SECTION IX

AIR QUALITY SURVEILLANCE PLAN

SECTION IX

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SECTION IX

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FEDERAL GUIDELINES
FOR
THE AIR QUALITY SURVEILLANCE PLAN

The following outline summarizes the compliance of the Air Quality Surveillance Plan with the requirements set forth in Paragraph 420.17 of the Federal Register, Volume 36, Number 158, August 14, 1971.

(a) (1) Establishment of a State air quality surveillance system which meets the minimum requirements indicated in the Federal Register, Paragraph 420.17, and which is in operation no later than two years after Environmental Protection Agency approval of the plan. Contingent upon availability of resources and demonstrated need, a comprehensive air quality surveillance network is proposed, with completion scheduled by the end of calendar year 1975. Within this system plan, all minimum monitoring requirements for each Region in the State as specified in the Federal Register, Paragraph 420.17, (See Attachment 1) will be met or exceeded by the end of calendar year 1973 (See Attachment 3 and Tab 1 to Attachment 4).

(2) Location of one or more sampling sites in the area of estimated maximum concentration of each pollutant. For each Region, these sampling sites will be in operation by the end of calendar year 1973 (See Attachment 3).

(b) Description of the existing and proposed air quality surveillance system.

(1) Basis for the design of the surveillance system and for the selection of samplers and sampling sites. Paragraphs A, B, and C present (i) the basis for system design and monitoring equipment requirements in terms of the objectives of air quality surveillance and (ii) the rationale for proposing a comprehensive air quality surveillance system which is not limited to the minimum Federally-prescribed requirements; specific reference to Region VII supports this presentation. Attachment 3 indicates criteria for selection of each sampling site and for installation priority.

(2) Locations of samplers by Universal Transverse Mercator (UTM) grid coordinates or the equivalent. See Attachment 3. UTM grid coordinates and latitude and longitude are given in Attachment 3 for existing

sampling sites and those proposed for completion by the end of 1973, including those sites which fulfill the minimum monitoring requirements. Sampling sites proposed for installation in 1974-75 generally are indicated only by city or town; precise locations will be determined later.

(3) Sampling schedules. See Attachment 3, Tab 2 to Attachment 3, and Attachment 9. Sampling frequency will equal or exceed that specified in the Federal Register, Paragraph 420.17.

(4) Methods of sampling and analysis. Sampling methods will be as prescribed in the Federal Register, Volume 36, Number 84, April 30, 1971. In addition, continuous monitoring is planned for sulfur dioxide/hydrogen sulfide/total sulfur by gas chromatography and for nitrogen dioxide by chemiluminescence analysis. Also see Attachment 9. Standard procedures will be developed and published by the Texas Air Pollution Control Services Staff for pollutants not governed by Federal standards.

(5) Method of data handling and analysis procedures. See Paragraph D and Attachment 9.

(6) Timetable for installation of additional equipment to complete the system. Development of the total air quality surveillance system is planned in three phases (See Paragraph C), with completion scheduled for mid-1975; the timetable is detailed in Attachments 2, 3, 4, 6, 7, and 8. For the completed system, Attachment 5 summarizes the total monitoring equipment in each Region; for quick reference, the complete network is mapped in Tab 4 (Phases I-III) to Attachment 3.

(c) Emergency episode air monitoring. Sampling sites designated as Emergency Episode stations in each Region are indicated in Attachment 3. For each Region which is Priority I for any given pollutant, monitoring equipment will be installed by the end of 1972 at the site of maximum concentration of that pollutant (Emergency Episode station). The proposed buildup of the air quality surveillance system during 1973-1975 and installation of communications equipment will provide a comprehensive Emergency Episode network (See Paragraph F, Paragraph B.2, and Tab 1 to Attachment 3).

SECTION IX

AIR QUALITY SURVEILLANCE PLAN

A. General

An adequate air quality surveillance network is an essential part of a reasonable and effective air pollution control program. Information that can be provided only by the network is required for planning and decision making within every phase of the control program. Because of its vital nature, such information should be comprehensive, accurate, and timely. Within the State of Texas, industrial and population centers are widely dispersed over a large geographic area stretching from Corpus Christi to Amarillo and from El Paso to Port Arthur. Equipment and manpower required for a network to cover this great expanse of territory and great diversity of industry are very costly; therefore, every attempt must be made to maximize the effectiveness of the resources used in the surveillance effort. This plan sets forth the requirement for a surveillance system that will satisfy the broad and important objectives of such a system. The plan also recognizes that care must be taken to insure that surveillance efforts are not carried beyond the level needed to satisfy these objectives at the expense of other aspects of the control program. Although air quality surveillance is a vital part of a control program, it cannot stand alone from the other parts. Information without action would be pointless.

B. Objectives of Air Quality Surveillance

An air quality surveillance system is needed within each Air Quality Control Region (AQCR) for the reasons stated below. As an example of the importance of these objectives for surveillance system design, a brief analysis of AQCR VII system requirements is included.

1. To verify compliance with and/or progress made toward meeting air quality standards. Within Region VII, population is concentrated in the Harris-Galveston County complexes, and it is here that monitoring and sampling activities must be concentrated. Major industrial plants, however, are located throughout the entire 13-county region. Short-term as well as long-term emission from these scattered plants may pose health and other problems for persons living

in rural areas and small towns. Frequent and, in some cases, continuous sampling of the air at numerous locations around the Region is required to insure that pollution buildups during atmospheric stagnation periods will be detected and measured before damaging concentration levels are reached. Continuous monitoring is required if the 30-minute, 1-hour, and 3-hour ambient standards are to have real meaning. Intermittent monitoring done on a random basis can be used in assessing long-term trends; however, operators of emission sources who have a knowledge of the sampling schedules can thwart and distort the results of such intermittent efforts by controlling emissions on sampling days.

2. To provide data during Emergency Episode conditions.

Emergency Episodes in Region VII are caused by meteorological stagnation conditions. When such conditions prevail, winds are low or nonexistent; clouds and/or haze limit the solar heating action; and temperature inversions exist. At such times, pollution pockets tend to form and remain in the vicinity of emission sources. The lack of dispersion by wind and lack of vertical mixing by thermal currents create severe problems for those charged with providing adequate data on which control actions must be based. In Region VII, it is estimated that over 100 continuous monitoring stations would be required for total region coverage. Obviously, it would be very expensive to provide, at this time, this number of stations - each costing over $50,000.00. As a minimum, an attempt should be made to locate at least one station in the forecasted area of maximum concentration for each pollutant and one station in each other area where dangerous concentrations would be likely to occur. Maximum concentration stations will have to be located in downtown Houston to monitor hydrocarbons, carbon monoxide, and nitrogen dioxide concentrations; along the Ship Channel to monitor sulfur compounds; and in the extreme northeast portion of Houston to monitor oxidants. To be of value during Emergency Episodes, data derived from continuous monitoring stations must be available to decision makers in time for appropriate control measures to be taken. For this reason, telemetering lines and equipment will be required to remote live data from the monitoring stations to the Austin and Baytown offices of the Air Pollution Control Services and to the offices of local Air Pollution Control Agencies, all of whom are vitally involved in abatement and control programs. For Region VII, appropriate data should be telemetered to Austin, to Baytown, to Houston, and to Galveston County Air Pollution Control offices.

3. To observe pollution trends throughout the Region including non-urban areas. Information on the non-urban areas is needed in order to determine whether air quality in the cleaner portions is deteriorating significantly and to gain knowledge about natural background levels. In Region VII, high-volume air samplers, gas bubbler type samplers, and a limited number of continuous monitors will be required in the cleaner areas outside Harris and Galveston counties. High-volume air samplers and gas bubblers will be needed in such cities and towns as Palacios, El Campo, Conroe, Columbus, and Cleveland. Although most of these towns are near oil fields, they are located in the cleaner areas of the Region. Continuous monitoring stations must also be located in a few of the smaller urban areas. These continuous stations should be equipped with gas chromatographs or equipment which is equally sensitive and precise. This type equipment is essential for accurate measurement of very low concentrations of gaseous pollutants. Only through such measurements can determinations be made as to whether the quality of air is deteriorating and natural background levels be assessed.

4. To provide a data base for application in:

   a. Evaluation of effects.

   b. Land use and transportation planning.

   c. Development and evaluation of abatement strategies.

   d. Development and validation of diffusion models.

   The significance of each of these actions warrants a comprehensive, accurate, and, in some cases, very detailed knowledge of past and present pollution levels and their trends. Under normal atmospheric conditions, smog and other gaseous pollutants originating in the Houston complex can affect persons, animals, crops, and materials far outside the city limits, thus necessitating monitoring in such areas. Alteration of zoning and transportation patterns would affect thousands of people and such actions must be based on valid information. Adequate continuous monitoring must, therefore, be provided in all parts of the heavily populated portions of Region VII and suburban and rural areas as well. Numerous stations will be required around the periphery of Houston, along the Ship Channel, and in Galveston County. Within an area such as Region VII, control strategies can become extremely complex.

Arbitrary controls which may unjustly penalize non-polluting plants must be avoided. Only by current knowledge of the true composition of the atmosphere over the entire Region can logical abatement actions be taken. This requirement forces the air quality evaluator to obtain data from many points within the Region and is a primary factor in determining the number and location of stations. Diffusion modeling, although a useful tool, can at best provide only an order-of-magnitude approximation of true ambient levels. Ground truth, in the form of frequent and actual measurements, is essential for validation and/or adjustment of such mathematical equations.

5. To discover and define air pollution problems not now recognized and to provide a basis for developing future regulations. Rapid industrial and population growth within Texas, and particularly in Region VII, has introduced into the Texas atmosphere many pollutants which did not exist only a short time ago. Current acceleration of this process is likely to continue into the future. Of particular concern are emissions from the petrochemical industry along the Houston Ship Channel. Additionally, new knowledge concerning damaging effects of atmospheric contaminants once thought harmless is being developed. New methods of analysis have recently revealed that the atmosphere in many areas of Texas contains significant amounts of these materials, which include heavy metals, and other potentially dangerous elements and compounds. Design of the air quality network must be flexible, to allow for the economical introduction of new monitors as they are needed. Information derived from such instruments will serve as the base for future control regulations.

6. To provide data for epidemiological studies involving human beings and animals. Data on a continuing basis from numerous points within rural and suburban areas, as well as highly congested urban areas, are needed to assess health effects of various pollutants. Without accurate, comprehensive data, correct conclusions concerning effects are impossible. The variety of contaminants emitted into the air within Region VII dictates a modern, sophisticated air surveillance system. Skimping on such a system may be "penny-wise, pound-foolish". Control strategies based on incorrect assessments can cost industry hundreds of millions of dollars for the installation of control equipment and fail to produce the improvements in air quality required to protect the health of hundreds of thousands of people.

C. Network Design

1. System Coverage. From the above discussion it can be seen that obtaining adequate air surveillance information for Texas will be neither cheap nor easy. Widespread sampling and monitoring stations covering numerous pollutants will be required to give an accurate and representative picture of the quality of the atmosphere in which Texans live. This plan examines two approaches to air surveillance network buildup in Texas.

   a. Minimum Federal Equipment Requirements. The Federal Register, Vol. 36, No. 158, August 14, 1971, requires that each state acquire a minimum of monitoring/sampling equipment to be in operation no later than two years after Environmental Protection Agency approval of the State's implementation plan. The equipment needed to satisfy this legal, Federally-imposed, minimum requirement in each Texas AQCR is shown in Attachment 1.

   While the Federally-prescribed air surveillance requirements recognize the primary needs of a surveillance system, they appear to have been oriented toward urban areas with high population concentrated in relatively small land areas. None of the objectives stated in Paragraph B above would be realized by a network limited in scope or size to the minimums set out by the Environmental Protection Agency. This can be demonstrated by a brief review of the types and quantities of monitoring equipment which would be required for Region VII if only the minimum equipment standards contained in Federal Register, August 14, 1971, were applied. The minimum thus prescribed would be thirteen high-volume air samplers, nine NASN type gas bubblers, nine tape samplers (coefficient-of-haze type), four sulfur dioxide monitors, and four ozone monitors. In a large, industrialized, 13-county area containing over 2 million persons, such sparse coverage would be totally inadequate. In fact, considerably more monitoring/sampling equipment than these quantities will be required in the city of Houston alone to meet basic surveillance needs. With such limited resources, compliance with and/or progress made toward meeting air quality standards would, for most areas within the Region, be impossible to determine, and emergency episode data would be inadequate for control and abatement decisions. Emergency episodes could occur in the Texas City or Freeport area or even along the near coastal portion of the Ship Channel without detection;

or, if detected, there would be no way rapidly to obtain qualitative or quantitative data on the pollutants involved. Such limited monitoring/sampling would provide no data on background or natural levels simply because all equipment would have to be placed in the higher priority Houston city area. Another serious deficiency in the Federally-prescribed minimum network would be its limited ability to discover and define air pollution problems not now recognized. Present studies have indicated that short-term exposure to nitrogen dioxide may present health hazards. In a special 1971 90-day survey, elevated levels of nitrogen dioxide were discovered and measured in several Texas cities. Although continuous monitoring of nitrogen dioxide is not yet prescribed by the Federal government, we believe that continuous monitoring should be performed to detect and measure short-term (1-hour and 3-hour maximums) nitrogen dioxide concentrations. Data from a number of points within the Region will be required to determine the distribution and significance of high short-term concentrations of nitrogen dioxide. The Texas Air Control Board has adopted standards for pollutants not presently covered by Federal Ambient Air Quality Standards. Beryllium, hydrogen sulfide, and hydrogen fluoride are presently covered by State standards and not by Federal standards. If these standards are to have real significance, it will be necessary to detect and monitor these pollutants in the atmosphere. Therefore, the State of Texas has elected to go beyond the minimum Federal requirements in order to realize fulfillment of the stated objectives.

b. The Proposed Texas Air Quality Surveillance System. To provide the information needed for development of logical and effective air pollution control strategies which will protect the health and welfare of all Texans without unduly hampering industrial operations or development, and to meet the other broad objectives discussed above, the State of Texas proposes to acquire and operate an adequate air surveillance control system. While it would appear desirable to implement the entire system as soon as possible, a more practicable approach from financial and other standpoints will be to acquire the system in phased increments. Advantages will accrue from an orderly phased buildup. For example, specific equipment needs probably will require adjustment as measurements are made and additional knowledge is gained. Such changes can be made more economically under a phased acquisition

program. Also, skilled manpower required for operating and maintaining the full system will be considerable. Time is needed to recruit and train these operators and technicians. System acquisition, as planned, with incremental buildups, allows for such time and helps eliminate waste due to rushed planning and "crash" procurements. This plan identifies three separate phases for system development with system completion scheduled for mid-calendar year 1975 (Attachment 2). Complete system layout for each region is contained in Attachment 3; the location, sampler type, installation date, and sampling schedule are indicated for each sampling site. Scheduled equipment acquisition for each region is summarized by Fiscal Year and by Phase in Attachment 4. Total statewide and regional monitoring equipment requirements for the proposed system (Phases I through III) are summarized in Attachment 5; equipment locations are mapped in Tab 4 to Attachment 3.

(1) Phase I. This phase is represented by those sampling stations in operation as of the end of calendar year 1971 and consists exclusively of noncontinuous high-volume suspended particulate and bubbler type gas samplers. Forty static effects packages are operated by various agencies throughout the State for Texas Air Pollution Control Services. Data obtained from laboratory analyses of exposed materials gives an indication of the effects of atmospheric pollutants on common materials, such as rubber, fabric, and metal, but is of no value in quantitative determinations of pollutant concentrations. Statewide, 140 hi-vols, 51 bubblers, and 3 tape samplers* were installed and in operation by the end of 1971 (Attachment 6). Data derived from these networks is currently stored in the Texas Air Quality Data Bank, which is maintained in the central computer facility located in the main offices of the Texas State Department of Health.

(2) Phase II. Expansion and augmentation of the existing surveillance system was begun in FY-1972 and will be continued through FY-1973. During this phase, the first two increments of continuous monitoring equipment for gaseous

* Air pollution control agencies in Texas possess a total of 35 tape sampling devices. Of this number, only 3 are installed at fixed sites. The remainder have been employed on a portable basis where and when needed. A total of 25 will be installed at fixed locations during subsequent phases of this plan.

pollutants will be introduced. Specific sites for monitoring stations to be added during this phase are contained in Attachment 3. Equipment costing $2,003,100.00 is required for this phase and is shown in Attachment 7. Of this amount, approximately $243,550.00 is available for expenditure in FY-1972. This leaves a balance of approximately 1.76 million dollars which is required in FY-1973. In FY-1972, components for five trailer-mounted continuous monitoring stations will be procured and assembled by engineers and technicians of the Air Pollution Control Services Staff. Experience gained from this effort will be used to develop improved and more definitive specifications for additional trailer-mounted stations to be procured in subsequent years on a contract, turn-key basis. Technicians who will be used to assemble the five stations purchased in FY-1972 will be subsequently fully employed in maintenance tasks and will not be available to assemble other stations. For this reason, contract fabrication and assembly will be required.

All minimum monitoring requirements as contained in Federal Register, August 14, 1971, will be met or exceeded by the end of Phase II.

(3) Phase III. During this phase, which embraces Fiscal Years 1974 and 1975, additional continuous monitoring stations, hi-vols, and bubblers will be installed (Attachment 8). Monitoring locations for Phase III are shown in Attachment 3. Because of changing patterns of pollution that result from population and industrial growth, relocations, and make-up, it is not practicable at this time to select exact locations for stations which are to be installed three to four years in the future. For the purposes of this plan, general locations such as towns, cities, and counties have been identified as probable monitoring/sampling sites. Knowledge gained during Phase II will be used to definitize locations for Phase III. Total equipment cost for Phase III is estimated to be 3.353 million dollars; 2.085 million dollars will be required in FY-74 and 1.268 million dollars in FY-75. Full system completion by the end of calendar year 1975 is planned. Total system cost (including current assets) will approximate 5.42 million dollars (Attachment 5). During Phase III, telemetering will be introduced into

the surveillance system. Use will be made of the planned Texas State communications system (TEX-AN) which is scheduled for installation in 1973. Exact costs cannot be forecast at this time; however, it is estimated that approximately $75,000.00 will be required in FY-74 and $100,000.00 in FY-75 for lease of circuitry and equipment for remoting data to local air pollution control offices and to the Austin and regional offices of the Air Pollution Control Services.

2. Sampling Methods will be as prescribed in Federal Register, Vol. 36, No. 84, dated April 30, 1971. Standard procedures will be developed and published by the Texas Air Pollution Control Services Staff for pollutants not governed by Federal standards.

