CAN USE THIS LIST AS A THROWAWAY LIST 2 WEEKS FROM TODAY

RET.FILE #	SAMPLE ID	CEN.LAB REC.#	LAB #	REMOTE #	BILLING CODE
3680	246120	31515	4	155	49
3681	246121	31518	4	155	49
3682	246122	31521	4	155	49
3683	246123	31524	4	155	49
3684	246124	31527	4	155	49
3685	246125	31529	4	155	49
3686	252154	32380	4	155	49
3687	230092	27430	4	21	53
3688	230101	27449	4	21	53
3689	241098	29796	4	21	53
3690	246033	31336	4	21	53
3691	246034	31338	4	21	53
3692	246036	31342	4	21	53
3693	246038	31346	4	21	53
3694	246050	31370	4	21	53
3695	252024	32098	4	21	53
3696	252025	32100	4	21	53
3697	252141	32344	4	21	53
3698	196042	21174	4	18	56
3699	196043	21176	4	18	56
3700	196044	21178	4	18	56
3701	196045	21180	4	18	56
3702	197031	21400	4	18	56
3703	233041	27938	4	18	56
3704	238069	29055	4	18	56
3705	240012	29225	4	18	56
3706	240013	29227	4	18	56
3707	240014	29229	4	18	56
3708	240016	29233	4	18	56
3709	240017	29235	4	18	56
3710	240018	29237	4	18	56
3711	240019	29239	4	18	56
3712	240024	29249	4	18	56
3713	240029	29259	4	18	56
3714	240030	29261	4	18	56
3715	241112	29827	4	18	56
3716	243014	30050	4	18	56
3717	243076	30179	4	18	56
3718	247192	31249	4	18	56
3719	247193	31251	4	18	56
3720	247194	31253	4	18	56
3721	247195	31255	4	18	56
3722	247196	31257	4	18	56
3723	247197	31259	4	18	56
3724	247198	31261	4	18	56
3725	247199	31263	4	18	56
3726	247200	31265	4	18	56
3727	248099	31961	4	18	56
3728	248100	31963	4	18	56

They also receive this report that tells the labs who has retrieved their data and which samples have been deactivated.

Note: The laboratories do not load new data on the first working day of each week. This is because if there were any problems in processing over the weekend, a new retrieval may be made using night priority to receive the same data.

3. LABWEEK

"LABWEEK" provides for the retrieval of weekly laboratory log-in data. The information in this report is for samples logged in by the laboratories during the previous week and is loaded into this retrieval file Tuesday afternoons or Wednesdays. Retrieval of these data may be made as many times as desired anytime thereafter until the new data is loaded on the following week. The JCL necessary to execute this procedure is shown here.

```
1  /*RELAY  PUNCH  RE2
2  //JØBCRDLW  JØB  (YØUR  JØB  CARD  GØES  HERE)
3  /*PRØCLIB  WRD.PRØCLIB
4  //  EXEC  LAB·WEEK
5  //STEP1.SYSIN  DD  *
6           XX                (LABWEEK  DATA  CARD)
7  /*
8  //
9  $$$
10
11    XX = YØUR  LAB  BILLING/DISTRICT  CØDE
12
```

The following are some of the most common errors you may run into.

```
N16.07.43 JOB 8954 IEF452I AG4170DT JOB NOT RUN-JCL ERROR
$16.07.44 JOB 8954 FLUSHED JCL ERROR

---- HASP-II JOB STATISTICS ----

       10 CARDS READ

       10 SYSOUT PRINT RECORDS

        0 SYSOUT PUNCH RECORDS

     0.09MINUTES ELAPSED   TIME

---- HASP-II JOB STATISTICS ----

       10 CARDS READ

       10 SYSOUT PRINT RECORDS

        0 SYSOUT PUNCH RECORDS

     0.09MINUTES ELAPSED   TIME
```

This is what is received when something happens to the cataloged procedure.

```
//AG4170DT JOB (469198600,A579,$$$$$),' R E GUST ',CLASS=B                J 8
***PROCLIB  WRD.PROCLIB                                                    DT
//   EXEC  LABWEAK                                                         DT
IEF612I PROCEDURE NOT FOUND
*** DATA CARD FORMAT ==> BILLING CODES IN COL'S 8-9 11-12 14-15 17-18 20-21
//STEP1.SYSIN DD *                                                        DT
//                                                                        DT
```

YOU REQUESTED AN INFORMATION REPORT ABOUT SAMPLES LOGGED IN FOR DISTRICT BILLING CODE(S) RG

PLEASE NOTE -- IT IS NO LONGER REQUIRED TO SPECIFY THE MONTH & MONDAY FOR THIS RETRIEVAL. AN INTERNAL CHECK IS MADE TO ENSURE THAT THE RETRIEVED DATA IS ALL FOR THE SAME PERIOD, AND YOU WILL GET THE LATEST INFORMATION THAT ALL LABORATORIES HAVE LOADED. THE ONLY INFORMATION REQUIRED ON YOUR "LABWEEK" DATA CARD IS YOUR 2 DIGIT BILLING CODE IN COLUMNS 8 & 9.

THIS IS NEW -> SHOULD YOU DESIRE TO RETRIEVE DATA FOR MORE THAN ONE DISTRICT IN A SINGLE RUN, THEN PLACE THE APPROPRIATE DISTRICT BILLING CODE(S) IN COLUMNS 11-12, 14-15, 17-18, 20-21, 23-24, 26-27. THIS PROVIDES THE CAPABILITY TO RETRIEVE DATA FOR FROM ONE TO SEVEN DISTRICTS. IF YOU USE THIS OPTION YOU WILL HOWEVER ONLY RECEIVE DATA FOR THOSE DISTRICTS FOR WHICH DATA WAS ENTERED - NO ERROR MESSAGE WILL APPEAR AS LONG AS THERE IS DATA FOR AT LEAST ONE DISTRICT.

WOOPS -- IF THE TIME OF THIS RETRIEVAL WAS NOT BETWEEN WEDNESDAY NIGHT AND MONDAY NIGHT - RERUN DURING THAT TIME PERIOD BECOUSE THE LABORATORIES LOAD NEW DATA ON TUESDAYS (DAY OR NIGHT) AND/OR WEDNESDAY.
IF THE TIME PERIOD IS OK THEN CALL RUBEN GUST IN DENVER ON FTS 234-4992 AND GIVE HIM THIS INFORMATION:
ATLANTA DATA = 102
ALBANY DATA = 103
DENVER DATA = 103

RUBEN WILL DISCUSS THE PROBLEM WITH YOU AND TAKE CORRECTIVE ACTION.

The three labs have not loaded for the same time period.

YOU REQUESTED AN INFORMATION REPORT ABOUT SAMPLES LOGGED IN FOR DISTRICT BILLING CODE(S) 86

PLEASE NOTE -- IT IS NO LONGER REQUIRED TO SPECIFY THE MONTH & MONDAY FOR THIS RETRIEVAL. AN INTERNAL CHECK IS MADE TO ENSURE THAT THE RETRIEVED DATA IS ALL FOR THE SAME PERIOD, AND YOU WILL GET THE LATEST INFORMATION THAT ALL LABORATORIES HAVE LOADED. THE ONLY INFORMATION REQUIRED ON YOUR "LAB#EEK" DATA CARD IS YOUR 2 DIGIT BILLING CODE IN COLUMNS 8 & 9.

THIS IS NEW -> SHOULD YOU DESIRE TO RETRIEVE DATA FOR MORE THAN ONE DISTRICT IN A SINGLE RUN, THEN PLACE THE APPROPRIATE DISTRICT BILLING CODE(S) IN COLUMNS 11-12, 14-15, 17-18, 20-21, 23-24, 26-27.
THIS PROVIDES THE CAPABILITY TO RETRIEVE DATA FOR FROM ONE TO SEVEN DISTRICTS. IF YOU USE THIS OPTION YOU WILL HOWEVER ONLY RECEIVE DATA FOR THOSE DISTRICTS FOR WHICH DATA WAS ENTERED - NO ERROR MESSAGE WILL APPEAR AS LONG AS THERE IS DATA FOR AT LEAST ONE DISTRICT.

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

THERE WAS NO DATA LOGGED IN LAST WEEK FOR YOUR BILLING CODE. NO FURTHER EXECUTION OF THESE PROGRAMS WAS PERFORMED.
TRY AGAIN NEXT WEEK. HAVE A GOOD DAY.

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

This is received if everything goes well.

YOU REQUESTED AN INFORMATION REPORT ABOUT SAMPLES LOGGED IN FOR DISTRICT BILLING CODE(S) 01

PLEASE NOTE -- IT IS NO LONGER REQUIRED TO SPECIFY THE MONTH & MONDAY FOR THIS RETRIEVAL. AN INTERNAL CHECK IS MADE TO ENSURE THAT THE RETRIEVED DATA IS ALL FOR THE SAME PERIOD, AND YOU WILL GET THE LATEST INFORMATION THAT ALL LABORATORIES HAVE LOADED. THE ONLY INFORMATION REQUIRED ON YOUR "LABWEEK" DATA CARD IS YOUR 2 DIGIT BILLING CODE IN COLUMNS 8 & 9.

THIS IS NEW -> SHOULD YOU DESIRE TO RETRIEVE DATA FOR MORE THAN ONE DISTRICT IN A SINGLE RUN, THEN PLACE THE APPROPRIATE DISTRICT BILLING CODE(S) IN COLUMNS 11-12, 14-15, 17-18, 20-21, 23-24, 26-27.
THIS PROVIDES THE CAPABILITY TO RETRIEVE DATA FOR FROM ONE TO SEVEN DISTRICTS. IF YOU USE THIS OPTION YOU WILL HOWEVER ONLY RECEIVE DATA FOR THOSE DISTRICTS FOR WHICH DATA WAS ENTERED - NO ERROR MESSAGE WILL APPEAR AS LONG AS THERE IS DATA FOR AT LEAST ONE DISTRICT.

**** DISTRICT 01 **** ** LOG-INV INFORMATION REPORT ** DATED 10/20/76.
THIS REPORT PROVIDES INFORMATION ON WORK BEING PERFORMED IN THE CENTRAL LABORATORY. THE PURPOSE OF THIS REPORT IS TO PROVIDE YOU WITH LOG-INV INFORMATION ON SAMPLES SUBMITTED FOR ANALYSIS. CHECK FOR CORRECT STATION ID, SAMPLE DATE, TIME, COST, AND IF RESULTS ARE TO BE ENTERED INTO THE WRD QW FILE. YOU MAY ALSO USE THIS AS AN AID IN FORECASTING HOW MUCH MONEY YOU ARE SPENDING AT YOUR FRIENDLY LAB. SHOULD YOU WISH TO MAKE CHANGES CONTACT THE INPUT_LAB. PLEASE IDENTIFY YOUR REQUEST WITH THE SAMPLE_ID AND RECORD_#.
NOTE: THE DATA FOR THIS REPORT WAS SUBMITTED IN THE THIRD WEEK OF OCTOBER.

SAMPLE ID	RECORD #	PROJECT CODE	STATION ID	SAMPLE DATE	TIME	ANALYSIS COST	WRD QW FILE	SCHEDULES YOU REQUESTED				INPUT_LAB
287004	24656	BENCHMARK	02450250	761007	1050	44.00	YES	304	305	0	0	* ATLANTA LAB *
288098	39688	BENCHMARK	02450250	761007	1050	2.59	YES	473	0	0	0	-- DENVER LAB ---
287004	24656	BENCHMARQ	02450250	761007	1050	117.93	YES	304	305	0	0	* ATLANTA LAB *
288098	39688	BENCHMARR	02450250	761007	1050	142.83	YES	473	0	0	0	-- DENVER LAB ---
287004	24656	03-8	02450250	761007	1050	0.00	YES	304	305	0	0	* ATLANTA LAB *
288098	39688	03B	02450250	761007	1050	0.00	YES	473	0	0	0	-- DENVER LAB ---

*** TOTAL AMOUNT OF WORK FORECAST TO BE PERFORMED FOR YOUR OFFICE FOR THE SAMPLES LISTED = $ 0.00
***** TOTAL TO BE CHARGED TO FEDERAL ACCOUNT = $ 307.35

SUMMARY OF PROJECT INFORMATION FOR DISTRICT 01. THIS INFORMATION WAS OBTAINED FROM PROJECT CODES SUPPLIED ON THE LOG-INV SHEET.

PROJECT #	$ WORK TO BE DONE	PROJECT #	$ WORK TO BE DONE	PROJECT #	$ WORK TO BE DONE	PROJECT #	$ WORK TO BE DONE
BENCHMRKM	46.59						
BENCHMRKQ	117.93						
BENCHMRKR	142.83						
03-B	0.00						
03B	0.00						

DATE OF THIS RUN WAS 10/22/76

NUMBER OF SAMPLES LOGGED IN LAST WEEK = 2

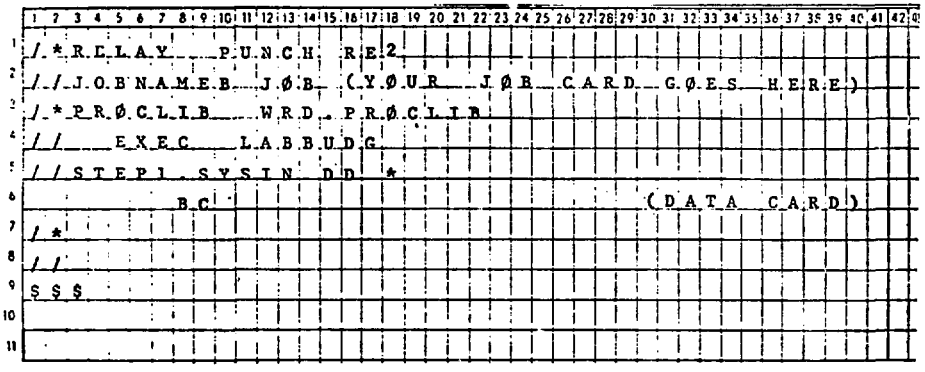
TOTAL MONEY FORECAST FOR DISTRICT WORK = $ 0.00

TOTAL MONEY FORECAST FOR FEDERAL ACCT = $ 307.35

TOTAL MONIES FOR WORK LOGGED IN - - - = $ 307.35

4. LABBUDG

"LABBUDG" PROVIDES FOR RETRIEVAL OF THE CENTRAL LABORATORY MONTHLY BUDGET DATA AND THIS CATALOGED PROCEDURE MAY BE ACTIVATED BY THE FOLLOWING JCL



"LABBUDG" DATA CARD

The only entry required is your District billing code in columns 8 and 9. You may enter additional codes in columns 11 and 12, 14 and 15, 17 and 18, 20 and 21, 23 and 24, and/or 26 and 27, if you wish to retrieve data for more than one District.

Except for the last month of each fiscal year, the budget data is loaded on the second Tuesday of each month. This loading is reviewed by the laboratories, changed if necessary, and then journal vouchered. By the 15th, the data should be there. The time span for a retrieval may vary, but generally is between the 15th of the month and the 9th of the next month. If all laboratory data is present and no data for the requestor is found, then a message so indicating is printed.

The first program quizzes three data files that are established by the Central Laboratories and checks to see if each lab has entered data for the same period and if there is any data for the District(s) requested.

The second program sorts the data for the District(s) or special project(s) requested. It sorts first by account numbers, and then by ascending laboratory identification numbers. The second program and also the third program only execute if the first program found that each laboratory had loaded its data, and that there was some data for at least one of the Districts requested.

The third program prints out the individual sample cost documentation, a cost summary of accounts for the month, a cost summary of accounts to date for the fiscal year, and a cost breakdown of monies spent at each Central Laboratory.

YOU REQUESTED BUDGET RETRIEVAL FOR BILLING CODE(S) RG

TAKE NOTE ---> IT IS NO LONGER REQUIRED TO SPECIFY THE MONTH FOR THIS RETRIEVAL. AN INTERNAL CHECK IS MADE TO ENSURE THAT THE RETRIEVED DATA IS ALL FOR THE SAME MONTH. YOU WILL RECEIVE THE LATEST DATA THAT ALL LABORATORIES HAVE LOADED. THE ONLY INFORMATION REQUIRED ON YOUR "LABBUDG" CARD IS YOUR TWO DIGIT BILLING CODE IN COLUMNS 8 & 9. SHOULD YOU DESIRE TO RETRIEVE DATA FOR MORE THAN ONE DISTRICT IN A SINGLE RUN, THEN PLACE THE APPROPRIATE DISTRICT BILLING CODE(S) IN COLUMNS 11-12, 14-15, 17-18, 20-21, 23-24, 26-27. THIS PROVIDES THE CAPABILITY TO RETRIEVE DATA FOR FROM ONE TO SEVEN DISTRICTS. IF YOU USE THIS OPTION YOU WILL HOWEVER ONLY RECEIVE DATA FOR THOSE DISTRICTS FOR WHICH DATA WAS ENTERED - NO ERROR MESSAGE WILL APPEAR AS LONG AS THERE IS DATA FOR AT LEAST ONE DISTRICT.

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

THERE WAS NO DATA CHARGED TO YOUR DISTRICT(S) LAST MONTH. NO FURTHER EXECUTION OF THESE PROGRAMS WAS PERFORMED. IF THIS DOES NOT AGREE WITH YOUR RECORDS THEN CALL THE LABORATORY HANDLING YOUR BUDGET DATA FOR CLARIFICATION.

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

YOU REQUESTED BUDGET RETRIEVAL FOR BILLING CODE(S) 02 35

TAKE NOTE ---> IT IS NO LONGER REQUIRED TO SPECIFY THE MONTH FOR THIS RETRIEVAL. AN INTERNAL CHECK IS MADE TO ENSURE THAT THE RETRIEVED DATA IS ALL FOR THE SAME MONTH. YOU WILL RECEIVE THE LATEST DATA THAT ALL LABORATORIES HAVE LOADED. THE ONLY INFORMATION REQUIRED ON YOUR "LABBUDG" CARD IS YOUR TWO DIGIT BILLING CODE IN COLUMNS 8 & 9. SHOULD YOU DESIRE TO RETRIEVE DATA FOR MORE THAN ONE DISTRICT IN A SINGLE RUN, THEN PLACE THE APPROPRIATE DISTRICT BILLING CODE(S) IN COLUMNS 11-12, 14-15, 17-18, 20-21, 23-24, 26-27. THIS PROVIDES THE CAPABILITY TO RETRIEVE DATA FOR FROM ONE TO SEVEN DISTRICTS. IF YOU USE THIS OPTION YOU WILL HOWEVER ONLY RECEIVE DATA FOR THOSE DISTRICTS FOR WHICH DATA WAS ENTERED - NO ERROR MESSAGE WILL APPEAR AS LONG AS THERE IS DATA FOR AT LEAST ONE DISTRICT.

This is what is received if everything goes well

DISTRICT NO.02, ALASKA DATE OF THIS RETRIEVAL WAS 761102 MONTHLY ACCOUNTING DOCUMENTATION

THE FOLLOWING BREAKDOWN OF ANALYTICAL CHARGES ARE FOR ANALYSES ESTABLISHED AND/OR COMPLETED SINCE THE LAST REPORT.
THE COMPLETED ANALYSES MAY HAVE COST ADJUSTMENTS. IF YOU HAVE ANY QUESTIONS PLEASE CONTACT THE CENTRAL LABORATORY
WHO MADE THE ANALYSIS AND THEY WILL HANDLE ANY NECESSARY ADJUSTMENTS. MONTHLY REPORT FOR OCTOBER

SAMPLE ID	RECORD NUMBER	ACCOUNT #	STATION IDENTIFICATION	SAMPLE DATE	TIME	ANALYSIS COST	WRD QW FILE	SCHEDULES YOU REQUESTED				LABORATORY 1=QAS,2=ATL 3=ALB,4=DEN	**** REMARKS ****
275017	37103	NASQANMON	155b5447	760923	1800	51.77	YES	8	9	10	0	4	FEDERAL CHARGE
275018	37106	NASQANMON	15304000	760924	1900	50.47	YES	8	9	10	0	4	FEDERAL CHARGE
275044	22623	NASQANMON	15304000	760924	1900	35.96	YES	309	310	0	0	2	FEDERAL CHARGE
275045	22625	NASQANMON	155b5447	760923	1800	35.96	YES	309	310	0	0	2	FEDERAL CHARGE
276094	37450	NASQANMON	15304000	760929	1500	2.59	YES	473	0	0	0	4	FEDERAL CHARGE
278027	22842	NASQANMON	15896000	760928	1500	35.96	YES	309	0	0	0	2	FEDERAL CHARGE
281048	38093	NASQANMON	15896000	760928	1500	49.18	YES	8	9	0	0	4	FEDERAL CHARGE
275017	37103	NASQANQUA	155b5447	760923	1800	187.19	YES	8	9	10	0	4	FEDERAL CHARGE
275018	37106	NASQANQUA	15304000	760924	1900	187.19	YES	8	9	10	0	4	FEDERAL CHARGE
275044	22623	NASQANQUA	15304000	760924	1900	28.76	YES	309	310	0	0	2	FEDERAL CHARGE
275045	22625	NASQANQUA	155b5447	760923	1800	28.76	YES	309	310	0	0	2	FEDERAL CHARGE
276094	37450	NASQANRAD	15304000	760929	1500	129.89	YES	473	0	0	0	4	FEDERAL CHARGE
262065	34757	470200330	15087600	760904	1600	118.80	YES	171	170	180	0	4	LOGIN INITIAL COST
262066	34760	470200330	15101200	760831	1400	118.80	YES	171	180	170	0	4	LOGIN INITIAL COST
269046	36088	470200330	15086600	760803	1200	86.21	YES	180	170	0	0	4	LOGIN INITIAL COST
269047	36090	470200330	15106920	760818	1200	86.21	YES	170	180	0	0	4	LOGIN INITIAL COST
269048	36092	470200330	15085100	760804	0845	24.73	YES	170	0	0	0	4	LOGIN INITIAL COST
269049	36094	470200330	15106980	760818	1400	86.21	YES	180	170	0	0	4	LOGIN INITIAL COST
269050	36096	470200330	15083500	760806	0930	87.37	YES	180	170	0	0	4	LOGIN INITIAL COST
276088	37438	470200330	15101800	760912	1200	47.52	YES	171	0	0	0	4	LOGIN INITIAL COST
276089	37440	470200330	15108250	760827	1630	47.52	YES	171	0	0	0	4	LOGIN INITIAL COST
276091	37444	470200330	15108290	760829	1145	47.52	YES	171	0	0	0	4	LOGIN INITIAL COST
281086	38174	470200330	15085100	760804	0845	43.84	YES	180	0	0	0	4	LOGIN INITIAL COST
236035	28343	470200350	610115147302000	760814	1530	-7.91	----------					4	ADJUSTMENT IN COST
275017	37103	470200350	155b5447	760923	1800	0.00	YES	8	9	10	0	4	LOGIN INITIAL COST

SUMMARY OF ACCOUNT INFORMATION FOR DISTRICT NO.02, ALASKA MONTHLY REPORT FOR OCTOBER
THIS INFORMATION WAS OBTAINED FROM ACCOUNT NOS. YOU SUPPLIED ON THE LOG IN SHEET. DATE OF THIS RETRIEVAL WAS 761102

ACCOUNT #	$ WORK TO BE DONE	ACCOUNT #	$ WORK TO BE DONE	ACCOUNT #	$ WORK TO BE DONE	ACCOUNT #	$ WORK TO BE DONE
470200330	794.73						
470200350	-7.92						
470200370	170.89						
470205450	122.61						
470208050	2.18						
470209130	107.55						
470210020	2354.91						

YOUR GENERAL ACCOUNT--470200350 HAS BEEN CHARGED $ -7.92 WHICH INCLUDES ALL UNIDENTIFIED ACCOUNTS & EXTRA ACCOUNTS ABOVE 100

*THE FEDERAL ACCOUNT--469102700 HAS BEEN CHARGED $ 823.68 FOR WORK DONE ON FEDERAL STATIONS IN YOUR STATE

*** TOTAL AMOUNT OF WORK TO BE PERFORMED FOR YOUR OFFICE FOR THIS REPORT = $ 4,368.59

SUMMARY OF ACCOUNT INFORMATION FOR DISTRICT NO.02, ALASKA MONTHLY REPORT FOR OCTOBER
THIS FISCAL YEAR SUMMARY IS ONLY FOR VALID 9 DIGIT ACCOUNT NUMBERS. DATE OF THIS RETRIEVAL WAS 761102

ACCOUNT #	$ WORK TO BE DONE	ACCOUNT #	$ WORK TO BE DONE	ACCOUNT #	$ WORK TO BE DONE	ACCOUNT #	$ WORK TO BE DONE
470200350	-7.92						
470200330	794.73						
470200370	170.89						
470205450	122.61						
470208050	2.18						
470209130	107.55						
470210020	2354.91						

DISTRICT NO.35, NEW MEXICO DATE OF THIS RETRIEVAL WAS 761102 MONTHLY ACCOUNTING DOCUMENTATION

THE FOLLOWING BREAKDOWN OF ANALYTICAL CHARGES ARE FOR ANALYSES ESTABLISHED AND/OR COMPLETED SINCE THE LAST REPORT. THE COMPLETED ANALYSES MAY HAVE COST ADJUSTMENTS. IF YOU HAVE ANY QUESTIONS PLEASE CONTACT THE CENTRAL LABORATORY WHO MADE THE ANALYSIS AND THEY WILL HANDLE ANY NECESSARY ADJUSTMENTS. MONTHLY REPORT FOR OCTOBER

SAMPLE ID	RECORD NUMBER	ACCOUNT #	STATION IDENTIFICATION	SAMPLE DATE	TIME	ANALYSIS COST	WRD OW FILE	SCHEDULES YOU REQUESTED				LABORATORY 1=QAS,2=ATL 3=ALB,4=DEN	**** REMARKS ****
275034	37143		08361000	760925	1140	22.49	YES	199	0	0	0	4	LOGIN INITIAL COST
258079	33721	NASQANMON	08481500	760831	1802	43.87	YES	76	0	0	0	4	FEDERAL CHARGE
258081	33727	NASQANMON	08407500	760903	1315	43.87	YES	76	0	0	0	4	FEDERAL CHARGE
258118	18299	NASQANMON	08481500	760831	1802	30.47	YES	309	0	0	0	2	FEDERAL CHARGE
259067	18831	NASQANMON	08407500	760903	1315	30.47	YES	309	310	0	0	2	FEDERAL CHARGE
273011	36627	NASQANMON	09368000	760922	0940	43.87	YES	76	10	0	0	4	FEDERAL CHARGE
273052	22061	NASQANMON	09368000	760922	0940	30.47	YES	309	0	0	0	2	FEDERAL CHARGE
274045	37022	NASQANMON	09368000	760711		23.77	YES	72	0	0	0	4	FEDERAL CHARGE
274047	37026	NASQANMON	09368000	760701		23.77	YES	72	0	0	0	4	FEDERAL CHARGE
276010	37247	NASQANMON	08313000	760801		28.05	YES	72	0	0	0	4	FEDERAL CHARGE
279062	37655	NASQANMON	09368000	760629		28.05	YES	72	0	0	0	4	FEDERAL CHAR
279066	37663	NASQANMON	09368000	760601		28.05	YES	72	0	0	0	4	FEDERAL CHAR
280052	23528	NASQANMON	07227140	760929	1030	35.96	YES	309	0	0	0	2	FEDERAL CHAR
281010	38010	NASQANMON	07227140	760929	1030	51.77	YES	76	10	0	0	4	FEDERAL CHAR
258079	33721	NASQANQUA	08481500	760831	1802	2.19	YES	76	0	0	0	4	FEDERAL CHARGE
258081	33727	NASQANQUA	08407500	760903	1315	2.19	YES	76	0	0	0	4	FEDERAL CHARGE
259067	18831	NASQANQUA	08407500	760903	1315	24.38	YES	309	310	0	0	2	FEDERAL CHARGE
273011	36627	NASQANQUA	09368000	760922	0940	158.65	YES	76	10	0	0	4	FEDERAL CHARGE
281010	38010	NASQANQUA	07227140	760929	1030	187.19	YES	76	10	0	0	4	FEDERAL CHARGE
217005	24923	003	09355500	760727	1130	-15.83	----------					4	ADJUSTMENT IN COST
258079	33721	003	08481500	760831	1802	38.77	YES	76	0	0	0	4	LOGIN INITIAL COST
258080	33724	003	08405260	760901	0900	84.84	YES	76	0	0	0	4	LOGIN INITIAL COST
258081	33727	003	08407500	760903	1315	38.77	YES	76	0	0	0	4	LOGIN INITIAL COST
258082	33730	003	08396500	760901	1410	84.84	YES	76	0	0	0	4	LOGIN INITIAL COST
258118	18299	003	08481500	760831	1802	0.00	YES	309	0	0	0	2	LOGIN INITIAL COST

DISTRICT NO.35, NEW MEXICO DATE OF THIS RETRIEVAL WAS 761102 MONTHLY ACCOUNTING DOCUMENTATION
THE FOLLOWING BREAKDOWN OF ANALYTICAL CHARGES ARE FOR ANALYSES ESTABLISHED AND/OR COMPLETED SINCE THE LAST REPORT.
THE COMPLETED ANALYSES MAY HAVE COST ADJUSTMENTS. IF YOU HAVE ANY QUESTIONS PLEASE CONTACT THE CENTRAL LABORATORY
WHO MADE THE ANALYSIS AND THEY WILL HANDLE ANY NECESSARY ADJUSTMENTS. MONTHLY REPORT FOR OCTOBER

SAMPLE ID	RECORD NUMBER	ACCOUNT #	STATION IDENTIFICATION	SAMPLE DATE	TIME	ANALYSIS COST	WRD QW FILE	SCHEDULES YOU REQUESTED				LABORATORY 1=QAS,2=ATL 3=ALB,4=DEN	**** REMARKS ****
282005	38699	003	07226560	760928	1000	142.40	YES	474	0	0	0	4	LOGIN INITIAL COST
282076	38856	003	08486260	760716		2.96	YES	0	0	0	0	4	LOGIN INITIAL COST
282091	38895	003	352137103264001	760825	1150	31.98	YES	72	0	0	0	4	LOGIN INITIAL COST
282099	38911	003	07199600	760727	1240	31.98	YES	72	0	0	0	4	LOGIN INITIAL COST
282100	38913	003	07201420	760629	1535	31.98	YES	72	0	0	0	4	LOGIN INITIAL COST
282101	38915	003	08396500	760823		31.98	YES	72	0	0	0	4	LOGIN INITIAL COST
282102	38917	003	07202000	760727	1330	31.98	YES	72	0	0	0	4	LOGIN INITIAL COST
282103	38919	003	08396500	760820		31.98	YES	72	0	0	0	4	LOGIN INITIAL CC
282104	38921	003	08396500	760801		31.98	YES	72	0	0	0	4	LOGIN INITIAL CC
282105	38923	003	08405000	760801		31.98	YES	72	0	0	0	4	LOGIN INITIAL CC
282106	38925	003	07226510	760928	1230	50.11	YES	74	0	0	0	4	LOGIN INITIAL CC
282107	38927	003	07226520	760928	1340	50.11	YES	74	0	0	0	4	LOGIN INITIAL CC
282108	38929	003	07226515	760928	1310	50.11	YES	74	0	0	0	4	LOGIN INITIAL CC

*** TOTAL AMOUNT OF WORK TO BE PERFORMED FOR YOUR OFFICE FOR THIS REPORT = $ 5,005.33

SUMMARY OF ACCOUNT INFORMATION FOR DISTRICT NO.35. NEW MEXICO MONTHLY REPORT FOR OCTOBER
THIS INFORMATION WAS OBTAINED FROM ACCOUNT NOS. YOU SUPPLIED ON THE LOG IN SHEET. DATE OF THIS RETRIEVAL WAS 761102

ACCOUNT #	$ WORK TO BE DONE	ACCOUNT #	$ WORK TO BE DONE	ACCOUNT #	$ WORK TO BE DONE	ACCOUNT #	$ WORK TO BE DONE
	22.49						
003	4165.80						

YOUR GENERAL ACCOUNT--463500300 HAS BEEN CHARGED $ 4188.29 WHICH INCLUDES ALL UNIDENTIFIED ACCOUNTS & EXTRA ACCOUNTS ABOVE 100

*THE FEDERAL ACCOUNT--469102700 HAS BEEN CHARGED $ 817.04 FOR WORK DONE ON FEDERAL STATIONS IN YOUR STATE

*** TOTAL AMOUNT OF WORK TO BE PERFORMED FOR YOUR OFFICE FOR THIS REPORT = $ 5.005.33

SUMMARY OF ACCOUNT INFORMATION FOR DISTRICT NO.35. NEW MEXICO MONTHLY REPORT FOR OCTOBER
THIS FISCAL YEAR SUMMARY IS ONLY FOR VALID 9 DIGIT ACCOUNT NUMBERS. DATE OF THIS RETRIEVAL WAS 761102

ACCOUNT #	$ WORK TO BE DONE	ACCOUNT #	$ WORK TO BE DONE	ACCOUNT #	$ WORK TO BE DONE	ACCOUNT #	$ WORK TO BE DONE
463500300	4188.29						

SUMMARY OF WORK DONE FOR EACH DISTRICT OR PROJECT FOR OCTOBER DATE OF THIS RETRIEVAL WAS 761102

STATE OR PROJECT IDENTIFICATION	BILLING CODE	MONTHLY STATE CHARGE	MONTHLY FEDERAL CHARGE	MONTHLY TOTAL CHARGE	FISCAL YEAR TOTAL CHARGE TO DATE
ALASKA	02	3.544.91	823.68	4.368.59	3.544.91
NEW MEXICO	35	4.188.29	817.04	5.005.33	4.188.29

0.00 = WORK IN QUALITY ASSURANCE SUPPORT PROGRAM
2764.46 = WORK TO BE ATTRIBUTED TO ATLANTA
0.00 = WORK TO BE ATTRIBUTED TO ALBANY
6669.46 = WORK TO BE ATTRIBUTED TO DENVER
9373.92 = WORK TO BE ATTRIBUTED TO ALL LABS FOR THIS REPORT

Appendix B
Card Formats

1. "L" CARDS

CENTRAL LAB ADP CARD FORMAT

LOG-INV CARD #1
(This card is always manditory)

Card Columns		
1	*	Card Type - ('L')
2 - 7	*	Sample Identffication
2 - 4		Julian Date
5 - 7		Sample Sequence Number
8	*	Card Number - ('1')
9 - 10		
11	*	Lab Number - ('1') Other; ('2') Atlanta; ('3') Albany; ('4') Denver
12 - 16	+	Lab Analysis Record Number (coded for updates only)
17	+#	Record Input Disposition ' ' (blank) - New Analysis 'U' - This is an update to a sample that has previously been logged in.
18		Data output Disposition
	#	' ' (blank) - Data will be stored in the WRD Hydrologic Data Files.
		'X' - Data will not be transferred to the WRD Hydrologic Data Files.
		'D' - Punch QW data cards and enter data into the National QW File.
		'C' - Punch QW data cards only. Data not to be placed into the National QW File.
19		USGS or non USGS Data
	#	'U' - USGS Data

LOG-INV CARD #1 CONT'D.

Card Columns		
		'N' - Non USGS Data
20 - 34	*	Station Identification
27 - 34 or 20 - 34		
35 - 40	*	Begin Date
35 - 36		~~Year~~
37 - 38		Month
39 - 40		Day
41 - 46		End Date
41 - 42		Year
43 - 44		Month
45 - 46		Day
47 - 50		Time of sampling
51 - 52	*	Site Code 'SW' - Surface Water 'GW' - Ground Water 'SP' - Spring 'LK' - Lake/Reservoir 'ES' - Esturary 'PR' - Precipitation 'SS' - Other
53 - 54	*	State Code
55 - 56	*	District Code (Billing Code)
57 - 59	†	County Code
60 - 68		Project Code
69 - 73		Cost Weight Factor
74 - 80		Cost Override

FOOTNOTES

* - This entry mandatory.

† - If the data is to be stored in the WRD Hydrologic Data Files then:
  a. If there is an entry in the WRD Station Header File for the specified station, the card field should be left blank.
  b. If there are no entries in the WRD Station Header File for the specified station, an entry in the card field is mandatory. For this case only, the central lab ADP system will store the entry into the WRD Station Header File.

FOOTNOTES

+ - Entry is mandatory for update operations

- Indicates which option is the default if the entry is left blank

CENTRAL LAB ADP CARD FORMAT

LOG-INV CARD #2

Card Columns	
1	Card Type - ('L')
2 - 7	Sample identification (See card #1)
8	Card Number - ('2')
9 - 10	
11	Lab Number (See card #1)
12 - 26	Latitude-Longitude-Sequence No.
12 - 17	Latitude
18 - 24	Longitude
25 - 26	Sequence Number
27 - 74	Station

If the data is to be stored in the WRD Hydrologic Data Files then:

a. If there is an entry in the WRD Station Header File for the specified station, information for this card does not have to be supplied.

b. If there are no entries in the WRD Station Header File for the specified station (columns 20-34 card #1) then the card must be submitted. For this case only all entries are mandatory. These two entries will be stored in the WRD Station Header File by the central lab ADP system.

