LAKE LAS VEGAS RESORT

June 29, 2004

Mr. Tom Porta, P.E.
Bureau Chief, Water Quality Planning
Nevada Division of Environmental Protection
Department of Conservation and Natural Resources
333 Nye Lane
Carson City, NV 89710

RE: 2003 Lake Las Vegas Water Quality Monitoring Report

Dear Mr. Porta:

Please find enclosed a copy of the 2003 Lake Las Vegas Monitoring Report for your review.

Your continued cooperation is appreciated. Please contact me with any questions or concerns at (702) 564-1600.

Sincerely,
Lake Las Vegas Joint Venture

Steven P. Weber
Director, Environmental Resources

SPW/ka

Enclosure

Cc: Jon Palm, P.E. NDEP w/enclosure
Ed Wojcik, P.E. CCHD w/enclosure
Curt Chandler, P.E. COH w/enclosure
Dave Laman, Premier Residential w/enclosure

2003 LAKE LAS VEGAS WATER QUALITY MONITORING REPORT

Prepared by:

LAKE LAS VEGAS JOINT VENTURE
1605 Lake Las Vegas Parkway
Henderson, Nevada 89011

Submitted to:

Nevada Division of Environmental Protection
(NDEP)

June 2004

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I. INTRODUCTION

A. Project History

J. Carlton Adair, then President of the Port Holiday Authority conceived the idea of Lake Las Vegas in 1964. The 2243-acre development project was known as Port Holiday, and the lake was called "Lake Adair." Project land was acquired from the federal government under a land exchange act (PL88-639) authorized by Congress on October 8, 1964. Approximately 170 acres of privately owned land in the Lake Mead National Recreation Area (LMNRA) was exchanged for 2,243 acres in Las Vegas Wash (LVW). That property was located along the western border of the LMNRA in the LVW (Figure 1).

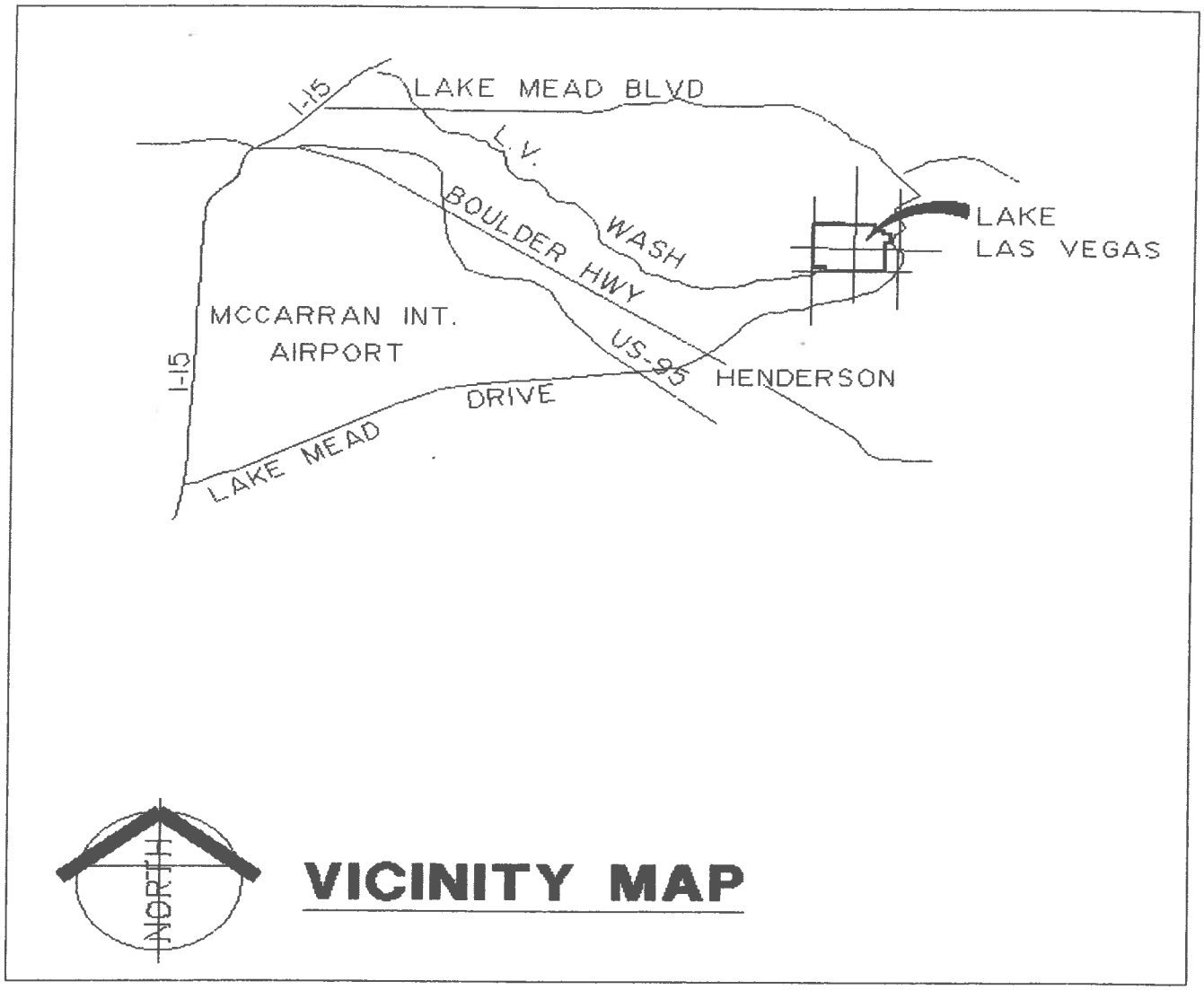
Carlton Adair halted the project in 1971, though a considerable amount of engineering and feasibility work had been done. The project remained idle until 1982 when it was reinitiated as the Lake at Las Vegas Project by Barry Silverton and the Pacific Malibu Development Corporation of Los Angeles, CA. Pacific Malibu and its prime consultant J. M. Montgomery (JMM) Consulting Engineers conducted extensive engineering and environmental studies during 1984-1987. Transcontinental Corporation of Santa Barbara, California, acquired controlling interest in the project in 1988. Transcontinental Corporation and its consultants completed the engineering and environmental studies and obtained the necessary local, state, and federal permits required to start construction of the project. Construction began on April 1, 1989. The project is now called "Lake Las Vegas Resort."

B. Project Description

The focal point of the project is a 320-acre recreational lake that is developed behind a 4800-ft., S-shaped earthen dam, 1500 ft. upstream of North Shore Road. The 190-ft. high dam was constructed with 3.0 million cubic yards of locally available materials. Lake elevation is maintained between 1401.85 ft. and 1404.85 ft. (NAVD 88). At an elevation of 1404.85 ft., the Lake has a storage capacity of approximately 10,000 acre feet, comprises 320 surface acres, a two mile length, a one mile width, and 12.3 miles of shoreline. Lake fill water is drawn from Lake Mead, and conveyed by the Basic Management Incorporated Pipeline (BMI). Approximately 7,000 – 9,000 acre-feet are required annually for project irrigation, seepage, evaporative losses from the lake.

Las Vegas Wash flows are by-passed under the lake through two 84-inch diameter reinforced concrete pipelines. The bypass system is 9,450 ft. in length and designed to pass Las Vegas Wash (LVW) flows up to approximately 1,200 cubic feet per second (cfs). Flows currently
average about 252 cubic feet per second in LVW in 2003.

Figure 1. **Location and description of Lake Las Vegas Resort (Las Vegas Review Journal map by Jim Day July 28, 1999)**



II. METHODS

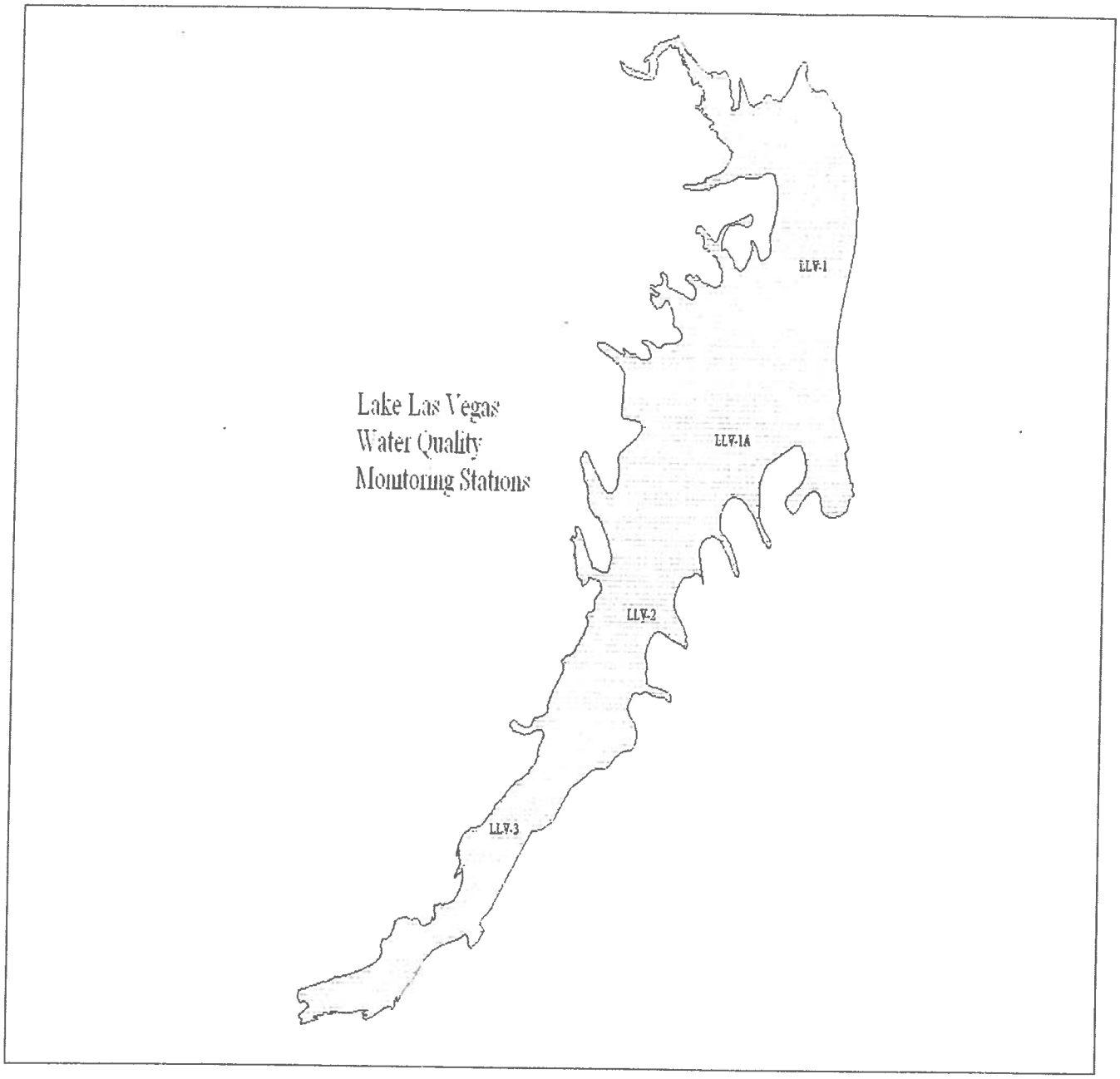
The revised Clark County 208 Water Management Plan was approved by the Clark County Board of County Commissioners on April 5, 1988 and certified by the State of Nevada on August 8, 1988. This plan required a water quality-monitoring program be developed for Lake Las Vegas Resort. The monitoring was required to insure that construction activities and operations of the reservoir did not violate the Las Vegas Wash water quality standards. The water quality-monitoring program was initiated in June 1991, and Lake Las Vegas has submitted annual reports to Nevada Division of Environmental Protection for review.