3. Sampling/Monitoring Station Housing. Except where they are associated with a continuous monitoring station, hi-vols and gas bubblers will generally be located on or in public buildings and facilities. Easy access, availability of electric power, and relative freedom from vandalism are factors which must be considered in placing this equipment. Housing and placement of continuous monitoring equipment is much more involved and requires careful, detailed planning. The following are additional considerations in such actions:

   a. Temperature and humidity control. The sensitivity and precision of most continuous monitoring equipment is dependent on control and stability of these factors.

   b. Storage of flammable, explosive, and toxic gases. Such gases as hydrogen, ethylene, and carbon monoxide are required for operation and calibration of these monitors. In most cases these are stored in high pressure tanks. For those instruments requiring hydrogen, a hydrogen generator will be employed. Adequate ventilation is always requisite.

   c. Access to representative ambient atmosphere. Certain of the pollutants, such as ozone, are highly perishable and must be brought to the monitor via glass inlets. Long runs of such glass plumbing are difficult and expensive to procure, install, and maintain.

   d. Electrical shielding, bonding, and grounding. Equipment must be free from influence of spurious

radiation and stray electrical impulses to prevent erroneous measurements; therefore, access to common ground potential and adequate shielding for all monitors within a station are essential.

Because of these factors, housing of continuous monitoring stations in public or leased private buildings is not practical. Occupants of such buildings object to the continuous noise of air pumps and electric motors and to the presence of high pressure gas lines which they feel may rupture. Therefore, priority will be given to the procurement of a trailer for adequate shelter for each continuous monitoring station. The trailer will be sufficiently large to allow for flexibility and future growth. Each trailer will be equipped with appropriate pollutant and meteorological sensors, a dynamic gaseous calibration system, a data conversion/recording system, and other necessary support items. The trailer will also serve as an office for an equipment operator during alerts and emergency episodes.

D. Data Acquisition and Analysis

1. Data Bank. Pollutant and meteorological data that will be available from the network and other sources will be handled by automatic data storage, retrieval, and processing. A repository of all ambient atmospheric data will be established at the central computer facility at the headquarters of the Texas State Department of Health. Historical data, as well as current information, will be retained so that trends may be observed and special data studies and analyses performed as required for planning purposes. Data from the following sources will be input to the bank as shown in Attachment 9 and Tabs thereto.

   a. The Texas Air Surveillance Network.

   b. Selected stations from local city and county networks.

   c. The National Air Surveillance Network.

   d. Meteorological records.

2. Data Format. The Federal Environmental Protection Agency (EPA) has developed and adopted a standard coding structure and format known as Storage and Retrieval of Aerometric Data (SAROAD) to facilitate the exchange of technical information needed for air pollution abatement, control, and research. The SAROAD system is described in the SAROAD Users Manual dated July, 1971, and published

by EPA's Office of Air Programs, at Research Triangle Park, North Carolina. Noncontinuous data obtained from hi-vols, gas bubblers, and effects packages operated by the State and local air pollution control programs will be recorded in SAROAD format prior to forwarding to the State Health Department's computer facility for entry into the Texas Air Quality Data Bank and/or to EPA for entry into the National Aerometric Data Bank.

3. Computer Programming Requirements

a. Data Validation. Computer software will be developed to assist in the validation of all data that is input into the data bank. The computer program will be structured so that all measurements are compared against a previously established table of limits for:

(1) High values.

(2) Low values.

(3) Extreme changes in values for consecutive observations.

Limits for high values will be based on air quality standards. Limits for low values will represent the minimum detectable capability of the instruments and methods of analysis. Computer-produced validation listings resulting from these data comparisons will be printed daily and will be manually reviewed by air quality network operations control personnel in the State office. After verification, the manually corrected listings will be returned to the central computer facility for correction or removal of incorrect entries.

b. Data Storage and Retrieval. Data will be stored indefinitely on magnetic disc or tape at the Texas State Health Department's central computer facility and will be available for prompt retrieval when needed for compilation of historical summaries and special data analyses. Access to specific measurements will also be provided. The most recent twelve months of data will be kept available for rapid access from a satellite computer, remote console, or other input-output unit.

c. Data Reduction

(1) Means and Deviations. Computer programs will be developed to provide pollutant data averaging and other mathematical computations. Specifically the following will be required for data received from each atmospheric sensor.

(a) Thirty-minute means of values recorded for sulfur dioxide. Program must identify all 30-minute means within any period of twelve consecutive hours. Each 30-minute period will be considered as starting on either the even or half hour.

(b) Thirty-minute means of values recorded for hydrogen sulfide.

(c) Hourly means of values recorded for carbon monoxide, photochemical oxidants, wind speed, wind direction, and inside and outside station temperatures. Times start and stop on the even hours so that 24 means will be calculated each day for each parameter.

(d) Three-hour period means for sulfur dioxide. This will require averaging for all consecutive three-hour periods beginning and ending on the even hour.

(e) Mean value of non-methane hydrocarbon concentrations for the values recorded during the three-hour period occurring each day between 6:00 A.M. to 9:00 A.M.

(f) Eight-hour means for carbon monoxide. This will require averaging for all consecutive eight-hour periods beginning and ending on the even hour.

(g) Quarterly and annual geometric mean and geometric standard deviation will be required for total suspended particulate, sulfur dioxide, and nitrogen dioxide.

(h) Quarterly and annual means and standard deviations will be required for all pollutants on which data is gathered during the appropriate period.

Data means (averages) provide a useful measure of central tendency of a pollutant concentration, while the standard deviations are useful for characterizing the spread of the data values about the mean value.

(2) Meteorological Comparisons. Programs will be developed to have the computer produce wind roses and pollution roses and for automatically comparing these roses to determine possible general and specific emission sources.

(3) Isopleths. Programs will also be developed to produce computer-generated isopleths which will show distribution of pollutants over the entire State of Texas.

(4) Reports. The following routine reports will be computer generated and produced and will be distributed as indicated.

(a) Daily validation listings will be handled as discussed above.

(b) Weekly summaries of all mean values exceeding State and/or Federal ambient standards will be printed by the central computer facility and mailed to all interested agencies, including city and county air pollution control agencies and Texas Air Pollution Control Services Regional Offices. All mean values will be accompanied by averaged meteorological data prevailing during the sampling period for which the mean applies.

(5) Monthly Reports. Will be as follows:

(a) Monthly summaries of mean values computed in accordance with the requirements set out in Paragraph D.3 above. Appropriate meteorological data will be included and reports will be distributed as specified for the weekly report.

(b) On a monthly basis, a tape will be prepared by the central computer facility which will contain all hourly average information for pollutants of interest to EPA. The tape, which will be prepared in SAROAD format, will be forwarded to EPA for inclusion in the National Aerometric Data Bank.

(6) Quarterly and Annual Reports. Each quarter year a comprehensive report will be computer generated and produced for each Region which will show for each pollutant the following information:

(a) Sampling site location.

(b) Sampling interval.

(c) Start date of sampling.

(d) End date of sampling.

(e) Number of samples recorded.

(f) Maximum 30-minute sample recorded (where appropriate) and total number of violations.

(g) Maximum one-hour sample recorded (where appropriate) and total number of violations.

(h) Maximum three-hour sample recorded (where appropriate) and total number of violations.

(i) Maximum eight-hour sample recorded (where appropriate) and total number of violations.

(j) Maximum twelve-hour sample recorded (where appropriate) and total number of violations.

(k) Maximum twenty-four hour sample recorded (where appropriate) and total number of violations.

(l) Arithmetic mean for all values.

(m) Standard deviation for all values.

(n) Geometric mean for all values.

(o) Geometric standard deviation for all values.

The Administrator of EPA requires a quarterly report on ambient air quality in each Air Quality Control Region but has not yet prescribed the exact format or content. Information contained in the quarterly and annual State report described above should satisfy EPA's requirement. Ambient network control personnel within Air Pollution Control Services will work closely with Technical Programs personnel and with the Texas Health Department computer facility personnel to develop detailed procedures for the preparation and handling of these reports.

E. Manpower and Other Costs

During the latter part of 1971 an intensive testing program was conducted by Texas Air Pollution Control Services (TAPCS) to evaluate different types of continuous atmospheric monitoring equipment. One of the conclusions reached as a result of these evaluations is that highly skilled technicians

are required to operate and maintain such equipment. These instruments employ sophisticated gas flow and control systems, latest state-of-the-art electronics circuitry, and complex electromechanical devices. Careful calibration and maintenance are absolutely essential if useful and reliable data are to be obtained. We, therefore, propose to place one technician with each station on a full-time basis. This technician will be supported by a small force of very highly skilled technicians working out of the Austin shops of TAPCS. The support force will assist with maintenance tasks that are beyond the capability of the on-station technician and will perform shop maintenance that cannot be performed in the trailer. Scheduled equipment overhaul at regular intervals will also be a central shop responsibility. Administrative responsibility for on-station technicians will be assigned to the TAPCS Regional Office in which the sampling station is located. Estimated yearly cost for each maintenance technician will be approximately $9,000.00. Estimates of personnel and other major operating costs are shown in Attachment 10.

F. Emergency Episode Data Collection Capabilities

This plan describes a monitoring system which will provide Emergency Episode protection in all twelve Air Quality Control Regions in Texas. The system is scheduled to be completed in Fiscal Year 1975. However, during Phase I and the early part of Phase II the real time data available for use in evaluating pollution buildups during atmosphere stagnation conditions will be very limited.

In April of 1972 the first real time monitoring station will be in operation. This station will be installed in Houston and will make data on the five major pollutants readily available to the control agency. Although a number of continuous type instruments are now available to the Houston City Health Department, their effectiveness in an Emergency Episode situation is very limited. This is due to the excessive amount of manpower required to operate the type of instruments available in use and to reduce the data to the required form once it has been collected. The resources of both the State and local agencies are limited and manpower priorities must be assigned if total program responsibilities are to be fulfilled.

During Phase I and the early part of Phase II every effort will be made by both the State and participating local agencies to collect and analyze as much data as possible during adverse meteorological conditions. True episode warning and monitoring capabilities will not exist in any meaningful sense, however, until the majority of the system described in Phase II is in operation.

Attachment 1

Minimum Federally-Prescribed Equipment

AIR QUALITY SURVEILLANCE

Minimum Federally-Prescribed Equipment

Region	Item (Quantity) Hi-Vol	Tape Sampler	Gas Bubbler	SO_2	CO	O_3	Total Cost*
I	3	1	3	1	-	-	15,850
II	3	1	6	2	-	-	28,950
III	3	1	1	-	-	2	13,350
IV	7	2	1	-	-	-	6,150
V	7	2	7	2	-	2	40,350
VI	3	1	3	1	-	-	15,850
VII	13	9	9	4	-	4	88,450
VIII	3	1	10	-	-	5	32,250
IX	3	1	1	-	-	3	18,450
X	3	1	5	2	-	2	36,550
XI	6	1	4	2	5	2	65,200
XII	3	1	1	-	-	-	3,150
Total Qty:	57	22	51	14	5	20	
						Total Cost:	$364,550

* Based on the following instrument unit costs: Hi-Vol: $250; Tape Sampler: $2,000; Gas Bubbler: $400; SO_2 Monitor (Gas Chromatograph): $8,000; Hydrogen Generator: $1,300; Dynamic Calibration System: $1,500; Strip Chart Recorder: $1,100; CO Monitor (NDIR): $5,000; O_3 Monitor: $4,000.

Attachment 2

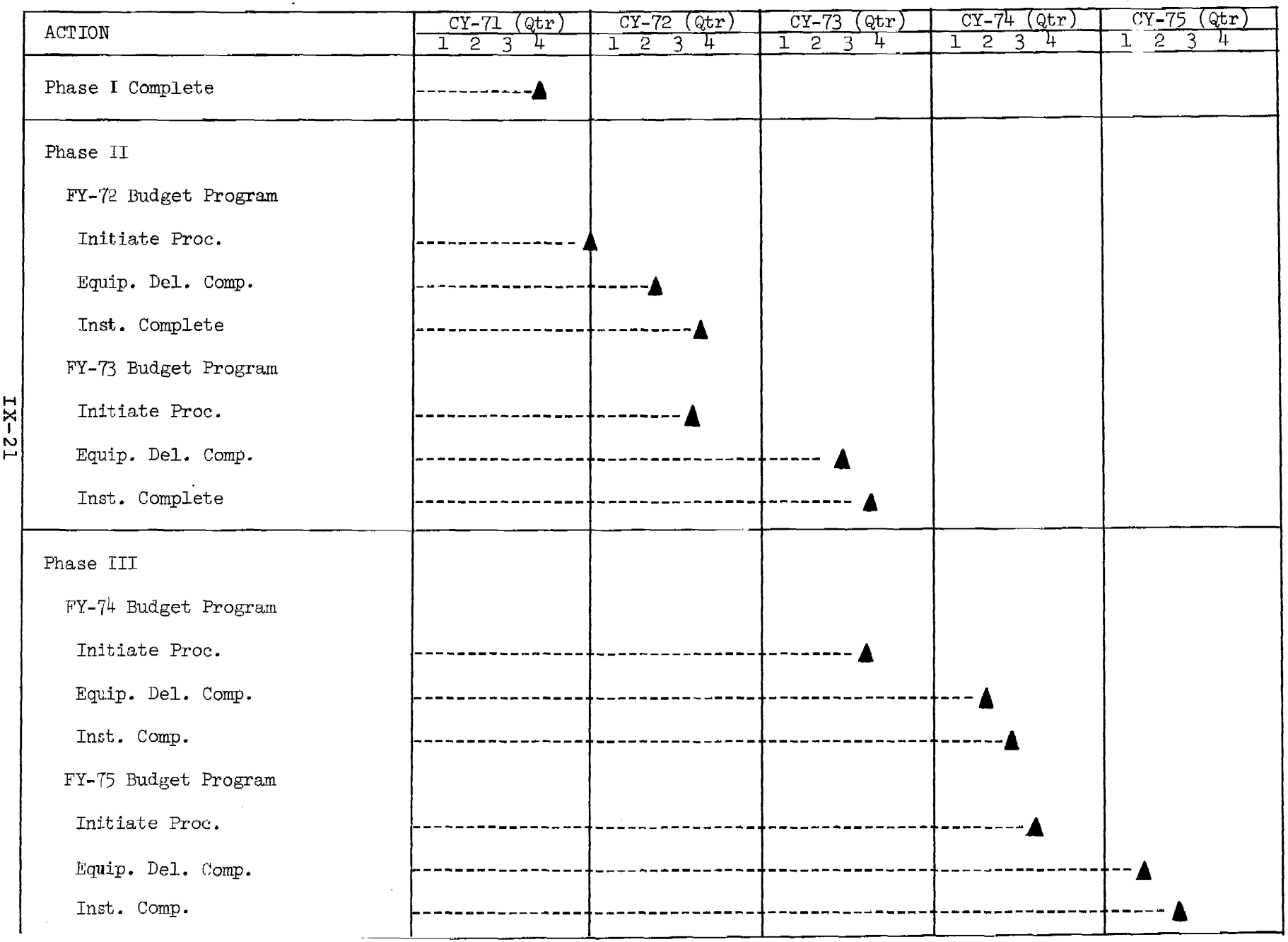
Basic System Plan

Milestones

AIR QUALITY SURVEILLANCE

System Development
Principal Milestones

Attachment 2



Attachment 3

Basic System Chart
Detailed Schedules

Types and Locations of Stations
Planned Installation Dates
Station Sampling Schedule

REGION I

City Name	*	Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule**
Wichita Falls	HP	98-29-45	33-54-30	14	54661	375217	1/58	NASN/TASN Hi-Vol*+	6 day/24 hr.
Wichita Falls	HP	98-29-45	33-54-30	14	54661	375217	7/70	NASN Bubbler	6 day/24 hr.
Wichita Falls	MC HP	98-29-45	33-54-30	14	54661	375217	12/70	TASN Bubbler +	6 day/24 hr.
Abilene	HP	99-44-30	32-27-00	14	43028	359063	5/71	TASN Hi-Vol	6 day/24 hr.
Brownwood	SR	98-59-00	31-43-30	14	50158	351003	Mar 72	Hi-Vol	6 day/24 hr.
Abilene	HP	99-44-30	32-27-00	14	43028	359063	Mar 72	Bubbler	6 day/24 hr.
Wichita Falls	MC HP EE	98-29-45	33-54-30	14	54661	375217	Oct/Dec 73	Tape Sampler+	As required
Brownwood	HP	98-59-00	31-43-30	14	50158	351003	73	Bubbler	6 day/24 hr.
Snyder	MS	100-55-15	32-44-30	14	32002	362435	73	Bubbler, Hi-Vol	6 day/24 hr.
Childress	SR	100-14-00	34-25-30	14	38667	381002	Jan/Mar 74	Bubbler, Hi-Vol	6 day/24 hr.
Throckmorton	SR	99-10-30	33-10-45	14	48368	367123	Jan/Mar 74	Bubbler, Hi-Vol	6 day/24 hr.
Coleman	SR	To be determined					74	Bubbler, Hi-Vol	6 day/24 hr.
Eastland	SR	To be determined					74	Bubbler, Hi-Vol	6 day/24 hr.
Breckenridge	SR	To be determined					74	Bubbler, Hi-Vol	6 day/24 hr.
Sweetwater	SR	To be determined					74	Bubbler, Hi-Vol	6 day/24 hr.
Wichita Falls	5 HP EE MC 2 HP EE MC 3 MC HP EE 6 MC HP EE	98-29-45	33-54-30	14	54661	375217	Oct/Dec 73	Type A***	Continuous: Scan every 5 minutes
Abilene	5 HP 2 HP 3 HP 6 HP	To be determined					74	Type A	Continuous: Scan every 5 minutes

* See Tab 1 for explanation.
\+ See Tab 1 for explanation.
** See Tab 2 for explanation.
*** See Tab 3 for configuration of each type station.

