Environmental Surveillance Report

on the
U.S. Department of Energy

Rocky Flats Environmental Technology Site

Information Exchange

FIRST QUARTER 2003

Colorado Department
of Public Health
and Environment

This is a numerical summary of environmental surveillance measurements performed by the Department during the past quarter.

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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 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.

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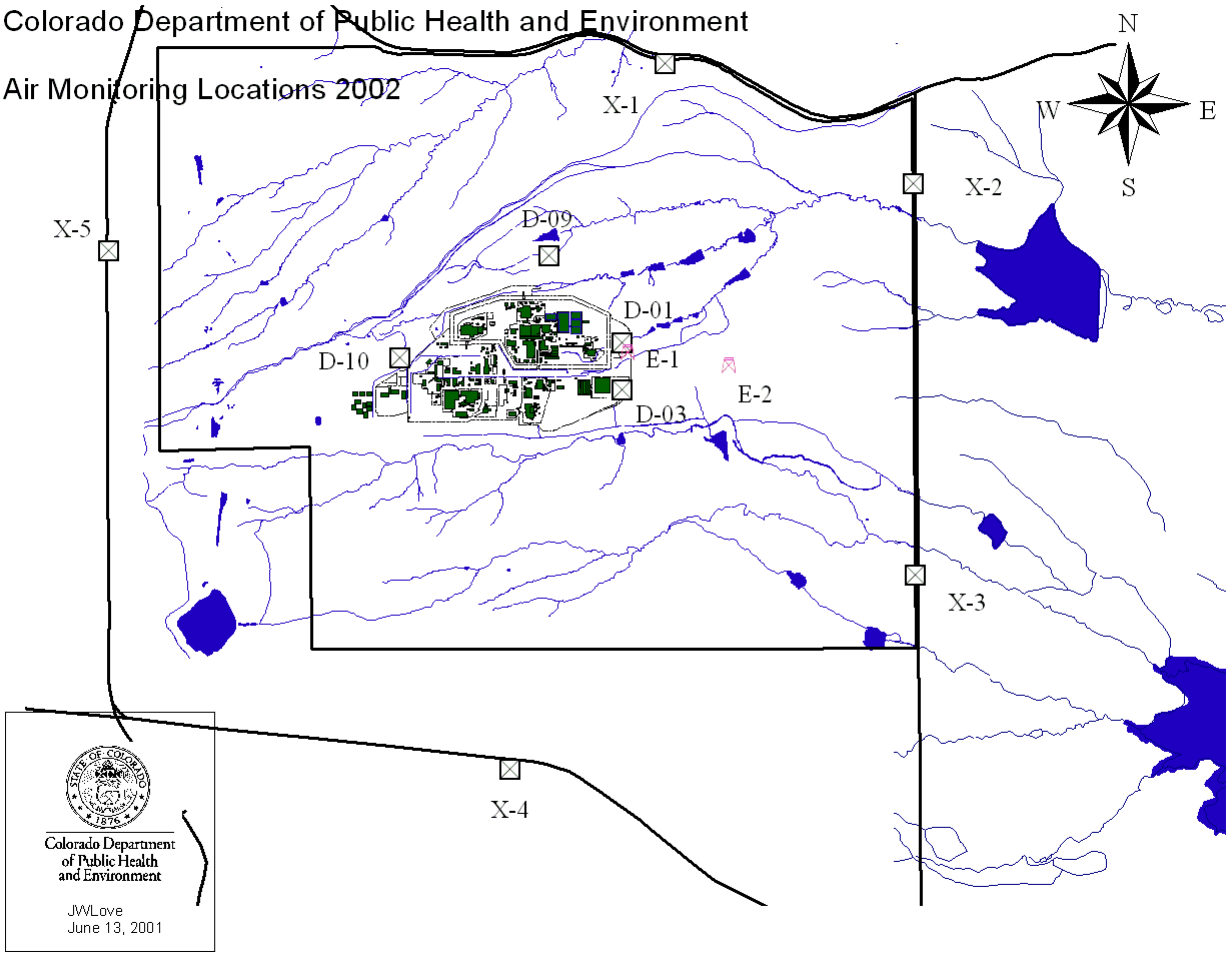
Colorado Department of Public Health and Environment

Air Monitoring Locations 2002



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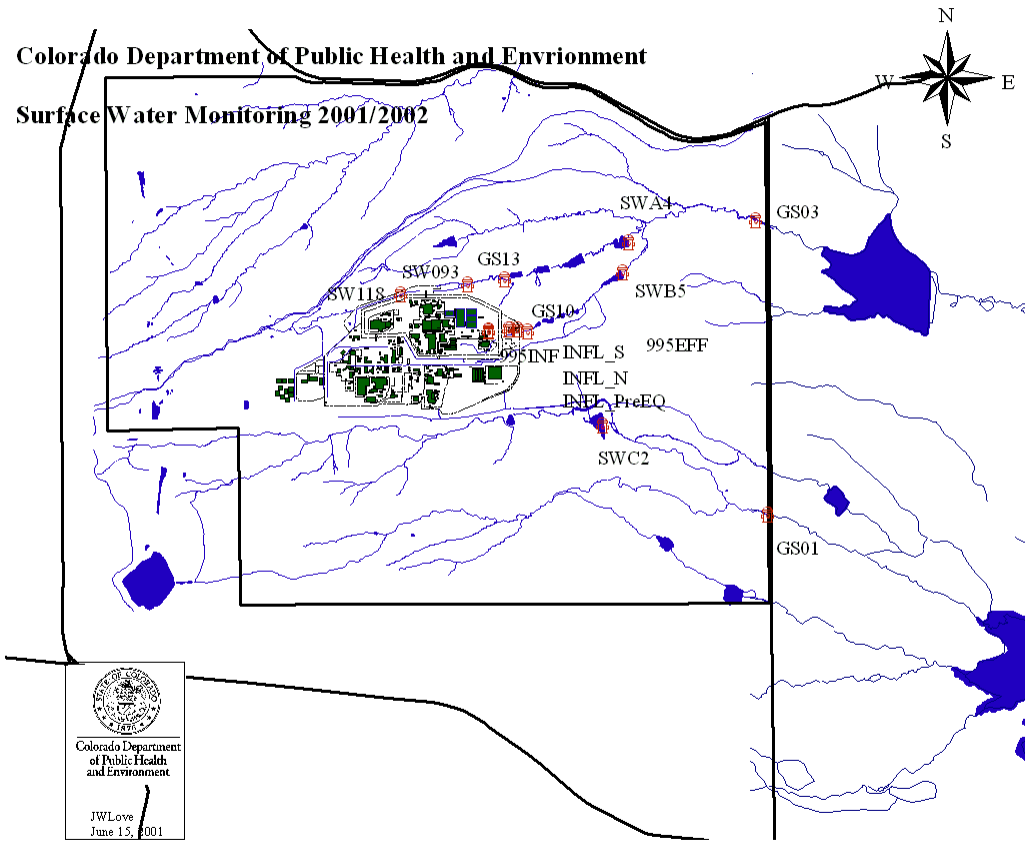
Colorado Department of Public Health and Envrionment
Surface Water Monitoring 2001/2002
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GS03
GS13
SW093
SW118
SWB5
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995INF
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Decision Rules

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_2), Ozone (O_3) and particulate monitoring is performed by APCD. Particulate monitoring includes monitoring of both fine particulates (PM_{10}) and total suspended solids (TSP).

   IF: A perimeter monitor detects an NO_2 (annual arithmetic mean) concentration of 0.053 parts per million (ppm), an O_3 (1 hr av. time) concentration of 0.12 ppm, a TSP measurement of 75 micrograms per cubic meter ($\mu g/m^3$) averaged over a 1 year time period or 150 $\mu g/m^3$ over a 24-hour time period, or a PM_{10} concentration of 50 $\mu g/m^3$ annually or 150 $\mu g/m^3$ 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 $\mu g/m^3$ 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: LARS and APCD air sampling locations are monitored for radiological contaminants, PM_{10} 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. Pond Predischarge Monitoring: Analytes of Interest (AoIs) and some VOCs are monitored in the ponds previous to pond discharge so that discharge will not result in exceedence of stream standards.

   IF: Predischarge monitoring indicates apparent exceedence of stream standards

   THEN: CDPHE will notify the Site of additional AoIs for that discharge.

   AND: The Site would then perform flow-paced POC monitoring for the additional AoIs during that discharge, as part of the Segment 4 compliance monitoring.

   OR

   The Site may evaluate alternative water management options which avoid immediate discharge including, but not limited to, treatment, storage or disposal.

2. Wastewater Treatment Plant (WWTP) Influent Radiological and Metals 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. Metals parameters include for the total recoverable fraction - arsenic, beryllium, cadmium, chromium (total), iron, lithium, and thallium; plus special metals (total recoverable fraction) – silver, copper, manganese, nickel and selenium. 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, through evaluation of pollutant loads and concentrations coming through the WWTP collection system.

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. Performance Monitoring: Performance monitoring is conducted where specific D&D operations or remedial action pose a concern for a specific contaminant release that could impact surface water or groundwater. Performance monitoring is integrated with groundwater investigations and conducted to improve monitoring network resolution to isolate impacts of individual projects. CDPHE conducts performance monitoring in association with the Mound and East Trenches groundwater plume and treatment system, and Solar Pond Plume Treatment System.

   a. Mound and East Trenches – VOC and metal contamination are present in the area of the Mound and East Trenches plume (south of South Walnut Creek). In order to ensure that stream standards are being attained, monitoring for VOCs and selected metals will be conducted in South Walnut Creek in the immediate vicinity where the groundwater contaminant plumes may be intersecting the stream.

