

# Environmental Surveillance Report

For the  
U.S. Department of Energy

**Rocky Flats Environmental Technology Site**

**Information Exchange**

**FOURTH QUARTER 2000**



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**Colorado Department  
of Public Health  
and Environment**

This is a summary of environmental surveillance monitoring performed by the Colorado Department of Public Health and Environment during the past calendar quarter. Data for earlier periods that have not already been reported may also be included.

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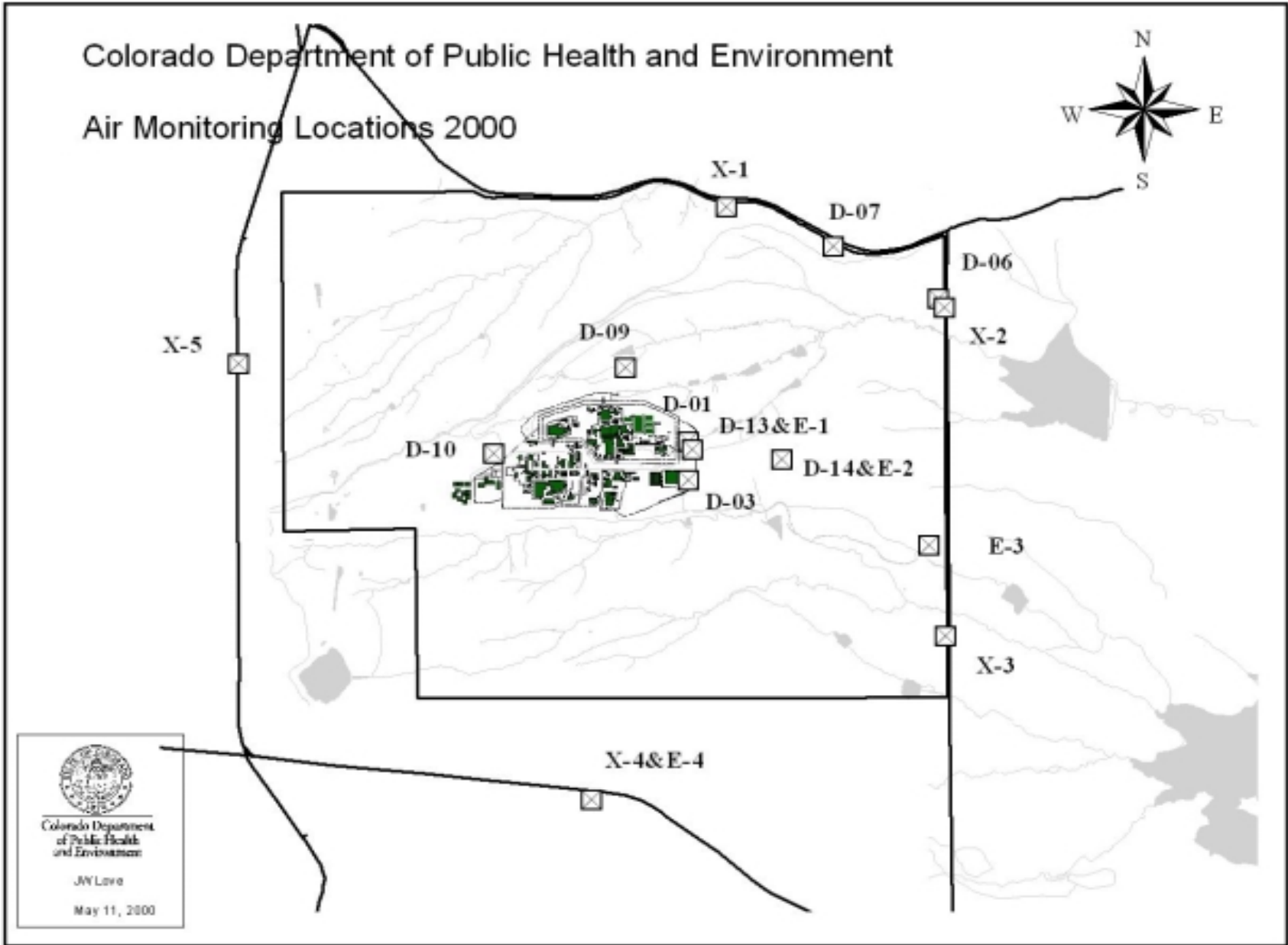
## Introduction

The purpose of this Environmental Surveillance Report (ESR) is to provide a quarterly update on Colorado Department of Public Health and Environment (CDPHE) air and surface water monitoring data at the Rocky Flats Environmental Technology Site (RFETS).

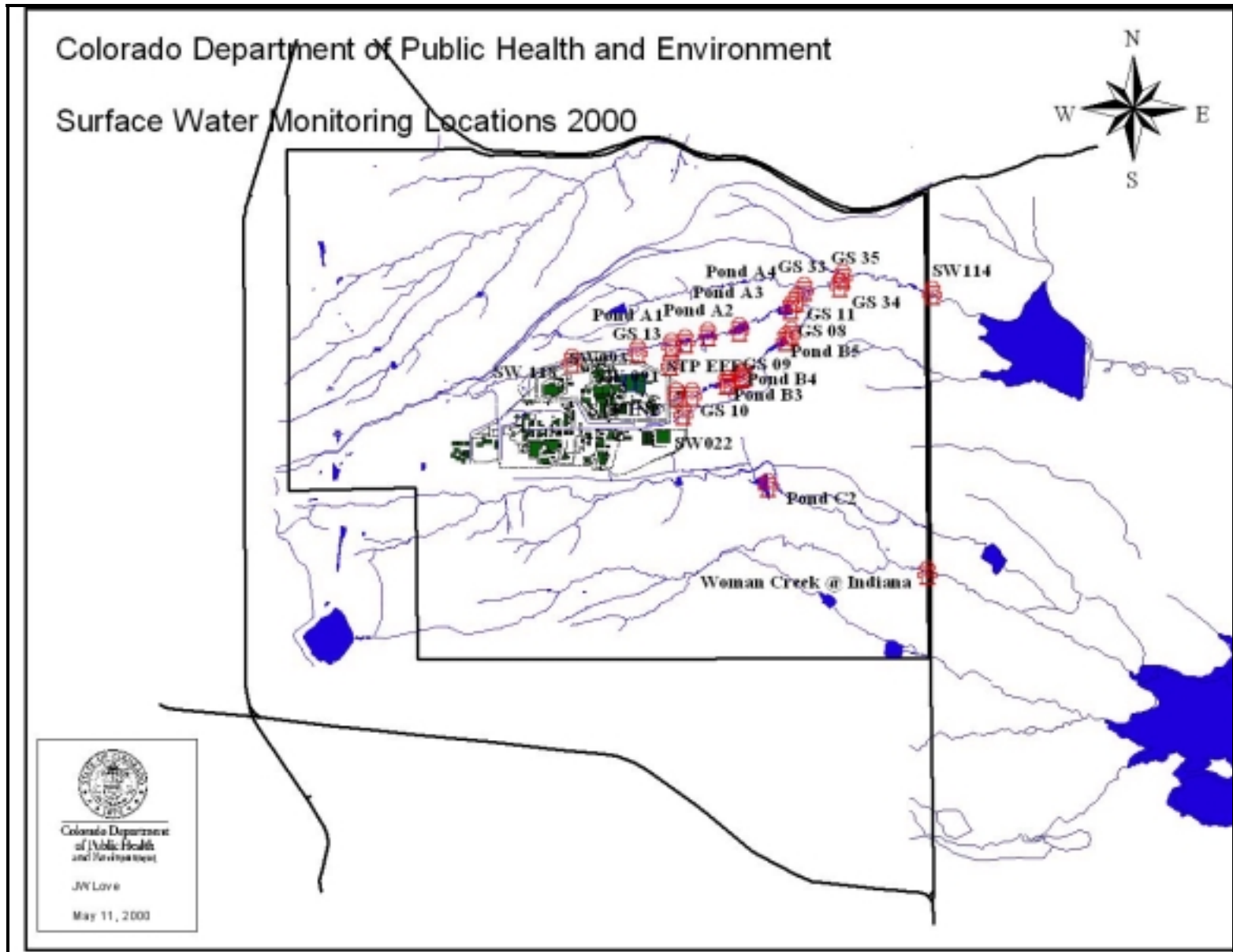
CDPHE currently has three Divisions that conduct monitoring at RFETS including the Air Pollution Control Division (APCD), the Hazardous Materials Waste Management Division, and the Laboratory and Radiation Services Division (LARS). APCD monitors air for contaminants such as particulates, oxides of nitrogen, ozone, volatile organic compounds (VOCs), radionuclides and beryllium. The Hazardous Materials Waste Management Division conducts surface water monitoring for many parameters, including metals, inorganics and radionuclides. The Radiation Control Division performs radiological monitoring in air and precipitation.

Under normal conditions, groundwater and soils are not monitored by Colorado Department of Public Health and Environment (CDPHE), but are monitored by DOE.

Sampling and data analysis is performed by CDPHE according to the Rocky Flats Integrated Monitoring Plan (IMP), which describes not only the monitoring done by CDPHE, but also that done by the Site and surrounding communities. It is possible that CDPHE may do some additional sampling as part of a special study or for some unusual circumstances. This report describes the results of both types of CDPHE monitoring.



2000 Air Monitoring Stations



2000 Water Monitoring Stations

## Decision Rules

The data acquired for each quarter is examined using standard methods of evaluation that are described in the Integrated Monitoring Plan (IMP). The methods use a series of decision rules to effectively analyze the data that has been collected, and make determinations about what actions need to be taken. Decision rules are if-then statements pertaining to data quality objectives. The decision rules define, quantitatively and qualitatively, the point at which a decision should be made or action should be taken.

The decisions could involve many different actions including, but not limited to, further analysis of data, implementation of new monitoring stations for source detection, management decisions, or evaluation of remediation alternatives. Any exceedence of an action level for a surface water or air contaminant during the quarter are summarized in this report, along with any actions taken or follow up investigations that are required.

The primary decision rules that pertain to each media are outlined below:

### **A. Air Monitoring**

1. **Ambient Air Quality Monitoring**: Nitrogen Dioxide (NO<sub>2</sub>), Ozone (O<sub>3</sub>) and particulate monitoring is performed by APCD. Particulate monitoring includes monitoring of both fine particulates (PM<sub>10</sub>) and total suspended solids (TSP).

IF: A perimeter monitor detects an NO<sub>2</sub> (annual arithmetic mean) concentration of 0.053 parts per million (ppm), an O<sub>3</sub> (1 hr av. time) concentration of 0.12 ppm, a TSP measurement of 75 µg/m<sup>3</sup> averaged over a 1 year time period or 150 µg/m<sup>3</sup> over a 24-hour time period, or a PM<sub>10</sub> concentration of 50 µg/m<sup>3</sup> annually or 150 µg/m<sup>3</sup> in a 24-hour period (Include these values in a table in the report, too confusing this way)

THEN: The Site's operating permit may potentially be revised to mitigate the exceedence.

2. **Beryllium (Be) Monitoring**: Emission points (stacks) are monitored for Be.

IF: Be emissions from a source exceed 10 g in a 24-hour period

THEN: CDPHE may take enforcement action.



IF: Ambient Be concentrations at monitoring sites exceed 0.01 µg/m<sup>3</sup> over a 30-day Period  
THEN: CDPHE may take action to identify the source.

3. Volatile Organic Compound (VOCs) Monitoring: Various VOC monitoring stations exist around the perimeter of the site and are maintained by APCD. It is possible that remediation processes could release significant levels of VOCs. VOC data does not tend to vary and the measured concentrations are generally very low. A significant increase from normal levels of any VOC at any monitoring site could indicate a potential problem.

IF: A measured value of any VOC exceeds trends in historical data  
THEN: An investigation will be enacted to determine the source of the elevated VOC concentration.

4. Radiological Ambient Air Quality Monitoring: Laboratory and Radiation Services Division (LARS) and Air Pollution Control Division (APCD) air sampling locations are monitored for radiological contaminants, PM<sub>10</sub> and total suspended particulates (TSP).

IF: Measured values of radionuclides exceed typical trends existing in historical data  
THEN: Any number of actions may be taken including, but not limited to, analysis of samples for verification, comparison of samples from nearest DOE monitoring sites, ComRad Program samplers, and/or APCD monitoring sites, request for investigation or explanation of elevated results from DOE, calculation of public dose/risk and/or a presentation to CDPHE management.

## **B. Surface Water Monitoring**

1. Source Location: Current surface water monitoring sites monitor for Analytes of Interest (AoIs) and indicator parameters for AoIs. Contaminant levels that exceed historical trends at a certain site could indicate the presence of a new contaminant source. When a new contaminant source is identified by a current monitoring location, it may be necessary to implement additional monitoring sites to identify the exact location of the new source.

IF: A new contaminant source is identified by any monitoring station  
THEN: Action should be taken to locate and quantify the source. Mitigation action will be taken pursuant to the Rocky Flats Cleanup Agreement (RFCA) Action Level Framework (ALF).

2. Wastewater Treatment Plant (WWTP) Influent Radiological Monitoring: The Site has made an effort to eliminate any possible connections between waste streams containing radionuclides and WWTP influent. Therefore, it is assumed that radiologic loads will not significantly increase from baseline values. Radiologic parameters include total plutonium, total americium, total uranium, tritium, as well as alpha and beta activity. Decontamination and decommissioning (D&D) activities could potentially introduce radiologic loads to WWTP influent. The influent is monitored to track sources of contaminants that may be introduced during the cleanup process.

IF: Influent loading for any of the radiologic parameters exceeds baseline values determined from historical data  
THEN: Evaluation will be performed to determine the source of contamination.

3. Pond Predischarge Monitoring: AoIs and some volatile organic compounds (VOCs) are monitored in the ponds previous to pond discharge so that discharge will not result in exceedence of stream standards.

IF: Predischarge monitoring shows exceedence of stream standards

THEN: CDPHE will notify the Site. At this point the Site may evaluate alternative options which avoid immediate discharge including, but not limited to, treatment, storage or disposal.

4. Precipitation Sampling: LARS is involved with sampling precipitation for gross alpha/beta, Pu-239/240, Am-241 and Tritium.

IF: Any measurement of radionuclides in precipitation exceeds the normal variation occurring in historical and baseline measurements

THEN: A series of actions may be taken including, but not limited to, reanalysis of the samples, analysis of individual ambient air filters from the same quarter, request for analysis of nearby filters from DOE, ComRad, or APCD sample sites, request for investigation, request for CDPHE and DOE modeling to determine environmental effects.

## Analytes of Interest

Analytes	Air	Water	Purpose of Monitoring	
<b>Radionuclide:</b>	Pu	X	X	High level of public concern. Known carcinogen. Known past releases (within the past 8 years) have exceeded RFCA stream standards and action levels. This provides reasonable cause to expect future releases in excess of RFCA Action Levels.
	U	X	X	Known renal toxicity. Past exceedances provide reasonable cause to expect future releases in excess of RFCA stream standards and action levels.
	Am	X	X	Known carcinogen. Known past exceedances provide reasonable cause to expect future releases in excess of RFCA stream standards and action levels.
	Tritium		X	Is an AOI due to past releases to drinking water supplies
<b>Metals:</b>	Be	X	X	Known to cause berylliosis in susceptible individuals when exposed in inhalation. May also cause contact dermatitis. Will be monitored as an indicator of releases from process and waste storage areas.
	Cr		X	Physiological and dermal toxicity. High level of regulatory concern due, in part to the chromic acid of incident of 1989. Low levels can cause significant ecological damage.
	Ag		X	Highly toxic to fish at low levels, if chronic. State of Colorado has temporarily removed its stream standard for silver, while under study. The study has been completed, and the standard will be reinstated at the next triennial review of South Platte stream standards, if not before. Used at RFETS only for photographic development. Routinely accepted by POTWs as municipal waste, but discharge is regulated. May be removed from this list later if data do not support concern.
	Cd		X	Highly toxic to fish at low levels, if chronic. Known human carcinogen (prostate cancer) and depletes physiologic calcium. Used at RFETS in plating processes. Monitoring data for the Interceptor Trench System (ITS) and the proposed discharge of untreated ITS waters into Walnut Creek provide reasonable cause to expect future releases in excess of RFCA Action Levels
	Hardness		X	Required to evaluate metals analyses, due to its effect on solubility to these metals.
<b>Particulates:</b>	Total suspended particulates	X		Monitored to provide information on total airborne particulate levels. Filters also used for metals and radionuclides analyses.