REGION II

City Name		Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
Lubbock	HP	101-51-00	33-34-30	14	23545	371874	1/61	NASN/TASN Hi-Vol	6 day/24 hr.
Amarillo	HP MS	101-51-30	35-12-45	14	23980	390039	2/69	NASN/TASN Hi-Vol	6 day/24 hr.
Amarillo	HP MS	101-51-30	35-12-45	14	23980	390039	2/69	NASN Bubbler	6 day/24 hr.
Lubbock	HP	101-51-00	33-34-30	14	23545	371874	3/69	NASN Bubbler	6 day/24 hr.
Amarillo	HP MC	101-51-30	35-12-45	14	23980	390039	5/71	TASN Bubbler +	6 day/24 hr.
Lubbock (City Network)	RB	101-52-45	33-35-00	14	23277	371974	Nov 71	Hi-Vol	6 day/24 hr.
Lubbock (City Network)	HP	101-50-45	33-36-45	14	23595	372289	Nov 71	Hi-Vol	6 day/24 hr.
Lubbock (City Network)	HP	101-52-30	33-33-00	14	23305	371603	Nov 71	Hi-Vol	6 day/24 hr.
Lubbock (City Network)	HP	101-48-15	33-35-45	14	23977	372093	Nov 71	Hi-Vol	6 day/24 hr.
Lubbock (City Network)	HP HE	101-48-30	33-33-15	14	23926	371632	Nov 71	Hi-Vol	6 day/24 hr.
Lubbock (City Network)	RB	101-55-00	33-33-45	14	22922	371753	Nov 71	Hi-Vol	6 day/24 hr.
Lubbock (City Network)	HE HP	101-48-30	33-33-15	14	23926	371632	Mar 72	Bubbler	6 day/24 hr.
Amarillo	HP MC EE	101-52-00	35-12-30	14	23903	389995	Dec 72	Tape Sampler +	As required
Pampa	SR	100-56-00	35-31-30	14	32470	393302	73	Bubbler, Hi-Vol	6 day/24 hr.
Dumas	HE	101-58-00	35-51-45	14	23211	397279	Jan/Mar 73	Bubbler, Hi-Vol	6 day/24 hr.
Lubbock	HP HE	101-52-30	33-35-00	14	23316	371973	Oct/Dec 73	Bubbler +	6 day/24 hr.
Plainview	SR	101-42-45	34-11-45	14	25004	378725	Jan/Mar 74	Bubbler, Hi-Vol	6 day/24 hr.
Littlefield	SR	102-17-30	33-55-30	14	19260	375888	Jan/Mar 74	Bubbler, Hi-Vol	6 day/24 hr.
Amarillo	5 MC HP EE 2 HP EE MC 3 HP EE MC 6 HP MC EE	101-52-00	35-12-30	14	23903	329995	Dec 72	Type D	Continuous: Scan every 5 minutes
Lubbock	5 HP EE 2 HP EE 3 HP HE PG 6 HP HE	101-52-30	33-35-00	14	23316	371973	Oct/Dec 73	Type A	Continuous: Scan every 5 minutes

RECION II
(Continued)

City Name		Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
S.E. Lubbock	5 HP HE PG 2 HP HE PG 3 HP HE PG 6 HP HE PG	To be determined					74	Type A	Continuous: Scan every 5 minutes
Amarillo	5 HP HE PG 2 HP HE PG 3 HP HE PG 6 HP HE PG	To be determined					75	Type A	Continuous: Scan every 5 minutes

REGION III

City Name		Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
Austin	HP HE	97-42-50	30-18-50	14	62365	335434	1/58	NASN/TASN Hi-Vol+	6 day/24 hr.
Waco	HP	97-07-45	31-33-15	14	67757	349261	1/58	Hi-Vol +	6 day/24 hr.
Austin	HP HE	97-42-50	30-18-50	14	62365	335434	3/69	NASN Bubbler	6 day/24 hr.
San Marcos	HP PG	97-56-00	29-52-45	14	60301	330502	6/71	Hi-Vol	6 day/24 hr.
San Marcos	HP PG	97-56-00	29-52-45	14	60301	330502	6/71	Bubbler	6 day/24 hr.
Austin	HP HE	97-44-00	30-16-30	14	62183	335001	Oct 71	Bubbler	6 day/24 hr.
Austin	HP PG	97-45-30	30-13-30	14	61949	334444	Oct 71	Hi-Vol	6 day/24 hr.
Austin	HP PG HE	97-44-00	30-16-30	14	62183	335001	Oct 71	Hi-Vol	6 day/24 hr.
Austin	HP PG	97-43-45	30-21-15	14	62213	335879	Oct 71	Hi-Vol	6 day/24 hr.
Bryan	HP PG	96-27-45	30-40-15	14	74311	3395945	Oct 71	Hi-Vol	6 day/24 hr.
Waco	HE HP	97-07-45	31-33-15	14	67757	349261	72	Bubbler +	6 day/24 hr.
Bryan	HP PG	96-27-45	30-40-15	14	74311	339594	Oct 72	Bubbler	6 day/24 hr.
Austin	MC HP PG	97-44-30	30-17-00	14	62102	335092	Apr/Jun 73	Bubbler +	6 day/24 hr.
Temple	HP	97-20-45	31-05-45	14	65777	344147	73	Bubbler, Hi-Vol	6 day/24 hr.
Austin	HP MC EE	97-44-30	30-17-00	14	62102	335092	Apr/Jun 73	Tape Sampler +	As required
Rockdale	MS	96-59-45	30-39-15	14	69204	339306	Oct/Dec 73	Bubbler, Hi-Vol	6 day/24 hr.
Rockdale	MS	96-59-45	30-39-15	14	69204	339306	Oct/Dec 73	Hi-Vol	6 day/24 hr.
Killeen	SR	97-40-45	31-06-30	14	62596	344243	74	Bubbler, Hi-Vol	6 day/24 hr.
Brenham	SR	96-23-45	30-10-00	14	75079	334019	74	Bubbler	6 day/24 hr.
Luling	SR	97-38-45	29-41-00	14	63102	328453	74	Bubbler	6 day/24 hr.
Hillsboro	SR	To be determined					74	Bubbler, Hi-Vol	6 day/24 hr.
Belton	PG	To be determined					74	Bubbler, Hi-Vol	6 day/24 hr.
Austin	5 HP EE MC 2 HP EE MC 3 MC HP EE 6 HP MC EE	97-44-30	30-17-00	14	62102	335092	Apr/Jun 73 Ozone-72	Type A	Continuous: Scan every 5 minutes
Waco	5 HP EE 2 HP EE 3 HP EE	97-07-45	31-33-15	14	67757	349261	July/Sept 73	Type A	Continuous: Scan every 5 minutes

REGION III
(Continued)

City Name		Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
Austin	5 HP EE PG 2 HP EE PG 3 HP HE EE PG 6 HP	97-42-50	30-18-50	14	62365	335434	74	Type C	Continuous: Scan every 5 minutes
Austin	2 HP PG 3 HP PG 6 HP PG	To be determined					74	Type C	Continuous: Scan every 5 minutes
Bryan-College Station	2 HP PG 3 HP PG 6 HP PG	To be determined					75	Type C	Continuous: Scan every 5 minutes

REGION IV

City Name		Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
Harlingen	HP	97-41-30	26-11-30	14	63073	289758	2/61	Hi-Vol	6 day/24 hr.
McAllen	HP	98-14-30	26-12-15	14	57576	289853	1/66	Hi-Vol	6 day/24 hr.
Laredo	HP HE	99-30-15	27-31-15	14	45011	304426	3/67	Hi-Vol	6 day/24 hr.
San Benito	HP	97-38-00	26-08-00	14	63662	289118	5/68	Hi-Vol	6 day/24 hr.
Port Isabel	SR	97-12-30	26-04-30	14	67921	288523	12/70	Hi-Vol	6 day/24 hr.
Laredo	HE HP	99-30-30	27-30-00	14	44978	304196	July 72	Hi-Vol +	6 day/24 hr.
Brownsville	HG HP	97-30-00	25-54-00	14	65025	286547	July 72	Hi-Vol	6 day/24 hr.
Laredo	MC HP	99-29-30	27-31-00	14	45144	304380	July 72	Bubbler +	6 day/24 hr.
Laredo	MC HP EE	99-29-30	27-31-00	14	45144	304380	Oct 72	Tape Sampler +	As required
Rio Grande City	HP	98-48-30	26-22-30	14	51912	291724	July/Sept 73	Hi-Vol	6 day/24 hr.
Laredo	HE HP	99-31-00	27-31-00	14	44897	304381	July/Sept 73	Hi-Vol	6 day/24 hr.
Brownsville	HE HP	97-30-00	25-54-00	14	65025	286547	July/Sept 73	Tape Sampler	As required
Brownsville	HE HP	97-30-00	25-54-00	14	65025	286547	73	Bubbler	6 day/24 hr.
Rio Grande City	HP	98-48-30	26-22-30	14	51912	271724	July/Sept 74	Bubbler	6 day/24 hr.
McAllen	HP	To be determined					74	Bubbler	6 day/24 hr.
Harlingen	HP	To be determined					74	Bubbler	6 day/24 hr.
Weslaco-Mercedes	SR	To be determined					74	Bubbler, Hi-Vol	6 day/24 hr.
Laredo	2 MC HP EE 3 MC HP EE 6 MC HP EE	99-30-30	27-30-00	14	44978	304196	73	Type C	Continuous: Scan every 5 minutes
Laredo	5 HP EE MC 2 HP EE 3 HP EE 6 HP	99-29-30	27-31-00	14	45155	304380	July/Sept 74	Type A	Continuous: Scan every 5 minutes
Brownsville	5 HP 2 HP 3 HP 6 HP	To be determined					75	Type A	Continuous: Scan every 5 minutes

REGION V

City Name	Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
Corpus Christi HP HE	97-25-30	27-46-45	14	65518	307377	1/57	STATE/NASN Hi-Vol	6 day/24 hr.
Corpus Christi HP HE	97-27-45	27-49-15	14	65143	307835	1/69	Hi-Vol	6 day/24 hr.
Corpus Christi HP HE	97-23-15	27-44-15	14	65894	306920	2/69	Hi-Vol	6 day/24 hr.
Corpus Christi HP HE	97-25-45	27-48-00	14	65474	307608	12/70	Bubbler	6 day/24 hr.
Corpus Christi HE HP	97-25-45	27-48-00	14	65474	307608	12/70	Bubbler	6 day/24 hr.
Point Comfort RB	96-34-00	28-40-30	14	73778	317446	12/70	Hi-Vol	6 day/24 hr.
Point Comfort RB	96-34-00	28-40-30	14	73778	317446	4/71	Bubbler	6 day/24 hr.
Corpus Christi HP HE (City Network)	97-23-52	27-47-17	14	67585	307479	Oct 71	Hi-Vol	6 day/24 hr.
Corpus Christi HP (City Network)	97-25-55	27-45-35	14	65453	307161	Oct 71	Hi-Vol	6 day/24 hr.
Corpus Christi HP (City Network)	97-25-40	27-47-45	14	65489	307562	Oct 71	Hi-Vol	6 day/24 hr.
Corpus Christi HE HP (City Network)	97-27-10	27-47-32	14	65243	307519	Oct 71	Hi-Vol	6 day/24 hr.
Corpus Christi RB (City Network)	97-29-52	27-46-20	14	67802	307292	Oct 71	Hi-Vol	6 day/24 hr.
Corpus Christi HE (City Network)	97-26-05	27-49-12	14	67417	307829	Oct 71	Hi-Vol	6 day/24 hr.
Corpus Christi HE (City Network)	97-25-45	27-49-30	14	65471	307885	Oct 71	Hi-Vol	6 day/24 hr.
Corpus Christi HP HE	97-25-30	27-46-45	14	65518	307377	Oct 71	Bubbler	6 day/ 24 hr.
Ingleside SR	97-12-15	27-51-30	14	67682	308285	Oct 71	Hi-Vol	6 day/24 hr.
Corpus Christi HP MC	97-26-05	27-48-15	14	65419	307653	Oct 72	Bubbler +	6 day/24 hr.
Corpus Christi HP MC EE	97-26-05	27-48-15	14	65419	307653	Oct 72	Tape Sampler +	As required
Victoria HP	96-59-30	28-48-15	14	69600	31880	73	Bubbler, Hi-Vol	6 day/24 hr.
Kingsville SR	97-54-00	27-32-30	14	60861	304695	73	Bubbler, Hi-Vol	6 day/24 hr.
Ingleside SR	97-12-15	27-51-30	14	67682	308285	July/Sept 73	Bubbler	6 day/24 hr.
Corpus Christi HP MC EE	97-24-30	27-48-30	14	65678	307703	July/Sept 73	Tape Sampler +	As required
Seadrift MS	96-40-30	28-24-30	15	13989	314799	July/Sept 73	Hi-Vol	6 day/24 hr.
Beeville SR	97-45-00	28-24-15	14	62244	314266	74	Bubbler, Hi-Vol	6 day/24 hr.
Cuero SR	97-17-30	29-05-45	14	66625	321987	74	Bubbler, Hi-Vol	6 day/24 hr.
Gregory SR	To be determined					74	Bubbler, Hi-Vol	6 day/24 hr.
Sinton SR	To be determined					74	Bubbler, Hi-Vol	6 day/24 hr.
Robstown SR	To be determined					74	Bubbler, Hi-Vol	6 day/24 hr.
Goliad SR	To be determined					74	Bubbler, Hi-Vol	6 day/24 hr.

REGION V
(Continued)

City Name		Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
Agua Dulce	SR	To be determined					75	Bubbler, Hi-Vol	6 day/24 hr.
Driscoll	SR	To be determined					75	Bubbler, Hi-Vol	6 day/24 hr.
Alice	SR	To be determined					75	Bubbler, Hi-Vol	6 day/24 hr.
Corpus Christi	5 HP EE HE 2 HP EE MC 3 HP MC EE 6 HP MC EE	97-26-05	27-48-15	14	65419	307653	Oct 72	Type D	Continuous: Scan every 5 minutes
Corpus Christi	5 HP EE MC 2 HP HE EE 3 HP HE EE 6 HP HE	97-24-30	27-48-30	14	65678	307703	July/ Sept 73	Type A	Continuous: Scan every 5 minutes
N. Corpus Christi	5 HP HE 2 HP HE 3 HP HE 6 HP HE	approx. 97-32-	27-50-				'74	Type A	Continuous: Scan every 5 minutes
E. Corpus Christi	5 HP HE 2 HP HE 3 HP HE 6 HP HE	To be determined					74	Type A	Continuous: Scan every 5 minutes
Victoria	5 HP 2 HP 3 HP 6 HP	To be determined					75	Type A	Continuous: Scan every 5 minutes
Kingsville	5 HP 2 HP 3 HP 6 HP	To be determined					75	Type A	Continuous: Scan every 5 minutes

REGION VI

City Name		Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
Odessa	HP HE	102-20-45	31-52-15	13	75109	352926	1/63	Hi-Vol	6 day/24 hr.
San Angelo	RB	100-26-06	31-27-40	14	36366	348167	8/69	NASN Hi-Vol	6 day/24 hr.
San Angelo	RB	100-26-15	31-27-40	14	36366	348167	8/69	NASN Bubbler	6 day/24 hr.
San Angelo	SR	100-26-15	31-27-45	14	36342	348183	5/71	Hi-Vol	6 day/24 hr.
San Angelo	SR	100-26-15	13-27-45	14	36342	348183	5/71	Bubbler	6 day/24 hr.
Odessa	HP HE	102-20-45	31-52-15	13	75109	352926	5/71	Bubbler	6 day/24 hr.
Big Spring	SR	101-28-45	32-15-15	14	26644	357138	6/71	Hi-Vol	6 day/24 hr.
Midland	HP HE	102-04-15	32-00-15	13	77672	354472	6/71	Hi-Vol	6 day/24 hr.
Midland	HP	102-04-15	32-00-15	13	77672	354472	72	Bubbler	6 day/24 hr.
Odessa	HP MC	102-23-00	31-50-45	13	74761	352641	Oct/ Dec 73	Bubbler +	6 day/24 hr.
Odessa	HP MC EE	102-23-00	31-50-45	13	74761	352641	Oct/ Dec 73	Tape Sampler +	6 day/24 hr.
Big Spring	SR	101-28-45	32-15-15	14	26644	357138	73	Bubbler	6 day/24 hr.
Lamesa	SR	101-57-15	32-44-15	14	22316	362612	73	Bubbler, Hi-Vol	6 day/24 hr.
Fort Stockton	SR	102-52-15	30-53-45	14	12992	342456	73	Bubbler, Hi-Vol	6 day/24 hr.
Monahans	SR	To be determined					74	Bubbler, Hi-Vol	6 day/24 hr.
Odessa	5 HP MC EE 2 HP EE MC 3 HP EE MC 6 HP MC EE	102-23-00	31-50-45	13	74761	352641	Oct/ Dec 73	Type A	Continuous: Scan every 5 minutes
Midland	5 HP HE 2 HP 3 HP 6 HP	To be determined					74	Type A	Continuous: Scan every 5 minutes
N. Odessa	5 HP HE 2 HP 3 HP 6 HP	To be determined					74	Type A	Continuous: Scan every 5 minutes
San Angelo	5 PG 2 PG 3 PG 6 PG	To be determined					75	Type A	Continuous: Scan every 5 minutes

City Name		Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
Texas City	HE HP	94-55-15	29-23-30	15	31390	327145	1/59	Hi-Vol	6 day/24 hr.
Galveston	HP	94-47-45	29-18-00	15	32557	344262	1/59	Hi-Vol	6 day/24 hr.
Baytown	HE HP	94-56-45	29-43-15	15	31178	328950	1/59	Bubbler	6 day/24 hr.
Houston	HE HP	95-21-49	29-15-31	15	27032	323902	9/65	NASN Hi-Vol	6 day/24 hr.
Houston	HE HP	95-21-49	29-15-31	15	27032	323902	9/65	NASN Bubbler	6 day/24 hr.
Clute	SR	95-24-30	29-01-30	15	26544	321321	1/66	Hi-Vol	6 day/24 hr.
Mont Belvieu	SR	94-53-45	29-51-15	15	31686	330420	11/66	Hi-Vol	6 day/24 hr.
Beach City	RB	94-55-00	29-40-15				11/66	Hi-Vol	6 day/24 hr.
Baytown	HE HP	94-56-45	29-43-15	15	31178	328950	11/66	Hi-Vol	6 day/24 hr.
Baytown	HE HP	94-58-45	29-44-45	15	31178	328950	12/66	Hi-Vol	6 day/24 hr.
Matagorda	RB	95-58-24	28-49-59	15	20985	319318	4/67	NASN Hi-Vol	6 day/24 hr.
Matagorda	RB	95-58-24	28-49-59	15	20985	319318	4/67	NASN Bubbler	6 day/24 hr
Winnie	SR	94-41-00	29-45-15	15	33723	329289	11/68	Hi-Vol	6 day/24 hr.
Pasadena	HE HP	95-13-30	29-42-45	15	28475	328907	7/69	NASN Hi-Vol	6 day/24 hr.
Pasadena	HE HP	95-13-30	29-15-31	15	28379	323875	7/69	NASN Bubbler	6 day/24 hr.
Baytown	HE HP	95-01-45	29-46-15	15	31178	328950	1/70	Hi-Vol	6 day/24 hr.
Houston (City Netwk.)	HP HE	95-22-00	29-44-00					Bubbler, Hi-Vol	6 day/24 hr.
Houston (City Netwk.)	HP HE	95-17-00	29-43-00					Bubbler, Hi-Vol	6 day/24 hr.
Houston (City Netwk.)	HP HE	95-13-00	29-37-00					Bubbler, Hi-Vol	6 day/24 hr.
Houston (City Netwk.)	HP HE	95-21-00	29-37-00					Bubbler, Hi-Vol	6 day/24 hr.
Houston (City Netwk.)	HP HE	95-21-00	29-44-00					Bubbler, Hi-Vol	6 day/24 hr.
Houston (City Netwk.)	HP HE	95-23-00	29-42-00					Bubbler, Hi-Vol	6 day/24 hr.
Houston (City Netwk.)	HP HE	95-26-00	29-42-00					Bubbler, Hi-Vol	6 day/24 hr.
Houston (City Netwk.)	HP HE	95-31-00	29-42-00					Bubbler, Hi-Vol	6 day/24 hr.
Houston (City Netwk.)	HP HE	95-26-00	29-44-00					Bubbler, Hi-Vol	6 day/24 hr.
Houston (City Netwk.)	HP HE	95-30-00	29-51-00					Bubbler, Hi-Vol	6 day/24 hr.