A. Lake Las Vegas Monitoring Sites

Since 1991, water quality monitoring was conducted on Lake Las Vegas monthly in January, February, November, and December, biweekly during March and October, and weekly during April through September.

Water quality monitoring was conducted at sites shown in Figure 2, at fixed points along the historical center channel in the deepest part of the Lake.

Figure 2. **Location of water quality monitoring stations at Lake Las Vegas.**



B. Field Measurements

Temperature, dissolved oxygen, pH, and specific conductance were measured throughout the vertical column at all sites with a Hydrolab Surveyor Model III Water Quality Analyzer or a YSI Water Quality Analyzer (Table 1). Transparency was measured at each lake site with a Secchi disc. Duplicate measurements were made on approximately 10% of the measurements.

Table 1. **2003 Lake Las Vegas physical, chemical and biological analyses.**

Sampling Program			
Measurements	Depth(s)	Frequency	Method(s)
Physical			
Temperature (°C)	1.0 m Intervals Variable Surface to Bottom		Electronic Multimeter
Dissolved Oxygen (mg/l)	"	"	"
pH (Std. Units)	"	"	"
Conductivity (µmhos/cm)	"	"	"
Secchi Depth (m)	Surface	"	"
Turbidity (NTU)	0 - 2.5 m Int.	"	EPA 180.1
Chemical			
Total Nitrogen (µg/l)	0 - 2.5 m Int.	"	APHA (1995)
Ammonia-N (µg/l)	"	"	EPA 350.2
Total Kjeldehl Nitrogen	"	"	EPA 351.3
Total Phosphorus (µg/l)	"	"	EPA 365.2
Ortho-Phosphorus (µg/l)	"	"	EPA 365.2
Total Suspended Solids (mg/l	"	"	EPA 160.1
Total Dissolved Solids (mg/l)	"	"	EPA 160.2
Major Anions/Cations (mg/l)	"	"	EPA 200.7
Sulfate	"	"	EPA 375.4
BOD 5	"	"	EPA 405.1
Biological			
Chlorophyll-a (µg/l)	"	"	Janik
Phytoplankton Counts (ng/m3)	"	"	"
Zooplankton Counts (No./l)	0 - 15 m Tow		"

C. Chemical and Biological Analysis

Depth integrated water samples were collected from 0 - 2.5 m at main-lake sampling sites (Figure 2). Additional depth samples were also collected quarterly at 5 m, 10 m, and 20 m at site LLV-1A with a Van Dorn sampler. Samples requiring filtration were filtered through 0.45 µm millipore filters.

Analyses were run on field duplicates at a frequency of approximately 10% of the samples. A State of Nevada certified laboratory ran the chemical and biological analyses with EPA-approved methods.

Samples were collected from the surface and near the bottom at site LLV-1A in December 2003 for analysis of toxic substances.

Monthly Zooplankton samples were collected at LLV-1 in a vertical tow from 0-15 m with an 80 μm Wisconsin plankton net. Phytoplankton (algae) was collected quarterly from the surface (0 - 2.5 m) from site LLV-1. Phytoplankton samples were identified to the level of species when possible.

Phytoplankton

Utermohl Method

The inverted-microscope method or Utermohl method (Utermohl 1958, Kellar et al. 1980, Janik 1984) is used for enumeration and identification of phytoplankton samples.

Counting Procedure:

The procedure incorporates a stratified design using at least three (x 78, 280, 560) magnifications (Janik 1984). The rational for this approach is that phytoplankton in most lakes have greatest axial linear dimension (GALD) than spans three orders of magnitude from 1-2 μm to 1000 μm or more for filamentous taxa.

Sample Sedimentation:

Wild™ and Hydro-Bios™ combined plate chambers consisting of a top cylinder (Sedimentation cylinder) of 10 mL capacity and a bottom-plate chamber (base plate) are used. The bottom diameter of the base chamber is 25.5 mm. Volumes sedimented range from 2.0 – 10.0 mL depending of algal density.

Biovolumes:

Cell volumes are calculated based on the measurements of at least 20 individuals of each species and the geometrical formulae which most closely approximates the cell shape (Lund et al. 1958). Cell sizes are measured at x 560 with a calibrated ocular micrometer. For most organisms the measurements are taken from outside cell wall to outside cell wall.

Zooplankton

Samples are analyzed with a Wild M40 inverted phase contrast microscope (Wetzel and Likens, 1979). Samples will be counted at: x 78. Higher magnification of x 280, and 560 are available to facilitate identifications.

Sample Preparation and Counting Procedure

The zooplankton sample is mixed by gently inverting the sample bottle for 30 seconds. A wide-bore automatic pipette is used to withdraw 2.9 mL of sample and fill a Hydro-Bios combination plate chamber. A cover slip is then placed on top of the chamber and allowed to settle for 15 minutes before counting. A second chambers is then prepared for a total of 5.8 mL for each sample. The entire 510 mm^2 plate chamber is counted in continuous strips.

D. Statistical Analysis

Statistical analysis was performed using Jandels Sigma Stat Analytical software. All data sets were tested for normality and heterogeneity. Data sets were analyzed using appropriate non-parametric statistical tests for non-normal distributed data. Statistical significance was defined at an alpha of < 0.05 unless otherwise noted.

E. Water Quality Guidelines

The water quality guidelines presented in table 2 are patterned after standards established for Lake Mead (NAC 445.1351). These guidelines were established and adapted as part of the Clark County 208 Amendment to protect and enhance the following beneficial uses at Lake Las Vegas:

1) Irrigation
2) Recreation not involving contact with the water (boating, sailing, canoeing);
3) Recreation involving contact with the water (swimming, bathing, diving);
4) Propagation of wildlife; and
5) Propagation of aquatic life, including a warm water fishery

Table 2. **Water quality guidelines for Lake Las Vegas**

1. The lake waters should be free of:
    a. Visible floating, suspended, or settleable solids,
    b. Sludge banks, lime infestations, heavy growths of attached plants (Periphyton) and animals, or of floating algae mats,
    c. Discoloration or excessive turbidity,
    d. Visible oil or slicks,
    e. Surfactant concentrations that produce foam when water is agitated or aerated,
    f. Toxicants in toxic amounts;
2. The pH as measured in standard units should range between 7.0 and 9.0 in 90% of the measurements.
3. Dissolved oxygen concentrations should be 5 mg/l in the epilimnion during stratification, and 5mg/l through out the water column the rest of the year.
4. The average chlorophyll-a concentration in the epilimnion (0-2.5 m) should not exceed 0.005 mg/l during April through September. The average must include at least two samples per month. The single value must not exceed .010 mg/l in 10% of the samples.
5. In all lake areas, the log mean of not less than five fecal coliform samples taken over a 30 day period during the recreational season (April-September) should not exceed 200 MPN/100 ml and not over 10% of such samples should exceed 400 MPN/100;
6. Average temperature in the epilimnion should not exceed 2°C above ambient temperature (e.g. temperature in epilimnion in Lake Mead;
7. Total dissolved solids concentrations should not exceed an annual average of 2000 mg/l throughout the water column;
8. Turbidity must not exceed that characteristic of natural conditions by more than 10 NTU.

III. WATER QUALITY RESULTS

A. Lake Water Surface Elevation

Water for Lake Las Vegas is pumped from the hypolimnion of Lake Mead through the Basic Management Incorporated (BMI) pipelines. Lake Las Vegas; Lake Mead inflows totaled eight hundred ninety eight (898) acre-feet during 2003 (Figure 3). One thousand nine hundred eighty four (1,984) acre-feet of lake water were lost to seepage/evaporation.

In 2003, a total of two thousand twenty five (2,025) acre-feet of storm water were harvested. Lake Las Vegas did not release any lake water through the dam's appurtenances.

There was a two-foot drop in lake elevation in 2003. Elevations are now referenced to the NAVD88.