	PM <sub>10</sub> particulates	X		Monitored to provide information on fine airborne particulate levels. Filters also used for metals and radionuclides analyses.
<b>Volatile Organic Compounds:</b>	VOCs	X	X	A variety of volatile organic compounds, some of which are toxic to humans and ecology. Known discharges to air and water as well as groundwater infiltration.
<b>Real Time Monitoring of Physical and Indicator Parameters:</b> (These parameters provide real-time indication for a wide variety of regulated contaminants, and are also required component for monitoring for AoIs. They require no laboratory analysis and are the RFETS most cost effective defensive monitoring.)	pH		X	Toxicity to humans and ecology. Regulatory concern due to chromic acid incident. Real-time monitoring is an inexpensive and effective method of detecting acid spills such as (chromic acid or plutonium nitrate) or failure of treatment systems.
	Conductivity		X	Conductivity is an indicator of total dissolved solids, metals, anions, and pH. Real-time monitoring of conductivity is an inexpensive indicator of overall water quality.
	Turbidity		X	Turbidity is a general indicator of elevated contaminant levels, and may be correlated with Pu.
	NO <sub>3</sub>		X	Past releases near RFCA stream standards and action levels upstream of ponds provide reasonable cause to expect future releases in excess of RFCA stream standards and action levels. ITS discharges are often high in nitrate, and may challenge RFCA action levels.
	Flow		X	Required to detect flow events, evaluate contaminant loads and plan pond operations and discharges. Affects nearly every decision rule, and is the most commonly discussed attribute of RFETS surface waters.
	Oxides of Nitrogen	X		Monitored due to RFETS historical use of nitric acid.
	Ozone	X		Monitored as part of the CDPHE network. Not required or part of monitoring for RFETS.
	Wind speed	X		Monitored to provide emergency response modeling information.
	Wind direction	X		Monitored to provide emergency response modeling information.
	Temperature	X		Monitored to provide emergency response modeling information.

## NATIONAL AMBIENT AIR QUALITY STANDARDS

POLLUTANT	AVERAGING TIME	STANDARD
Carbon Monoxide (CO)		
Primary Standard	1 Hour <sup>(a)</sup>	35 ppm
Primary Standard	8 Hour <sup>(a)</sup>	9 ppm
Ozone (O <sub>3</sub> )		
Primary and Secondary Standards (up to 1997)	1 Hour <sup>(b)</sup>	0.12 ppm
Primary and Secondary Standards (as of July 1997)	8 Hour <sup>(c)</sup>	0.08 ppm
Nitrogen Dioxide (NO <sub>2</sub> )		
Primary and Secondary Standards	Annual Arithmetic Mean	0.053 ppm
Sulfur Dioxide (SO <sub>2</sub> )		
Primary Standard	Annual Arithmetic Mean	0.030 ppm
Primary Standard	24 Hour <sup>(a)</sup>	0.14 ppm
Secondary Standard	3 Hour <sup>(a)</sup>	0.5 ppm
Particulates (PM <sub>10</sub> )		
Primary and Secondary Standards	Annual Arithmetic Mean <sup>(d)</sup>	50 µg/m <sup>3</sup>
Primary and Secondary Standards	24 Hour <sup>(b)</sup> prior to July 1997, <sup>(e)</sup> as of July	150 µg/m <sup>3</sup>
Fine Particulates (PM <sub>2.5</sub> ) (as of July 1997)		
Primary and Secondary Standards	Annual Arithmetic Mean <sup>(d)</sup>	15.0 µg/m <sup>3</sup>
Primary and Secondary Standards	24 Hour <sup>(f)</sup>	65 µg/m <sup>3</sup>
Lead (Pb)		
Primary and Secondary Standards	Calendar Quarter Average	1.5 µg/m <sup>3</sup>
Total Suspended Particulates (TSP)		
Primary Standard	Annual Geometric Mean <sup>(g)</sup>	75 µg/m <sup>3</sup>
Primary Standard	24 Hour <sup>(g)</sup>	260 µg/m <sup>3</sup>
Secondary Standard	Annual Geometric Mean <sup>(g)</sup>	60 µg/m <sup>3</sup>
Secondary Standard	24 Hour <sup>(g)</sup>	150 µg/m <sup>3</sup>

- <sup>(a)</sup> Not to be exceeded more than once per year.
- <sup>(b)</sup> Statistically estimated number of days with concentrations above this level averaged over a three year period, is not to be more than 1 per year.
- <sup>(c)</sup> The three year average of the fourth maximum value for each year is not to exceed this level.
- <sup>(d)</sup> The average of three years of annual averages (based on quarterly averages) is not to exceed this level.
- <sup>(e)</sup> The three year average of the 99<sup>th</sup> percentile for each year is not to exceed this level.
- <sup>(f)</sup> The three year average of the 98<sup>th</sup> percentile for each year is not to exceed this level.
- <sup>(g)</sup> The TSP standard was replaced by the PM<sub>10</sub> standard on July 1, 1987. TSP is now a State standard only and was temporarily suspended from 30 August 1993 to 30 October 1995 by the AQCC.

## Colorado Water Quality Control Commission Standards for Radioactive Materials at and around RFETS

	SEGMENT 2  Standley Lake	SEGMENT 3  Great Western Reservoir	SEGMENTS 4a and 5  Woman Creek	SEGMENTS 4a, 4b and 5  Walnut Creek
Gross Alpha (pCi/L)	6	5	7	11
Gross Beta (pCi/L)	9	12	8	19
Plutonium (pCi/l)	0.03	0.03	0.15	0.15 *
Americium (pCi/l)	0.03	0.03	0.15	0.15 *
Tritium (pCi/l)	500	500	500	500
Uranium (pCi/L)	3	4	11	10
* Temporary modifications apply until December 31, 2000. The modification is a narrative standard requiring that the concentration of americium and plutonium be consistent with attaining the numerical water quality standard in Segment 4(b) of Big Dry Creek				

### Standards for Inorganics and Metals

Inorganic/Metal	SEGMENTS 4a & 4b	SEGMENT 5
	Standards (µg/L)	Action Levels (µg/L)
Ammonia	*	*
Beryllium, total recoverable	0.0040	0.0040
Cadmium, dissolved **	0.0015	0.002
Chloride	0.011	0.011
Chromium, total	50	50
Copper**	16	16
Iron, dissolved	300	300
Iron, total	1000	1000
Manganese, dissolved	50	50
Manganese, total	1000	1000
Nitrate	10000	10000
Nitrite	500	500
Phosphate, ortho	?	?
Phosphate, total	?	?
Selenium, total	10	10
Silver, dissolved**	0.59	0.59
Sulfate	250000	250000
Sulfide	20	20

\*There is no unionized ammonia standard for Segment 5 or Segment 4b. A standard of 0.1 mg/L applies to Segment 4a.

\*\*The standards for these metals were calculated using a formula based on hardness. A hardness value of 143 mg/L was used because this is the average hardness found in these waters.

### EPA Method 502.2 for VOCs in Surface Waters

VOCs	MCL (µg/L)	MDL (µg/L)	PQL (µg/L)	VOCs	MCL (µg/L)	MDL (µg/L)	PQL (µg/L)
1,1,2-Tetrachloroethane	none	0.5	1	Chloroform	none	0.5	1
1,1,1-Trichloroethane	200	0.5	1	Chloromethane	none	0.5	1
1,1,2,2-Tetrachloroethane	none	0.5	1	Dibromochloromethane	none	0.5	1
1,1,2-Trichloroethane	5	0.5	1	Dibromomethane	none	0.5	1
1,1-Dichloroethane	none	0.5	1	Dichlorodifluoromethane	none	0.5	1
1,1-Dichloroethene	7	0.5	1	Dichloromethane	5	0.5	1
1,1-Dichloropropene	none	0.5	1	Ethylbenzene	700	0.5	1
1,2,3-Trichlorobenzene	none	0.5	1	Fluorotrichloromethane	none	0.5	1
1,2,3-Trichloropropane	none	0.5	1	Hexachlorobutadiene	none	0.5	1
1,2,4-Trichlorobenzene	70	0.5	1	Isopropylbenzene	none	0.5	1
1,2,4-Trimethylbenzene	none	0.5	1	Naphthalene	none	0.5	1
1,2-Dichlorobenzene	600	0.5	1	Propylbenzene	none	0.5	1
1,2-Dichloroethane	5	0.5	1	Styrene	100	0.5	1
1,2-Dichloropropane	5	0.5	1	Tetrachloroethene	5	0.5	1
1,3,5-Trimethylbenzene	none	0.5	1	Toluene	1000	0.5	1
1,3-Dichlorobenzene	none	0.5	1	Trichloroethene	5	0.5	1
1,3-Dichloropropane	none	0.5	1	Vinyl chloride	2	0.5	1
1,4-Dichlorobenzene	75	0.5	1	Xylene, (total)	10,000	0.5	1
2,2-Dichloropropane	none	0.5	1	cis-1,2-Dichloroethene	70	0.5	1
2-Chlorotoluene	none	0.5	1	cis-1,3-Dichloropropene	none	0.5	1
4-Chlorotoluene	none	0.5	1	n-Butylbenzene	none	0.5	1
4-Isopropyltoluene	none	0.5	1	sec-Butylbenzene	none	0.5	1
Benzene	5	0.5	1	tert-Butylbenzene	none	0.5	1
Bromobenzene	none	0.5	1	trans-1,2-Dichloroethene	100	0.5	1
Chloroethane	none	0.5	1	trans-1,3-Dichloroethene	none	0.5	1

### EPA Method 515.1 for Chlorinated Acid Herbicides

Contaminant	MDL (µg/L)	PQL (µg/L)	Contaminant	MDL (µg/L)	PQL (µg/L)
Acifluorfen	0.3	3	3,5-Dichlorobenzoic acid	0.8	8
Bentazon	0.4	4	Dichlorprop	0.3	3
Cloramben	1.2	12	Dinoseb	0.6	6
2,4-D	0.3	3	4-Nitrophenol	0.8	8
Dalapon	0.7	7	Pentachlorophenol	0.6	6
2,4-DB	0.5	5	Picloram	0.5	5
DCPA	0.4	4	2,4,5-T	0.3	3
Dicamba	0.3	3	2,4,5-TP	0.3	3

**EPA Method 525.2 for SVOCs in Surface Waters**

SVOCs	MCL (µg/L)	MDL (µg/L)	PQL (µg/L)	SVOCs	MCL (µg/L)	MDL (µg/L)	PQL (µg/L)
1,2,4-Trichlorobenzene	none	5	10	Benzo(a)anthracene	none	5	10
1,2-Dichlorobenzene	none	5	10	Benzo(a)anthracene	0.2	5	10
1,3-Dichlorobenzene	none	5	10	Benzo(b)fluoranthene	none	5	10
1,4-Dichlorobenzene	none	5	10	Benzo(ghi)perylene	none	5	10
2,4,5-Trichlorophenol	none	5	10	Benzo(k)fluoranthene	none	5	10
2,4,6-Trichlorophenol	none	5	10	Butyl benzyl phthalate	none	5	10
2,4-Dichlorophenol	none	5	10	Chrysene	none	5	10
2,4-Dimethylphenol	none	5	10	Di-n-butylphthalate	none	5	10
2,4-Dinitrophenol	none	25	10	Di-n-octylphthalate	none	5	10
2,4-Dinitrotoluene	none	5	10	Dibenz(a,h)anthracene	none	5	10
2-Chloronaphthalene	none	5	10	Dibenzofuran	none	5	10
2-Methyl-4,6-dinitrophenol	none	25	50	Diethyl phthalate	none	5	10
2-Chlorophenol	none	5	10	Dimethyl phthalate	none	5	10
2-Methylnaphthalene	none	5	10	Hexachlorobutadine	none	5	10
2-Methylphenol	none	5	10	Hexachlorocyclopentadiene	50	5	10
2-Nitroaniline	none	5	10	Hexachloroethane	none	5	10
2-Nitrophenol	none	5	10	Indeno(1,2,3-cd)pyrene	none	5	10
3,3-Dichlorobenzidine	none	5	10	Isophorone	none	5	10
3-Nitroaniline	none	25	50	N-Nitosodi-n-propylamine	none	5	10
4-Bromophenylphenylether	none	5	10	N-Nitrosodiphenylamine	none	5	10
4-Chloro-3-methylphenol	none	10	20	Naphthalene	none	5	10
4-Chloroaniline	none	10	20	Nitrobenzene	none	5	10
4-Chlorophenylphenylether	none	5	10	Pentachlorophenol	1	25	10
4-Methylphenol	none	5	10	Phenanthrene	none	5	10
4-Nitroaniline	none	25	50	Phenol	none	5	10
4-Nitrophenol	none	25	50	Pyrene	none	5	10
Acenaphthene	none	5	10	bis(2-Chloroethoxy)methane	none	5	10
Acenaphthylene	none	5	10	bis(2-Chloroethyl) ether	none	5	10
Anthracene	none	5	10	bis(2-Ethylhexyl) phthalate	6	5	10



## Description of Air Sampling this Quarter

Table A contains the complete gross alpha /gross beta results for the 4<sup>th</sup> quarter 2000. Data from the 4<sup>th</sup> quarter 2000 show no obvious anomalies, compared to historical data. Table B contains incomplete plutonium and americium results for the 4<sup>th</sup> quarter 1999. This dataset should be complete in the next report. Also included are plutonium and americium results for the E-3-P sample collected during the week ending July 11<sup>th</sup>, 2000 (the week of the buffer zone fire.) This air sampler was reported to be in the plume of the fire, and should reflect the maximum exposure resulting from the fire itself. These data are presented in a special table below, "Buffer Zone Fire, Week of July 4-11, 2000."

Oxides of nitrogen and ozone data for the fourth quarter of 2000 are presented in Table D. Average oxides of nitrogen levels are slightly higher than typical historical values for the period, though still very low. Maximum hourly oxides of nitrogen levels were typical for the period. Ozone concentrations for the quarter have decreased to typical wintertime levels. Particulate concentrations for the third and fourth quarters of 2000 are presented in Table E. PM10 levels for the period are slightly higher than typical historical levels, but are still well below the Federal standards. TSP levels are also slightly higher than typical for the period.

