



## Air Quality Division November 1992 Monthly Report

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### STATE ACTIVITIES

Grand Canyon Visibility Transport Commission (GCVTC): Committee meetings of the GCVTC were held November 18-20, 1992, in Scottsdale, Arizona, to further the efforts of addressing regional haze which affects visibility in the Golden Circle of parks and wildernesses of the Colorado Plateau. Reports and draft work products were presented on several initial subcommittee tasks and new assignments made to continue the work of the Commission.

The State of Wyoming requested membership on the Commission and it is expected that the current members will support including Wyoming on the GCVTC; a Commission vote and recommendation to the EPA Administrator will be forthcoming. With this addition, the Commission would consist of eight State representatives - Arizona, New Mexico, Colorado, Utah, Wyoming, Nevada, California, and Oregon - along with representatives from EPA, NPS, BLM, USFS, and FWS. All representatives from the Federal Government are non-voting members.

Considerable time at the meeting was devoted to the proposal by WEST Associates and the Electric Power Research Institute (EPRI) to conduct a significant portion of the Commission's work plan tasks. Since the last meeting of the GCVTC committees in September, a management structure to deal with the EPRI proposal was developed and policies and mechanisms formulated to consider any outside parties' offers for providing information related to accomplishment

of the Commission's work. However, due to the vested interests of the electric utility industry (as represented by WEST and EPRI) and the large scale effort they have proposed, there is a credibility issue facing the Commission which has the potential to taint its work as a whole if not dealt with properly. Several actions are underway to effectively handle this situation.

Involvement in the GCVTC by the NPS is likely to be considerable throughout the course of the next 3 years. Staff of the AQD and field units may be requested to help where their expertise and contributions to the Commission's work plan and activities may prove beneficial to the outcome of the process. The next meeting of the GCVTC committees, including the first meeting of the Public Advisory Committee, is scheduled to be held in San Diego from January 12-15, 1992. At that time, EPA will brief the membership on the potential effects of the 1990 Clean Air Act Amendments on visibility, and a presentation by the National Academy of Sciences is expected regarding the state of visibility science and its implications for the formulation of regional haze policy. (Brian Mitchell)

Virginia Rulemakings: Several proposals for rule development announced by the Virginia Department of Air Pollution Control (VDAPC) were reviewed and commented on by the NPS. These included: (1) provisions pertaining to the State's operating permits program; (2) a program to assess permit fees for stationary sources; and (3) proposed amendments to the State's PSD program. The Air Quality Division (AQD), working with

Julie Thomas - Resource Manager at Shenandoah NP, drafted separate responses to each of the State's proposals for the Superintendent's signature. NPS comments placed emphasis on the need for regulations which provide an appropriate level of involvement for affected Federal Land Managers (FLMs) in the permitting processes and recommended technical and substantive revisions, which would help assure the protection of air quality and related values of Class I areas. (Mitchell)

### **OUTREACH ACTIVITIES**

FY 1993 Air Quality Exhibit Budget: The budget for FY 1993 air quality exhibits design and fabrication is being drafted. Although most of the FY 1993 budget will be used for uncompleted FY 1992 projects, Regional Air Quality Coordinators should still contact Dee Morse if any new projects have been identified for FY 1993.

Air Quality Wayside Exhibit Plan for Sleeping Bear Dunes NL: The AQD received a layout plan for a proposed air quality exhibit at the Lake Michigan Overlook at Sleeping Bear Dunes National Lakeshore. The exhibit will inform visitors about air quality monitoring activities and issues at the lakeshore. The AQD reviewed the proposed plan and provided comments and modifications on the text through the regional air quality coordinator.

13th Annual Meeting, Society of Environmental Toxicology and Chemistry (SETAC): Staff from the AQD participated in this year's meeting. SETAC is an international organization consisting of representatives from Federal and State agencies, industry, academia, and private consulting firms who work in the field of environmental contaminants. The annual meeting includes paper and poster sessions in which current research is discussed, along with exhibitors that specialize in environmental contaminants testing. Staff attended sessions on topics including plant

toxicology, aquatic toxicology, regional contaminants issues, and individual, community-level, and ecosystem responses to contaminants. Presented papers included research on aquatic metal toxicity at Indiana Dunes National Lakeshore, and a discussion of non-point sources of water pollution in a number of NPS units. There was also a session dedicated to the Mercury Initiative being planned for the Everglades NP ecosystem. This research effort will include representatives from the NPS, U.S. Fish and Wildlife Service, Florida State agencies, and the utility industry, and will involve mercury modeling and soil, water, and biotic sampling. (Maniero, Porter)

### **PERMIT REVIEW AND TECHNICAL SUPPORT**

During November the Policy, Planning, and Permit Review Branch reviewed permit applications for the new air pollution sources listed in Table 1 which are proposed near NPS/FWS areas. Please contact the staff person identified for more specific information regarding these projects.