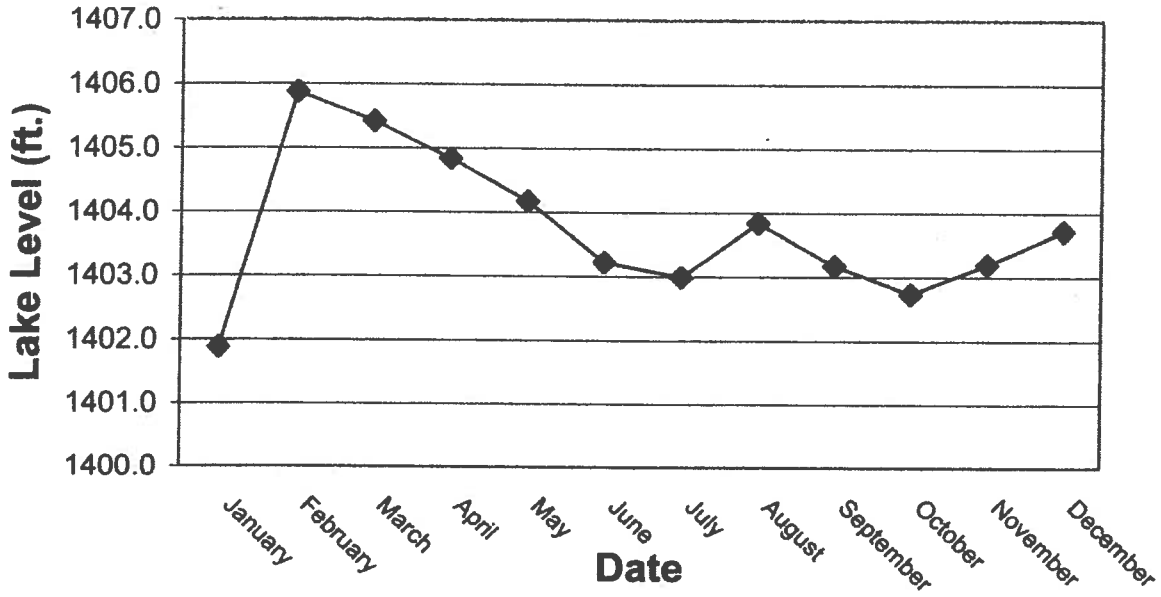


Figure 3. **2003 Lake Las Vegas Surface elevations.**

B. Physical Analysis

Temperature

Surface temperatures in Lake Las Vegas ranged from 9.49°C to 29.4°C during 2003, with the lowest temperatures found in February and the highest in July (Figure 4). The Lake was uniformly mixed top to bottom during December, but reflected various stages of thermal stratification during the remaining quarters through early spring. By March, the Lake began to stratify with the thermocline developing between ten to fourteen meters (Table 3). The Lake remained stratified during the summer and early fall months.

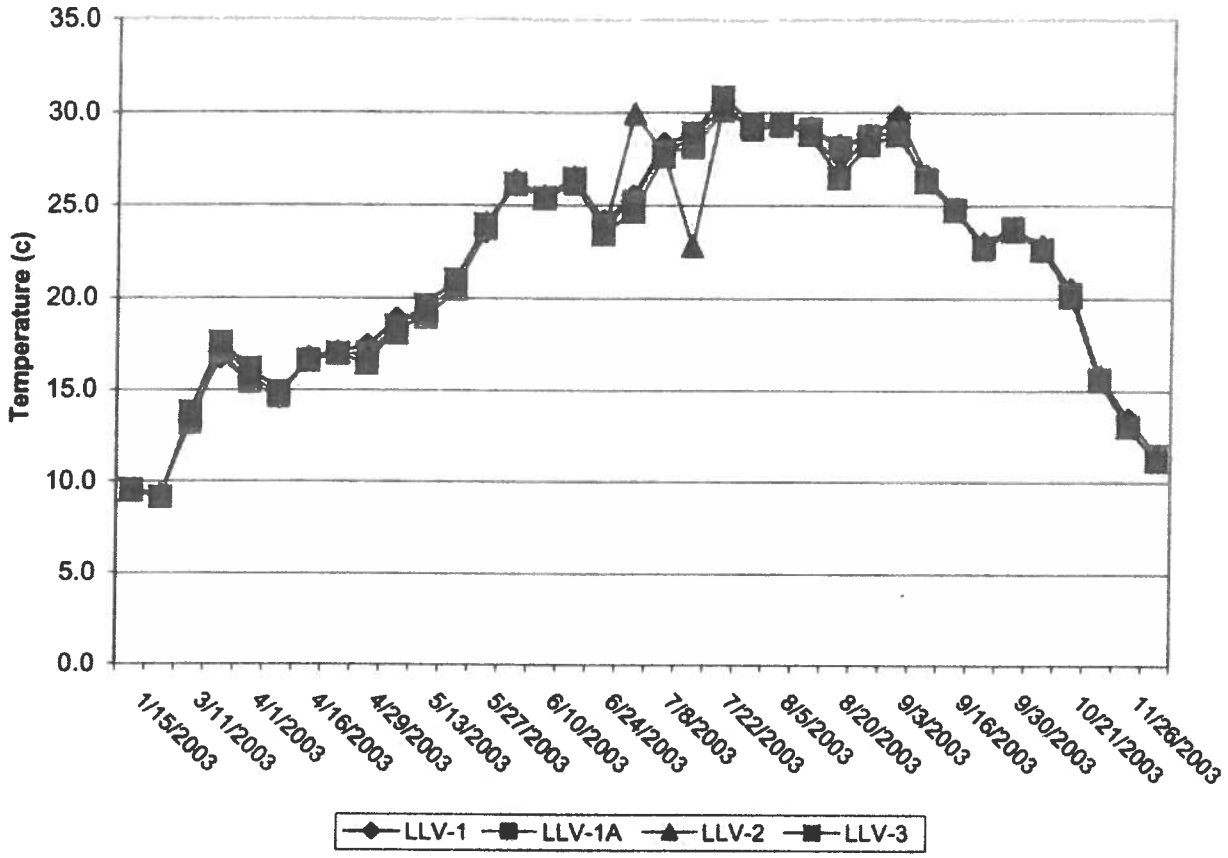


Figure 4. **Surface temperature measurements at Lake Las Vegas monitoring stations LLV-1, LLV-1A, LLV-2, LLV-3 in 2003.**

Depth	3/25/2003	6/24/2003	9/23/2003	12/9/2003
0	17.03	24.04	22.66	11.52
2	15.81	23.98	22.65	11.51
4	15.44	23.78	22.63	11.51
6	14.81	23.62	22.59	11.51
8	13.75	22.52	22.52	11.51
10	12.05	19.23	22.43	11.49
12	11.2	17.23	22.09	11.49
14	11.05	16.06	17.18	11.49
16	10.9	14.19	15.71	11.49
18	10.84	13.6	14.77	11.47
20	10.82	13.18	14.21	11.47
22	10.82	13.15	14.16	11.47
24	10.87	13.12	14.16	11.44
25	10.9	13.28	14.21	11.44

Table 3. **Lake Las Vegas temperature profiles at Lake monitoring station LLV-1A during March, June, September, and December 2003.**

Dissolved Oxygen

Dissolved oxygen concentrations at the lake surface had considerable variations between the sites throughout the year (Figure 5). Concentration ranged from approximately 6.5 to 14.4 mg/l. Concentrations at depth exhibited the common dissolved oxygen trends found within dimictic lakes that stratify (Table 4).

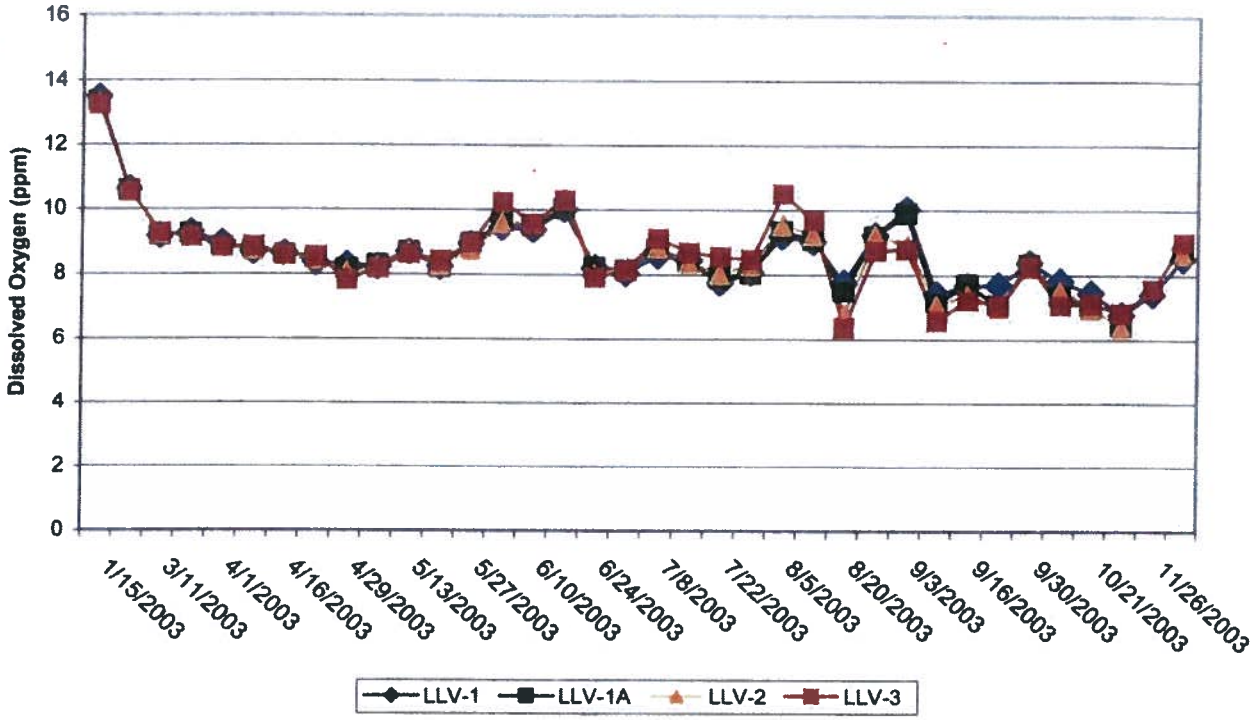


Figure 5. **Lake Las Vegas dissolved oxygen in surface waters at Lake monitoring stations during January – December 2003.**

The Lake remained relatively well mixed during the late fall through late spring. During the period of stratification, dissolved oxygen concentrations, below the thermocline, were less than 5.0 mg/l (Table 4).

Depth	3/25/2003	6/24/2003	9/23/2003	12/9/2003
0	9.3	8.2	7.1	8.7
2	9.2	8.3	7.0	8.7
4	9.2	8.1	7.0	8.6
6	9.2	7.9	7.0	8.7
8	8.5	6.2	7.0	8.6
10	7.9	0.7	7.0	8.6
12	6.2	0.3	5.3	8.6
14	6.1	0.3	0.4	8.6
16	5.6	0.4	0.4	8.6
18	5.3	0.4	0.5	8.6
20	5.3	0.4	0.6	8.6
22	5.0	0.4	0.6	8.6
24	4.7	0.5	0.7	8.6
25	4.9	0.5	0.8	8.6

Table 4. **Lake Las Vegas dissolved oxygen profiles at station LLV-1A during March, June, September, and December 2003.**

pH

There were some seasonal variation in pH of surface waters in Lake Las Vegas during 2003 (Figure 6). Surface water pH values varied slightly between the four Lake sites ranging between 7.6 and 9.4 in 2003 (Figure 6). Depth profiles of pH indicated the pH followed a similar trend of dissolved oxygen. During periods of stratification pH vales decreased as bicarbonate concentrations declined with the onset of anaerobic conditions (Table 5).