      IF: VOC or metal concentrations exceed stream standards

      THEN: The monitoring frequency and number of sampling locations may be increased.

      ELSE: VOC monitoring will be discontinued after three years and metals concentrations will be reviewed using the following Decision Rule.

      IF: Metals concentrations are lower than stream standards, but significantly higher than the concentrations found at other RFETs locations.

      THEN: Further investigation of in-stream concentrations and the cause of unusually high concentrations will be considered.

      ELSE: Metals monitoring may be discontinued after a period of three years.

   b. Solar Pond Plume Treatment System – The Solar Ponds groundwater contaminant plume contains elevated concentrations of nitrate, uranium and chloride, as well as lower concentrations of several metals. A groundwater treatment system has been installed, monitoring is being conducted to ensure that stream standards are being attained. The Site collects nitrate and uranium parameters. CDPHE collects metals and nitrate (as part of the *Ad Hoc* Nitrate Study).

      IF: Metals or nitrate concentrations exceed stream standards.

      THEN: The monitoring frequency and number of sampling locations may be

increased.

ELSE: Metals and nitrate monitoring will be continued until it has been demonstrated that metals concentrations at the most downgradient portion of the Solar Pond Plume are declining.

4. *Ad Hoc* Program: *Ad Hoc* Monitoring may be requested by DOE or the stakeholders to collect specific information related to special projects or to support decision-making processes. CDPHE has taken the responsibility for an evaluation of nitrate loading on Walnut Creek, and man-made versus natural uranium by inductively coupled plasma/mass spectrometry (ICP/MS) methodology.

   a. *Nitrate Loading* - Nitrate from the Solar Pond Groundwater Plume and treated effluent from the on-site Sewage Treatment Plant pose potential impact to surface water in the Walnut Creek Drainage and pond system. To supplement in-place continuous performance monitoring, for more accurate evaluation of nitrate loading, CDPHE is conducting additional water quality monitoring, consisting of grab samples for nitrate and ammonia analysis.

      IF: No upward trend or high variability is detected.

      THEN: Monitoring will continue on a quarterly basis.

      ELSE Monitoring frequency may change.

   b. *Uranium ICP/MS* – Conducted to augment the ICP/MS evaluation of groundwater at RFETs. The Uranium ICP/MS study has been undertaken to evaluate where man-made uranium isotopes are present in groundwater versus natural uranium in groundwater. The Site is supporting CDPHE in the collection of samples and analysis by ICP/MS.

      IF: Sample results indicate non-natural uranium,

      THEN: Evaluate potential sources of non-natural uranium and whether loading from that source may change over time.

5. Stream Segment 4, Non-POC Monitoring – POC monitoring will be supplemented to assess the effect of reduced flows and reduced nutrient loading to the Walnut Creek drainage as a result of the Sites' closure process. Monitoring for select metals will be conducted to ensure that stream standards are attained. To assist with the assessment of loading inorganics, nutrients (nitrate and ammonia) and physical parameters (pH, dissolved oxygen, hardness, total suspended solids) are also collected.

   IF: Concentrations or loadings of specified contaminants exceed their 95% upper tolerance levels (UTLs)

   THEN: CDPHE will notify the Site and the Cities, and RFETS may propose a change in ambient standards.

Analytes of Interest				
Analytes		**Air**	**Water**	**Purpose of Monitoring**
Radionuclide	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
Metals	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.
Particulates	Total suspended particulates	X		Monitored to provide information on total airborne particulate levels. Filters also used for metals and radionuclides analyses.

Analytes of Interest				
Analytes		**Air**	**Water**	**Purpose of Monitoring**
	PM_{10} particulates	X		Monitored to provide information on fine airborne particulate levels. Filters also used for metals and radionuclides analyses.
Volatile Organic Compounds	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.
Real Time Monitoring of Physical and Indicator Parameters (Note A)	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.
	NO_3		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.

Note A: 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.

NATIONAL AMBIENT AIR QUALITY STANDARDS

POLLUTANT	AVERAGING TIME	STANDARD
Carbon Monoxide (CO)		
Primary Standard	1 Hour [a]	35 ppm
Primary Standard	8 Hour [a]	9 ppm
Ozone (O_3)		
Primary and Secondary Standards (up to 1997)	1 Hour [b]	0.12 ppm
Primary and Secondary Standards (as of July 1997)	8 Hour [c]	0.08 ppm
Nitrogen Dioxide (NO_2)		
Primary and Secondary Standards	Annual Arithmetic Mean	0.053 ppm
Sulfur Dioxide (SO_2)		
Primary Standard	Annual Arithmetic Mean	0.030 ppm
Primary Standard	24 Hour [a]	0.14 ppm
Secondary Standard	3 Hour [a]	0.5 ppm
Particulates (PM_{10})		
Primary and Secondary Standards	Annual Arithmetic Mean [d]	50 $\mu g/m^3$
Primary and Secondary Standards	24 Hour [b] prior to July 1997, [e] as of July 1997	150 $\mu g/m^3$
Fine Particulates ($PM_{2.5}$) (as of July 1997)		
Primary and Secondary Standards	Annual Arithmetic Mean [d]	15.0 $\mu g/m^3$
Primary and Secondary Standards	24 Hour [f]	65 $\mu g/m^3$
Lead (Pb)		
Primary and Secondary Standards	Calendar Quarter Average	1.5 $\mu g/m^3$
Total Suspended Particulates (TSP)		
Primary Standard	Annual Geometric Mean [g]	75 $\mu g/m^3$
Primary Standard	24 Hour [g]	260 $\mu g/m^3$
Secondary Standard	Annual Geometric Mean [g]	60 $\mu g/m^3$
Secondary Standard	24 Hour [g]	150 $\mu g/m^3$

(a) Not to be exceeded more than once per year.

(b) 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.

(c) The three-year average of the fourth maximum value for each year is not to exceed this level.

(d) The average of three years of annual averages (based on quarterly averages) is not to exceed this level.

(e) The three-year average of the 99th percentile for each year is not to exceed this level.

(f) The three-year average of the 98th percentile for each year is not to exceed this level.

(g) The TSP standard was replaced by the PM_{10} 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.

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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
* 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 Standards (μg/L)**	**SEGMENT 5 Action Levels (μg/L)**
Ammonia	*	*
Beryllium, total recoverable	4	4
Cadmium, dissolved **	1.5	1.5
Cadmium, Total recoverable	5	-
Chloride	250,000	250,000
Chromium (VI), dissolved**	11	11
Copper, dissolved**	16	16
Iron, dissolved	300	-
Iron, total recoverable	1000	1000
Manganese, dissolved**	50	1000
Manganese, total recoverable	200	-
Nitrate	10,000	100,000 ™
Nitrite	500	4500 ™
Phosphate, ortho	-	-
Phosphate, total	-	-
Selenium, dissolved**	5	5
Silver, dissolved**	0.59	0.59
Sulfate	250,000	250,000
Sulfide	2	2

*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.
TM – Temporary Modification

EPA Method 524.2 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	0.5	Chloroform	5.7	0.5	0.5
1,1,1-Trichloroethane	200	0.5	0.5	Chloromethane	none	0.5	0.5
1,1,2,2-Tetrachloroethan	0.18	0.5	0.5	Dibromochloromethane	none	0.5	0.5
1,1,2-Trichloroethane	3	0.5	0.5	Dibromomethane	none	0.5	0.5
1,1-Dichlorethane	none	0.5	0.5	Dichlorodifuoromethane	none	0.5	0.5
1,1-Dichlorethene	7	0.5	0.5	Ethylbenzene	700	0.5	0.5
1,1-Dichloropropene	none	0.5	0.5	Fluorotrichloromethane	none	0.5	0.5
1,2,3-Trichlorobenzene	none	0.5	0.5	Hexachlorobutadiene	14	0.5	0.5
1,2,3-Trichloropropane	none	0.5	0.5	Isopropylbenzene	none	0.5	0.5
1,2,4-Trichlorobenzene	70	0.5	0.5	Naphthalene	28	0.5	0.5
1,2,4-Trimethylbenzene	none	0.5	0.5	Propylbenzene	none	0.5	0.5
1,2-Dichlorobenzene	600	0.5	0.5	Styrene	100	0.5	0.5
1,2-Dichloroethane	0.38	0.5	0.5	Tetrachloroethene	5	0.5	0.5
1,2-Dichloropropane	0.52	0.5	0.5	Toluene	1000	0.5	0.5
1,3,5-Trimethylbenzene	none	0.5	0.5	Trichloroethene	5	0.5	0.5
1,3-Dichlorobenzene	600	0.5	0.5	Vinyl chloride	2	0.5	0.5
1,3-Dichloropropane	none	0.5	0.5	Xylene, (total)	10,000	0.5	0.5
1,4-Dichlorobenzene	75	0.5	0.5	cis-1,2-Dichlroethene	70	0.5	0.5
2,2-Dichloropropane	none	0.5	0.5	cis-1,3-Dichloropropene	none	0.5	0.5
2-Chlorotoluene	none	0.5	0.5	n-Butylbenzene	none	0.5	0.5
4-Chlorotoluene	none	0.5	0.5	sec-Butylbenzene	none	0.5	0.5
4-Isopropyltoluene	none	0.5	0.5	tert-Butylbenzene	none	0.5	0.5
Benzene	1.2	0.5	0.5	trans-1,2-Dichloroethene	100	0.5	0.5
Bromobenzene	none	0.5	0.5	trans-1,3-Dichloroethene	none	0.5	0.5
Chloroethane	none	0.5	0.5	Methylene Chloride	4.7	0.5	0.5
Bromodichloromethane	0.56	0.5	0.5				
Bromoform	4.3	0.5	0.5				
Carbon Tetrachloride	0.27	0.5	0.5				
Clorobenzene	100	0.5	0.5				
Chloroethane	none	0.5	0.5				
1,1-Dichloropropene	none	0.5	0.5				