Great Smoky Mountains National Park (GRSM): The State of South Carolina held a pre-application meeting to discuss the BMW automobile assembly plant proposed near Spartanburg, approximately 115 km SE of GRSM. Representatives from the NPS (AQD, SERO, GRSM), Forest Service, Environmental Protection Agency, State, and BMW attended the meeting. The proposed facility would be a major emitter of VOCs and a significant emitter of NO<sub>x</sub> and PM. Given the existing adverse impacts at GRSM, we are very concerned about the effects of additional pollution in the area. Both the NPS and Forest Service discussed these concerns, and again recommended that the State require new sources to obtain emission offsets. However, neither the State nor BMW was receptive to this idea. It appears that the State will be under extreme pressure to expedite the processing of the BMW

application. The AQD just recently received the permit application, and will be evaluating the potential impacts at GRSM. (Bunyak)

## **GASEOUS POLLUTANT MONITORING**

Annual Data Summary Reports: 1991 annual gaseous pollutant summary reports have been prepared for Pinnacles National Monument and Big Bend National Park. Final ozone, sulfur dioxide and/or meteorological data are included, as well as graphs and summaries of the data. These reports were sent to the parks and the respective Regional Air Quality Coordinators.

Calibration and Maintenance Visits: Tables 2 and 3 list the semi-annual calibration and maintenance visits conducted during November 1992 and those to be performed December through March 1993. Visits will be scheduled with the site operators by the visitor. Site operators, Park Superintendents and Regional Air Quality Coordinators will be given a 2-week written notice of the site visit. (Ron Lawler Heavner)

Quality Assurance Audits: Table 4 is a tentative schedule of system and performance audits by Ogden Environmental and Energy Services through December 1992. These are tentative dates, parks should refer to written notification by Ogden Environmental for actual dates. Parks should receive written notification from Ogden Environmental at a minimum of 2 weeks prior to the visit. Ogden Environmental will not audit sites at Shenandoah National Park, Great Smoky Mountains National Park, Mammoth Cave National Park, and Everglades National Park during 1992. These parks will be part of the Ogden Environmental audit schedule starting in 1993. (Bob Carson)

NAAQS Exceedances: The raw data for November 1992, indicated that Hawaii Volcanoes National Park may have exceeded the 3-hour secondary National Ambient Air Quality Standard (NAAQS) for sulfur dioxide (0.5 ppm) during the month. Hawaii

Volcanoes National Park recorded 1 day above the 3-hour secondary NAAQS with an average concentration of 0.731 ppm on November 4, 1992, between hours 0600-0800. The maximum concentration recorded during the 3 hour period was 0.872 ppm at 0700 hours. All other National Park Service areas with monitoring sites were below the ozone and sulfur dioxide NAAQS during November. (Bob Carson)

Changes to Gaseous Pollutant Network: During the month of November gaseous pollutant monitoring at Point Reyes NS was discontinued and a new station added at Mt. Rainier NP. The station at MORA is located at Tahoma Woods, site of the current IMPROVE sampler and will serve as a trends site.

Revised Monitoring Table: Attached to this monthly report is a revised version of the Air Quality Division's monitoring table, which identifies the type of gaseous pollutant, fine particle, visibility, meteorological and wet deposition monitoring conducted in NPS units. This version incorporates the recent changes made to the gaseous pollutant monitoring network.

## **BIOLOGICAL EFFECTS PROGRAM**

Division Seminar on the ForestHealth Expert System: Bruce Nash presented an overview of ForestHealth, a computerized expert advisory system, developed under the direction of Bruce, Dr. Michael Saunders (Penn State University), and Mr. Bruce Miller (Penn State). The expert system contains three major modules, a diagnostic module and two training modules. The Diagnostic Module has a graphical user interface to provide technical assistance for identifying foliar injury on several hardwood species. The Foliar Injury Assessment Module trains users to categorize the amount of injury on leaves by displaying individual "injured" leaves for evaluation. This system was used in 1992 to train field crews evaluating ozone injury in Great Smoky Mountains and Shenandoah National Parks.