CENTRAL LAB ADP CARD FORMAT

LOG-INV CARD #3

Card Columns		
1	*	Card Type - ('L')
2 - 7	*	Sample Identification
8	*	Card Number - ('3')
9 - 10		
11	*	Lab Number (See card #1)
12 - 29		Mailing Address
30 - 45	**	Analysis schedules - Identifies the record(s) that can contain a pre-defined list of lab codes.
30 - 33		Schedule #1
34 - 37		Schedule #2
38 - 41		Schedule #3
42 - 45		Schedule #4
		If more than one schedule is listed, the schedules will be merged
46 - 52		Water Discharge
53 - 56		Ph
57 - 62		Conductance
63 - 66		Temperature
67 - 72		Depth
73 - 80		Geological Unit Code

* - Entry is mandatory

** One schedule number must be included even if it is zero.

RECORD FORMAT
LOG-INV CARD #4 - (This card is optional)

Col. 1	*	'L' card type
Cols. 2 - 7	*	Sample identification
Cols. 2 - 4		Julian date
Cols. 5 - 7		Sequence number
Col. 8	*	Card number '4'.
Cols. 9 - 10		Blank
Cols. 11	*	Lab number (See Card #1)

Cols. 12-14, 16-18, 20-22, 24-26, 28-30, 32-34, 36-38, 40-42, 44-46, 48-50, 52-54, 56-58, 60-62, 64-66, 68-70, 72-74, 76-78

Lab codes of determinations that are to be added to or subtracted from the analyses as defined by the analysis schedule.

Cols. 15, 19, 23, 27, 31, 35, 39, 43, 47, 51, 55, 59, 63, 67, 71, 75, 79

MOD codes
The MOD code indicates if the PARM code coded in the previous four columns is to be added or subtracted from the analysis schedule list of determinations.

'D' - Delete this determination from the analysis.

'A' - This determination is to be added to the analysis.

Col. 80 Blank

Note: There can be more than one #4 card for each sample.

* - Indicates the entry is mandatory

- Indicates which option is the default if the entry is left blank.

RECORD FORMAT
LOG-INV CARD #5 - (This card is optional)

Col. 1	*	'L' Card type
Cols. 2-7	*	Sample identification
Cols. 2-4		Julian date
Cols. 5-7		Sequence number
Col. 8	*	'5' Card number
Cols. 9-10		Blank
Col. 11	*	Lab number (See Card #1)
Cols. 12-15		Blank
Cols. 16-18, 29-31, 42-44, 55-57, 68-70		Lab codes for the values that are to be placed into the Lab analysis record. If the lab code is not in specified schedule(s) or has not been coded on a LOG-INV #4 card, both the lab code, value, and remark will be added to the analysis.
Cols. 19-27, 32-40, 45-53, 58-66, 71-79		Values that are to be placed into the Lab analysis record.
Cols. 28, 41, 54, 67, and 80		Remark: Codes that apply to the value coded in the previous data field.

Note: There can be more than one #5 card for each sample.

* - Indicates the entry is mandatory

RECORD FORMAT
LOG-INV CARDS #6, #7 and #8 (optional)

Col. 1	*	'L' Card Type
Cols. 2-7	*	Sample identification
Cols. 2-4		Julian date
Cols. 5-7		Sequence number
Col. 8	*	'6', '7', or '8' card number
Cols. 9-10		Blank
Col. 11	*	Lab number (See Card #1)
Cols. 12-80		Comments

* - indicates the entry is mandatory

CENTRAL LAB PROJECT

Lab Analysis Update Card Format - (Mandatory for all constituents requiring a laboratory determination - Lab section 1-9)

Col. 1 * 'U' type of card

Cols. 2-7 * Sample identification

Cols. 2-4 Julian date

Cols. 5-7 Sequence number

Col. 8 List option - code an 'L' to request a listing of the basic and descriptive information data records for this sample.

Cols. 9-10

Col. 11 * Lab Number ('1' Other, '2' - Atlanta, '3' - Albany, '4' - Denver)

Col. 12-15

Col. 16-19 * Lab code

Cols. 20-31 Value

Col. 32 Remarks & Delete Options

Cols. 33-40 Instrument Reading

Cols. 41-45 Dilution factor (Default=1)

Cols. 46-50 Correction factor - Factor will be subtracted from the value entered in columns 33-40 in order to calculate a 'corrected' instrument reading. (Default = 0)

I=Improper sample
O=Out of water
R= Sample ruined during analysis
S=Sample spilled in shipment
U=Unable to determine-- interference
D=Deletion requested by district

Col. 51 Calibration Curve Number

OR

Disposition Code

If an entry has been made in columns 33-40 (Instrument Reading) the computer program will assume the entry in column 51 is either a

Col. 51		Calibration Curve Number or a Titration Constant Number. Note that a blank will be interpreted as a '1' (one) If there is no entry in columns 33-40 and column 51 is not left blank, the program will search for one of the following three Disposition Codes. 'D'-Delete the determination from the analysis. 'E'-The value coded in columns 20-31 is to override a determination that is normally calculated. 'P'-The determination is to be marked as "DETR. PENDING" (Partial analyses only)
Cols. 52-59		Determination name abbreviated
Col. 60	*#	Lab section number
Cols. 61-64	H	Analysis pH - Float Dec.
Cols. 65-68	H	Analysis Conductance - Float Dec.
Cols. 69-76	*	Lab analysis data record number
Cols. 77-78	H	Parameter record number (Binary)
Cols. 79-80	H	Lab analysis data record number (Binary)

NOTE: If the card is generated from program number A579, columns 1-19 and 52-80 will be punched by the computer.

* - Indicates the entry is mandatory.

H - Punched in Hexadecimal code by the computer, or leave blank.

\# - Indicates the default option.

CENTRAL LAB PROJECT

Parameter Record Calibration Curve Update Card Format

Col.	1	''' (Single Quote) - Card Type
Cols.	2-4	Lab code
Col.	5	Calibration Curve or Titration constant number.
Cols.	6-9	Enter a numeric digit from '1' to '9'. A blank will be interpreted as a '1'.
Col.	10	Data type code 'C' - The card contains concentration values 'I' - The card contains instrument readings 'T' - The card contains a Titration constant
Cols.	11-17 18-24 25-31 32-38 39-45	- Concentrations OR
	46-52 53-59 60-66 67-73 74-80	- Instrument Readings

If a Titration constant is to be entered, then the value must be coded in columns 11-17.

The values coded in columns 11-17 correspond to the first point on the calibration curve, the values coded in columns 18-24 correspond to the second point on the calibration curve set etc.

Instrument Readings *must be entered in accending order.*

4. "A" CARDS

CENTRAL LAB PROJECT

ACCOUNTING CARD FORMAT - (MANDATORY FOR ACCEPTING OR REJECTING AN ANALYSIS)

Col. 1	*	'A' card type
Cols. 2-7	*	Sample identification
Cols. 2-4		Julian date
Cols. 5-7		Sequence number (left justified)
Col. 8		Blank
Cols. 9-10		Blank
Col. 11	*	Lab number ('1' - Salt Lake, '2' - Atlanta, '3' - Albany, '4' - Denver)
Cols. 12-13		State code (Billing)
Cols. 14-21		Project code (left justified)
Cols. 22-24		
Cols. 25-39		Station ID
Cols. 40-45		Sample Date
Cols. 40-41		Year
Cols. 42-43		Month
Cols. 44-45		Day
Cols. 46-49		Time of day the sample was collected
Col. 50		Analysis Approval
	#	'A' - The analysis has been approved
		'U' - Same as 'A' except that all determinations will be passed to program A533 regardless of whether any of the values have been previously entered into the WRD QW data files.

For the 'A' option (default), the only determinations passed to A533 will be (1) values that have not been previously entered into the WRD QW data file, and (2) all calculated values with one exception. Dissolved Solids values in Tons/Day will not be passed to A533 if the values have been previously entered into the WRD QW files.

'R' - The analysis has been rejected.

Col. 51 Data output Disposition

'D' - Punch QW data cards and enter data into the National QW File.

'C' - Punch QW data cards only. Data not to be placed into the National QW File.

'X' - Data not to be punched or entered into the National File.

'Q' - Data to enter National QU file.

' ' - If the entry is left blank, the disposition request entered on the LOG-INV #1 card will remain in effect.

Any other non-blank character will cause the data to be transferred to the National QW Data File. In this case, the QW data cards will not be punched.

Cols. 52-59 Analysis cost

Col. 60 Blank

Cols. 61-62 H Lab analysis record number (Binary)

Cols. 63 B-Budget adjustment; U-Unapproved analysis; A-Approved analysis

Col. 64 Blank

Cols. 65-70 * Lab analysis record number (character)

Cols. 71-72 Station ID update request. If 'ID' is coded in columns 71-72, the station ID entered in cols. 25-39 will be used to update the station ID stored in the analysis Data File.

Note: If the accounting card is generated by program number A579 all columns except 50-51 will be punched by the computer.

* - Indicates that the entry is mandatory

H - Punched in hexadecimal code by the computer

- Default option if the entry is left blank

Col. 73-78	Processing data
Col. 79-80	of budget adjustment card (will contain "AT")
Col. 80	of approved and unapproved ("A" or "U" in Col. 63) (will contain a "D" if the previous output of this sample was not approved).

5. "M" CARDS

UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
CENTRAL LABORATORY

ACCOUNTING CARD INFORMATION--THIS FORM IS ONLY FOR SUPPLIES AND MATERIALS.

**** CODE INFORMATION ONE (1) CHARACTER PER COLUMN WHERE DESIGNATED ****

CARD TYPE	LAB #	
M	1	(A "1" GOES IN COL. 11 FOR ALL LABORATORIES TO)
-	-	(SEPARATE THESE CHARGES FROM ANALYTICAL WORK.)
COL.1	COL.11	

DIST. (12)	ACCT. # (14)	DESCRIPTION (23)	YR/MO/DAY DATE (37)	AMOUNT (52)
				$
				$
				$
				$
				$
				$
				$
				$
				$
				$
				$
				$
				$
				$

PREPARED BY _____

VERIFIED BY _____

6. "T" CARDS

FORMAT FOR "T" CARD

COL 01	"T"
COL 02 - 07	LAB-ID
COL 08 - 10	BLANK
COL 11	LAB NUMBER (2=ATLANTA 4=DENVER)
COL 12 - 13	DISTRICT/BILLING CODE
COL 14 - 22	PROJECT CODE
COL 23 - 24	DISTRICT TERMINAL REMOTE NUMBER (BINARY)
COL 25 - 39	STATION IDENTIFICATION
COL 40 - 45	COLLECTION DATE
COL 46 - 49	TIME OF COLLECTION
COL 50	BLANK
COL 51	DISPOSITION (Q=NATIONAL QW FILE X=LAB FILE ONLY)
COL 52 - 59	AMOUNT OF SAMPLE COST CHARGED TO THE DISTRICT
COL 60	BLANK
COL 61 - 62	NUMBET OF PARAMETERS IN THE SAMPLE (BINARY)
COL 63 - 64	BLANK
COL 65 - 70	RECORD NUMBER
COL 71 - 72	BLANK
COL 73 - 80	SCHEDULE NUMBERS REQUESTED (BINARY) 73 - 74 SCHEDULE ONE 75 - 76 SCHEDULE TWO 77 - 78 SCHEDULE THREE 78 - 80 SCHEDULE FOUR

7. "Z" CARDS

FORMAT FOR "Z" CARD

COL 01	"Z"
COL 02 - 07	LAB-ID
COL 08 - 10	BLANK
COL 11	LAB NUMBER (2=ATLANTA 4=DENVER)
COL 12 - 13	DISTRICT/BILLING CODE
COL 14 - 22	FEDERAL PROJECT IDENTIFIER
COL 23 - 24	DISTRICT TERMINAL REMOTE NUMBER (BINARY)
COL 25 - 39	STATION IDENTIFICATION
COL 40 - 45	COLLECTION DATE
COL 46 - 49	TIME OF COLLECTION
COL 50	BLANK
COL 51	DISPOSITION (Q=NATIONAL QW FILE X=LAB FILE ONLY)
COL 52 - 59	AMOUNT CHARGED TO FEDERAL PROJEDT
COL 60	BLANK
COL 61 - 62	NUMBET OF PARAMETERS IN THE SAMPLE (BINARY)
COL 63 - 64	BLANK
COL 65 - 70	RECORD NUMBER
COL 71 - 72	BLANK
COL 73 - 80	SCHEDULE NUMBERS REQUESTED (BINARY) 73 - 74 SCHEDULE ONE 75 - 76 SCHEDULE TWO 77 - 78 SCHEDULE THREE 78 - 80 SCHEDULE FOUR

7. Format For Rerun Request Card

Columns 1-6	Lab-i.d.
Colums 7-8	Blank
Columns 9	Section number
Columns 10-11	Blank
Columns 12-14	Lab-code
Columns 15-16	Blank
Columns 17-24	Comments
Columns 25-80	Blank

8. PARAMETER CARDS

CENTRAL LAB ADP PROJECT

PARAMETER CARD #1

(Card contains update data for parameter/lab code data records)

Col	1		"@" Card Type
Cols.	2- 5	+	Lab Code
Cols.	6-10		Parameter Code
Col.	11		OTHER LAB resp. for work
Col.	12		ATALANTA SEC. resp. for work
Col.	13		ALBANY SEC. resp. for work
Col.	14		DENVER SEC. resp. for work
Col.	15		Calculation Code "0" = entered directly from a lab determination (instrument reading or value) "1" = calculated from determined values
Col.	16		Constituent Code "C" = major cation "A" = major anion "N" = not major const.
Col.	17		Units Code "M" = MG/L "U" = UG/L "Ø" = other
Col.	18		Dissolved Solids Calculation "0" = to be used in DS calc. sum "1" = not to be used
Col.	19		Total Constituent "0" = not a "total constituent" "1" = is a "total constituent"
Col.	20		Parameter arithmetic factor for primary & secondary constituents. (see attached Flow Chart for general calculation rountined." ADD = "1" SUBTRACT = "0"

PARAMETER CARD #1 CONT'D.

Col. 21	Parameter arithmetic factor for secondary and additional 3rd constituent involved in the general calculation routine. ADD = "1" SUBTRACT = "0"
Cols. 22-28	COST
Cols. 29-30	Sample TYPE CODE
Cols. 31-36	Sample AMOUNT IN MILLILETERS OR GRAMS
Cols. 37-44	Parameter symbol.
Cols. 45-64	Parameter name.
Cols. 65-79	Reserved for future use.
Col. 80	Card number ("1")

+ If "ALL" is entered in cols. 2-4 then a retrieval of all the active parameter records between 1 and 1438 will be made and printed out.

CENTRAL LAB ADP PROJECT

PARAMETER CARD #2

(Card contains update data for parameter/lab code data records)

Col.	1	"@" Card Type
Cols.	2- 5	Lab Code
Col.	6	No. of significant figures in range 0-<0.01
Col.	7	No. of significant figures in range .01-<0.1
Col.	8	No. of significant figures in range .1-<1
Col.	9	No. of significant figures in range 1-<10
Col.	10	No. of significant figures in range 10-<100
Col.	11	No. of significant figures in range 100-<1000
Col.	12	No. of significant figures in range > =1000
Col.	13	Maximum No. of dec. places
Cols.	14-23	MEQ conversion factor
Cols.	24-26	PGM control index = 1 for generalized calculation routine. (See attached Flow Chart) < 1 for unique computation
Cols.	27-30	Primary Lab code for general calculation routine.
Cols.	31-34	Secondary Lab code for general calculation rountine. NOTE!! Lab codes are entered in decreasing priority. No. 2 cannot be processed unless No. 1 is present, etc.
Cols.	35-38	Third Lab code for general calculation routine.
Cols.	39-48	Multiplication factor for general calculation routine.
Cols.	49-52	Dissolved solids Lab code for total check. NOTE!! Total switch (col. 19 card No. 1) must be on for this value to be there.

PARAMETER CARD #2 CONT'D.

Col. 53-56	1st dependent lab code. (lab code that is to be automatically added to the schedule when the primary lab code (2-5) IS REQUESTED
Cols.57-60	2nd dependent lab code.
Cols.61-64	3rd dependent lab code.
Cols.65-68	4th dependent lab code. NOTE: To insure inclusion of all calculated or determined lab codes for a given Calculation, include on each associated parameter record the other lab codes involved in the calculation. For example 167=228-160, in each parameter rec. would be other associated lab codes.
Cols.69-79	Reserved
Col. 80	Card Number ("2")

9. GRAPHITE CARDS

SECTION 9 (GRAPHITE FURNACE) DATA SHEET

X 1 - 7	Y1 9 - 14	Y2 16-21	Y3 23-28	LC 30-32	LAB-ID 34-39	VOLUME 41-46	DIL.FAC 48 - 49	COMMENTS 51 - 80
______	______	______	______	___	______	______	______	______________
______	______	______	______					
______	______	______	______					
______	______	______	______	999				

X 1 - 7	Y1 9 - 14	Y2 16-21	Y3 23-28	LC 30-32	LAB-ID 34-39	VOLUME 41-46	DIL.FAC 48 - 49	COMMENTS 51 - 80
______	______	______	______	___	______	______	______	______________
______	______	______	______					
______	______	______	______					
______	______	______	______	999				

X 1 - 7	Y1 9 - 14	Y2 16-21	Y3 23-28	LC 30-32	LAB-ID 34-39	VOLUME 41-46	DIL.FAC 48 - 49	COMMENTS 51 - 80
______	______	______	______	___	______	______	______	______________
______	______	______	______					
______	______	______	______					
______	______	______	______	999				

X 1 - 7	Y1 9 - 14	Y2 16-21	Y3 23-28	LC 30-32	LAB-ID 34-39	VOLUME 41-46	DIL.FAC 48 - 49	COMMENTS 51 - 80
______	______	______	______	___	______	______	______	______________
______	______	______	______					
______	______	______	______					
______	______	______	______	999				

10. SCHEDULE CARDS

CENTRAL LAB PROJECT

Analysis Schedule Cards -- an analysis schedule of laboratory parameter codes may be established in or deleted from a disk file with these cards. The file presently accomodates 919 schedules with up to 100 lab codes per schedule.

Card Format - entry option

Col.	1	* "I"-Card type
Cols.	2-5	* Numeric schedule number
Col.	6	* Numeric card number
Cols.	7-8	* Alphanumeric district code
Cols.	9-80	Numeric lab codes, 18 fields of four columns each (Cols. 9-12, 13-16, 17-20, etc.)

Delete option

Cols.	1-6	* Same as above
Cols.	7-8	Blank
Cols.	9-14	"Delete"

*Required entries

CENTRAL LAB PROJECT Data Control Card

Record Format - Data Control Card

Col.	**1**	* '#'
Cols.	**2-7**	Blank
Col.	**8**	Code an 'A' if the Backfile Record and the Basic Data Records are to be printed for each Accounting card processed. Code an 'L' if the Basic Data Records and the Descriptive Information Record are to be printed for each sample logged in. Code a 'U' if the Basic Data Records and the Descriptive Information Record are to be printed for each sample updated. Code an 'X' if both the 'U' and 'A' options are desired.
Cols.	**9-10**	* Format Version ('72)
Col.	**11**	* Lab Number ('1' - Salt Lake, '2' - Atlanta, '3' - Albany, '4' - Denver)
Cols.	**12-41**	Master Index Update - Updates will be made only by the LOG-INV procedure.
	Cols. 12-17	Current Date YYMMDD. The Master Index Record cannot be updated unless the date entered in this field matches the current date stored in the computer. Mandatory for Updates.
	Cols. 18-23	Maximum number of regions available in the Data File. Each time a new region is allocated, the number of regions used plus one is compared to this entry. If the maximum is exceeded, then the next available region is set equal to two (Data set will be reused).
	Cols. 24-29	Standard Analysis Cost
	Cols. 30-35	Number of analyses, Processed. If this entry contains a zero, then the counter will be set equal to zero, and the current date (Cols. 12-41) will be stored in the Index as the begin date for the analysis count.

Record Format - Data Control Card Cont'd.

Cols. 36-41	Next available Region number in the Data File. CAUTION this entry should not be updated unless absolutely necessary.
Cols. 42-80	Blank

* - Indicates the entry is mandatory if the card is submitted.

Appendix C
Job Control Language Decks

```
//STEP4 EXEC PROC=PSORT,COND=((4,GT,STEP2),(8,LT,STEP2),(0,EQ,STEP3))
//SORTIN DD DSN=&UCARDS,DISP=(OLD,DELETE)
//SORTOUT DD DSN=&USRTD,UNIT=SYSDK,DISP=(NEW,PASS,DELETE),
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=12800),SPACE=(TRK,(20,5),RLSE)
//SYSIN DD *
 SORT FIELDS=(60,1,CH,A,12,8,CH,A,2,6,CH,A),SIZE=E3000
/*
//STEP5 EXEC PGM=JOBPREP,PARM='ISA(15K),NR',TIME=2,REGION=110K,
//  COND=((4,GT,STEP2),(8,LT,STEP2),(0,EQ,STEP3))
//STEPLIB DD DSN=JOB.PREP.SHEETS,UNIT=3330,VOL=SER=CCD932,DISP=SHR
//        DD DSN=SYS1.PPLNKLIB,DISP=SHR
//PLIDUMP DD SYSOUT=A
//SYSPRINT DD SYSOUT=A
//SYSPUT DD DUMMY,DCB=(RECFM=F,LRECL=80,BLKSIZE=80)
//SYSIN DD DSN=&USRTD,DISP=(OLD,PASS)
/*
//STEP5B EXEC PGM=REDOFILE,PARM='ISA(7K),NR',TIME=2,REGION=70K,
//  COND=((4,GT,STEP2),(8,LT,STEP2),(0,EQ,STEP3))
//STEPLIB DD DSN=REDO.UCARD.PROG,UNIT=3330,VOL=SER=CCD933,DISP=SHR
//        DD DSN=SYS1.PPLNKLIB,DISP=SHR
//PLIDUMP DD SYSOUT=A
//PCHUCRD DD SYSOUT=(K,,UCRD),DCB=(RECFM=F,LRECL=80,BLKSIZE=80)
//CARDIN  DD DSN=&USRTD,DISP=(OLD,PASS)
/*
//STEP6 EXEC PGM=W770,PARM='ISA(60K),NR',TIME=9,REGION=195K,
//  COND=((4,GT,STEP2),(8,LT,STEP2),(0,EQ,STEP3))
//STEPLIB DD DSN=CENLAB.NEWTCARD.DT7608.PROGRAM,
//  UNIT=3330,VOL=SER=CCD932,DISP=SHR
//        DD DSN=SYS1.PPLNKLIB,DISP=SHR
//PLIDUMP DD SYSOUT=A
//SYSPRINT DD SYSOUT=A
//ANALFYR DD DSN=A579.V731.DATAS,UNIT=3330,VOL=SER=CCD933,
// DISP=OLD,DCB=DSORG=DA
//CURRENT DD DSN=CENLAB.FEDERAL.FYR1977.FILE,
//  UNIT=3330,VOL=SER=CCD932,DISP=(OLD,KEEP)
//PARMFYR DD DSN=A579.V730.PARMF,UNIT=3330,VOL=SER=CCD932,
// DISP=SHR,DCB=DSORG=DA
//SCHFILE  DD DSN=CENLAB.FEDERAL.SCHEDULE.FILE,UNIT=3330,
//       DISP=SHR,DCB=DSORG=DA,VOL=SER=CCD932
//ACNTFYR DD SYSOUT=B,DCB=(RECFM=F,LRECL=80,BLKSIZE=80)
//OLDSCHD DD DSN=A579.V730.SCHDF,UNIT=3330,VOL=SER=CCD932,
//  DISP=SHR,DCB=DSORG=DA
//REDFILE DD DSN=CENLAB.SCHEDULE.REDCOST.FILE,UNIT=3330,
```

Sorts the "U" cards by section, labcode, and sample i.d.

Produces the section, generates "U" card output.

Computes cost, and generates "T" and "Z" cards ("T" district cost, and "Z" federal cost).

Updates the sample, checks for nutrient parameters. If all nutrients are in program, generates "U" and "A" cards.

```
//BUDGET  DD SYSOUT=B,DCB=(RECFM=F,LRECL=80,BLKSIZE=80)                  1300
//ACNTFYR DD SYSOUT=B,DCB=(RECFM=F,LRECL=80,BLKSIZE=80)                  1310
//FYRACNT DD SYSOUT=B,DCB=(RECFM=F,LRECL=80,BLKSIZE=80)                  1320
//ANALFYR DD DSN=A579.V731.DATAS,UNIT=3330,VOL=SER=CCD933,               1330
// DISP=OLD,DCB=DSORG=DA                                                 1340
//PARMFYR DD DSN=A579.V730.PARMF,UNIT=3330,VOL=SER=CCD932,               1350
// DISP=SHR,DCB=DSORG=DA                                                 1360
//TRANFYR DD DSN=&LOUIE,DISP=(OLD,DELETE)                                1370
/*                                                                      1380
//STEP9  EXEC PGM=A122,PARM='ISA(24K),NR',TIME=5,REGION=155K,            1390
// COND=((2,GT,STEP2),(4,LT,STEP2))                                      1400
//STEPLIB DD DSN=CENLAB.STANDARD.REF.PROGRAM,UNIT=3330,DISP=SHR,         1410
//  VOL=SER=CCD932                                                      1420
//        DD DSN=SYS1.PPLNKLIB,DISP=SHR                                 1430
//PLIDUMP DD SYSOUT=A                                                   1440
//SYSPRINT DD SYSOUT=A                                                  1450
//PRINT DD SYSOUT=A                                                     1460
//CURRENT DD DSN=CENLAB.BLIND.SAMPLE.FILE,                              1470
//  UNIT=3330,VOL=SER=CCD932,DISP=(SHR,KEEP)                            1480
//CDFILE DD DSN=CENLAB.COEFF.FILE,                                      1490
//  UNIT=3330,VOL=SER=CCD932,DISP=SHR,DCB=DSORG=DA                      1500
//INFILE DD DSN=CENLAB.BLIND.SAMPLE.INDEX,                              1510
//  UNIT=3330,VOL=SER=CCD932,DISP=OLD,DCB=DSORG=DA                      1520
//IDFILE DD DSN=CENLAB.BLIND.SAMPLE.INFOR,                              1530
//  UNIT=3330,VOL=SER=CCD932,DISP=OLD,DCB=DSORG=DA                      1540
//PARMFYR DD DSN=A579.V730.PARMF,UNIT=3330,VOL=SER=CCD932,              1550
// DISP=SHR,DCB=DSORG=DA                                                1560
//ANALFYR DD DSN=A579.V731.DATAS,UNIT=3330,VOL=SER=CCD933,              1570
// DISP=OLD,DCB=DSORG=DA                                                1580
//DARWIN DD DSN=DAR.STE.SRS,UNIT=3330,VOL=SER=CCD932,                   1590
// DISP=SHR,DCB=DSORG=DA                                                1600
//SYSIN DD DSN=&SALTL,DISP=(OLD,PASS)                                   1610
/*                                                                      1620
//STEP10 EXEC PGM=UCIN,PARM='ISA(7K),NR',TIME=5,REGION=90K,             1630
// COND=((2,GT,STEP2),(4,LT,STEP2))                                     1640
//STEPLIB DD DSN=UCARD.INPUT,UNIT=3330,VOL=SER=CCD932,DISP=SHR          1650
// DD DSN=SYS1.PPLNKLIB,DISP=SHR                                        1660
//PLIDUMP DD SYSOUT=A                                                   1670
//SYSPRINT DD SYSOUT=A                                                  1680
//PARM DD DSN=CENLAB.UCARD.MONSUM.FILE,UNIT=3330,VOL=SER=CCD932,        1690
//  DISP=OLD,DCB=DSORG=DA                                               1700
//SYSIN DD DSN=&SALTL,DISP=(OLD,DELETE)                                 1710
/*                                                                      1720
//                                                                      1730
//
```

Standard reference program, both "in-house" and "blind"; generates standard reference reports.

Generate "U" card date into monthly production summary file.

```
//    VOL=SER=CCD932,DISP=SHR,DCB=DSORG=DA                                  860
//SYSIN DD DSN=&USRTO,DISP=(OLD,PASS)                                       870
/*                                                                          880
//STEP6B EXEC PGM=WRKSHT,PARM='ISA(5K),NR',TIME=3,REGION=80K,               890
//  COND=((4,GT,STEP2),(8,LT,STEP2),(0,EQ,STEP3))                          900
//STEPLIB DD DSN=SLC.WORK.SHEETS,UNIT=3330,VOL=SER=CCD932,DISP=SHR          910
//         DD DSN=SYS1.PPLNKLIB,DISP=SHR                                    920
//PLIDUMP DD SYSOUT=A                                                       930
//SYSPRINT DD SYSOUT=A                                                      940
//SYSIN DD DSN=&USRTO,DISP=(OLD,DELETE)                                     950
/*                                                                          960
//STEP7 EXEC PGM=A579AU,PARM='ISA(68K),NR',TIME=9,REGION=242K,              970
// COND=((2,GT,STEP2),(4,LT,STEP2))                                         980
//STEPLIB DD DSN=CENLAB.A579AU.NUTNIONS.PROGRAM,                            990
//  UNIT=3330,VOL=SER=CCD932,DISP=SHR                                      1000
//         DD DSN=SYS1.PPLNKLIB,DISP=SHR                                   1010
//PLIDUMP DD SYSOUT=A                                                      1020
//SYSPRINT DD SYSOUT=A                                                     1030
//ACNTFYR DD DUMMY,DCB=(RECFM=F,LRECL=80,BLKSIZE=80)                       1040
//PUNCHA  DD    DUMMY,DCB=(RECFM=F,LRECL=80,BLKSIZE=80)                    1050
//PUNCHU  DD SYSOUT=B,DCB=(RECFM=F,LRECL=80,BLKSIZE=80)                    1060
//PUNCHM  DD SYSOUT=B,DCB=(RECFM=F,LRECL=80,BLKSIZE=80)                    1070
//PARMFYR DD DSN=A579.V730.PARMF,UNIT=3330,VOL=SER=CCD932,                 1080
// DISP=SHR,DCB=DSORG=DA                                                   1090
//INDXFYR DD DSN=A579.V731.DATAS,UNIT=3330,VOL=SER=CCD933,                 1100
// DISP=OLD,DCB=DSORG=DA                                                   1110
//ANALFYR DD DSN=A579.V731.DATAS,UNIT=3330,VOL=SER=CCD933,                 1120
// DISP=OLD,DCB=DSORG=DA                                                   1130
//SWQWFYR DD DSN=&HARRY,UNIT=SYSDK,DISP=(NEW,PASS),                        1140
// DCB=(RECFM=VB,LRECL=1248,BLKSIZE=1252),SPACE=(TRK,(5,2),RLSE)           1150
//LISTLNK  DD DSN=&LOUIE,UNIT=SYSDK,DISP=(NEW,PASS),                       1160
//  DCB=(RECFM=FB,LRECL=1164,BLKSIZE=6984),SPACE=(TRK,(40,5),RLSE)         1170
//SYSIN DD DSN=&SALTL,DISP=(OLD,PASS)                                      1180
/*                                                                         1190
//STEP8  EXEC PGM=A579QC,PARM='ISA(65K),R',TIME=15,REGION=270K,            1200
// COND=((4,GT,STEP7),(8,LT,STEP7),(2,GT,STEP2),(4,LT,STEP2))             1210
//STEPLIB DD DSN=CENLAB.LABQC.PRINT.PROGRAM,                               1220
//  UNIT=3330,VOL=SER=CCD932,DISP=SHR                                      1230
//         DD DSN=SYS1.PPLNKLIB,DISP=SHR                                   1240
//PLIDUMP DD SYSOUT=A                                                      1250
//BIOPASS  DD DSN=&&BIORECS,UNIT=SYSDK,SPACE=(TRK,(5,1),RLSE),             1260
//  DCB=(RECFM=FB,LRECL=80,BLKSIZE=12800),DISP=(,PASS)                     1270
//SYSPRINT DD SYSOUT=A                                                     1280
//PRINTSYS DD DUMMY                                                        1290
```

If cost differs by more than 50¢, an adjustment budget card is generated. Generates "A" cards, "U" (unapproved) in column 63
"A" (approved)
"B" budget adjustment.

```
/*RELAY  PUNCH RE2
//AG4170L4 JOB (469198600,A579,NWQLD,55,30,1000),' L&UCARDS ',CLASS=D,
// MSGLEVEL=(0,0)
/*ROUTE  PRINT REMOTE20 RE1                                              10
/*ROUTE  PUNCH REMOTE20 RE1                                              20
/*PROCLIB  WRD.PROCLIB                                                   30
//STEP1 EXEC PROC=PSORT                                                  40
//SORTIN DD *                                                            50
#       A724                                                            60
/*                                                                       70
//SORTOUT DD DSN=&SALTK,UNIT=SYSDK,DISP=(NEW,PASS),                      80
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=12800),SPACE=(TRK,(20,5),RLSE)         90
//SYSIN DD *                                                            100
 SORT FIELDS=(1,10,CH,A),SIZE=E3000                                     110
/*                                                                      120
//STEP2 EXEC PGM=A579ED2,PARM='ISA(5K),NR',TIME=2,REGION=115K           130
//STEPLIB DD DSN=DOYLE2,UNIT=3330,VOL=SER=CCD932,DISP=SHR               140
// DD DSN=SYS1.PPLNKLIB,DISP=SHR                                        150
//PLIDUMP DD SYSOUT=A                                                   160
//ANALFYR DD DSN=A579.V731.DATAS,UNIT=3330,VOL=SER=CCD933,              170
// DISP=OLD,DCB=DSORG=DA                                                180
//SYSPRINT DD SYSOUT=A                                                  190
//RYSIN DD DSN=&SALTK,DISP=(OLD,DELETE)                                 200
//RYSIN1 DD DSN=&SALTL,UNIT=SYSDK,DISP=(NEW,PASS),                      210
//   DCB=(RECFM=FB,LRECL=80,BLKSIZE=12800),SPACE=(TRK,(20,5),RLSE)      220
/*                                                                      230
//STEP3 EXEC PGM=A579LI,PARM='ISA(36K),NR',TIME=2,REGION=200K,          240
// COND=((4,GT,STEP2),(8,LT,STEP2))                                     250
//STEPLIB DD DSN=CENLAB.A579LI.LOGIN.PROGRAM,UNIT=3330,                 260
//   VOL=SER=CCD932,DISP=SHR                                           270
//         DD DSN=SYS1.PPLNKLIB,DISP=SHR                               280
//PLIDUMP DD SYSOUT=A                                                   290
//SYSPRINT DD SYSOUT=A                                                  300
//DATAFYR DD DSN=&UCARDS,UNIT=SYSDK,DISP=(NEW,PASS,DELETE),             310
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=12800),SPACE=(TRK,(20,5),RLSE)        320
//PARMFYR DD DSN=A579.V730.PARMF,UNIT=3330,VOL=SER=CCD932,              330
// DISP=SHR,DCB=DSORG=DA                                                340
//SCHDFYR DD DSN=A579.V730.SCHOF,UNIT=3330,VOL=SER=CCD932,              350
//   DISP=SHR,DCB=DSORG=DA                                             360
//INDXFYR DD DSN=A579.V731.DATAS,UNIT=3330,VOL=SER=CCD933,              370
// DISP=OLD,DCB=DSORG=DA                                                380
//ANALFYR DD DSN=A579.V731.DATAS,UNIT=3330,VOL=SER=CCD933,              390
// DISP=OLD,DCB=DSORG=DA                                                400
//SYSIN DD DSN=&SALTL,DISP=(OLD,PASS)                                   410
/*                                                                      420
```

Reads in data; sorts in first 10 columns.

Sets condition codes for programs to execute based on type of cards submitted.

LOGIN program generates one "U" card per requested parameter. They are passed as a temporary data set to follow on programs.

Sorts the "U" cards by section, labcode, and sample i.d.