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-Ttichlorobenzene	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-Dinitroroluene	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-Nitoraniline	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

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AIR RESULTS

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CDPHE AIR MONITORING
FIRST QUARTER 2003

Laboratory and Radiation Services Division

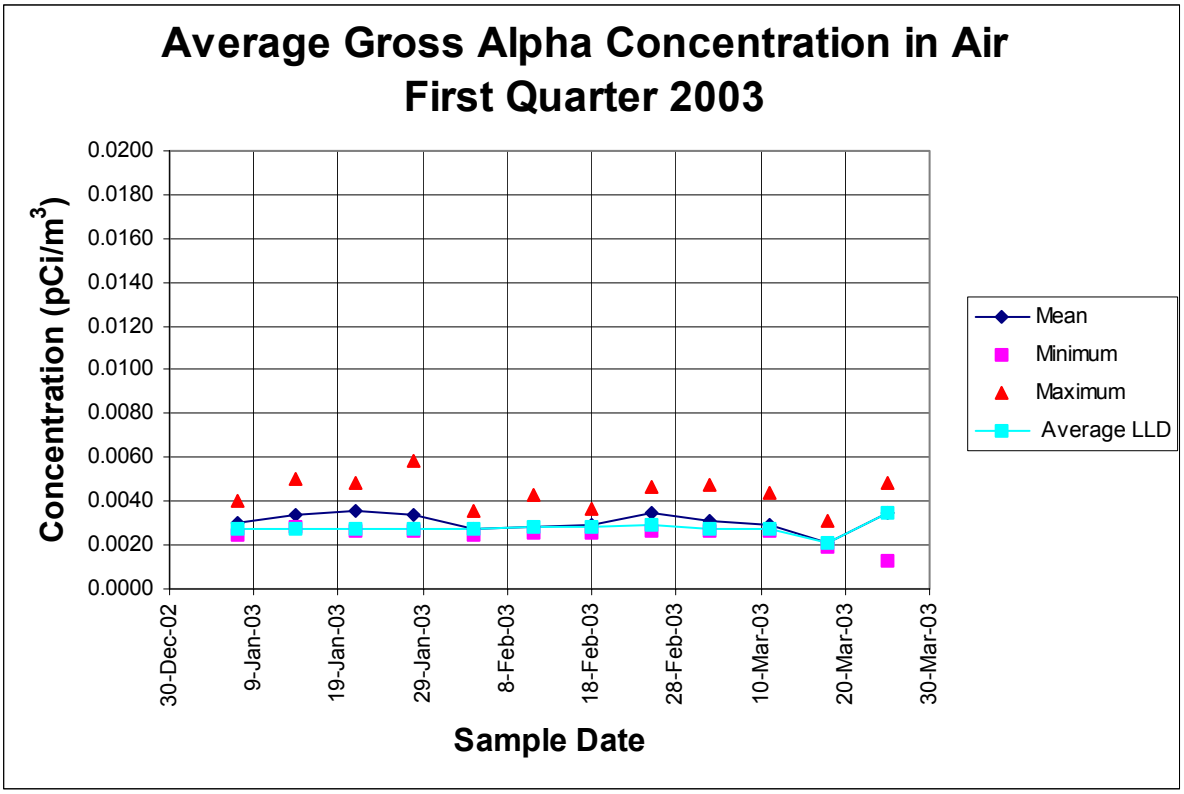
1. General Discussion

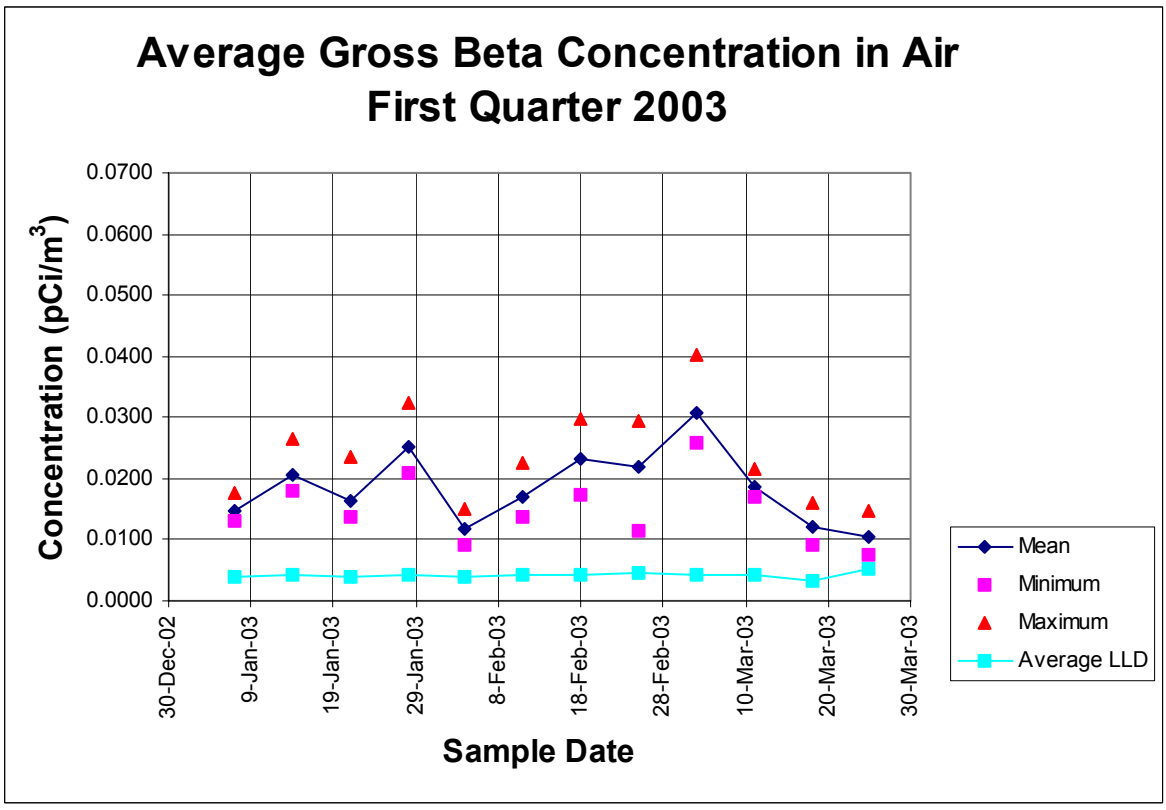
Table A contains the complete gross alpha /gross beta results for the 1st quarter 2003.

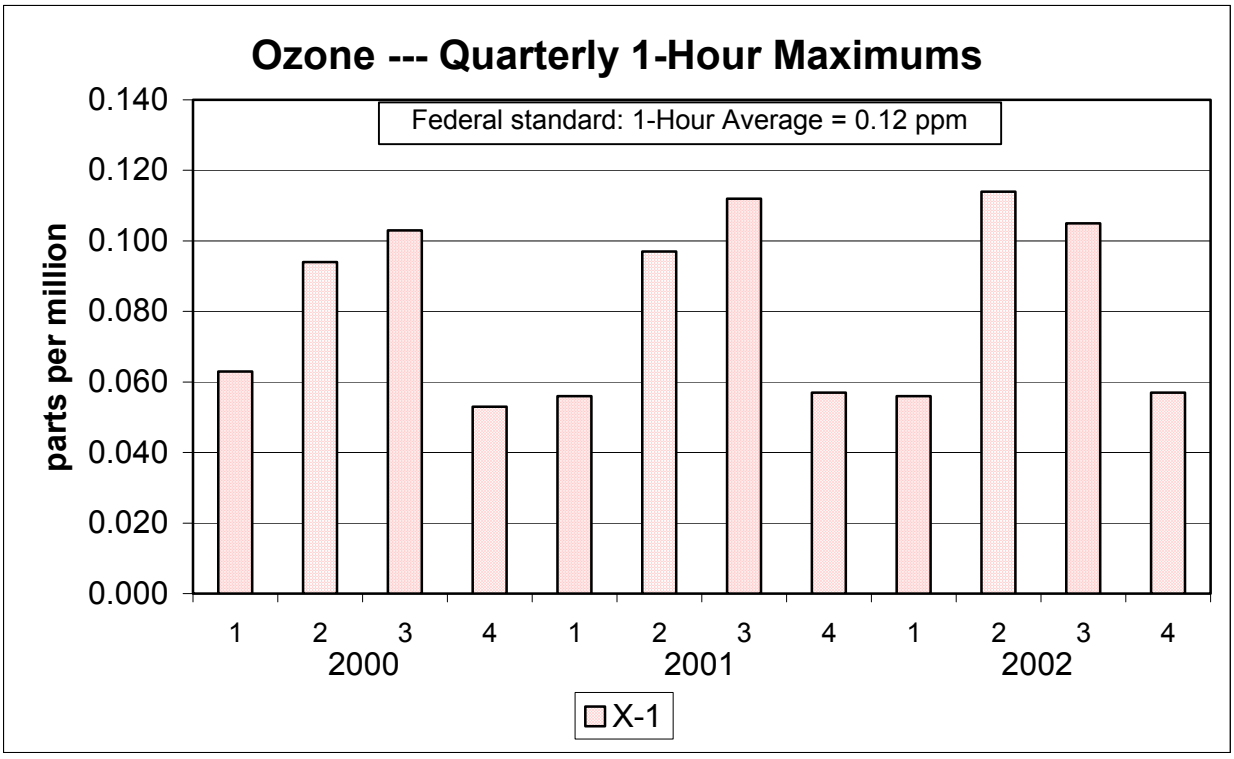
Table B-1 contains plutonium, americium and isotopic uranium results for the 3rd quarter 2002 for all sample locations. All of these data show no obvious anomalies, compared to historical data.