REGION VII
(Continued)

City Name		Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
Houston (City Netwk.)	HP HE	95-22-00	29-51-00					Bubbler, Hi-Vol	6 day/24 hr.
Houston (City Netwk.)	HP HE	95-16-00	29-47-00					Bubbler, Hi-Vol	6 day/24 hr.
Houston (City Netwk.)	HP HE	95-16-00	29-47-00					Bubbler, Hi-Vol	6 day/24 hr.
Houston (City Netwk.)	HP HE	95-12-00	29-47-00					Bubbler, Hi-Vol	6 day/24 hr.
Houston (City Netwk.)	HP HE	95-11-00	29-48-00					Bubbler, Hi-Vol	6 day/24 hr.
Houston (City Netwk.)	HP HE	95-12-00	29-43-00					Bubbler, Hi-Vol	6 day/24 hr.
Houston (City Netwk.)	HP HE	95-06-00	29-42-00					Bubbler, Hi-Vol	6 day/24 hr.
Galveston County Netwk.	HP HE							Tape Sampler	As required
Galveston County Netwk.	HP HE							Tape Sampler	As required
Galveston County Netwk.	HP HE							Tape Sampler	As required
Galveston County Netwk.	HP HE							Hi-Vol	6 day/24 hr.
Galveston County Netwk.	HP HE							Hi-Vol	6 day/24 hr.
Galveston County Netwk.	HP HE							Hi-Vol	6 day/24 hr.
Galveston County Netwk.	HP HE							Hi-Vol	6 day/24 hr.
Galveston County Netwk.	HP HE							Hi-Vol	6 day/24 hr.
Galveston County Netwk.	HP HE							Hi-Vol	6 day/24 hr.
Galveston County Netwk.	HP HE							Hi-Vol	6 day/24 hr.
Galveston	HP HE							Hi-Vol	6 day/24 hr.

City Name		Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
Galveston County Netwk.	HP HE							Hi-Vol	6 day/24 hr.
Galveston County Netwk.	HP HE							Hi-Vol	6 day/24 hr.
Galveston County Netwk.	HP HE							Hi-Vol	6 day/24 hr.
Galveston County Netwk.	HP HE							Bubbler, Hi-Vol	6 day/24 hr.
Galveston County Netwk.	HP HE							Bubbler, Hi-Vol	6 day/24 hr.
Galveston County Netwk.	HP HE							Bubbler, Hi-Vol	6 day/24 hr.
Galveston County Netwk.	HP HE							Bubbler, Hi-Vol	6 day/24 hr.
Galveston County Netwk.	HP HE							Bubbler, Hi-Vol	6 day/24 hr.
Galveston County Netwk.	HP HE							Bubbler	6 day/24 hr.
Galveston County Netwk.	HP HE							Bubbler	6 day/24 hr.
Galveston County Netwk.	HP HE							Bubbler	6 day/24 hr.
Harris County	HE HP						Nov 71	Hi-Vol	6 day/24 hr.
Harris County	HE HP						Nov 71	Hi-Vol	6 day/24 hr.
Harris County	HE HP						Nov 71	Hi-Vol	6 day/24 hr.
Harris County	HE HP						Nov 71	Hi-Vol	6 day/24 hr.
Harris County	HE HP						Nov 71	Hi-Vol	6 day/24 hr.
Harris County	HE HP						Nov 71	Hi-Vol	6 day/24 hr.
League City	HE	95-07-30	29-29-15	15	29397	326394	Nov 71	Hi-Vol	6 day/24 hr.
League City	HE	95-07-30	29-29-15	15	29397	236394	Nov 71	Bubbler	6 day/24 hr.
Houston	MC HP EE	95-14-00	29-44-00	15	28399	329139	Apr 72	Tape Sampler+	As required
Houston	HE HP EE	95-21-15	29-44-30	15	27323	229255	May 72	Tape Sampler+	As required
Pasadena	HE HP EE	95-12-00	29-42-30	15	28716	328856	May 72	Tape Sampler+	As required
Texas City	HE HP	94-56-00	29-23-30	15	31238	325300	June 72	Bubbler +	6 day/24 hr.

REGION VII
(continued)

City Name		Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
Texas City	HE HP EE	94-56-00	29-23-30	15	31238	325300	June 72	Tape Sampler +	As Required
Pasadena	HE HP	95-12-00	29-42-30	15	28716	328856	May 72	Bubbler +	6 day/24 hour
Houston	HE HP	95-14-00	29-44-00	15	28399	329139	Apr 72	Bubbler +	6 day/24 hour
Houston	HE HP	95-21-15	29-44-30	15	27232	329255	May 72	Bubbler +	6 day/24 hour
Galveston	HE HP	94-47-45	29-18-00	15	32557	324262	July/Sept 73	Bubbler	6 day/24 hour
Freeport	HE	95-21-15	28-57-15	15	27056	320525	July/Sept 73	Bubbler	6 day/24 hour
Clute	HE	95-24-30	29-00-30	15	26544	321321	July/Sept 73	Bubbler	6 day/24 hour
Harris County	EE HE HP	To be determined					July/Sept 73	Tape Sampler	As Required
Harris County	EE HE HP	To be determined					July/Sept 73	Tape Sampler	As Required
Harris County	EE HE HP	To be determined					74	Tape Sampler	As Required
Harris County	EE HE HP	To be determined					74	Tape Sampler	As Required
Rosenberg	SR	95-48-45	29-33-30	14	80886	327415	74	Hi-Vol	6 day/24 hour
Huntsville	SR	95-33-00	30-43-30	14	83040	340428	July/Sept 74	Bubbler, Hi-Vol	6 day/24 hour
Bay City	HE	To be determined					74	Bubbler, Hi-Vol	6 day/24 hour
Palacios	SR	To be determined					74	Bubbler, Hi-Vol	6 day/24 hour
El Campo	HE						74	Bubbler	6 day/24 hour
Wharton	HE						74	Bubbler	6 day/24 hour
Columbus	SR						74	Bubbler, Hi-Vol	6 day/24 hour
Conroe	HE						74	Bubbler	6 day/24 hour
Cleveland	HE						74	Bubbler	6 day/24 hour
Liberty	HE						74	Bubbler	6 day/24 hour
Scaly	SR						74	Bubbler	6 day/24 hour
Freeport	HP HE						74	Bubbler	6 day/24 hour
Freeport	HP HE						74	Bubbler	6 day/24 hour
Angleton	HE						74	Bubbler	6 day/24 hour
Rosenberg	HE						74	Bubbler	6 day/24 hour
El Campo	SR						74	Hi-Vol	6 day/24 hour
Conroe	SR						74	Hi-Vol	6 day/24 hour
Cleveland	SR						74	Hi-Vol	6 day/24 hour
Galena Park	2 HP EE 3 HP HE EE 5 MC HP EE 6 HP EE	95-14-00	29-44-00	15	28399	329139	Apr 72	Type D	Continuous: Scan every 5 minutes
Houston (Downtown)	2 HP EE 3 MC HP EE 5 HP HE EE 6 MC EE	95-21-15	29-44-30	15	27232	329255	73	Type A	Continuous: Scan every 5 minutes

City Name		Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
Pasadena	2 HP 3 HE HP 5 HE HP 6 HE HP	95-12-00	29-42-30	15	28716	328856	73	Type A	Continuous: Scan every 5 minutes
N.W. Houston	2 MC HP EE 3 HP HE EE 5 HP FE 6 HP HE EE	94-56-00	29-23-30	15	26395	330250	73	Type A	Continuous: Scan every 5 minutes
E. Houston	2 HP 3 HE HP 5 HE HP 6 HE HP	Precise location will be determined at appropriate time prior to station activation					74	Type A	Continuous: Scan every 5 minutes
San Jacinto City	2 HP 3 HE HP 5 HE HP 6 HE HP	Precise location will be determined at appropriate time prior to station activation					74	Type A	Continuous: Scan every 5 minutes
Freeport	2 HP 3 HE HP 5 HE MS HP 6 HE HP	Precise location will be determined at appropriate time prior to station activation					74	Type A	Continuous: Scan every 5 minutes
Baytown	2 HP 3 HE HP 5 HE HP 6 HE HP	Precise location will be determined at appropriate time prior to station activation					74	Type A	Continuous: Scan every 5 minutes
Texas City	2 HP 3 HE HP 5 HE HP 6 HE HP	Precise location will be determined at appropriate time prior to station activation					74	Type A	Continuous: Scan every 5 minutes
N. Houston	2 HE HP 3 HE HP 5 HE HP 6 HE HP	Precise location will be determined at appropriate time prior to station activation					74	Type A	Continuous: Scan every 5 minutes
S.W.Houston	2 HE HP 3 HE HP 5 HE HP 6 HE HP	Precise location will be determined at appropriate time prior to station activation					74	Type A	Continuous: Scan every 5 minutes

REGION VII
(continued)

City Name		Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
San Jacinto Ordinance Depot	2 HE HP 3 HE HP 5 HE HP 6 HE HP	Precise location will be determined at appropriate time prior to station activation					74	Type A	Continuous: Scan every 5 minutes
LaMarque	2 HE HP 3 HE HP 5 HE HP 6 HE HP	Precise location will be determined at appropriate time prior to station activation					74	Type A	Continuous: Scan every 5 minutes
S. Houston	2 HE HP 3 HE HP 5 HE HP 6 HE HP	Precise location will be determined at appropriate time prior to station activation					74	Type A	Continuous: Scan every 5 minutes
Northern Harris County	2 HP PG 3 HP PG 5 HP PG 6 HP PG	Precise location will be determined at appropriate time prior to station activation					75	Type A	Continuous: Scan every 5 minutes
Morgans Point	2 HP 3 HP PG 5 HP PG 6 HP PG	Precise location will be determined at appropriate time prior to station activation					75	Type A	Continuous: Scan every 5 minutes
Bay City	2 SR 5 HE	Precise location will be determined at appropriate time prior to station activation					75	Type B	Continuous: Scan every 5 minutes
Bay Port	2 PG 3 PG 5 HE PG 6 PG	Precise location will be determined at appropriate time prior to station activation					75	Type A	Continuous: Scan every 5 minutes
Galveston	2 HP 3 HP 5 HP 6 HP HE	Precise location will be determined at appropriate time prior to station activation					75	Type A	Continuous: Scan every 5 minutes
Conroe	2 SR 5 HE	Precise location will be determined at appropriate time prior to station activation					75	Type B	Continuous: Scan every 5 minutes
Liberty	2 SR 5 HE	Precise location will be determined at appropriate time prior to station activation					75	Type B	Continuous: Scan every 5 minutes

REGION VIII

City Name		Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
Fort Worth	HE HP	97-19-45	32-45-00	14	65653	362488	1/61	Hi-Vol	6 day/24 hr.
Dallas	HE HP	96-46-45	32-46-15	14	70802	362813	8/67	NASN Hi-Vol/NASN Bubbler	6 day/24 hr.
Fort Worth	HE HP	97-19-50	32-45-00	14	65640	362488	2/68	NASN Hi-Vol/NASN Bubbler	6 day/24 hr.
Ft.Worth(City Netwk)	HE HP	97-23-00	32-48-00	14	65137	363034	Dec 71	Hi-Vol	6 day/24 hr.
Ft.Worth(City Netwk)	HE HP	97-18-45	32-46-30	14	65805	362767	Dec 71	Hi-Vol	6 day/24 hr.
Ft.Worth(City Netwk)	HE HP	97-17-00	32-44-00	14	66085	362310	Dec 71	Hi-Vol	6 day/24 hr.
Ft.Worth(City Netwk)	HE HP	97-20-30	32-44-00	14	65539	362301	Dec 71	Hi-Vol	6 day/24 hr.
Ft.Worth(City Netwk)	HE HP	97-21-45	32-43-45	14	65344	362252	Dec 71	Hi-Vol	6 day/24 hr.
Ft. Worth(City Netwk)	HE HP	97-17-00	32-42-00	14	66091	361940	Dec 71	Hi-Vol	6 day/24 hr.
Ft.Worth (City Netwk)	HE HP	97-20-00	32-42-30	14	65621	362025	Dec 71	Hi-Vol	6 day/24 hr.
Ft.Worth(City Netwk)	HE HP	97-15-00	32-43-30	14	66399	362223	Dec 71	Hi-Vol	6 day/24 hr.
Ft.Worth (City Netwk)	HE HP	97-14-30	32-42-30	14	66481	362039	Dec 71	Hi-Vol	6 day/24 hr.
Ft.Worth(City Netwk)	HE HP	97-16-00	32-43-00	14	66245	362128	Dec 71	Hi-Vol	6 day/24 hr.
Dallas (City Netwk)	HE HP	96-50-10	32-48-30	14	70260	363218	Dec 71	Hi-Vol	6 day/24 hr.
Dallas (City Netwk)	HE HP	96-48-30	32-48-40	14	70519	363254	Dec 71	Hi-Vol	6 day/24 hr.
Dallas (City Netwk)	HE HP	96-47-45	32-46-25	14	70645	362841	Dec 71	Hi-Vol	6 day/24 hr.
Dallas (City Netwk)	HE HP	96-44-50	32-47-40	14	71095	363082	Dec 71	Hi-Vol	6 day/24 hr.
Dallas (City Netwk)	HE HP	96-43-20	32-46-10	14	71336	362809	Dec 71	Hi-Vol	6 day/24 hr.
Dallas (City Netwk)	HE HP	96-42-10	32-51-50	14	71495	363861	Dec 71	Hi-Vol	6 day/24 hr.
Dallas (City Netwk)	HE HP	96-47-25	32-46-50	14	70695	362919	Dec 71	Hi-Vol	6 day/24 hr.
Dallas (City Netwk)	HE HP	96-47-45	32-46-35	14	70644	362872	Dec 71	Hi-Vol	6 day/24 hr.
Dallas (City Netwk)	HE HP	96-46-15	32-48-45	14	70870	363277	Dec 71	Hi-Vol	6 day/24 hr.
Dallas (City Netwk)	HE HP	96-50-10	32-46-20	14	70268	362818	Jan 72	Hi-Vol	6 day/24 hr.
Sherman	PG SR	96-36-30	33-38-15	14	72182	372359	Jan 72	Hi-Vol	6 day/24 hr.
Denton	PG SR	97-08-00	33-13-00	14	67396	367693	Jan 72	Hi-Vol	6 day/24 hr.
Sherman	SR	96-36-30	33-38-15	14	72182	372459	Jan 72	Bubbler	6 day/24 hr.
Denton	SR	97-08-00	33-13-00	14	67396	367693	Jan 72	Bubbler	6 day/24 hr.
Dallas	HP EE MC	96-48-00	32-47-00	14	70604	362948	Aug 72	Tape Sampler +	As Required
Dallas	HE HP	96-48-00	32-47-00	14	70604	362948	Aug 72	Bubbler +	6 day/24 hr.
Fort Worth	HE HP	97-20-00	32-45-00	14	65614	362487	Aug 72	Bubbler +	6 day/24 hr.
Grand Prairie	PG	To be determined					73	Bubbler, Hi-Vol	6 day/24 hr.