The Crown Injury Assessment Module generates three-dimensional trees which may be "injured", viewed from different sides, and then rated for degree of crown injury. Funding for this system has been provided by the USDA Forest Service, Penn State University, and the AQD. (Nash)

"Trend Plot" Review: Twenty-one representatives from the National Park Service, USDA-Forest Service, and three universities met at the George Wright Society meetings to review the objectives, procedures, and accomplishments of the "Hardwood Trend Plot Program." This meeting was the first step in the process to refine the goals and field techniques used in this program. Participants discussed sample design, tree selection, foliage collection and evaluation, potential use of passive ozone monitors, sources of variability in foliar response, and quality assurance concerns. Rigorous statistical analysis will be applied to the existing "Trend Plot" data sets to formulate an efficient and valid study plan for 1993 field testing at Acadia, Great Smoky Mountains, and Shenandoah National Parks. (Nash, Tonnessen, Malkin)

Air Quality Division Represented at the George Wright Society Meetings: The Seventh Conference on Research and Resource Management in Parks and on Public Lands was held in Jacksonville, Florida, from November 16-20, 1992. The meetings were attended by about 500 NPS resource managers and scientists, joined by representatives from other resource management agencies (BLM, USFWS, USFS). The theme of the meeting, "Partners in Stewardship" was carried out in a series of plenary sessions, concurrent technical sessions, and poster presentations that included topics in natural and cultural resource protection. On Tuesday, November 17, members of the Biological Effects Program, AQD, presented a session titled "Ecological Effects of Air pollution." Kathy Tonnessen and Bruce Nash organized the session and lead the discussion following the presentations based on

work at Great Smoky Mountains, Shenandoah, Acadia, Yosemite, Sequoia-Kings Canyon National Parks, and parks and refuges in Alaska. Most of these talks were given by contractors working on AQD projects. Another four air pollution effects papers were presented during the poster session.

Biological Effects Program Progress Reviewed at Air Quality Coordinators Meeting: At the annual meeting of the Regional Air Quality Coordinators, Bruce Nash reviewed the progress made by the Biological Effects Program (BEP) in FY 1992. During this fiscal year the BEP: published the Desert Workshop Report; provided technical support to other branches of the Air Quality Division, NPS regions, and other government agencies (EPA, USDA Forest Service, WESTAR, and U.S. Fish and Wildlife Service); sponsored research programs at Acadia (ACAD), Great Smoky Mountains (GRSM), and Shenandoah National Parks (SHEN); funded biomonitoring gardens at Joshua Tree and Saguaro National Monuments (SAGU); funded development of a computerized training/quality assurance system (for evaluating ozone injury to hardwood foliage); participated in joint USDA-Forest Service/NPS activities (Project FOREST, Lichen Workshop); and funded a research review at SAGU. Bruce also outlined the program's plans for FY 1993. The BEP plans to: review and test field survey protocols for evaluating ozone injury to hardwood foliage; continue development of the computerized training/quality assurance system; organize an air quality session at the George Wright Society Meeting; sponsor data analysis for work completed at ACAD, SHEN, and GRSM; fund the final year of fumigation studies at ACAD; fund an investigation on the significance of needle fungi on symptomatic white pines in ACAD; participate in Project FOREST; conduct regional "research reviews"; fund episodic acidification studies; and complete the proceedings from the Lichen Workshop and develop a standard work plan for lichen investigations.

AQD Research Branch Participates in WRD's Water Resource Coordinators' Meeting: Randy Ferrin attended the Water Resource Coordinators Meeting on November 4, 1992, as a representative of the AQD. Dan Kimball, acting WRD Chief, opened the meeting with an introduction to the project funding and selection process. The regional office representatives presented project proposals in three areas: water quality, wetlands, and other water resource projects. Projects selected will be announced by the end of November, with project work plans due March 1993. Since the Biological Effects Program of the AQD has begun funding research and monitoring projects to investigate the impacts of air pollution and deposition on surface waters, we are making an effort to coordinate our field activities with those of other programs within the National Park Service and other Agencies. (Ferrin)

Division Holds Strategic Planning Session: On Monday, November 30, 1992, staff of the Air Quality Division from Denver, Fort Collins, and Washington, D.C. assembled at the Jefferson County Conference Center to discuss plans and strategies. We were brought up-to-date on the status of new responsibilities relative to the Grand Canyon Visibility Transport Commission, the Southern Appalachian Mountain Initiative, information needs for the new Administration, and the AQRV identification process. At the close of a full day of discussion the Biological Effects Program agreed to undertake some new initiatives: (1) preparation of a prototype list of sensitive species in parks using Bioleff and NPFLORA, (2) investigation of opportunities for collaborating with the USFS in the southeast region to develop an AQRV document, and (3) institution of regular coordination meetings with staff of MDAB and PPPRB.