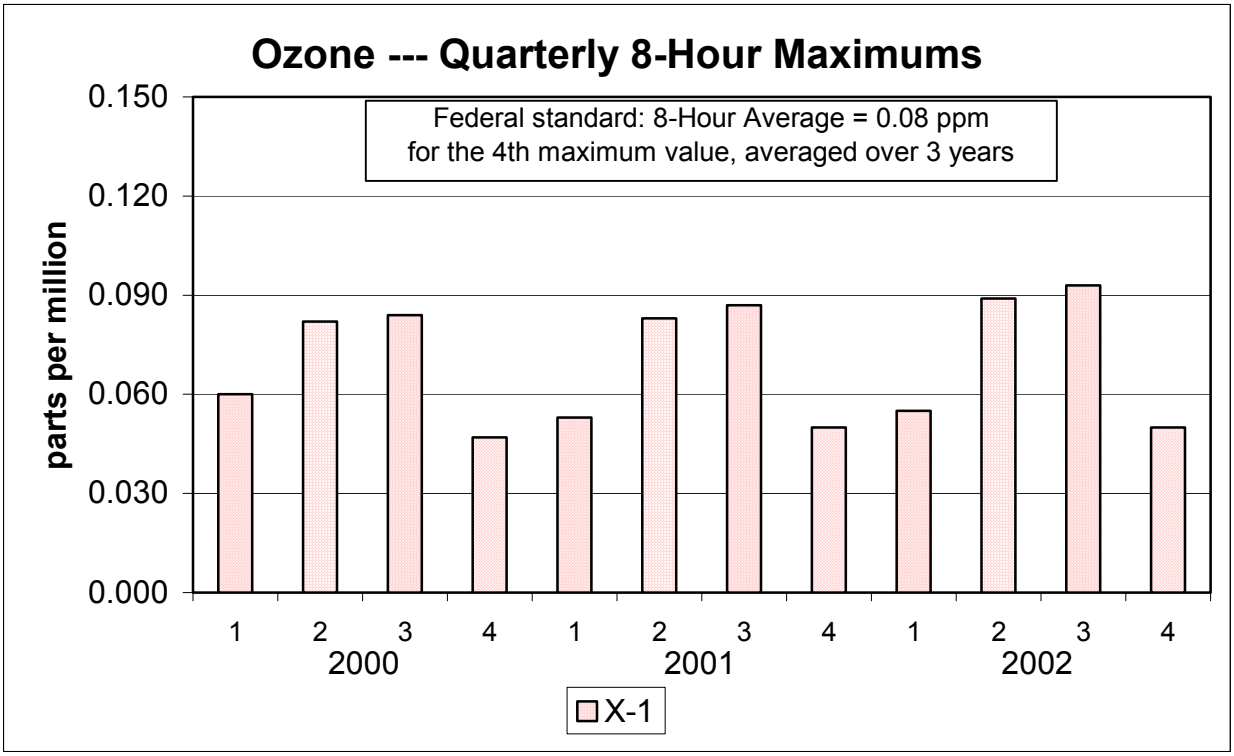
2. Graphical Presentation

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









. 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

FIRST QUARTER 2003

Location	Sampler Type	Number of Samples		Gross Alpha Mean pCi/m^3	Gross Alpha Max pCi/m^3	Gross Alpha Min pCi/m^3	Gross Beta Mean pCi/m^3	Gross Beta Max pCi/m^3	Gross Beta Min pCi/m^3
INDUSTRIAL AREA SAMPLERS									
D-1	TSP / Continuous	13	<	< 0.0043	0.0079	0.0019	0.0255	0.0415	0.0164
D-3	TSP / Continuous	13	<	< 0.0034	0.0053	0.0019	0.0250	0.0442	0.0108
E-1-T	TSP / Continuous	12	<	< 0.0039	0.0055	0.0024	0.0228	0.0369	0.0126
BUFFER ZONE SAMPLERS									
D-9	TSP / Continuous	13	<	< 0.0037	0.0084	0.0011	0.0231	0.0406	0.0108
D-10	TSP / Continuous	12	<	< 0.0037	0.0072	0.0009	0.0229	0.0362	0.0157
E-2-T	TSP / Continuous	12	<	< 0.0039	0.0087	0.0012	0.0249	0.0473	0.0131
SITE BOUNDARY SAMPLERS									
X-1	TSP / Continuous	13	<	< 0.0030	0.0053	0.0016	0.0237	0.0388	0.0149
X-2	TSP / Continuous	13	<	< 0.0038	0.0060	0.0015	0.0261	0.0480	0.0120
X-3	TSP / Continuous	12	<	< 0.0038	0.0087	0.0016	0.0226	0.0334	0.0120
X-4	TSP / Continuous	13	<	< 0.0033	0.0075	0.0005	0.0242	0.0416	0.0112
X-5	TSP / Continuous	9	<	< 0.0029	0.0041	0.0012	0.0227	0.0406	0.0151

pCi/m^3 = Picocuries per cubic meter

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

Environmental Surveillance Report

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

Third QUARTER 2002

								Mean
LOCATION	SAMPLER	$^{239+240}$Pu	^{241}Am	$^{239+240}$Pu/^{241}Am	^{234}U	^{235}U	^{238}U	Gross Alpha
	TYPE	pCi/M^3	pCi/M^3	Ratio	pCi/M^3	pCi/M^3	pCi/M^3	pCi/M^3
D-1	TSP/Continuous	0.000005 ± 0.000002	< 0.000004	---	0.000039	< 0.000005	0.000036	< 0.0045
D-3	TSP/Continuous	0.000100 ± 0.000013	0.000019 ± 0.000005	5.3 ± 1.6	0.000027	< 0.000004	0.000039	0.0055
X-1	TSP/Continuous	< 0.000002	< 0.000006	---	0.000042	< 0.000007	0.000036	0.0054
X-2	TSP/Continuous	< 0.000004	0.000013 ± 0.000005	---	0.000069	< 0.000005	0.000042	0.0058
X-3	TSP/Continuous	0.000004 ± 0.000002	< 0.000012	---	0.000037	< 0.000003	0.000041	0.0050
X-4	TSP/Continuous	0.000002 ± 0.000001	< 0.000003	---	< 0.000027	< 0.000005	0.000049	< 0.0050
X-5	TSP/Continuous	0.000004 ± 0.000002	< 0.000004	---	0.000057	< 0.000007	0.000050	0.0064

pCi/m^3 = Picocuries per cubic meter **TSP = Total Suspended Particulates** **Continuous = continuous sampling**

Environmental Surveillance Report

TABLE D: INORGANIC GASEOUS COMPOUNDS IN AIR

Fourth QUARTER 2002

Compound	North Site (X-1) Average 1-Hour ppm	Maximum 1-Hour ppm	Maximum 8-Hour Average ppm	# Hours
		OCTOBER 2002		
Ozone (O_3)	0.028	0.057	0.050	740
		NOVEMBER 2002		
Ozone (O_3)	0.031	0.051	0.049	718
		DECEMBER 2002		
Ozone (O_3)	0.028	0.052	0.049	735

ppm = Parts per million
N/A = Not available

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WATER RESULTS

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CDPHE Surface Water Sampling

First Quarter 2003

Surface water sampling conducted by CDPHE for the 1st Quarter 2003, included:

- Wastewater Treatment Plant (WWTP) influent samples from Building 995 were collected on January 22, 2003, February 19, 2003, and March 26, 2003. Samples from the north and south parts of the sewer system were collected from Building 990 on March 26, 2003.

- Pre-discharge samples were collected from Ponds A-4 and B-5 on January 28, 2003, and from Pond B-5 on March 24, 2003.

- Nitrate and performance monitoring samples were taken from North and South Walnut Creek on March 5, 2003. VOC samples were taken at Ponds B1, B2N, B2S, B3-EFFL, and B4. Nitrate samples taken SW-118, SW-093, GS-13, A3, and GS-10. Chloride samples were taken at SW-093, GS-13, GS-10, and GS-9. Metals samples were taken at GS-9 and GS-13.