REGION VIII
(Continued)

City Name		Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
Hurst	PG	To be determined					73	Bubbler, Hi-Vol	6 day/24 hr.
Denison	SR	96-32-15	33-44-45	14	72811	373676	Apr/Jun 73	Bubbler, Hi-Vol	6 day/24 hr.
Corsicana	SR	96-27-30	32-03-30	14	73987	355350	Apr/Jun 73	Bubbler, Hi-Vol	6 day/24 hr.
Waxahachie	SR	96-51-00	32-23-00	14	70225	358503	Apr/Jun 73	Bubbler, Hi-Vol	6 day/24 hr.
Greenville	SR	96-06-30	33-08-30	14	76974	367079	Apr/Jun 73	Bubbler, Hi-Vol	6 day/24 hr.
Gainesville	SR	To be determined					74	Bubbler, Hi-Vol	6 day/24 hr.
Cleburne	SR	To be determined					74	Bubbler, Hi-Vol	6 day/24 hr.
Ennis	SR	To be determined					74	Bubbler, Hi-Vol	6 day/24 hr.
McKinney	SR PG	To be determined					74	Bubbler, Hi-Vol	6 day/24 hr.
Commerce	SR	To be determined					74	Bubbler, Hi-Vol	6 day/24 hr.
Mineral Wells	SR	To be determined					74	Bubbler, Hi-Vol	6 day/24 hr.
Dallas	2 MC HP EE 3 HP MC EE 6 MC EE HP	96-48-00	32-47-00	14	70604	362948	Jan/Mar 73 Ozone-72	Type C	Continuous: Scan every 5 minutes
Fort Worth	2 HE HP EE 3 HP EE 6 HP HE	97-20-00	32-45-00	14	65614	362487	Jan/Mar 73	Type C	Continuous: Scan every 5 minutes
Fort Worth	5 MC HP EE 2 HE HP EE 3 HE HP EE 6 HE HP EE	97-18-30	32-44-00	14	65851	362306	Jan/Mar 73	Type A	Continuous: Scan every 5 minutes
Dallas	5 HE HP EE 2 HE HP EE 3 HE HP EE 6 HE HP	96-48-00	32-48-30	14	70598	363225	73	Type A	Continuous: Scan every 5 minutes
Dallas	2 HE HP EE 3 HE HP EE 6 HE HP	96-47-00	32-46-00	14	70764	362767	73	Type C	Continuous: Scan every 5 minutes

REGION VIII
(Continued)

City Name		Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
N. Dallas	2 HE HP 3 HE HP 6 HE HP	To be determined					74	Type C	Continuous: Scan every 5 minutes
S. Fort Worth	2 HE HP 3 HE HP 6 HE HP	To be determined					74	Type C	Continuous: Scan every 5 minutes
N. or N. E. Fort Worth	2 HE HP 3 HE HP 6 HE HP	To be determined					74	Type C	Continuous: Scan every 5 minutes
Arlington	2 HP 3 HP 6 HP	To be determined					74	Type C	Continuous: Scan every 5 minutes
Mesquite	2 HP 3 HP 6 HP	To be determined					74	Type C	Continuous: Scan every 5 minutes
Irving	2 HP 3 HP 6 HP	To be determined					75	Type C	Continuous: Scan every 5 minutes
Garland	2 PG 3 PG 6 PG	To be determined					75	Type C	Continuous: Scan every 5 minutes
Sherman	2 PG SR 3 PG SR 6 PG SR	To be determined					75	Type C	Continuous: Scan every 5 minutes

REGION IX

City Name		Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
San Antonio	HE HP	98-29-29	29-26-25	14	54932	325694	1/67	NASN Hi-Vol	6 day/24 hour
San Antonio	HE HP	98-49-29	29-26-25				1/67	NASN Bubbler	6 day/24 hour
Eagle Pass	SR	100-30-00	28-41-00	14	35344	317388	6/71	Hi-Vol	6 day/24 hour
San Antonio(C.Netwk)	HE HP	98-29-47	29-25-24				Jan 72	Hi-Vol	6 day/24 hour
San Antonio(C.Netwk)	HE HP	98-33-52	29-26-16				Jan 72	Hi-Vol	6 day/24 hour
San Antonio(C.Netwk)	HE HP	98-29-16	29-29-52				Jan 72	Hi-Vol	6 day/24 hour
San Antonio(C.Netwk)	HE HP	98-32-37	29-22-04				Jan 72	Hi-Vol	6 day/24 hour
San Antonio(C.Netwk)	HE HP	98-24-58	29-26-07				Jan 72	Hi-Vol	6 day/24 hour
San Antonio(C.Netwk)	HE HP	98-24-12	29-30-30				Jan 72	Hi-Vol	6 day/24 hour
San Antonio(C.Netwk)	HE HP	98-36-51	29-26-32				Jan 72	Hi-Vol	6 day/24 hour
San Antonio(C.Netwk)	HE HP	98-26-37	29-20-27				Jan 72	Hi-Vol	6 day/24 hour
San Antonio	MC EE HP	98-30-00	29-26-30	14	54849	325709	Sept 72	Tape Sampler +	As Required
San Antonio	HE HP	98-30-00	29-26-30	14	54849	325709	Sept 72	Bubbler +	6 day/24 hour
Eagle Pass	SR	100-30-00	28-41-15	14	35345	317434	73	Bubbler	6 day/24 hour
San Antonio	HE HP	98-31-00	29-29-00	14	54685	326170	Apr/Jun 73	Bubbler +	6 day/24 hour
Del Rio	SR	100-54-00	29-22-00	14	31557	325017	Oct/Dec 73	Bubbler, Hi-Vol	6 day/24 hour
Kerrville	SR	99-08-30	30-02-45	14	48634	332394	Oct/Dec 73	Bubbler, Hi-Vol	6 day/24 hour
New Braunfels	SR	98-07-30	29-42-15	14	58464	328639	Oct/Dec 73	Bubbler, Hi-Vol	6 day/24 hour
Uvalde	SR	99-47-00	29-12-45	14	42385	323184	74	Bubbler, Hi-Vol	6 day/24 hour
Fredericksburg	SR	98-52-15	30-16-30	14	51242	334934	74	Bubbler, Hi-Vol	6 day/24 hour
Karnes City	SR	97-54-00	28-53-15	14	60726	319608	74	Bubbler, Hi-Vol	6 day/24 hour
San Antonio	2 MC HP EE 3 HP MC EE 6 HP MC EE	98-30-00	29-26-30	14	54849	325709	Jan/Mar 73 Ozone-72	Type C	Continuous: Scan every 5 minutes
San Antonio	5 HP EE MC 2 HP HE EE 3 HP HE EE 6 HP HE	98-31-00	29-29-00	14	54685	326170	Apr/Jun 73	Type A	Continuous: Scan every 5 minutes
San Antonio	2 HE HP EE 3 HE HP EE 6 HP HE	98-29-00	29-24-00	14	55013	325248	Apr/Jun 73	Type C	Continuous: Scan every 5 minutes
N.E. Bexar County	5 HP HE 2 HP HE 3 HP HE 6 HP HE	98-21- approx.	29-33-				74	Type A	Continuous: Scan every 5 minutes

City Name		Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
W.San Antonio	2HP HE 3HP HE 6HP HE	To be determined					74	Type C	Continuous: Scan every 5 minutes
S.W. Bexar County	5 HP HE 2 HP HE 3 HP HE 6 HP HE	To be determined					74	Type A	Continuous: Scan every 5 minutes

City Name		Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
Beaumont	HP	94-05-30	30-03-30	15	39476	332582	1/59	State/NASN Hi-Vol	6 day/24 hour
Beaumont	HE HP	94-05-30	30-03-30	15	39476	332582	1/59	NASN Bubbler	6 day/24 hour
Orange	HE HP	93-44-00	30-05-45	15	42933	332970	2/66	Hi-Vol	6 day/24 hour
Port Arthur	HE HP	93-56-30	29-54-30	15	40909	330907	3/66	Hi-Vol	6 day/24 hour
Port Arthur	HE HP	93-56-00	29-53-00	15	40987	330629	72	Bubbler +	6 day/24 hour
Orange	HE HP	93-46-00	30-05-30	15	42612	332926	Feb 72	Bubbler	6 day/24 hour
Beaumont	MC HP EE	94-06-00	30-05-00	15	39391	332860	July 72	Tape Sampler +	As Required
Beaumont	HE HP	94-06-00	30-05-00	15	39391	332860	July 72	Bubbler +	6 day/24 hour
Kountze	HE	94-18-45	30-22-45	15	37388	336160	73	Bubbler, Hi-Vol	6 day/24 hour
Evadale	HE	94-04-30	30-20-30	15	39827	335719	July/Sept 73	Bubbler, Hi-Vol	6 day/24 hour
Lufkin	SR	94-43-45	31-20-30	15	33550	346883	74	Bubbler, Hi-Vol	6 day/24 hour
Crockett	SR	95-27-30	31-19-00	14	83709	347019	74	Bubbler, Hi-Vol	6 day/24 hour
Nacogdoches	SR	94-39-15	31-36-15	15	34307	349782	74	Bubbler, Hi-Vol	6 day/24 hour
Nederland	SR	To be determined					74	Bubbler, Hi-Vol	6 day/24 hour
Livingston	SR	To be determined					74	Bubbler, Hi-Vol	6 day/24 hour
Beaumont	5 MC HP EE 2 MC HP EE 3 MC HP EE 6 MC HP EE	94-06-00	30-05-00	15	39391	332860	July 72	Type D	Continuous: Scan every 5 minutes
Port Arthur	5 HE HP 2 HE HP 3 HE HP 6 HE HP	93-56-00	29-53-00	15	40987	330629	73	Type A	Continuous: Scan every 5 minutes
Orange	5 HE HP 2 HE HP 3 HE HP 6 HE HP	93-46-00	30-05-45	15	42612	332970	73	Type A	Continuous: Scan every 5 minutes
Beaumont	5 HE HP 2 HE HP 3 HE HP 6 HE HP	94-05- approx.	30-03-				74	Type A	Continuous: Scan every 5 minutes
N.E. Port Arthur	5 HE HP 2 HE HP 3 HE HP 6 HE HP	To be determined					74	Type A	Continuous: Scan every 5 minutes
N.W. of Orange	5 HE HP 2 HE HP 3 HE HP 6 HE HP	93-55- approx.	30-10-				75	Type A	Continuous: Scan every 5 minutes

REGION XI

City Name		Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
El Paso	HE HP	106-29-00	31-45-30	13	35951	351468	1/62	State/NASN Hi-Vol	6 day/24 hr.
El Paso	HE HP	106-29-00	31-45-30	13	35951	351468	1/62	Hi-Vol	6 day/24 hr.
El Paso	HE HP	106-29-00	31-45-30	13	35951	351468	1/62	Bubbler	6 day/24 hr.
Alpine	SR	103-39-45	30-20-45	13	62855	335794	Dec 71	Hi-Vol	6 day/24 hr.
El Paso(City Netwk)	HE HP						Dec 71	Hi-Vol	6 day/24 hr.
El Paso(City Netwk)	HE HP						Dec 71	Hi-Vol	6 day/24 hr.
El Paso(City Netwk)	HE HP						Dec 71	Hi-Vol	6 day/24 hr.
El Paso(City Netwk)	RB						Dec 71	Hi-Vol	6 day/24 hr.
El Paso (City Netwk)	RB						Dec 71	Hi-Vol	6 day/24 hr.
El Paso(City Netwk)	HE HP						Dec 71	Hi-Vol	6 day/24 hr.
El Paso (City Netwk)	MS HP						Dec 71	Hi-Vol	6 day/24 hr.
El Paso(City Netwk)	MS HP						Dec 71	Hi-Vol	6 day/24 hr.
El Paso	MS HP EE MC	106-29-30	31-45-45	13	35873	351585	Nov 72	Tape Sampler +	As Required
El Paso	MS HP	106-29-30	31-45-45	13	35873	351585	Nov 72	Bubbler +	6 day/24 hr.
Alpine	RB	103-39-45	30-20-45	13	62855	335794	Nov 72	Bubbler	6 day/24 hr.
Van Horn	RB	104-50-00	31-02-30	13	51590	343430	Jan/Mar 73	Bubbler, Hi-Vol	6 day/24 hr.
El Paso	HE HP	106-30-00	31-46-15	13	35795	351609	Jan/Mar 73	Bubbler	6 day/24 hr.
El Paso	HE HP	106-27-45	31-46-30	13	36151	351650	Oct/Dec 73	Bubbler +	6 day/24 hr.
El Paso	EE HE HP	106-27-45	31-46-30	13	36151	351650	Oct/Dec 73	Tape Sampler +	As Required
El Paso	HE HP	To be determined					Jan/Mar 74	Bubbler	6 day/24 hr.
Fort Davis	RB	103-53-15	30-35-00	13	60667	338402	74	Bubbler, Hi-Vol	6 day/24 hr.
El Paso	5 MS HP EE MC 2 MC HP EE 3 HE HP EE 6 HE HP	106-29-30	31-45-45	13	35873	351585	Nov 72	Type D	Continuous: Scan every 5 minutes
El Paso	5 HE HP EE 2 HE HP EE 3 MC HP EE 6 HP MC EE	106-27-45	31-46-30	13	36151	351650	Oct/Dec 73	Type A	Continuous: Scan every 5 minutes
N. El Paso	5 HP HE 2 HP HE 3 HP HE 6 HP HE	To be determined					73	Type A	Continuous: Scan every 5 minutes

REGION XI
(Continued)

City Name		Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
S. El Paso	5 HP HE 2 HE HP 3 HP HE 6 HP HE	To be determined					73	Type A	Continuous: Scan every 5 minutes
El Paso	5 HP HE 2 HP HE 3 HP HE 6 HP HE	To be determined					73	Type A	Continuous: Scan every 5 minutes
South of El Paso	5 PG 2 PG 3 PG 6 PG	To be determined					74	Type A	Continuous: Scan every 5 minutes

REGION XII

City Name		Longitude W	Latitude N	UTM Zone	Easting	Northing	Date Installed	Sample Type	Schedule
Tyler	PG HP	95-18-00	32-21-00	15	28355	358163	1/63	Hi-Vol	6 day/24 hr.
Texarkana	HP MC	94-02-33	33-25-30	15	40307	369896	1/64	Hi-Vol	6 day/24 hr.
Tyler	PG HP	95-18-00	32-21-00	14	84826	358533	Sept 72	Bubbler	6 day/24 hr.
Texarkana	MC HP EE	94-02-30	33-25-30	15	40315	369895	Sept 72	Tape Sampler +	As Required
Texarkana	HP	94-02-30	33-25-30	15	40315	369895	72	Bubbler +	6 day/24 hr.
Daingerfield	MS	94-43-15	33-01-45	15	33928	365591	Apr/Jun 73	Bubbler, Hi-Vol	6 day/24 hr.
Longview	HP	94-44-30	32-29-15	15	33635	359588	73	Bubbler , Hi-Vol+	6 day/24 hr.
Marshall	SR	94-22-15	32-33-00	15	37128	360230	74	Bubbler, Hi-Vol	6 day/24 hr.
Paris	SR	95-38-30	33-39-45	14	81143	372986	Apr/Jun 74	Bubbler, Hi-Vol	6 day/24 hr.
Palestine	SR	To be determined					75	Bubbler, Hi-Vol	6 day/24 hr.
Henderson	SR	To be determined					75	Bubbler, Hi-Vol	6 day/24 hr.
Texarkana	5 HP MC EE 2 HP MC EE 3 HP MC EE 6 HP MC EE	94-02-30	33-25-30	15	40315	369895	73	Type A	Continuous: Scan every 5 minutes
Longview	5HP 2 HP 3 HP 6 HP	94-44-30	32-29-15	15	33635	359588	Apr/Jun 75	Type A	Continuous: Scan every 5 minutes
Tyler	5 PG HP 2 PG HP 3 PG HP 6 PG HP	To be determined					75	Type A	Continuous: Scan every 5 minutes

TAB 1 TO ATTACHMENT 3

Explanation of Symbols and Abbreviations Used in the Systems Chart

Continuous Monitoring Instrument Code

1. Sulfur Dioxide
2. Ozone
3. Carbon Monoxide/Hydrocarbons/Methane
4. Carbon Monoxide
5. Sulfur Dioxide/Hydrogen Sulfide/Total Sulfur
6. NO_2

Sampler Type

NASN National Air Surveillance Network

TASN Texas Air Surveillance Network

\+ Located at or to be moved to continuous monitoring site.

Site Category

MC - Maximum pollutant (maximum density concentration)

HP - High population density

HE - High emissions density

PG - Projected growth

RB - Predominantly rural (background)

MS - Major source oriented

SR - Small town (background) (population with little industry)

EE - Emergency Episode alert network (See following page.)

In the attached tables only a few stations have been designated as Emergency Episode stations. Each of the stations so designated will be located in the area of estimated maximum concentration for one or more of the major pollutants. As additional manpower and more effective means of collecting and communicating (telemetering) the data are installed and become operational, more and more stations will be included in the Emergency Episode monitoring system. If the needs are such that it is necessary to install a full statewide telemetering system to gather data from all stations at one central point, all reporting stations would be considered as Emergency Episode stations.

TAB 2 TO ATTACHMENT 3

** Sampling Schedule Explanation

Six-Day/Twenty-four Hour

This comment under the "Schedule" column of the table refers to a sampling schedule which calls for samples of 24-hour duration to be taken at approximately six-day intervals. The standard statewide schedule will have 61 sampling days in a year. Each 24-hour sample will be run from midnight to midnight of the scheduled sampling day.

All noncontinuous samplers (hi-vols and bubblers) will be operated simultaneously over the State on designated sampling days. The schedule will be made up to require an approximately equal number of samples to be taken on each day of the week over a year's time.

Continuous: Scan Every Five Minutes

This comment applies to continuous monitoring devices which will be operated in the State sampling program. Normally a continuous monitoring station will be a trailer equipped with measuring instruments and magnetic tape recorder. At five-minute intervals, each instrument's instantaneous indication will be recorded on magnetic tape. Instrument scanning and data recording is automatic. The magnetic tape will later be collected and analyzed by a computer program.

Continuous Monitoring Station Configuration

Type A

Item	Unit Cost	
Monitoring Trailer Temperature Controlled, with electric power circuitry, plumbing, instrument benches, desks, sinks, work benches, gas storage, flow, and ventilation systems, atmospheric intakes, manifold and exhaust systems, security systems, and following sensors, instruments and associated items installed and/or furnished:	$29,250	1 ea.
SO_2, H_2S, Total Sulfur Monitor (Gas Chromatograph)	8,000	1 ea.
Ozone Monitor	4,000	1 ea.
Nitrogen Dioxide Monitor*	6,000	1 ea.
CO, CH_4, Total Hydrocarbon Monitor (Gas Chromatograph)	7,500	1 ea.
Data Logger	4,000	1 ea.
Line Printer	2,000	1 ea.
Strip Chart Recorder	1,100	1 ea.
Wind Direction & Speed Instrument	1,500	1 ea.
Dynamic Calibration System	1,500	1 ea.
Hydrogen Generator	1,300	1 ea.
Special Tools & Test Equipment	1,000	1 set
Intake Manifold System	1,000	1 ea.
Uncommon spare parts - One year supply	2,000	1 kit
Hi-Volume Suspended Particulate Air Sampler	250	1 ea.
Total Cost:	$70,400	

* Although no Federally-recognized reference method for continuous monitoring of NO_2 now exists, short-term effects of this gas are such that continuous monitoring is required. Instrumentation is now available. It is anticipated that a reference method for measurement will be adopted and published in 1972.