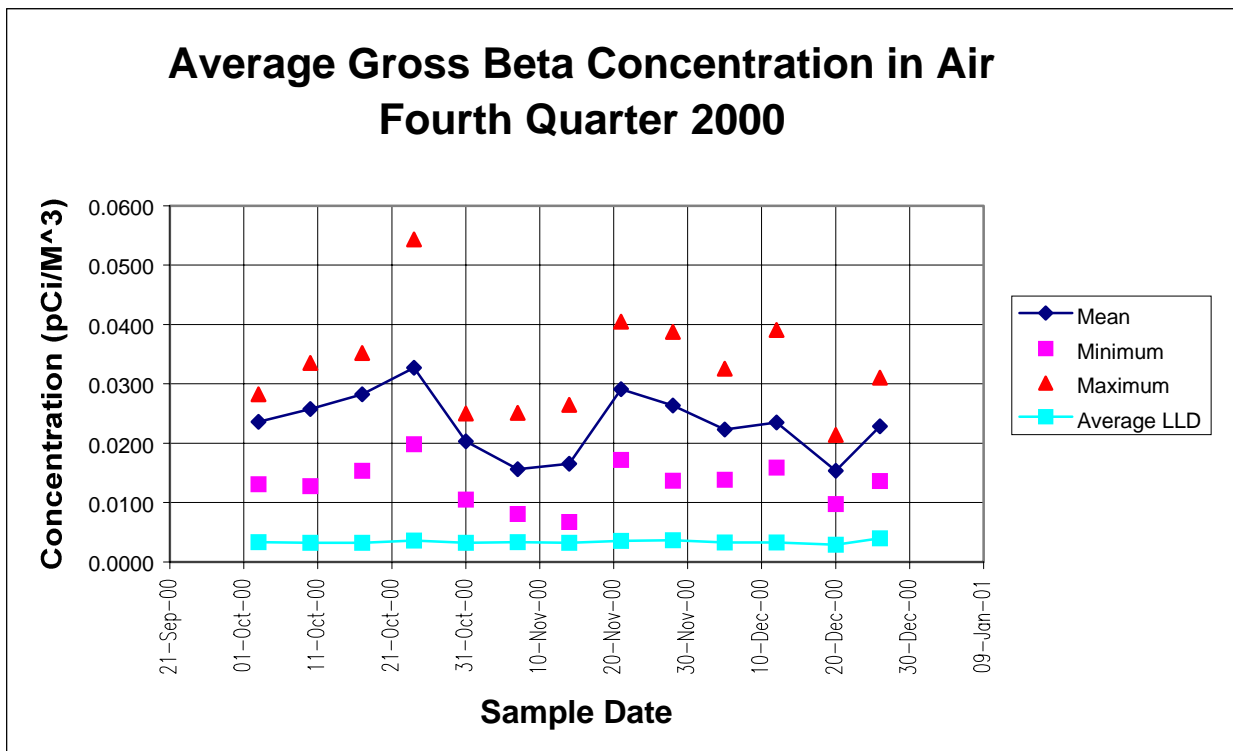
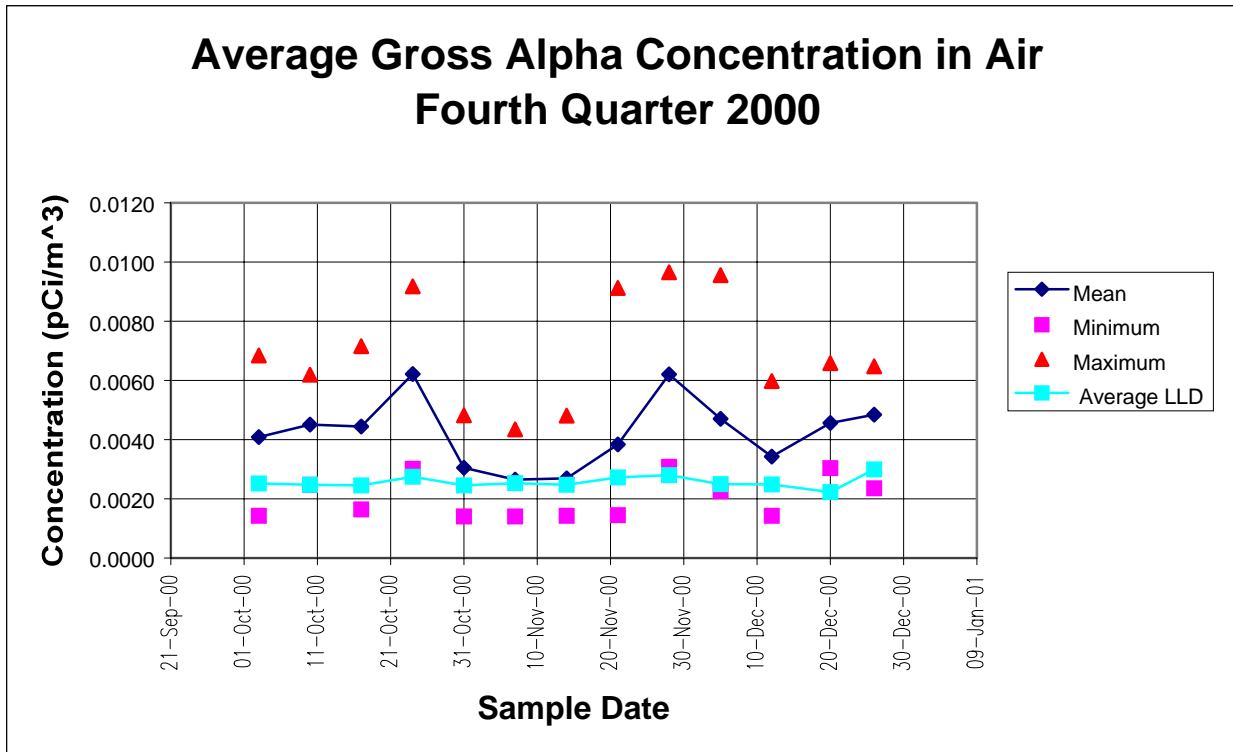
No new beryllium and uranium data (Table F) are available at this time. Volatile organic compound analyses for the third and fourth quarters of 2000 (Table G) are not yet available and will be presented in next quarter's report.

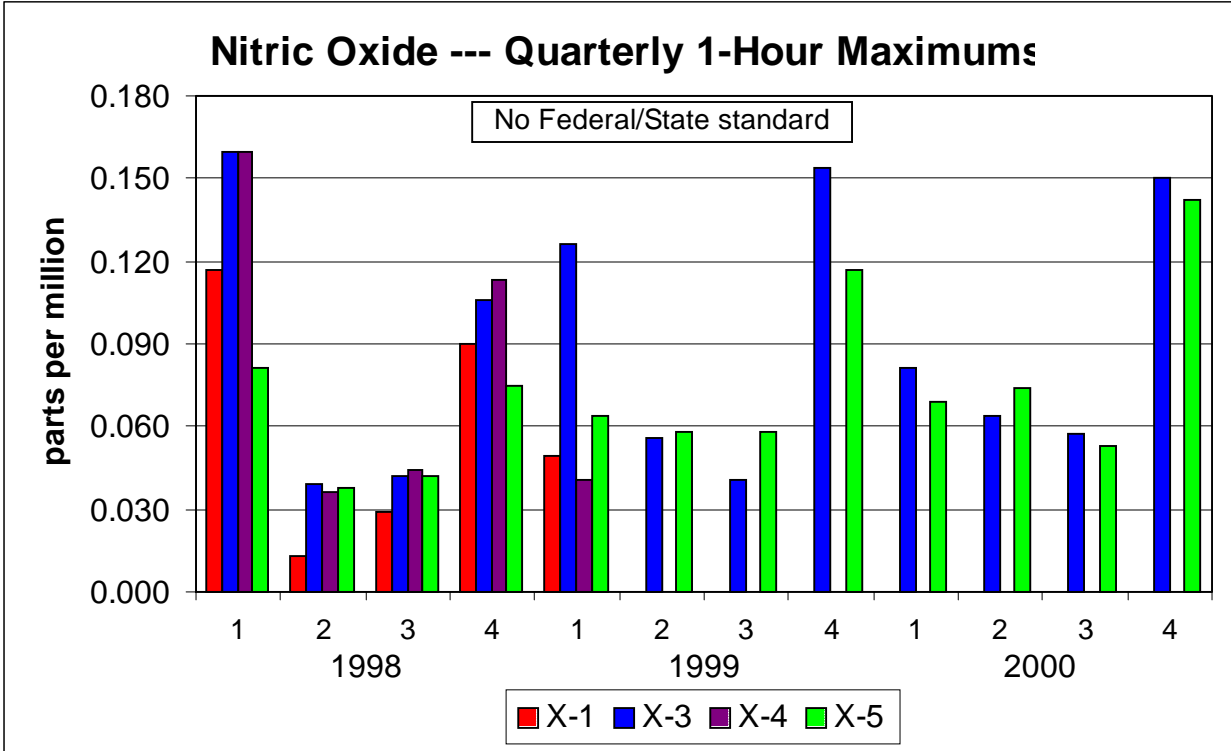
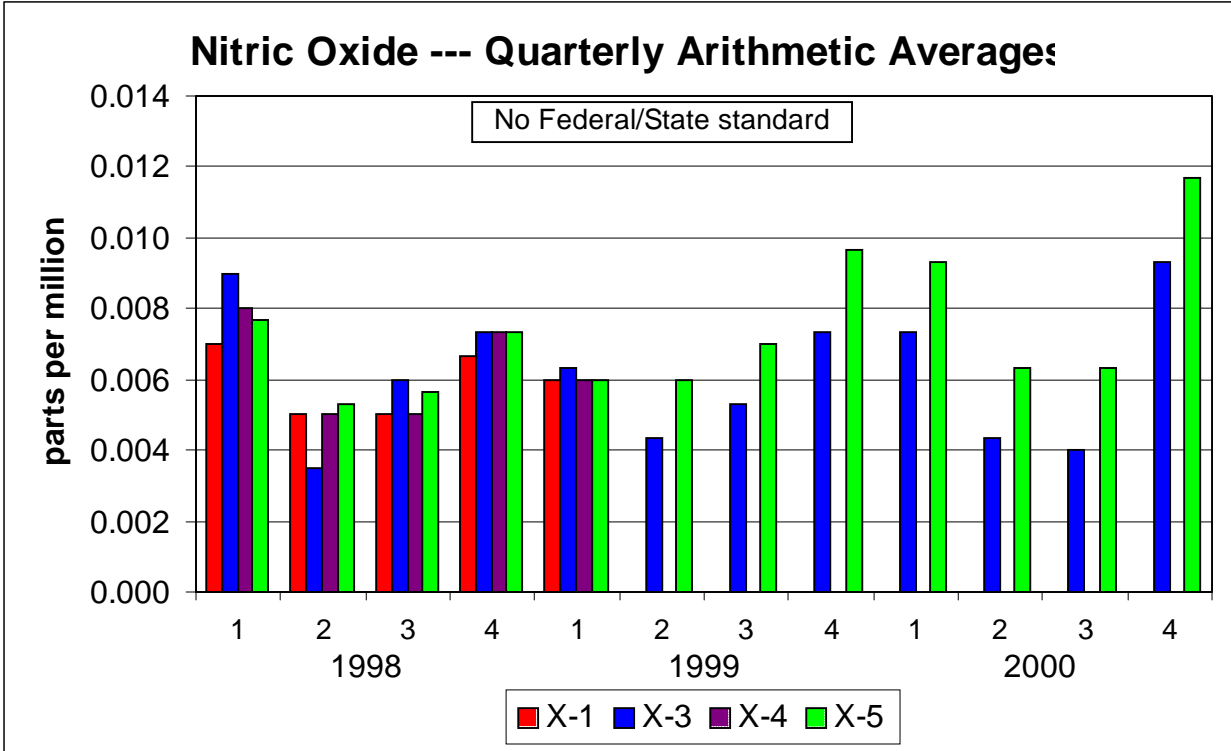
**Special Table**  
**Buffer Zone Fire, Week of July 4-11, 2000**

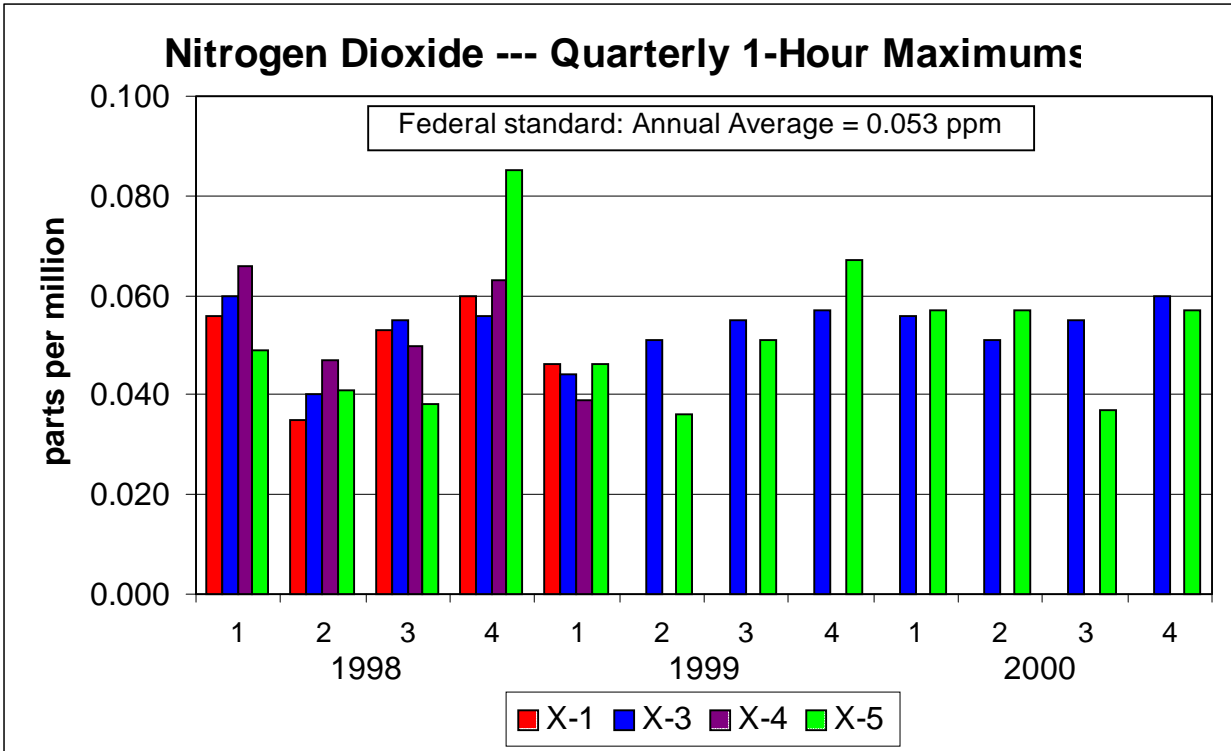
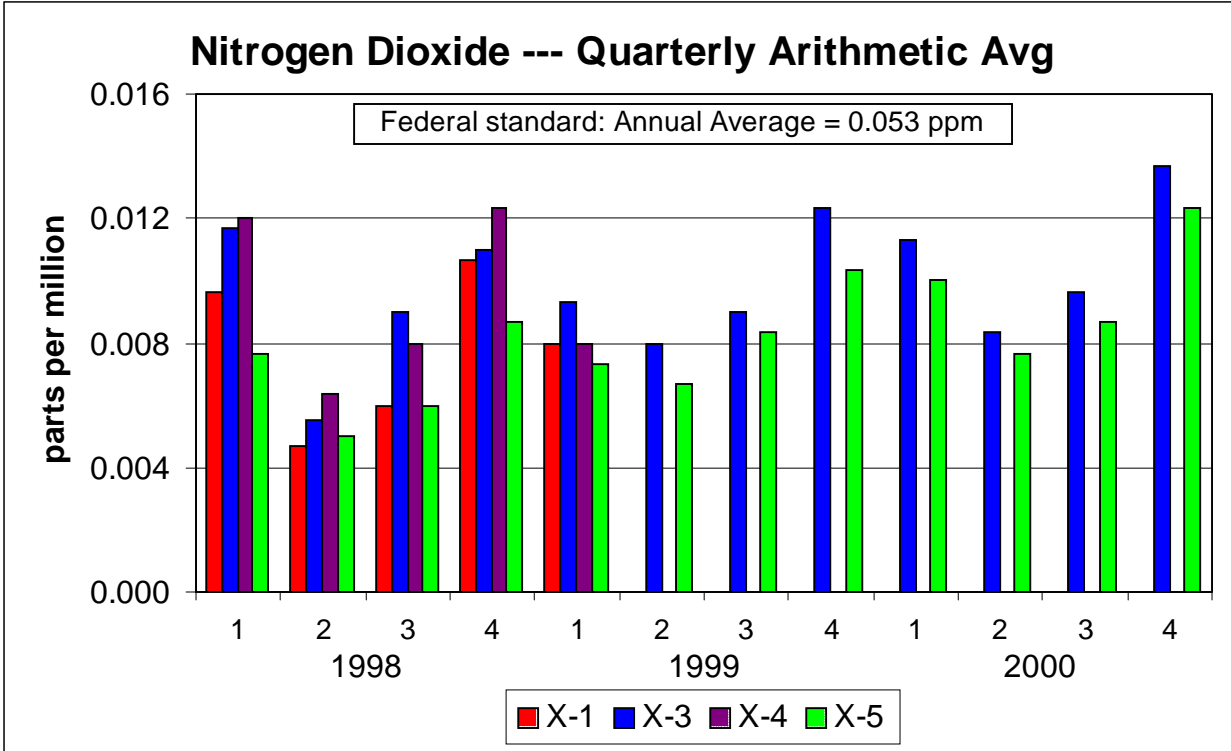
<b>Location</b>	<b>Sampler Type</b>	<b>Number of Samples</b>	<b>Gross Alpha pCi/m<sup>3</sup></b>	<b>Gross Beta pCi/m<sup>3</sup></b>
<b>Ground Level Samplers:</b>				
<i>Security area</i>				
D-1	TSP	1	< 0.0033	0.0250
D-3	TSP	1	0.0044	0.0213
<i>Buffer Zone</i>				
D-9	TSP	1	0.0028	0.0208
D-10	TSP	1	0.0039	0.0226
D-13	TSP	1	0.0037	0.0231
D-14	TSP	1	0.0027	0.0213
<i>Perimeter</i>				
D-6	TSP	1	< 0.0032	0.0276
D-7	TSP	1	< 0.0029	0.0244
<b>Elevated Samplers:</b>				
<i>Buffer Zone</i>				
E-1-T	TSP	1	0.0026	0.0215
E-2-T	TSP	1	0.0025	0.0202
E-1-P	PM10	1	< 0.0014	0.0097
E-2-P	PM10	1	0.0027	0.0146
<i>Perimeter</i>				
E-3-T	TSP	0	---	---
E-3-P	PM10	1	< 0.0014	0.0108
E-4-T	TSP	0	---	---
<b>Location</b>	<b>Sampler Type</b>	<b><sup>239-240</sup>Pu pCi/m<sup>3</sup></b>	<b><sup>241</sup>Am pCi/m<sup>3</sup></b>	
E-3-P	PM10	< 0.000015	0.000009 +/- 0.000004	