Research Branch Staff Represented at the American Water Resources Association (AWRA) Meeting, Reno, Nevada: On November 3-5, 1992, Kathy Tonnessen

participated in the annual meetings of the AWRA. This conference, "Managing Water Resources During Global Change," was chaired by Ray Herrmann of the NPS-WRD, and was well-attended by NPS researchers and contractors. Kathy presented a paper at a special symposium chaired by Pete Comanor (NPS-Global Change) on "The Role of Park and Equivalent Reserves in Assessing the Hydrologic Cycle." She presented a paper, also published in the Proceedings volume, titled: "Acid Deposition and Global Change Research in Sequoia National Park: A Case Study of Interagency Cooperation." Kathy also chaired a session on the final day of the conference on "Studies of Ecosystems Response to Climate Change." At this session, as with many of the others held during the week, there was considerable student participation. (Tonnessen)

NASA Reviews Progress of the Earth-Observing System Study of Alpine Hydrology: On November 12-13, 1992, Kathy Tonnessen travelled to the University of California, Santa Barbara for a site review of the 10-year interdisciplinary investigation of the hydrology and hydrochemistry of seasonally snow-covered areas, sponsored by NASA. At this meeting each of the co-investigators on the project presented information on (1) the progress of setting up field sites in the Sierra Nevada, the Rockies, and the Tien Shan in China and Kazakstan, and (2) the development of hydrochemical, snowmelt, and image processing models to interpret spectral data and field data collected as part of this project. There was considerable discussion on the direction the program should take with respect to data base development for the large physical and chemical data sets being collected over the 10-year span of the project. The ultimate objective of this EOS investigation is to allow us to make use of satellite data that will be collected by instruments on a series of EOS platforms planned for launch in the late 1990s. (Tonnessen)

TABLE 1

<u>PROJECT</u>	<u>LOCATION</u>	<u>MAJOR COMMENTS</u>	<u>CONTACT</u>
Cyprus Northshore Mining (replacing old furnaces)	150 km SE of VOYA	Major increase in NO <sub>x</sub> and SO <sub>2</sub> emissions; discussed the need to assess potential impacts on park air quality related values.	Rolofson
Marvin Windows (window manufacturing facility)	160 km NW of VOYA	Significant increase in NO <sub>x</sub> and VOC emissions; considering distance to park, no significant impacts expected.	Rolofson
Polk Power Partners (120 MW cogeneration facility)	120 km SE of Chassahowitzka NWR	Major NO <sub>x</sub> and SO <sub>2</sub> emitter; no significant impacts expected to air quality related values, but possible "significant" contribution to SO <sub>2</sub> Class I increment exceedance.	Notar
Frontier Refining (refinery modification)	88 km NE of ROMO	Major SO <sub>2</sub> increase; State did not provide us adequate notification; reminded State of notification requirements and discussed overall air quality concerns at the park.	Maniero

TABLE 2

<u>SITE LOCATION</u>	<u>VISITED BY</u>	<u>DATE</u>
Mount Rainier NP**	Mark Tigges and Mike Bagby (ARS)	November 3-7
Olympic NP	Mark Tigges and Mike Bagby (ARS)	November 8-9
Point Reyes NS*	John Faust (ARS)	November 15
Craters of the Moon NM	Ron Lawler Heavner (AQD)	November 16
Saguaro NM	Mike Tigges (ARS)	November 17-20