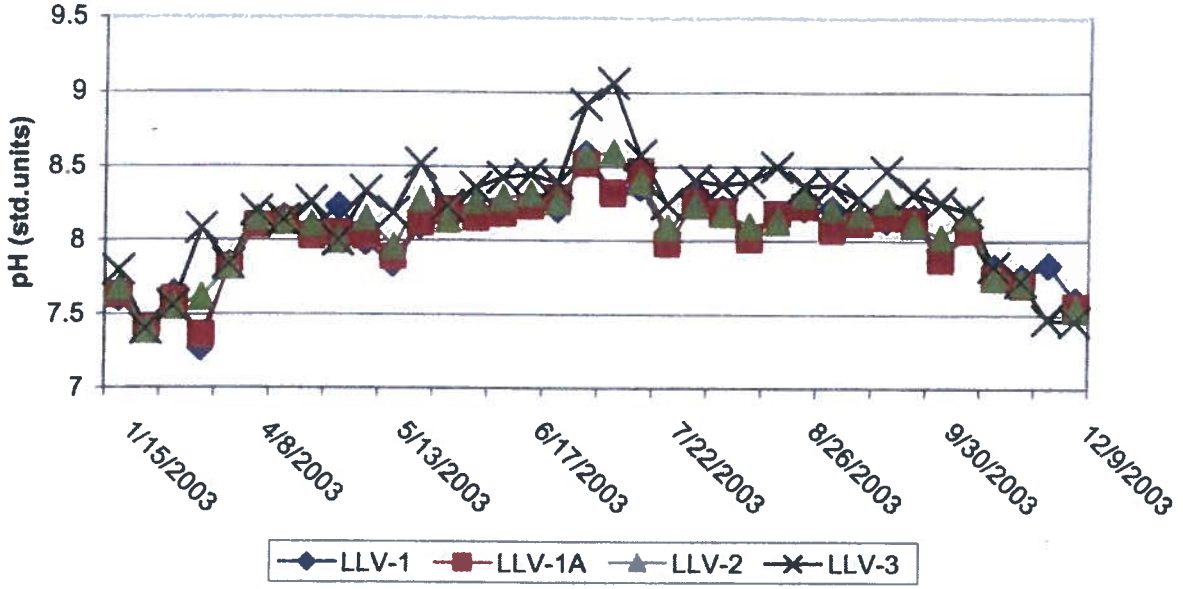


Figure 6. **Lake Las Vegas pH in surface water at the main-lake monitoring stations during January – December 2003.**

Depth	3/25/2003	6/24/2003	9/23/2003	12/9/2003
0	7.36	8.29	8.14	7.56
2	7.44	8.28	8.13	7.56
4	7.45	8.24	8.12	7.56
6	7.45	8.15	8.09	7.56
8	7.48	7.99	8.07	7.56
10	7.47	7.85	8	7.56
12	7.45	8.24	7.87	7.56
14	7.45	8.55	8.17	7.56
16	7.46	8.94	8.41	7.56
18	7.46	9.13	8.69	7.56
20	7.47	9.26	8.8	7.56
22	7047	9.29	8.81	7.56
24	7.46	9.3	8.8	7.56
25	7.45	9.29	8.77	7.56

Table 5. **Lake Las Vegas pH profiles at station LLV-1A during April, July, September and December 2003.**

Conductance

Lake water conductivity ranged between roughly 2000 µmho/cm 3500 µmho/cm at the surface during 2003 (Figure 7). Conductivity did not vary significantly between the four lake sites. Conductivity did not vary greatly with depth.

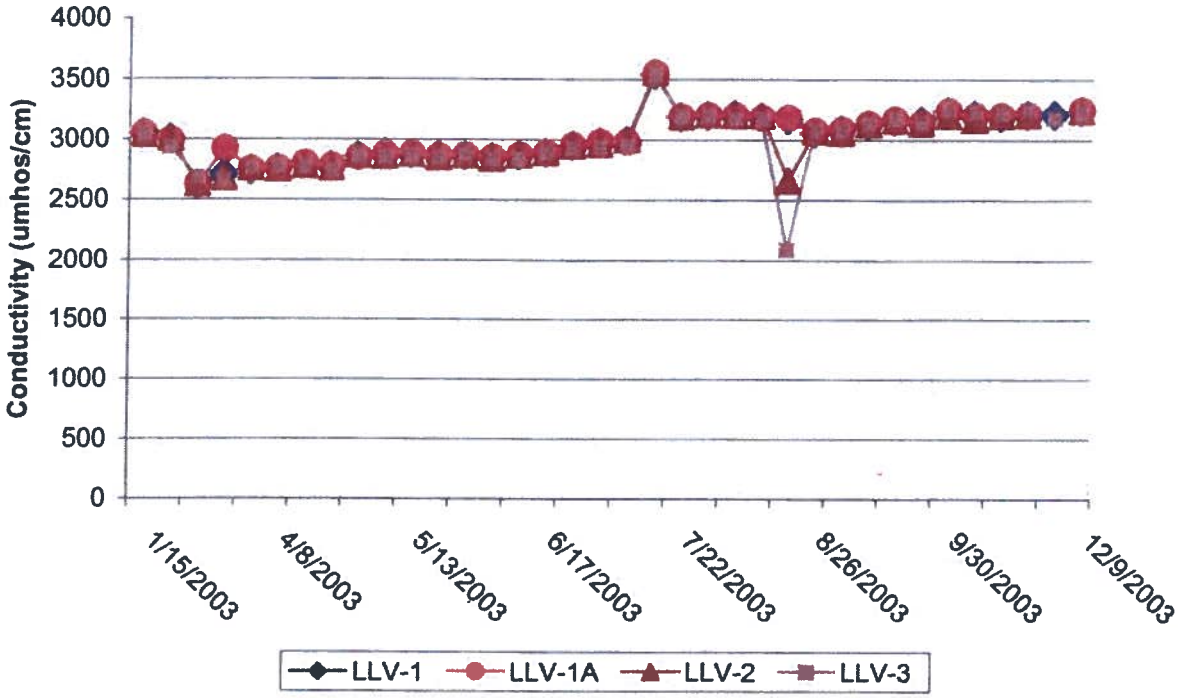


Figure 7. **Lake Las Vegas conductance in surface waters at main-lake stations during January – December 2003.**

Depth	3/25/2003	6/24/2003	9/23/2003	12/9/2003
0	2920	2950	3140	3250
2	2710	2950	3140	3230
4	2710	2950	3160	3230
6	2710	2950	3160	3260
8	2840	2960	3120	3240
10	2830	2870	3070	3240
12	2850	2850	3070	3260
14	2870	2910	3080	3260
16	2850	2910	3050	3270
18	2820	2890	3070	3240
20	2930	2870	3070	3250
22	2870	2890	3060	3250
24	2900	2880	3040	3260
25	2940	2870	3090	3270

Table 6. **Lake Las Vegas conductance profiles at station LLV-1A during March, June, September, and December 2003.**

Transparency

There was considerable seasonal and spatial variability in Lake transparency values during 2003 with values ranging between 0.0 and 1.0 meters of lake depth. There compared to 0.3 and 5.5 meters in 2002. Transparency was typically greatest at sites LLV-1 and LLV-1A on the deeper East End of the Lake. (Figure 8).

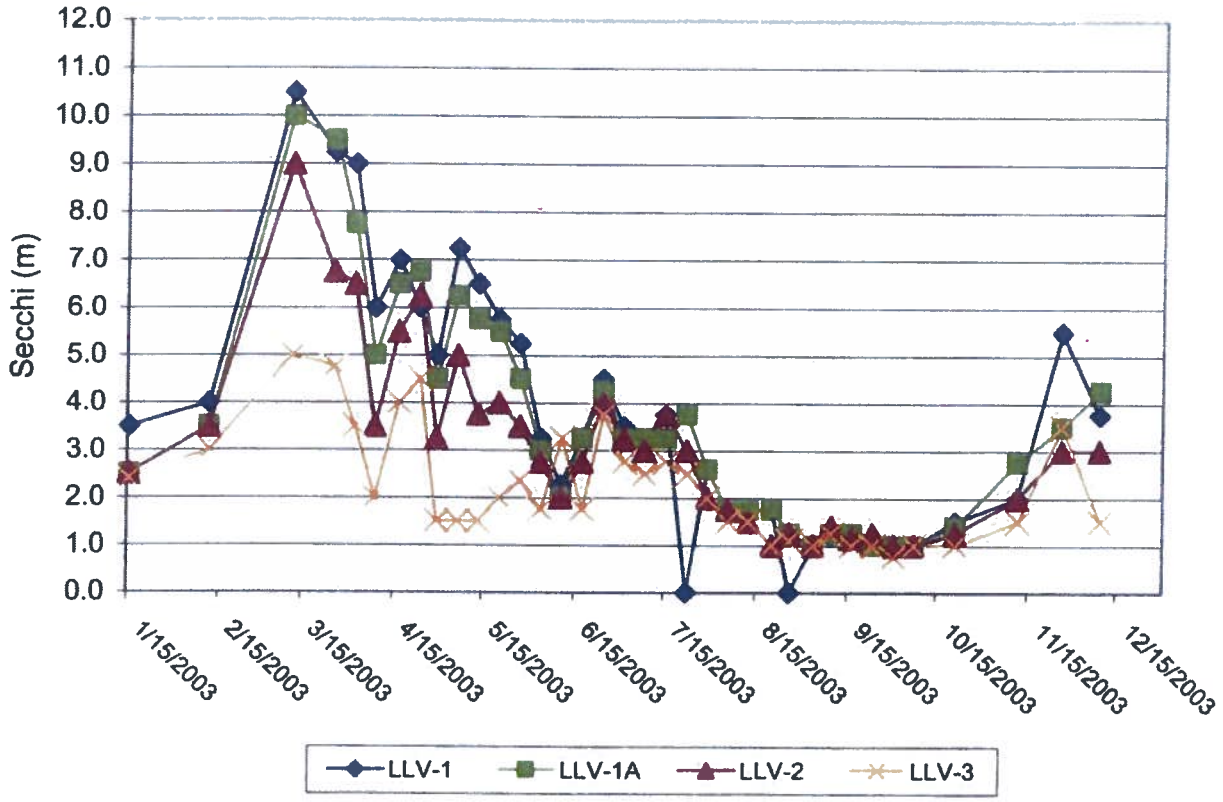


Figure 8. **Lake Las Vegas transparency measurements in surface water at Lake monitoring station during 2003.**

Turbidity

Monthly Turbidity values did not vary significantly between the four sites with concentrations varying between 1.0 of 4 NTU at the surface (0-2.5m) ($p>0.05$). There was no significant difference in turbidity concentrations between depths at site LLV-1A in 2003 ($p>0.05$) (Table 7).