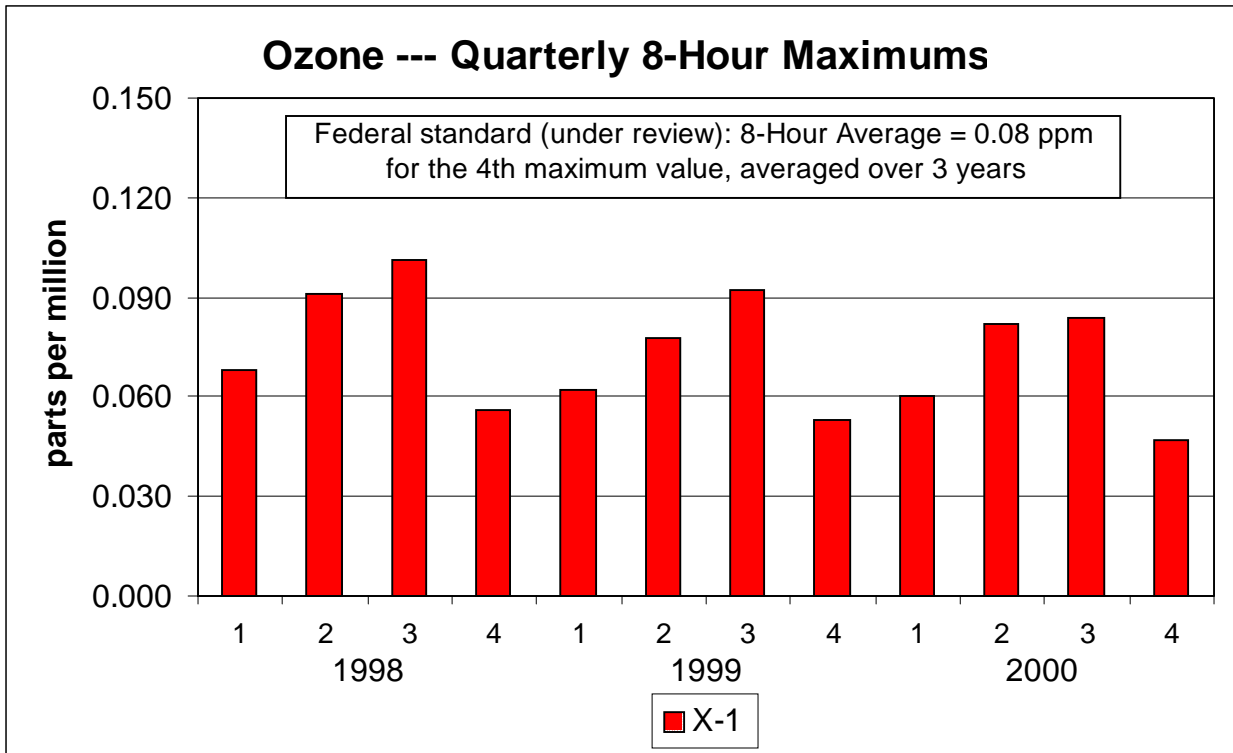
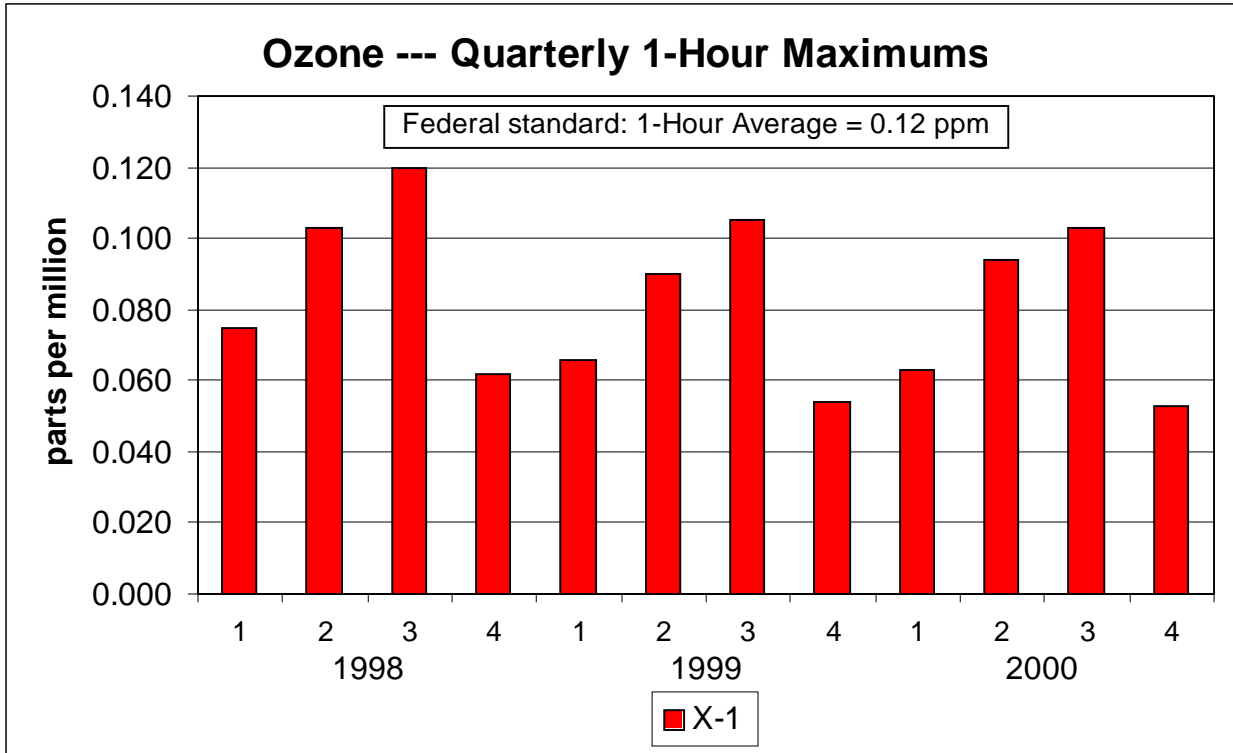
## 2. Graphical Presentation

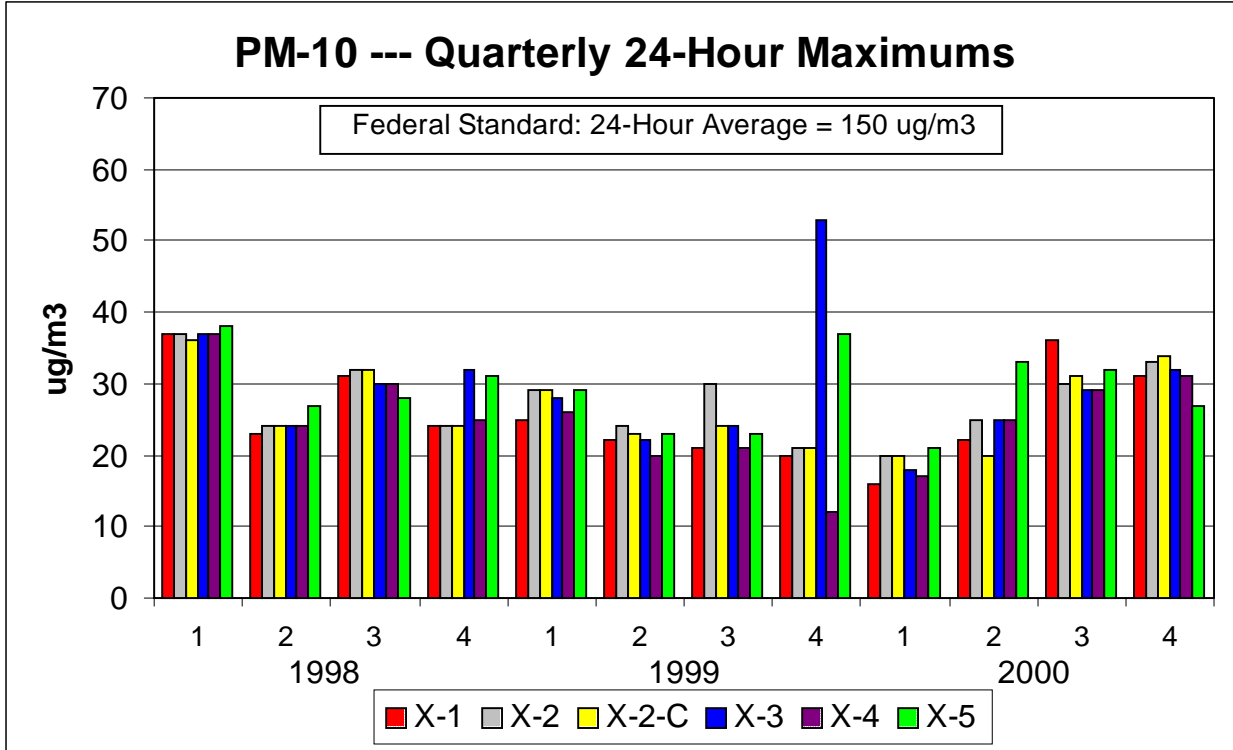
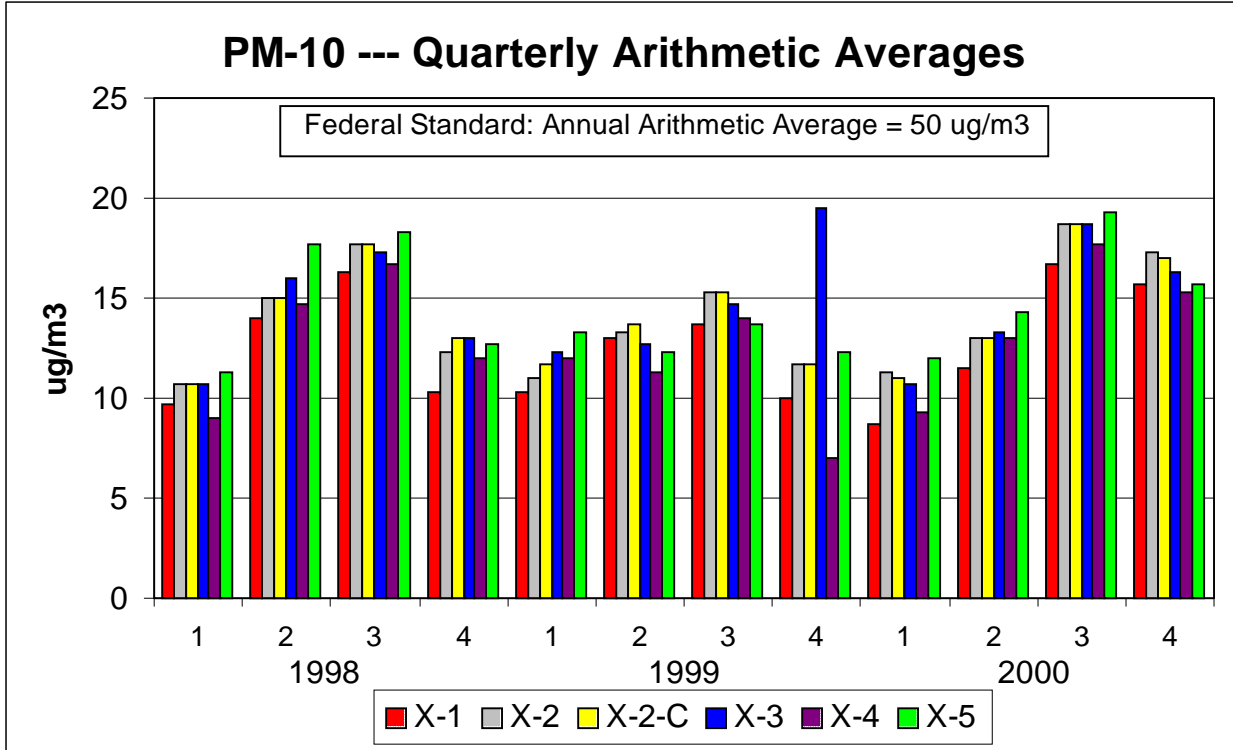
Graphs of pertinent and abnormal data from air monitoring are presented in this section.