Type B

Same as Type A except that the following items are not included:

Nitrogen Dioxide Monitor
CO, CH_4, Total Hydrocarbon Monitor (Gas Chromatograph)

Type C

Same as Type A except that the following item is not included:

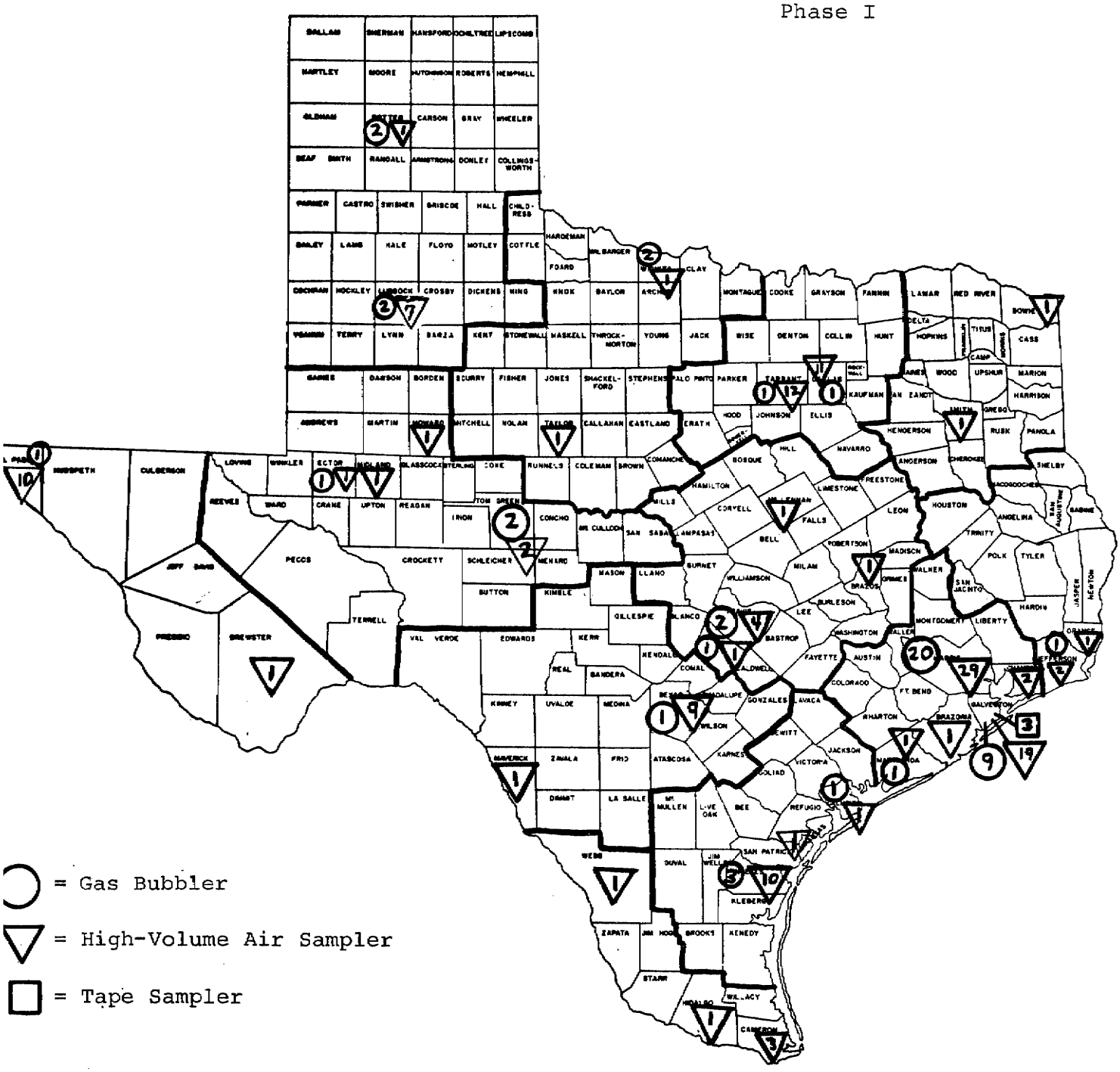
SO_2, H_2S, Total Sulfur Monitor (Gas Chromatograph)

Type D

Same as Type A except that all engineering and installation of all electrical, plumbing, atmospheric intake, manifold and exhaust systems will be performed by Texas Air Pollution Control Services personnel. Experience gained with this type trailer, of which only 5 will be fabricated, will be important in developing plans and specifications for Type A, B, and C trailers that will be procured on a contractual, turn-key basis. The monitoring trailer complete with all equipment except the NO_2 monitor is to be installed in 1972; the NO_2 monitor is to be added in 1973. Total cost $43,900.

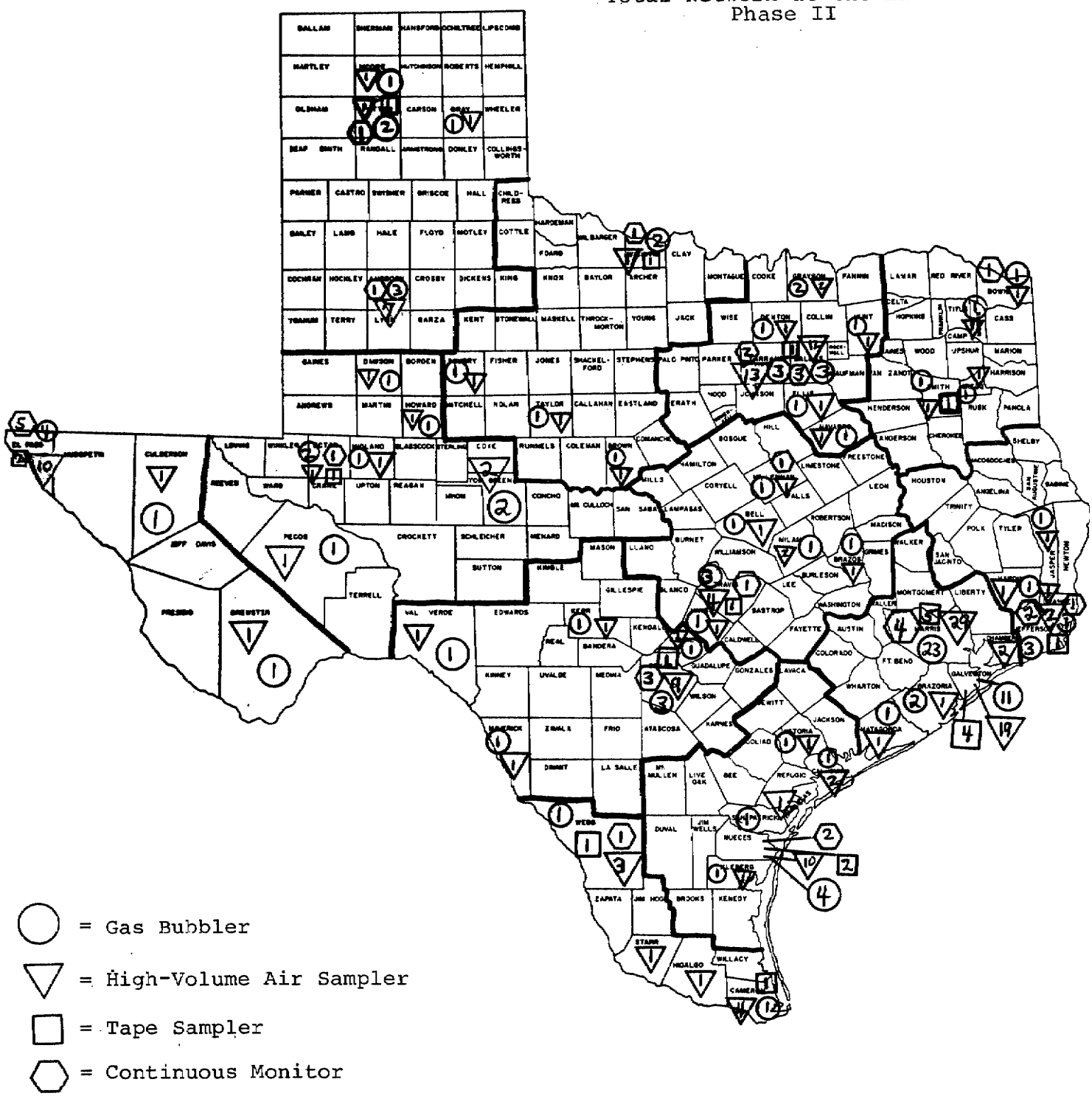
TAB 4 TO ATTACHMENT 3

Texas Air Quality Surveillance System
Total Network
Phase I



Note: Digit inside of symbol indicates number of stations.

Texas Air Quality Surveillance System
Total Network at the End of
Phase II



= Gas Bubbler

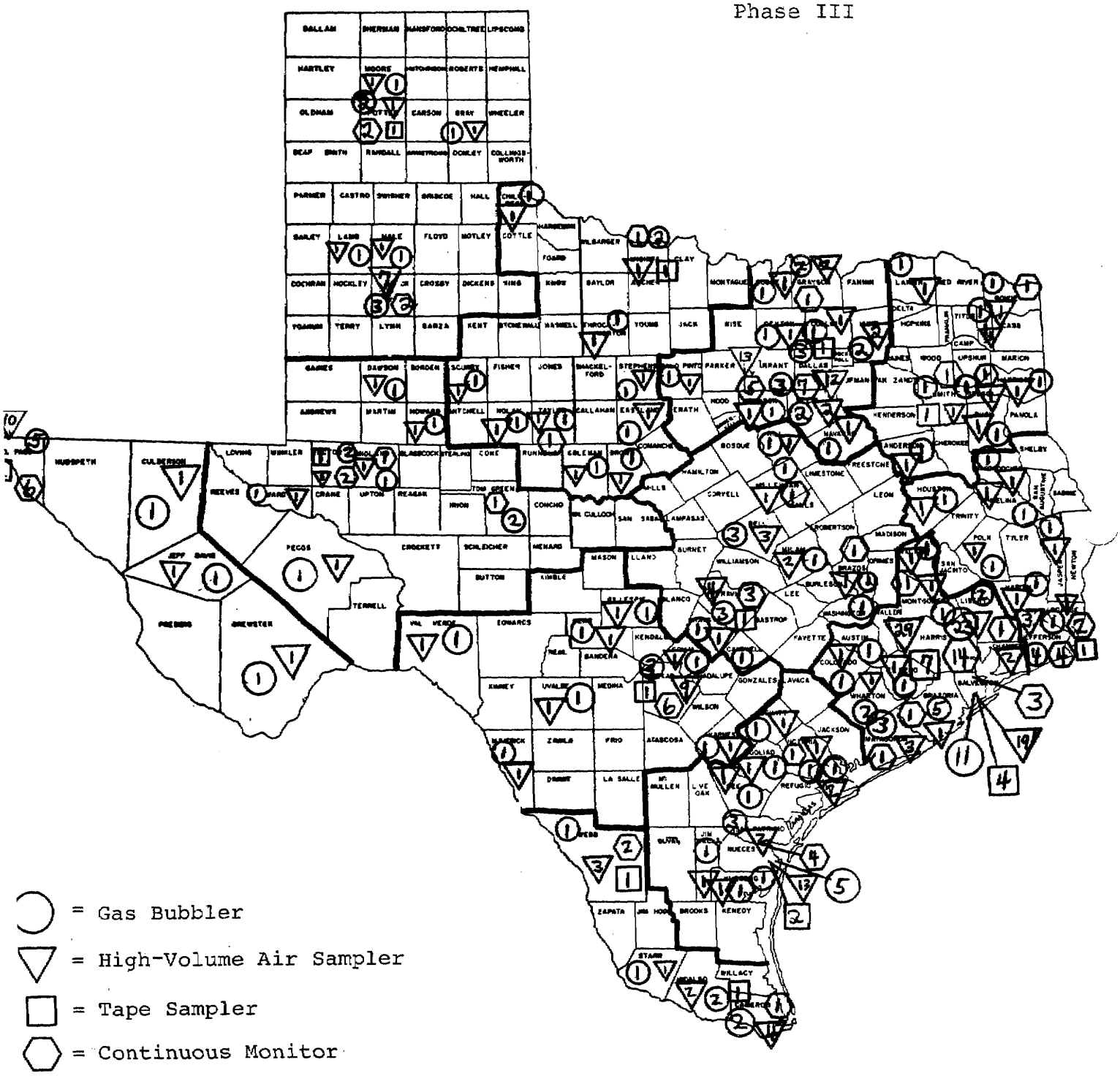
= High-Volume Air Sampler

= Tape Sampler

= Continuous Monitor

Note: Digit inside of symbol indicates number of stations.

Texas Air Quality Surveillance System
Total Network at the End of
Phase III



○ = Gas Bubbler

▽ = High-Volume Air Sampler

□ = Tape Sampler

⬡ = Continuous Monitor

Note: Digit inside of symbol indicates number of stations.

Attachment 4

Basic System Plan

Regional Equipment Procurement and Costs
By Fiscal Year and Phase

AIR QUALITY SURVEILLANCE

Schedule for Completion of Basic System Plan

Region I

Item	PHASE I		PHASE II*				PHASE III					
	Existing Assets		FY-72		FY-73		FY-74		FY-75		FY-74 & FY-75	
	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost
Hi-Vol	2	500	1	250	1	250	6	1,500	-	-	6	1,500
Tape Sampler	-	-	-	-	1	2,000	-	-	-	-	-	-
Gas Bubbler	2	800	1	400	2	800	6	2,400	-	-	6	2,400
Continuous Monitoring Station:												
Type A	-	-	-	-	1	70,400	1	70,400	-	-	1	70,400
Type B	-	-	-	-	-	-	-	-	-	-	-	-
Type C	-	-	-	-	-	-	-	-	-	-	-	-
Type D**	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL COST		1,300		650		73,450		74,300		-		74,300

* Phase II includes completion of minimum Federal requirements in 1973 (See Tab 1.).
** NO_2 monitors for Type D monitoring stations set up in 1972 will be purchased in FY-73.

AIR QUALITY SURVEILLANCE

Schedule for Completion of Basic System Plan

Region II

Item	PHASE I		PHASE II*				PHASE III					
	Existing Assets		FY-72		FY-73		FY-74		FY-75		FY-74 & FY-75	
	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost
Hi-Vol	8	2,000	-	-	2	500	2	500	-	-	2	500
Tape Sampler	-	-	1	2,000	-	-	-	-	-	-	-	-
Gas Bubbler	4	1,600	-	-	3	1,200	2	800	-	-	2	800
Continuous Monitoring Station:												
Type A	-	-	-	-	1	70,400	1	70,400	1	70,400	2	140,800
Type B	-	-	-	-	-	-	-	-	-	-	-	-
Type C	-	-	-	-	-	-	-	-	-	-	-	-
Type D**	-	-	1	33,900***	-	10,000	-	-	-	-	-	-
TOTAL COST		3,600		35,900		82,100		71,700		70,400		142,100

* Phase II includes completion of minimum Federal requirements in 1973 (See Tab 1.).

** NO_2 monitors for Type D monitoring stations set up in 1972 will be purchased in FY-73.

*** Ozone monitor will be purchased in FY-73.

AIR QUALITY SURVEILLANCE

Schedule for Completion of Basic System Plan

Region III

Item	PHASE I		PHASE II*				PHASE III					
	Existing Assets		FY-72		FY-73		FY-74		FY-75		FY-74 & FY-75	
	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost
Hi-Vol	7	1,750	-	-	3	750	3	750	-	-	3	750
Tape Sampler	-	-	-	-	1	2,000	-	-	-	-	-	-
Gas Bubbler	3	1,200	2	800	3	1,200	5	2,000	-	-	5	2,000
Continuous Monitoring Station:												
Type A	-	-	-	8,000****	2	132,800	-	-	-	-	-	-
Type B	-	-			-	-	-	-	-	-	-	-
Type C	-	-			-	-	2	124,800	1	62,400	3	187,200
Type D**	-	-			-	-	-	-	-	-	-	-
TOTAL COST		2,950		8,800		136,750		127,550		62,400		189,950

* Phase II includes completion of minimum Federal requirements in 1973 (See Tab 1.).

** NO_2 monitors for Type D monitoring stations set up in 1972 will be purchased in FY-73.

**** Ozone monitor and data logger for one monitoring station will be purchased in FY-72; the monitoring trailer and all additional equipment to complete the appropriate type station will be purchased in FY-73.

AIR QUALITY SURVEILLANCE

Schedule for Completion of Basic System Plan

Region IV

Item	PHASE I		PHASE II*				PHASE III					
	Existing Assets		FY-72		FY-73		FY-74		FY-75		FY-74 & FY-75	
	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost
Hi-Vol	5	1,250	2	500	2	500	1	250	-	-	1	250
Tape Sampler	-	-	1	2,000	1	2,000	-	-	-	-	-	-
Gas Bubbler	-	-	1	400	1	400	4	1,600	-	-	4	1,600
Continuous Monitoring Station:												
Type A	-	-	-	-	-	-	1	70,400	1	70,400	2	140,800
Type B	-	-	-	-	-	-	-	-	-	-	-	-
Type C	-	-	-	-	1	62,400	-	-	-	-	-	-
Type D**	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL COST		1,250		2,900		65,300		72,250		70,400		142,650

* Phase II includes completion of minimum Federal requirements in 1973 (See Tab 1.).

** NO_2 monitors for Type D monitoring stations set up in 1972 will be purchased in FY-73.

AIR QUALITY SURVEILLANCE

Schedule for Completion of Basic System Plan

Region V

Item	PHASE I		PHASE II*				PHASE III					
	Existing Assets		FY-72		FY-73		FY-74		FY-75		FY-74 & FY-75	
	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost
Hi-Vol	12	3,000	-	-	3	750	6	1,500	3	750	9	2,250
Tape Sampler	-	-	1	2,000	1	2,000	-	-	-	-	-	-
Gas Bubbler	4	1,600	1	400	3	1,200	6	2,400	3	1,200	9	3,600
Continuous Monitoring Station:												
Type A	-	-	-	-	1	70,400	2	140,800	2	140,800	4	281,600
Type B	-	-	-	-	-	-	-	-	-	-	-	-
Type C	-	-	-	-	-	-	-	-	-	-	-	-
Type D**	-	-	1	37,900	-	6,000	-	-	-	-	-	-
TOTAL COST		4,600		40,300		80,350		144,700		142,750		287,450

* Phase II includes completion of minimum Federal requirements in 1973 (See Tab 1.).

** NO_2 monitors for Type D monitoring stations set up in 1972 will be purchased in FY-73.

AIR QUALITY SURVEILLANCE

Schedule for Completion of Basic System Plan

Region VI

Item	PHASE I		PHASE II*				PHASE III					
	Existing Assets		FY-72		FY-73		FY-74		FY-75		FY-74 & FY-75	
	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost
Hi-Vol	5	1,250	-	-	2	500	1	250	-	-	1	250
Tape Sampler	-	-	-	-	1	2,000	-	-	-	-	-	-
Gas Bubbler	3	1,200	1	400	4	1,600	1	400	-	-	1	400
Continuous Monitoring Station:												
Type A	-	-	-	-	1	70,400	2	140,800	1	70,400	3	211,200
Type B	-	-	-	-	-	-	-	-	-	-	-	-
Type C	-	-	-	-	-	-	-	-	-	-	-	-
Type D**	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL COST		2,450		400		74,500		141,450		70,400		211,850

* Phase II includes completion of minimum Federal requirements in 1973 (See Tab 1.).

** NO_2 monitors for Type D monitoring stations set up in 1972 will be purchased in FY-73.

AIR QUALITY SURVEILLANCE

Schedule for Completion of Basic System Plan

Region VII

Item	PHASE I		PHASE II*				PHASE III					
	Existing Assets		FY-72		FY-73		FY-74		FY-75		FY-74 & FY-75	
	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost
Hi-Vol	52	13,000	-	-	-	-	8	2,000	-	-	8	2,000
Tape Sampler	3	6,000	4	8,000	2	4,000	2	4,000	-	-	2	4,000
Gas Bubbler	30	12,000	4	1,600	3	1,200	14	5,600	-	-	14	5,600
Continuous Monitoring Station:												
Type A	-	-	-	-	3	211,200	10	704,000	4	281,600	14	985,600
Type B	-	-	-	-	-	-	-	-	3	170,700	3	170,700
Type C	-	-	-	-	-	-	-	-	-	-	-	-
Type D**	-	-	1	37,900	-	6,000	-	-	-	-	-	-
TOTAL COST		31,000		47,500		222,400		715,600		452,300		1,167,900

* Phase II includes completion of minimum Federal requirements in 1973 (See Tab 1.).
** NO_2 monitors for Type D monitoring stations set up in 1972 will be purchased in FY-73.