\* Gaseous pollutant monitoring equipment was removed

\*\* Gaseous pollutant monitoring equipment was installed

**TABLE 3**

<u>SITE LOCATION</u>	<u>TO BE VISITED BY</u>	<u>DATE</u>
<b>December Site Visits</b>		
Voyageurs NP	Mitch Walker (ARS)	December 2-4
Joshua Tree NM	Mitch Walker (ARS)	December 3-5
Pinnacles NP	Mark Tigges (ARS)	December 7-9
Mammoth Cave NP	Mark Tigges (ARS)	December 14-17
<b>January Site Visits</b>		
Grand Canyon NP	Mark Tigges (ARS)	January 6-8
Yosemite NP	Mitch Walker (ARS)	January 11-15
Mount Rainier NP	Robert Lehman (ARS)	January 18-20
Canyonlands NP	Mike Bagby (ARS)	January 18-21
Olympic NP	Robert Lehman (ARS)	January 21-22
Everglades NP	John Faust (ARS)	January 25-29
<b>February Site Visits</b>		
Lassen Volcanic NP	Mark Tigges (ARS)	February 1-4
Shenandoah NP	Mitch Walker (ARS)	February 8-12
Hawaii Volcanoes NP	John Faust (ARS)	February 20-24
Haleakala NP	John Faust (ARS)	February 25-27
<b>March Site Visits</b>		
Mesa Verde NP	Mike Bagby (ARS) and Bobby Carson (AQD)	March 1-5
Rocky Mountain NP	Robert Lehman (ARS)	March 16-17
Great Smoky Mts. NP	John Faust and Mitch Walker (ARS)	March 22-26

**TABLE 4**

<u>SITE LOCATION</u>	<u>DATE</u>
<b>December Performance Audits</b>	
Haleakala NP	December 1-2
Hawaii Volcanoes NP	December 3-4
Mount Rainier NP	December 8-9
Olympic NP	December 10-11

UNIT	--CAA--	T	N	C	FP	MET	SO2	O3	TSP	NO2	W	COMMENTS
ACADIA NP	I	X		X	I	X	i	X			X	NO2/ROC COLLECTED 1991 (SO2 88-91)
ARCHES NP	I			*	*	*	*	*				GPM REMOVED 7/92 (1987-92)
BADLANDS NP	I	X		X	I	*	i	*				GPM REMOVED 10/92 (1987-92)
BANDELIER NM	I	X		X	I	X	i&c	X				SO2/O3 OPERATED AT LANL BY STATE
BERING LAND BRIDGE N PRES		II			S							
BIG BEND NP	I	X		X	I	X	i	X			X	
BIG THICKET NP		II				*		*				GPM REMOVED 6/92 (1985-92)
BLACK CANYON OF THE GUNNISON NM	I			X								BLM FUNDING
BRYCE CANYON NP	I			X	I	X					X	
BUFFALO NR		II		*	*				X		X	
CANYONLANDS NP	I	X		X	I	X		X				GPM INSTALLED 8/92
CAPE COD NS		II						X			X	NO2/ROC COL. '91, STATE/NPS OPER.
CAPITOL REEF NP	I			*								
CAPULIN VOLCANO NM		II		*	*						X	
CARLSBAD CAVERNS NP	I			*	*							FP
CHACO CULTURE NHP		II		*	*							
CHANNEL ISLANDS NP		II					c	X		X		OPERATED BY VENTURA COUNTY
CHIRICAHUA NM	I	X		X	I	X	i	X				NDDN
COLORADO NM		II		*		*	*	*				GPM REMOVED 7/92 (1989-92)
CONGAREE SWAMP NM		II					c	X	X	X		OPERATED BY STATE
CRATER LAKE NP	I		X	X	I							
CRATERS OF THE MOON NM	I			X	*	X		X			X	GPM INSTALLED 9/92
CUYAHOGA VALLEY NM		II				*	c	*				GPM REMOVED 5/92 (1989-92)
DEATH VALLEY NM		II		*	*	X			X			
DENALI NP	I			X	I	X	i	X			X	
DINOSAUR NM		II		*	*	X						
EVERGLADES NP	I			*	I	X	i	X			X	(SO2 86-88)
GATES OF THE ARCTIC NP & PRES		II			S							
GLACIER NP	I	X		X	I	X	i	X			X	NDDN
GLEN CANYON NRA		II										
GRAND CANYON NP	I	X		X	I	X	i	X			X	NDDN-NPS COMPARABILITY SITE
GRAND TETON NP	I			*	*							
GREAT BASIN NM		II	X	X	I						X	
GREAT SAND DUNES NM	I			X	I	*	*	*				GPM REMOVED 10/91 (1988-91)
GREAT SMOKY MOUNTAINS NP	I		X	X	I	X		X	X		X	3 OZONE SITES (1 SEASONAL)
GUADALUPE MOUNTAINS NP	I	X		X	I	X	i	*			X	GPM REMOVED 10/92 (1987-92)
HALEAKALA NP	I			X	I	X	i	X				
HAWAII VOLCANOES NP	I			X	I	X	c	X				
INDIANA DUNES NL		II				X	c	X	X		X	
ISLE ROYALE NP	I			*	*	X	i	*			X	OZONE (1987-91)
JOSHUA TREE NM	I			*	*	X		X				
KATMAI NP & PRES		II			S							
KINGS CANYON NP	I							X				SEE SEQUOIA NP
LAKE MEAD NRA		II										
LASSEN VOLCANIC NP	I			X	I	X		X				
LAVA BEDS NM	I			*	*							
LITTLE BIGHORN BNM		II									X	
MAMMOTH CAVE NP	I		X	X	I	X		X	X			
MESA VERDE NP	I	X		X	I	X		X			X	GPM TO BE INSTALLED FY93
MOUNT RAINIER NP	I		X	X	I	X		X				GPM INSTALLED 11/92
NATIONAL MALL		II		X	I							