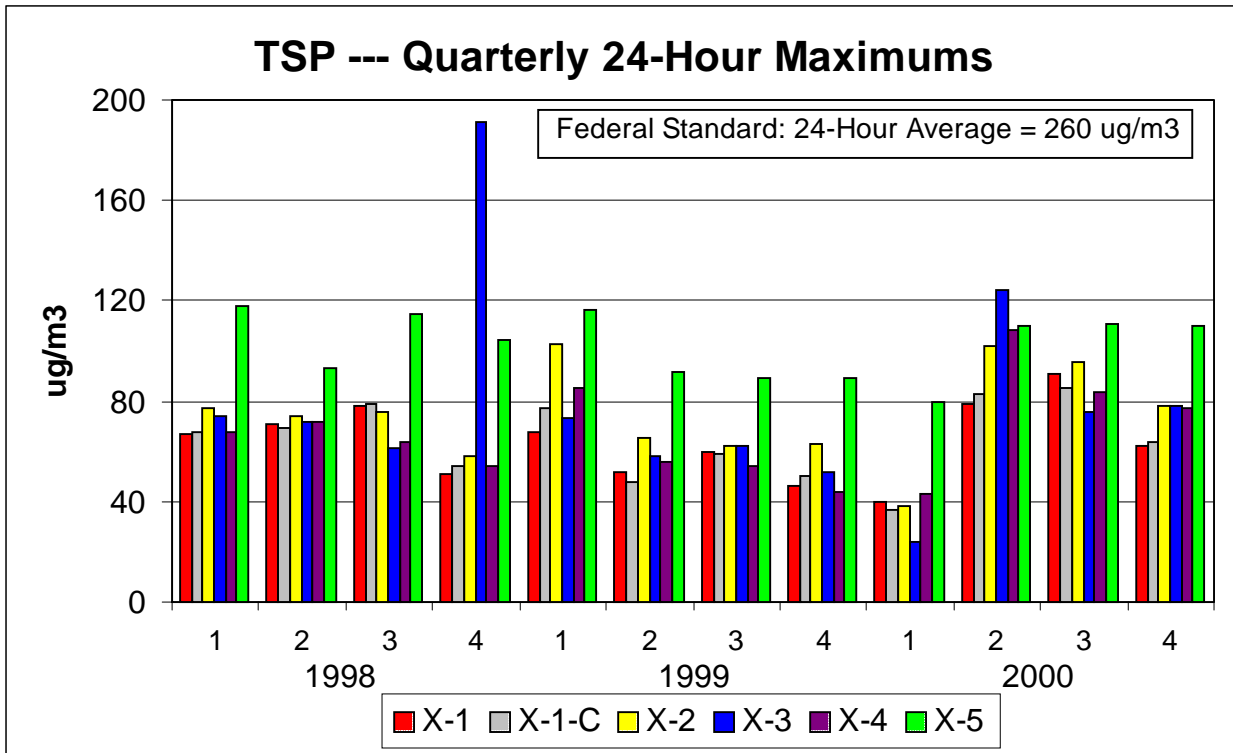
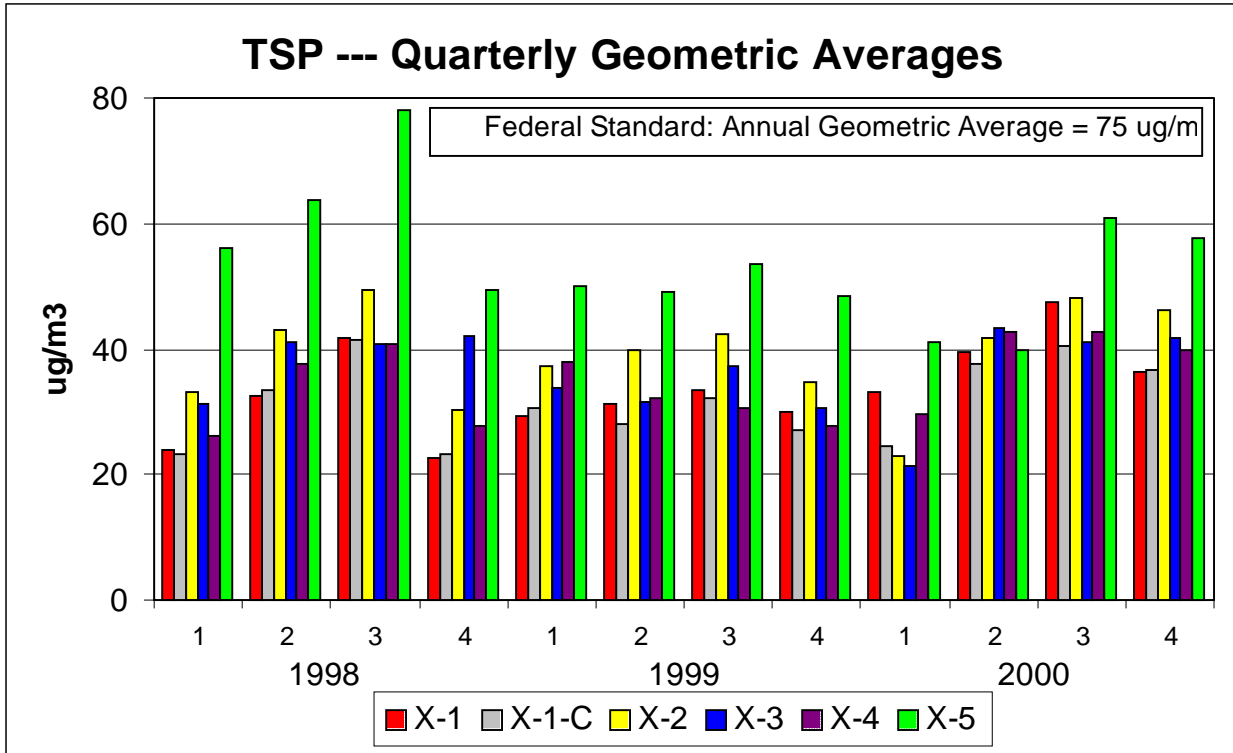














**3. Tabular Data**

Tables of current data are presented in this section.

## Environmental Surveillance Report

TABLE A: GROSS ALPHA AND GROSS BETA RADIOACTIVITY CONCENTRATIONS  
IN SUSPENDED AIRBORNE PARTICULATE MATERIAL

**FOURTH QUARTER 2000**

Location	Sampler Type	Number of Samples	Gross Alpha			Gross Beta			
			Mean pCi/m <sup>3</sup>	Max pCi/m <sup>3</sup>	Min pCi/m <sup>3</sup>	Mean pCi/m <sup>3</sup>	Max pCi/m <sup>3</sup>	Min pCi/m <sup>3</sup>	
<b>GROUND LEVEL SAMPLERS</b>									
Security area:	D-1	TSP	10	< 0.0041	0.0072	0.0017	0.0242	0.0335	0.0153
	D-3	TSP	12	< 0.0053	0.0096	0.0019	0.0272	0.0419	0.0133
Buffer zone:	D-9	TSP	13	< 0.0039	0.0062	0.0021	0.0234	0.0303	0.0162
	D-10	TSP	13	0.0048	0.0097	0.0026	0.0260	0.0405	0.0136
	D-13	TSP	12	< 0.0048	0.0086	0.0015	0.0251	0.0368	0.0158
	D-14	TSP	12	< 0.0040	0.0059	0.0015	0.0239	0.0326	0.0140
Perimeter:	D-6	TSP	12	< 0.0053	0.0091	0.0021	0.0290	0.0402	0.0187
	D-7	TSP	12	0.0041	0.0059	0.0026	0.0265	0.0352	0.0167
<b>ELEVATED SAMPLERS</b>									
Buffer zone:	E-1-T	TSP	13	< 0.0036	0.0058	0.0013	0.0224	0.0312	0.0140
	E-2-T	TSP	10	< 0.0047	0.0086	0.0004	0.0214	0.0364	0.0104
	E-1-P	PM10	13	< 0.0022	0.0041	0.0008	0.0143	0.0212	0.0068
	E-2-P	PM10	13	< 0.0033	0.0054	0.0011	0.0180	0.0264	0.0090
Perimeter:	E-3-T	TSP	11	< 0.0041	0.0084	0.0009	0.0256	0.0379	0.0109
	E-3-P	PM10	13	< 0.0022	0.0037	0.0005	< 0.0143	0.0209	0.0081
	E-4-T	TSP	10	0.0058	0.0095	0.0029	0.0278	0.0543	0.0156

pCi/m<sup>3</sup> = Picocuries per cubic meter

TSP = Total Suspended Particulates  
PM10 = Particulate Material < 10 microns in diameter

## Environmental Surveillance Report

TABLE B: ALPHA SPECTROMETRIC ANALYSIS AND LONG-LIVED GROSS ALPHA RADIOACTIVITY  
CONCENTRATIONS IN SUSPENDED AIRBORNE PARTICULATE MATERIAL

FOURTH QUARTER 1999

Location	Sampler Type	<sup>239+240</sup> Pu pCi/m <sup>3</sup>	<sup>241</sup> Am pCi/m <sup>3</sup>	<sup>239+240</sup> Pu / <sup>241</sup> Am Ratio	<sup>234</sup> U / <sup>238</sup> U Ratio	Long-Lived Gross Alpha pCi/m <sup>3</sup>
D-1	TSP / Continuous	0.000011 +/- 0.000005	< 0.000007	---		0.0063
D-3	TSP / Continuous	0.000209 +/- 0.000020	0.000021 +/- 0.000006	10.0 +/- 3.0		0.0072
D-6	TSP / Continuous			---		0.0072
D-7	TSP / Continuous			---		< 0.0061
D-13	TSP / Continuous	0.000023 +/- 0.000006	< 0.000007	---		0.0073
E-1-T	TSP / Continuous	0.000009 +/- 0.000004	< 0.000007	---		< 0.0063
E-1-P	PM10 / Continuous	< 0.000003	< 0.000002	---		0.0049
E-3-T	TSP / Continuous			---		< 0.0055
E-3-P	PM10 / Continuous	< 0.000003	< 0.000002	---		0.0046
E-4-T	TSP / Continuous			---		< 0.0048

pCi/m<sup>3</sup> = Picocuries per cubic meter

TSP = Total Suspended Particulates

PM10 = Particulate Material < 10 microns in diameter

TSP - CL = Collocated Sampler - Total Suspended Particulates

PM10 - CL = Collocated Sampler - Particulate Material < 10 microns in diameter

## Environmental Surveillance Report

**TABLE B: ALPHA SPECTROMETRIC ANALYSIS AND LONG-LIVED GROSS ALPHA RADIOACTIVITY  
CONCENTRATIONS IN SUSPENDED AIRBORNE PARTICULATE MATERIAL**

**FIRST QUARTER 2000 – FOURTH QUARTER 2000**

Location	Sampler Type	$^{239+240}\text{Pu}$ pCi/m <sup>3</sup>	$^{241}\text{Am}$ pCi/m <sup>3</sup>	$^{239+240}\text{Pu} / ^{241}\text{Am}$ Ratio	$^{234}\text{U} / ^{238}\text{U}$ Ratio	Long-Lived Gross Alpha pCi/m <sup>3</sup>
D-1	TSP / Continuous					
D-3	TSP / Continuous					
D-6	TSP / Continuous					
D-7	TSP / Continuous					
D-13	TSP / Continuous					
E-1-T	TSP / Continuous					
E-1-P	PM10 / Continuous					
E-3-T	TSP / Continuous					
E-3-P	PM10 / Continuous					
E-4-T	TSP / Continuous					

**DATA NOT YET AVAILABLE**

**pCi/m<sup>3</sup> = Picocuries per cubic meter**  
**TSP = Total Suspended Particulates**  
**PM10 = Particulate Material < 10 microns in diameter**  
**TSP - CL = Collocated Sampler - Total Suspended Particulates**  
**PM10 - CL = Collocated Sampler - Particulate Material < 10 microns in diameter**

# Environmental Surveillance Report

**TABLE D: INORGANIC GASEOUS COMPOUNDS IN AIR**

**FOURTH QUARTER 2000**

Compound	North Site (X-1) (Hourly values)			Southeast Site (X-3) (Hourly values)			West Site (X-5) (Hourly values)		
	Avg ppm	Max ppm	# Hours	Avg ppm	Max ppm	# Hours	Avg ppm	Max ppm	# Hours
<b><u>OCTOBER 2000</u></b>									
Nitric Oxide (NO)	---	---	---	0.007	0.049	710	0.011	0.069	701
Nitrogen Dioxide (NO <sub>2</sub> )	---	---	---	0.012	0.051	709	0.011	0.050	701
Ozone (O <sub>3</sub> )	0.025	0.053	732	---	---	---	---	---	---
<b><u>NOVEMBER 2000</u></b>									
Nitric Oxide (NO)	---	---	---	0.010	0.081	671	0.012	0.116	669
Nitrogen Dioxide (NO <sub>2</sub> )	---	---	---	0.015	0.059	670	0.014	0.056	685
Ozone (O <sub>3</sub> )	0.020	0.043	718	---	---	---	---	---	---
<b><u>DECEMBER 2000</u></b>									
Nitric Oxide (NO)	---	---	---	0.011	0.150	702	0.012	0.142	709
Nitrogen Dioxide (NO <sub>2</sub> )	---	---	---	0.014	0.060	701	0.012	0.057	708
Ozone (O <sub>3</sub> )	0.022	0.045	740	---	---	---	---	---	---

ppm = Parts per million  
N/A = Not available

# Environmental Surveillance Report

## TABLE E: SUSPENDED PARTICULATE MATERIAL IN AIR

### THIRD QUARTER 2000

Item	North Site (X-1) (Daily values)			Northeast Site (X-2) (Daily values)			Southeast Site (X-3) (Daily values)			South Site (X-4) (Daily values)			West Site (X-5) (Daily values)		
	Avg ug/m <sup>3</sup>	Max ug/m <sup>3</sup>	#	Avg ug/m <sup>3</sup>	Max ug/m <sup>3</sup>	#	Avg ug/m <sup>3</sup>	Max ug/m <sup>3</sup>	#	Avg ug/m <sup>3</sup>	Max ug/m <sup>3</sup>	#	Avg ug/m <sup>3</sup>	Max ug/m <sup>3</sup>	#
<b>JULY 2000</b>															
TSP-P	47	60	5	52	65	5	43	56	5	47	59	5	62	85	5
PM10-P	18	23	5	21	25	5	20	23	5	20	23	5	20	26	5
TSP-CL	44	54	5												
PM10-CL				21	25	5									
<b>AUGUST 2000</b>															
TSP-P	45	64	5	52	63	5	47	67	5	46	58	5	73	111	5
PM10-P	18	22	5	21	28	5	21	29	5	20	29	5	25	32	5
TSP-CL	43	64	5												
PM10-CL				20	27	5									
<b>SEPTEMBER 2000</b>															
TSP-P	50	91	3	40	96	5	33	76	5	35	84	5	48	104	5
PM10-P	14	36	5	14	30	5	15	27	5	13	27	5	13	29	5
TSP-CL	34	85	5												
PM10-CL				15	31	5									

ug/m<sup>3</sup> = Micrograms per cubic meter  
 N/A = Not available

TSP = Total Suspended Particulates (P = primary, CL = collocated)  
 PM10 = Particulate Matter < 10 microns in diameter (P = primary, CL = collocated)