Table G provides a summary of the sample activity and parameters collected by CDPHE. Table H presents inorganic results.

Wastewater Treatment Plant Influent

WWTP Influent is monitored to evaluate routine and non-routine discharges to the WWTP. The CDPHE sampling supplements sampling conducted by the Site for WWTP operational evaluations and permit requirements. Only the CDPHE results are presented in this document. Reference Table G for monitoring specifics.

Copper, iron, silver, manganese, lithium, nickel, gross beta, and americium were detected in influent samples during this quarter. None of the detections exceeded the respective effluent limit or stream standard.

Pre-Discharge Monitoring

The Pre-Discharge sampling program is conducted for compliance evaluation of the Site's ability to discharge storm water and treated wastewater to the Big Dry Creek drainage. Pre-Discharge Monitoring is conducted at the terminal ponds on Walnut Creek (Pond A4 and Pond B5). Typically the Walnut Creek Ponds A4 and B5 are discharged 8-10 times per years and Woman Creek Pond C2 once a year. Sampling is conducted by both the Site and CDPHE. Only the CDPHE results are presented in this document. Reference Table G for monitoring specifics.

This quarters' pre-discharge samples from Pond B5 did not exhibit any concentrations above

established RFCA action levels or applicable WQCC stream standards.

This quarters' pre-discharge samples from Pond A4 did not exhibit any concentrations above established RFCA action levels or applicable WQCC stream standards

Point of Compliance - Surface Water Results

Point of Compliance monitoring is conducted below the terminal ponds and at the Site boundary along Indiana Street, on both Walnut and Woman Creek. Point of Compliance monitoring is conducted to evaluate Site compliance with WQCC stream standards and RFCA action levels, as appropriate. Point of Compliance monitoring activities are shared between CDPHE and the Site. Only the CDPHE monitoring results are presented in this document. Reference Table G for monitoring specifics.

Nutrient Sampling - North Walnut Creek

This *Ad Hoc* program conducted by CDPHE monitors nutrient concentrations related to nitrate and ammonia in the North and South Walnut Creek drainages as a result of Sewage Treatment Plant Operations and Solar Pond Groundwater Plume. The nitrate profile in the Walnut Creek drainages exhibits a pattern of elevated levels in excess of the underlying standard, since the time the French drain and active treatment system for the solar pond area was dismantled and discontinued, and the installation of the passive solar pond plume passive treatment project. Historically the highest exceedences are at GS-13, which more represent the full impact of the solar pond nitrate plume into North Walnut Creek.

This quarters' nitrate results ranged from <0.7 mg/L to 4.1 mg/L. The highest result was from the sample collected above Pond A-3. All results were less than the temporary modification of 100 mg/L. The normal Colorado standard for nitrate is 10 mg/L.

This quarters' total ammonia results ranged from 0.05 mg/L to 1.6 mg/L. Calculating for unionized ammonia exhibited concentrations ranging from 0.0002 to 0.0122 mg/L, compared against the conservative unionized standard of 0.1 mg/L (segment 4a stream standard), no samples exceed the stream standard.

Performance Monitoring – Mound/East Trench Plume

The Mound and East Trenches groundwater contaminant plumes contain volatile organic compounds (VOCs) and select metals. Groundwater collection and treatment systems are in place and appear to be effective. However, it is possible that some contaminated groundwater either was downgradient of the collection systems before installation, or that some groundwater may be by-passing the collection trenches. There is no in-stream monitoring specified in the Decision Documents for these systems that can either verify or disprove this. In order to ensure that stream standards are being attained, monitoring for VOCs and selected metals was commenced during second quarter 2002 in South Walnut Creek in the immediate vicinity of where the groundwater contamination plumes may be intersecting the stream.

Exceedances of trichloroethylene , tetrachloroethylene, chloroform, vinyl chloride , and carbon tetrachloride were found in Pond B2.

Performance Monitoring – Solar Pond Plume

The Solar Ponds groundwater contaminant plume contains high levels of nitrates and uranium, and lower concentrations of several other metals. Groundwater collection and treatment systems have been installed, and the treatment appears to be effective. However, it is possible that some contaminated groundwater either was already down gradient of the collection system before it was installed, or, that some groundwater may be bypassing the collection trench.

While the Site monitors in-stream uranium concentrations, CDPHE will perform in-stream monitoring for metals. This data will be used in order to ensure that stream standards are being attained. It should be noted that both the Site and CDPHE monitor nitrate concentrations at this location, and the CDPHE nitrate monitoring is described in the ad-hoc section of this ESR.

No exceedances were found.

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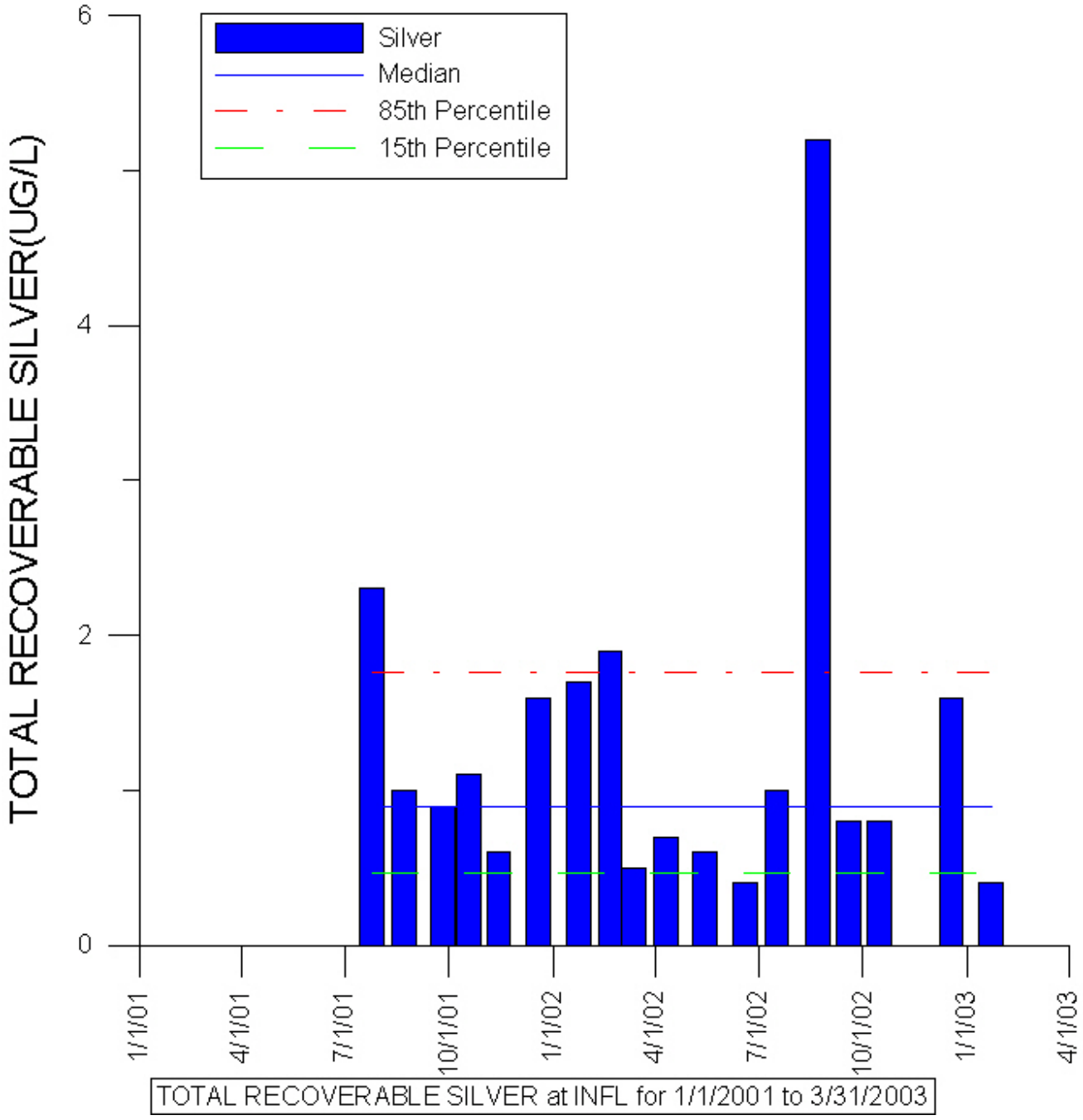
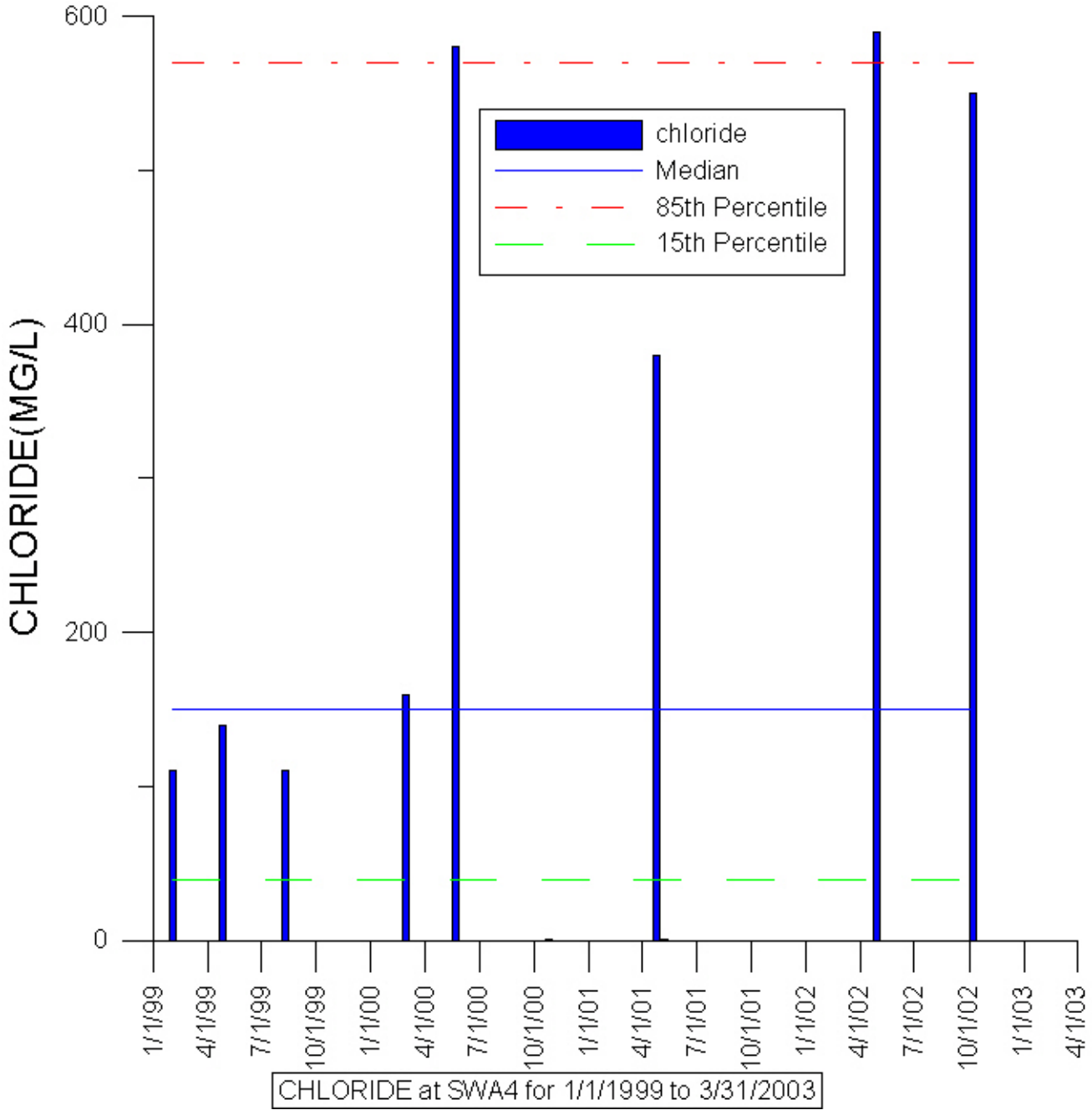