2. DRF TRANSFER

```
/*RELAY  PUNCH RE2                                                    LO-DR  1
//AG4170DL JOB (469198600,A579,3,15),' R E GUST ',CLASS=B             LO-DR  2
/*ROUTE  PRINT REMOTE20 RE1                                           LO-DR  3
//STEP1 EXEC PROC=PSORT                                               LO-DR  4
//SORTIN DD *                                                         LO-DR  5
#       724                                                           LO-DR  6
/*                                                                    LO-DR  7
//SORTOUT DD DSN=&SALTL,UNIT=SYSDK,DISP=(NEW,PASS),                   LO-DR  8
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=12800),SPACE=(TRK,(20,5),RLSE)      LO-DR  9
//SYSIN DD *                                                          LO-DR 10
 SORT FIELDS=(12,2,CH,A,2,6,CH,A),SIZE=E9000                         LO-DR 11
/*                                                                    LO-DR 12
//STEP2 EXEC  PGM=W771,PARM='ISA(160K),R',TIME=2,REGION=270K          LO-DR 13
//STEPLIB DD DSN=CENLAB.ANALYSES.DISINPUT.PROGRAM,                    LO-DR 14
//  UNIT=3330,VOL=SER=CCD932,DISP=OLD                                 LO-DR 15
//         DD DSN=SYS1.PPLNKLIB,DISP=SHR                              LO-DR 16
//PLIDUMP DD SYSOUT=A                                                 LO-DR 17
//SYSPRINT DD SYSOUT=A                                                LO-DR 18
//ANALFYR DD DSN=A579.V731.DATAS,UNIT=3330,VOL=SER=CCD933,            LO-DR 19
// DISP=OLD,DCB=DSORG=DA                                              LO-DR 20
//BNALFYR DD DSN=A579.V730.DATAF,UNIT=3330,VOL=SER=CCD932,            LO-DR 21
// DISP=OLD,DCB=DSORG=DA                                              LO-DR 22
//CARDO   DD SYSOUT=B,DCB=(RECFM=F,LRECL=80,BLKSIZE=80)               LO-DR 23
//DISRET DD DSN=CENLAB.REMOTE.RETRIEVE.FILE,                          LO-DR 24
//  UNIT=3330,VOL=SER=CCD932,DISP=OLD,DCB=DSORG=DA                    LO-DR 25
//SYSIN DD DSN=&SALTL,DISP=(OLD,DELETE)
/*
//
```

3. LOAD LABBUDG DATA

```
/*RELAY  PUNCH RE2
//AG4170BL JOB (469198600,A579,5,10),' R E GUST ',CLASS=B
//STEP1 EXEC PGM=CRDLOAD,PARM='ISA(4K),R',REGION=80K                    JCL1  10
//STEPLIB DD DSN=CENLAB.CRDLOAD.PROGRAM,                                JCL1  20
//   UNIT=3330,VOL=SER=CCD932,DISP=OLD                                  JCL1  21
//        DD DSN=SYS1.PPLNKLIB,DISP=SHR                                 JCL1  30
//PLIDUMP DD SYSOUT=A                                                   JCL1  40
//SYSPRINT DD SYSOUT=A                                                  JCL1  50
//RYSIN DD DSN=&HARRY,UNIT=SYSDK,DISP=(NEW,PASS),                       JCL1  70
//  DCB=(RECFM=FB,LRECL=80,BLKSIZE=12800),SPACE=(TRK,(25,5),RLSE)       JCL1  80
//* DATE CARD FIRST THEN T,M,A,AND 2 CARDS.                             JCL1  90
//SYSIN DD *                                                            JCL1 100
DATE03
/*                                                                      JCL1 120
//STEP2 EXEC PGM=IEFBR14,COND=(1,EQ,STEP1)                              JCL1 130
//DL DD DSN=A460097.AZ600.AG4ARTS.DENTCARD,                             JCL1 140
//  UNIT=3330,DISP=(OLD,DELETE),VOL=SER=CCD932                          JCL1 141
/*                                                                      JCL1 150
//STEP3 EXEC PLIXCG,COND=(1,EQ,STEP1)                                   JCL1 160
//PLI.SYSIN DD *                                                        JCL1 170
 LOAD_IT:      /*  LIST THE CARDS BEING LOADED  */                      JCL1 171
      PROC OPTIONS (MAIN);                                              JCL1 172
 DCL  1 CARD,                                                           JCL1 173
        2 TYPE      CHAR(01),                                           JCL1 174
        2 STUFF     CHAR(21),                                           JCL1 175
        2 FB1       CHAR(2),                                            JCL1 176
        2 MORSTUFF  CHAR(48),                                           JCL1 177
        2 FB2       CHAR(8);                                            JCL1 177
  DCL CONTROL FILE DIRECT KEYED ENV(F BLKSIZE(80) REGIONAL(1));         JCL1 178
      OPEN FILE (CONTROL) UPDATE;                                       JCL1 179
      ON ENDFILE (SYSIN) GO TO DUN;                                     JCL1 180
      CARD = '';                                                        JCL1 181
      REWRITE FILE (CONTROL) FROM (CARD) KEY (08);                      JCL1 182
 L1:  READ FILE (SYSIN) INTO (CARD);                                    JCL1 190
      WRITE FILE (RYSIN) FROM (CARD);                                   JCL1 191
      IF TYPE = 'T'  |  TYPE = 'Z'   THEN FB1, FB2 = '';                JCL1 192
      PUT EDIT (CARD)    (COL(1),5(A));                                 JCL1 193
      GO TO L1;                                                         JCL1 194
 DUN: PUT EDIT ('THE END - - - LOADING COMPLETED')  (SKIP(3),A);        JCL1 200
 END;                                                                   JCL1 201
/*                                                                      JCL1 210
//GO.SYSPRINT DD SYSOUT=A                                               JCL1 220
//GO.RYSIN DD DSN=A460097.AZ600.AG4ARTS.DENTCARD,                       JCL1 230
//  UNIT=3330,VOL=SER=CCD932,                                           JCL1 231
//  DISP=(NEW,KEEP,DELETE),SPACE=(TRK,(25,5),RLSE),                     JCL1 240
//  DCB=(RECFM=FB,LRECL=80,BLKSIZE=12800)                               JCL1 250
//GO.CONTROL DD DSN=CENLAB.CONTROL.FILE,UNIT=3330,VOL=SER=CCD932,       JCL1 251
//  DISP=OLD,DCB=DSORG=DA                                               JCL1 252
//GO.SYSIN DD DSN=&HARRY,DISP=(OLD,DELETE)                              JCL1 260
/*                                                                      JCL1 270
//
```

4. LOAD LABWEEK DATA

```
/*RELAY  PUNCH RE2
//AG4170ZT JOB (469198600,A579,5,10),' R E GUST ',CLASS=D
//STEP1 EXEC PGM=CRDLOAD,PARM='ISA(4K),R',REGION=80K                    Z&T   20
//STEPLIB DD DSN=CENLAB.CRDLOAD.PROGRAM,                                Z&T   30
//   UNIT=3330,VOL=SER=CCD932,DISP=OLD                                  Z&T   40
//       DD DSN=SYS1.PPLNKLIB,DISP=SHR                                  Z&T   50
//PLIDUMP DD SYSOUT=A                                                   Z&T   60
//SYSPRINT DD SYSOUT=A                                                  Z&T   70
//RYSIN DD DSN=&HARRY,UNIT=SYSDK,DISP=(NEW,PASS),                       Z&T   90
//  DCB=(RECFM=FB,LRECL=80,BLKSIZE=12800),SPACE=(TRK,(50,5),RLSE)       Z&T  100
//* 1ST DATA CARD ==> DATEMMW ==> MM=MONTH  W=MONDAY OF THE MONTH       Z&T  110
//*   PRESENT DATE GOES IN COL 21 - 28 REMAINDER OF CARD FOR REMARKS.   Z&T  111
//SYSIN DD *                                                            Z&T  120
DATE033              03/23/77,
/*                                                                      Z&T  130
//STEP2 EXEC PGM=IEFBR14,COND=(1,EQ,STEP1)                              Z&T  140
//DL DD DSN=A460097.AZ600.AG4ARTS.DENWCARD,                             Z&T  150
//  UNIT=3330,DISP=(OLD,DELETE),VOL=SER=CCD932                          Z&T  160
/*                                                                      Z&T  170
//STEP3 EXEC PLIXCG,PARM.PLI='NS,NAG,NA,NX,NSTG',COND=(1,EQ,STEP1)      Z&T  180
//PLI.SYSIN DD *                                                        Z&T  190
 LOAD_IT:      /*  WRITE CARDS INTO FILE "RYSIN"  */                   Z&T  200
      PROC OPTIONS (MAIN);                                            Z&T  210
 DCL  CARD          CHAR(80);                                          Z&T  220
      ON ENDFILE (SYSIN) GO TO DUN;                                   Z&T  230
 L1:  READ FILE (SYSIN) INTO (CARD);                                  Z&T  240
      WRITE FILE (RYSIN) FROM (CARD);                                 Z&T  250
      GO TO L1;                                                       Z&T  270
 DUN: PUT EDIT ('LOADING OF "T" & "Z" CARDS IS COMPLETED. ')          Z&T  280
       (SKIP(5),A);                                                   Z&T  281
 END;                                                                 Z&T  290
/*                                                                    Z&T  300
//GO.SYSPRINT DD SYSOUT=A                                             Z&T  310
//GO.RYSIN DD DSN=A460097.AZ600.AG4ARTS.DENWCARD,                       Z&T  320
//  UNIT=3330,VOL=SER=CCD932,                                         Z&T  321
//  DISP=(NEW,KEEP,DELETE),SPACE=(TRK,(50,5),RLSE),                   Z&T  330
//  DCB=(RECFM=FB,LRECL=80,BLKSIZE=12800)                             Z&T  340
//GO.SYSIN DD DSN=&HARRY,DISP=(OLD,DELETE)                            Z&T  350
/*                                                                    Z&T  360
//                                                                    Z&T  590
```

```
/*RELAY  PUNCH RE2                                                          
//AG4170PS JOB (469198600,A579,18,30),' R E GUST ',CLASS=F                  
/*ROUTE  PRINT REMOTE20 RE1                                                 
//STEP1 EXEC PROC=PSORT                                                     PR   010
//* THIS PROGRAM IS USED TO MODIFY THE PARAMETER AND SCHEDULE FILES          PR   020
//*  THERE IS AN ADDITIONAL STEP TO RERIEVE SHCEDULES                       PR   030
//SORTIN DD *     @, I AND S-CARDS FOLLOW HERE                              PR   040
/*                                                                          PR   050
//SORTOUT DD DSN=&SALTL,UNIT=SYSDK,DISP=(NEW,PASS),                         PR   060
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=7280),SPACE=(TRK,(20,5),RLSE)             PR   070
//SYSIN DD *                                                                PR   080
 SORT FIELDS=(1,6,CH,A),SIZE=E1000                                          PR   090
/*                                                                          PR   100
// EXEC PGM=RUBE1,PARM='ISA(60K),R',REGION=260K,TIME=7                      PRSH 110
//STEPLIB DD DSN=CENLAB.PARAMETR.SCHEDULE.PROGRAM,                          PRSH 120
//  UNIT=3330,VOL=SER=CCD932,DISP=OLD                                       PRSH 121
// DD DSN=SYS1.PPLNKLIB,DISP=SHR                                            PR   130
// DD DSN=SYS1.PPLNKSRT,DISP=SHR                                            PR   135
//SYSPRINT DD SYSOUT=A                                                      PR   140
//PLIDUMP DD SYSOUT=A                                                       PR   150
//ACTNFL DD SYSOUT=A                                                        PR   160
//SYSOUT  DD SYSOUT=A                                                       PR   170
//ANALFYR DD DSN=A579.V731.DATAS,UNIT=3330,VOL=SER=CCD933,                  PR   180
// DISP=OLD,DCB=DSORG=D                                                     PR   190
//SCHDFYR     DD DSN=A579.V730.SCHDF,UNIT=3330,SPACE=(CYL,2),               PR   200
//      DISP=OLD,DCB=DSORG=DA,VOL=SER=CCD932                                PR   210
//PARMFYR     DD DSN=A579.V730.PARMF,UNIT=3330,VOL=SER=CCD932,              PR   220
//   DISP=OLD,DCB=DSORG=DA                                                  PR   230
//REDFILE DD DSN=CENLAB.SCHEDULE.REDCOST.FILE,UNIT=3330,                    PRSH 231
//   VOL=SER=CCD932,DISP=OLD,DCB=DSORG=DA                                  PRSH 232
//SORTLIB  DD DSN=SYS1.SM01SORT,DISP=SHR                                    PR   240
//SORTIN   DD UNIT=SYSDK,SPACE=(CYL,(2,1),RLSE),DISP=(NEW,PASS),            PR   250
//  DCB=(RECFM=FB,LRECL=208,BLKSIZE=6240)                                   PR   260
//SORTOUT  DD UNIT=SYSDK,SPACE=(CYL,(2,1),RLSE),DISP=(NEW,PASS),            PR   270
//  DCB=(RECFM=FB,LRECL=208,BLKSIZE=6240)                                   PR   280
//SORTMSG DD SYSOUT=A                                                       PR   290
//SORTWK01  DD UNIT=SYSDK,SPACE=(TRK,(10),,CONTIG),DISP=(,DELETE)           PR   300
//SORTWK02  DD UNIT=SYSDK,SPACE=(TRK,(10),,CONTIG),DISP=(,DELETE)           PR   310
//SORTWK03  DD UNIT=SYSDK,SPACE=(TRK,(10),,CONTIG),DISP=(,DELETE)           PR   320
//SORTWK04  DD UNIT=SYSDK,SPACE=(TRK,(10),,CONTIG),DISP=(,DELETE)           PR   330
//SORTWK05  DD UNIT=SYSDK,SPACE=(TRK,(10),,CONTIG),DISP=(,DELETE)           PR   340
//SORTWK06  DD UNIT=SYSDK,SPACE=(TRK,(10),,CONTIG),DISP=(,DELETE)           PR   350
//SYSIN    DD DSN=&SALTL,UNIT=SYSDK,DISP=(OLD,DELETE)                       PR   360
/*                                                                          PR   370
//                                                                          PR   380
```

6. THROWAWAY LISTING

```
//AG4170TL JOB (469198600,A579,3,5),' R E GUST',CLASS=D,MSGLEVEL=(0,0)
// EXEC PLIXCG,PARM.PLI='NS,NAG,NA,NX,NSTG'
//*  THROW-AWAY LIST DATE IN THE FIRST 19 COLUMNS.
//*  THROW AWAY ALL SSMPLES PRIOR TO SET LISTED IN COLUMN 23 - 25.
//PLI.SYSIN DD *
 TAL: PROC OPTIONS (MAIN);                                          TAL  1

 OPEN FILE (SYSPRINT) PRINT LINESIZE(132);                          TAL  2

 DCL  1  CARD,                                                      TAL  3
        2 NO      CHAR  (1),                                        TAL  4
        2 ID      CHAR  (6),                                        TAL  5
        2 REST    CHAR (73);                                        TAL  6

 DCL  PAGE FIXED (1),                                               TAL  7
      HOLD CHAR (6),                                                TAL  8
      LST(651) CHAR (6);                                            TAL  9

 DCL (COL,I,J,LINES,PAGES)  FIXED(3);

 DCL  1  WHEN,                                                      TAL 10
        2 TDATE   CHAR (19),                                        TAL 11A
        2 SP      CHAR(3),                                          TAL 11B
        2 DT      CHAR(3),                                          TAL 11C
        2 JUNK    CHAR (55);                                        TAL 12

 DCL  SW FIXED (1);                                                 TAL 13

 ON ENDFILE (SYSIN) GO TO SWH ;                                     TAL 14
 PAGE = 1 ;                                                         TAL 15
 SW = 1 ;                                                           TAL 16
 LST = '' ;                                                         TAL 17
 READ FILE (SYSIN) INTO (WHEN) ;                                    TAL 18
 I = 0 ;                                                            TAL 19
 NEW: HOLD = '' ;                                                   TAL 20

 L1:  I = I + 1 ;                                                   TAL 21
 IF I > 650 THEN GO TO L3 ;                                         TAL 22

 L2:  READ FILE (SYSIN) INTO (CARD) ;                               TAL 23
 IF I = 1  THEN GO TO FIRST ;                                       TAL 24
 IF LST(I - 1) = ID   THEN GO TO L2 ;                               TAL 25
 IF SUBSTR(ID,1,3) ¬= SUBSTR(LST(I-1),1,3) THEN                     TAL 26
    DO ;                                                            TAL 27
      LST(I) = '' ;                                                 TAL 28
      I = I + 1 ;                                                   TAL 29
    END;                                                            TAL 30

 FIRST:  LST(I) = ID ;                                              TAL 31
 GO TO L1 ;                                                         TAL 32

 SWH:  SW = 0 ;                                                     TAL 33

 L3: DO PAGES = 1 TO 7 ;     /*  HOW MANY COPIES  */                TAL 34
     PUT EDIT ((7)'*',' THROW AWAY LIST',(7)'*')                    TAL 35
         (COL(36),A,COL(55),A,COL(81),A) ;                          TAL 36
     PUT EDIT ('THE FOLLOWING SAMPLES HAVE BEEN APPROVED/TRANSMITTED.',  TAL 37
         '  BOTTLES FOR THESE SAMPLES SHOULD BE THROWN AWAY ON/AFTER ',  TAL 38
         TDATE)  (SKIP(2), A,A,A);                                  TAL 39
     PUT EDIT ((18)'-') (COL(113),A) ;                              TAL 40
     PUT EDIT ('LIST IS IN ORDER BY JULIAN DATE:',                  TAL 41A
```

```
        '***** DISCARD ALL SAMPLES PRIOR TO JULIAN DATE - ',DT,          TAL 418
        ' *****')    (COL(1),A,X(10),3(A));                             TAL 41C
      PUT SKIP(2);                                                       TAL 41D
        DO LINES = 1 TO 50 ;                                             TAL 42
          PUT EDIT (' ')  (COL(1),A);                                    TAL 43
            DO COL = 0 TO 12 ;                                           TAL 44
               J = COL * 50 + LINES ;                                    TAL 45
               PUT EDIT (LST(J)) (X(4),A(6)) ;                           TAL 46
            END ;                                                        TAL 47
        END ;                                                            TAL 48
      PUT EDIT ('PAGE', PAGE)  (LINE(60),COL(120),A,A) ;                 TAL 49
      END ;                                                              TAL 50

 PAGE = PAGE + 1 ;                                                       TAL 51
 HOLD = LST(651) ;                                                       TAL 52
 LST = '' ;                                                              TAL 53
 I = 0 ;                                                                 TAL 54
 IF HOLD ¬= ''  THEN                                                     TAL 55
         DO ;                                                            TAL 56
           I = 1 ;                                                       TAL 57
           LST(I) = HOLD ;                                               TAL 58
         END ;                                                           TAL 59
 IF SW = 1  THEN GO TO NEW ;                                             TAL 60
 OUT:  PUT EDIT ('DISTRIBUTION:') (PAGE,LINE(20),A) ;                    TAL 61
 PUT EDIT ('ONE COPY TO QUALITY CONTROL.',                               TAL  63
           'ONE COPY TO THE CARBON ROOM IN SECTION 5.',                  TAL  64
           'ONE COPY EACH TO SECTION SIX AND SEVEN.',                    TAL  65
           'THREE COPIES TO THE BOTTLE ROOM.') (LINE(22),4(COL(8),A));   TAL  66
 END;                                                                    TAL 67
/*
//GO.SYSIN DD *
MARCH 17,1977,        229      DATE IN 1 - 19      PRIOR TO IN 23 - 25
/*
//
```

7. PARAMETER LISTING

```
//AG4170LC JOB (469198600,A579),' RUBEN ',CLASS=8                                  A
//STEP1 EXEC PROC=PSORT                                                            B
//SORTIN DD *                                                                      C
/*                                                                                 D
//SORTOUT  DD DSN=&SALT,UNIT=SYSDK,SPACE=(CYL,(5,1),RLSE),DISP=(,PASS),            E
//  DCB=(RECFM=FB,LRECL=80,BLKSIZE=7280)                                           F
//SYSIN  DD *                                                                      G
 SORT FIELDS=(2,4,CH,A)                                                           H
/*                                                                                 I
//  EXEC PLIXCG,PARM.PLI='NS,NAG,NA,NX,NST0'                                       J
//PLI.SYSIN  DD *
 WRD_QW:   PROC OPTIONS (MAIN);                                          WRD   10
 DCL  1 CARDIN,                                                          WRD   20
        2 SIGN       CHAR( 1),                                          WRD   30
        2 LC         CHAR( 4),                                          WRD   40
        2 ST         CHAR( 5),                                          WTD   50
        2 SL         CHAR( 1),                                          WRD   60
        2 ATL        CHAR( 1),                                          WRD   70
        2 ALB        CHAR( 1),                                          WRD   80
        2 DEN        CHAR( 1),                                          WRD   90
        2 STUFF      CHAR(22),                                          WRD  100
        2 SYM        CHAR( 8),                                          WRD  110
        2 NAME       CHAR(20),                                          WRD  120
        2 BLANK      CHAR(15),                                          WRD  130
        2 NUM        CHAR( 1);

 DCL   DATE   BUILTIN,                                                   WRD  210
       WHEN   CHAR(6),                                                   WRD  220
       MARK   CHAR(8)  INITIAL('**/**/**'),                              WRD  230
       (I, J, K)   FIXED(3),                                             WRD  240
       MORE   CHAR(3) INITIAL('YES');                                    WRD  250

 DCL   LB(171)    CHAR(4),                                               WRD  310
       WD(171)    CHAR(5),                                               WRD  320
       L2(171)    CHAR(1),                                               WRD  330
       L3(171)    CHAR(1),                                               WRD  340
       L4(171)    CHAR(1),                                               WRD  350
       NM(171)    CHAR(20);                                              WRD  360

       OPEN FILE (SYSPRINT) OUTPUT STREAM PRINT LINESIZE(132);            WRD  400
       ON ENDFILE (SYSIN) BEGIN;                                          WRD  410
                            MORE = 'NO';                                  WRD  420
                            GO TO PRT;                                    WRD  430
                          END;

       WHEN = DATE;                                                       WRD  510
       SUBSTR(MARK,1,2) = SUBSTR(WHEN,3,2);                               WRD  520
       SUBSTR(MARK,4,2) = SUBSTR(WHEN,5,2);                               WRD  530
       SUBSTR(MARK,7,2) = SUBSTR(WHEN,1,2);                               WRD  540

 RD:   LB, WD, L2, L3, L4, NM = '';                                       WRD  600
       DO I = 1 TO 171;                                                   WRD  610
         READ FILE (SYSIN) INTO (CARDIN);                                 WRD  620
         LB(I) = LC;   WD(I) = ST;   L2(I) = ATL;   L3(I) = ALB;          WRD  630
         L4(I) = DEN;  NM(I) = NAME;                                      WRD  640
       END;                                                               WRD  650
 PRT:  PUT EDIT ('#####  LISTING BY LAB-CODE  #####', 'AS OF ', MARK,     LC   710
                 (3)'   CODE     SECTION                        * ',      WRD  720
                 (3)' LAB  WRD   AT AL D  NAME                  * ')      WRD  730
        (PAGE,COL(11),A,COL(70),2(A),  2(COL(1),A));                      LC   740
       PUT SKIP;                                                          WRD  750
```

```
      DO I = 1 TO 57;                                                    WRD  760
        J = I + 57;                                                      WRD  770
        K = J + 57;                                                      WRD  780
        PUT EDIT (LB(I), WD(I), L2(I), L3(I), L4(I), NM(I),              WRD  790
                  LB(J), WD(J), L2(J), L3(J), L4(J), NM(J),              WRD  800
                  LB(K), WD(K), L2(K), L3(K), L4(K), NM(K))              WRD  810
          (COL(1),3(A,X(1),A,3(X(2),A),X(2),A,X(3)));                    WRD  820
       END;                                                              WRD  830
      IF MORE = 'NO ' THEN GO TO EOJ;                                    WRD  840
      GO TO RD;                                                          WRD  850

 EOJ: END;                                                               WRD 1000

/*
//GO.SYSIN DD DSN=&SALT,DISP=(OLD,PASS)
/*
//


//AG4170NM JOB (469198600,A579),' RUBEN ',CLASS=B
 SORT FIELDS=(45,20,CH,A,2,4,CH,A)                                       NM     G
 PRT: PUT EDIT ('#####  LISTING BY  NAME      #####', 'AS OF ', MARK,    NM   710


//AG4170WC JOB (469198600,A579),' RUBEN ',CLASS=B
 SORT FIELDS=(6,5,CH,A,2,4,CH,A)                                         WRD    G
 PRT: PUT EDIT ('#####  LISTING BY WRD-CODE  #####', 'AS OF ', MARK,     WRD  710

//


---- HASP-II JOB STATISTICS ----

      101 CARDS READ

      101 SYSOUT PRINT RECORDS

        0 SYSOUT PUNCH RECORDS
```

8. RERUN REQUEST

```
/*RELAY  PUNCH RE2                                                          
//AG4170RR JOB (469198600,A579,3,5),' R E GUST ',CLASS=D,                   
//   MSGLEVEL=(0,0)                                                         
//STEP1 EXEC PROC=PSORT,TIME=(,15)                                  RR     1
//SORTIN DD *                                                       RR     2
                  DATE = 03/23/77 = MO/DA/YR                        RR     3
/*                                                                  RR     4
//SORTOUT DD DSN=&RERUN,UNIT=SYSDK,DISP=(NEW,PASS),                 RR     5
// DCB=(RECFM=FB,LRECL=80,BLKSIZE=7280),SPACE=(TRK,(20,5),RLSE)     RR     6
//SYSIN DD *                                                        RR     7
 SORT FIELDS=(9,1,CH,A,12,3,CH,A,1,6,CH,A),SIZE=E1000               RR     8
/*                                                                  RR     9
//STEP2 EXEC PGM=RERUNS,PARM='ISA(6K),R',REGION=100K                RR    10
//STEPLIB DD DSN=RERUN.REQUESTS,UNIT=3330,VOL=SER=CCD932,DISP=OLD   RR    11
//        DD DSN=SYS1.PPLNKLIB,DISP=SHR                             RR    12
//PLIDUMP DD SYSOUT=A                                               RR    13
//SYSPRINT DD SYSOUT=A                                              RR    14
//SYSIN    DD DSN=&RERUN,DISP=(OLD,DELETE)                          RR    15
/*                                                                  RR    16
//                                                                  RR    17
```

9. LABWEEK

```
/*RELAY  PUNCH RE2                                                          
//AG4170DT JOB (469198600,A579),' R E GUST ',CLASS=B                        
/*PROCLIB  WRD.PROCLIB                                              DT    10
//   EXEC  LABWEEK                                                  DT    20
//* DATA CARD FORMAT ==> BILLING CODES IN COL'S 8-9 11-12 14-15 17-18 20-21 ETC
//STEP1.SYSIN DD *                                                  DT    40
      22 34 04                                                            
/*                                                                  DT    50
//                                                                  DT    60
```

```
//
```

```
---- HASP-II JOB STATISTICS ----
```

10. LABBUDG

```
/*RELAY  PUNCH RE2
//AG41708R JOB (469198600,A579,3,5),' R E GUST ',CLASS=B
/*ROUTE  PRINT REMOTE20 RE1
/*PROCLIB  WRD.PROCLIB                                                    D-BGT  1
//    EXEC  LABBUDG                                                      D-BGT  2
//* DATA CARD FORMAT ==> BILLING CODE(S) IN COL'S 8-9,11-12,14-15,ETC MAX OF 7
//STEP1.SYSIN DD *                                                       D-BGT  3
       D1 D1
/*                                                                      D-BGT  4
//                                                                      D-BGT  5



//



---- HASP-II JOB STATISTICS ----
```

11. BACKLOG

```
/*RELAY  PUNCH RE2
//AG41708B JOB (469198600,A579,3,5),' R E GUST ',CLASS=B,
//  MSGLEVEL=(0,0)
/*JOBPARM COPIES=3
/*ROUTE  PRINT REMOTE20 RE1
//STEP1 EXEC PGM=IEFBR14                                                 BB     1
//D1 DD DSN=DENVER.BIG.BROTHER.FILE,UNIT=3330,                           BB     2
//    VOL=SER=CCD933,DISP=(OLD,DELETE)                                   BB     3
/*                                                                       BB     4
//STEP2 EXEC PROC=PSORT                                                  BB    10
//SORTIN DD *                                                            BB    20
 070
/*                                                                       BB    30
//SORTOUT DD DSN=DENVER.BIG.BROTHER.FILE,UNIT=3330,VOL=SER=CCD933,       BB    40
//    SPACE=(CYL,(5,1),RLSE),DISP=(NEW,KEEP,DELETE),                     BB    41
//  DCB=(RECFM=FB,LRECL=80,BLKSIZE=12800)                                BB    50
//SYSIN  DD *                                                            BB    60
 SORT FIELDS=(60,1,CH,A,12,8,CH,A,2,6,CH,A),SIZE=E30000                 BB    70
/*                                                                       BB    80
//STEP3 EXEC PGM=BIGBRO,PARM='ISA(4K),R',REGION=70K,TIME=3               BB    90
//STEPLIB DD DSN=BIG.BROTHER.LIST,UNIT=3330,DISP=OLD,VOL=SER=CCD932      BB   100
//  DD DSN=SYS1.PPLNKLIB,DISP=SHR                                        BB   110
//SYSPRINT DD SYSOUT=A                                                   BB   120
//PRINT DD SYSOUT=A                                                      BB   121
//PLIDUMP  DD SYSOUT=A                                                   BB   130
//SYSIN DD DSN=DENVER.BIG.BROTHER.FILE,UNIT=3330,VOL=SER=CCD933,         BB   140
//    DISP=OLD                                                           BB   141
/*                                                                       BB   150
//
```

12. PRODUCTION

```
/*RELAY  PUNCH RE2
//AG4170US JOB (469197600,A579,3,I5),' R E GUST ',CLASS=B
/*ROUTE  PRINT REMOTE20 RE1
/*JOBPARM COPIES=7
//*
//*   THIS PRINTOUT IS FOR ART BEETEM     PH X6834
//*   FROM RUBEN E. GUST     DENVER LABORATORY    FTS  234-4992.
//*
//STEP1 EXEC PGM=UCSUM,PARM='ISA(60K),R',TIME=4,REGION=160K
//STEPLIB DD DSN=UCARD.MONTH.SUM,UNIT=3330,VOL=SER=CCD932,DISP=OLD       UCARD 20
// DD DSN=SYS1.PPLNKLIB,DISP=SHR                                         UCARD 30
//PLIDUMP DD SYSOUT=A                                                   UCARD 40
//SYSPRINT DD SYSOUT=A                                                  UCARD 45
//INDXFYR DD DSN=A579.V73I.DATAS,UNIT=3330,VOL=SER=CCD933,              UCARD 50
//   DISP=OLD,DCB=DSORG=DA                                              UCARD 60
//PARMFYR DD DSN=A579.V730.PARMF,UNIT=3330,VOL=SER=CCD932,              UCARD 70
//   DISP=OLD,DCB=DSORG=DA                                              UCARD 80
//PARM DD DSN=CENLAB.UCARD.MONSUM,FILE,UNIT=3330,VOL=SER=CCD932,        UCARD 90
//   DISP=OLD,DCB=DSORG=DA                                              UCARD100
//TEMP DD DSN=&WHOA,UNIT=SYSDK,DISP=(NEW,DELETE),                       UCARD101
//   DCB=(RECFM=FB,LRECL=340,BLKSIZE=12920),SPACE=(TRK,(40,5),RLSE)     UCARD102
//* 1 DATA CARD INPUT MANDATORY, IF ALL CODED IN COL. 1 - 3 THEN RESULT UCARD110
//* IS ALL MONTHS AND IF NOT ALL, THEN A NON BLANK CHARACTER IN         UCARD120
//* COL. 1 - 12 GIVES THE DESIRED MONTH OR MONTHS.                      UCARD130
//SYSIN DD *                                                            UCARD140
 X
/*                                                                      UCARD150
//                                                                      UCARD160
```

13. LABPRIM

```
/*RELAY  PUNCH RE2
//AG4170DR JOB (469198600,A579,5,15,400),' R E GUST ',CLASS=F
/*ROUTE  PRINT REMOTE20 RE1
/*ROUTE  PUNCH REMOTE20 RE1
/*KEY       ELLN                                                        D-RET  1
/*PROCLIB  WRD.PROCLIB                                                  D-RET  2
//   EXEC  LABPRIM                                                      D-RET  3
//STEP1.SYSIN DD *                                                      D-RET  4
R20      D15
/*                                                                      D-RET  5
//   EXEC  LABPRIM                                                      D-RET  8
//STEP1.SYSIN DD *                                                      D-RET  9
        D32
/*                                                                      D-RET 11
//
```

```
/*RELAY  PUNCH RE2
//AG417082 JOB (469198600,A579,3,5),' R E GUST ',CLASS=F
/*SETUP    112051/9R,113677/9R                                          82    10
//STEP1 EXEC PGM=FDRDSF,REGION=100K                                     82    20
//STEPLIB DD DSN=SYS1.FDR,DISP=SHR                                      82    30
//SYSPRINT DD SYSOUT=A                                                  82    40
//SYSUDUMP DD SYSOUT=A                                                  82    50
//DISK1 DD UNIT=3330,DISP=SHR,VOL=SER=CCD932                            82    60
//TAPE1 DD UNIT=TAPE9,DISP=(,KEEP),VOL=SER=112051,                      82    70
//  LABEL=(1,SL),DSN=ATL.ALB.BACKUP                                     82    80
//SYSIN DD *                                                            82    90
 DUMP DSN=A579.V730.DATAF                                               82   100
  DUMP DSN=A579.V730.PARMF                                              82   110
  DUMP DSN=A579.V730.SCHDF                                              82   120
   DUMP DSN=OAR.STE.SRS                                                 82   130
  DUMP DSN=CENLAB.DISTRICT.ACCOUNT.FILE                                 82   140
  DUMP DSN=CENLAB.BLIND.SAMPLE.INFOR                                    82   150
  DUMP DSN=CENLAB.COEFF.FILE                                            82   160
  DUMP DSN=CENLAB.BLIND.SAMPLE.INDEX                                    82   170
  DUMP DSN=CENLAB.FEDERAL.SCHEDULE.FILE                                 82   180
   DUMP DSN=CENLAB.UCARD.MONSUM.FILE                                    82   190
   DUMP DSN=CENLAB.SCHEDULE.REDCOST.FILE                                82   199
  DUMP DSN=CENLAB.REMOTE.RETRIEVE.FILE                                  82   200
/*                                                                      82   210
//STEP2 EXEC PGM=FDRDSF,REGION=100K                                     82   220
//STEPLIB DD DSN=SYS1.FDR,DISP=SHR                                      82   230
//SYSPRINT DD SYSOUT=A                                                  82   240
//SYSUDUMP DD SYSOUT=A                                                  82   250
//DISK1 DD UNIT=3330,DISP=SHR,VOL=SER=CCD933                            82   260
//TAPE1 DD UNIT=TAPE9,DISP=(,PASS),VOL=SER=113677,                      82   270
//  LABEL=(1,SL),DSN=SLC.DEN.BKUP                                       82   280
//SYSIN DD *                                                            82   290
 DUMP DSN=A579.V731.DATAS                                               82   300
/*                                                                      82   310
//STEP3 EXEC PGM=L001,PARM='ISA(8K),R',REGION=120K,TIME=4               82   320
//STEPLIB DD DSN=CENLAB.FEDERAL.FILE.BACKUP,                            82   330
//  UNIT=3330,VOL=SER=CCD932,DISP=OLD                                   82   340
//   DD DSN=SYS1.PPLNKLIB,DISP=SHR                                      82   350
//PLIDUMP  DD  SYSOUT=A                                                 82   360
//SYSPRINT DD  SYSOUT=A                                                 82   370
//DURRENT DD DSN=SAVENQ,UNIT=2400,VOL=SER=113677,DISP=(NEW,KEEP,KEEP),  82   380
//  DCB=(RECFM=FB,LRECL=416,BLKSIZE=12896),LABEL=(2,SL)                 82   390
//CURRENT DD DSN=CENLAB.FEDERAL.FYR1977.FILE,                           82   400
//  UNIT=3330,VOL=SER=CCD932,DISP=(OLD,KEEP)                            82   410
//SYSIN DD *                                                            82   420
Y     Y = PRINT       N = NO PRINT                                      82   430
/*                                                                      82   440
//STEP4 EXEC PGM=L001,PARM='ISA(8K),R',REGION=120K,TIME=4               82   441
//STEPLIB DD DSN=CENLAB.FEDERAL.FILE.BACKUP,                            82   442
//  UNIT=3330,VOL=SER=CCD932,DISP=OLD                                   82   443
//   DD DSN=SYS1.PPLNKLIB,DISP=SHR                                      82   444
//PLIDUMP  DD  SYSOUT=A                                                 82   445
//SYSPRINT DD  SYSOUT=A                                                 82   446
//DURRENT DD DSN=SAVENT,UNIT=2400,VOL=SER=113677,DISP=(NEW,KEEP,KEEP),  82   447
//  DCB=(RECFM=FB,LRECL=416,BLKSIZE=12896),LABEL=(3,SL)                 82   448
//CURRENT DD DSN=CENLAB.FEDERAL.STATION.FILE,                           82   449
//  UNIT=3330,VOL=SER=CCD932,DISP=(OLD,KEEP)                            82   450
//SYSIN DD *                                                            82   451
N     Y = PRINT       N = NO PRINT                                      82   452
/*                                                                      82   453
//                                                                      82   850
```

15. GRAPHITE

```
/*RELAY  PUNCH RE2
//AG4170GF JOB (469198600,A579,3,9),' R E GUST',CLASS=F,MSGLEVEL=(0,0)
//  EXEC PGM=GRAFURN,PARM='ISA(6K),R',TIME=3,REGION=70K
//STEPLIB DD DSN=CENLAB.GRAFURN.PROGRAM,
//  UNIT=3330,VOL=SER=CC0932,DISP=OLD
//        DD DSN=SYS1.PPLNKLIB,DISP=SHR
//PLIDUMP DD SYSOUT=A
//SYSPRINT DD SYSOUT=A
//PRTBAD   DD SYSOUT=A
//PRTGOOD  DD SYSOUT=A
//SYSIN DD *
/*
//
```