# Environmental Surveillance Report

**TABLE E: SUSPENDED PARTICULATE MATERIAL IN AIR**

**FOURTH QUARTER 2000**

Item	North Site (X-1) (Daily values)			Northeast Site (X-2) (Daily values)			Southeast Site (X-3) (Daily values)			South Site (X-4) (Daily values)			West Site (X-5) (Daily values)		
	Avg ug/m <sup>3</sup>	Max ug/m <sup>3</sup>	#	Avg ug/m <sup>3</sup>	Max ug/m <sup>3</sup>	#	Avg ug/m <sup>3</sup>	Max ug/m <sup>3</sup>	#	Avg ug/m <sup>3</sup>	Max ug/m <sup>3</sup>	#	Avg ug/m <sup>3</sup>	Max ug/m <sup>3</sup>	#
	<b>OCTOBER 2000</b>														
TSP-P	46	58	5	58	69	5	52	78	5	46	55	5	88	110	5
PM10-P	21	31	5	22	29	5	20	26	5	19	25	5	22	26	5
TSP-CL	46	57	5												
PM10-CL				21	30	5									
<b>NOVEMBER 2000</b>															
TSP-P	34	62	5	44	78	5	45	76	5	43	77	5	43	73	4
PM10-P	14	27	5	17	33	5	16	32	5	15	31	5	13	27	3
TSP-CL	34	64	5												
PM10-CL				17	34	5									
<b>DECEMBER 2000</b>															
TSP-P	29	46	5	37	56	5	28	51	5	31	56	5	42	66	5
PM10-P	12	19	5	13	21	5	13	23	5	12	25	5	12	20	4
TSP-CL	30	45	5												
PM10-CL				13	20	5									

ug/m<sup>3</sup> = Micrograms per cubic meter  
N/A = Not available

TSP = Total Suspended Particulates (P = primary, CL = collocated)  
PM10 = Particulate Matter < 10 microns in diameter (P = primary, CL = collocated)

# Environmental Surveillance Report

**TABLE F: METALS IN AIR**

**SECOND - FOURTH QUARTER 2000**

	North Site (X-1) (Quarterly composites) ug/m <sup>3</sup>	Northeast Site (X-2) (Quarterly composites) ug/m <sup>3</sup>	Southeast Site (X-3) (Quarterly composites) ug/m <sup>3</sup>	South Site (X-4) (Quarterly composites) ug/m <sup>3</sup>	West Site (X-5) (Quarterly composites) ug/m <sup>3</sup>
<b>Metal</b>					
<b>Beryllium -- TSP-P</b>					
<b>Beryllium -- PM10-P</b>					
<b>Beryllium -- TSP-CL</b>					
<b>Beryllium -- PM10-CL</b>					
<b>Uranium -- TSP</b>					
<b>Uranium -- PM10</b>					
<b>Uranium -- TSP-CL</b>					
<b>Uranium -- PM10-CL</b>					

DATA NOT YET AVAILABLE

ug/m<sup>3</sup> = Micrograms per cubic meter

N/A = Not available

TSP = Total Suspended Particulates (P = primary, CL = collocated)

PM10 = Particulate Matter < 10 microns in diameter (P = primary, CL = collocated)

# Environmental Surveillance Report

TABLE G: VOLATILE ORGANIC COMPOUNDS IN AIR

THIRD & FOURTH QUARTERS 2000

Compound	CAS #	TLV ppm	North site (X-1) (Daily averages)		Northeast site (X-2) (Daily averages)		Southeast site (X-3) (Daily averages)		South site (X-4) (Daily averages)		West site (X-5) (Daily averages)	
			Avg ppb	Max ppb	Avg ppb	Max ppb	Avg ppb	Max ppb	Avg ppb	Max ppb	Avg ppb	Max ppb

DATA NOT YET AVAILABLE

ppb = Parts per billion  
ppm = Parts per million  
nd = Not detected

N/A = Not available  
TLV = ACGIH Threshold Limit Value  
CAS # = Chemical Abstracts Service number



# Description of Precipitation and Surface Water Sampling Done This Quarter

## Precipitation

Results for the 3<sup>rd</sup> and 4<sup>th</sup> quarter 2000 samples are presented below. These results show no obvious anomalies, and are consistent with historical results from the same locations.

### 3rd Quarter, 2000

LOCATION	<sup>239+240</sup> Pu pCi/L	<sup>241</sup> Am pCi/L	<sup>239+240</sup> Pu/ <sup>241</sup> Am Ratio	<sup>234</sup> U/ <sup>238</sup> U Ratio	Gross Alpha pCi/L	Gross Beta pCi/L	<sup>3</sup> H pCi/L
D-3 Precipitation	QNS	QNS	---	---	QNS	QNS	<140
E-1 Precipitation	0.013 ± .003	0.008 ± .003	---	---	< 5	11 ± 5	<140
E-3 Precipitation	< 0.006	0.011 ± .006	---	---	< 5	7 ± 4	<140
CDPHE Precipitation	< 0.040	< 0.007	---	---	15 ± 5	17 ± 5	<140

### 4th Quarter, 2000

LOCATION	<sup>239+240</sup> Pu pCi/L	<sup>241</sup> Am pCi/L	<sup>239+240</sup> Pu/ <sup>241</sup> Am Ratio	<sup>234</sup> U/ <sup>238</sup> U Ratio	Gross Alpha pCi/L	Gross Beta pCi/L	<sup>3</sup> H pCi/L
D-3 Precipitation	QNS	QNS	---	---	8 ± 4	11 ± 5	<140
E-1 Precipitation	QNS	QNS	---	---	< 5	< 7	<140
E-3 Precipitation	QNS	QNS	---	---	< 5	< 7	<140
CDPHE Precipitation	QNS	QNS	---	---	6 ± 4	12 ± 5	<140

## Surface Water

For surface water, sampling for the 3rd quarter of 2000 was done as follows:

3 samples of the Sewage Treatment Plant Influent were collected, on 10/26/2000, 11/15/2000, and 12/26/2000

1 Sewage Treatment Plant Effluent sample was collected, on 11/22/2000;

1 pre-discharge sample was collected from Pond A-4 - on 10/25/2000;

2 pre-discharge samples were collected from Pond B-5 - on 10/25/2000 and 12/26/2000;

1 sample was collected from Walnut Creek at Indiana Street, on 11/21/2000;

1 sample was collected from Woman Creek at Indiana Street, on 12/21/2000;

1 round of nitrate sampling was done on 11/22/2000, at SW093, GS13, SWA4, GS10, STP-Outfall, SWB4, SWB5 and GS03.

The results of these sampling events are shown in Table H (all but organic results) and Table I (organic results).

For nitrate, results for some sampling stations are not shown due to some database updates that are still in progress.

### Notable Surface Water Results

The results for all analyses except those for organic chemicals are presented in Table H. None of the results exceed water quality standards or are of immediate concern. Results for the most critical parameters - americium and plutonium, are presented along with historical values in the following graphs for the stations monitored this quarter. Note that no Am or Pu analyses are performed by CDPHE for Indiana Street stations.

Nitrate results for stations SW093, GS13, and GS10, which are the most important to track, are also graphed.

With respect to organic chemicals, Table I shows that there were a few organic chemicals detected, but only at very low levels.