Table 7. **2003 Lake Las Vegas chemical concentrations at site LLV-1A during the months of March, June, September, and December at 0, 5, 10 and 20m depths.**

Date	Depth	BOD5	TDS (mgs/l)	TSS (mg/l)	TURB (NTU)	Uncorr Chl-a (ppb)	Ortho Phos (ug/l)	TotalPhos (ug/l)	NO2 + NO3 (ug/l)	TKN (ug/l)	Total N (ug/l)	Ca (mg/l)	CL (mg/l)	HCO3 (mg/l)	SO4 (mg/l)	K (mg/l)	Na (mg/l)	Mg (mg/l)
3/25/03	0	5	2356	1	1	1	5	10	1550	580	2130	417	310	108	1283	47.1	267	120
3/25/03	5	4	2322	1	1	2	5	10	1570	670	2240	395	315	108	1281	41.6	259	119
3/25/03	10	5	2502	1	1	1	5	10	1420	900	2320	394	345	108	1366	40.7	256	118
3/25/03	20	3	2632	5	1	2	5	20	1280	610	1890	415	365	108	1436	42.4	271	123
6/24/03	0	2	2650	3	1	3	5	20	1590	740	2330	314	382	68	1422	28.4	268	99.0
6/24/03	5	2	2600	3	1	1	5	20	1550	900	2450	332	382	68	1417	31.3	292	105
6/24/03	10	2	2518	6	1	8	5	20	1260	780	2040	312	380	120	1381	28.2	255	95.5
6/24/03	20	2	2566	6	1	4	5	30	1010	640	1650	326	380	120	1418	28.6	267	98.3
9/23/03	0	2	2752	7	1	14	5	20	1460	1420	2880	400	390	56	1435	35	320	130
9/23/03	5	2	2728	7	1	14	5	19	1560	1290	2850	390	380	58	1451	34	310	130
9/23/03	10	2	2710	8	1	13	5	16	1530	1110	2640	400	400	52	1429	36	320	140
9/23/03	20	5	2681	2	4	3	10	26	1370	1920	3290	400	370	136	1409	31	290	120
12/9/03	0	2	2736	4	1	1	5	13	954	2330	3284	353	402	92	1448	34	300	109
12/9/03	5	2	2748	3	1	1	5	45	914	1990	2904	475	425	92	1457	49	420	146
12/9/03	10	2	2774	3	1	1	5	5	974	1850	2824	380	425	96	1462	38	329	117
12/9/03	20	2	2762	3	1	1	5	5	1020	1720	2740	363	425	108	1445	35	314	112

C. Chemical Analysis

Total Suspended Solids

Monthly total suspended solids concentrations varied between 1.0 and 12.4 mg/l with significant differences between the eastern (LLV-1, LLV-1A, LLV-2) sites and the furthest site west (LLV-3.) (Figure 9).

There were no significant differences in total suspended solids concentrations between depths at site LLV-1A in 2003 ($p>0.05$) (Table 7).

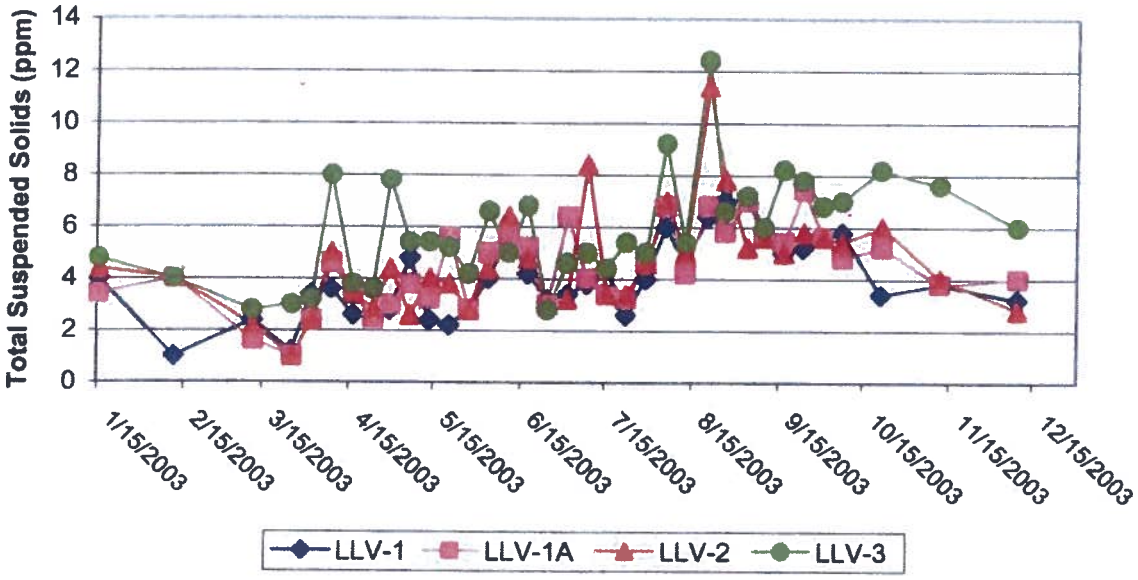


Figure 9. **Lake Las Vegas total suspended solids concentrations in surface waters at monitoring stations during 2003.**

Total Dissolved Solids

There was no significant difference in monthly total dissolved solids (TDS) concentrations between the four Lake sites ($p>0.05$) (Figure 10). Monthly concentrations ranged between 1892 and 2653 mg/l at the surface (0-2.5m).

The increase TDS over the course of the rest of the year was due to lakefill being limited to replace evaporation to accommodate the construction of the Ritz Carlton Bridge over the lake. There was no significant difference in total dissolved solids concentrations between depths at site LLV-1A in 2003 ($p>0.05$) (Table 7)

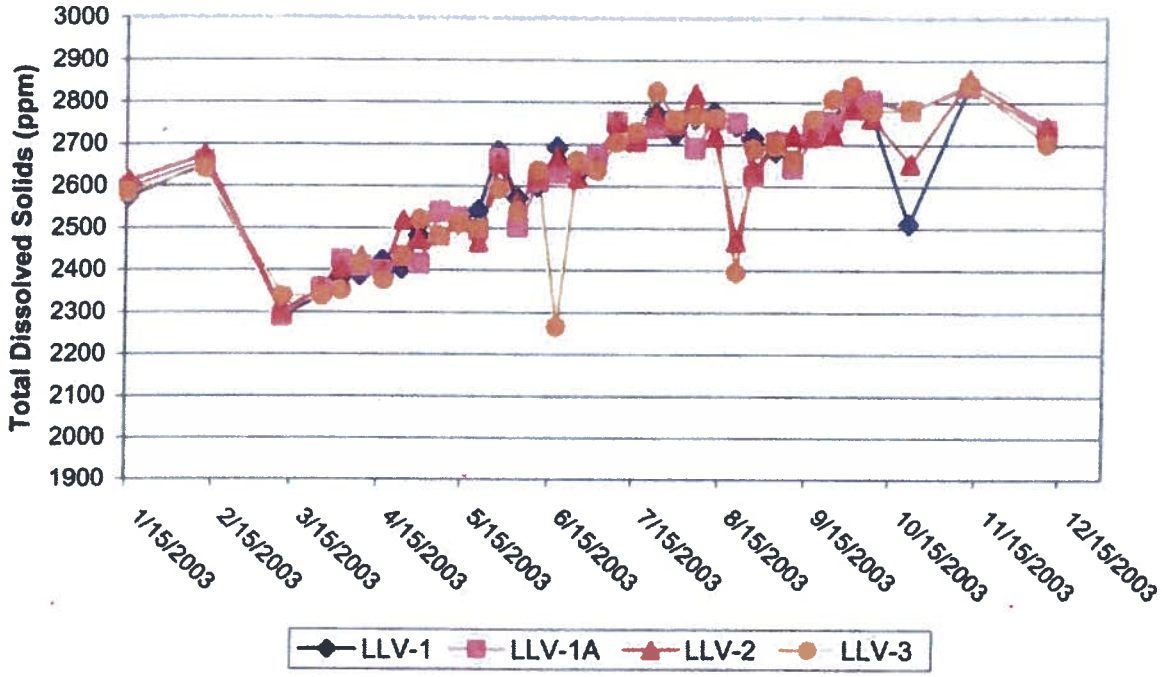


Figure 10. **Lake Las Vegas total dissolved solids concentrations at Lake monitoring station during 2003.**

Major Ion Concentrations

Quarterly depth samples did not vary significantly at site LLV-1A for the ions of calcium, sodium, chloride, potassium, sulfate and magnesium ($p>0.05$) (Table 7). Calcium, Choride, Bicarbonate, Sodium, Potassium, and Magnesium concentrations did not vary with depth or time.

Total Phosphorus

Monthly concentrations ranged between 5 and 80 mg/l at the surface (0-2.5m). This is compared to 8 and 46 mg/l last year. In 2003 there was no significant difference between the sites ($p>0.005$) (Figure 11). Monthly total phosphorus concentrations varied slightly between depths at site LLV-1A, but were not significantly different ($p>0.05$) (Table 7). Storm events during 2003 caused short term elevations in total phosphorus concentrations. (Figure 11).