16. BOTTLE TYPE

```
//AG4170BC JOB (469198600,4579,3,5),' R E GUST ',CLASS=B
//  EXEC PLIXCG
//PLI.SYSIN  DD *
 BOT_TYP: /* PARAMETER ===> BOTTLE TYPE */  PROC OPTIONS (MAIN);                  10

 DCL 1 CARD,                                                                    20
       2 SIGN       CHAR( 1),                                                   30
       2 LC         CHAR( 4),                                                   40
       2 STUFF      CHAR(23),                                                   50
       2 TYPE       CHAR( 2),                                                   60
       2 AMT        CHAR( 6),                                                   70
       2 SYM        CHAR( 8),                                                   80
       2 NAME       CHAR(20),                                                   90
       2 BLK        CHAR(15),                                                  100
       2 NUM        CHAR( 1),                                                  110

      TYP(35)  CHAR(12),                                                       150
      (I, N)  FIXED(3),                                                        160
      LB(110)  CHAR(4),                                                        170
      TY(110)  CHAR(12),                                                       180
      SM(110)  CHAR(8),                                                        190
      MORE  CHAR(3) INITIAL ('YES'),                                           200
      T  FIXED(2);                                                             210

      ON ENDFILE (SYSIN) BEGIN;                                                310
                           MORE = 'NO';                                        320
                           GO TO PRT;                                          330
                         END;                                                  340

      TYP( 1) = 'FA          ';                                                420
      TYP( 2) = 'FA--AM      ';                                                430
      TYP( 3) = 'RA          ';                                                440
      TYP( 4) = 'RU          ';                                                450
      TYP( 5) = 'RU--SS      ';                                                460
      TYP( 6) = 'RU ZNAC     ';                                                470
      TYP( 7) = 'RC--MBAS    ';                                                480
      TYP( 8) = 'RC H2SO4    ';                                                490
      TYP( 9) = 'RC CUSO4    ';                                                500
      TYP(10) = 'RC NAOH     ';                                                510
      TYP(11) = 'RC O & GR   ';                                                520
      TYP(12) = 'FU          ';                                                530
      TYP(13) = 'RA--HG,AS   ';                                                540
      TYP(14) = 'RA--EPA     ';                                                550
      TYP(15) = 'RC          ';                                                560
      TYP(16) = 'FC          ';                                                570
      TYP(17) = 'FA--SPEC    ';                                                580
      TYP(18) = 'CU          ';                                                590
      TYP(19) = 'CC          ';                                                600
      TYP(20) = 'RA--SPEC    ';                                                610
      TYP(21) = 'RU-TRITIUM  ';                                                620
      TYP(22) = 'CALL CEN LAB';                                                630
      TYP(23) = 'FA CLEAN LAB';                                                640
      TYP(24) = 'RA CLEAN LAB';                                                650
      TYP(25) = 'TOC         ';                                                660
      TYP(26) = 'DOC         ';                                                670
      TYP(27) = 'CALL CEN LAB';                                                680
      TYP(28) = 'SILVER FILT.';                                                690
      TYP(29) = 'RC-ORGANIC  ';                                                700
      TYP(30) = 'BTM-ORGANIC ';                                                710
      TYP(31) = 'FU-RAD.CHEM.';                                                720
      TYP(32) = 'RU-RAD.CHEM.';                                                730
```

```
      TYP(33) = 'NOT DEFINED ';                                          740
      TYP(34) = 'NOT DEFINED ';                                          750
      TYP(35) = 'NONE        ';                                          760

 RD:  LB, TY, SM = '';                                                   810
      DO I = 1 TO 110;                                                   820
 RD2:   READ FILE (SYSIN) INTO (CARD);                                   830
        IF TYPE = '' THEN GO TO RD2;                                     840
        T = TYPE;                                                        850
        LB(I) = LC;                                                      860
        SM(I) = SYM;                                                     870
        TY(I) = TYP(T);                                                  880
       END;                                                              890

 PRT: PUT EDIT ('PARAMETER - BOTTLE TYPE CROSS REFERENCE',               910
        'LAB', 'LAB', (2)'CODE  SYMBOL    BOTTLE TYPE       ')          920
       (PAGE,COL(15),A, SKIP,A,COL(34),A, SKIP,A);                       930
      DO I = 1 TO 55;                                                    940
        N = I + 55;                                                      950
        PUT EDIT (LB(I), SM(I), TY(I), LB(N), SM(N), TY(N))              960
         (SKIP,A,2(X(2),A),COL(34),A,2(X(2),A));                         970
       END;                                                              980
      IF MORE = 'NO ' THEN GO TO EOJ;                                    990
      GO TO RD;                                                         1000

 EOJ: END;  /* END OF JOB */                                            2000

/*
//GO.SYSIN DD *
/*
//
```

```
//
```

```
---- HASP-II JOB STATISTICS ----
```

Appendix D
File Formats

```
     /*  PARAMETER/LAB-CODE RECORD STRUCTURE  */                          SR   550
DCL     1 PARM_RCD BASED(P_PARM),                                         SR   551
          2 PARM_LAB_CODE FIXED BIN(15), /* RECORD ID */                  SR   560
          2 PARM_SWITCHES, /* BIT SWITCHES - REMARKS CORRESPOND TO */      SR   570
                           /* THE SWITCHES SET TO '1'B                */  SR   580
           (3 PARM_CALC, /* CONST. CALCULATED UNLESS */                   SR   590
                         /* PARM_LSEC(LABNO) > '0'   */                   SR   600
            3 PARM_MCATION, /* POTENTIAL MAJOR CATION */                  SR   610
            3 PARM_MANION,  /* POTENTIAL MAJOR ANION  */                  SR   620
            3 PARM_UGL,     /* UNITS EXPRESSED IN UG/L */                 SR   630
            3 PARM_MGL,     /* UNITS EXPRESSED IN MG/L */                 SR   640
            3 PARM_DSCAL,   /* CONST. TO BE ADDED TO CALCULATED */        SR   650
                            /* SUM OF DISOLVED SOLIDS          */         SR   660
            3 PARM_TOT,     /* TOTAL CONSTITUENT */                       SR   670
            3 PARM_PNDG,    /* CONST. TO BE AUTOMATICALLY MARKED */       SR   680
                            /* PENDING DURING LOG-IN */                   SR   690
            3 PARM_ADD, /* ADD (ADD='1'B) OR SUBTRACT (ADD='0'B) THE */SR   700
                        /* VALUES LOCATED BY PARM_LCH AND PARM_LCL   */SR   710
            3 PARM_ADT) /* ADD (ADT='1'B) OR SUBTRACT (ADT='0'B) THE */SR   720
                        /* VALUE LOCATED BY PARM_LCT TO | FROM THE   */SR   730
                        /* RESULT OF THE FIRST COMPUTATION           */SR   740
                     BIT(1),                                              SR   750
            3 PARM_SWR BIT(6), /* RESERVED */                             SR   760
          2 PARM_CODE FIXED BIN(31), /* EPA 5 DIGIT CODE */               SR   770
          2 PARM_LSEC(4) CHAR(1), /* LAB SEC. RESPONSIBLE FOR DETR. */     SR   780
                                  /* SUBSCRIPT = LAB NO. */                SR   790
          2 PARM_LCGEN(4) FIXED BIN(15), /* LAB CODES GENERATED DUE */     SR   800
                                         /* TO SCHEDULE ADDITIONS   */     SR   810
          2 PARM_SYMB CHAR(8),   /* ABREVIATED NAME */                     SR   820
          2 PARM_EDIT, /* EDIT DATA FOR ROUNDING AND PRINTING */          SR   830
                       /* NO. OF SIGNIFICANT FIGURES TO BE REPORTED */    SR   840
                       /* IN THE INDICATED ABSOLUTE VALUE RANGE  */       SR   850
            (3 PARM0_TOH,   /* 0 TO < 0.01 */                            SR   860
             3 PARMH_TOT,     /* 0.01 TO < 0.1 */                        SR   870
             3 PARMT_TOI,   /* 0.1 TO < 1 */                             SR   880
             3 PARMI_TOX,   /* 1 TO < 10 */                              SR   890
             3 PARMX_TOC,   /* 10 TO < 100 */                            SR   900
             3 PARMC_TOM,   /* 100 TO < 1000 */                          SR   910
             3 PARMM_TOB,   /* 1000 TO INFINITY */                       SR   920
             3 PARM_MAXD) /* MAXIMUM NO. DECIMAL PLACES  */             SR   930
                       FIXED DEC(1),                                     SR   940
          2 PARM_NAME CHAR(20), /* CONST. NAME */                         SR   950
          2 PARM_CONV_MEQ FLOAT(6), /* MEQ CONV. FACTOR */                SR   960
          2 PARM_COSTF FLOAT(6), /* COST FACTOR */                        SR   970
          2 PARM_PGMCNTL FIXED BIN(15), /* A579 LABEL ARRAY INDEX */     SR   980
         (2 PARM_LCH, /* PRIME LAB CODE IN GENERAL COMP. ROUTINE     */SR   990
          2 PARM_LCL, /* SECONDARY LAB CODE IN GENERAL COMP. ROUTINE */SR  1000
          2 PARM_LCT) /* THIRD LAB CODE IN GENERAL COMP. ROUTINE     */SR  1010
                   FIXED BIN(15),                                        SR  1020
          2 PARM_MULTP FLOAT(6), /* MULTIPLIER USED IN GEN.COMP.RTN. */SR  1030
          2 PARM_NCC FIXED BIN(15), /* NO. CALIBRATION CURVES */         SR  1040
          2 PARM_NUM_PTS FIXED BIN(15), /* TOTAL NO. PTS IN ALL CC */    SR  1050
            /* NOTE THAT PARM_NCC & PARM_NUM_PTS = 00 WHEN THE */        SR  1060
            /* PARM_RCD IS STORED ON DISK (REGIONAL(1) DATA SET) */      SR  1070
          2 PARM_DISSC FIXED BIN(15), /* LOCATES THE DISSOLVED */        SR  1080
                       /* COMPONENT OF A TOTAL CONSTITUENT */           SR  1090
          2 PARM_SMPL CHAR(2), /* TYPE OF SAMPLE */                      SR  1110
          2 PARM_QTY FIXED BIN(15), /* QUANTITY OF SAMPLE IN ML */       SR  1120
          2 PARM_RES CHAR(14);                                           SR  1130
```

2. SCHDFYR

```
     /*  LAB ANALYSIS SCHEDULES STRUCTURE  */                          SR   460
DCL 1 ASCHD_STR BASED(P_ASU),                                          SR   461
     (2 ASCHD_NO,                 /* SCHEDULE NUMBER                */SR   470
      2 ASCHD_NCODES              /* NUMBER OF CODES IN SCHEDULE    */SR   480
     )FIXED BIN(15),                                                   SR   490
      2 ASCHD_DT CHAR(2),         /* DISTRICT CODE                  */SR   500
     (2 ASCHD_NU,                 /* NOT USED                       */SR   510
      2 ASCHD_LCODES(100)         /* LAB CODE NUMBERS               */SR   520
     )FIXED BIN(15);                                                   SR   530
```

3. FED

```
DCL 1 FEDERAL_FILE, /* FEDERAL STRUCTURE */                                TC  2220
2 RES1 CHAR(1), /* NOT USED */                                            TC  2230
2 STATION_ID CHAR(15), /* STATION IDENTIFICATION */                       TC  2240
2 ACC_NUMBER CHAR(9), /* FEDERAL ACCOUNT # */                            TC  2250
2 FREQUENCY CHAR(3), /* # OF TIMES SAMPLED PER YEAR */                   TC  2260
2 ADD_PROGRAM CHAR(1), /* IF ANALYSIS > 100 PARAMETERS, USE */           TC  2270
2 STATION_TYPE CHAR(2), /* NM = NASQAN MONTHLY, ETC */                    TC  2280
2 DISTRICT_CODE CHAR(2),                                                 TC  2290
2 DELETED CHAR(1), /* Y = YES, OTHER = NO */                             TC  2300
2 SCH_NUMBER FIXED BIN(15), /* SCHEDULE # IN FEDERAL FILE */             TC  2310
2 NLAB CHAR(1), /* LAB # CHECK FOR SYSTEM FAILURE */                     TC  2320
2 N_CHE_JD CHAR(3), /* LAB JULIAN DATE CHECK FOR SYSTEM FAILURE */       TC  2330
2 TOTAL_ALLOW_COST FLOAT(9), /* INCLUDES #OTSI */                        TC  2340
2 TOTAL_COST_DATE FLOAT(9), /* INCLUDES #OTSI */                         TC  2350
2 N_SMPL_ID FIXED BIN(31),                                               TC  2360
2 WOTSI_FACTOR FLOAT(6), /* IN FRONT OF FED_DATE(24), */                 TC  2370
2  SAVEIT CHAR(8), /* RESERVED */                                        TC  2380
2 FED_DATE(24), /* MAXIMUM = 24 DATES */                                 TC  2390
  3 DATE_STORED CHAR(6),                                                 TC  2400
2 FED_DATA(100),                                                         TC  2410
  3 FED_KOUNT FIXED BIN(15);                                    &        TC  2420
/* TOTAL = 416 BYTES, 31 RECORDS PER BLOCK, BLKSIZE = 12896 BYTES */     TC  2430
 /*  KEY = FIRST 31 BYTES */                                             TC  2440
```

4. BLIND STANDARD REFERENCE

```
DCL CURRENT FILE RECORD              KEYED ENV(INDEXED),                SRP 1740
1 FEDFILE_SRS,                                                          SRP 1750
 2 RESI CHAR(1),                                                        SRP 1760
2 STATION_ID1 CHAR(15),                                                 SRP 1770
  2 RESERVED CHAR(2),                                                   SRP 1780
 2 DATA(100),                                                           SRP 1790
  3 LAB_CODE FIXED BIN(15),                                             SRP 1800
3 TRUE_VALUE FLOAT(6),                                                  SRP 1810
 3 STAND_DEV FLOAT(6),                                                  SRP 1820
 3 USE_STAN_DEV CHAR(1), /* Y = YES, OTHER = NO */                      SRP 1830
 3 RES2 CHAR(1);  /* RECORD LENGTH = 1218 BYTES */                      SRP 1840

//


---- HASP-II JOB STATISTICS ----


       49 CARDS READ
```

5. STANDARD REFERENCE

```
DCL 1  STAND_REF,                                                       SRP  240
        2 NO FIXED BIN(15),                                             SRP  250
        2 ACTIVE CHAR(1),  /* Y = YES, N = NO */                        SRP  260
        2 DATA(100),                                                    SRP  270
            3 LAB_CODE FIXED BIN(15),                                   SRP  280
            3 VALUE    FLOAT(6),                                        SRP  290
            3 STAN_DEV FLOAT(6);                                        SRP  300
                                                                        SRP  310

//


---- HASP-II JOB STATISTICS ----


       46 CARDS READ


       46 SYSOUT PRINT RECORDS
```

6. PRODUCTION

```
/* PROGRAM TO PUT INDIVIDUAL DATA INTO FILE AS TO HOW MUCH          UCI   20
   PROCESSED MONTHLY */                                            UCI   30
 DCL  1 DATA,                                                      UCI   40
        2 PARM_CODE FIXED BIN(15),                                 UCI   50
  2 R1 CHAR(2),                                                    UCI   60
        2 MONTH(12),                                               UCI   70
          3 FYR CHAR(2),                                           UCI   80
     3 R2 CHAR(2),                                                 UCI   90
          3 SLC FIXED BIN(31),                                     UCI  100
          3 ATL FIXED BIN(31),                                     UCI  110
          3 ALB FIXED BIN(31),                                     UCI  120
          3 DEN FIXED BIN(31),                                     UCI  130
          3 SLCK FIXED BIN(15),                                    UCI  140
          3 ATLK FIXED BIN(15),                                    UCI  150
          3 ALBK FIXED BIN(15),                                    UCI  160
          3 DENK FIXED BIN(15);                                    UCI  170
 /* TOTAL OF ABOVE = 340 BYTES FOR DATA STRUCTURE */               UCI  180

//



---- HASP-II JOB STATISTICS ----


       48 CARDS READ
```

7. LABBUDG

```
     /* STRUCTURE TO PULL OUT PRIOR ACCOUNTING AND ADD TO IT.  */     BT   351
     /* "MONTH" SERVES AS A CHECK TO PREVENT DOUBLE ADDITION.  */     BT   351
     /* THERE ARE A MAXIMUM OF 600 ACCOUNTS.                   */     BT   352
DCL  1 ACC_DATA,                                                      BT   360
       2 MONTH          CHAR(2),                                      BT   370
       2 KOUNT          FIXED BIN(15),                                BT   380
       2 RESERVED2      CHAR(4),                                      BT   390
       2 DATA(600),                                                   BT   400
         3 ACC_TOTAL    FLOAT(9),                                     BT   410
       2 DATA1(600),                                                  BT   420
         3 ACC_NAME     CHAR(9),                                      BT   430
       2 RESERVED3      CHAR(2400);                                   BT   440
```

```
CREATE: /* CREATE NEW REMOTE DIRECT ACCESS RETRIEVAL FILE */
 PROC OPTIONS (MAIN);
DCL RTFILE FILE KEYED ENV(F BLKSIZE(12800) REGIONAL(1));
DCL 1 NEW_REC,
     2 DATA(800),
         3 RMOTE FIXED BIN(15),
         3 LB# CHAR(1),
         3 R_CODE BIT(1),
         3 N_ACTIVE BIT(1),
         3 DEACTIVE BIT(1),
         3 R_AR BIT(1),
         3 R_AI BIT(1),
         3 R1 BIT(1),
         3 R2 BIT(1),
         3 R3 BIT(1),
         3 RCORD FIXED BIN(31),
         3 LABID FIXED BIN(31),
         3 STBILL CHAR(2), 3 RESERVED CHAR(2);
DO I = 1 TO 800;
RMOTE(I) = 0B; LB#(I) = ''; R_CODE(I) = '1'B; N_ACTIVE(I) = '1'B;
 DEACTIVE(I) = '1'B; R_AR(I) = '1'B; R_AI(I) = '1'B;
 R1(I) = '1'B; R2(I) = '1'B; R3(I) = '1'B;
RESERVED(I) = '';
RCORD(I) = 0B; LABID(I) = 0B; STBILL(I) ='''; END;
DO I = 0 TO 12;
IF I = 0B THEN RCORD(1) = 2; ELSE RCORD(1) = 0B;
WRITE FILE (RTFILE) FROM (NEW_REC)    KEYFROM (I);
PUT EDIT ('RECORD HAS BEEN CREATED FOR REGION ',I) (COL(1),A,F(6));
END;
END;
```

9. ANALFYR

```
    /*  "ANALFYR" DESCRIPTIVE RECORD  */                                    QC  2170
DCL 1 DILADR_STR,                                                           QC  2180
      2 I_SMPL_ID  FIXED BIN(31),    /* SAMPLE ID. NO.              */      QC  2190
      2 I_RGN  FIXED BIN(31),    /* REGION NO. FOR THIS RECORD     */      QC  2200
      2 I_DRGN  FIXED BIN(31),   /* REGION NO. FOR THE 1ST DATA RCD */      QC  2210
      2 I_BIT_SW,                                                           QC  2220
        3 I_B6  BIT(6),                                                     QC  2221
        3 I_REDUCECOST  BIT(1),                                             QC  2222
        3 I_B8  BIT(1),                                                     QC  2223
      2 I_RES  CHAR(3),                                                     QC  2224
      2 I_COST_WGTF  FLOAT(6),   /* COST WEIGHT FACTOR             */      QC  2230
      2 I_TOT_COST  FLOAT(6),    /* TOTAL COST FOR THE SAMPLE      */      QC  2240
      2 I_ASCHD_NO(4)  FIXED BIN(15),   /* ANALYSIS SCHEDULE(S)    */      QC  2250
      2 I_NDETR_CMPLT  FIXED BIN(15),   /* NO. DETR. COMPLETED     */      QC  2260
      2 I_PSUM_DETR  FIXED BIN(15),   /* TOTAL NO. DETERMINATIONS  */      QC  2270
      2 CHECK_COST  FLOAT(6),    /* COST BEFORE THIS RUN           */      QC  2271
      2 I_OUT  FIXED BIN(15), /* # OF TIMES ANALYSIS HAS BEEN OUT  */      QC  2272
      2 I_STATUS  CHAR(1),   /* U = UNAPPROVED UNPASSED IN A533    */      QC  2273
      2 I_DATE  CHAR(6),         /* DATE OF COMPLETED ANALYSIS     */      QC  2274
      2 NEW_LOG  CHAR(1),        /* NEW ACCOUNTING SYSTEM          */      QC  2280
      2 I_RMT#  FIXED BIN(15),   /* REMOTE, ANALYSIS ROUTED TO     */      QC  2281
      2 I_GUNIT  CHAR(8),        /* GEOLOGIC UNIT CODE             */      QC  2290
      2 I_LABN  CHAR(1),         /* PROCESSING LAB #               */      QC  2300
      2 I_STA_NM  CHAR(48),      /* STATION NAME                   */      QC  2320
      2 I_STATE  CHAR(2),        /* DISTRICT CODE                  */      QC  2330
      2 I_COUNTY  CHAR(3),       /* COUNTY CODE                    */      QC  2340
      2 I_PROJECT  CHAR(9),      /* PROJECT ID                     */      QC  2350
      2 I_AGENCY  CHAR(3),       /* AGENCY CODE                    */      QC  2360
      2 I_MADDR  CHAR(19),       /* MAALING ADDRESS                */      QC  2370
      2 I_CMNT(3)  CHAR(69);     /* COMMENTS                       */      QC  2380
```

```
     /* "ANALFYR" BASIC DATA RECORD */                                  QC   880
DCL                                                                     QC   881
1 LABDR_STR,                    /* DATA RECORD */                       QC   890
  2 D_SMPL_ID FIXED BIN(31),  /* SAMPLE ID. NO. */                      QC   900
  2 D_RGN FIXED BIN(31), /* REGION NO. FOR THIS RCD. */                 QC   910
  2 D_PTR FIXED BIN(31), /* REGION NO. OF DISCR. INFO. RCD. */          QC   920
  2 D_BIT_SW, /* IF BITS LISTED BELOW = '1'B THEN: */                   QC   930
    3 D_RCD_TYP BIT(1), /* ONLY DATA IS STORED IN THIS RCD. */          QC   940
    3 D_LST_RCD BIT(1), /* LAST DATA RCD. STORED FOR SAMPLE */          QC   950
    3 D_ACTIVE BIT(1),  /* THIS SAMPLE IS ACTIVE */                     QC   960
    3 D_REJECT BIT(1),  /* THIS SAMPLE WAS REJECTED */                  QC   970
    3 D_81 BIT(1), /* NOT USED */                                       QC   980
    3 D_USGS BIT(1),     /* NOT USGS DATA */                            QC   990
    3 D_SWFILE BIT(1),  /* DATA TO BE STORED IN QUALITY FILE */         QC  1000
    3 D_82 BIT(1),  /* NOT USED */                                      QC  1010
    3 D_FILE_ENTRY BIT(1), /* DATA STORED IN OUTPUT FILE */             QC  1020
    3 D_RCD_CMPLT BIT(1),  /* DETERMINATIONS COMPLETED */               QC  1030
    3 D_SOLIDS BIT(1),  /* CAL. SUM OF DIS. SOLIDS */                   QC  1040
    3 D_83 BIT(1),  /* NOT USED */                                      QC  1050
    3 D_PCNT_NA BIT(1), /* CAL. % SODIUM */                             QC  1060
    3 D_SAR BIT(1),    /* CAL. SODIUM ABS. RATIO */                     QC  1070
    3 D_DS_TD BIT(1),    /* CAL. DIS. SOLIDS TONS/DAY */                QC  1080
    3 D_CDFILE BIT(1),  /* PUNCH DATA IN QW FORMAT */                   QC  1090
  2 D_STAID CHAR(15),    /* STATION ID. NO. */                          QC  1100
  2 D_BGN_DATE CHAR(6), /* DATE SAMPLE TAKEN OR BEGIN DATE */           QC  1110
  2 D_END_DATE CHAR(6), /* END DATE  (COMPOSITES ONLY) */               QC  1120
  2 D_TIME CHAR(4),      /* TIME SAMPLE TAKEN */                        QC  1130
  2 D_SRCE CHAR(2),      /* SITE CODE */                                QC  1140
  2 D_STCD_LOC CHAR(2), /* STATE CODE */                                QC  1150
  2 D_LLS CHAR(15),    /* LAT-LONG-SEQ.NO. */                          QC  1160
  2 D_RED_COST  FLOAT(6),                                             QC  1170
  2 D_SAVE2  CHAR(10),                                                QC  1171
  2 D_NO_DETR FIXED BIN(15), /* NO. OF CONSTITUENTS */                 QC  1180
  2 O_DATA(34),       /* DATA ARRAY */                                QC  1190
    3 D_VALUE FLOAT(6), /* DATA VALUE */                              QC  1200
    3 D_LABCD FIXED BIN(15),  /* LAB CODE */                          QC  1210
    3 D_PRMK CHAR(1),    /* REMARK CODE */                            QC  1220
    3 D_CAL BIT(1),    /* VALUE IS CALCULATED */                      QC  1230
            /* IF BITS LISTED BELOW = '1'B THEN: */                   QC  1240
    3 D_ENTRY BIT(1), /* VALUE HAS BEEN STORED */                     QC  1250
    3 D_DLTE BIT(1),  /* CONSTITUENT HAS BEEN DELETED */              QC  1260
    3 D_PNDG BIT(1),  /* DETERMINATION PENDING */                     QC  1270
    3 D_NEWV BIT(1),  /* VALUE NOT YET STORED IN OUTPUT FILE */       QC  1280
    3 D_NCHG BIT(1),  /* DO NOT CHARGE FOR THIS DETR. */              QC  1290
    3 D_FCHR  BIT(1),                                                 QC  1291
    3 D_RES2  BIT(1);                                                 QC  1292
```

10. WRD

```
DCL     1 B_STR BASED(P_B),                                          AU  2110
          2 B_R1 CHAR(1),                                                2120
          2 B_STAID CHAR(15),                                            2130
          2 B_B19 CHAR(2),                                               2140
          2 B_BGND CHAR(6),                                              2150
          2 B_E19 CHAR(2),                                               2160
          2 B_ENDD CHAR(6),                                              2170
          2 B_TIME CHAR(4),                                              2180
          2 B_TYPE CHAR(1),                                              2190
          2 B_CCD CHAR(3),                                               2200
          2 B_SCD CHAR(2),                                               2210
          2 B_OCD CHAR(2),                                               2220
          2 B_GUNIT CHAR(8),                                             2230
          2 B_R2 CHAR(30),                                               2240
          2 B_SI CHAR(2),                                                2250
          2 B_R3 CHAR(48),                                               2260
          2 B_NDETR FIXED BIN(31),                                       2270
          2 B_DATA(DIMENB REFER(B_NDETR)),                               2280
            3 B_PARM FIXED BIN(31),                                      2290
            3 B_VALUE FLOAT(6),                                          2300
            3 B_CMNT CHAR(4);                                        AU  2310
```

11. STATION HEADER

```
/* H & N CARDS MADE HERE */                                          QC  3590
  PUT FILE(HPASS) EDIT                                               QC  3600
     ('H',D_STAID,D_LLS,D_STCD_LOC,I_STATE,I_COUNTY,D_SRCE,'X',      QC  3610
      'N',D_STAID,I_STA_NM,I_GUNIT,'X')                              QC  3620
     (A(1),A(15),A(15),A(2),A(2),A(3),A(2),X(39),A(1),               QC  3630
      A(1),A(15),A(48),A(8),X(7),A(1));                              QC  3640
```

```
---- HASP-II JOB STATISTICS ----


        44 CARDS READ


        44 SYSOUT PRINT RECORDS
```

Appendix E
Reports

1. SCHEDULE LISTING

DISTRICT CODE CL DATE 77/02/23

SCHEDULE NUMBER 10 TOTAL ACTUAL COST OF ANALYSIS =$87.19

LAB	STORET	NAME
6	01000	ARSENIC DISSOLVED
17	01030	CHROMIUM DISSOLVED
18	01035	COBALT DISSOLVED
22	01040	COPPER DISSOLVED
36	01046	IRON DISSOLVED
37	01045	IRON TOTAL
38	01049	LEAD DISSOLVED
41	01055	MANGANESE TOTAL
42	01056	MANGANESE DISSOLVED
67	01090	ZINC DISSOLVED
73	01025	CADMIUM DISSOLVED
87	01145	SELENIUM DISSOLVED
114	00680	CARBON TOT ORGANIC
226	71890	MERCURY DISSOLVED
227	71900	MERCURY TOTAL
231	01001	ARSENIC SUSPENDED
232	01002	ARSENIC TOTAL
241	01026	CADMIUM SUSPENDED
242	01027	CADMIUM TOTAL
245	01031	CHROMIUM SUSPENDED
246	01034	CHROMIUM TOTAL
247	01036	COBALT SUSPENDED
248	01037	COBALT TOTAL
249	01041	COPPER SUSPENDED
250	01042	COPPER TOTAL
256	01050	LEAD SUSPENDED
257	01051	LEAD TOTAL
262	01054	MANGANESE SUSPENDED
263	71895	MERCURY SUSPENDED
275	0104-	IRON SUSPENDED
285	01146	SELENIUM SUSPENDED
286	01147	SELENIUM TOTAL
295	01091	ZINC SUSPENDED
296	01092	ZINC TOTAL

********** SAMPLE TYPE AND VOLUME REQUIREMENT INFORMATION FOR THE ABOVE SCHEDULE **********

NOTE: VOLUMES LISTED ARE MINIMUM AMOUNTS IN MILLILETERS OR GRAMS REQUIRED TO PERFORM THE ANALYSES OF THESE PARAMETERS.
COLLECT ADEQUATE SAMPLE AMOUNTS, BY TYPE, TO FURNISH AT LEAST THE MINIMUMS REQUIRED.

**	VOL	TYPE	**	VOL	TYPE	**	VOL	TYPE	**	VOL	TYPE	**
**	1125	FA--AR	**	200	RA	**	100	TOC	**	600	RA--MG,AS	**
**			**			**			**			**
**			**			**			**			**
**			**			**			**			**
**			**			**			**			**
**			**			**			**			**

2. SAMPLE-TYPE LISTING

********** EXPLANATION OF SAMPLE TYPE CODES **********

SAMPLE TYPE = BTM-ORGANIC = BOTTOM MATERIAL IN GLASS BOTTLE SUPPLIED BY LAB. CALL LAB FOR INSTRUCT.
SAMPLE TYPE = CALL CEN LAB = CALL CENTRAL LAB FOR INSTRUCTIONS
SAMPLE TYPE = CC = CARTON, CHILLED
SAMPLE TYPE = CU = CARTON, UNTREATED-OR-CARTON, CHILLED
SAMPLE TYPE = DOC = *DISSOLVED ORGANIC CARBON CHILLED*
SAMPLE TYPE = FA--AR = FILTERED, ACIDIFIED, COLLECT IN ACID RINSED BOTTLE
SAMPLE TYPE = FA--SPEC = FILTERED, ACIDIFIED SPECTROGRAPHIC ANAL
SAMPLE TYPE = *FA CLEAN LAB* = *FILTERED, ACIDIFIED WITH ULTRA PURE ACID*, COLLECTED IN ULTRA CLEAN TEFLON BOTTLE & BOTTLE ENCLOSED IN PLASTIC BAG
SAMPLE TYPE = FC = FILTERED, CHILLED
SAMPLE TYPE = FU = FILTERED, UNTREATED
SAMPLE TYPE = FU-RAD.CHEM. = FILTERED, UNTREATED RADIOCHEMICAL ANAL.
SAMPLE TYPE = RA = RAW, ACIDIFIED, COLLECTED IN ACID RINSED BOTTLE
SAMPLE TYPE = RA--EPA = RAW, ACIDIFIED, COLLECTED IN ACID RINSED BOTTLE
SAMPLE TYPE = RA--MG,AS = RAW, ACIDIFIED, COLLECT IN ACID RINSED BOTTLE
SAMPLE TYPE = RA--SPEC = RAW, ACIDIFIED SPECTROGRAPHIC ANALYSIS
SAMPLE TYPE = *RA CLEAN LAB* = *RAW, ACIDIFIED WITH ULTRA PURE ACID*, COLLECTED IN ULTRA CLEAN TEFLON BOTTLE & BOTTLE ENCLOSED IN PLASTIC BAG
SAMPLE TYPE = RC = RAW, CHILLED
SAMPLE TYPE = *RC-ORGANIC* = RAW, CHILLED GLASS BOTTLE SUPPLIED BY LAB. CONTACT LAB FOR INSTRUCTIONS
SAMPLE TYPE = RC CUSO4 = ADD 1 G.CUSO4 PER 1000 ML SAMPLE AND H3PO4 TO PH 4 (.5ML PER LITER) (FOR PHENOL) CHILLED
SAMPLE TYPE = RC H2SO4 = RAW, ACIDIFIED WITH H2SO4 AT RATE .75 ML PER 250 ML OF SAMPLE, COLLECT IN GLASS BOTTLE (FOR COD & MBAS), CHILLED PLASTIC BOTTLE ALSO ACCEPTABLE
SAMPLE TYPE = RC NAOH = ADD NAOH TO PH 12 (.5ML PER 250 ML OF SAMPLE) CHILL (FOR CYANIDE)
SAMPLE TYPE = RC O & GR = (FOR OIL & GREASE) COLLECT IN ACETONE RINSED GLASS BOTTLE, ADD 2.5ML H2SO4 PER 500ML SAMPLE (TO PH < 3), DO NOT RINSE BOTTLE, FILL BOTTLE 1/2 FULL, CHILL
SAMPLE TYPE = RU = RAW, UNTREATED
SAMPLE TYPE = RU--SS = RAW, UNTREATED
SAMPLE TYPE = RU-RAD.CHEM. = RAW, UNTREATED RADIOCHEMICAL ANALYSIS
SAMPLE TYPE = RU-TRITIUM = RAW, GLASS BOTTLE SUPPLIED BY THE DENVER LAB
SAMPLE TYPE = RU ZNAC = RAW, ADD 0.5G ZNAC PER 250 ML SAMPLE (FOR TOTAL SULFIDE DETERMINATION)
SAMPLE TYPE = SILVER FILT. = FOR SUSPENDED ORGANIC CARBON, CHILLED
SAMPLE TYPE = TOC = TOTAL ORGANIC CARBON, CHILLED

****

3. THROWAWAY LISTING

******* THROW AWAY LIST *******

THE FOLLOWING SAMPLES HAVE BEEN APPROVED/TRANSMITTED. BOTTLES FOR THESE SAMPLES SHOULD BE THROWN AWAY ON/AFTER OCTOBER 20, 1976.