AIR QUALITY SURVEILLANCE

Schedule for Completion of Basic System Plan

Region VIII

Item	PHASE I		PHASE II*				PHASE III					
	Existing Assets		FY-72		FY-73		FY-74		FY-75		FY-74 & FY-75	
	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost
Hi-Vol	23	5,750	2	500	6	1,500	6	1,500	-	-	6	1,500
Tape Sampler	-	-	1	2,000	-	-	-	-	-	-	-	-
Gas Bubbler	2	800	4	1,600	6	2,400	6	2,400	-		6	2,400
Continuous Monitoring Station:												
Type A	-	-	-	-	2	140,800	-	-	-	-	-	-
Type B	-	-	-	-	-	-	-	-	-	-	-	-
Type C	-	-	-	8,000****	3	179,200	5	312,000	3	187,200	8	499,200
Type D**	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL COST		6,550		12,100		323,900		315,900		187,200		503,100

* Phase II includes completion of minimum Federal requirements in 1973 (See Tab 1.).

** NO_2 monitors for Type D monitoring stations set up in 1972 will be purchased in FY-73.

**** Ozone monitor and data logger for one monitoring station will be purchased in FY-72; the monitoring trailer and all additional equipment to complete the appropriate type station will be purchased in FY-73.

JAN 28

AIR QUALITY SURVEILLANCE

Schedule for Completion of Basic System Plan

Region IX

Item	PHASE I		PHASE II*				PHASE III					
	Existing Assets		FY-72		FY-73		FY-74		FY-75		FY-74 & FY-75	
	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost
Hi-Vol	10	2,500	-	-	3	750	3	750	-	-	3	750
Tape Sampler	-	-	1	2,000	-	-	-	-	-	-	-	-
Gas Bubbler	1	400	1	400	5	2,000	3	1,200	-	-	3	1,200
Continuous Monitoring Station:												
Type A	-	-	-	-	1	70,400	2	140,800	-	-	2	140,800
Type B	-	-	-	-	-	-	-	-	-	-	-	-
Type C	-	-	-	**** 8,000	2	116,800	1	62,400	-	-	1	62,400
Type D**	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL COST		2,900		10,400		189,950		205,150		-		205,150

* Phase II includes completion of minimum Federal requirements in 1973 (See Tab 1.).

** NO_2 monitors for Type D monitoring stations set up in 1972 will be purchased in FY-73.

**** Ozone monitor and data logger for one monitoring station will be purchased in FY-72; the monitoring trailer and all additional equipment to complete the appropriate type station will be purchased in FY-73.

AIR QUALITY SURVEILLANCE

Schedule for Completion of Basic System Plan

Region X

Item	PHASE I		PHASE II*				PHASE III					
	Existing Assets		FY-72		FY-73		FY-74		FY-75		FY-74 & FY-75	
	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost
Hi-Vol	3	750	-	-	2	500	5	1,250	-	-	5	1,250
Tape Sampler	-	-	1	2,000	-	-	-	-	-	-	-	-
Gas Bubbler	1	400	3	1,200	2	800	5	2,000	-	-	5	2,000
Continuous Monitoring Station:												
Type A	-	-	-	-	2	140,800	2	140,800	1	70,400	3	211,200
Type B	-	-	-	-	-	-	-	-	-	-	-	-
Type C	-	-	-	-	-	-	-	-	-	-	-	-
Type D**	-	-	1	37,900	-	6,000	-	-	-	-	-	-
TOTAL COST		1,150		41,100		148,100		144,050		70,400		214,450

* Phase II includes completion of minimum Federal requirements in 1973 (See Tab 1.).

** NO_2 monitors for Type D monitoring stations set up in 1972 will be purchased in FY-73.

AIR QUALITY SURVEILLANCE

Schedule for Completion of Basic System Plan

Region XI

Item	PHASE I		PHASE II*				PHASE III					
	Existing Assets		FY-72		FY-73		FY-74		FY-75		FY-74 & FY-75	
	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost
Hi-Vol	11	2,750	-	-	1	250	1	250	-	-	1	250
Tape Sampler	-	-	1	2,000	1	2,000	-	-	-	-	-	-
Gas Bubbler	1	400	2	800	3	1,200	2	800	-	-	2	800
Continuous Monitoring Station:												
Type A	-	-	-	-	4	281,600	1	70,400	-	-	1	70,400
Type B	-	-	-	-	-	-	-	-	-	-	-	-
Type C	-	-	-	-	-	-	-	-	-	-	-	-
Type D**	-	-	1	37,900	-	6,000	-	-	-	-	-	-
TOTAL COST		3,150		40,700		291,050		71,450		-		71,450

* Phase II includes completion of minimum Federal requirements in 1973 (See Tab 1.).

** NO_2 monitors for Type D monitoring stations set up in 1972 will be purchased in FY-73.

AIR QUALITY SURVEILLANCE

Schedule for Completion of Basic System Plan

Region XII

Item	PHASE I		PHASE II*				PHASE III					
	Existing Assets		FY-72		FY-73		FY-74		FY-75		FY-74 & FY-75	
	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost	Qty	Total Cost
Hi-Vol	2	500	-	-	2	500	2	500	2	500	4	1,000
Tape Sampler	-	-	1	2,000	-	-	-	-	-	-	-	-
Gas Bubbler	-	-	2	800	2	800	2	800	2	800	4	1,600
Continuous Monitoring Station:												
Type A	-	-	-	-	1	70,400	-	-	2	140,800	2	140,800
Type B	-	-	-	-	-	-	-	-	-	-	-	-
Type C	-	-	-	-	-	-	-	-	-	-	-	-
Type D**	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL COST		500		2,800		71,700		1,300		142,100		143,400

* Phase II includes completion of minimum Federal requirements in 1973 (See Tab 1.).

** NO_2 monitors for Type D monitoring stations set up in 1972 will be purchased in FY-73.

TAB 1 TO ATTACHMENT 4

All minimum Federally-prescribed equipment requirements (Attachment 1) will be met or exceeded by the end of Phase II of the Basic System Plan. Below is shown the total equipment which, contingent on availability of resources and demonstrated need, will be installed in each Region by the end of calender year 1973 (Phase I-II).

	ITEM (Quantity)						
Region	Hi-Vol	Tape Sampler	Gas Bubbler	SO_2*	CO*	O_3*	NO_2*
I	4	1	5	1	1	1	1
II	10	1	7	2	2	2	2
III	10	1	8	2	2	2	2
IV	9	2	2	-	1	1	1
V	15	2	8	2	2	2	2
VI	7	1	8	1	1	1	1
VII	52	9	37	4	4	4	4
VIII	31	1	12	2	5	5	5
IX	13	1	7	1	3	3	3
X	5	1	6	3	3	3	3
XI	12	2	6	5	5	5	5
XII	4	1	4	1	1	1	1
Total Qty:	172	23	110	24	30	30	30

* Continuous monitoring equipment is housed in fully-equipped Type A, B, C, or D trailers as indicated in Attachment 4.

Attachment 5

Basic System Plan

Total System Requirements
by Region

AIR QUALITY SURVEILLANCE

Basic System Plan, Phases I-III

Region	Item (Quantity) Hi-Vol	Tape Sampler	Gas Bubbler	Cont. Monitoring Station, Type: A	B	C	D	Total Cost
I	10	1	11	2	-	-	-	149,700
II	12	1	9	3	-	-	1	263,700
III	13	1	13	2	-	3	-	338,450
IV	10	2	6	2	-	1	-	212,100
V	24	2	17	5	-	-	1	412,700
VI	8	1	9	4	-	-	-	289,200
VII	60	11	51	17	3	-	1	1,468,800
VIII	37	1	18	2	-	11	-	845,650
IX	16	1	10	3	-	3	-	408,400
X	10	1	11	5	-	-	1	404,800
XI	13	2	8	5	-	-	1	406,350
XII	8	1	8	3	-	-	-	218,400
Total Qty:	221	25	171	53	3	18	5	

Phases I-III, Total Cost: $5,418,250

Phases I-III, Total Number Continuous Monitoring Stations: 79

Attachment 6

Basic System Plan

Phase I
Requirements by Region

AIR QUALITY SURVEILLANCE

Phase I

Region	Item (Quantity) Hi-Vol	Tape Sampler	Gas Bubbler	Total Cost
I	2	-	2	1,300
II	8	-	4	3,600
III	7	-	3	2,950
IV	5	-	-	1,250
V	12	-	4	4,600
VI	5	-	3	2,450
VII	52	3	30	31,000
VIII	23	-	2	6,550
IX	10	-	1	2,900
X	3	-	1	1,150
XI	11	-	1	3,150
XII	2	-	-	500
Total Qty:	140	3	51	
			Phase I, Total Cost:	$61,400

Attachment 7

Basic System Plan

Phase II
Requirements by Region

AIR QUALITY SURVEILLANCE

Phase II

Region	Item (Quantity) Hi-Vol	Tape Sampler	Gas Bubbler	Cont. Monitoring Station, Type: A	B	C	D	Total Cost
I	2	1	3	1	-	-	-	74,100
II	2	1	3	1	-	-	1	118,000
III	3	1	5	2	-	-	-	145,550
IV	4	2	2	-	-	1	-	68,200
V	3	2	4	1	-	-	1	120,650
VI	2	1	5	1	-	-	-	74,900
VII	-	6	7	3	-	-	1	269,900
VIII	8	1	10	2	-	3	-	336,000
IX	3	1	6	1	-	2	-	200,350
X	2	1	5	2	-	-	1	189,200
XI	1	2	5	4	-	-	1	331,750
XII	2	1	4	1	-	-	-	74,500
Total Qty:	32	20	59	19	-	6	5	

Phase II, Total Cost: $2,003,100

FY-72: $ 243,550

FY-73: $1,759,550

Phase II, Number Continuous Monitoring Stations: 30

FY-72: 5

FY-73: 25

Attachment 8

Basic System Plan

Phase III
Requirements by Region

AIR QUALITY SURVEILLANCE

Phase III

Region	Item (Quantity) Hi-Vol	Tape Sampler	Gas Bubbler	Cont. Monitoring Station, Type: A	B	C	Total Cost
I	6	-	6	1	-	-	74,300
II	2	-	2	2	-	-	142,100
III	3	-	5	-	-	3	189,950
IV	1	-	4	2	-	-	142,650
V	9	-	9	4	-	-	287,450
VI	1	-	1	3	-	-	211,850
VII	8	2	14	14	3	-	1,167,900
VIII	6	-	6	-	-	8	503,100
IX	3	-	3	2	-	1	205,150
X	5	-	5	3	-	-	214,450
XI	1	-	2	1	-	-	71,450
XII	4	-	4	2	-	-	143,400
Total Qty:	49	2	61	34	3	12	

Phase III, Total Cost: $3,353,750

FY-74: $2,085,400

FY-75: $1,268,350

Phase III, Number Continuous Monitoring Stations: 49

FY-74: 30

FY-75: 19

Attachment 9

Summary of Data Sources
Proposed By Basic System Plan
With Data Flow Diagrams

ATTACHMENT 9

Data Sources

High-Volume Air Samplers

The data outlined below will be generated from high-volume air sampler filters.

Total Suspended Particulate

Total suspended particulate data will be obtained from the State network on five samples per month at each station using methods prescribed in the Federal Register, Volume 36, No. 84, April 30, 1971. Data will be forwarded daily from the laboratory to the central computer facility on a log sheet in SAROAD format. Similarly, log sheets will be obtained from participating local programs on a weekly basis. The data will show the areas that fail to meet national and/or State standards for total suspended particulate and will be used to alert both State and local personnel to the need for increased control of source emissions in that locality.

Benzene Solubles

Benzene soluble data will be generated once each month for each station by taking an equal section of the five filters of the month and extracting the resulting composite in a single analysis. Sulfates and nitrates will be run once each quarter on the heaviest filter received from each station. This data will be forwarded on flow sheets. Similar data will be obtained from participating local programs.

Lead

Lead loading will be determined by atomic absorption on the heaviest filter of each quarter, from each State network station. Where local programs possess atomic absorption equipment, the same information will be obtained. This data will be forwarded to the central computer facility on log sheets. Local programs that do not possess atomic absorption equipment will be requested to forward a section from the heaviest filter of each quarter for analysis in Austin.

Other Heavy Metals and Trace Elements

Purchase of x-ray fluorescence (XRF) equipment is planned to allow us to obtain a much greater volume of information than by any other available technique. The validity of this technique in examining hi-vol filter samples has been well

demonstrated. The information will be in the form of airborne loading of many potentially harmful heavy elements, such as Arsenic, Cadmium, Lead, Chromium, Nickel, and Manganese. Data on other less harmful elements will be generated at the same time, with no increase in cost or analysis time. This data will include loadings for Barium, Bromine, Calcium, Cobalt, Iron, Molybdenum, Titanium, Zinc, and Zirconium. This extensive volume of information for each sample will be of significant value to the program in enforcing the provisions of the Clean Air Act of Texas and the Regulations of the Texas Air Control Board in two ways.

First, the XRF technique will allow us to find sources of heavy metal pollution that are not now known. Once each month, each State network hi-vol sampler will be used to obtain a 24-hour filtered air sample on a cellulose filter. Also, one or more local programs will be furnished cellulose filters to be run on each of their hi-vols. The resulting filter samples will be analyzed by the XRF technique for all of the elements indicated above. The resulting data will be examined to find any samples having unusually heavy loadings of any potentially toxic metals.

For each sample showing an unusually heavy loading of a toxic metal, we will request additional hi-vol sampler filters from either temporary or permanent sites near the site of the original sample. These will also be analyzed by XRF to determine metal loadings, and the resulting data will be plotted to determine isopleths for the toxic metal of immediate interest. This should allow determination of the source to be made readily, and the results will be forwarded to an enforcement group so that abatement can be required, as allowed under the provisions of the Clean Air Act of Texas. Thus, the data can be used to find sources and to force their compliance with Texas laws. The validity of this concept has been proven by work undertaken by an outside contractor. Filters were analyzed by XRF from State network hi-vol samplers, and several unexpected high levels of heavy metals were found. In one of the cities, the local program was requested to run cellulose filters on its local hi-vol network. Analysis of the filters by XRF pinpointed the source of the pollution, and the data is now being prepared for submission to the compliance group so that abatement can be required.

Second, the XRF equipment can be used to identify the source of a particulate. In heavily industrialized areas, particulate matter from one source often settles on another source, so that attempts to measure obvious sources sometimes result in obtaining heavier loadings upwind than downwind. This makes it difficult to enforce Regulation I of the Texas Air Control Board. However, XRF data will make it easy to demonstrate the true source of the particulate in question and will thus facilitate enforcement of Regulation I.

This vast volume of information is obtained by XRF techniques with no sample preparation, and the sample is not destroyed. The x-ray count is rapid and takes little operator time, so that many samples can be run without excessive load on the laboratory staff. The nondestructive nature of this technique, coupled with the ability to reanalyze and to present the sample actually analyzed as evidence, will give extra significance to XRF data presented in court in support of a case filed under the Clean Air Act of Texas.

Data from XRF analyses will be recorded on magnetic tape and forwarded to the central facility for storage.

Gas Bubblers

Data from the gas bubblers in the State network will be obtained five times per month and forwarded to the central processing unit on log sheets. The gas bubblers in use are capable of taking five individual samples simultaneously. The identity of the pollutant measured is determined by the choice of absorbing reagent and analytical method used by the laboratory. Gas absorption tubes are mailed to each network station five times per month. The local personnel pull air through the absorption tubes for twenty-four hours and then return them to the laboratory for analysis. Thus, the identity of the pollutants to be measured is under the direct control of the State laboratory, and changes can be made easily.

The more important pollutants, SO_2 and NO_2, will be measured on each of the five sampling days within each month. The less common pollutants, such as ammonia, oxidants, and aldehydes, will be measured at a frequency dependent on the concentrations found at each local site. The tube slots freed will be used for running ambient air surveys across the State for other pollutants, such as mercury vapor, hydrogen sulfide, and fluorides. In this manner, the network can be used to the best advantage, and indeed the identity of the pollutants measured can be tailored to the needs of each locality.

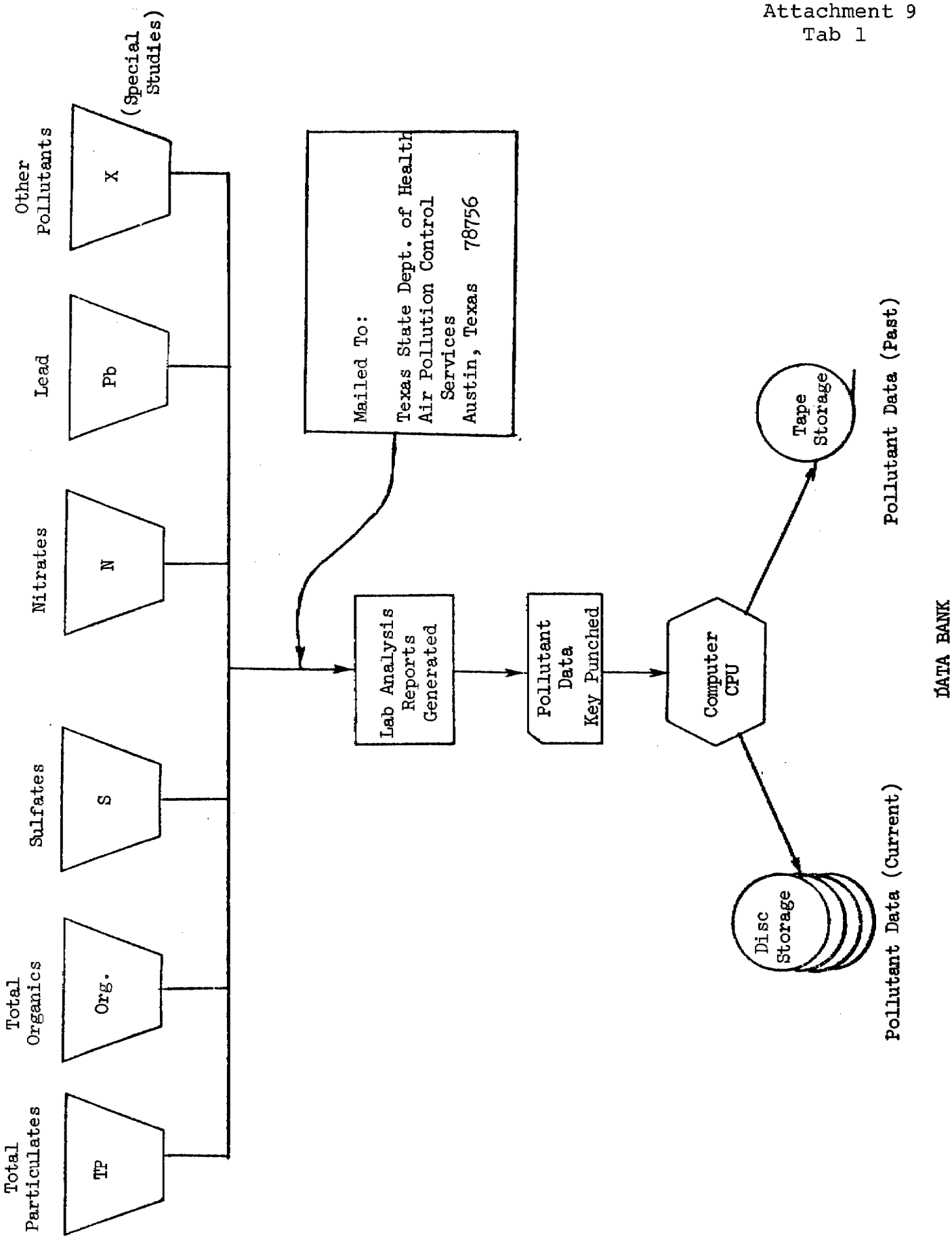
Continuous Monitors

Data from continuous monitoring equipment in the State network will be recorded on magnetic and/or punched paper tape, which will be forwarded weekly to the central process unit. During Phase III, a program to provide for telemetering of data will begin. When received in the Austin offices of TAPCS, either by mail or electrical circuitry, the data will be converted to proper format and then processed by the central computer. Other continuous monitoring equipment used in special projects will be connected to strip chart or digital recorders. This

information will be entered onto flow sheets and forwarded to the central computer facility. In the same manner, participating local programs with continuous monitoring equipment will enter their data onto log sheets and forward it to the central computer facility. Automatic data acquisition equipment will be used as much as possible to minimize the manpower required for manual data reduction.