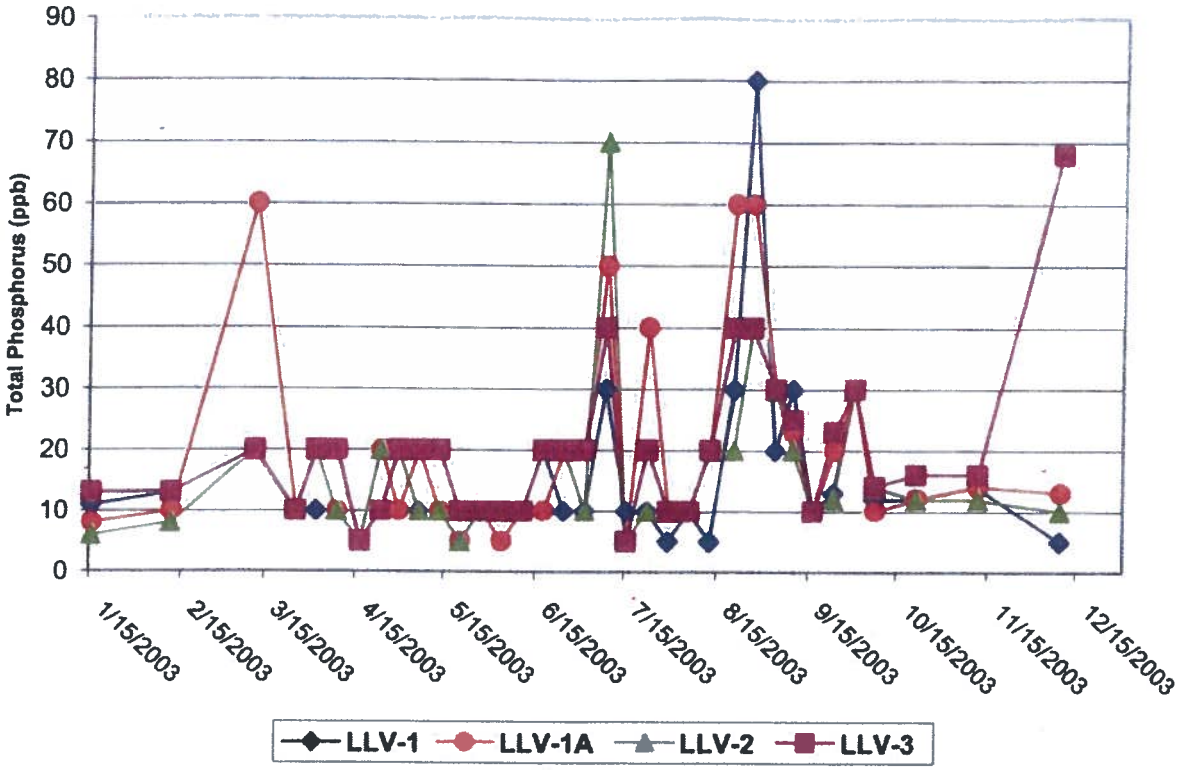


Figure 11. **Lake Las Vegas total phosphorus concentrations in surface waters at Lake monitoring sites during 2003.**

Ortho-Phosphorus

Monthly Ortho-phosphorus concentrations did not vary significantly between sites and ranged between 4 and 20 mg/l ($p>0.05$) (Figure 12). Monthly ortho-phosphorus concentrations did not show a significant difference between depth. ($p>0.05$) (Table 7).

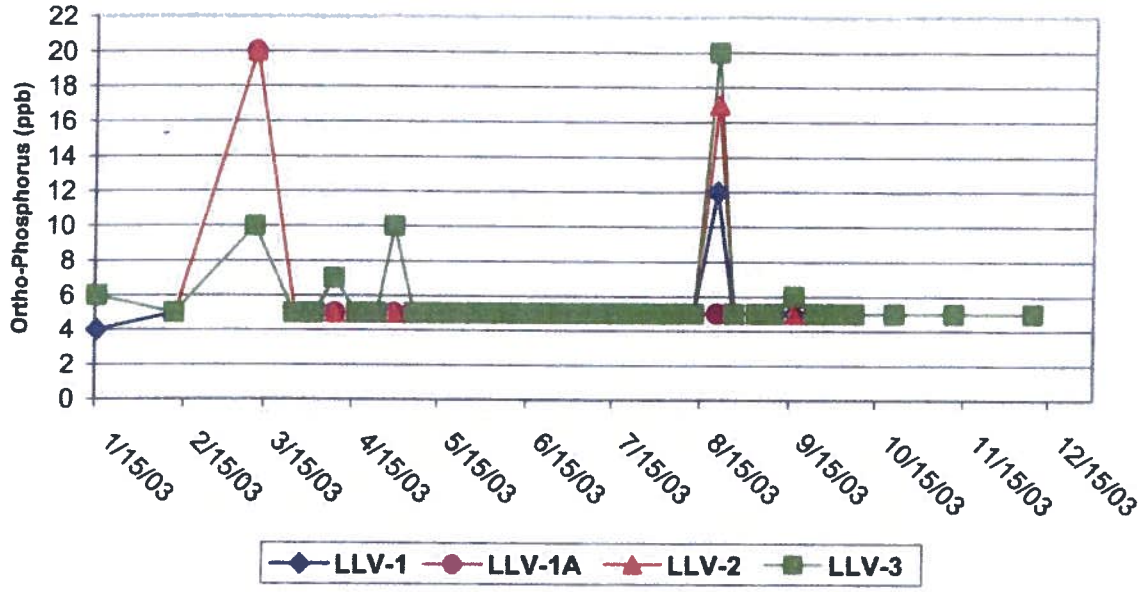


Figure 12. **Lake Las Vegas ortho-phosphorus concentrations in surface waters at Lake monitoring stations during 2003.**

(Nitrite + Nitrate) – Nitrogen

Monthly nitrite plus nitrate surface water concentrations ranged between 147 and 1650 µg/l at the four Lake sites in 2003 with no significant difference ($p>0.05$) (Figure 13). A large decrease in $NO_2 + NO_3$ was observed during the summer months. At this time a reasonable explanation is not available for this observance. Monthly nitrite plus nitrate concentrations were not significantly different by site or depth ($p>0.05$) (Table 7).

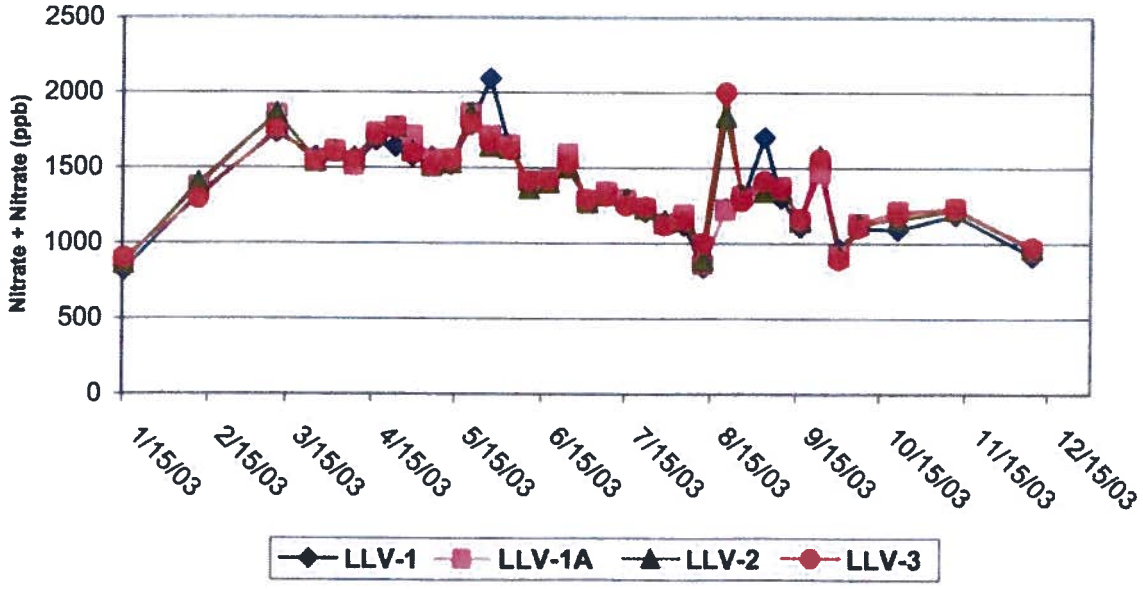


Figure 13. **Lake Las Vegas nitrite + nitrate concentrations in surface waters at Lake monitoring stations during 2003.**

Ammonia - Nitrogen

Monthly ammonia surface water concentrations ranged between 1.0 to 750 µg/l during 2003, with no significant difference between the four Lake sites ($p>0.05$) Figure 14). Concentrations were highest during the late fall turnover period (Figure 14). Variability in concentrations between depths was not found significant for ammonia during 2003 at site LLV-1A ($p>0.05$) (Table 7). In comparison to 2001, 2002 concentration did not fluctuate greatly at the surface.

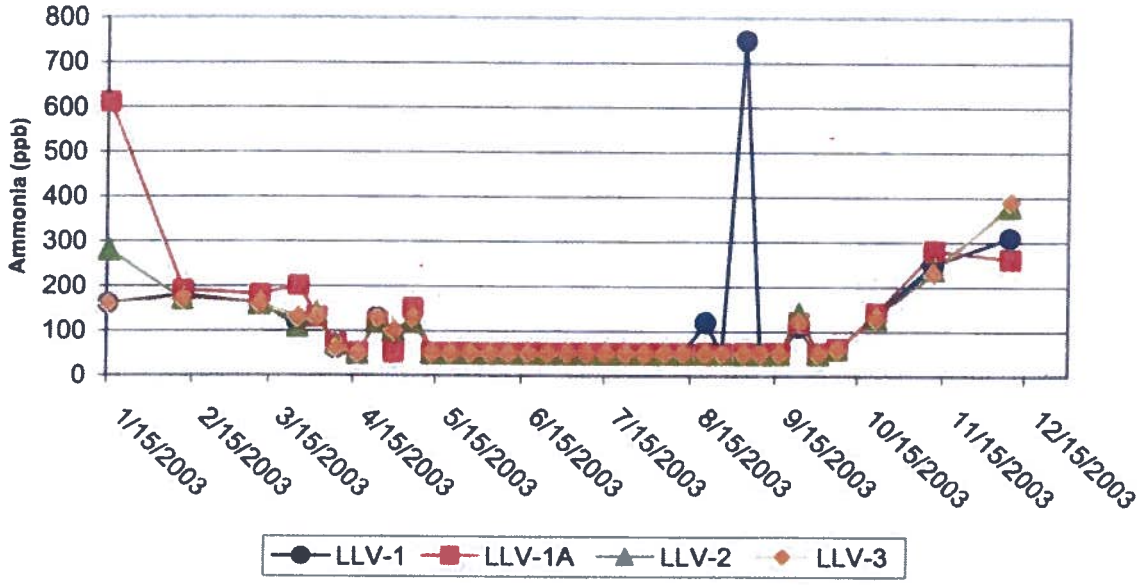


Figure 14. **Lake Las Vegas ammonia-N concentrations in surface waters at Lake monitoring stations during 2003.**

Total Nitrogen

Monthly total nitrogen concentrations ranged between 1550 and 3550 µg/l and were not significantly different between sites ($p>0.05$) (Figure 15). As with the other chemical characteristics sampled total nitrogen concentrations exhibited a declining trend from 2001 to 2002. No significant difference was found between depths at site LLV-1A during 2002 ($p>0.05$) (Table 7).