LIST IS IN ORDER BY JULIAN DATE: ***** DISCARD ALL SAMPLES PRIOR TO JULIAN DATE = 146 *****

105029	119750	133747	141744	180079	201115	204063	209078	213010		220019	224039
		133748	141745		201116	204064	209098	213051	218007	220020	222803 , 224043
119701	122063	133749	141746	181010	201501	204068		213058	218049	220023	222811
119702		133750	141747	181043	201513	204074	210051	213059	218051	220026	222814 225086
119703	131014		141748	181044			210052	213061	218053	220028	222815 225007
119704		136042	141749	181045	202008	205008	210053	213062	218054	220029	222816 225011
119705	133702		141750		202023	205010	210054	213089	218056	220037	222818 225013
119706	133703	141701		183050	202037	205028	210055		218063	220038	222820 225021
119707	133704	141702	142011	183078	202051	205038	210067	215001	218064	220039	222821
119708	133705	141703			202052	205047	210075	215004	218066	220040	222829 226001
119709	133706	141704	146004	188025	202053		210076	215018	218067	220041	222841 226002
119710	133707	141705	146065	188057	202054	208007	210077	215019	218068	220042	222845 226006
119711	133708	141706	146113		202055	208016	210078	215020	218077	220043	222846 226008
119712	133709	141707	146136	189001	202062	208021	210079	215032	218501	220044	222848 226014
119713	133710	141708			202073	208053	210080		218502	220045	222849 226016
119714	133711	141709	147101	190007		208056	210109	216006		220046	222869 226017
119715	133712	141710	147159		203024	208060	210116	216016	219028	220047	222870 226030
119716	133713	141711	147160	194003	203025	208069	210118	216018	219029	220048	222871 226053
119717	133714	141712		194021	203027	208073		216046	219030	220049	222891 226055
119718	133715	141713	161153	194034	203030	208084	211011	216061	219031	220050	226056
119719	133716	141714	161501		203031	208085	211012	216079	219032	220051	223002 226057
119720	133717	141715		195009	203032	208086	211024	216080	219033	220052	223004 226059
119721	133718	141716	169019	195019	203033	208087	211027	216081	219035	220053	223005 226068
119722	133719	141717	169047		203034	208088	211046	216082	219036	220054	223006
119723	133720	141718	169121	196006	203035	208093	211047	216083	219042	220055	223007 227007
119724	133721	141719	169181	196007	203036	208102	211051	216084	219058	220056	223008 227016
119725	133722	141720	169182	196044	203038	208110	211054	216085	219059	220057	223009 227051
119726	133723	141721	169185	196079	203039	208111	211055	216086	219060	220060	223012 227093
119727	133724	141722			203040	208113	211062	216087	219061	220066	223013
119728	133725	141723	173036	197001	203041	208114	211075	216088	219063	220076	223016 229014
119729	133726	141724	173048	197002	203043	208115	211076	216089	219064	220078	223019 229064
119730	133727	141725	173076	197004	203044	208120	211080	216090	219066	220079	223020 229085
119731	133728	141726	173077	197011	203046	208121	211081	216091	219067	220081	223021 229086
119732	133729	141727	173078	197026	203050	208125	211086	216092	219068	220084	223022
119733	133730	141728	173079	197027	203060	208126	211087	216095	219069	220085	223026 230003
119734	133731	141729	173080	197031	203061	208127	211088	216102	219070	220086	223027 230005
119735	133732	141730	173094	197034	203077	208128	211089	216104	219071	220087	223029 230006
119736	133734	141731	173095	197051	203081	208129	211107		219072	220088	223030 230007
119737	133735	141732				208130	211108	217004	219073	220089	223031 230008
119738	133736	141733	175033	198013	204011	208141		217007	219074	220101	223032 230009
119739	133737	141734	175046	198014	204013	208143	212001	217009	219075	220103	223033 230010
119740	133738	141735		198016	204023	208144	212003	217010	219076	220104	223034 230011
119741	133739	141736	180005	198017	204030		212004	217013	219077	220105	223056 230013
119742	133740	141737	180035	198021	204036	209004	212019	217016	219078	220107	223063 230014
119743	133741	141738	180037	198038	204040	209018	212029	217019	219080	220110	223065 230016
119744	133742	141739	180038	198054	204042	209037	212030	217020	219081	220112	223066 230018
119745	133743	141740	180039		204044	209041	212039	217028	219082	220113	223067 230021
119747	133744	141741	180040	201020	204055	209050		217088	219090	220114	230024
119748	133745	141742	180070	201047	204061	209051	213006	217089		220115	224007 230025
119749	133746	141743	180071	201061	204062	209068	213007	217501	220017	220116	224030 230026

PAGE 1

4. PARAMETER LISTING (LOG)

PARAMETER RECORD 12/03/76

NAME	SYMBOL	LAB CODE	PARAMETER CODE	COST FACTOR	COST
CARBON TOT.INORG.ORG	CAR.TOT.	43	690	0.00000	0.00

OTHER LAB SEC #	ATLANTA SEC #	ALBANY SEC #	DENVER SEC #
0	0	0	0

CALCULATION CODE (0 = NO;1 = YES)	MAJOR CATION (0=NO;1=YES)	MAJOR ANION (0=NO;1=YES)	UNITS IN UG/L (0=NO; 1=YES)	UNITS IN MG/L (0=NO; 1=YES)
1	0	0	0	1

************ NUMBER OF SIGNIFICANT FIGURES FOR RANGES ARE AS FOLLOWS ************

0 TO<0.01	0.01 TO<0.1	0.1 TO<1	1 TO<10	10 TO<100	100 TO<1000	1000 & ABOVE
1	1	1	2	2	3	3

DISSOLVED SOLIDS (0 = YES;1 = NO)	TOTAL CONSTITUENT (0 = NO; 1 = YES)	LAB CODES AUTOMATICALLY ADDED FOR THIS PARAMETER ***** 1**** ***** 2**** **** 3**** ***** 4****			
1	0	114	19	0	0

ARITHMETIC FACTORS FOR CALCULATIONS INVOLVING THIS LAB CODE PRIMARY(ADD = 1;SUBTRACT = 0)	SECONDARY(ADD = 1;SUBTRACT = 0)	MEQ. CON. FACTOR
1	0	0.00000

LAB CODES ASSOCIATED WITH ABOVE FACTORS FIRST	SECOND	THIRD	MULTIPLICATION FACTOR (USED IN CALCULATION)	PGM.CONTROL INDEX
114	19	0	0.00000	0

DISSOLVED LAB CODE THAT IS CHECKED IF THIS IS A TOTAL LAB CODE	MAXIMUM DECIMAL POSITION REPORTED FOR THIS LAB CODE
0	1

SAMPLE TYPE	SAMPLE AMOUNT IN ML OR GR.
TOC	100

5. DRF INPUT LISTING

**** DISTRICT RETRIEVAL FILE HAS BEEN UPDATED ON THIS DATE--770223 ****

DISTRICT RET.FILE NUMBER	CEN.LAB SAMPLE ID NUMBER	CEN.LAB RECORD NUMBER	LABORATORY 1=SLC,2=ATL 3=ALB,4=DEN	ANALYSIS ROUTED TO REMOTE #	STATION IDENTIFICATION	DATE OF COLL.	TIME	DISTRICT BILLING CODE
7750	36037	56386	4	20	458	760205	1035	SR
7751	35150	56192	4	983	03374950	770201	0930	WB
7752	349582	49217	4	86	5712571345229B0	761110	1630	02
7753	4811	51556	4	43	3431591115219B1	761223		04
7754	4873	51680	4	43	09498580	761229	1400	04
7755	4875	51686	4	43	09499880	761229	1100	04
7756	28012	54656	4	43	09584280	770114	1200	04
7757	28013	54659	4	43	09504500	770114	1600	04
7758	4876	51689	4	68	07263620	770103	1400	05
7759	28073	54785	4	68	07032000	770126	1035	05
7760	43501	57881	4	68	235	770209	1035	05
7761	43502	57883	4	68	237	770209	1000	05
7762	43503	57885	4	68	236	770208	0930	05
7763	43504	57887	4	68	232	770209	1030	05
7764	43505	57889	4	68	234	770209	1000	05
7765	43506	57891	4	68	233	770208	0930	05
7766	43507	57893	4	68	231	770208	1100	05
7767	358018	58881	4	68	07032000	761220	1400	05
7768	358019	58883	4	68	07265450	761221	1400	05
7769	48034	56813	4	49	3356251173912B0	770204	1040	06
7770	286076	39148	4	73	11264500	761104	1200	06
7771	21086	53524	4	1	09152600	770117	1225	08
7772	21089	53530	4	1	09106200	770117	1345	08
7773	21090	53532	4	1	09163490	770118	1245	08
7774	29002	54842	4	1	07099200	770124	1500	08

6. DRF RETRIEVAL LISTING

DATE OF THIS REPORT = 770301. THE NEXT AVAILABLE REGION IN THE DISTRICT RETRIEVAL FILE = 8541
***PLEASE NOTE YOU ARE DEACTIVATING THE FOLLOWING ANALYSES THAT HAVE BEEN RETRIEVED. PLEASE SAVE THIS OUTPUT FOR FUTURE REFERENCE AND YOU CAN USE THIS LIST AS A THROWAWAY LIST 2 WEEKS FROM TODAY

RET.FILE #	SAMPLE ID	CEN.LAB REC.#	LAB #	REMOTE #	BILLING CODE
5779	353046	50043	4	57	27
6095	26044	54275	4	983	28
6144	2V7036	21680	4	57	27
6145	324022	45734	4	57	27
6146	339040	47766	4	57	27
6147	339044	47774	4	57	27
6148	339047	47780	4	57	27
6149	350028	49306	4	57	27
6150	357017	50418	4	57	27
6151	357018	50421	4	57	27
6152	362035	51207	4	57	27
6153	362037	51211	4	57	27
6154	362038	51213	4	57	27
6155	362039	51215	4	57	27
6156	362040	51217	4	57	27
6157	363025	51118	4	57	27
8580	26044	54275	4	983	28
6622	1F024	52031	4	57	27
6632	2V1007	40375	4	57	27
6633	3F3058	45441	4	57	27
6634	339043	47772	4	57	27
6635	339046	47778	4	57	27
6636	345038	48730	4	57	27
6637	345039	48732	4	57	27
6638	345041	48736	4	57	27
6646	362036	51209	4	57	27
6647	363024	51116	4	57	27
6955	213427	25173	4	57	27
6956	300001	22022	4	57	27
6957	300005	22033	4	57	27
6958	300007	22039	4	57	27
6959	300008	22042	4	57	27
6960	300009	22045	4	57	27
6961	300010	22047	4	57	27
6962	300011	22050	4	57	27
6963	300012	22053	4	57	27
6964	313007	42939	4	57	27
6965	35801T	50878	4	57	27
7089	28016	54667	4	86	02
7090	28017	54669	4	86	02
7091	28018	54671	4	86	02
7092	28019	54673	4	86	02
7093	28020	54675	4	86	02
7094	24049	53875	4	68	05
7095	346052	49056	4	68	05
7097	290033	34072	4	57	27
7098	339042	47770	4	57	27
7284	335004	47081	4	86	02
7285	335036	47149	4	86	02

7. SAMPLE-LOGGED LISTING

LIST OF ANALYSES LOGGED INTO THE COMPUTER - DATE 770317

SET COMPLETE ____

SAMPLE OUT	SAMPLE ID	BASIC DATA REGION NO.	DISCH DATA REGION NO.	STATION IDENT.	BEGIN DATE	END DATE	TIME	NO. OF DETR.	STATE CODE	BILLING CODE
____	75001	60987	60988	324758115060300	770311		0730	9	06	93
____	75002	60989	60990	324758115060300	770311		0730	8	06	93
____	75003	60991	60992	324758115060300	770311		0730	30	06	93
____	75004	60993	60994	324758115060300	770311		0730	8	06	93
____	75005	60995	60996	325058116043900	770307		1330	8	06	93
____	75006	60997	60998	325058116043900	770307		1330	7	06	93
____	75007	60999	61000	325058116043900	770307		1330	29	06	93
____	75008	61001	61002	325058116043900	770307		1330	7	06	93
____	75009	61003	61004	331034115371800	770310		0940	9	06	93
____	75010	61005	61006	331034115371800	770310		0940	4	06	93
____	75011	61007	61008	331034115371800	770310		0940	30	06	93
____	75012	61009	61010	331034115371800	770310		0940	8	06	93
____	75013	61011	61012	324c001160500000	770309		1015	8	06	93
____	75014	61013	61014	324c001160500000	770309		1015	7	06	93
____	75015	61015	61016	324c001160500000	770309		1015	29	06	93
____	75016	61017	61018	324c001160500000	770309		1015	7	06	93
____	75017	61019	61020	324351115392200	770311		0830	9	06	93
____	75018	61021	61022	324351115392200	770311		0830	8	06	93
____	75019	61023	61024	324351115392200	770311		0830	30	06	93
____	75020	61025	61026	324351115392200	770311		0830	8	06	93
____	75021	61027	61028	324444114371600	770309		0830	8	06	93
____	75022	61029	61030	324444114371600	770309		0830	7	06	93
____	75023	61031	61032	324444114371600	770309		0830	29	06	93
____	75024	61033	61034	324444114371600	770309		0830	7	06	93
____	75025	61035	61036	332142114432000	770308		1030	8	06	93
____	75026	61037	61038	332142114432000	770308		1030	7	06	93
____	75027	61039	61040	332142114432000	770308		1030	29	06	93
____	75028	61041	61042	332142114432000	770308		1030	7	06	93
____	75029	61043	61044	330951115335800	770310		0900	9	06	93
____	75030	61045	61046	330951115335800	770310		0900	8	06	93
____	75031	61047	61048	330951115335800	770310		0900	30	06	93
____	75032	61049	61050	330951115335800	770310		0900	8	06	93
____	75033	61051	61052	324954115204800	770309		1110	8	06	93
____	75034	61053	61054	324954115204800	770309		1110	7	06	93
____	75035	61055	61056	324954115204800	770309		1110	29	06	93
____	75036	61057	61058	324954115204800	770309		1110	7	06	93
____	75037	61059	61060	333902116070800	770307		1230	9	06	93
____	75038	61061	61062	333902116070800	770307		1230	7	06	93
____	75039	61063	61064	333902116070800	770307		1230	29	06	93
____	75040	61065	61066	333902116070800	770307		1230	7	06	93
____	75041	61067	61068	0418030V	770315		1000	21	08	08
____	75042	61069	61070	455	770226			26	99	56
____	75043	61071	61074	0436795U	770304		0830	77	35	35
____	75044	61075	61078	0435555U	770308		1230	75	35	35
____	75045	61079	61082	0436455U	770308		1505	75	35	35
____	75046	61083	61086	0435855U	770314		1215	77	35	35
____	75047	61087	61089	0436755U	770310		1130	42	35	35
____	75048	61090	61091	364706108262610	770310		1450	30	35	35
____	75049	61092	61093	364737108254710	770310		1500	29	35	35
____	75050	61094	61095	0435730U	770311		0930	30	35	35
____	75051	61096	61097	364031108261010	770310		1300	30	35	35
____	75052	61098	61099	0726V	770304		1215	24	35	35
____	75053	61100	61101	06279000	770222		1215	23	35	35
____	75054	61102	61103	07199000	770304		1045	24	35	35
____	75055	61104	61105	06276500	770222		1035	29	35	35
____	75056	61106	61107	07282000	770309		1130	24	35	35
____	75057	61108	61109	06360100	770312		1000	10	35	35
____	75058	61110	61111	0835B400	770314		0745	10	35	35
____	75059	61112	61114	10167300	770315		1000	35	49	49
____	75060	61115	61117	10172600	770315		1230	35	49	49
____	75061	61118	61119	09062500	770314		0930	31	08	08
____	75062	61120	61121	09534000	770304		1130	24	04	04
____	75063	61122	61123	13095300	770303		1530	9	16	16
____	75064	61124	61125	13095400	770303		1515	9	16	16
____	75065	61126	61127	13093300	770302		1135	9	16	16
____	75066	61128	61129	13091010	770228		1340	25	16	16
____	75067	61130	61131	13094500	770301		1120	9	16	16
____	75068	61132	61133	13091000	770304		1000	9	16	16
____	75069	61134	61135	13091700	770303		1620	9	16	16
____	75070	61136	61137	13090100	770303		1100	9	16	16
____	75071	61138	61139	13090350	770228		1510	9	16	16
____	75072	61140	61141	13090100	770228		1210	9	16	16
____	75073	61142	61143	13095175	770301		1505	9	16	16
____	75074	61144	61145	13095350	770303		1445	9	16	16
____	75075	61146	61147	13090300	770228		1425	9	16	16
____	75076	61148	61149	13134800	770228		1505	9	16	16
____	75077	61150	61151	13091200	770303		1210	8	16	16
____	7507d	61152	61153	13133800	770301		1540	9	16	16

MASTER INDEX RECORD

INDEX RGN.NO.	NEXT AVAILABLE RGN. NO.	MAX. NO. RGNS. AVAILABLE	STD. ANAL. COST	NO. ANAL. PROCESSED	DATE COUNT BEGAN	NO. ANAL. ENTERED INTO QM FILE	LAB NO.
0	61154	67499	43.15		761104		
				0		0	1
				0		0	2
				0		0	3
				18773		0	4

THE EXECUTION OF PROGRAM A579 HAS BEEN TERMINATED DUE TO A SYSIN END OF FILE

COMPLETION CODE = R

8. JOB SHEET BY SECTION

JOB SHEET FOR LAHORATORY SECTION_2 (AUTOANALYZER)

LAB_CODE SYMBOL JUL_DATE SAMPLE SEQUENCE NUMBERS

8	HCO3	75	41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56,***, 61,***, 66,
14	CO3	75	45,***, 48,***, 50,
15	CL DISS.	75	41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56,***, 59, 60, 61,***, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78,
23	CN	75	62,
31	F DISS	75	41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56,***, 61,***, 66,
36	DIS FE	75	43, 44, 45, 46, 47, 48, 49, 50, 51,
37	TOT FE	75	43, 44, 45, 46,***, 62,
56	SIO2 DIS	75	41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56,***, 59, 60, 61,***, 66,
63	SO4 DISS	75	41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56,***, 59, 60, 61,***, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78,
68	PH LAB	75	42,
69	COND LAB	75	41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58,***, 61,
76	COD HIGH	75	43, 44, 45, 46, 47,***, 59, 60, 61,
84	TOT N KD	75	43, 44, 45, 46, 47,***, 57, 58, 59, 60,***, 62,
123	NH4 AS N	75	43, 44, 45, 46, 47,***, 57, 58, 59, 60,
129	P TOTAL	75	43, 44, 45, 46, 47,***, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78,
160	NO2 AS N	75	42,
162	PO4 AS P	75	43, 44, 45, 46, 47, 48, 49, 50, 51,***, 55,***, 62,
228	NO2+NO3D	75	42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56,***, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78,
258	N-DIS-KD	75	61,
301	NH4 AS N	75	61,
304	NO2+NO3T	75	43, 44, 45, 46, 47,***, 57, 58, 59, 60,***, 62,

9. SAMPLE PREP SHEET

PREPARATION SHEET FOR SECTION_6 (MANUAL METHODS)

PREPARATION METHOD--HCL WHOLE WATER DIGESTION

123 456,

PREPARATION METHOD--HCL BED MATERIAL DIGESTION

PREPARATION METHOD--BED MATERIAL PREPARATION

PREPARATION METHOD--EPA DIGESTION

PREPARATION METHOD--SPECTROGRAPHIC

10. CONDUCTANCE AND DILUTION SHEET

CONDUCTANCE, DILUTION FACTOR, AND APPROXIMATE DISHES — SECTION 4

SAMPLE	COND	DLU.F	DISH	SAMPLE	COND	DLU.F	DISH	SAMPLE	COND	DLU.F	DISH	SAMPLE	COND	DLU.F	DISH
75001	3400	10.0	0.10	075026	-1	0.0	99.99	075051	5750	10.0	0.10	075076	323	0.0	0.80
002	3400	10.0	0.10	027	-1	0.0	99.99	052	837	2.5	0.20	077	554	2.5	0.40
003	3400	10.0	0.10	028	-1	0.0	99.99	053	344	0.0	0.80	078	298	0.0	1.00
004	3400	10.0	0.10	029	4150	10.0	0.10	054	2920	5.0	0.10				
005	-1	0.0	99.99	030	4150	10.0	0.10	055	322	0.0	0.80				
006	-1	0.0	99.99	031	4150	10.0	0.10	056	2800	5.0	0.10				
007	-1	0.0	99.99	032	4150	10.0	0.10	057	-1	0.0	99.99				
008	-1	0.0	99.99	033	-1	0.0	99.99	058	-1	0.0	99.99				
009	4950	10.0	0.10	034	-1	0.0	99.99	059	2190	5.0	0.10				
010	4950	10.0	0.10	035	-1	0.0	99.99	060	1780	5.0	0.10				
011	4950	10.0	0.10	036	-1	0.0	99.99	061	1330	5.0	0.20				
012	4950	10.0	0.10	037	-1	0.0	99.99	062	-1	0.0	99.99				
013	-1	0.0	99.99	038	-1	0.0	99.99	063	395	0.0	0.80				
014	-1	0.0	99.99	039	-1	0.0	99.99	064	384	0.0	0.80				
015	-1	0.0	99.99	040	-1	0.0	99.99	065	618	2.5	0.40				
016	-1	0.0	99.99	041	-1	0.0	99.99	066	555	2.5	0.40				
017	3550	10.0	0.10	042	-1	0.0	99.99	067	456	0.0	0.80				
018	3550	10.0	0.10	043	2080	5.0	0.10	068	511	2.5	0.40				
019	3550	10.0	0.10	044	400*	0.0	0.80	069	572	2.5	0.40				
020	3550	10.0	0.10	045	990	2.5	0.20	070	587	2.5	0.40				
021	-1	0.0	99.99	046	990	2.5	0.20	071	590	2.5	0.40				
022	-1	0.0	99.99	047	4000	10.0	0.10	072	589	2.5	0.40				
023	-1	0.0	99.99	048	8250	20.0	0.10	073	431	0.0	0.80				
024	-1	0.0	99.99	049	5400	10.0	0.10	074	387	0.0	1.00				
025	-1	0.0	99.99	050	400	0.0	0.80	075	621	2.5	0.40				

11. BENCH CHEMIST WORK SHEET

LAB CODE = 6 PARAMETER = AS DISS SECTION = 3

DIRECT ENTRY ____ OR CURVE ____ DATE _____ ANALYST _____

# SAMPLE	VALUE	RMK	DIL	# SAMPLE	VALUE	RMK	DIL	# SAMPLE	VALUE	RMK	DIL	# SAMPLE	VALUE	RMK	DIL
1				1				1				1			
2				2				2				2			
3				3				3				3			
4				4				4				4			
5				5				5				5			
6				6				6				6			
7				7				7				7			
8				8				8				8			
9				9				9				9			
10				10				10				10			
11	307009			11				11				11			
12	307010			12				12				12			
13	307011			13				13				13			
14				14				14				14			
15				15				15				15			
16				16				16				16			
17				17				17				17			
18				18				18				18			
19				19				19				19			
20				20				20				20			

CURVE DATA: PLEASE USE STANDARD CURVE ____

INSTRUMENT HEADINGS I____ ____ ____ ____ ____ ____ ____ ____ ____ ____

10 18 25 32 39 46 53 60 67 74

CONCENTRATION VALUES C____ ____ ____ ____ ____ ____ ____ ____ ____ ____

10 18 25 32 39 46 53 60 67 74

12. COMPLETED SAMPLE REPORT

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CENTRAL LABORATORY, DENVER, COLORADO

WATER QUALITY ANALYSIS
LAB ID # 59023 RECORD # 58931

SAMPLE LOCATION: 3S/1E-32D2
STATION ID: 373756121530601 LAT.LONG.SEC.: * NONE GIVEN *
DATE OF COLLECTION: BEGIN--770225 END-- TIME--1100
COUNTY CODE: 001 PROJECT IDENTIFICATION: 479200300
DATA TYPE: 2 SOURCE: GROUND WATER GEOLOGIC UNIT:
COMMENTS:
ATTN: SORENSON. SAMPLE FROM AQUAFER. FORMWELL

MAIL TO MENLO PARK CA BCODE: 92
SCHEDULES USED: 90 0 0 0
TOTAL PARAMETERS: 32 MCODE = 0
COST OF ANALYSIS $ 71.12 OOP--770316
SUBMIT CORRECTIONS TO CENTRAL LAB WITHIN
15 DAYS FROM BELOW STAMPED DATE. INDICATE
CENTRAL LAB ID # AND RECORD # WITH RESPONSE.
WRD-GW FILE STORAGE REQUESTED. UPDATES TO THE
STATION HEADER FILE WILL BE MADE IN THE
DISTRICT RETRIEVAL PROGRAM " LABPRIM ".

ALK.TOT(CACO3)	MG/L	6	NO2+NO3 AS N DISS	MG/L	0.01
BICARBONATE	MG/L	716	PH FIELD		7.3
BORON DISSOLVED	UG/L	1280	PH LAB		7.4
CALCIUM DISS	MG/L	69	PHOSPHORUS DIS AS P	MG/L	0.39
CHLORIDE DISS	MG/L	390	POTASSIUM DISS	MG/L	2.1
COD LOW LEVEL	MG/L	15	RESIDUE DIS CALC SUM	MG/L	1250
DEPTH BELOW LSD (FT)		24.2	RESIDUE DIS TON/AFT		1.70
FLUORIDE DISS	MG/L	0.5	RESIDUE DIS 180C	MG/L	1250
HARDNESS NONCARB	MG/L	0	SAR		5.4
HARDNESS TOTAL	MG/L	560	SILICA DISSOLVED	MG/L	23
IRON DISSOLVED	UG/L	130	SODIUM DISS	MG/L	290
MAGNESIUM DISS	MG/L	89	SODIUM PERCENT		54
NITR. NO3 AS NO3 DIS	MG/L	0.04	SP. CONDUCTANCE FLD		2210
NITROGEN NO2 ASN DIS	MG/L	0.00	SP. CONDUCTANCE LAB		2280
NITROGEN NO3 ASN DIS	MG/L	0.01	SULFATE DISS	MG/L	26
			WATER TEMP (DEG C)		16.0

CATIONS	(MG/L)	(MEQ/L)	ANIONS	(MG/L)	(MEQ/L)
CALCIUM DISS	69	3.444	BICARBONATE	716	11.736
MAGNESIUM DISS	89	7.322	CHLORIDE DISS	390	11.002
POTASSIUM DISS	2.1	0.054	FLUORIDE DISS	0.5	0.027
SODIUM DISS	290	12.615	SULFATE DISS	26	0.542
			ALK.TOT(CACO3)	6	0.120
			NO2+NO3 AS N D	0.01	0.001
TOTAL		23.433	TOTAL		23.425

PERCENT DIFFERENCE = 0.02

QUALITY CONTROL INFORMATION FOR LAB ID # 59023 RECORD # 58931

***BOTH FLD & LAB CONDUCTANCES SUBMITTED - ONLY FIELD VALUE IS STORED IN GW FILE VALUE = 2210.000
**BOTH HCO3 & ALK AS CACO3 ARE IN THE ANION BALANCE--CORRECT BY DELETING ONE

13. COMPLETED SAMPLE REPORT (BIOLOGICAL)

```
*****  BIOLOGICAL IDENTIFICATION ANALYSES FILE UPDATE AND RETRIEVAL PROGRAM  *****
                                3/22/77

*****  THE FOLLOWING ARE REQUESTED RECORD LISTINGS  *****

          06478500   JAMES RIVER NEAR SCOTLAND,S.DAK.                    AGENCY : USGS
            LAT 43-11-09   LONG 097-38-07   SEQ 00                      STATE CODE : 46

                                DEC. 1ST 1976
                                  1145 HOURS

                        IDENTIFICATION OF PHYTOPLANKTON

                                15000 CELLS/ML

   _ORGANISM__NAME_____________  _COMMON__NAME_______  CELLS/ML   PER_CENT

   CHLOROPHYTA                  GREEN ALGAE
   .CHLOROPHYCEAE
   ..CHLOROCOCCALES
   ...MICRACTINIACEAE
L  ....GOLENKINIA                                                    0
   ...OOCYSTACEAE
D  ....ANKISTRODESMUS                                 5,400         36
L  ....CHODATELLA                                                    0
L  ....DICTYOSPHAERIUM                                               0
   ....KIRCHNERIELLA                                    210          1
   ...SCENEDESMACEAE
L  ....CRUCIGENIA                                                    0
L  ....SCENEDESMUS                                                   0
L  ....TETRASTRUM                                                    0
   ..VOLVOCALES
   ...CHLAMYDOMONADACEAE
   ....CHLAMYDOMONAS                                    420          3
                                TOTALS                6,200         40      0.658=DIVERSITY

   CHRYSOPHYTA
   .BACILLARIOPHYCEAE           DIATOMS
   ..CENTRALES                  CENTRIC
   ...COSCINODISCACEAE
   ....CYCLOTELLA                                       840          6
   ..PENNALES                   PENNATE
   ...NITZSCHIACEAE
D  ....NITZSCHIA                                      3,900         26
                                TOTALS                4,800         32      0.672=DIVERSITY

   .CHRYSOPHYCEAE               YELLOW-BROWN ALGAE
   ..CHRYSOMONADALES
   ...CHROMULINACEAE
   ....CHROMULINA                                       210          1
   ...OCHROMONADACEAE
   ....UROGLENA                                         840          6
                                TOTALS                1,100          7      0.722=DIVERSITY

   CYANOPHYTA                   BLUE-GREEN ALGAE
   .MYXOPHYCEAE
   ..CHROOCOCCALES              COCCOID
   ...CHROOCOCCACEAE
L  ....ANACYSTIS                                                     0

   EUGLENOPHYTA                 EUGLENOIDS
   .CRYPTOPHYCEAE               CRYPTOMONADS
   ..CRYPTOMONOIDALES
   ...CRYPTOCHRYSIDACEAE
```

```
....CHROOMONAS
                                                  TOTALS     280        2      0.000=DIVERSITY
                                                             280        2

 .EUGLENOPHYCEAE
 ..EUGLENALES
 ...EUGLENACEAE
D ....TRACHELOMONAS
                                                  TOTALS   2,800       19      0.000=DIVERSITY
                                                           2,800       19

 PYRRHOPHYTA                       FIRE ALGAE
 .DINOPHYCEAE                      DINOFLAGELLATES
 ..PERIDINIALES
 ...GLENODINIACEAE
L ....GLENODINIUM                                                       0
 ...PERIDINIACEAE
L ....PERIDINIUM                                                        0

NOTE: D - DOMINANT ORGANISM: GREATER OR EQUAL TO 15%
      L - LESS THEN 1%: MAY NOT HAVE BEEN ACTUALLY COUNTED
      ANALYSIS METHOD: GLASS CHAMBER(12MM CIRC), INVERTED MICROSCOPE
      DIVERSITY INDICES, BASED ON ACTUAL COUNTS:
                       PHYL/DIV 1.526
                          CLASS 1.679
                          ORDER 2.239
                         FAMILY 2.289
                         GENERA 2.411

ANALYSIS BY USGS-ACL-JSD, MAR. 11, 1977

CENTRAL LAB ID 76.352.041


REQUESTED DATA RETRIEVALS ARE AS FOLLOWS...

DATA REQUEST CARD=>        06452000        99600  102  197612031210      197612031210        <=RESULTED IN . . .
  STATE_CODE    AGENCY_CODE    __STATION_ID___    PARM_CODE    STAT_CODE    ____DATE_____    REMARKS
      46            USGS           06452000         99600        102        DEC. 3, 1976: ANALYSIS RETRIEVED & PRINTED

DATA REQUEST CARD=>        06453000        99600  102  197612141300      197612141300        <=RESULTED IN . . .
  STATE_CODE    AGENCY_CODE    __STATION_ID___    PARM_CODE    STAT_CODE    ____DATE_____    REMARKS
      46            USGS           06453000         99600        102        DEC. 14, 1976: ANALYSIS RETRIEVED & PRINTED

DATA REQUEST CARD=>        06478500        99600  102  197612141145      197612141145        <=RESULTED IN . . .
  STATE_CODE    AGENCY_CODE    __STATION_ID___    PARM_CODE    STAT_CODE    ____DATE_____    REMARKS
      46            USGS           06478500         99600        102        DEC. 14, 1976: ANALYSIS RETRIEVED & PRINTED

END OF RETRIEVAL REQUESTS

          END OF BIOLOGICAL IDENTIFICATION ANALYSIS FILE UPDATE/RETRIEVAL PROGRAM
```

14. COMPUTER APPROVED SAMPLE REPORT

DATE OF REPORT--770317*** THE FOLLOWING ARE GOOD APPROVED ANALYSES AND MAY BE MAILED OUT RIGHT NOW ***

LAB ID LAB ID LAB ID LAB ID LAB ID LAB ID LAB ID LAB ID LAB ID LAB ID LAB ID LAB ID LAB ID LAB ID LAB ID

43047

TOTAL # OF COMPLETED ANALYSES = 1 # OF UNAPPROVED ANALYSES = 0 # OF APPROVED ANALYSES = 1 % APPROVED =100.00

15. STANDARD REFERENCE SAMPLE REPORT

---------- UNKOWN STANDARD REFERENCE SAMPLE PROGRAM, BOTH GOOD AND BAD ARE REPORTED ----------

LAB-ID	RECORD #	STANDARD REF.SAM.	PARAMETER NAME	LAB-CODE	REPORTED VALUE * > 1.5 STAN.DEV. GOOD < 1.0 S.DEV.	ACCEPTANCE INTERVAL MEAN +- 1 STAN.DEV. MEAN +-1.5STAN.DEV.	MEAN	STANDARD DEV.
60016	59132	52	MOLYBDENUM DISSOLVED	110	7.00*	8.37 TO 12.03 7.45 TO 12.95	10.20	1.83
63025	59573	53	MOLYBDENUM DISSOLVED	110	29.00*	33.80 TO 43.00 31.50 TO 45.30	38.40	4.60
63025	59573	53	MOLYBDENUM TOTAL	265	30.00*	33.80 TO 43.00 31.50 TO 45.30	38.40	4.60
67020	60007	57	MOLYBDENUM DISSOLVED	110	37.000000	34.52 TO 43.88 32.19 TO 46.21	39.20	4.68
70018	60402	54	MOLYBDENUM DISSOLVED	110	1.000000	0.97 TO 3.03 0.46 TO [illegible]	2.00	1.03
73012	60650	54	SODIUM DISS	54	150.00	138.72 TO 149.28 136.07 TO 151.93	144.00	5.28
73012	60650	54	MAGNESIUM DISS	48	61.000000	57.36 TO 61.64 56.28 TO 62.72	59.50	2.14

DATE OF THIS REPORT IS 770317

16. BLIND STANDARD REFERENCE REPORT

THE FOLLOWING PARAMETERS HAVE BEEN DETERMINED ON BLIND SAMPLES SUBMITTED TO YOUR CENTRAL LABORATORY BY DISTRICTS THAT YOU SERVE. FOR PARAMETER VALUES <= 1.5 STANDARD DEVIATIONS, NO RESPONSE IS NECESSARY. HOWEVER, FOR VALUES > 1.5 A RESPONSE IS MANDATORY. THIS REPORT IS PREPARED TO ASSIST YOU IN TURNING OUT THE HIGHEST QUALITY WORK POSSIBLE. DATE OF REPORT (YR+MO+DAY):770317

LAB CODE	PARAMETER NAME	LAB SEC	JOB SET	# STAN. DEV.	COMMENT	RESPONSE KEY (COLS.1-8)	RECORD NO. (COLS.9-12)	LAB CODE (COLS.13-16)	EXPLANATION OF PROBLEM (COLS.17-80)
110	MOLYBDENUM DISSOLVED	3	088	-0.51	LOOKS GOOD				

17. COST BY SECTION REPORT

LAB CODE # 10 MAD 1 DETR. IN THIS JOB, AND COST $ 6.47. PARAMETER SYMBOL = B DISS
LAB CODE # 27 MAD 1 DETR. IN THIS JOB, AND COST $ 6.47. PARAMETER SYMBOL = DS 180C
LAB CODE # 49 MAD 1 DETR. IN THIS JOB, AND COST $ 2.71. PARAMETER SYMBOL = RESVOLNO
LAB CODE # 66 MAD 1 DETR. IN THIS JOB, AND COST $ 1.29. PARAMETER SYMBOL = TURB
LAB CODE # 168 MAD 1 DETR. IN THIS JOB, AND COST $ 6.47. PARAMETER SYMBOL = SS 110C
LAB CODE # 169 MAD 1 DETR. IN THIS JOB, AND COST $ 6.47. PARAMETER SYMBOL = RESTOTND

TOTAL NUMBER OF DETERMINATIONS TO BE PERFORMED = 6
TOTAL COST FOR SECTION 4 TO ANALYZE JOB 123 SPECIAL IS $ 29.88

18. WEEKLY ACCOUNTING REPORT

WEEKLY LOG-INV INFORMATION REPORT DATED 11/10/76.

NOTE: THE DATA FOR THIS REPORT WAS SUBMITTED THE 2ND WEEK OF NOV FOR SAMPLES LOGGED IN DURING THE PREVIOUS WEEK.

LABORATORY	NUMBER OF SAMPLES	DISTRICT ACCOUNTS	FEDERAL ACCOUNTS	TOTAL MONIES
ATLANTA	563	32,430.20	9,719.12	42,149.32
ALBANY	183	8,124.24	1,292.13	9,416.37
DENVER	540	37,090.80	3,557.33	40,648.13
TOTALS	1286	77,645.24	14,568.58	92,213.82

19. WEEKLY ACCOUNTING BY DISTRICT

**** DISTRICT 05 **** ** LOG-INV INFORMATION REPORT ** DATED 11/24/76.
THIS REPORT PROVIDES INFORMATION ON WORK BEING PERFORMED IN THE CENTRAL LABORATORY. THE PURPOSE OF THIS REPORT IS TO PROVIDE YOU WITH LOG-INV INFORMATION ON SAMPLES SUBMITTED FOR ANALYSIS. CHECK FOR CORRECT STATION ID, SAMPLE DATE, TIME, COST, AND IF RESULTS ARE TO BE ENTERED INTO THE WRD QW FILE. YOU MAY ALSO USE THIS AS AN AID IN FORECASTING HOW MUCH MONEY YOU ARE SPENDING AT YOUR FRIENDLY LAB. SHOULD YOU WISH TO MAKE CHANGES CONTACT THE INPUT_LAB. PLEASE IDENTIFY YOUR REQUEST WITH THE SAMPLE_ID AND RECORD_#.
NOTE: THE DATA FOR THIS REPORT WAS SUBMITTED IN THE 4TH WEEK OF NOV FOR THE PREVIOUS WEEK.

SAMPLE ID	RECORD #	PROJECT CODE	STATION ID	SAMPLE DATE	TIME	ANALYSIS COST	WRD QW FILE	SCHEDULES YOU REQUESTED				INPUT_LAB
324032	45756	BENCHMRKM	070607 10	761118	1000	44.00	YES	304	0	0	0	-- DENVER LAB ---
320034	32086	NASQAN	073620 00	761112	1300	0.00	YES	309	0	0	0	* ATLANTA LAB *
323060	45447	NASQAN	072654 50	761117	0930	0.00	YES	8	9	0	0	-- DENVER LAB ---
323065	45458	NASQAN	070320 00	761116	1000	0.00	YES	8	9	0	0	-- DENVER LAB ---
324032	45756	NASQAN	070607 10	761118	1000	0.00	YES	304	0	0	0	-- DENVER LAB ---
324072	33171	NASQAN	070320 00	761116	1000	0.00	YES	309	0	0	0	* ATLANTA LAB *
324075	33177	NASQAN	072654 50	761117	0930	0.00	YES	309	0	0	0	* ATLANTA LAB *
325031	46031	NASQAN	073620 00	761112	1300	1.36	YES	8	9	0	0	-- DENVER LAB ---
320034	32086	NASQANMON	073620 00	761112	1300	35.96	YES	309	0	0	0	* ATLANTA LAB *
323060	45447	NASQANMON	072654 50	761117	0930	51.77	YES	8	9	0	0	-- DENVER LAB ---
323065	45458	NASQANMON	070320 00	761116	1000	51.77	YES	8	9	0	0	-- DENVER LAB ---
324072	33171	NASQANMON	070320 00	761116	1000	35.96	YES	309	0	0	0	* ATLANTA LAB *
324075	33177	NASQANMON	072654 50	761117	0930	35.96	YES	309	0	0	0	* ATLANTA LAB *
325031	46031	NASQANMON	073620 00	761112	1300	51.77	YES	8	9	0	0	-- DENVER LAB ---
320045	32109	00300	070725 00	761110	1100	28.76	YES	310	0	0	0	* ATLANTA LAB *
324031	45754	00300	070605 00	761118	0845	30.05	YES	9	0	0	0	-- DENVER LAB ---
321013	44844	460503000	070556 10	761110	0915	5.94	YES	0	0	0	0	-- DENVER LAB ---
323061	45449	460503000	VG1	761116	0920	59.15	NO	313	0	0	0	-- DENVER LAB ---
323062	45451	460503000	VG4	761116	1020	59.15	NO	313	0	0	0	-- DENVER LAB ---
323063	45453	460503000	VG2	761116	0830	59.15	NO	313	0	0	0	-- DENVER LAB ---
323064	45455	460503000	VG3	761116	0945	85.70	NO	312	0	0	0	-- DENVER LAB ---
324043	33112	460503000	VG3	761116	0945	76.66	NO	309	0	0	0	* ATLANTA LAB *

*** TOTAL AMOUNT OF WORK FORECAST TO BE PERFORMED FOR YOUR OFFICE FOR THE SAMPLES LISTED = $ 405.92
***** TOTAL TO BE CHARGED TO FEDERAL ACCOUNT = $ 307.19

SUMMARY OF PROJECT INFORMATION FOR DISTRICT 05. THIS INFORMATION WAS OBTAINED FROM PROJECT CODES SUPPLIED ON THE LOG-INV SHEET.