Silver
Median
85th Percentile
15th Percentile
TOTAL RECOVERABLE SILVER(UG/L)
6
4
2
0
1/1/01
4/1/01
7/1/01
10/1/01
1/1/02
4/1/02
7/1/02
10/1/02
1/1/03
4/1/03
TOTAL RECOVERABLE SILVER at INFL for 1/1/2001 to 3/31/2003


600
400
200
0
CHLORIDE(MG/L)
chloride
Median
85th Percentile
15th Percentile
1/1/99
4/1/99
7/1/99
10/1/99
1/1/00
4/1/00
7/1/00
10/1/00
1/1/01
4/1/01
7/1/01
10/1/01
1/1/02
4/1/02
7/1/02
10/1/02
1/1/03
4/1/03
CHLORIDE at SWA4 for 1/1/1999 to 3/31/2003

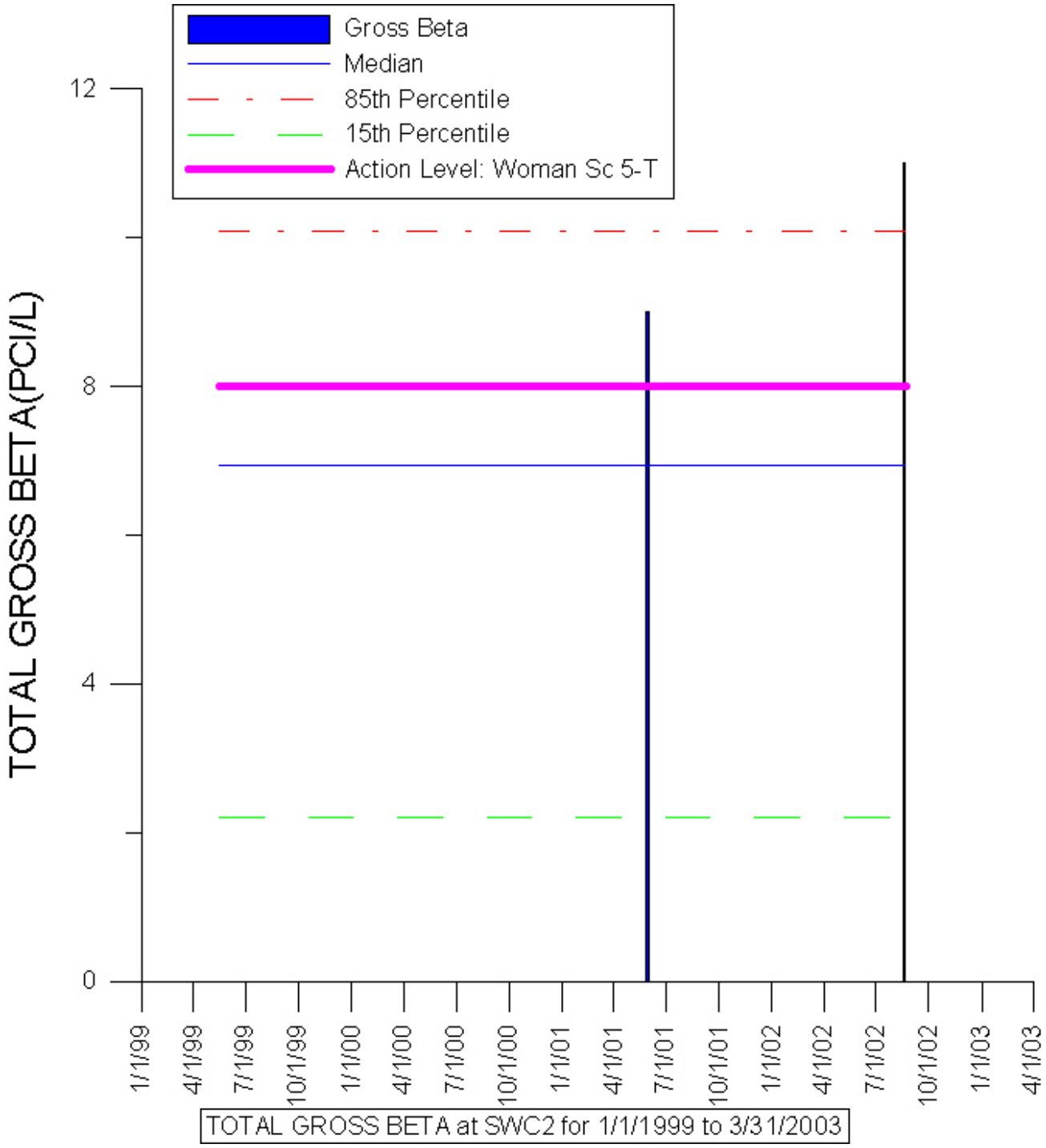

Gross Beta
Median
85th Percentile
15th Percentile
Action Level: Woman Sc 5-T
TOTAL GROSS BETA(PCI/L)
12
8
4
0
1/1/99
4/1/99
7/1/99
10/1/99
1/1/00
4/1/00
7/1/00
10/1/00
1/1/01
4/1/01
7/1/01
10/1/01
1/1/02
4/1/02
7/1/02
10/1/02
1/1/03
4/1/03
TOTAL GROSS BETA at SWC2 for 1/1/1999 to 3/31/2003