### Graphs of Selected Surface Water Results

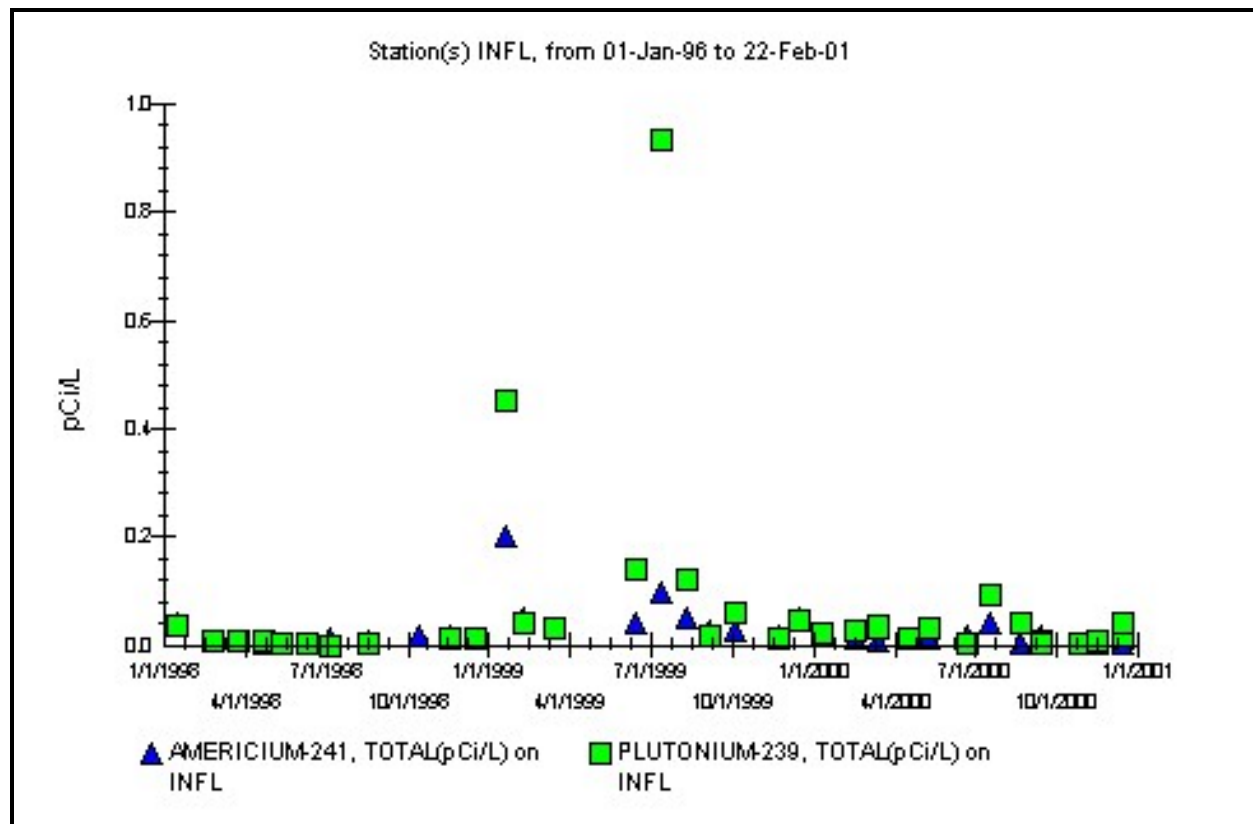


Figure SW1 - Am and Pu Concentrations in STP Influent

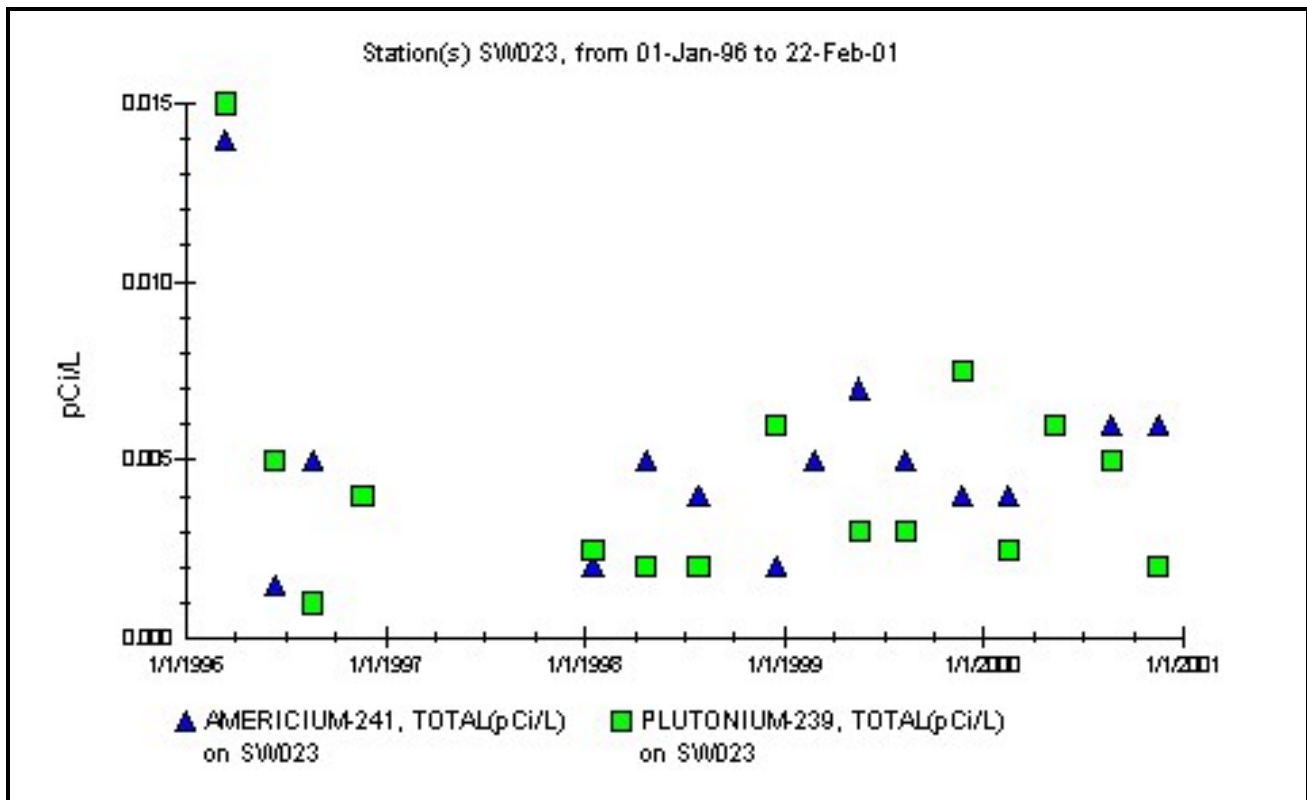


Figure SW2 - Am and Pu Concentrations in STP Effluent

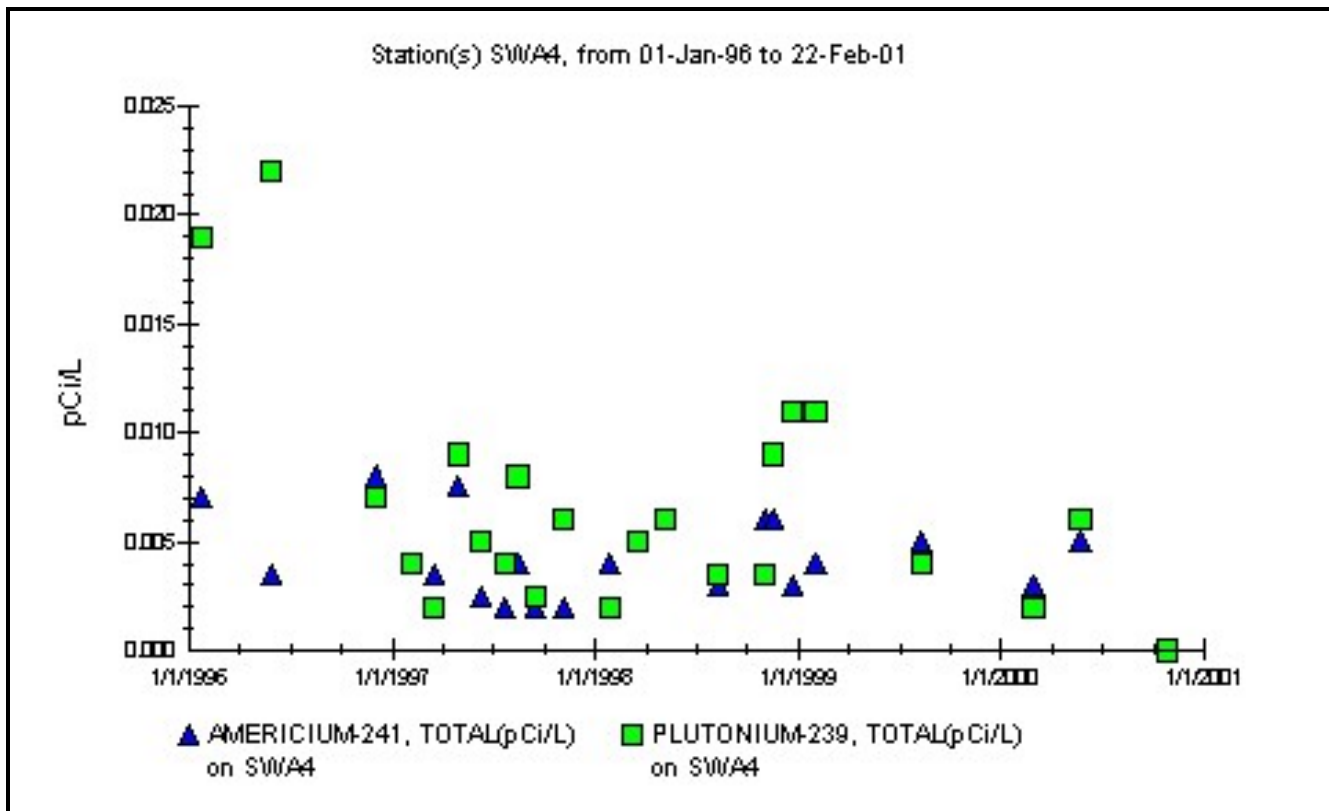


Figure SW3 - Am and Pu Concentrations in Pond A4

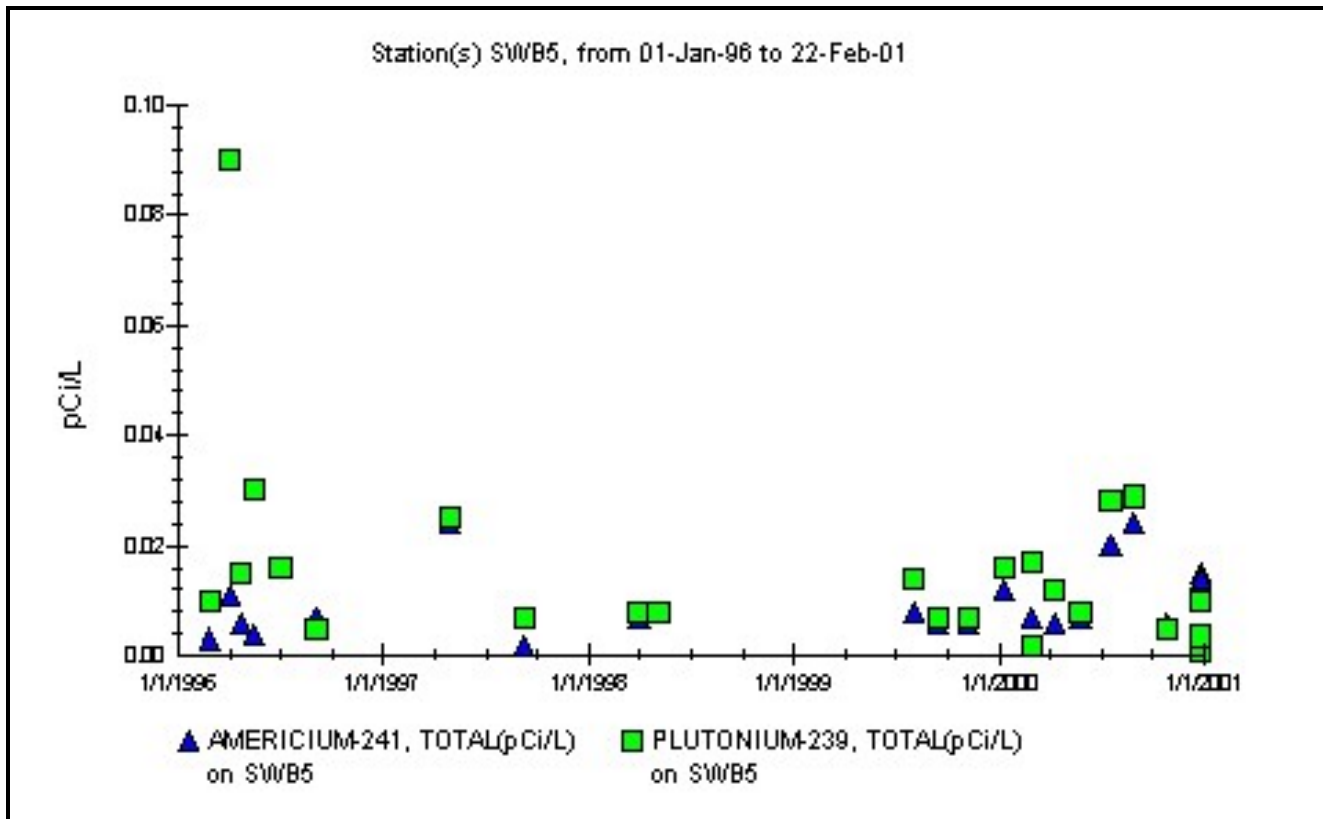


Figure SW4 - Am and Pu Concentrations in Pond B5

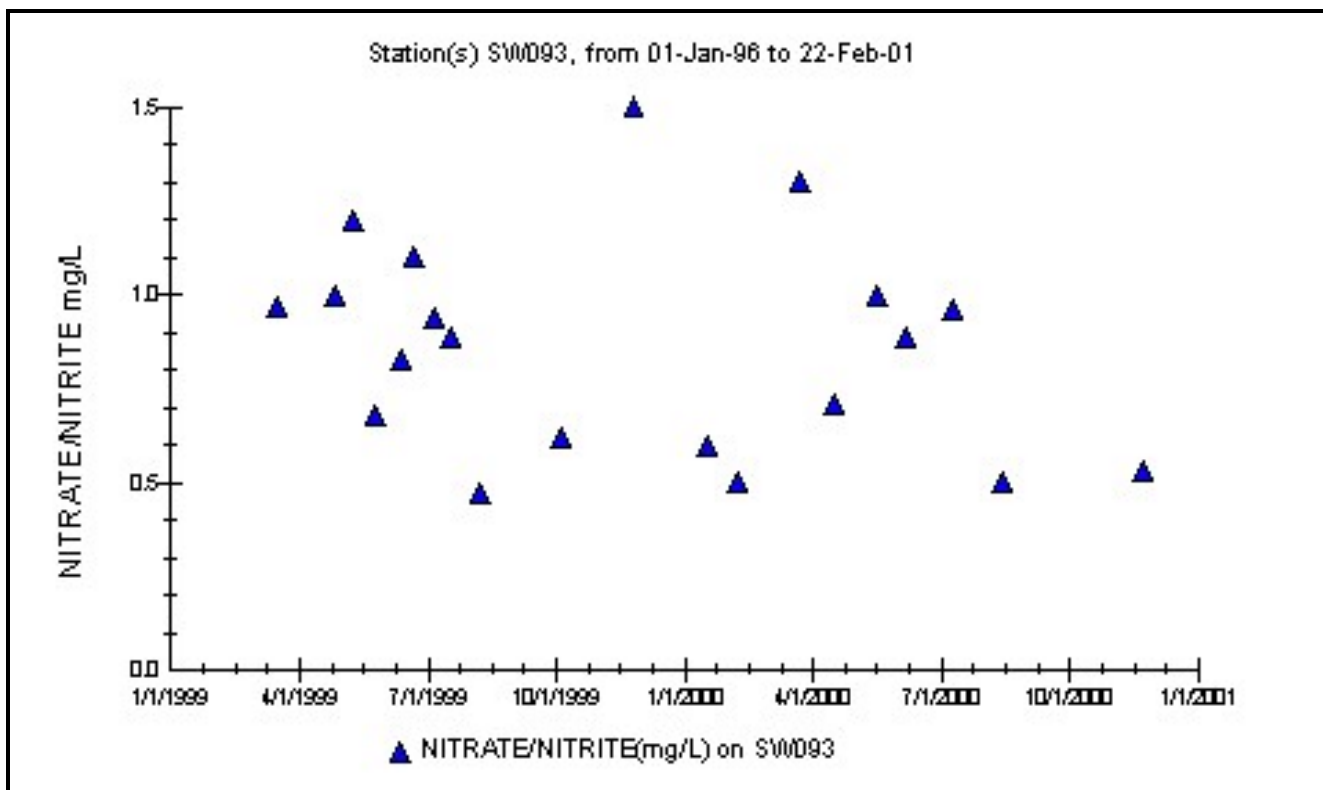


Figure SW5 - Nitrate Concentrations at SW093

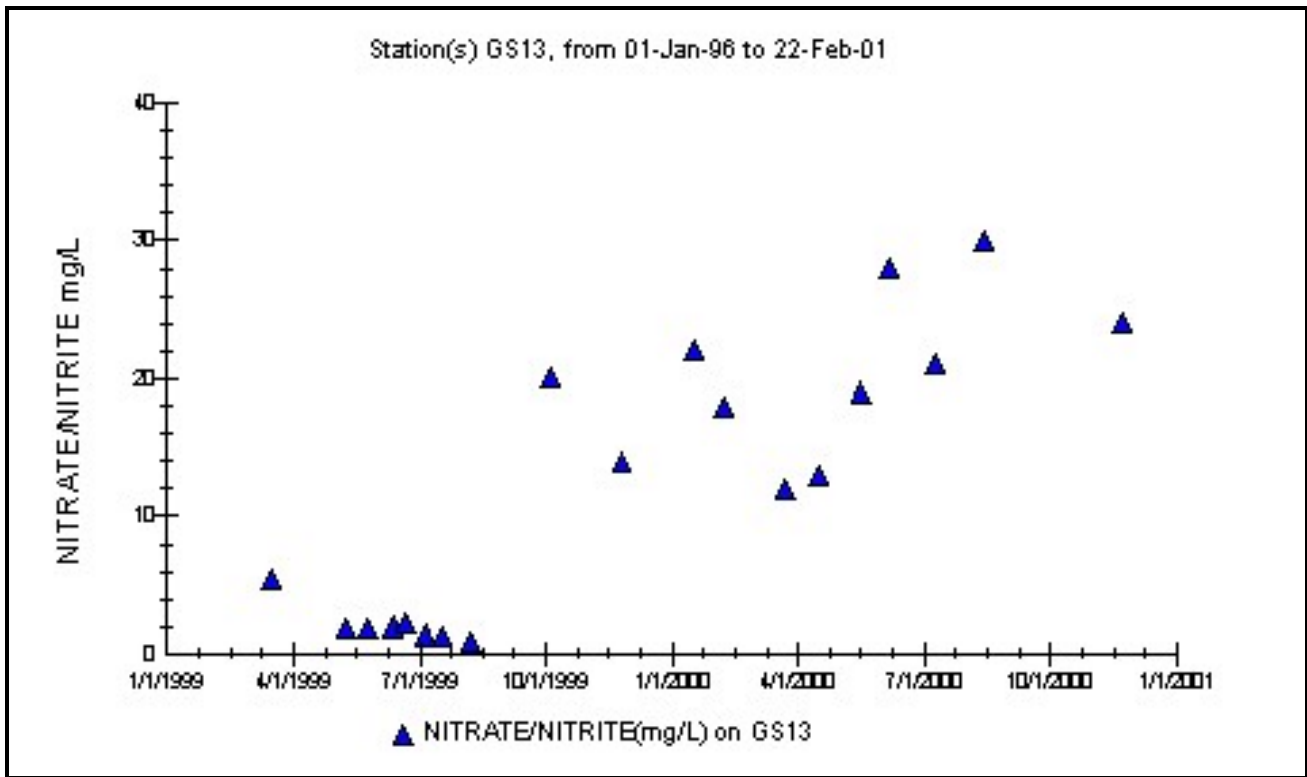


Figure SW6 – Nitrate Concentrations at GS13

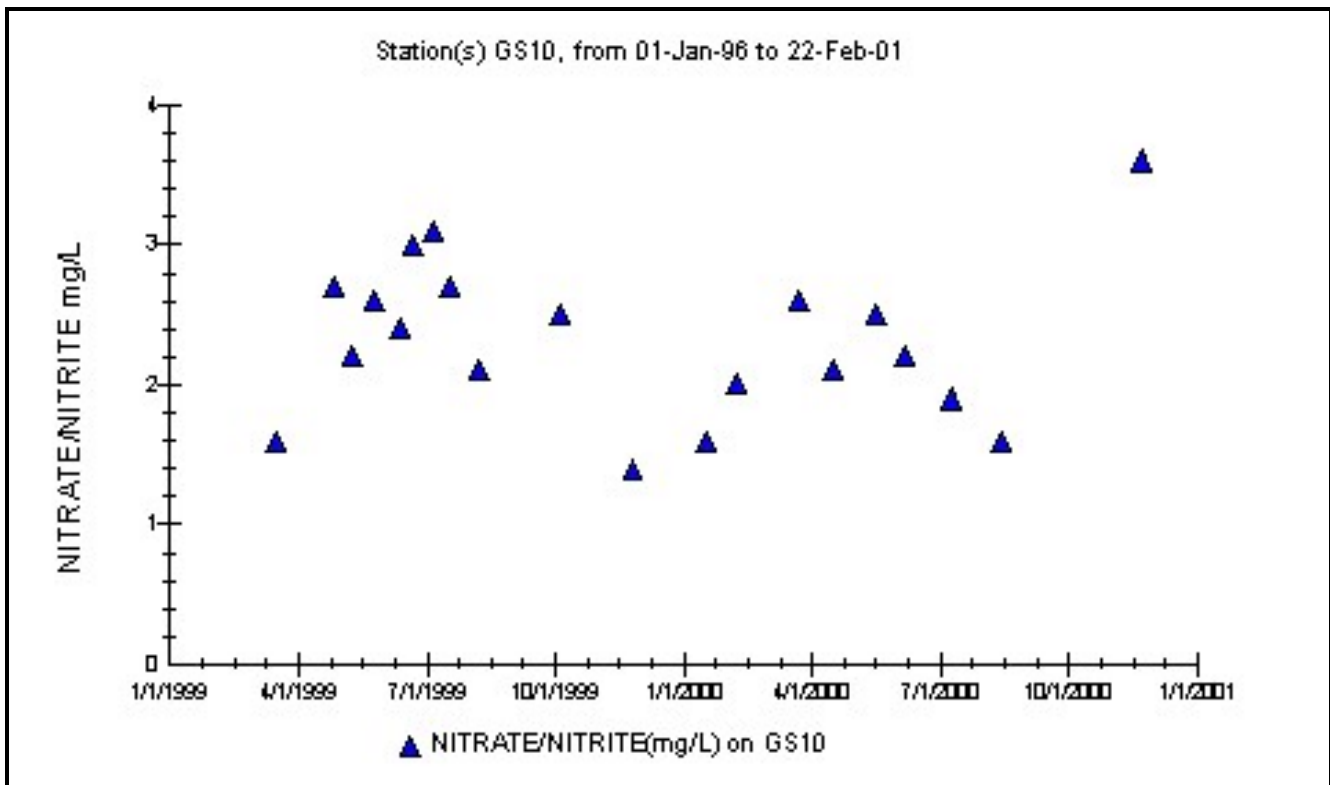


Figure SW7 – Nitrate Concentrations at GS10

**Environmental Surveillance Report**  
**TABLE H - INORGANIC ANALYSIS OF SURFACE WATER**  
**FOURTH QUARTER 2000**

Location	Sample Date	Parameter	Analysis			*Analysis*		
				Level		Units	1st	2nd
POND A4	10/25/2000	AMERICIUM-241, TOTAL	<	0.006		pCi/L		
		AMMONIA, TOTAL		0.14		mg/L		
		ARSENIC, TOTAL		2		ug/L		
		BERYLLIUM, DISSOLVED	<	1		ug/L		
		CADMIUM, DISSOLVED	<	0.3		ug/L		
		CHLORIDE	<	5		mg/L		
		CHROMIUM, TOTAL	<	3		ug/L		
		CONDUCTIVITY, SPECIFIC		1160		umho		
		COPPER, DISSOLVED	<	4		ug/L		
		CYANIDE, DISTILLED		0.034		mg/L		
		GROSS ALPHA, TOTAL	<	4		pCi/L		
		GROSS BETA, TOTAL		9	+/-	5 pCi/L		
		IRON, RECOVERABLE		95		ug/L		
		MANGANESE, RECOVERABLE		95		ug/L		
		NITRATE/NITRITE		0.22		mg/L		
		NITRITE		0.03		mg/L		
		PH		8.49		SU		
		PHOSPHATE, ORTHO		0.26		mg/L		
		PHOSPHATE, TOTAL		0.04		mg/L		
		PLUTONIUM-239, TOTAL	<	0.004		pCi/L		
		SELENIUM, DISSOLVED	<	1		ug/L		
		SILVER, DISSOLVED	<	0.2		ug/L		