PROJECT #	$ WORK TO BE DONE	PROJECT #	$ WORK TO BE DONE	PROJECT #	$ WORK TO BE DONE	PROJECT #	$ WORK TO BE DONE
BENCHMRKM	44.00						
NASQAN	1.36						
NASQANMON	263.19						
00300	58.81						
460503000	345.75						

20. DISTRICT COST REPORT

DISTRICT NO.02: ALASKA DATE OF THIS RETRIEVAL WAS 770312 MONTHLY ACCOUNTING DOCUMENTATION
THE FOLLOWING BREAKDOWN OF ANALYTICAL CHARGES ARE FOR ANALYSES ESTABLISHED AND/OR COMPLETED SINCE THE LAST REPORT.
THE COMPLETED ANALYSES MAY HAVE COST ADJUSTMENTS. IF YOU HAVE ANY QUESTIONS PLEASE CONTACT THE CENTRAL LABORATORY
WHO MADE THE ANALYSIS AND THEY WILL HANDLE ANY NECESSARY ADJUSTMENTS. MONTHLY REPORT FOR MARCH

SAMPLE ID	RECORD NUMBER	ACCOUNT #	STATION IDENTIFICATION	SAMPLE DATE	TIME	ANALYSIS COST	WRD QW FILE	SCHEDULES YOU REQUESTED				LABORATORY 1=GAS,2=ATL 3=ALB,4=DEN	**** REMARKS ****
368075	37834	470200330	150248000	761115		14.38	----------					2	ADJUSTMENT IN COST
066028	59938	470200350	152190000	770222	1530	100.43	YES	170	180	0	0	4	LOGIN INITIAL COST
066029	59938	470200350	151950000	770223	1530	100.43	YES	170	180	0	0	4	LOGIN INITIAL COST
039501	56699	470209130	5T125713452E9	770117	1045	14.87	YES	0	0	0	0	4	LOGIN INITIAL COST
039502	56701	470209130	150498000	770116	1600	14.87	YES	0	0	0	0	4	LOGIN INITIAL COST
369501	49215	470209130	554931131273T00	761204	1200	9.49	----------					4	ADJUSTMENT IN COST
015013	52791	470210350	6133171+9155001	770110	2000	9.49	----------					4	ADJUSTMENT IN COST
015013	52791	470210350	6133171+9155001	770110	2000	-2.58	----------					4	ADJUSTMENT IN COST

*** TOTAL AMOUNT OF WORK TO BE PERFORMED FOR YOUR OFFICE FOR THIS REPORT = $ 261.37

SUMMARY OF ACCOUNT INFORMATION FOR DISTRICT NO.02: ALASKA MONTHLY REPORT FOR MARCH
THIS INFORMATION WAS OBTAINED FROM ACCOUNT NOS. YOU SUPPLIED ON THE LOG IN SHEET. DATE OF THIS RETRIEVAL WAS 770312

ACCOUNT #	$ WORK TO BE DONE	ACCOUNT #	$ WORK TO BE DONE	ACCOUNT #	$ WORK TO BE DONE	ACCOUNT #	$ WORK TO BE DONE
470200330	14.38						
470200350	200.86						
470209130	39.23						
470210350	6.90						

YOUR GENERAL ACCOUNT--470200350 HAS BEEN CHANGED $ 200.86 WHICH INCLUDES ALL UNIDENTIFIED ACCOUNTS & EXTRA ACCOUNTS ABOVE 100

*** TOTAL AMOUNT OF WORK TO BE PERFORMED FOR YOUR OFFICE FOR THIS REPORT = $ 261.37

SUMMARY OF ACCOUNT INFORMATION FOR DISTRICT NO.02: ALASKA MONTHLY REPORT FOR MARCH
THIS FISCAL YEAR SUMMARY IS ONLY FOR VALID 7 DIGIT ACCOUNT NUMBERS. DATE OF THIS RETRIEVAL WAS 770312

ACCOUNT #	$ WORK TO BE DONE	ACCOUNT #	$ WORK TO BE DONE	ACCOUNT #	$ WORK TO BE DONE	ACCOUNT #	$ WORK TO BE DONE
470200350	1076.36						
470200330	1199.63						
470200370	1026.87						
470201970	30.60						
470205450	283.93						
470207450	62.37						
470208050	221.00						
470209130	268.65						
470209150	177.20						
470209170	95.04						
470209350	440.43						
470210020	4312.31						
470210350	195.33						
470298801	25.46						

21. ACCOUNTING CARDS LOGGED LISTING

DATE03

T038001	72400460008400	4802141052038007702031410	Q	234.96	56433
T038002	72400460008400	3832111061846007702021000	Q	234.96	56436
T038003	72449464900300	101726007702011145	Q	95.31	56439
T038004	72449464900300	101673007702010700	Q	95.31	56442
T038005	72456465600300	062361007702010945	Q	38.89	56445
T038006	72415MI003	165318007702021200	Q	43.70	56447
T038007	7243000300	061723107702031300	Q	46.64	56449
T038008	72416IDA77003	132690007701271230	Q	152.19	56451
Z038009	72416NASOANNON	133170007701251400	Q	51.77	56561
T038009	72416IDA77003	133170007701251400	Q	0.00	56561
Z038010	72416NASQANNON	132904507701261200	Q	51.77	56454
T038010	72416IDA77003	132904507701261200	Q	0.00	56454
T038011	72404470400217	320115112573001761214	D	47.45	56457
T038012	72404470400217	315730113012601761214	Q	47.45	56459
T038013	72404470400217	315623113002701761213	Q	47.45	56461
T038014	72404470400217	315780113011601761214	Q	47.45	56463
T038015	72404470403200	094244707701201200	Q	47.45	56465
T038016	7240400400	342904111483501770021400	Q	58.43	56467
T038017	7245300330	141125007701191430	Q	21.58	56469
T038018	72453FS	NO # AVAILABLE 999999	X	12.59	56471
T038019	7245300330	142509007701181315	Q	38.40	56473
T038020	7245300330	142475007701181400	Q	38.40	56475
T038021	7245300330	141235007701191235	Q	38.40	56477
T038022	7245300330	120169007701171230	Q	38.40	56479
T038023	7245300330	120135007701180900	Q	38.40	56481
T038024	7245300330	124319007701241115	Q	38.40	56483
T038025	7245300330	124194957701240930	Q	38.40	56485
T038026	7245300330	121894987701121230	Q	59.98	56487
T038027	7245300330	142202007701190810	Q	59.98	56489
T038028	724SA	[illegible]	X	46.88	56491
T038029	7242046200740	[illegible]	X	4.96	56493
T038030	7242046200740	[illegible]	X	4.96	56495
T038031	7242046200740	[illegible]	X	4.96	56497
T038032	7242046200740	[illegible]	X	4.96	56499
T038033	7242046200740	[illegible]	A	4.95	56501
T038034	7242046200740	[illegible]	A	4.96	56503
T038035	7242046200740	[illegible]	X	4.96	56505
T038036	7242046200740	[illegible]	X	4.96	56507
T038037	7242046200740	[illegible]	X	4.96	56509
T038038	7242046200740	[illegible]	X	4.96	56511
T038039	7242046200740	[illegible]	A	4.96	56513
T038040	7242046200740	[illegible]	X	4.96	56515
T038041	7242046200740	[illegible]	X	4.96	56517
T038042	7242046200740	[illegible]	X	4.96	56519
T038043	7242046200740	[illegible]	X	4.96	56521
T038044	7242046200740	[illegible]	X	4.96	56523
T038045	7242046200740	[illegible]	X	4.96	56525
T038046	7242046200740	[illegible]	X	4.96	56527
T038047	7242046200740	[illegible]	A	4.96	56529
T038048	7242046200740	[illegible]	X	4.96	56531
T038049	7242046200740	[illegible]	X	4.96	56533
T038050	7242046200740	[illegible]	X	4.96	56535
T038051	7242046200740	[illegible]	X	4.96	56537
T038052	7242046200740	[illegible]	X	4.96	56539
T038053	7242046200740	[illegible]	A	4.96	56541
T038054	7242046200740	[illegible]	X	4.96	56543
T038055	7242046200740	[illegible]	X	4.96	56545
T038056	7242046200740	[illegible]	X	4.96	56547
T038057	7242046200740	T13SR1#SEC26ADD7608101200	X	4.96	56549

22. BASIC DATA RECORD

LAB ANALYSIS BASIC DATA RECORD

SAMPLE ID	REGION NO.	DIR REGION NO.
11046	52218	52219

DATA ONLY	LAST RCD	RCD ACTIVE	RCD REJECTED	DI RCD	NON USGS	DATA TO ENTER QWFILE	FILE ENTRY
0	1	0	0	0	0	1	1

RCD CMPLT	CALCULATE DISLV SOLIDS	NAK RPTD	CALCULATE SNA	CALCULATE SAR	CALCULATE DS LOADS
1	1	0	1	1	1

STATE CD	STATION ID	BEGIN DATE	END DATE	TIME	NO. DETR.	LAT...LONG...SW	SAMPLE SOURCE
46	06438000	770110		1045	29	* NONEGIVEN *	SW

LAB CODE	VALUE	REMARK	CAL VALUE	VALUE STORED	VALUE DELETED	VALUE PENDING	NEW VALUE	NO CHARGE
2	411.0000		1	1	0	0	1	0
11	501.0000		0	1	0	0	1	0
12	430.0000		0	1	0	0	0	0
14	0.0000		0	1	0	0	0	1
15	58.0000	A	0	1	0	0	0	0
21	4380.0000		0	1	0	0	0	0
27	4170.0000		0	1	0	0	0	0
29	3470.0000		1	1	0	0	1	0
29	5.6700		1	1	0	0	1	0
30	158.0000		1	1	0	0	0	0
31	0.7000	A	0	1	0	0	0	0
32	1700.0000		1	1	0	0	1	0
33	2190.0000		1	1	0	0	1	0
40	240.0000		0	1	0	0	0	0
51	9.3000		0	1	0	0	0	0
54	21.0000		0	1	0	0	0	0
56	9.6000	A	0	1	0	0	0	0
57	3.5000		1	1	0	0	1	0
59	376.0000		0	1	0	0	0	0
60	24.0000		1	1	0	0	1	0
61	14.0000		0	1	0	0	0	1
63	2300.0000	A	0	1	0	0	0	0
66	9.6000		0	1	0	0	0	1
65	1.0000		0	1	0	0	0	0
72	7.5000		1	1	0	0	1	0
94	1.0000	A	0	1	0	0	0	0
129	0.0000	A	0	1	0	0	0	0
275	31.0000		1	1	0	0	1	0
300	4.7600	A	0	1	0	0	0	0
0	0.0000		0	0	0	0	0	0
0	0.0000		0	0	0	0	0	0
0	0.0000		0	0	0	0	0	0
0	0.0000		0	0	0	0	0	0
0	0.0000		0	0	0	0	0	0

LAB ANALYSIS DESCRIPTIVE INFORMATION DATA RECORD

SAMPLE ID	DIR REGION NO.	DATA REGION NO.
11046	52219	52218

COST WGT FACTOR	TOT COST	ANALYSIS SCHEDULE NOS.				ACTIVE	DI RCD	COST OVR	LAB NO.	GEO.UNIT
1.0	51.77	A	9	0	0	0	1	0	4	

STATION NAME	DISTRICT CD	COUNTY CD	PRJ CD	AGENCY CD
BELLE FOURCHE R NR ELM SPRINGS, SD	46	WASHAN		

MAILING ADDRESS

COMMENTS

RR 1 BOX 1412 HURON SD

100% ICE COVERED BOTTLES MARKED #4

NO. DETR CMPLT	NO. LAB DETR
19	19

23. COMPLETED SAMPLE REPORT

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CENTRAL LABORATORY, DENVER, COLORADO

WATER QUALITY ANALYSIS
LAB ID # 35150 RECORD # 56192

SAMPLE LOCATION: BIG LOUI NR LOVELAND
STATION ID: 03374050 LAT.LONG.SEQ.: * NONE GIVEN *
DATE OF COLLECTION: BEGIN--770201 END-- TIME--0930
STATE CODE: 08 COUNTY CODE: 023 PROJECT IDENTIFICATION: 96T300
DATA TYPE: 2 SOURCE: SPRING GEOLOGIC UNIT:
COMMENTS:

MAIL TO COLO OIST
SCHEDULES USED: 6 0 0 0
NUMBER OF DETERMINATIONS: 15 NCODE = 0
COST OF ANALYSIS $ 43.64 BILLING CODE: WB
SUBMIT CORRECTIONS TO THE DENVER CENTRAL LAB WITHIN 15 DAYS FROM 02/25/77. INDICATE THE CENTRAL LAB ID # AND RECORD # WITH RESPONSE.
WRD-GW FILE STORAGE WAS NOT REQUESTED FOR THIS ANALYSIS. THE ANALYSIS WILL REMAIN IN THE CENTRAL LAB FILE ONLY.

ALK.TOT (AS CACO3)	MG/L	42	RESIDUE DIS TON/AFT		0.48
BICARBONATE	MG/L	51	RESIDUE DIS TON/DAY		0.11
CALCIUM DISS	MG/L	44	RESIDUE DIS 180C	MG/L	394
CHLORIDE DISS	MG/L	100	SAR		0.9
FLUORIDE DISS	MG/L	1.6	SILICA DISSOLVED	MG/L	7.6
HARDNESS NONCARB	MG/L	170	SODIUM DISS	MG/L	30
HARDNESS TOTAL	MG/L	210	SODIUM PERCENT		23
LITHIUM DISSOLVED	UG/L	10	SP. CONDUCTANCE LAB		636
MAGNESIUM DISS	MG/L	24	STREAMFLOW(CFS)-INST		0.12
POTASSIUM DISS	MG/L	9.3	*STRONTIUM DISSOLVED*	UG/L	600
RESIDUE DIS CALC SUM	MG/L	330	SULFATE DISS	MG/L	88
			WATER TEMP (DEG C)		8.0

CATIONS	(MG/L)	(MEQ/L)	ANIONS	(MG/L)	(MEQ/L)
CALCIUM DISS	44	2.196	BICARBONATE	51	0.836
MAGNESIUM DISS	24	1.975	CHLORIDE DISS	100	2.821
POTASSIUM DISS	9.3	*0.238*	*FLUORIDE DISS*	1.6	0.085
SODIUM DISS	30	1.305	SULFATE DISS	88	1.833
TOTAL		5.713	TOTAL		5.573

PERCENT DIFFERENCE = 1.23

QUALITY CONTROL INFORMATION FOR LAB ID # 35150 RECORD # 56192

**CATION/*.01(CONDUCTANCE) RATIO IS EITHER BELOW 0.92 OR ABOVE 1.24---------RATIO VALUE = 0.901
**CALCULATED SOLIDS/*CONDUCTANCE RATIO IS EITHER BELOW* 0.55 OR ABOVE 0.81---RATIO VALUE = 0.520

24. BACKLOG REPORT

```
SAMPLES UNCOMPLETED THROUGH JOB 021  AS OF 02/01/77, OR JULIAN DATE 032.  DENVER CENTRAL LABORATORY

SECTION - 1

PARAMETER - #  100, TAYLOR
   JOB = 027  SAMPLES =    777                                                    JOB TOTAL =    1

                                                                                PARAMETER TOTAL =    1


SAMPLES UNCOMPLETED THROUGH JOB 021  AS OF 02/01/77, OR JULIAN DATE 032.  DENVER CENTRAL LABORATORY

SECTION - 2

PARAMETER - #  302, NO2 AS N
   JOB = 015  SAMPLES =     52, 53, 54                                            JOB TOTAL =    3
   JOB = 026  SAMPLES =    501                                                    JOB TOTAL =    1

                                                                                PARAMETER TOTAL =    4

PARAMETER - LC = 304,  NO2+NO3T
   JOB = 015  SAMPLES =      1,  2,  3,  4,  5,  6, 12, 13, 18, 20, 23, 24, 26, 27, 28,
                            31, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48,
                            49, 50, 51, 52, 53, 54                                JOB TOTAL =   36
   JOB = 018  SAMPLES =    501                                                    JOB TOTAL =    1
   JOB = 026  SAMPLES =    501                                                    JOB TOTAL =    1
   JOB = 027  SAMPLES =    501                                                    JOB TOTAL =    1

                                                                                PARAMETER TOTAL =   39

PARAMETER - LC = 509,  FE B.M.
   JOB = 021  SAMPLES =    903,904,905,906                                        JOB TOTAL =    4

                                                                                PARAMETER TOTAL =    4

PARAMETER - LC = 514,  N.KJN BM
   JOB = 021  SAMPLES =    903,904,905,906                                        JOB TOTAL =    4

                                                                                PARAMETER TOTAL =    4

PARAMETER - LC = 515,  PHOS BM
   JOB = 021  SAMPLES =    903,904,905,906                                        JOB TOTAL =    4

                                                                                PARAMETER TOTAL =    4

PARAMETER - LC = 532,  COD BTM
   JOB = 021  SAMPLES =    903,904,905,906                                        JOB TOTAL =    4

                                                                                PARAMETER TOTAL =    4


SAMPLES UNCOMPLETED THROUGH JOB 021  AS OF 02/01/77, OR JULIAN DATE 032.  DENVER CENTRAL LABORATORY

SECTION - 3

PARAMETER - #    3, AL TOT
   JOB = 019  SAMPLES =    910                                                    JOB TOTAL =    1
   JOB = 021  SAMPLES =    170                                                    JOB TOTAL =    1

                                                                                PARAMETER TOTAL =    2

PARAMETER - LC =   4,  AL DIS
   JOB = 027  SAMPLES =    501                                                    JOB TOTAL =    1

                                                                                PARAMETER TOTAL =    1

PARAMETER - LC =   6,  AS DISS
   JOB = 020  SAMPLES =     71                                                    JOB TOTAL =    1
   JOB = 027  SAMPLES =    501                                                    JOB TOTAL =    1

                                                                                PARAMETER TOTAL =    2

PARAMETER - LC =   7,  BA DISS
   JOB = 020  SAMPLES =     14                                                    JOB TOTAL =    1
   JOB = 021  SAMPLES =    170                                                    JOB TOTAL =    1

                                                                                PARAMETER TOTAL =    2

PARAMETER - LC =  12,  CA DISS
   JOB = 027  SAMPLES =    501                                                    JOB TOTAL =    1

                                                                                PARAMETER TOTAL =    1

PARAMETER - LC =  16,  CO DISS
   JOB = 015  SAMPLES =     18, 20, 21, 27, 32,902,903                            JOB TOTAL =    7
   JOB = 017  SAMPLES =     37                                                    JOB TOTAL =    1
   JOB = 018  SAMPLES =     39, 40, 41, 42, 49, 50                                JOB TOTAL =    6
   JOB = 019  SAMPLES =     38                                                    JOB TOTAL =    1
   JOB = 020  SAMPLES =     58, 59, 71                                            JOB TOTAL =    3
   JOB = 021  SAMPLES =     91, 92,170,186                                        JOB TOTAL =    4

                                                                                PARAMETER TOTAL =   22

PARAMETER - LC =  22,  CU DISS
   JOB = 015  SAMPLES =      1,  2,  3,  4,  5,  7, 18, 20, 21, 27, 28, 29, 32,902,903    JOB TOTAL =   15
   JOB = 017  SAMPLES =     25, 37                                                JOB TOTAL =    2
   JOB = 018  SAMPLES =     12, 13, 14, 39, 40, 41, 42, 43, 44, 46, 47, 48, 49, 50, 51,
                            52, 53                                                JOB TOTAL =   17
   JOB = 019  SAMPLES =      1,  2,  3,  4, 13, 14, 15, 16, 17, 22, 23, 24, 25, 26, 38,
                            44                                                    JOB TOTAL =   16
   JOB = 020  SAMPLES =      6,  7,  8, 14, 41, 58, 59, 63, 64, 71                JOB TOTAL =   10
   JOB = 021  SAMPLES =     91, 92, 98, 99,170,186                                JOB TOTAL =    6

                                                                                PARAMETER TOTAL =   66
```

SAMPLES UNCOMPLETED THROUGH JOB 021 AS OF 02/01/77. OR JULIAN DATE 032. DENVER CENTRAL LABORATORY

SECTION = 4

PARAMETER = 18. B DISS

JOB = 007	SAMPLES =	35	JOB TOTAL = 1
JOB = 013	SAMPLES =	39,901	JOB TOTAL = 2
JOB = 014	SAMPLES =	18	JOB TOTAL = 1
JOB = 015	SAMPLES =	16,901,982,903	JOB TOTAL = 4
JOB = 017	SAMPLES =	20, 21	JOB TOTAL = 2
JOB = 018	SAMPLES =	12, 13, 14, 15, 16, 17, 18, 19, 26, 32, 33, 34, 38, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49	JOB TOTAL = 23
JOB = 019	SAMPLES =	7, 8, 9, 10, 11, 27, 28, 30, 32, 33, 35, 36, 37, 38, 39, 40, 43, 44	JOB TOTAL = 18
JOB = 020	SAMPLES =	6, 7, 8, 9, 10, 11, 12, 13, 18, 19, 20, 21, 22, 23, 24, 40, 41, 42, 43, 44, 45, 46, 47, 48, 61, 62, 63, 64, 67, 68, 70, 72, 73	JOB TOTAL = 33
JOB = 021	SAMPLES =	93, 94, 95, 96, 97, 98, 99,186,197	JOB TOTAL = 9
JOB = 026	SAMPLES =	502,503,504,505	JOB TOTAL = 4
JOB = 346	SAMPLES =	901	JOB TOTAL = 1
			PARAMETER TOTAL = 98

PARAMETER = LC = 50. TURB

JOB = 026	SAMPLES =	501	JOB TOTAL = 1
			PARAMETER TOTAL = 1

PARAMETER = LC = 89. S

JOB = 003	SAMPLES =	11	JOB TOTAL = 1
			PARAMETER TOTAL = 1

PARAMETER = LC = 96. DETRGNTS

JOB = 015	SAMPLES =	14	JOB TOTAL = 1
JOB = 021	SAMPLES =	172	JOB TOTAL = 1
			PARAMETER TOTAL = 2

PARAMETER = LC = 111. V DISS

JOB = 346	SAMPLES =	11	JOB TOTAL = 1
			PARAMETER TOTAL = 1

PARAMETER = LC = 169. RESTDTNO

JOB = 026	SAMPLES =	501	JOB TOTAL = 1
			PARAMETER TOTAL = 1

PARAMETER = LC = 271. U TOTAL

JOB = 013	SAMPLES =	39	JOB TOTAL = 1

SAMPLES UNCOMPLETED THROUGH JOB 021 AS OF 02/01/77. OR JULIAN DATE 032. DENVER CENTRAL LABORATORY

SECTION = 5

PARAMETER = 113. C DIS OR

JOB = 011	SAMPLES =	4	JOB TOTAL = 1
JOB = 014	SAMPLES =	10	JOB TOTAL = 1
JOB = 020	SAMPLES =	63, 64, 68, 70	JOB TOTAL = 4
			PARAMETER TOTAL = 6

PARAMETER = LC = 116. C TOT OR

JOB = 010	SAMPLES =	5, 6, 10, 20, 23, 27	JOB TOTAL = 6
JOB = 011	SAMPLES =	1, 2, 3, 4, 5, 6, 9, 11, 12, 13, 14, 16, 17	JOB TOTAL = 13
JOB = 012	SAMPLES =	92	JOB TOTAL = 1
JOB = 013	SAMPLES =	3	JOB TOTAL = 1
JOB = 015	SAMPLES =	20	JOB TOTAL = 1
JOB = 018	SAMPLES =	2, 44, 50	JOB TOTAL = 3
JOB = 019	SAMPLES =	37, 38, 39,902,904,905,906,907	JOB TOTAL = 8
JOB = 020	SAMPLES =	1, 2, 3, 4, 5, 58, 59, 63, 64, 65, 66, 67, 71	JOB TOTAL = 13
JOB = 021	SAMPLES =	91, 92,173,174,175,176,177,17 ,179,180,181,182,183,184,186, 187,188,189,191,901,902	JOB TOTAL = 21
JOB = 026	SAMPLES =	501	JOB TOTAL = 1
JOB = 027	SAMPLES =	501	JOB TOTAL = 1
JOB = 350	SAMPLES =	7	JOB TOTAL = 1
JOB = 363	SAMPLES =	11	JOB TOTAL = 1
			PARAMETER TOTAL = 71

PARAMETER = LC = 305. C.ORG S

JOB = 003	SAMPLES =	8	JOB TOTAL = 1
JOB = 004	SAMPLES =	92, 93, 94	JOB TOTAL = 3
JOB = 007	SAMPLES =	19	JOB TOTAL = 1
JOB = 011	SAMPLES =	1, 2, 3, 4, 5, 6, 11, 12, 13, 14, 43, 44	JOB TOTAL = 12
JOB = 013	SAMPLES =	41, 42, 43, 44	JOB TOTAL = 4
JOB = 014	SAMPLES =	10	JOB TOTAL = 1
JOB = 018	SAMPLES =	14	JOB TOTAL = 1
JOB = 020	SAMPLES =	63, 64, 68, 70	JOB TOTAL = 4
JOB = 328	SAMPLES =	42, 43, 44, 45, 46, 48, 49	JOB TOTAL = 7
JOB = 329	SAMPLES =	25, 26, 27, 28, 29	JOB TOTAL = 5
JOB = 336	SAMPLES =	39	JOB TOTAL = 1
JOB = 337	SAMPLES =	45	JOB TOTAL = 1
JOB = 338	SAMPLES =	17	JOB TOTAL = 1
JOB = 339	SAMPLES =	40, 41, 42, 43, 44, 45, 46, 47	JOB TOTAL = 8
JOB = 343	SAMPLES =	14, 19, 20	JOB TOTAL = 3
JOB = 345	SAMPLES =	24, 37, 38, 39, 40, 41, 42, 43	JOB TOTAL = 8
JOB = 346	SAMPLES =	43	JOB TOTAL = 1
JOB = 349	SAMPLES =	901,902	JOB TOTAL = 2
JOB = 350	SAMPLES =	7, 8, 26, 28	JOB TOTAL = 4
JOB = 351	SAMPLES =	14, 16	JOB TOTAL = 2
JOB = 352	SAMPLES =	2, 3, 4, 6	JOB TOTAL = 4

SAMPLES UNCOMPLETED THROUGH JOB 021 AS OF 02/01/77, OR JULIAN DATE 032. DENVER CENTRAL LABORATORY

SECTION - 6

PARAMETER - = 139, BI DISS

JOB = 265	SAMPLES =	61, 85, 87, 88, 89, 91, 92, 93	JOB TOTAL = 8
JOB = 266	SAMPLES =	11, 12, 13, 14, 15	JOB TOTAL = 5
JOB = 271	SAMPLES =	17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31	JOB TOTAL = 15
JOB = 272	SAMPLES =	15, 22, 23, 24, 25, 26, 67, 71, 72	JOB TOTAL = 9
JOB = 274	SAMPLES =	41	JOB TOTAL = 1
JOB = 286	SAMPLES =	15, 16, 17, 18, 19, 20	JOB TOTAL = 6
JOB = 287	SAMPLES =	17, 18, 19	JOB TOTAL = 3
JOB = 288	SAMPLES =	79	JOB TOTAL = 1
JOB = 289	SAMPLES =	32, 33, 34, 35, 36, 37, 38, 39, 40, 41	JOB TOTAL = 10
JOB = 290	SAMPLES =	24, 25, 26, 27, 28, 29, 30, 31, 32, 34, 35	JOB TOTAL = 11
JOB = 295	SAMPLES =	1	JOB TOTAL = 1
JOB = 297	SAMPLES =	18, 19, 20	JOB TOTAL = 3
JOB = 300	SAMPLES =	91, 92, 93, 94, 95, 96, 97, 98, 99,100,101	JOB TOTAL = 11
JOB = 301	SAMPLES =	53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65	JOB TOTAL = 13
JOB = 302	SAMPLES =	155,156,157,158,159	JOB TOTAL = 5
JOB = 307	SAMPLES =	5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27	JOB TOTAL = 23
JOB = 309	SAMPLES =	51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71	JOB TOTAL = 21
JOB = 321	SAMPLES =	40, 41, 43, 45, 48, 50	JOB TOTAL = 6
JOB = 328	SAMPLES =	53, 54, 56, 57, 58	JOB TOTAL = 5
JOB = 346	SAMPLES =	68, 69, 70, 71, 72	JOB TOTAL = 5
JOB = 358	SAMPLES =	30, 31, 32, 33, 34, 35, 36	JOB TOTAL = 7

PARAMETER TOTAL = 169

PARAMETER - LC = 225, SN DISS

JOB = 265	SAMPLES =	61, 85, 87, 88, 89, 91, 92, 93	JOB TOTAL = 8
JOB = 266	SAMPLES =	11, 12, 13, 14, 15	JOB TOTAL = 5
JOB = 271	SAMPLES =	17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31	JOB TOTAL = 15
JOB = 272	SAMPLES =	15, 22, 23, 24, 25, 26, 67, 71, 72	JOB TOTAL = 9
JOB = 274	SAMPLES =	41	JOB TOTAL = 1
JOB = 286	SAMPLES =	15, 16, 17, 18, 19, 20	JOB TOTAL = 6
JOB = 287	SAMPLES =	17, 18, 19	JOB TOTAL = 3
JOB = 288	SAMPLES =	79	JOB TOTAL = 1
JOB = 289	SAMPLES =	32, 33, 34, 35, 36, 37, 38, 39, 40, 41	JOB TOTAL = 10
JOB = 290	SAMPLES =	24, 25, 26, 27, 28, 29, 30, 31, 32, 34, 35	JOB TOTAL = 11
JOB = 295	SAMPLES =	1	JOB TOTAL = 1
JOB = 297	SAMPLES =	18, 19, 20	JOB TOTAL = 3
JOB = 300	SAMPLES =	91, 92, 93, 94, 95, 96, 97, 98, 99,100,101	JOB TOTAL = 11
JOB = 301	SAMPLES =	53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65	JOB TOTAL = 13
JOB = 302	SAMPLES =	155,156,157,158,159	JOB TOTAL = 5
JOB = 304	SAMPLES =	111,112	JOB TOTAL = 2
JOB = 306	SAMPLES =	56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 76, 77, 78, 79, 80, 81, 88, 89, 90, 91, 92	JOB TOTAL = 21
JOB = 307	SAMPLES =	5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27	JOB TOTAL = 23

SAMPLES UNCOMPLETED THROUGH JOB 021 AS OF 02/01/77, OR JULIAN DATE 032. DENVER CENTRAL LABORATORY

SECTION - 7

PARAMETER - = 444, G.AL.DIS

JOB = 309	SAMPLES =	66, 68, 72,104,105	JOB TOTAL = 5
JOB = 310	SAMPLES =	19	JOB TOTAL = 1
JOB = 313	SAMPLES =	46, 95, 96, 97, 98, 99	JOB TOTAL = 6
JOB = 314	SAMPLES =	3, 4, 5, 32, 63	JOB TOTAL = 5
JOB = 315	SAMPLES =	54	JOB TOTAL = 1
JOB = 316	SAMPLES =	1, 81, 82, 83, 94, 95	JOB TOTAL = 6
JOB = 318	SAMPLES =	125	JOB TOTAL = 1
JOB = 320	SAMPLES =	98, 99	JOB TOTAL = 2
JOB = 321	SAMPLES =	16, 17, 40, 41, 43, 45, 47, 48, 50, 60, 75, 76, 77	JOB TOTAL = 13
JOB = 323	SAMPLES =	41, 48, 51, 52	JOB TOTAL = 4
JOB = 324	SAMPLES =	34, 35, 36	JOB TOTAL = 3
JOB = 325	SAMPLES =	2, 10, 12, 26, 27, 28, 40, 41, 46	JOB TOTAL = 9
JOB = 327	SAMPLES =	17, 27, 46	JOB TOTAL = 3
JOB = 328	SAMPLES =	29, 32, 33, 34, 35, 39	JOB TOTAL = 6
JOB = 329	SAMPLES =	32, 33, 34, 49	JOB TOTAL = 4
JOB = 334	SAMPLES =	9, 10, 11, 12, 13, 14, 15, 45	JOB TOTAL = 8
JOB = 335	SAMPLES =	11	JOB TOTAL = 1
JOB = 337	SAMPLES =	2, 19, 20, 37, 38	JOB TOTAL = 5
JOB = 339	SAMPLES =	38, 48, 49	JOB TOTAL = 3
JOB = 342	SAMPLES =	10, 11, 12, 13, 14, 15, 16, 17, 18	JOB TOTAL = 9
JOB = 343	SAMPLES =	8, 9, 10	JOB TOTAL = 3
JOB = 346	SAMPLES =	40, 41, 67	JOB TOTAL = 3
JOB = 348	SAMPLES =	19, 20, 21, 22, 23	JOB TOTAL = 5
JOB = 352	SAMPLES =	59, 60, 61, 62	JOB TOTAL = 4
JOB = 353	SAMPLES =	62	JOB TOTAL = 1
JOB = 355	SAMPLES =	31, 32, 33	JOB TOTAL = 3
JOB = 363	SAMPLES =	29	JOB TOTAL = 1

PARAMETER TOTAL = 270

PARAMETER - LC = 445, G.BE.590

JOB = 003	SAMPLES =	1, 2, 3	JOB TOTAL = 3
JOB = 004	SAMPLES =	70, 71	JOB TOTAL = 2
JOB = 018	SAMPLES =	35, 36	JOB TOTAL = 2
JOB = 019	SAMPLES =	34	JOB TOTAL = 1
JOB = 106	SAMPLES =	34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52	JOB TOTAL = 19
JOB = 110	SAMPLES =	5	JOB TOTAL = 1
JOB = 271	SAMPLES =	89	JOB TOTAL = 1
JOB = 280	SAMPLES =	18, 19, 20, 21, 22	JOB TOTAL = 5
JOB = 281	SAMPLES =	1, 2, 15, 16, 17, 19	JOB TOTAL = 6
JOB = 282	SAMPLES =	64, 65, 81, 93, 94,110-111	JOB TOTAL = 7
JOB = 287	SAMPLES =	20, 21, 22,103	JOB TOTAL = 4
JOB = 288	SAMPLES =	78, 80, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98,101	JOB TOTAL = 13
JOB = 289	SAMPLES =	31	JOB TOTAL = 1
JOB = 290	SAMPLES =	33	JOB TOTAL = 1

SAMPLES UNCOMPLETED THROUGH JOB 021 AS OF 02/01/77. OR JULIAN DATE 032. DENVER CENTRAL LABORATORY

SECTION = 9

PARAMETER = 2 719. PB TOT G

JOB = 254	SAMPLES = 401	JOB TOTAL =	1
JOB = 262	SAMPLES = 86	JOB TOTAL =	1
JOB = 268	SAMPLES = 86	JOB TOTAL =	1
JOB = 271	SAMPLES = 401,402,403,404,405,406,407,408,409	JOB TOTAL =	9
JOB = 273	SAMPLES = 51	JOB TOTAL =	1
JOB = 315	SAMPLES = 401,402,403,404,405,406,407	JOB TOTAL =	7
		PARAMETER TOTAL =	60

PARAMETER = LC = 711. NI TOT G

JOB = 185	SAMPLES = 404	JOB TOTAL =	1
JOB = 199	SAMPLES = 415	JOB TOTAL =	1
JOB = 213	SAMPLES = 402,404,405,407,408,409,410,413,414,415,416,417,428,481,422, 423,424,427,428,429,430,431	JOB TOTAL =	22
JOB = 220	SAMPLES = 401,402,403	JOB TOTAL =	3
JOB = 229	SAMPLES = 401,403,405,406,407,410,415,418,419,420,422,423,424,485,426, 427,428,429,430,431,433,434,435,436,437,438,439,440	JOB TOTAL =	28
JOB = 239	SAMPLES = 416,417,423,426,433,436,437,438,439,440,441	JOB TOTAL =	11
JOB = 253	SAMPLES = 401,402,403,404,405,406,407,408,410,411,412,413,414,415	JOB TOTAL =	14
JOB = 254	SAMPLES = 401	JOB TOTAL =	1
JOB = 262	SAMPLES = 86	JOB TOTAL =	1
JOB = 268	SAMPLES = 86	JOB TOTAL =	1
JOB = 271	SAMPLES = 401,402,403,404,405,406,407,408,409	JOB TOTAL =	9
JOB = 273	SAMPLES = 51	JOB TOTAL =	1
JOB = 315	SAMPLES = 401,402,403,404,405,406,407	JOB TOTAL =	7
		PARAMETER TOTAL =	100

PARAMETER = LC = 712. ZN TOT G

JOB = 199	SAMPLES = 409	JOB TOTAL =	1
JOB = 213	SAMPLES = 401,402,404,405,407,408,409,410,413,414,415,416,417,420,421, 422,423,424,427,428,429,430,431	JOB TOTAL =	23
JOB = 229	SAMPLES = 401,403,405,406,407,410,415,418,419,420,422,423,424,425,426, 427,428,429,430,431,433,434,435,436,437,438,439,440	JOB TOTAL =	28
JOB = 239	SAMPLES = 416,417,423,426,433,436,437,438,439,440,441	JOB TOTAL =	11
JOB = 253	SAMPLES = 401,402,403,404,405,406,407,408,410,411,412,413,414,415	JOB TOTAL =	14
JOB = 254	SAMPLES = 401	JOB TOTAL =	1
JOB = 262	SAMPLES = 86	JOB TOTAL =	1
JOB = 268	SAMPLES = 86	JOB TOTAL =	1
JOB = 271	SAMPLES = 401,402,403,404,405,406,407,408,409	JOB TOTAL =	9
JOB = 273	SAMPLES = 51	JOB TOTAL =	1
JOB = 315	SAMPLES = 401,402,403,404,405,406,407	JOB TOTAL =	7
		PARAMETER TOTAL =	97

PARAMETER = LC = 713. CO TOT G

JOB = 229	SAMPLES = 403,405,406,407,410,415,418,419,420,422,423,424,425,426,427, 428,429,430,431,433,434,435,436,437,438,439,440	JOB TOTAL =	27

NUMBER OF OUTSTANDING PARAMETERS FOR SECTION = 1 IS 1 THE PERCENT OF OUTSTANDING PARAMETERS IS 0.01 %

NUMBER OF OUTSTANDING PARAMETERS FOR SECTION = 2 IS 674 THE PERCENT OF OUTSTANDING PARAMETERS IS 5.98 %

NUMBER OF OUTSTANDING PARAMETERS FOR SECTION = 3 IS 386 THE PERCENT OF OUTSTANDING PARAMETERS IS 3.42 %

NUMBER OF OUTSTANDING PARAMETERS FOR SECTION = 4 IS 133 THE PERCENT OF OUTSTANDING PARAMETERS IS 1.18 %

NUMBER OF OUTSTANDING PARAMETERS FOR SECTION = 5 IS 1972 THE PERCENT OF OUTSTANDING PARAMETERS IS 17.49 %

NUMBER OF OUTSTANDING PARAMETERS FOR SECTION = 6 IS 5185 THE PERCENT OF OUTSTANDING PARAMETERS IS 46.00 %

NUMBER OF OUTSTANDING PARAMETERS FOR SECTION = 7 IS 2338 THE PERCENT OF OUTSTANDING PARAMETERS IS 20.74 %

NUMBER OF OUTSTANDING PARAMETERS FOR SECTION = 9 IS 583 THE PERCENT OF OUTSTANDING PARAMETERS IS 5.17 %

****THE TOTAL NUMBER OF OUTSTANDING PARAMETERS FOR THE LAB IS 11272

SAMPLES UNCOMPLETED THROUGH JOB 021 AS OF 02/01/77. OR JULIAN DATE 032.