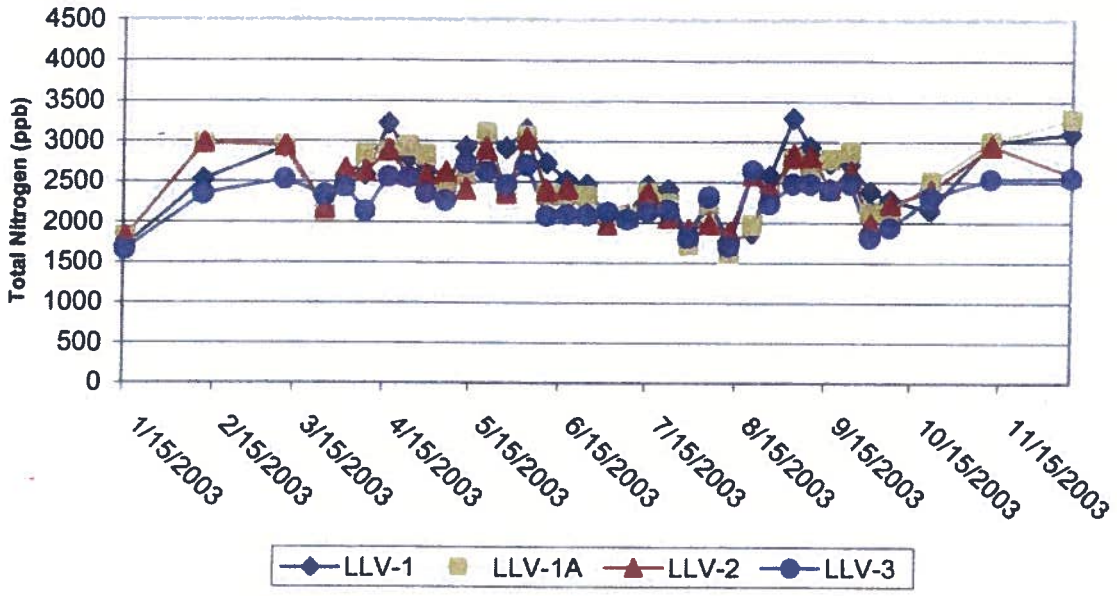


Figure 15. **Lake Las Vegas Total Nitrogen concentrations in surface waters at Lake monitoring stations during 2003.**

D. Biological Analysis

Zooplankton Species Composition and Abundance

Numerous species of zooplankton have been identified in 0 – 15 m vertical plankton tows at station LLV-1 in 2003 (Table 8). Copepods dominated the population with a frequency of (55%), followed by Cladocerans (29%) and Rotifers (4%) during 2003.

Daphnia pulex and *Diaptomus Sp* exhibited the greates average annual average density in 2003 (Table 8). Of the Cladoceran family, *Daphnia pulex* and juvenile copepods dominated with average densities totaling 171,210. This genus is well known for their ability to control Phytoplankton populations in pelagic zones.

Rotifer densities were very low in respect to the other two families represented. *Brachionus caudata sp.* was most common with a total of 14,713 adults/m^3 (Table 8).

COPEPODS	Total	%Freq
Copepedid	40,242	3
Copepod copepodite	3,484	0
Cyclops vernalis	1,311	0
Diacyclops bicuspidatus	17,614	1
Diaptomus sp.	93,416	6
Mesocyclops edax	29,455	2
Nauplii	142,091	9
Ceratuim hirundinella	3,221	0
Juvenille Copepods	619,531	41
TOTAL COPEPODS	**826,785**	**55**

CLADOCERANS	Total	%Freq
Daphnia pulex	171,210	11
Alona sp.	7,261	0
Juvenille Cladoceran	101,722	7
Cladocerans brachionus	177	0
TOTAL CLADOCERANS	**443,035**	**29**

ROTIFERS	Total	%Freq
Brachionus caudata	14,713	1
Hexarthra sp	20,591	1
Keratella quadrata	1,637	0
Notholca sp	1,102	0
Polyarthra sp.	784	0
TOTAL ROTIFERS	**60,982**	**4**

Table 8. **Lake Las Vegas zooplankton species identified in the 0 – 15 m vertical plankton tows at station LLV-1 during 2003.**

Chlorophyll-a

Chlorophyll-a concentrations ranged from 2 to 28 µg/l in surface water during 2003. Concentrations were not significantly different between sites ($p>0.05$) (Table 7).

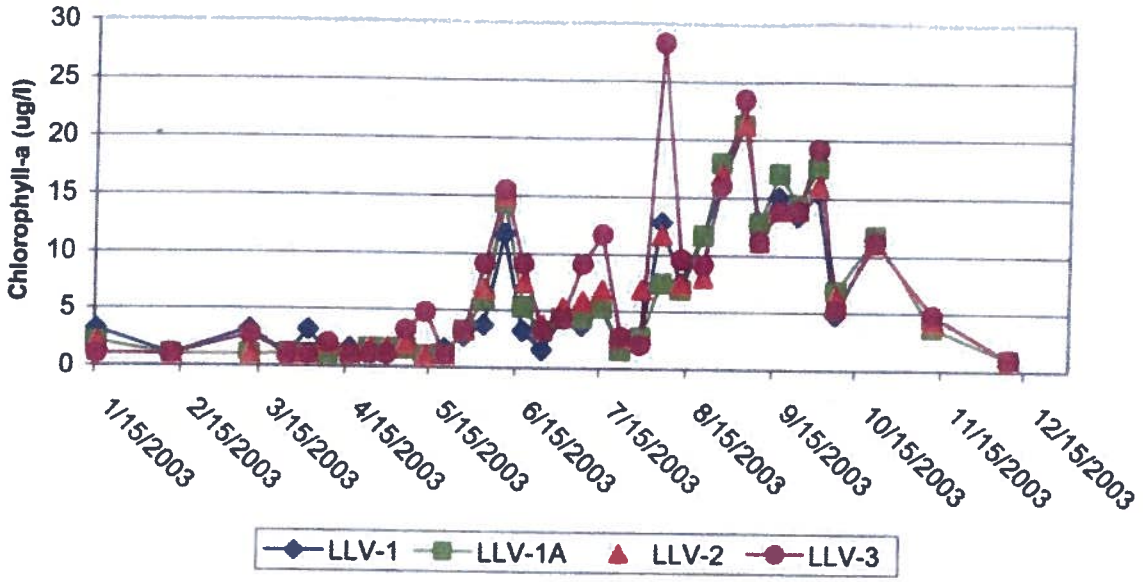


Figure 16. **Lake Las Vegas chlorophyll "a" concentrations in surface waters at Lake monitoring stations during 2003.**

Phytoplankton

Eight (8) taxonomic divisions of phytoplankton were found at LLV-1 during 2003 (Table 9), compared to nine in 2002. By abundance the most frequently observed division was *Chlorophyta* in 2003 (78%) (Figure17). The remaining eight divisions, *Bacillariophyta (0.6%), Cryptophyta (%), Cyanophyta (16%), Euglenophyta (0.1%), Pyrrhophyta (4.0%), Chrysophyta (6.4%), Haptophyta (3.4%)*, were distributed in relation to *Chlorophyta* during the year. (Figure 17).

Division	Genus/Species	Total Biomass (mg/m3)
Bacillariophyceae	Anomeionels vitrea	5
Bacillariophyceae	Nitzschia palea	2
Bacillariophyceae	Synedra sp.	63
	Total	70
	%Freq	0.6
Chlorophyta	Ankistrodesmus falcatus	104
Chlorophyta	Botryoccoccus braunii	23
Chlorophyta	Coelastrum microporum	10
Chlorophyta	Diatyosphaerium	2
Chlorophyta	Dictyosphaerum pulchellum	2
Chlorophyta	Elakathothrix gelatinosa	51
Chlorophyta	Gloeocystis ampla	8848
Chlorophyta	Gloeocystis sp.	6
Chlorophyta	Lagerheimia quadriseta	1
Chlorophyta	Oocystis gigas v. incrassata	683
Chlorophyta	Oocystis sp.	4
Chlorophyta	Oedogonium sp	6
Chlorophyta	Scendesmus serratus	39
Chlorophyta	Scenedesmus quadricauda	18
Chlorophyta	Selenastrum serratus	29
	Total	9825
	%Freq	77.7
Chrysophyta	Mollomonas sp.	23
Chrysophyta	Ochromonas sp.	71
Chrysophyta	Ochromonas sphagnalis	403
Chrysophyta	Chromulina sp.	311
Chrysophyta	Nitzschia sp.	2
	Total	810
	%Freq	6.4

Division	Genus/Species	Total Biomass (mg/m3)
Crytophyta	Cryptomonas sp.	8
Crytophyta	Cryptomonas erosa v. reflexa	13
Crytophyta	Cryptomonas marssonii	41
Crytophyta	Cryptomonas rostratiromis	6
Crytophyta	Katablepharis ovalis	2
Crytophyta	Rhodomonas minuta	12
	Total	82
	%Freq	0.7
Cyanophyta	Anabaena aphanizemenoldes	1
Cyanophyta	Anabaena sp.	479
Cyanophyta	Aphanotece nidulans	9
Cyanophyta	Coccoid Blue-Greens	443
Cyanophyta	Cyanbacteruim sp	443
Cyanophyta	Lyngbya limnetica	39
Cyanophyta	Lyngbya lagerheimii f. minor	18
Cyanophyta	Merismopedia tenuissima	29
Cyanophyta	Oscillatoria rubescens	311
Cyanophyta	Planktolyngbya contorta	23
Cyanophyta	Planktolyngbya subtilis	2
Cyanophyta	Pseudanabaena galeata	71
Cyanophyta	Pseudanabaena limnetica	403
Cyanophyta	Spirulina subsalsa	13
Cyanophyta	Synechocystis aequatilis	41
	Total	893
	%Freq	7.1
Euglenophyta	Trachelomonas sp.	9
	Total	9
	%Freq	0.1
Haptophyta	Chrysochromulina parva	443
	Total	443
	%Freq	3.5
Pyrrhophyta	Ceratuim hirundinella	6
Pyrrhophyta	Glenodinium armatum	8
Pyrrhophyta	Glenodinium pulvisculus	2
Pyrrhophyta	Gymnodinium sp.	12
Pyrrhophyta	Peridinium penardiforme	479
Pyrrhophyta	Peridinium sp.	1
	Total	509
	%Freq	4.0

Table 9. **Lake Las Vegas phytoplankton species identified in the 0 – 15 m vertical plankton tows at station LLV-1 during 2002.**

In 2003 Bio-chemical oxygen demands (BOD_5) concentrations ranged between 2 and 6 mg/l. Concentrations fluctuate the greatest during the year, coinciding with algal cycles observed.