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TABLE G – CDPHE SURFACE WATER MONITORING PROGRAM

Sampling Frequencies for Listed Locations & Parameters			Pre Discharge		Treatment Plant Influent		Performance Monitoring		Ad Hoc Program	Stream Segment 4, POC Monitoring, Non-POC Monitoring at Indiana					
Parameter or Method	**Method**	**Total # Analyses Per Year All Sites**	**Pond A4 or Pond B5**	**Pond C2**	**Bldg 995 Following Equalization Basin**	**: Bldg 990 N. & S. Interceptors Prior to Equalization Basin**	**Mound/ East Trenches Plume (footnote a)**	**Solar Pond Plume**	**Nitrate Study 8 Stations (footnote b)**	**During Pond Releases (footnote c)**		**Dry Weather Flow - No Pond Release**		**Following Storm Events - No Pond Release [d]**	
			SWA4 or SWB5	SWC2	INFL	990 INFL_N 990 INFL_S	SWB1, SWB2, SWB3, GS09	GS13	various	**SW114 (GS03) Walnut Ck**	**SW001 (GS01) Woman Ck**	**SW114 (GS03) Walnut Ck**	**SW001 (GS01) Woman Ck**	**SW114 (GS03) Walnut Ck**	**SW001 (GS01) Woman Ck**
Field pH		na	Field pH and Temperature Will be Collected for All Samples >>>>>>>>>												
Field Temp, C		na	Field pH and Temperature Will be Collected for All Samples >>>>>>>>>												
Field DO		na	10/yr[1]	1/yr[1]											
RADS - Total (unfiltered), RUSH															
Americium - 241	TRU SPEC	11	10/yr[1]	1/yr[1]											
Plutonium - 239/240	TRU SPEC	11	10/yr[1]	1/yr[1]											
Gross Alpha	900.0	11	10/yr[1]	1/yr[1]											
Gross Beta	900.0	11	10/yr[1]	1/yr[1]											
RADS - Total (unfiltered)															
Americium - 241	TRUSPEC	20			Monthly[2]	Quarterly[1]									
Plutonium - 239/240	TRUSPEC	20			Monthly[2]	Quarterly[1]									
Gross Alpha	900.0	20			Monthly[2]	Quarterly[1]									
Gross Beta	900.0	20			Monthly[2]	Quarterly[1]									
Uranium, Fluorometric	908.0	25	Quarterly[1]	1/yr[1]	Monthly[2]	Quarterly[1]									
Metals - Dissolved (filtered)															
Ag	200.8	22 - 26	Quarterly[1]	1/yr[1]			Quarterly[1]	Quarterly[1]		Quarterly[1]	1/yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]
Cu	200.8	22 - 26	Quarterly[1]	1/yr[1]			Quarterly[1]	Quarterly[1]		Quarterly[1]	1/yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]
Mn	200.7	22 - 26	Quarterly[1]	1/yr[1]			Quarterly[1]	Quarterly[1]		Quarterly[1]	1/yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]
Ni	245.1	22 - 26	Quarterly[1]	1/yr[1]			Quarterly[1]	Quarterly[1]		Quarterly[1]	1/yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]
Se	200.8	22 - 26	Quarterly[1]	1/yr[1]			Quarterly[1]	Quarterly[1]		Quarterly[1]	1/yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]
Metals - Total Recoverable															

TABLE G – CDPHE SURFACE WATER MONITORING PROGRAM

Sampling Frequencies for Listed Locations & Parameters			Pre Discharge		Treatment Plant Influent		Performance Monitoring		Ad Hoc Program	Stream Segment 4, POC Monitoring, Non-POC Monitoring at Indiana					
Parameter or Method	**Method**	**Total # Analyses Per Year All Sites**	**Pond A4 or Pond B5**	**Pond C2**	**Bldg 995 Following Equalization Basin**	**: Bldg 990 N. & S. Interceptors Prior to Equalization Basin**	**Mound/ East Trenches Plume (footnote a)**	**Solar Pond Plume**	**Nitrate Study 8 Stations (footnote b)**	**During Pond Releases (footnote c)**		**Dry Weather Flow - No Pond Release**		**Following Storm Events - No Pond Release [d]**	
			SWA4 or SWB5	SWC2	INFL	990 INFL_N 990 INFL_S	SWB1, SWB2, SWB3, GS09	GS13	various	**SW114 (GS03) Walnut Ck**	**SW001 (GS01) Woman Ck**	**SW114 (GS03) Walnut Ck**	**SW001 (GS01) Woman Ck**	**SW114 (GS03) Walnut Ck**	**SW001 (GS01) Woman Ck**
(unfiltered)															
As	200.8	42 - 46	Quarterly[1]	1/yr[1]	Monthly[2]	Quarterly[1]	Quarterly[1]	Quarterly[1]		Quarterly[1]	1/yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]
Be	200.8	42 - 46	Quarterly[1]	1/yr[1]	Monthly[2]	Quarterly[1]	Quarterly[1]	Quarterly[1]		Quarterly[1]	1/yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]
Cd	200.8	42 - 46	Quarterly[1]	1/yr[1]	Monthly[2]	Quarterly[1]	Quarterly[1]	Quarterly[1]		Quarterly[1]	1/yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]
Cr(VI) dslvd??	200.8	42 - 46	Quarterly[1]	1/yr[1]	Monthly[2]	Quarterly[1]	Quarterly[1]	Quarterly[1]		Quarterly[1]	1/yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]
Fe	200.7	42 - 46	Quarterly[1]	1/yr[1]	Monthly[2]	Quarterly[1]	Quarterly[1]	Quarterly[1]		Quarterly[1]	1/yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]
Lithium	200.8	42 - 46	Quarterly[1]	1/yr[1]	Monthly[2]	Quarterly[1]	Quarterly[1]	Quarterly[1]		Quarterly[1]	1/yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]
Thallium	200.8	42 - 46	Quarterly[1]	1/yr[1]	Monthly[2]	Quarterly[1]	Quarterly[1]	Quarterly[1]		Quarterly[1]	1/yr[1]	2 / yr[1]	2 / yr	2 / yr	2 / yr
Special TR Metals (unfiltered) For STP Influent - until domestic sewage contributions are discontinued:															
Ag	200.8	20			Monthly[2]	Quarterly[1]									
Cu	200.7	20			Monthly[2]	Quarterly[1]									
Mn dslvd??	200.7	20			Monthly[2]	Quarterly[1]									
Ni	245.1	20			Monthly[2]	Quarterly[1]									
Se	200.8	20			Monthly[2]	Quarterly[1]									
Hardness as CaCO3	130.2	22-26	Quarterly[1]	1/yr[1]			Quarterly[1]	Quarterly[1]		Quarterly[1]	1/yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]
Organic Analyses															
VOCs	502.2	8					Semi-Annual[1]								

TABLE G – CDPHE SURFACE WATER MONITORING PROGRAM

Sampling Frequencies for Listed Locations & Parameters			Pre Discharge		Treatment Plant Influent		Performance Monitoring		Ad Hoc Program	Stream Segment 4, POC Monitoring, Non-POC Monitoring at Indiana					
Parameter or Method	**Method**	**Total # Analyses Per Year All Sites**	**Pond A4 or Pond B5**	**Pond C2**	**Bldg 995 Following Equalization Basin**	**: Bldg 990 N. & S. Interceptors Prior to Equalization Basin**	**Mound/ East Trenches Plume (footnote a)**	**Solar Pond Plume**	**Nitrate Study 8 Stations (footnote b)**	**During Pond Releases (footnote c)**		**Dry Weather Flow - No Pond Release**		**Following Storm Events - No Pond Release [d]**	
			SWA4 or SWB5	SWC2	INFL	990 INFL_N 990 INFL_S	SWB1, SWB2, SWB3, GS09	GS13	various	**SW114 (GS03) Walnut Ck**	**SW001 (GS01) Woman Ck**	**SW114 (GS03) Walnut Ck**	**SW001 (GS01) Woman Ck**	**SW114 (GS03) Walnut Ck**	**SW001 (GS01) Woman Ck**
Nutrients/Inorganics															
Ammonia as N	350.2	52 - 56	10/yr[1]	1/yr[1]					Quarterly[1]	Quarterly[1]	1/yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]
Nitrite/Nitrate as N	353.2	52 - 56	10/yr[1]	1/yr[1]					Quarterly[1]	Quarterly[1]	1/yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]
Phosphate, T	365.1	20 - 24	10/yr[1]	1/yr[1]						Quarterly[1]	1/yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]
Orthophosphate	365.2	20 - 24	10/yr[1]	1/yr[1]						Quarterly[1]	1/yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]
Solids, total suspended	160.1	40 - 44	10/yr[1]	1/yr[1]	Monthly[1]	Quarterly[1]				Quarterly[1]	1/yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]	2 / yr[1]
Chloride	325.3	5	Quarterly[1]	1/yr[1]											

[a] Metals and hardness monitoring will be conducted at GS09, below Pond B4. VOC monitoring will be conducted in Ponds B-1 and B-2 from the surface, and at the outfall from Ponds B-3 and below B-4 at GS09. VOC monitoring will be conducted in late fall

[b] Nitrate Special Study Stations: SW118, SW093, GS13, Pond A-4, GS10, EFFL, Pond B-5, SW114. Station EFFL is the outfall from the STP.

[c] Metals monitoring at Indiana Street "During Pond Releases", will be conducted for those pond discharges where metals monitoring was done for the Pre-Discharge sample.

[d] "Storm Event / No Pond Release" related monitoring may be conducted by the Site as part of it's Buffer Zone Hydrologic Monitoring Program . If not, the State will attempt to schedule grab sample collection.