THIS REPORT HAS BEEN PREPARED FOR THE DENVER CENTRAL LABORATORY

25. PRODUCTION REPORT

PRODUCTION DATA FOR MONTH = FEB 1977 DATE OF THIS ANALYSIS = 770323

LAB CODE	PARAMETER NAME	PARAMETER COST	OTHER LAB ANALYZED	OTHER LAB SEC	ATLANTA,GEORGIA ANALYZED	ATLANTA,GEORGIA SEC	ALBANY,NEW YORK ANALYZED	ALBANY,NEW YORK SEC	DENVER,COLORADO ANALYZED	DENVER,COLORADO SEC	TOTAL INCOME OF PARAMETER
1	ACIDITY AS H+	$ 5.17	0	1	14	1	0	1	11	4	$ 129.44
2	ALK,TOT (AS CACO3)	$ 0.00	0	1	2	1	0	1	0	1	$ .00
3	ALUMINUM TOTAL	$ 10.85	0	3	42	3	0	3	74	3	$ 1,259.35
4	ALUMINUM DISSOLVED	$ 9.49	0	4	42	3	0	3	127	3	$ 1,685.84
6	ARSENIC DISSOLVED	$ 10.97	0	4	116	3	0	3	292	3	$ 4,477.00
7	BARIUM DISSOLVED	$ 6.47	0	3	51	3	0	3	27	3	$ 584.85
8	BICARBONATE	$ 2.58	0	1	246	1	0	1	1198	2	$ 3,738.51
10	BORON DISSOLVED	$ 6.47	0	4	35	4	0	4	497	4	$ 3,443.36
11	BROMIDE	$ 12.94	0	4	1	4	0	4	38	4	$ 401.29
12	CALCIUM DISS	$ 3.45	0	3	707	3	0	3	1034	3	$ 6,089.92
14	CARBONATE	$ 2.58	0	1	62	1	0	1	100	2	$ 419.41
15	CHLORIDE DISS	$ 2.58	0	2	754	2	0	2	1885	2	$ 4,556.85
16	CHROMIUM HEXAVALENT	$ 9.49	0	3	37	3	0	3	0	3	$ 351.48
17	CHROMIUM DISSOLVED	$ 6.47	0	3	137	3	0	3	95	3	$ 1,501.61
18	COBALT DISSOLVED	$ 9.49	0	3	77	3	0	3	86	3	$ 1,547.35
19	CARBON TOT.INORGANIC	$ 9.34	0	4	10	5	0	4	0	5	$ 93.46
20	COLOR	$ 1.29	0	4	61	1	0	4	70	4	$ 169.57
21	SP. CONDUCTANCE FLD	$ 0.00	0	1	22	1	0	1	30	1	$ .00
22	COPPER DISSOLVED	$ 9.49	0	3	166	3	0	3	207	3	$ 3,540.88
23	CYANIDE	$ 16.39	0	4	20	2	0	2	75	2	$ 1,557.71
24	DENSITY AT 20 C	$ 6.47	0	4	1	4	0	4	0	4	$ 6.47
27	RESIDUE DIS 180C	$ 6.47	0	4	450	4	0	4	627	4	$ 6,970.88
28	RESIDUE DIS CALC SUM	$ 0.00	0	1	0	1	0	1	1	1	$ .00
29	RESIDUE DIS TOM/AFT	$ 0.00	0	1	3	1	0	1	1	1	$ .00
31	FLUORIDE DISS	$ 3.88	0	2	445	2	0	2	789	2	$ 4,792.23
32	HARDNESS NONCARB	$ 0.00	0	1	0	1	0	1	1	1	$ .00

PRODUCTION DATA FOR MONTH = FEB 1977 DATE OF THIS ANALYSIS = 770323

LABORATORY	SECTION 1 IN $	SECTION 2 IN $	SECTION 3 IN $	SECTION 4 IN $	SECTION 5 IN $	SECTION 6 IN $	SECTION 7 IN $	SECTION 8 IN $	SECTION 9 IN $	TOTAL INCOME IN $
OTHER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.00
ATLANTA	1,405.87	22,353.51	36,311.78	5,919.62	16,213.89	0.00	0.00	18,149.79	0.00	100,353.60
ALBANY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.00
DENVER	0.00	46,051.15	53,716.22	12,764.73	11,305.04	1,091.66	7,862.04	0.00	6,177.66	138,956.53
TOTALS----	1,405.87	68,404.67	90,025.93	18,684.36	27,518.93	1,091.66	7,862.04	18,149.79	6,177.66	239,328.14

LABORATORY	SECTION 1 COUNT	SECTION 2 COUNT	SECTION 3 COUNT	SECTION 4 COUNT	SECTION 5 COUNT	SECTION 6 COUNT	SECTION 7 COUNT	SECTION 8 COUNT	SECTION 9 COUNT	TOTAL NUMBER COUNT
OTHER	0	0	0	0	0	0	0	0	0	0
ATLANTA	750	5502	4068	832	2580	0	0	1038	0	16770
ALBANY	0	0	0	0	0	0	0	0	0	0
DENVER	104	12475	9253	2146	1466	294	547	0	374	26659
TOTALS----	854	17977	13321	2978	4046	294	547	1038	374	43429

26. INITIAL LOG INVENTORY SHEET

CENTRAL LAB LOG-INV INFORMATION

Card No. 1

File Disposition* Circle One
W....Central Lab & WRD QW File
X....Central Lab File Only Col. 18

Station Identification* Col. 20-34

SITE CODE (Col 51-52)
SW....Surface Water
GW....Ground Water
SP....Spring
LK....Lake/Reservoir
ES....Estuary
PR....Precipitation
SS....Other

Yr Mo Day Sample Date* Col. 35-40

Yr Mo Day Composite End Date,* Col 41-46

Time* Col. 47-50

State Code* Col. 53-54

Billing Code* Col. 55-56

County Code* Col. 57-59

Project Code* Col. 60-68

Cost Factor Col. 69-73

Cost Override Col. 74-80

Laboratory ID No.

Card 2

NOTE!! Card 2 is OPTIONAL--See reverse side.

STATION NAME* Col. 27-74

Latitude* Col. 12-17

Longitude* Col. 18-24

Seq. #* Col. 25-26

Card 3

MAILING ADDRESS*

Col. 12-29

Analysis Schedules*

Col. 30-33 Col. 34-37 Col. 38-41 Col. 42-45

Q,Inst.(cfs)* Col. 46-52

pH* Col. 53

Conductance* Col. 57-62

Temp. in °C Col. 63-66

Depth(ft)* Col. 67-72

Geologic Unit* Col. 73-80

Card 4

VARIABLES TO DELETE OR ADD TO THE ANALYSIS--USE CENTRAL LAB CODES AND A=ADD & D=DELETE*

CODE A/D CODE A/D CODE A/D CODE A/D CODE A/D CODE A/D CODE A/D CODE A/D CODE A/D

Card 5

FIELD VALUES TO ADD TO THE ANALYSIS--USE CENTRAL LAB CODES & CODE VALUES AND REMARKS*

CODE VALUE R (28) CODE VALUE R (41) CODE VALUE R (54) CODE VALUE R (67) CODE VALUE R (80)

Cards 6-8

Comments* Limit to 140 Spaces

27. LOG INVENTORY SHEET

CENTRAL LAB LOG-INV INFORMATION

ile Disposition*
Circle One
)...Central Lab & WRD QW File
....Central Lab File Only Col. 18

Station Identification* Col. 20-34: 09-3281.00

Sample Date* Col. 35-40 (Yr Mo Day): 76 10 12

Composite End Date,* Col 41-46 (Yr Mo Day): __ __ __

Time* Col. 47-50: 1215

aboratory ID No.: 291040

SITE CODE (Circle One)
(SW.)..Surface Water
GW....Ground Water
SP....Spring
LK....Lake/Reservoir
ES....Estuary
ME....Meteorology
SS....Other

State Code* Col. 53-54: 49

Billing Code* Col. 55-56: 49

County Code* Col. 57-59: 15

Project Code* Col. 60-68: 464900300

Cost Factor Col. 69-73: ____

Cost Override Col. 74-80: ______

NOTE!! Card 2 is OPTIONAL--See reverse side.

atitude* ol. 12-17: 39°4'51"

Longitude* Col. 18-24: 110°39'56"

Seq. #* Col. 25-26: ____

STATION NAME* Col. 27-74: San Rafael R @ S.R. Bridge near Campground nr Castle Dale

MAILING ADDRESS* Col. 12-29: Salt lake City

Analysis Schedules*: Utah
Col. 30-33 ____ Col. 34-37 ____ Col. 38-41 ____ Col. 42-45: 93

field values

Q,Inst.(cfs)* Col. 46-52	pH* Col. 53	Conductance* Col. 57-62	Temperature* Col. 63-66	Depth(ft)* Col. 67-72	Geologic Unit* Col. 73-80
34.0	8.2	3330	12.5		

FIELD VALUES TO ADD TO THE ANALYSIS--USE CENTRAL LAB CODES & CODE VALUES AND REMARKS*

CODE	VALUE	R	CODE	VALUE	R	CODE	VALUE	R	CODE	VALUE	R	CODE	VALUE	R
65	19.0													

VARIABLES TO DELETE OR ADD TO THE ANALYSIS--USE CENTRAL LAB CODES AND A=ADD & D=DELETE*

CODE	A/D	CODE	A/D	CODE	A/D	CODE	A/D	CODE	A/D	CODE	A/D	CODE	A/D	CODE	A/D	CODE	A/D

Comments* G.A. Birdwell - weather clear & calm - stream clear -
3 LINES ONLY! PH = Sargent Welch cond. = YSI Model 33

*Information to be supplied to Central Laboratory from field. Please make comments legible.

28. COVER SHEET

JOB NUMBER_____ DATE_____ REMARKS_____

ID	RU	RC	RA	FU	FC	FA	CN	S=	COD	BM	MBAS	O&G	PHEN	TOC	DOC	SOC	ORG RC	ORG BM	SPEC RA	SPEC FA	SPEC BM	GRAPHITE RA	GRAPHITE FA	RADCHEM RU	RADCHEM FA	TRIT	C^{14}	ID	COND.
001																												001	
002																												002	
003																												003	
004																												004	
005																												005	
006																												006	
007																												007	
008																												008	
009																												009	
010																												010	
011																												011	
012																												012	
013																												013	
014																												014	
015																												015	
016																												016	
017																												017	
018																												018	
019																												019	
020																												020	
ID	RU	RC	RA	FU	FC	FA	CN	S=	COD	BM	MBAS	O&G	PHEN	TOC	DOC	SOC	ORG RC	ORG BM	SPEC RA	SPEC FA	SPEC BM	GRAPHITE RA	GRAPHITE FA	RADCHEM RU	RADCHEM FA	TRIT	C^{14}	ID	COND.

29. SAVE-THESE LISTING

Save these:

355025	010058	303901	300075	303033
026	019003	902	↓	308042
355906	018	286046	300081	043
907	019	259902	300084	
364015	020	903	↓	
007033	021	906	300113	
034	342075	911	261030	
035	019001	916	↓	
036	023	265901	261067	
313045	025	↓	236043	
028039	321102	265954	044	
019026	020010	233064	267007	
026503	012	266011	280087	
365023	018502	↓	307086	
003902	018003	266015	311010	
017020	004501	272001	313058	
024		002	075	
327005		279084	314061	
342027		303032	087	
358029		033	089	
357019		035	316043	
342112		029	325007	

30. QC APPROVED LISTING

DATE OF REPORT--770301*** THE FOLLOWING ARE GOOD APPROVED ANALYSES AND MAY BE
LAB ID LAB ID LAB ID LAB ID LAB ID LAB ID LAB ID LAB ID LAB ID LAB

34096
34097
34098
34099
34100
34101
34102
34103
35090
35091
35092
35093
35101
35102
35103
35171
36001
39501
39502
42004
42022
42024
42025
42030
42032
42034
42035
42036
42037
42052
42053
42054
42057
286076

Approved 3/1/77
042011
012
014
015
017
019
028
029
033
038
041

TOTAL # OF COMPLETED ANALYSES = 55 # OF UNAPPROVED ANALYSES = 21 # O

31. RERUN REQUEST (QC)

***** PUNCH FOR RERUN REQUESTS *****

	LAB-ID (1)	SEC-# (9)	LAB-CODE (12)	TYPE BOTTLE (17)
1	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
2	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
3	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
4	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
5	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
6	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
7	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
8	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
9	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
10	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
11	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
12	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
13	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
14	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
15	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
16	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
17	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
18	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
19	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
20	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
21	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
22	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
23	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
24	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _
25	_ _ _ _ _ _	_	_ _ _	_ _ _ _ _ _ _ _

32. RERUN WORK SHEET

SECTION 3 LAB_CODE 012 (ALSO INCLUDES MG AND/OR NA WHERE INDICATED)

THESE ARE RERUNS PLEASE EXPEDITE. RESULTS GO TO QUALITY CONTROL.

DATE OF THIS REQUEST 03/21/77. DATE SUBMITTED TO QUALITY CONTROL _____. ANALYST _____.

COMMENTS	LAB-ID	CA	MG	NA	COMMENTS	LAB-ID	CA	MG	NA	COMMENTS	LAB-ID	CA	MG	NA
J MG NA	~~046055~~	55	3.6	533										
J MG NA	~~046060~~	43	4.9	536										
J MG NA	053032	32	26	42										
J MG	055053	187	31											
J MG NA	056007	21	5.6	33										
J MG NA	057012	47	8.8	21.8										
J MG NA	057017	258	71	166										
J	057038	122												
J MG NA	059003	65	24.0	70										
J MG NA	061008	85	19	23.3										
J MG NA	321091	5.1	1.4	1.8										
J NA	042062			0.5										
J NA	055084			115										
J NA	057044			185										

33. UPDATE DATA SHEET FOR RERUNS

I.D.	Record	L.C.	Value
054046	58478	40	64
054046	58478	59	48
054036	58454	15	28,000
054036	58454	69	66,000
056042	58825	Pull as is	
046055	57471	12	55
046055	57471	40	3.6
046055	57471	59	530
046055	57471	15	910

34. RERUN REQUEST FROM DISTRICT

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Water Resources Division
1201 Pacific Avenue - Suite 600
Tacoma, Washington 98402 March 15, 1977

Memorandum

To: Chief, Central Laboratory, WRD, Arvada, Colorado

From: Chief, Laboratory Unit, WRD, Tacoma, Washington

Subject: WATER QUALITY - Reruns

For the following samples please rerun the parameters indicated:

Lab ID.	Record No.	Parameter	STORET Code
36047	56408	Dissolved zinc	01092
38026	56487	Calcium	00915
"	"	Magnesium	00925
"	"	Sodium	00930
34095	55649	Bicarbonate	00440
31008	54953	Sodium	00930
"	"	Potassium	00935
25038	54105	Total chromium	01034

James C. Ebbert

James C. Ebbert

35. WRD DATA VERIFY REPORT

PROCESSING DATE: 77/03/22

STATION NUMBER: 0643450[illegible] - INLET CANAL NR BELLE FOURCHE,S.DAK. WATER YEAR - 1977

TYPE OF STATION: STREAM LATITUDE-LONGITUDE: 443214 1034923.00 STATE: 46 COUNTY: 019 DISTRICT: 46

DATE	TYPE	TIME	ALKA-LINITY AS CACO3 (MG/L) 00410	BICAR-BONATE (HCO3) (MG/L) 00440	DIS-SOLVED BORON (B) (UG/L) 01020	DIS-SOLVED CAL-CIUM (CA) (MG/L) 00915	CAR-BONATE (CO3) (MG/L) 00445	DIS-SOLVED CHLO-RIDE (CL) (MG/L) 00940	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS) 00095	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L) 70301	DIS-SOLVED SOLIDS (TONS PER AC-FT) 70303	DIS-SOLVED SOLIDS (TONS PER DAY) TU302
FEB. 01...	2	1415	224	276	80	210	0	4.5	1300	452	1.29	494

DATE	DIS-SOLVED FLUO-RIDE (F) (MG/L) 00950	NON-CAR-BONATE HARD-NESS (CA+MG) (MG/L) 00902	HARD-NESS (CA+MG) (MG) 00900	DIS-SOLVED MAG-NE-SIUM (MG) 00925	PH (UNITS) 00400	DIS-SOLVED PO-TAS-SIUM (K) (MG/L) 00935	DIS-SOLVED SILICA (SIO2) (MG/L) 00955	SODIUM AD-SORP-TION RATIO 00931	DIS-SOLVED SODIUM (NA) (MG/L) 00930	PERCENT SODIUM 00932	INSTAN-TANEOUS DIS-CHARGE (CFS) 00061	DIS-SOLVED SULFATE (SO4) (MG/L) 00945
FEB. 01...	0.4	500	730	99	7.3	3.5	9.2	0.3	17	5	169	520

DATE	TEMPER-ATURE (DEG C) 00010	DIS-SOLVED ORTHO PHOS-PHATE (PO4) (MG/L) 00660	DIS-SOL-VED PHOS-PHORUS (P) (MG/L) 00666	TOTAL PHOS-PHORUS (P) (MG/L) 00665	DIS-SOLVED ORTHO, PHOS-PHORUS (P) (MG/L) 00671	DIS-SOLVED NITRITE PLUS NITRATE (N) (MG/L) 00631	CANNON DIOXIDE (CU2) (MG/L) 00405
FEB. 01...	0.0	0.00	0.03	0.07	0.00	0.51	42

2 0642150094444[illegible] 1400 - ERROR IN DATE OR TIME

36. WRD STATION HEADER REPORT

UPDATE HEADER RECORD

MAR 26, 1977

AGENCY CODE	STATION IDENTIFICATION NUMBER	STATION LOCATOR LAT-ITUDE	LONG-ITUDE	SEQ NUM.	STATE CODE	DISTRICT CODE	COUNTY CODE	SITE CODES #1 #2 #3	HYDROLOGIC UNIT CODE	DRAINAGE AREA	CONTRIB. DRAINAGE AREA
USGS	06180300	* NONE GIVEN *			36	WB		SW			

STATION NAME OR LOCAL WELL NUMBER	GEOLOGIC UNIT CODE	WELL DEPTH	AQUIFER TYPE	DATUM	PASSWORDS UPD	PASSWORDS RTV	INTERNAL USE TBQPUNLER
ROARING FALLS BROOK AT HERMAN STILL NY					NULL	NULL	100003000

HU005 THE FOLLOWING DATA FIELDS FOR THE HEADER RECORD LISTED ABOVE, WERE FOUND TO CONTAIN ONE OR MORE ERRORS

STATION LOCATOR

DISTRICT CODE

HU006 ********** NO UPDATES MADE **********

37. DRF QUIZ REPORT

ANALYSIS MADE ON DISTRICT RETRIEVAL FILE 03/08/77 BETWEEN RECORD 7126 AND 9675
*** DATA LOADED THE LAST TWO WEEKS. ***

DATA FOR THE FOLLOWING DISTRICTS/PROJECTS HAS NOT BEEN RETRIEVED:

DISTRICT 08 PROJECT: 58
DISTRICT 08 PROJECT: 72
DISTRICT 03 PROJECT: 46
DISTRICT 08 PROJECT: 80
DISTRICT 08 PROJECT: 55
DISTRICT 08 PROJECT: 29
DISTRICT 08 PROJECT: 43
DISTRICT 08 PROJECT: 89
DISTRICT 03 PROJECT: 09
DISTRICT 03 PROJECT: 13
DISTRICT 08 PROJECT: 02
DISTRICT 08 PROJECT: 05
DISTRICT 08 PROJECT: 25
DISTRICT 08 PROJECT: 27
DISTRICT 08 PROJECT: 36
DISTRICT 08 PROJECT: 37

38. CURVE DATA REPORT

LAB CODE	CURVE NO.	NO. POINTS	INSTR. READING	CONC. STANDARD
8	1	1		
			1.000000	0.0000

LAB CODE	CURVE NO.	NO. POINTS	INSTR. READING	CONC. STANDARD
14	1	1		
			1.000000	0.0000

LAB CODE	CURVE NO.	NO. POINTS	INSTR. READING	CONC. STANDARD
15	1	6		
			0.000000	0.0000
			1.990000	2.0000
			4.139999	4.0000
			6.270000	6.0000
			8.230000	8.0000
			10.000000	10.0000
	2	10		
			11.000000	10.0000
			21.000000	20.0000
			48.000000	40.0000
			74.000000	60.0000
			100.000000	80.0000
			125.000000	100.0000
			243.000000	200.0000
			345.000000	300.0000
			435.000000	400.0000
			500.000000	500.0000

LAB CODE	CURVE NO.	NO. POINTS	INSTR. READING	CONC. STANDARD
18	2	5		
			1.000000	0.0000
			3.000000	2.0000
			5.000000	4.0000
			10.000000	10.0000
			19.000000	20.0000

LAB CODE	CURVE NO.	NO. POINTS	INSTR. READING	CONC. STANDARD
22	2	7		
			0.000000	0.0000

39. BACKUP REPORT NO. 1

```
FDR101 FAST DUMP RESTORE DATA SET FUNCTIONS - VER 4.0 - INNOVATION DATA PROCESSING
FDR110   DUMP DSN=A579.V730.DATAF                                          81   100
FDR110    DUMP DSN=A579.V730.PARMF                                         81   110
FDR110    DUMP DSN=A579.V730.SCHDF                                         81   120
FDR110     DUMP DSN=DAR.STE.SRS                                            81   130
FDR110    DUMP DSN=CENLAB.DISTRICT.ACCOUNT.FILE                            81   140
FDR110    DUMP DSN=CENLAB.BLIND.SAMPLE.INFOR                               81   150
FDR110    DUMP DSN=CENLAB.COEFF.FILE                                       81   160
FDR110    DUMP DSN=CENLAB.BLIND.SAMPLE.INDEX                               81   170
FDR110    DUMP DSN=CENLAB.FEDERAL.SCHEDULE.FILE                            81   180
FDR110     DUMP DSN=CENLAB.UCARD.MONSUN.FILE                               81   190
FDR110     DUMP DSN=CENLAB.SCHEDULE.REQCOST.FILE                           81   199
FDR110    DUMP DSN=CENLAB.REMOTE.RETRIEVE.FILE                             81   200
FDR007  STARTING TIME DATA SET FUNCTIONS -- 07.14.18 -- UNIT=3330
FDR007  ENDING   TIME DATA SET FUNCTIONS -- 07.25.21 -- UNIT=3330
FDR107    DUMP DSF SUCCESSFULLY COMPLETED VOL=CCD932          035257032+0372+1805+1412+3549
FDR101 FAST DUMP RESTORE DATA SET FUNCTIONS - VER 4.0 - INNOVATION DATA PROCESSING
FDR110  DUMP DSN=A579.V731.DATAS                                           81   300
FDR007  STARTING TIME DATA SET FUNCTIONS -- 07.27.32 -- UNIT=3330
FDR007  ENDING   TIME DATA SET FUNCTIONS -- 07.38.48 -- UNIT=3330
FDR107    DUMP DSF SUCCESSFULLY COMPLETED VOL=CCD933          024428300+02527+1323+1055+2508
```

40. BACKUP REPORT NO. 3

THE FOLLOWING STATIONS IN THE FEDERAL STATION FILE HAVE BEEN BACKED UP ON THIS DATE (YEAR+MONTH+DAY):770226

STATION ID	ACCOUNT #	COLLECTION FREQUENCY	STATION TYPE	DISTRICT CODE	FEDERAL SCHEDULE #	WOTSI FACTOR	STATION ACTIVE	ALLOWABLE COST	TOTAL COST TO DATE	STATION COST LOCKED OUT
01017100	469109000	004	NQ	23	2	1.00	YES	844.00	448.15	
01017100	469109000	012	NM	23	1	1.00	YES	1081.00	341.65	
01021050	469109000	004	NQ	23	2	1.00	YES	918.37	478.27	
01021050	469109000	012	NM	23	1	1.00	YES	648.56	333.09	
01034500	469109000	002	NR	23	3	1.00	YES	271.00	132.47	
01034500	469109000	004	NQ	23	2	1.00	YES	844.00	398.76	
01034500	469109000	012	NM	23	1	1.00	YES	1081.00	289.74	
01046500	469109000	004	NQ	23	2	1.00	YES	844.00	427.53	
01046500	469109000	012	NM	23	1	1.00	YES	1081.00	292.33	
01054200	469109000	001	SP	23	7	1.00	YES	262.00	261.06	
01054200	469109000	001	SR	23	6	1.00	YES	136.00	142.83	*** YES ****
01054200	469109000	004	SQ	23	5	1.00	YES	472.00	117.93	
01054200	469109000	012	SM	23	4	1.00	YES	568.00	134.59	
01059400	469109000	004	NQ	23	2	1.00	YES	844.00	427.53	
01059400	469109000	012	NM	23	1	1.00	YES	1081.00	341.65	
01066000	469109000	004	NQ	23	2	1.00	YES	844.00	398.76	
01066000	469109000	012	NM	23	1	1.00	YES	1081.00	289.74	
01096550	469109000	004	NQ	25	2	1.00	YES	864.00	202.06	
01096550	469109000	012	NM	25	1	1.00	YES	1081.00	194.09	
01103500	469109000	004	NQ	25	2	1.00	YES	844.00	187.19	
01103500	469109000	012	NM	25	1	1.00	YES	1081.00	189.11	
01155050	469109000	004	NQ	33	2	1.00	YES	864.00	158.65	
01155050	469109000	012	NM	33	1	1.00	YES	1081.00	238.08	
01184000	469109000	002	NR	09	3	1.00	YES	271.00	118.08	
01184000	469109000	004	NQ	09	2	1.00	YES	618.62	448.72	
01184000	469109000	012	NM	09	1	1.00	YES	773.98	539.97	

BACKUP IS COMPLETE. NOW HERE COMES THE PROGRAM TYPES, TOTALS, & NUMBER OF STATIONS IN EACH PROGRAM TYPE

PROGRAM TYPE:NQ ALLOWABLE $: 271110.28 SPENT TO DATE $: 114528.57 # OF STATIONS IN PROGRAM: 347 DATE:770226

PROGRAM TYPE:NM ALLOWABLE $: 340283.78 SPENT TO DATE $: 130761.67 # OF STATIONS IN PROGRAM: 348 DATE:770226

PROGRAM TYPE:NR ALLOWABLE $: 14773.00 SPENT TO DATE $: 4919.58 # OF STATIONS IN PROGRAM: 52 DATE:770226

PROGRAM TYPE:SP ALLOWABLE $: 13362.00 SPENT TO DATE $: 8370.89 # OF STATIONS IN PROGRAM: 51 DATE:770226

PROGRAM TYPE:SR ALLOWABLE $: 6936.00 SPENT TO DATE $: 4860.49 # OF STATIONS IN PROGRAM: 51 DATE:770226

PROGRAM TYPE:SQ ALLOWABLE $: 23954.00 SPENT TO DATE $: 3917.51 # OF&STATIONS IN PROGRAM: 51 DATE:770226

PROGRAM TYPE:SM ALLOWABLE $: 28420.00 SPENT TO DATE $: 7034.20 # OF STATIONS IN PROGRAM: 51 DATE:770226

PROGRAM TYPE:SR ALLOWABLE $: 220000.00 SPENT TO DATE $: 1340.09 # OF STATIONS IN PROGRAM: 22 DATE:770226

TOTAL FEDERAL PROGRAM IN $: 918839.06
$ SPENT TO DATE ON PROGRAM: 275733.00
TOTAL # OF FEDERAL STATION = 973
DATE OF REPORT (YR+MON+DAY):770226

41. BACKUP REPORT NO. 2

```
BACKUP IS COMPLETE. NOW HERE COMES THE PROGRAM TYPES, TOTALS, & NUMBER OF STATIONS IN EACH PROGRAM TYPE

PROGRAM TYPE:NQ ALLOWABLE $:  58512.90 SPENT TO DATE $:  43981.09 # OF STATIONS IN PROGRAM:     352 DATE:770226

PROGRAM TYPE:NM ALLOWABLE $:  74063.45 SPENT TO DATE $:  50826.99 # OF STATIONS IN PROGRAM:     353 DATE:770226

PROGRAM TYPE:NR ALLOWABLE $:   7765.84 SPENT TO DATE $:    857.43 # OF STATIONS IN PROGRAM:      53 DATE:770226

PROGRAM TYPE:BP ALLOWABLE $:  11498.42 SPENT TO DATE $:    757.57 # OF STATIONS IN PROGRAM:      52 DATE:770226

PROGRAM TYPE:BR ALLOWABLE $:   6813.87 SPENT TO DATE $:    389.07 # OF STATIONS IN PROGRAM:      52 DATE:770226

PROGRAM TYPE:BQ ALLOWABLE $:   5200.00 SPENT TO DATE $:   1110.66 # OF STATIONS IN PROGRAM:      52 DATE:770226

PROGRAM TYPE:BM ALLOWABLE $:   6328.65 SPENT TO DATE $:   3119.22 # OF STATIONS IN PROGRAM:      52 DATE:770226

TOTAL FEDERAL PROGRAM IN $:  170183.13
% SPENT TO DATE ON PROGRAM:  101042.03
TOTAL # OF FEDERAL STATION =       966
DATE OF REPORT (YR:MON:DAY):770226
```

42. GRAPHITE REPORT

```
712  315404
     DATE OF COMPUTER RUN 03/24/77

ADDITION
  (UG)      CM                  CM
  "X"     "Y1"    "Y2"    "Y3"   MEAN

0.00E-4    0.52    0.54           5.300E-01

0.10E-4    2.05    2.30           2.175E+00

0.20E-4    3.26    3.31           3.285E+00

0.30E-4    4.40    4.80           4.600E+00

 LEAST      STANDARD    % REL
 SQUARES    DEVIATION   STD. DEV.      INTERCEPTS USING          SAMPLE
 SLOPE      OF SLOPE    OF THE         ABSORBANCE MEAN           VOLUME
(CM/UG)     (CM/UG)     SLOPE           "X"        "Y"          (IN LITERS)

1.332E+05   6.034E+03   4.530E+00    -4.876E-06   6.495E-01     5.000E-06

    STANDARD   % STD ADD     CONC
    ADD CONC     ERROR      ERROR      DILUTION
     (UG/L)                 (UG/L)     FACTOR

       0.975      2^.928       0.224         1

THE VALUE FOR LC 712 SAMPLE ID 315404 IS     1.00     RERUN ** VALUE IS OUT OF BOUNDS


THE NUMBER OF SETS PROCESSED DURING THIS RUN WAS,   9
PLEASE COMPARE THE INPUT AND OUTPUT DATA FOR ACCURACY.

NUMBER OF APPROVED ==>   7  % APPROVED =  77.70



CHECK THESE. THEY WERE OUT OF BOUNDS 03/24/77

SAMPLE_ID  LAB_CODE  ENTRY = OF X STD_CONC

  315404      712      1.00 =  1 X   1.00

  253402      711      2.00 =  1 X   2.00



THESE VALUES WERE COMPUTER APPROVED ON 03/24/77

 SAMPLE_ID  LAB_CODE  ENTRY = OF X STD_CONC

   315401      712      2.80 =  1 X   2.80

   315402      712      3.10 =  1 X   3.10

   315403      712      3.90 =  1 X   3.90

   SRWS56      704      3.30 =  1 X   3.30

   315405      712      6.10 =  1 X   6.10

   315406      712      0.40 =  1 X   0.40

   253403      711      2.00 =  1 X   2.00
```

43. BOTTLE-TYPE LISTING BY LABCODE

PARAMETER - BOTTLE TYPE CROSS REFERENCE

LAB CODE	SYMBOL	BOTTLE TYPE
1	M=	RC
3	AL TOT	RA
4	AL DIS	FA--AR
6	AS DISS	FA--AR
7	BA DISS	FA--AR
8	HCO3	RU
10	% DISS	FU
11	BR	RU
12	CA DISS	FA--AR
14	CO3	RU
15	CL DISS.	FU
16	CR HEX	FA--AR
17	CR DIS	FA--AR
18	CO DISS	FA--AR
19	C TOT IN	TOC
20	CDL,OR	RC
22	*CU DISS*	*FA--AR*
23	CN	RC NAOH
24	DENSITY	FU
27	DS 180C	FU
31	F DISS	FU
34	OM	RU
35	1	RU
36	DIS FE	FA--AR
37	TOT FE	RA
38	PB DISS	FA--AR
39	LI DISS	FA--AR
40	MG DISS	FA--AR
41	MN TOT	RA
42	MN DISS	FA--AR
44	NI DISS	FA--AR
49	RESVOLNO	RU--SS
50	TURB	RU
52	PHENOL	RC CUSO4
54	K DISS.	FA--AR
55	A&P	CALL CEN LAB
56	SIO2 DIS	FU
59	NA DISS.	FA--AR
62	SR DISS	FA--AR
63	SO4 DISS	FU
66	TURB	RU
67	ZN DISS	FA--AR
68	PH LAB	RU
69	COND LAB	RU
70	TOT ALK	RU
73	CD DISS	FA--AR
75	COD LOW	RC M2SO4
76	COD HIGH	RC M2SO4
77	ANYIM,DS	FA--AR
80	ANYIM,TO	RA--MO,AS
84	TOT N KD	RC
85	RESLOITS	RU--SS
86	RESTOTFA	RU--SS
87	SE DISS	FA--AR
88	DIS S	RU ZNAC
89	S	RU ZNAC
94	TL	FA--AR
96	DEFRGNTS	RC M2SO4
99	AL DIS	FA--AR
109	AL TOT	RA
110	MO DISS	FA--AR
111	V DISS	FU
112	AS DISS	FA--AR
113	C DIS OR	DOC
114	C TOT OR	TOC
115	CHL(PH)A	CALL CEN LAB
116	CHL(PH)B	CALL CEN LAB
117	CHL(PH)C	CALL CEN LAB
118	AS TOTAL	RA--MG,AS
119	HCO3	RU
120	B DISS	FU
121	*B TOTAL*	*RA*
122	FE	FA--AR
123	NH4 AS N	RC
124	NH4+ORGN	RC
125	NH4+2ND	RC
126	CD DISS	FA--AR
127	OIL&GREA	RC O & GR
128	P DIS	FC
129	P TOTAL	RC
130	CO TOTAL	RA
132	C,I+B,M=	CU
133	C,T+B,M=	CU
134	COD LOW	RC M2SO4
135	BI DISS	FA--SPEC
136	COD HIGH	RC M2SO4
138	YANMINLG	RC
146	CR DIS	FA--AR
147	CR TOTAL	RA
148	CO DISS	FA--AR
149	CO TOTAL	RA
151	CU DISS	FA--AR
155	CHL(PH)T	CALL CEN LAB
156	CU TOTAL	RA
157	CN	RC NAOH
158	F DISS	FU
159	RESTO105	FU
160	NO2 AS N	FC
162	PO4 AS P	FC
163	F TOTAL	RU
164	I	RU
165	RESTO105	RU--SS
166	AG DISS	FA--AR
168	SS 110C	RU--SS
169	RESTOTNO	RU--SS
170	BE DISS	FA--AR
171	I	RU
172	DIS FE	FA--AR
173	FE +6 +3	FA--AR
174	MN	FA--AR
189	TOT FE	RA
190	FE B,M=	CU
191	PB DISS	FA--AR
192	PB TOTAL	RA
193	MN DISS	FA--AR
194	MN TOT	RA
195	MG DIS	FA--AR
196	MG TOT	RA--MO,AS
197	NI DISS	FA--AR
198	NI TOTAL	RA
199	NH4 AS N	FC
209	GROS-A,T	RU-RAD,CHEM.
210	GROS-B,T	RU-RAD,CHEM.
211	G,SCAN S	CALL CEN LAB
212	G,SCAN B	CALL CEN LAB
213	GROS-B,T	RU-RAD,CHEM.
214	*NH4 AS N*	*RC*
215	N-NH4 BM	CC
216	N-DIS-KD	FC
217	TOT N KD	RC
218	N,KJM BM	CC
219	N-TOT BM	CC
220	SIO2 DIS	FU
221	AG B,M=	CU
222	BR	RU
225	SN DISS	FA--AR
226	MO DIS	FA--AR
227	MG TOT	RA--MG,AS
228	NO2+NO3D	FC
229	RESVOL U	FU
232	AS TOTAL	RA--MG,AS
234	BA TOTAL	RA
236	BE TOTAL	RA
238	BI TOTAL	RA--SPEC
242	CO TOTAL	RA
244	CA TOTAL	RA
246	CR TOTAL	RA
248	CO TOTAL	RA
250	CU TOTAL	RA
257	PB TOTAL	RA
261	MG TOTAL	RA
265	MO TOTAL	RA
267	NI TOTAL	RA
288	N-DIS-KD	FC
271	B TOTAL	RA
273	F TOTAL	RU
277	LI TOTAL	RA
279	MP-PO4 D	FC
282	MP-PO4 T	RC
286	SE TOTAL	RA--MG,AS
288	AG TOTAL	RA
290	SR TOTAL	RA
292	SN TOTAL	RA--SPEC
294	V TOTAL	RU
296	ZN TOTAL	RA
297	PO4 AS P	RC
298	S34/S32	CALL CEN LAB
300	D/H	CALL CEN LAB
301	NH4 AS N	FC
302	NO2 AS N	MC
304	NO2+NO3T	RC
305	C,ORG S	SILVER FILT.
306	C,INORG.	DOC
307	C,INOR,S	SILVER FILT.
309	SEST DRY	CALL CEN LAB
320	NA TOTAL	RA
321	K TOTAL	RA
322	RESFIRNO	RU--SS
324	CA T EPA	RA--EPA
325	MG T EPA	RA--EPA
326	NA T EPA	RA--EPA
327	*K T EPA*	*RA--EPA*
342	PERTHN B	BTH-ORGANIC
343	PERTHN S	RC-ORGANIC
344	PERTHN O	RC-ORGANIC
345	ENDOS O	RC-ORGANIC
346	ENDOS B	BTH-ORGANIC
347	ENDOS S	RC-ORGANIC
348	PERTHN T	RC-ORGANIC
349	ENDOS T	RC-ORGANIC
350	ALO TOT	RC-ORGANIC
351	CHL TOT	RC-ORGANIC
352	ODD TOT	RC-ORGANIC
353	ODE TOT	RC-ORGANIC
354	ODT TOT	RC-ORGANIC
355	DIEL TOT	RC-ORGANIC
356	END TOT	RC-ORGANIC
357	HEPT TOT	RC-ORGANIC
358	MEOX TOT	RC-ORGANIC
359	LIND TOT	RC-ORGANIC
360	TOX TOT	RC-ORGANIC
361	ALO BTH	BTH-ORGANIC
362	CHL BTH	BTH-ORGANIC
363	ODD BTH	BTH-ORGANIC
364	ODE BTH	BTH-ORGANIC
365	ODT BTH	BTH-ORGANIC
366	DIEL BTH	BTH-ORGANIC
367	END BTH	BTH-ORGANIC
368	HEPT BTH	BTH-ORGANIC
369	MEOX BTH	BTH-ORGANIC
370	LIND BTH	BTH-ORGANIC
371	TOX BTH	BTH-ORGANIC
372	24D TOT	RC-ORGANIC
373	245T TOT	RC-ORGANIC
374	SILV TOT	RC-ORGANIC
375	24D BTH	BTH-ORGANIC
376	245T BTH	BTH-ORGANIC
377	SILV BTH	BTH-ORGANIC
378	DIAZ TOT	RC-ORGANIC
379	ETHI TOT	RC-ORGANIC