**Environmental Surveillance Report**  
**TABLE H - INORGANIC ANALYSIS OF SURFACE WATER**  
**FOURTH QUARTER 2000**

Location	Sample Date	Parameter	Analysis			Units	*Analysis*		
				Level			1st	2nd	3rd
		SOLIDS, DISSOLVED		660		mg/L			
		SULFATE		17		mg/L			
		SULFIDE	<	0.1		mg/L			
		TEMPERATURE		15.1		C			
		TRITIUM, TOTAL	<	140		pCi/L			
		URANIUM, TOTAL		5		pCi/L			
	11/22/2000	AMMONIA, TOTAL		0.16		mg/L			
		NITRATE/NITRITE		0.3		mg/L			
		PH		8.47		SU			
		TEMPERATURE		4.5		C			
<b>POND B5</b>	10/25/2000	AMERICIUM-241, TOTAL		0.006	+/-	0.003	pCi/L		
		AMMONIA, TOTAL		0.15		mg/L			
		ARSENIC, TOTAL		2		ug/L			
		BERYLLIUM, DISSOLVED	<	1		ug/L			
		CADMIUM, DISSOLVED	<	0.3		ug/L			
		CHLORIDE		72		mg/L			
		CHROMIUM, TOTAL	<	3		ug/L			
		CONDUCTIVITY, SPECIFIC		510		umho			

## Environmental Surveillance Report

### TABLE H - INORGANIC ANALYSIS OF SURFACE WATER

FOURTH QUARTER 2000

Location	Sample	Parameter	Analysis			Units	*Analysis*		
	Date		Level				1st	2nd	3rd
		COPPER, DISSOLVED	<	4		ug/L			
		CYANIDE, DISTILLED		0.038		mg/L			
		GROSS ALPHA, TOTAL	<	4		pCi/L			
		GROSS BETA, TOTAL		9	+/-	5	pCi/L		
		IRON, RECOVERABLE		55		ug/L			
		MANGANESE, RECOVERABLE		66		ug/L			
		NITRATE/NITRITE		2.1		mg/L			
		NITRITE		0.2		mg/L			
		PH		9.49		SU			
		PHOSPHATE, ORTHO		0.82		mg/L			
		PHOSPHATE, TOTAL		1.3		mg/L			
		PLUTONIUM-239, TOTAL		0.005	+/-	0.003	pCi/L		
		SELENIUM, DISSOLVED		1		ug/L			
		SILVER, DISSOLVED	<	0.2		ug/L			
		SOLIDS, DISSOLVED		320		mg/L			
		SULFATE		15		mg/L			
		SULFIDE	<	0.1		mg/L			
		TEMPERATURE		13.8		C			
		TRITIUM, TOTAL	<	140		pCi/L			
		URANIUM, TOTAL	<	2		pCi/L			
	11/22/2000								
		AMMONIA, TOTAL		0.87		mg/L			
		NITRATE/NITRITE		1.9		mg/L			



**Environmental Surveillance Report**  
**TABLE H - INORGANIC ANALYSIS OF SURFACE WATER**  
**FOURTH QUARTER 2000**

Location	Sample Date	Parameter	Analysis			*Analysis*				
			Level			Units	1st	2nd	3rd	
		PH		9.13			SU			
		TEMPERATURE		4.3			C			
	12/26/2000	AMERICIUM-241, TOTAL	<	0.03			pCi/L			
		AMMONIA, TOTAL		2.9			mg/L			
		ARSENIC, TOTAL		1			ug/L			
		BERYLLIUM, DISSOLVED	<	1			ug/L			
		CADMIUM, DISSOLVED	<	0.3			ug/L			
		CHLORIDE		68			mg/L			
		CHROMIUM, TOTAL	<	3			ug/L			
		CONDUCTIVITY, SPECIFIC		660			umho			
		COPPER, DISSOLVED	<	4			ug/L			
		CYANIDE, DISTILLED	<	0.01			mg/L			
		GROSS ALPHA, TOTAL	<	6			pCi/L			
		GROSS BETA, TOTAL		11	+/-	5	pCi/L			
		IRON, RECOVERABLE		86			ug/L			
		MANGANESE, RECOVERABLE		92			ug/L			
		NITRATE/NITRITE		2.9			mg/L			
		NITRITE		0.51			mg/L			
		PH		8.35			SU			
		PHOSPHATE, ORTHO		2.4			mg/L			
		PHOSPHATE, TOTAL		2.4			mg/L			
		PLUTONIUM-239, TOTAL		0.01	+/-	0.005	pCi/L			

**Environmental Surveillance Report**  
**TABLE H - INORGANIC ANALYSIS OF SURFACE WATER**  
**FOURTH QUARTER 2000**

Location	Sample	Parameter	Analysis		Units	*Analysis*		
	Date		Level	1st		2nd	3rd	
		SELENIUM, DISSOLVED	<	1	ug/L			
		SILVER, DISSOLVED	<	0.2	ug/L			
		SOLIDS, DISSOLVED		490	mg/L			
		SULFATE		21	mg/L			
		SULFIDE	<	0.2	mg/L			
		TEMPERATURE		4.6	C			
		TRITIUM, TOTAL	<	140	pCi/L			
		URANIUM, TOTAL	<	2	pCi/L			
<b>WALNUT CREEK AT IND.</b>								
	11/21/2000	AMMONIA, TOTAL		0.4	mg/L			
		BERYLLIUM, DISSOLVED	<	1	ug/L			
		CADMIUM, DISSOLVED	<	0.3	ug/L			
		CHLORIDE		190	mg/L			
		CHROMIUM, TOTAL	<	3	ug/L			
		CONDUCTIVITY, SPECIFIC		960	umho			
		NITRATE/NITRITE		1	mg/L			
		NITRITE		0.1	mg/L			
		PH		9.36	SU			
		PHOSPHATE, ORTHO		0.59	mg/L			
		PHOSPHATE, TOTAL		0.62	mg/L			
		SILVER, DISSOLVED	<	0.2	ug/L			
		SOLIDS, DISSOLVED		550	mg/L			

**Environmental Surveillance Report**  
**TABLE H - INORGANIC ANALYSIS OF SURFACE WATER**  
**FOURTH QUARTER 2000**

Location	Sample	Parameter	Analysis			*Analysis*		
	Date		Level	Units	1st	2nd	3rd	
		SOLIDS, TOTAL SUSPENDED		12	mg/L			
		TEMPERATURE		5.1	C			
<b>WOMAN CREEK AT IND.</b>								
	12/21/2000							
		AMMONIA, TOTAL	<	0.05	mg/L			
		BERYLLIUM, DISSOLVED	<	1	ug/L			
		CADMIUM, DISSOLVED	<	0.3	ug/L			
		CHLORIDE		59	mg/L			
		CHROMIUM, TOTAL	<	3	ug/L			
		CONDUCTIVITY, SPECIFIC		870	umho			
		NITRATE/NITRITE		0.07	mg/L			
		NITRITE	<	0.02	mg/L			
		PH		9.41	SU			
		PHOSPHATE, ORTHO	<	0.02	mg/L			
		PHOSPHATE, TOTAL		0.04	mg/L			
		SILVER, DISSOLVED		0.7	ug/L			
		SOLIDS, DISSOLVED		350	mg/L			
		SOLIDS, TOTAL SUSPENDED		29	mg/L			
		TEMPERATURE		0.3	C			

**Environmental Surveillance Report**  
**TABLE H - INORGANIC ANALYSIS OF SURFACE WATER**  
**FOURTH QUARTER 2000**

Location	Sample	Parameter	Analysis			Units	*Analysis*		
	Date		Level				1st	2nd	3rd
<b>WWTF INFLUENT</b>									
	10/26/2000								
		AMERICIUM-241, TOTAL		0.006	+/-	0.003	pCi/L		
		ARSENIC, TOTAL	<	1			ug/L		
		BERYLLIUM, TOTAL	<	1			ug/L		
		CADMIUM, TOTAL	<	0.3			ug/L		
		CHROMIUM, TOTAL	<	3			ug/L		
		COPPER, TOTAL		30			ug/L		
		GROSS ALPHA, TOTAL	<	6			pCi/L		
		GROSS BETA, TOTAL		13	+/-	8	pCi/L		
		IRON, TOTAL		370			ug/L		
		MANGANESE, TOTAL		28			ug/L		
		PH		7.1			SU		
		PLUTONIUM-239, TOTAL		0.006	+/-	0.003	pCi/L		
		SELENIUM, TOTAL	<	1			ug/L		
		SILVER, TOTAL	<	0.2			ug/L		
		SOLIDS, TOTAL SUSPENDED		320			mg/L		
		TEMPERATURE		18.8			C		
		TRITIUM, TOTAL	<	140			pCi/L		
		URANIUM, TOTAL	<	2			pCi/L		
	11/15/2000								
		AMERICIUM-241, TOTAL	<	0.006			pCi/L		
		ARSENIC, TOTAL	<	1			ug/L		

**Environmental Surveillance Report**  
**TABLE H - INORGANIC ANALYSIS OF SURFACE WATER**  
**FOURTH QUARTER 2000**

Location	Sample Date	Parameter	Analysis			Units	*Analysis*		
			Level				1st	2nd	3rd
		BERYLLIUM, TOTAL	<	1		ug/L			
		CADMIUM, TOTAL	<	0.3		ug/L			
		CHROMIUM, TOTAL	<	3		ug/L			
		COPPER, TOTAL		26		ug/L			
		GROSS ALPHA, TOTAL	<	7		pCi/L			
		GROSS BETA, TOTAL		13	+/-	8	pCi/L		
		IRON, TOTAL		340		ug/L			
		MANGANESE, TOTAL		25		ug/L			
		PH		8.5		SU			
		PLUTONIUM-239, TOTAL		0.008	+/-	0.004	pCi/L		
		SELENIUM, TOTAL	<	1		ug/L			
		SILVER, TOTAL		3.8		ug/L			
		SOLIDS, TOTAL SUSPENDED		52		mg/L			
		TEMPERATURE		16.1		C			
		TRITIUM, TOTAL	<	140		pCi/L			
		URANIUM, TOTAL	<	2		pCi/L			
	12/13/2000	AMERICIUM-241, TOTAL	<	0.031		pCi/L			
		ARSENIC, TOTAL		1		ug/L			
		BERYLLIUM, TOTAL	<	1		ug/L			
		CADMIUM, TOTAL		0.3		ug/L			
		CHROMIUM, TOTAL	<	3		ug/L			
		COPPER, TOTAL		34		ug/L			

**Environmental Surveillance Report**  
**TABLE H - INORGANIC ANALYSIS OF SURFACE WATER**  
**FOURTH QUARTER 2000**

Location	Sample Date	Parameter	Analysis			Units	*Analysis*		
			Level				1st	2nd	3rd
		GROSS ALPHA, TOTAL	<	6		pCi/L			
		GROSS BETA, TOTAL		16	+/-	5 pCi/L			
		IRON, TOTAL		470		ug/L			
		MANGANESE, TOTAL		31		ug/L			
		PH		8		SU			
		PLUTONIUM-239, TOTAL		0.02	+/-	0.009 pCi/L			
		SELENIUM, TOTAL	<	1		ug/L			
		SILVER, TOTAL		1.7		ug/L			
		SOLIDS, TOTAL SUSPENDED		31		mg/L			
		TEMPERATURE		12.6		C			
		TRITIUM, TOTAL	<	140		pCi/L			
		URANIUM, TOTAL		2		pCi/L			
<b>WWTF EFFLUENT</b>									
	11/15/2000								
		AMERICIUM-241, TOTAL		0.006	+/-	0.003 pCi/L			
		GROSS ALPHA, TOTAL	<	6		pCi/L			
		GROSS BETA, TOTAL		11	+/-	5 pCi/L			
		PH		7.7		SU			
		PLUTONIUM-239, TOTAL		0.002	+/-	0.002 pCi/L			
		TEMPERATURE		14.1		C			
		TRITIUM, TOTAL	<	140		pCi/L			
		URANIUM, TOTAL	<	2		pCi/L			

**Environmental Surveillance Report**  
**TABLE H - INORGANIC ANALYSIS OF SURFACE WATER**  
**FOURTH QUARTER 2000**

Location	Sample	Parameter	Analysis	Units	*Analysis*		
	Date		Level		1st	2nd	3rd
	11/22/2000						
		AMMONIA, TOTAL	2.2	mg/L			
		NITRATE/NITRITE	1	mg/L			
		PH	7.37	SU			
		TEMPERATURE	16.1	C			

B = found in blank

H = exceeds holding time

2/22/2001 Run Date

**Environmental Surveillance Report**  
**TABLE I - ORGANIC ANALYSIS OF SURFACE WATER**  
**FOURTH QUARTER 2000**

Location	Date	Method	Result	**Qualifiers**		
				1st	2nd	3rd
POND A4						
POND B5						
	10/25/2000	Volatile Organic Compounds	CHLOROFORM	0.2 ug/l		
		Organophosphates	ATRAZINE	0.1 ug/l		
			BROMACIL	0.5 ug/l		
			SIMAZINE	0.27 ug/l		
	12/26/2000	Volatile Organic Compounds	CHLOROFORM	0.3 ug/l		
			CHLOROTHALONIL	1.1 ug/l		

**Results Show Detects Only**

B = found in blank

J = detected, but below Practical Quantitative Limit (value is estimated)

2/22/2001 Run Date



## GLOSSARY

Am	Americium
APCD	Air Pollution Control Division
AQCC	Air quality control commission
B	Found in blank
Be	Beryllium
CAS	Chemical abstracts service number
CDPHE	Colorado Department of Public Health and Environment
EPA	Environmental Protection Agency
H	Exceeds holding time
J	Detected but below practical quantitative limit
LARS	Laboratory and Radiation Services
MCL	Maximum contaminant level (below MCL is safe)
MDL	Minimum detection level
Nd	Not detected
pCi/l	Picocuries per liter
PM	Particulate material
ppb	Parts per billion
ppm	Parts per million
PQL	Practical quantitative level
Pu	Plutonium
QNS	Quantity not sufficient
RFETS	Rocky Flats Environmental Technology Site
RFPU	Rocky Flats Program Unit
SVOC	Semivolatile organic compounds
TLV	ACGIH Threshold limit value
TSP	Total Suspended Particulate
TSS	Total suspended solids
ug/m <sup>3</sup>	Micrograms per cubic meter
U	Uranium
VOCs	Volatile organic compounds
WQCC	Water Quality Control Commission
WQCD	Water Quality Control Division