[1] Grab Sample

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Environmental Surveillance
TABLE H - INORGANIC ANALYSIS OF SURFACE WATER
FIRST QUARTER 2003

Location	Sample Date	Parameter	Analysis	Units	*Analysis* 1st	2nd	3rd

Environmental Surveillance
TABLE H - INORGANIC ANALYSIS OF SURFACE WATER
FIRST QUARTER 2003

Location	Sample Date	Parameter	Analysis			Units	*Analysis* 1st	2nd	3rd
Influent to Sewage Treatment Plant (INFL)									
	1/22/2003								
		pH		8.09		Standard Units			
		Temperature		11.1		°C			
		Americium^{241}	<	0.009		pCi/L			
		Gross Alpha	<	4		pCi/L			
		Gross Beta		22	+/- 5	pCi/L			
		Plutonium$^{239+240}$		0.018	+/- 0.007	pCi/L			
		Uranium, Total	<	3		pCi/L			
		Arsenic, Total Recoverable	<	1		ug/L			
		Beryllium, Total Recoverable	<	1		ug/L			
		Cadmium, Total Recoverable	<	0.3		ug/L			
		Chromium, Total Recoverable	<	3		ug/L			
		Copper, Total Recoverable		0.031		ug/L			
		Iron, Total Recoverable		320		ug/L			
		Lithium, Total Recoverable		5		ug/L			
		Manganese, Total Recoverable		30		ug/L			
		Nickel, Total Recoverable	<	150		ug/L			
		Selenium, Total Recoverable	<	1.0		ug/L			
		Silver, Total Recoverable	<	0.4		ug/L			
		Thallium, Total Recoverable	<	1		ug/L			
		Total Suspended Solids		50		mg/L			
Pre-Discharge Monitoring									
Pond B5									
	1/28/2003								
		Dissolved Oxygen		12.44		mg/L			
		pH		8.98		Standard Units			
		Temperature		10.3		°C			
		Americium^{241}	<	0.020		pCi/L			
		Gross Alpha	<	5		pCi/L			
		Gross Beta		16	+/- 5	pCi/L			
		Plutonium$^{239+240}$		0.020	+/- 0.010	pCi/L			
		Uranium, Total	<	3		pCi/L			
		Arsenic, Total Recoverable		1		ug/L			
		Beryllium, Total Recoverable	<	1		ug/L			
		Cadmium, Total Recoverable	<	0.3		ug/L			
		Chromium, Total Recoverable	<	3		ug/L			
		Copper, Dissolved	<	5		ug/L			
		Iron, Total Recoverable	<	10		ug/L			
		Lithium, Total Recoverable		17		ug/L			
		Manganese, Total Recoverable		42		ug/L			
		Nickel, Dissolved	<	30		ug/L			
		Selenium, Dissolved	<	1.0		ug/L			
		Silver, Dissolved	<	0.4		ug/L			
		Thallium	<	1		ug/L			

Environmental Surveillance
TABLE H - INORGANIC ANALYSIS OF SURFACE WATER
FIRST QUARTER 2003

Location	Sample Date	Parameter	Analysis		Units	*Analysis* 1st	2nd	3rd
		Ammonia as N	1.6		mg/L			
		Chloride	380		mg/L			
		Hardness as CaCO3	190		mg/L			
		Nitrate/Nitrite	2.4		mg/L			
		Orthophosphate	1.43		mg/L			
		Phosphate, Total	1.6		mg/L			
		Total Suspended Solids	20		mg/L			
	3/24/2003							
		Dissolved Oxygen	8.76		mg/L			
		pH	7.89		Standard Units			
		Temperature	6.6		°C			
		Gross Alpha	< 3		pCi/L			
		Gross Beta	11	+/- 4	pCi/L			
		Uranium, Total	< 3		pCi/L			
		Ammonia as N	0.31		mg/L			
		Nitrate/Nitrite	1.7		mg/L			
		Phosphate, Total	0.71		mg/L			
		Total Suspended Solids	25		mg/L			
		Unionized Ammonia	0.0034		mg/L			
Pond A4								
	3/26/2003							
		Dissolved Oxygen	9.61		mg/L			
		pH	8.62		Standard Units			
		Temperature	10		°C			
		Uranium, Total	4		pCi/L			
		Arsenic, Total Recoverable	< 1		ug/L			
		Beryllium, Total Recoverable	< 1		ug/L			
		Cadmium, Total Recoverable	< 0.3		ug/L			
		Chromium, Total Recoverable	< 3		ug/L			
		Copper, Dissolved	< 25		ug/L			
		Iron, Total Recoverable	460		ug/L			
		Lithium, Total Recoverable	14		ug/L			
		Manganese, Dissolved	92		ug/L			
		Nickel, Dissolved	< 150		ug/L			
		Selenium, Dissolved	1.3		ug/L			
		Silver, Dissolved	< 0.4		ug/L			
		Thallium	< 1		ug/L			
		Ammonia as N	0.17		mg/L			
		Chloride	540		mg/L			
		Hardness as CaCO3	220		mg/L			
		Nitrate/Nitrite	3.1		mg/L			
		Orthophosphate	2.8		mg/L			
		Phosphate, Total	0.031		mg/L			
		Total Suspended Solids	47		mg/L			
		Unionized Ammonia	0.0122		mg/L			

Nutrient Monitoring
South Walnut Creek above B-Series Bypass (GS10)

Environmental Surveillance
TABLE H - INORGANIC ANALYSIS OF SURFACE WATER
FIRST QUARTER 2003

Location	Sample Date	Parameter	Analysis	Units	*Analysis* 1st 2nd 3rd
	3/05/2003				
		pH	7.85	Standard Units	
		Temperature	3.40	°C	
		Ammonia as N	0.32	mg/L	
		Chloride	1900	mg/L	
		Nitrate/Nitrite	2.6	mg/L	
		Phosphate, Total	0.14	mg/L	
		Unionized Ammonia	0.0025	mg/L	
Effluent from Sewage Treatment Plant (EFFL)					
	3/05/2003				
		pH	7.7	Standard Units	
		Temperature	11	°C	
		Ammonia as N	1.7	mg/L	
		Chloride	580	mg/L	
		Nitrate/Nitrite	4.8	mg/L	
		Phosphate, Total	2.5	mg/L	
		Unionized Ammonia	0.0169	mg/L	
SW118					
	3/05/2003				
		pH	7.65	Standard Units	
		Temperature	-0.1	°C	
		Ammonia as N	0.05	mg/L	
		Nitrate/Nitrite	0.73	mg/L	
		Phosphate, Total	0.021	mg/L	
		Unionized Ammonia	0.0002	mg/L	
Walnut Creek below Portal 3 (SW093)					
	3/05/2003				
		pH	7.91	Standard Units	
		Temperature	1.2	°C	
		Ammonia as N	0.20	mg/L	
		Chloride	2400	mg/L	
		Nitrate/Nitrite	3.2	mg/L	
		Phosphate, Total	0.013	mg/L	
		Unionized Ammonia	0.0015	mg/L	
Pond A3					
	3/05/2003				
		pH	8.32	Standard Units	
		Temperature	2.4	°C	
		Ammonia as N	0.21	mg/L	
		Nitrate/Nitrite	4.1	mg/L	
		Phosphate, Total	0.018	mg/L	
		Unionized Ammonia	0.0043	mg/L	

Environmental Surveillance
TABLE H - INORGANIC ANALYSIS OF SURFACE WATER
FIRST QUARTER 2003

Location	Sample Date	Parameter	Analysis	Units	*Analysis* 1st	2nd	3rd

Environmental Surveillance
TABLE I – VOLATILE ORGANIC ANALYSIS OF SURFACE WATER
FIRST QUARTER 2003

Location	Sample Date	Parameter	Analysis Level	Units	*Analysis* 1st	2nd	3rd
Pond B2 North							
	3/05/2003						
		Chloroform	0.9	ug/L			
		Trichlorothethylene	19	ug/L			
		Tetraochloroethylene	2.4	ug/L			
		Vinyl Chloride	0.8	ug/L			
		cis-1,2-Dichlorothylene	6	ug/L			
		Dibromochloromethane	2.5	ug/L			
Pond B2 South							
	3/05/2003						
		Dibromochloromethane	2.5	ug/L			
		Tetraochloroethylene	60	ug/L			
		cis-1,2-Dichlorothylene	41	ug/L			
		Chloroform	12	ug/L			
		1,1,1-Trichloroethane	0.6	ug/L			
		Vinyl Chloride	2.9	ug/L			
		1,1-Dichloroethylene	3.5	ug/L			
		Trichlorothethylene	400	ug/L			
		Carbon Tetrachloride	5.3	ug/L			
Pond B4							
	3/05/2003						
		Trichlorothethylene	0.7	ug/L			

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GLOSSARY

Ag	silver
Am	americium
AOI	analyte of interest
APCD	Air Pollution Control Division
AQCC	Air Quality Control Commission
ALF	action level framework
B	found in blank
Be	beryllium
CAS	chemical abstracts service number
Cd	cadmium
CDPHE	Colorado Department of Public Health and Environment
Cr	chromium
D&D	decontamination and decommissioning
DOE	Department of Energy
EPA	Environmental Protection Agency
ESR	Environmental Surveillance Report
H	exceeds holding time
IMP	Integrated Monitoring Plan
J	detected but below practical quantitative limit
LARS	Laboratory and Radiation Services
mg/L	Milligram per liter
MCL	Maximum Contaminant Level (below MCL is safe)
MDL	minimum detection level
Nd	not detected
NO_3	nitrate
pCi/L	picocuries per liter
pCi/m^3	picocuries per cubic meter
PM	particulate material
ppb	parts per billion
ppm	parts per million
PQL	practical quantitative level
Pu	plutonium
QNS	quantity not sufficient
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
TLV	ACGIH Threshold limit value
TSP	Total Suspended Particulate
TSS	**Total Suspended Solids**
µg/L	microgram per liter
$\mu g/m^3$	micrograms per cubic meter
U	uranium
VOCs	volatile organic compounds
WQCC	Water Quality Control Commission
WQCD	Water Quality Control Division
WWTP	wastewater treatment plan

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If you have questions or comments about this report, or if you would like to be placed on the mailing or email list to receive copies of this report in the future, please write to:

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