PARAMETER - BOTTLE TYPE CROSS REFERENCE

LAB CODE	SYMBOL	BOTTLE TYPE
380	MALA TOT	RC-ORGANIC
381	MPAR TOT	RC-ORGANIC
382	MTRI TOT	RC-ORGANIC
383	EPAR TOT	RC-ORGANIC
384	ETRI TOT	RC-ORGANIC
385	DIAZ BTM	BTM-ORGANIC
386	ETHI BTM	BTM-ORGANIC
387	MALA BTM	BTM-ORGANIC
388	MPAR BTM	BTM-ORGANIC
389	MTRI BTM	BTM-ORGANIC
390	EPAR BTM	BTM-ORGANIC
391	ETRI BTM	BTM-ORGANIC
392	PCB TOT	RC-ORGANIC
393	PCN TOT	RC-ORGANIC
394	PCB BTM	BTM-ORGANIC
395	PCN BTM	BTM-ORGANIC
396	RDX TOT	RC-ORGANIC
397	TNT TOT	RC-ORGANIC
398	RDX BTM	BTM-ORGANIC
399	TNT BTM	BTM-ORGANIC
400	METH TOT	RC-ORGANIC
401	METH BOT	BTM-ORGANIC
402	24DP TOT	RC-ORGANIC
403	24DP BTM	BTM-ORGANIC
404	ALD SUS	RC-ORGANIC
405	CHL SUS	RC-ORGANIC
406	ODD SUS	RC-ORGANIC
407	ODE SUS	RC-ORGANIC
408	ODT SUS	RC-ORGANIC
409	DIEL SUS	RC-ORGANIC
410	MEPT SUS	RC-ORGANIC
411	MEOX SUS	RC-ORGANIC
412	LIND SUS	RC-ORGANIC
413	TOX SUS	RC-ORGANIC
414	PCB SUS	RC-ORGANIC
415	PCN SUS	RC-ORGANIC
416	METH SUS	RC-ORGANIC
417	DIAZ SUS	RC-ORGANIC
418	ETHI SUS	RC-ORGANIC
419	MALA SUS	RC-ORGANIC
420	MPAR SUS	RC-ORGANIC
421	PARA SUS	RC-ORGANIC
422	TRIT SUS	RC-ORGANIC
423	DIAZ DIS	RC-ORGANIC
424	ETHI DIS	RC-ORGANIC
425	MALA DIS	RC-ORGANIC
426	MPAR DIS	RC-ORGANIC
427	PARA DIS	RC-ORGANIC
428	TRIT DIS	RC-ORGANIC
430	GALL.DIS	FA--SPEC
431	GE DISS.	FA--SPEC
432	TI DISS.	FA--SPEC
433	ZR DISS.	FA--SPEC
434	GA TOTAL	RA--SPEC
435	GE TOTAL	RA--SPEC
436	TI TOTAL	RA--SPEC
437	ZR TOTAL	RA--SPEC
438	C-14-PMT	CALL CEN LAB
439	C-14-AGE	CALL CEN LAB
440	C-13/12R	CALL CEN LAB
441	CA,E,CAR	C' L CEN LAB
442	CS-137 D	CALL CEN LAB
443	D,SGAN D	FU-RAD.CHEM.
444	D,AL,DIS	RU-RAD.CHEM.
445	D,BE,S90	RU-RAD.CHEM.
446	D,AL,SUS	RU-RAD.CHEM.
447	D,BES590	RU-RAD.CHEM.
448	LEAO-210	CALL CEN LAB
449	R,226-BR	RU-RAD.CHEM.
450	SR-90,D,	CALL CEN LAB
451	T/U ATM	CALL CEN LAB
452	T,LIW,SC	RU-TRITIUM
453	U,D,DR,F	FU-RAD.CHEM.
454	U,D,EXTR	RU-RAD.CHEM.
455	D,BE,137	RU-RAD.CHEM.
456	D,BES137	RU-RAD.CHEM.
458	R,226-PL	CALL CEN LAB
459	M-3,GASC	CALL CEN LAB
460	M-3,EOAS	CALL CEN LAB
461	CO-60 D,	CALL CEN LAB
462	TC-99 D,	CALL CEN LAB
463	ALD DISS	RC-ORGANIC
464	CHL DISS	RC-ORGANIC
465	DDD DISS	RC-ORGANIC
466	DDE DISS	RC-ORGANIC
467	DDT DISS	RC-ORGANIC
468	DIEL DIS	RC-ORGANIC
469	END DISS	RC-ORGANIC
470	MEPT DIS	RC-ORGANIC
471	MEOX DIS	RC-ORGANIC
472	LIND DIS	RC-ORGANIC
473	TOX DISS	RC-ORGANIC
474	PCB DISS	RC-ORGANIC
475	PCN DISS	RC-ORGANIC
476	METH DIS	RC-ORGANIC
477	24D DISS	RC-ORGANIC
478	245T DIS	RC-ORGANIC
479	SILV DIS	RC-ORGANIC
480	24D SUS	RC-ORGANIC
481	245T SUS	RC-ORGANIC
482	SILV SUS	RC-ORGANIC
483	END SUSP	RC-ORGANIC
484	ME,TH. O	RC-ORGANIC
485	ME,TR,S.	RC-ORGANIC
486	2,4-DP S	RC-ORGANIC
487	2,4-DP D	RC-ORGANIC
489	OXY10/16	CALL CEN LAB
490	RN-222-M	CALL CEN LAB
491	RN-222-D	CALL CEN LAB
500	AS B.M.	CU

PARAMETER - BOTTLE TYPE CROSS REFERENCE

LAB CODE	SYMBOL	BOTTLE TYPE
501	B B.M.	CU
502	CO B.M.	CU
503	C,T,B,M.	CU
504	C,D,B,M.	CU
505	CR B.M.	CU
506	CU B.M.	CU
507	CU B.M.	CC
508	CN B.M.	CC
509	FE B.M.	CU
510	PB B.M.	CU
511	MG B.M.	CU
512	MN B.M.	CU
513	NO2NO3BM	CC
514	N,KJL BM	CC
515	PHOS BM	CC
516	RESLO1BM	CU
517	SE B.M.	CU
518	ZN B.M.	CU
519	NI B.M.	CU
520	AL B.M.	CU
521	BA B.M.	CU
522	BE B.M.	CU
523	MO B.M.	CU
524	N-NH4 BM	CC
526	N-NO2 BM	CC
527	N-TOT BM	CC
528	AG B.M.	CU
530	SR B.M.	CU
531	OIL&GR,B	CC
532	COD BTM	CC
533	% MOIS.B	CC
534	SB B.M.	CU
535	BI B.M.	CU
536	GA B.M.	CU
537	GE B.M.	CU
538	SN B.M.	CU
539	TI B.M.	CU
540	ZR B.M.	CU
541	LI B.M.	CU
542	MIRA DIS	RC-ORGANIC
543	MIRA SUS	RC-ORGANIC
544	MIRA TOT	RC-ORGANIC
545	MIRA BTM	BTM-ORGANIC
551	TNT DISS	RC-ORGANIC
552	TNT SUSP	RC-ORGANIC
553	RDX DISS	RC-ORGANIC
554	RDX SUSP	RC-ORGANIC
561	KEPONE D	RC-ORGANIC
562	KEPONE S	RC-ORGANIC
563	KEPONE T	RC-ORGANIC
564	KEPONE B	RC-ORGANIC
565	IN B ORY	CALL CEN LAB
566	IN B ASH	CALL CEN LAB
567	IN B TOT	CALL CEN LAB
568	MACRPM T	CALL CEN LAB
569	BAC NITR	CALL CEN LAB
570	BAC SL R	CALL CEN LAB
571	P G-O/M3	CALL CEN LAB
572	P G-O/M2	CALL CEN LAB
573	P G-C/M3	CALL CEN LAB
574	P G-C/M2	CALL CEN LAB
575	P C2/M3	CALL CEN LAB
576	P O2/M2	CALL CEN LAB
577	P C/M3	CALL CEN LAB
578	P N-C/M2	CALL CEN LAB
579	ASP O/M3	CALL CEN LAB
580	ASP O/M2	CALL CEN LAB
581	PER TOT	CALL CEN LAB
582	ZOO TOT	CALL CEN LAB
583	ZOOPL DR	CALL CEN LAB
584	ZOOPL AM	CALL CEN LAB
585	ADEN TRI	CALL CEN LAB
586	C A PHCF	CALL CEN LAB
587	C B PHCF	CALL CEN LAB
588	C A PECF	CALL CEN LAB
589	C B PECF	CALL CEN LAB
591	AZ/DNN-T	RC-ORGANIC
592	DISYST-T	RC-ORGANIC
593	PHORAT-T	RC-ORGANIC
594	PHOSUR-T	RC-ORGANIC
600	PHYT I	CALL CEN LAB
601	PHYT II	CALL CEN LAB
602	PERI I	CALL CEN LAB
603	BMS(PE)D	CALL CEN LAB
604	BMS PO M	CALL CEN LAB
605	BEN-IN-1	CALL CEN LAB
606	BEN-IN-2	CALL CEN LAB
607	OIV-INDX	CALL CEN LAB
608	IN B WET	CALL CEN LAB
609	CHL(PE)A	CALL CEN LAB
610	CHL(PE)B	CALL CEN LAB
611	BMS(PE)A	CALL CEN LAB
612	SEST ASH	CALL CEN LAB
613	CHL(PE)C	CALL CEN LAB
614	CHL(PE)T	CALL CEN LAB
615	SEST DRY	CALL CEN LAB
616	ATP	CALL CEN LAB
617	ZP	CALL CEN LAB
618	C A PHCS	CALL CEN LAB
619	C B PHCS	CALL CEN LAB
620	BI DY PH	CALL CEN LAB
621	BI AM PH	CALL CEN LAB
622	BI CM PL	CALL CEN LAB
623	C A PECS	CALL CEN LAB
624	C B PECS	CALL CEN LAB
625	BO OR PR	CALL CEN LAB
626	BO AM PR	CALL CEN LAB
627	BI CM PE	CALL CEN LAB
631	PROMET-T	RC-ORGANIC
636	CARBTL-T	RC-ORGANIC

PARAMETER - BOTTLE TYPE CROSS REFERENCE

LAB CODE	SYMBOL	BOTTLE TYPE
637	PROPNM-T	RC-ORGANIC
638	METHYL-T	RC-ORGANIC
640	AL DIS	FA--SPEC
641	BA DISS	FA--SPEC
643	CR DIS	FA--SPEC
644	CO DISS	FA--SPEC
645	DIS FE	FA--SPEC
646	PB DISS	FA--SPEC
648	MN DISS	FA--SPEC
649	MO DISS	FA--SPEC
650	NI DISS	FA--SPEC
651	AG DISS	FA--SPEC
652	SR DISS	FA--SPEC
653	V DISS	FA--SPEC
655	BE DISS	FA--SPEC
656	B DISS	FA--SPEC
657	CU DISS	FA--SPEC
658	AL TOT	RA--SPEC
659	BA TOTAL	RA--SPEC
661	CR TOTAL	RA--SPEC
662	CO TOTAL	RA--SPEC
663	TOT FE	RA--SPEC
664	PB TOTAL	RA--SPEC
665	MN TOT	RA--SPEC
667	MO TOTAL	RA--SPEC
668	NI TOTAL	RA--SPEC
669	AG TOTAL	RA--SPEC
670	SR TOTAL	RA--SPEC
671	V TOTAL	RA--SPEC
673	BE TOTAL	RA--SPEC
674	B TOTAL	RA--SPEC
675	CU TOTAL	RA--SPEC
676	AL B.M.	CU
677	BA B.M.	CU
679	CR B.M.	CU
680	CO B.M.	CU
681	FE B.M.	CU
682	PB B.M.	CU
684	MN B.M.	CU
685	MO B.M.	CU
686	NI B.M.	CU
687	AG B.M.	CU
688	SR B.M.	CU
689	V B.M.	CU
691	BE B.M.	CU
692	B B.M.	CU
693	CU B.M.	CU
701	CU DIS G	FA CLEAN LAB
702	PB DIS G	FA CLEAN LAB
703	NI DIS G	FA CLEAN LAB
704	ZN DIS G	FA CLEAN LAB
705	CD DIS G	FA CLEAN LAB
706	CR DIS G	FA CLEAN LAB
707	CO DIS G	FA CLEAN LAB
708	AG DIS G	FA CLEAN LAB

LAB CODE	SYMBOL	BOTTLE TYPE
709	CU TOT G	RA CLEAN LAB
710	PB TOT G	RA CLEAN LAB
711	NI TOT G	RA CLEAN LAB
712	ZN TOT G	RA CLEAN LAB
713	CD TOT G	RA CLEAN LAB
714	CR TOT G	RA CLEAN LAB
715	CO TOT G	RA CLEAN LAB
716	AG TOT G	RA CLEAN LAB

44. GRAPHITE DATA SHEET

X	Y1	Y2	Y3	LC	LAB-ID	VOLUME	DIL.FAC	COMMENTS
1 - 7	9 - 14	16-21	23-28	30-32	34-39	41-46	48 - 49	51 - 80
______	______	______	______	___	______	______	______	______________
______	______	______	______					
______	______	______	______					
______	______	______	______	999				

X	Y1	Y2	Y3	LC	LAB-ID	VOLUME	DIL.FAC	COMMENTS
1 - 7	9 - 14	16-21	23-28	30-32	34-39	41-46	48 - 49	51 - 80
______	______	______	______	___	______	______	______	______________
______	______	______	______					
______	______	______	______					
______	______	______	______	999				

X	Y1	Y2	Y3	LC	LAB-ID	VOLUME	DIL.FAC	COMMENTS
1 - 7	9 - 14	16-21	23-28	30-32	34-39	41-46	48 - 49	51 - 80
______	______	______	______	___	______	______	______	______________
______	______	______	______					
______	______	______	______					
______	______	______	______	999				

X	Y1	Y2	Y3	LC	LAB-ID	VOLUME	DIL.FAC	COMMENTS
1 - 7	9 - 14	16-21	23-28	30-32	34-39	41-46	48 - 49	51 - 80
______	______	______	______	___	______	______	______	______________
______	______	______	______					
______	______	______	______					
______	______	______	______	999				

45. SAMPLE UPDATE SHEET

United States Department of the Interior

GEOLOGICAL SURVEY
1033 Post Office Building
St. Paul, Minnesota 55101

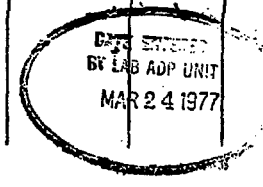
3-21-77

TO: Ruben Gust

FROM: Mark R. Have
St. Paul, MN

Please make the following updates:

Lab ID	Rec. #	Lab Code	Value	Lab ID	Rec. #	Lab Code	Value
V 199417	45648	79	3	✓352037	49862	12	110
199418	45650	TIME	0935			37	10
201145	22269	79	7			40	45
✓202001	21726	79	7			268	.39
-241102	29804	79	3			279	.01
201146	22272	79	7			128	.01
201144	22266	79	7			21	867
✓202002	21729	79	7			63	61
-202005	21738	79	7	✓329042	46389	123	.12
-202007	21744	79	7			301	.12
✓246168	31624	79	3			228	1.5
		324	44	✓42060	57027	21	398
		325	3.1				
		129	.05				
-202006	21741	79	7				
-202008	21747	79	7				
✓202003	21732	79	7				
✓202004	21735	79	7				
✓240111	29433	79	7				
✓49041	58118	228	.92				
48191	58006	42	630				



FOR THE DISTRICT CHIEF
Charles R. Collier

Mark
Mark R. Have
Hydrologist

Appendix *F*
Calculation and Report Program: Gross Alpha and Beta

AN INTRODUCTION TO THE PROGRAMS ON THIS TAPE

O. J. Feist

GENERAL

In general, the calculator talks to you by the display, you talk to it by the keyboard, and the results of this discussion appear on the printout. In some cases, a message is of continuing importance or too long to fit on the display (or both) in which case it is printed and the display says, "See printed message".

To use any program on this tape, first find which file it is in by checking the card in the box. Press the "load" key (located near the casette), followed by the number of the file, then "execute". When the casette stops running, press "run" then "execute".

For some of these programs, tables of data are needed from the auxiliary tape unit so it is a good idea to keep that unit turned on.

All of these programs are set up to use the "star date" system, the year and month then decimal and the day of the month (for example Jan 2, 1976 would be 7601.02).

If more than one number is asked for at one time, the requests will be separated by commas. All of the requested numbers should be entered at once, in the order listed, and separated by commas. Each time you make an entry in response to a program request, you must press "execute" to continue.

I have attempted to make all of these programs self-explantory. However, discussions of each program are available here and you can choose whether or not to have each explained. You will be asked whether you want an explanation of each program in turn. In every case a "1" indicates a "yes" and a "0" means "no" (the display will remind you of this each time). As mentioned above, each time you make an entry in response to a program request, you must press "execute" to continue.

Do you want a discussion of the RA-226 program?

RADIUM 226 BY RADON

The radium calculations involve tables of cell constants and backgrounds, which are in the auxiliary tape so that unit must be turned on. The method calls for 1000 ml of sample so the program assumes this volume; however, sometimes other volumes are used and by following the printed message this can be changed. This change is made when the sample number is requested, but before it is entered. The program will again assume 1000 ml for the next sample.

The day requested is the "Julian date" or day of the year. The hour and minute are the time on the 24-hr clock. All three numbers are entered at once and separated by commas (for example: 1:30 PM on Jan. 29th would be: 29,13,30).

Do you want a discussion of the gross alpha and beta program?

GROSS ALPHA AND BETA

The same program is used to calculate either gross dissolved or gross suspended alpha and beta. Both are printed on the heading and the incorrect one is to be crossed out.

The program is designed to use any number of 50-min counts, each is entered individually. To tell the calculator that you have finished a series of counts, simply enter a pair of negative numbers (such as -3,-3) as indicated in the printed message.

To select the correct table of factors, the calculator needs to know which instrument the samples were counted on. The widebeta I is No. 1, the lowbeta II is No. 2, and the widebeta II is No. 3 (the display will tell you the same thing, in abbreviated form). The auxiliary tape must be on.

All three counters print the beta before the alpha, so the program is designed the same way. Each time an entry is made, the time is incremented by 50 min, so every count must be entered individually (even if it is zero). As mentioned above, a pair of negative numbers is used to indicate that you are finished entering blank counts.

The background count rate which we use is actually the average of the last 10 backgrounds. This is accomplished by keeping a log of individual and cumulative counts in a log book. The new 10-background average is obtained by adding on the latest numbers and subtracting the eleventh set back. The calculator does the calculations but you must supply the numbers. Separate logs

are kept for alpha and beta, for each instrument, and for dissolved and suspended.

First obtain the correct alpha log. The new short term background information is printed and must be logged, then enter the last cumulative counts (comma) and time. Then count back to the eleventh entry back (including your new one) and enter the short term counts and time of that entry. The new cumulative counts and time are printed and must be logged. Turn to the appropriate beta log and repeat the process.

If you are running gross suspended, the next part will look natural — sample number and volume, then filter plugs residue and filter (alone) weights. If gross dissolved is being run, simply (mentally) substitute planchette for filter and all will go well.

A maximum of 150 mg of residue can be used and if a sample is over this weight the calculator doesn't let you waste your time entering counts. It prints a message telling you to rerun with less volume, and how much residue there was so you can calculate how much volume to use the next time. Then it flashes "rerun!!!!" to attract your attention and calls for the next sample. Do you want a discussion of the direct uranium procedure?

DIRECT URANIUM

The portions of the blank caused by fluorescence and reflectance (known as BE and BR respectively) may change between batches of flux. Therefore, these values for the current batch are requested at the beginning of the program.

Since the blank reading is set at 10.0, this value is assumed by the program and only two standard readings need to be entered.

Four readings are taken for each sample: two unspiked and spiked with 0.05UG of U. These are normally set up unspiked, spiked, unspiked, spiked in the tray and on the worksheet. Therefore, the four readings are entered in that order.

Do you want an explanation of the extractable uranium procedure?

Since the method normally calls for 400 ml, the program assumes this volume; however, this can be changed by following the printed message before entering the sample number and reading. A volume of 400 ml will again be assumed for the next sample.

Do you want a discussion of the SR-90 or CS-137 programs?

STRONTIUM-90

Since the method normally calls for 1000 ml, the program assumes this value. If any other volume is used, this can be changed by following the printed message. A volume of 1000 ml will be assumed for the next sample. This program can use any number of 50-min counts. As a signal that you have finished a series, enter any negative number.

Although there are two standards, the results are to be averaged so enter all of the standard counts in one series. In order to correct for incomplete recovery in the separation steps, the original concentration of strontium in the sample must be known and entered when called for.

For cesium-137 the above discussion applies, except that the volume is 500 ml and there is no cesium concentration to be entered.

Do you want a discussion of the potassium-40 program?

POTASSIUM-40

This is based on the assumption of normal isotopic ratio. Potassium is determined by atomic absorption spectrophotometry. The sample number and potassium concentration are entered and the activity of potassium-40 is printed out.

Do you want a discussion of the radium cell constant program?

RADIUM CELL CONSTANT CALCULATION PROGRAM

Each cell's calibration is followed through all five instruments. The day, hour, and minute follow the same conventions used in the RA-226 program. It is assumed that the counting takes place on the same day as the deemanation so only hour and minute are needed for the starting times. The background for

each cell-instrument combination is needed for the calculation and is entered along with the counts and counting time.

Do you want a discussion of the radium data storage program?

RADIUM DATA STORAGE

This program takes the background and cell constant data from the cell log and makes up tables (on the auxiliary tape and a "hard copy") to be used for RA-226 calculations. Since the log has all the backgrounds for a cell on one page and the constants on another, the program calls for all of the backgrounds for a cell, then the constants, then goes on to the next cell.

After entering the last cell constant, entering a negative number tells the calculator that you are finished. The tables are then stored on the auxiliary tape (it must be on) then a copy is printed. If any errors are found, they can be corrected by following the instructions on the display.

It is important to "relist" after making corrections as this is the only way to get the corrected values on the auxiliary tape. A corrected table will also be printed.

Do you want a discussion of the gross alpha and beta factor storage?

GROSS ALPHA AND BETA FACTOR STORAGE

For the calculator to know which instrument is being calibrated, the same numbers are used as in the gross alpha and beta program and are indicated on the display.

Calibration factors are needed for every milligram of residue from 0 to 150 (the calculator keeps track of where you are). Three factors are needed: alpha, beta as SR/Y-90, and beta as CS-137, and must be entered in this order. Example: the display reads "factors for weight 0?" You might punch 0.35,943,1003 "execute". The display would then go on to weight one. After all the factors have been entered, the table is stored on the auxiliary tape and a listing is made. If any errors are found, enter the weight when the "edit: weight (200=relist)" is displayed. At that time, all three factors must be entered. The above display then returns.

It is very important that, if any corrections are made, a relist be executed entering a 200) so that the correct values will be on the auxiliary tape.

I hope these explanations have helped, and good luck with my programs.

The program for this is infile 10, but I am not listing it out since this run gives the necessary information.

```
----------OLLIE----------
        FILE #0
                    RADIUM-226 (L.C. 449)

 5 FIND 13
 10 DISP "RA-226"
 20 WAIT 2000
 30 PRINT TAB20, "RADIUM-226 (L.C. 449)",TAB60,"USGS -"WRD"
 40 FIXED 2
 50 DISP "ENTER DATE";
 60 INPUT D
 70 PRINT TAB20, "DATE";D,TAB60, "CENTRAL LAB"
 80 PRINT TAB60, "SECTION 7"
 90 PRINT "IF THE VOLUME OF ANY SAMPLE IS OTHER THAN 1000 ML"
 100 PRINT "PUNCH 'STOP, EXECUTE, V=---,EXECUTE, CONT, EXECUTE' BEFORE ENTERING"
 110 PRINT "ITS NUMBER"
 120 PRINT
 130 DISP "SEE PRINTED MESSAGE"
 140 WAIT 5000
 150 DIM B1[50,5],K1[50,5]
 160 LOAD  DATA 13,B
 170 LOAD  DATA 14,K
 180 REWIND
 190 PRINT
 200 L=-0.0001259095
 210 FIXED 0
 220 V=1000
 230 DISP "ENTER SAMPLE NUMBER";
 240 INPUT N
 250 PRINT TAB5,"SAMPLE";N;"VOLUME";V
 260 PRINT TAB5,"DEEM   DAY  HOUR  MINUTE"
 270 DISP "FIRST DEEM:DAY,HOUR,MINUTE";
 280 INPUT D1,H1,M1
 290 PRINT TAB5, "FIRST ";D1;H1;M1
 300 DISP "SECOND DEEM:DAY,HOUR,MINUTE";
 310 INPUT D2,H2,M2
 32  PRINT TAB5, "SECOND";D2;H2;M2
 330 DISP "START COUNT:DAY,HOUR,MINUTE";
 340 INPUT D3,H3,M3
 350 PRINT TAB5,"COUNT ";D3;H3;M3
 360 DISP "ENTER CELL,INSTRUMENT";
 370 INPUT C9,I9
 380 PRINT TAB5,"CELL";C9;"IN INSTRUMENT";I9
 390 FIXED 1
 400 B1=B[C9,I9]/1000
 410 K1=K[C9,I9]/100
 420 DISP "ENTER COUNTS,COUNTING TIME";
 430 INPUT C,T
 440 PRINT TAB5,C;"COUNTS IN";T"MINUTES"
 450 R=C/T-B1
 460 T1=(D2-D1)*1440+(H2-H1)*60+M2-M1
 470 F1=1-(EXP(L*T1))
 480 T2=(D3-D2)*1440+(H3-H2)*60+M3-M2
```

```
490 F2=EXP(L*(T2+T/2))
500 A=1000*R/V/K1/F1/F2
510 IF A<0.01 THEN 550
520 FIXED 2
530 PRINT "VALUE";A;"PC/L"
540 GOTO 190
550 PRINT "VALUE   LESS THAN .01 PC/L"
560 GOTO 190
570 END
```

FILE #1

GROSS ALPHA & BETA

```
10 FIND 15
20 DISP "GROSS ALPHA & BETA'
30 DIM FI[151,3],D$[10]
40 WAIT 3000
50 DISP "DISS OR SUSP";
60 INPUT D$
70 PRINT TAB20, "GROSS ALPHA & BETA", TAB60,"USGS - WRD"
80 IF D$="DISS" THEN 130
90 IF D$#"SUSP" THEN 50
100 PRINT TAB20"SUSPEND";
110 Q9=0
120 GOTO 150
130 PRINT TAB20"DISSOLVED";
140 Q9=1
150 PRINT TAB60"CENTRAL LAB"
160 FIXED 2
170 DISP "ENTER DATE";
180 INPUT D
190 PRINT TAB20,"DATE";D,TAB60,"SECTION 7"
200 PRINT
210 PRINT "TO TERMINATE A SERIES OF COUNT ENTRIES, ENTER ANY NEGATIVE NUMBERS"
220 PRINT
230 PRINT
240 DISP "SEE PRINTED MESSAGE"
250 WAIT 5000
260 DISP "WHICH INST.?WBI=1,WBII=2";
270 INPUT I
280 IF I=1 THEN 320
290 IF I#2 THEN 260
300 PRINT TAB5,"INSTRUMENT#2(WBII)"
310 GOTO 330
320 PRINT TAB5,"INSTRUMENT#1(WBI)"
330 LOAD DATA I+14,F
340 REWIND
350 PRINT TAB5,"BLANK COUNTS"
360 PRINT TAB5, "BETA      ALPHA'
370 B1=A1=T-0
380 DISP "ENTER A BLANK COUNT:BETA,ALPHA";
390 INPUT B,A
400 IF B<0 THEN 470
410 WRITE (15,420)B,A
420 FORMAT 5X,2F7.0
```

```
430 B1=B1+B
440 A1=A1+A
450 T=T+50
460 GOTO 380
470 B2+B1/T
480 A2=A1/T
490 WRITE (15,500)A1,T,A2
500 FORMAT "ALPHA BACKGROUND",F5.0," COUNTS IN",F5.0," MINUTES, RATE",F5.2," CPM
510 PRINT
520 WAIT 10000
530 DISP  "A ENTER PREVIOUS CUM.COUNTS,TIME";
540 INPUT C1,T1
550 PRINT TAB5, "PREVIOUS CUM.";C1;"COUNTS";T1;"MINUTES"
560 C1=C1+A1
570 T1=T1+T
580 DISP "ENTER COUNTS, TIME TO BE DROPPED";
590 INPUT C2,T2
600 PRINT TAB5,"DROPPED";C2;"COUNTS";T2''MINUTES"
610 C1=C1-C2
620 T1=T1-T2
630 A0=C1/T1
640 WRITE (15,650)C1,T1,A0
650 FORMAT 5X,"NEW CUMULATIVE",F5.0," COUNTS",F5,0," MINUTES,RATE",F5,2," CPM"
660 PRINT
670 WAIT 10000
680 WRITE (15,690)B1,T,B2
690 FORMAT "BETA BACKGROUND",F5.0," COUNTS IN",F5.0," MINUTES, RATE",F5.2,"CPM"
700 PRINT
710 WAIT 10000
720 DISP "B ENTER PREVIOUS CUM.COUNTS,TIME";
730 INPUT C1,T1
740 PRINT TAB5,"PREVIOUS CUM.";C1;"COUNTS";T1;"MINUTES"
750 C1=C1+B1
760 T1=T1+T
770 DISP "ENTER COUNTS,TIME TO BE DROPPED";
780 INPUT C2,T2
790 PRINT TAB5,"DROPPED";C2;"COUNTS";T2;"MINUTES"
800 C1=C1-C2
810 T1=T1-T2
820 B0=C1/T1
830 WRITE (15,650)C1,T1,B0
840 PRINT
850 WAIT 10000
860 A2=A2/T
870 B2=B2/T
880 PRINT
890 PRINT
900 A1=B1=T=0
910 DISP "ENTER SAMPLE NUMBER, VOLUME";
920 INPUT N,V
930 PRINT TAB5, "SAMPLE";N;"VOLUME";V
940 DISP "ENTER WGHTS:FILT+RES, FILT";
950 INPUT W2,W1
970 FIXED 3
980 PRINT TAB5, "WEIGHTS:FILT+RES.";W2''FILTER";W1;"RES";W
```

```
990 IF W<0 THEN 1850
1000 W9=INT(1000*W+1.5)
1010 IF W9>151 THEN 1810
1020 F1=F[W9,1]/1000
1030 F2=F[W9,2]
1040 F3=F[W9,3]
1050 PRINT
1060 PRINT TAB5,"SAMPLE COUNTS"
1070 PRINT TAB5,"BETA      ALPHA"
1080 DISP "ENTER A SAMPLE COUNT:B,A";
1090 INPUT B,A
1100 IF B<0 THEN 1160
1110 WRITE (15,420)B,A
1120 B1=B1+B
1130 A1=A1+A
1140 T=T+50
1150 GOTO 1080
1160 R1=A1/T
1170 R2=R1-A0
1180 M=2*SQR(A2+R1/T)
1190 IF R2<M THEN 1230
1200 U=R2/F1*1000/V
1210 L1=0
1220 GOTO 1250
1230 U=M/F1*1000/V
1240 L1=1
1250 R1=B1/T
1260 R2=R1-B0
1270 M=2*SQR(B2+R1/T)
1280 IF R2<M THEN 1330
1290 C=R2*F3/V
1300 S=R2*F2/V
1310 L2=0
1320 GOTO 1360
1330 C=M*F3/V
1340 S=M*F2/V
1350 L2=1
1360 FIXED 1
1370 IF Q9=0 THEN 1400
1380 PRINT "VALUE   (L.C. 444)";
1390 GOTO 1410
1400 PRINT "VALUE   (L.C. 446)";
1410 IF U<0.4 THEN 1450
1420 IF L1=1 THEN 1470
1430 PRINT "GROSS ALPHA  ";U;"UG/L U EQUIVALENT"
1440 GOTO 1480
1450 PRINT "GROSS ALPHA  < 0.4 UG/L U EQUIVALENT"
1460 GOTO 1480
1470 PRINT "GROSS ALPHA  <";U;"UG/L U EQUIVALENT"
1480 IF Q9=0 THEN 1510
1490 PRINT "VALUE   (L.C. 445)";
1500 GOTO 1520
1510 PRINT "VALUE   (L.C. 447)";
1520 IF S<0.4 THEN 1560
1530 IF L2=1 THEN 1580
```

```
1540 PRINT "GROSS BETA   ";S;"PC/L SR/Y-90 EQUIVALENT"
1550 GOTO 1590
1560 PRINT "GROSS BETA   < 0.4  PC/L SR/Y-90 EQUIVALENT"
1570 GOTO 1590
1580 PRINT "GROSS BETA   <";S;"PC/L SR/Y-90 EQUIVALENT"
1590 IF Q9=0 THEN 1620
1600 PRINT "VALUE   (L.C. 455)";
1610 GOTO 1630
1620 PRINT "VALUE   (L.C. 456)";
1630 IF C<0.4 THEN 1670
1640 IF L2=1 THEN 1690
1650 PRINT "GROSS BETA   ";C;"PC/L CS-137 EQUIVALENT"
1660 GOTO 1700
1670 PRINT "GROSS BETA   < 0.4 PC/L CS-137 EQUIVALENT"
1680 GOTO 1700
1690 PRINT "GROSS BETA   <";C;"PC/L CS-137 EQUIVALENT"
1700 FIXED 0
1710 IF Q9=0 THEN 1740
1720 PRINT "VALUE   (L.C. 159)";
1730 GOTO 1750
1740 PRINT TAB8,"(L.C. 630)";
1750 S=W*1000000/V
1760 IF S<1 THEN 1790
1770 PRINT "SOLIDS     ";S;"MG/L"
1780 GOTO 890
1790 PRINT "SOLIDS      <1 MG/L"
1800 GOTO 890
1810 PRINT TAB5,"RERUN WITH LESS VOLUME, RESIDUE IS";W;"G"
1820 DISP "RERUN!!!!!!!!!!!!!!!!!!"
1830 WAIT 3000
1840 GOTO 890
1850 DISP "RE-ENTER!!!!!!!!!!!!!!!"
1860 WAIT 3000
1870 PRINT "NEGATIVE RESIDUE---CHECK YOUR WEIGHTS AND RE-ENTER THE SAMPLE"
1880 PRINT
1890 GOTO 890
1900 END
```

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