UNIT	--CAA--	T	N	C	FP	MET	SO2	O3	TSP	NO2	W	COMMENTS
NAVAJO NM	II			*								
NORTH CASCADES NP	I			*	*						X	
NORTHWEST ALASKA AREA	II				S							
OLYMPIC NP	I			*		X	c	X	X		X	
ORGAN PIPE CACTUS NM	II										X	
PETRIFIED FOREST NP	I	X		X	I	*	*	*				GPM REMOVED 4/92 (1987-92)
PINNACLES NM	I	X		X	I	X	i	X				
POINT REYES NS	I			X	I	*	i	*				GPM REMOVED 11/92 (1988-92)
REDWOOD NP	I			X	I	X	i	X				
ROCKY MOUNTAIN NP	I	X		X	I	X		X			X	
SAGUARO NM	I			X	I	X	i&c	X				
SANTA MONICA MOUNTAINS NRA	II							*				GPM REMOVED 4/92 (1987-92)
SEQUOIA NP	I				I	X		X	X		X	4 SITES, ONLY 1 W/MET
SHENANDOAH NP	I	X	X	X	I	X	c	X			X	NDDN-NPS COMPAR. SITE. 3-03, 2-SO2
STEAMTOWN NHS	II											SHORT-TERM SO2 & PM-10 STUDY 90/91
THEODORE ROOSEVELT NP	I			*	*	X	c	X	X		X	OPERATED BY STATE; ALSO H2S
TONTO NM	II	X		X	I							SUBSTITUTION FOR USFS IMPROVE SITE
VIRGIN ISLANDS NP	I				I							
VOYAGEURS NP	I			X	I	X	i	X				VISIBILITY FUNDED BY BOISE CASCADE
WIND CAVE NP	I			*	*							
WRANGELL/ST. ELIAS NP & PRES	II				S							
YELLOWSTONE NP	I	X		X	I	X	i	X			X	
YOSEMITE NP	I	X		X	I	X		X	X		X	4 SITES(3-NPS 1-ST) 1 MET (CO-92)
YUKON-CHARLIE RIVERS N PRES	II				S	X						
ZION NP	I			*								
TOTAL/CURRENT MONITORING	48	28	18	5	35	42	36	26	34	10	2	27
TOTAL/DISCONTINUED MONITORING			0	0	20	15	8	4	11	0	0	0

C = CAMERA  
 CAA = CLEAN AIR ACT CLASSIFICATION  
 FP = FINE PARTICLE  
 I = IMPROVE PARTICLE SAMPLER  
 (I- TO BE INSTALLED)  
 ROC = REACTIVE ORGANIC COMPOUNDS  
 \* = REMOVED DUE TO LACK OF FUNDS NEEDED TO MAINTAIN NECESSARY EQUIPMENT.

MET = METEOROLOGICAL STATION  
 N = NEPHELOMETER  
 NO2 = NITROGEN DIOXIDE  
 O3 = OZONE  
 S = STACKED FILTER UNIT  
 c = CONTINUOUS SAMPLING

SO2 = SULFUR DIOXIDE  
 T = TRANSMISSOMETER  
 TSP = TOTAL SUSPENDED PARTICULATE  
 W = PRECIPITATION CHEMISTRY  
 X+ = TO BE INSTALLED  
 i = 7-DAY INTEGRATED

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November 1992

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