Effects Packages

Effects package components will be forwarded to field operators for exposure to the ambient atmosphere for a prescribed time. Operators will return the components to the laboratory for examination. The resulting data will be forwarded on log sheets to the central process unit. This data will be (monthly) dustfall, rubber strip, sulfation, nylon panel, silver plate, sticky paper jar; (quarterly) fabrics, steel plate; (yearly) steel plate and zinc plate.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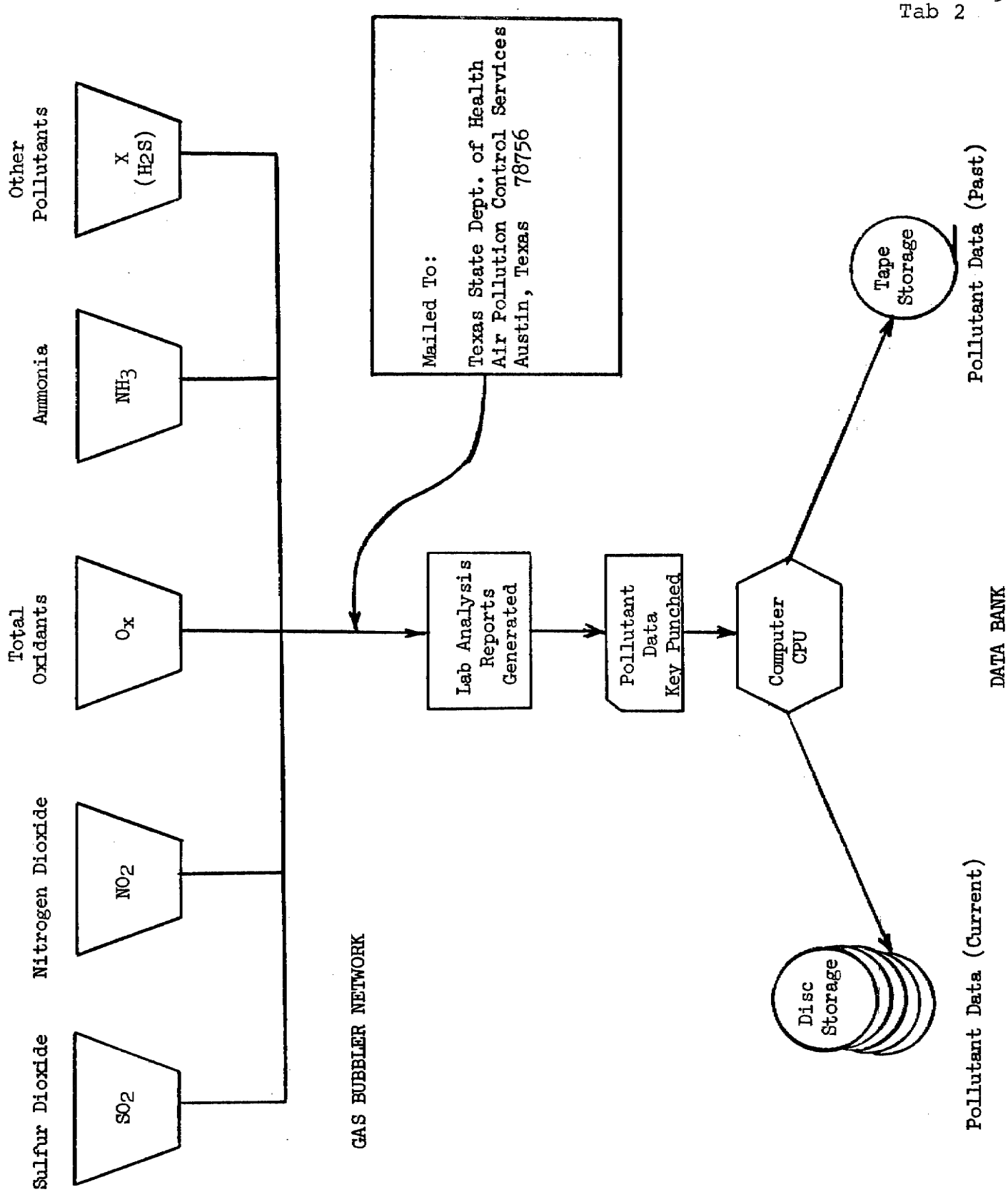
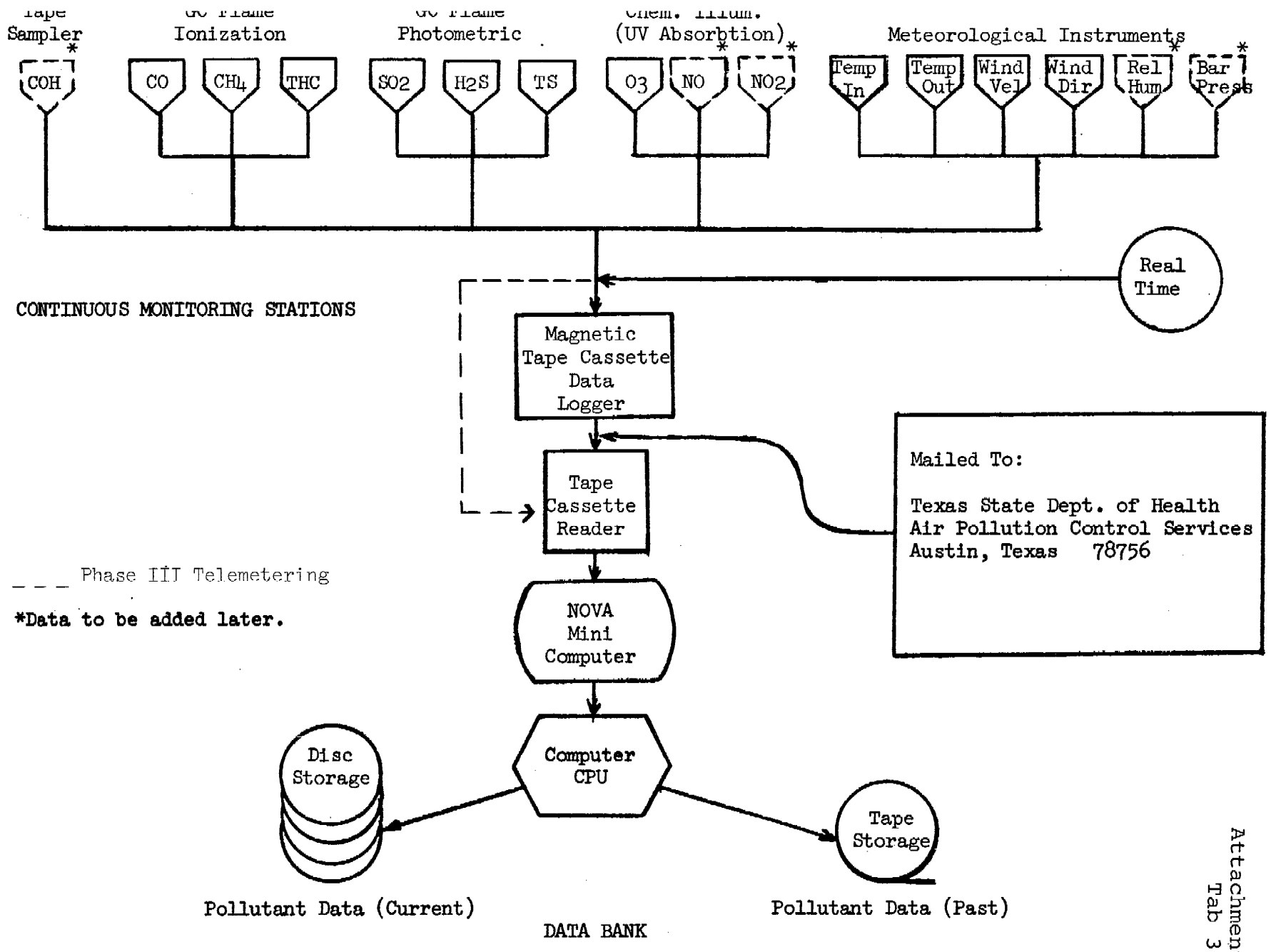
TP
Total Organics
Org.
Sulfates
S
Nitrates
N
Lead
Pb
Other Pollutants
X
(Special Studies)
Mailed To:
Texas State Dept. of Health
Air Pollution Control
Services
Austin, Texas 78756
Lab Analysis Reports Generated
Pollutant Data Key Punched
Computer CPU
Tape Storage
Pollutant Data (Past)
Disc Storage
Pollutant Data (Current)
DATA BANK


Other Pollutants
X (H2S)
Ammonia
NH3
Total Oxidants
Ox
Nitrogen Dioxide
NO2
Sulfur Dioxide
SO2
GAS BUBBLER NETWORK
Mailed To:
Texas State Dept. of Health
Air Pollution Control Services
Austin, Texas 78756
Lab Analysis Reports Generated
Pollutant Data Key Punched
Computer CPU
Tape Storage
Pollutant Data (Past)
Disc Storage
Pollutant Data (Current)
DATA BANK


Tape Sampler
Ionization
Photometric
(UV Absorption)
Meteorological Instruments
COH
CO
CH4
THC
SO2
H2S
TS
O3
NO
NO2
Temp In
Temp Out
Wind Vel
Wind Dir
Rel Hum
Bar Press
Real Time
CONTINUOUS MONITORING STATIONS
Magnetic Tape Cassette Data Logger
Tape Cassette Reader
Mailed To:
Texas State Dept. of Health
Air Pollution Control Services
Austin, Texas 78756
Phase III Telemetering
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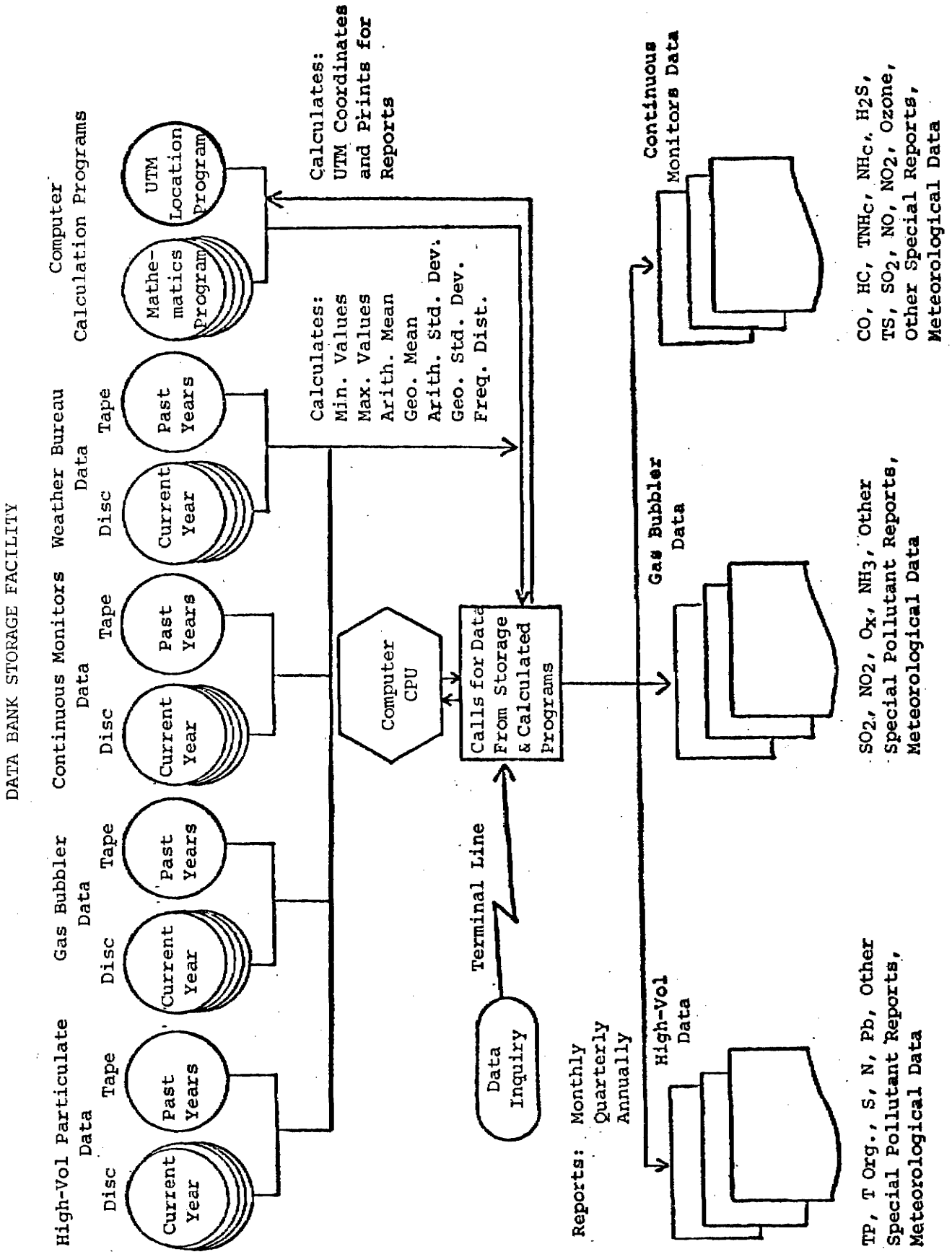
NOVA Mini Computer
Computer CPU
Disc Storage
Tape Storage
Pollutant Data (Current)
Pollutant Data (Past)
DATA BANK


DATA BANK STORAGE FACILITY
High-Vol Particulate Data
Disc
Tape
Current Year
Past Years
Gas Bubbler Data
Disc
Tape
Current Year
Past Years
Continuous Monitors Data
Disc
Tape
Current Year
Past Years
Weather Bureau Data
Disc
Tape
Current Year
Past Years
Computer Calculation Programs
Mathe-matics Program
UTM Location Program
Calculates:
UTM Coordinates and Prints for Reports
Calculates:
Min. Values
Max. Values
Arith. Mean
Geo. Mean
Arith. Std. Dev.
Geo. Std. Dev.
Freq. Dist.
Computer CPU
Calls for Data From Storage & Calculated Programs
Terminal Line
Data Inquiry
Reports: Monthly Quarterly Annually
High-Vol Data
Gas Bubbler Data
Continuous Monitors Data
TP, T Org., S, N, Pb, Other Special Pollutant Reports, Meteorological Data
SO2, NO2, Ox, NH3, Other Special Pollutant Reports, Meteorological Data
CO, HC, TNHc, NHc, H2S, TS, SO2, NO, NO2, Ozone, Other Special Reports, Meteorological Data

Attachment 10

Basic System Plan
Annual Operating Costs
Fiscal Years 1973, 1974, 1975

AIR QUALITY SURVEILLANCE SYSTEM

Annual Operating Costs
FY - 1973

Item	Quantity	Average Unit Cost	Total Cost
Personnel*			
Administrative	1	$15,000	$ 15,000
Engineers	2	13,000	26,000
Env. Health Spec.	11	10,000	110,000
Engineer Technicians			
Regional Assignees	17	9,000	153,000
Central Shop	13	9,000	117,000
Total Personnel Costs			$421,000
Travel & Per Diem			$ 50,000
Spare Parts & Supplies			100,000
Utilities			40,000
Telemetering Costs			0
Equipment Depreciation (10%/year)			200,000
TOTAL ANNUAL COSTS			$791,000

* Does not include laboratory services

AIR QUALITY SURVEILLANCE SYSTEM

Annual Operating Costs
FY - 1974

Item	Quantity	Average Unit Cost	Total Cost
Personnel*			
Administrative	1	$15,000	$ 15,000
Engineers	2	13,000	26,000
Env. Health Spec.	14	10,000	140,000
Engineer Technicians			
Regional Assignees	45	9,000	405,000
Central Shop	15	9,000	135,000
Total Personnel Costs			$ 821,000
Travel & Per Diem			75,000
Spare Parts & Supplies			200,000
Utilities			75,000
Telemetering Costs			75,000
Equipment Depreciation (10%/year)			400,000
TOTAL ANNUAL COSTS			$1,646,000

*Does not include laboratory services

AIR QUALITY SURVEILLANCE SYSTEM

Major Annual Operating Costs
FY - 1975

Item	Quantity	Average Unit Cost	Total Costs
Personnel*			
Administrative	1	$15,000	$ 15,000
Engineers	2	13,000	26,000
Env. Health Spec.	16	10,000	160,000
Engineer Technicians			
Regional Assignees	70**	9,000	630,000
Central Shop	13	9,000	127,000
Total Personnel Cost			$ 958,000
Travel & Per Diem			$ 100,000
Spare Parts & Supplies			250,000
Utilities (Elec. & Telephone)			100,000
Telemetering Costs			100,000
Equipment Depreciation (10%/year)			500,000
TOTAL ANNUAL COSTS			$2,048,000

* Does not include laboratory services
** Will increase to 79 in FY-76