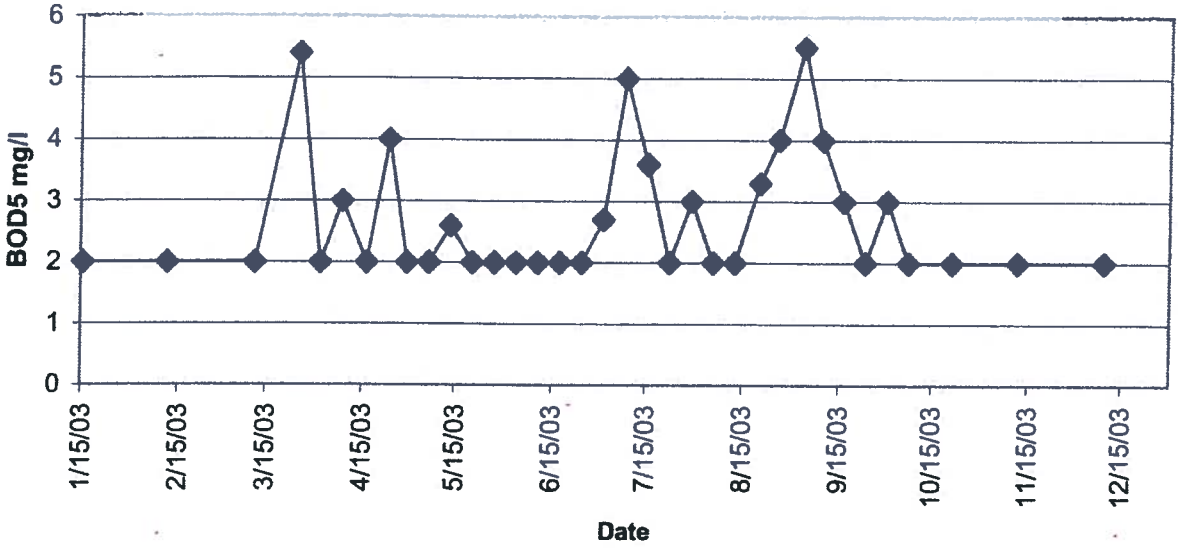
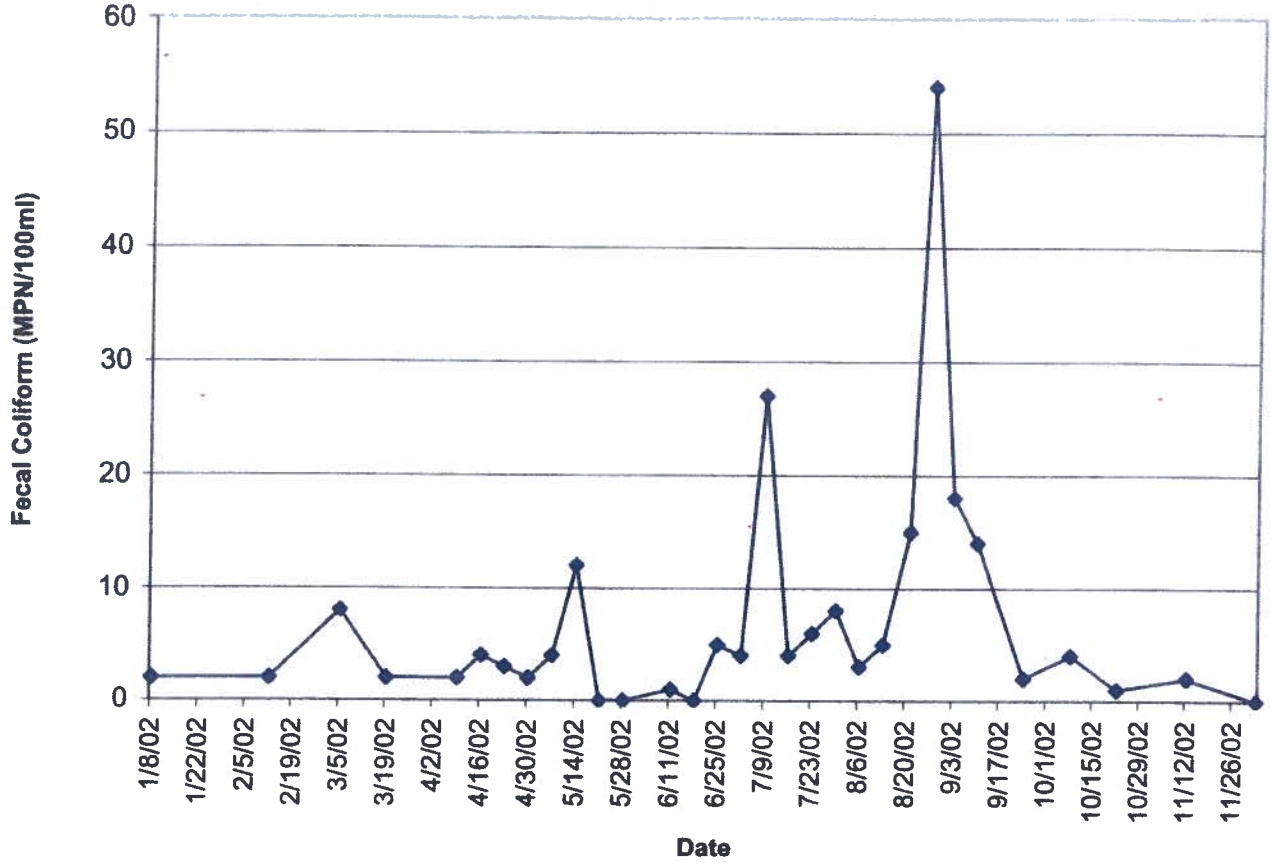


Figure 17. **Lake Las Vegas Biochemical Oxygen Demand concentrations (mg/l) in surface waters at Lake Monitoring Station (LLV-3) during 2003.**

Bacteria

Fecal coliform monitoring was completed on a monthly basis at Lake site LLV-3 in 2003. In 2003, bacteria sampling frequency was completed weekly during the months of April through October due to increased recreational use. Fecal coliform counts in surface waters were below body contact limits in 2003. A slight increase was observed during the full turnover of the lake, but was still within the guideline. (Figure 18).

Figure 18. **Lake Las Vegas fecal coliform counts (MPN/100ml) in surface waters at Lake monitoring station (LLV-3) during 2003.**



Toxic Substances

Water samples for toxic analysis were collected from the surface (0m) and bottom (1m from bottom) of station LLV-1 during December 2003, when the lake was completely mixed. These samples were analyzed for toxic metals, trihalomethanes, pesticides, herbicides, PCBs, and various other organic and inorganic chemicals. Trace metal concentrations were well below the recommended MCLs. Concentrations of pesticides, herbicides and other toxic organic compounds also were below levels of detection. (Appendix C).

IV. SUMMARY

The water quality in Lake Las Vegas was within the proposed water quality guidelines for recreational uses. Average chlorophyll-a concentrations were at or below the proposed guideline of five- (5) µg/l during the April – September growing season. The chlorophyll-a guideline is applied at that time of year to protect water quality during the peak recreation period. Fecal coliform bacteria were at, or below, the limits of detection, as were concentrations of toxic metals, pesticides, herbicides and other toxic organic compounds. Except for total dissolved solids and its related ions, water quality in Lake Las Vegas continues to be very good. The Total dissolved solids guideline was established to keep salinity in the Lake at levels acceptable for irrigation. The project was designed so lake water can be withdrawn for on-site irrigation. Evaporation will continue to increase total dissolved solids until ions reach saturation and precipitate, or are diluted by inflows from Lake Mead. It will take several years for development to reach the point where irrigation demands are sufficient to keep total dissolved solids in the Lake at acceptable levels. Currently, water drawn from the Lake for irrigation is blended with Lake Mead water to dilute the total dissolved solids concentrations for Lake Las Vegas current three golf courses.

V. REFERENCES

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Utermohl, H. 1958. *Zur vervollkommnung der quantitiven phytoplankton methodik.* Mitt. Int. Verein. Limnol. 9:1-38.

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VI. APPENDIX

Annual Toxicity Analysis

Silver State
Analytical Laboratory

5070 South Arville Street, Suite 6
Las Vegas, Nevada 89118

Telephone: (702) 873-4478
Fax: (702) 873-7967

LABORATORY REPORT

DATE: December 15, 2003

REPORT NUMBER: 03-3030
Page: 1 of 3

CLIENT: Lake Las Vegas Resort
1605 Lake Las Vegas Parkway
Henderson, Nevada 89011

CLIENT PROJECT:

CLIENT P.O. NO:

Sampled By: LLV
Date Sampled: 12/09/03
Time Sampled: Refer to COC

Submitted by: Jim Pauli
Date Received: 12/09/03
Time Received: 1115

Report Attention: Steven Weber

Sample ID	Parameter	Result	Units	Detection Limit	Method	Date Analyzed	Analyst
LLV-1A	Nitrite	0.02	mg/L	0.01	EPA 405.1	12/11/03	RA
0m	Turbidity	ND	NTU	1.0	EPA 180.1	12/11/02	VRP
LLV-1A	Nitrite	0.07	mg/L	0.01	EPA 405.1	12/11/02	RA
20m	Turbidity	ND	NTU	1.0	EPA 180.1	12/11/02	VRP

EPA Flags: *none*
ND = non-detect
NOTE: PCBs, Pesticides and SVOC subcontracted to SVL Analytical, Inc., Kellogg ID (See attached laboratory report).
8151A subcontracted to Anatek Labs, Inc., Moscow, ID (See attached laboratory report)

REVIEWED BY:

Ronald W. Winter
Laboratory Manager

Silver State Analytical Laboratory
Report Number: 03-3030
December 15, 2003

Method: 8260 GCMS

Sample ID: LLV-1A 0m

Compound	Result µg/L	Reporting Limits µg/L	Compound	Result µg/L	Reporting Limits µg/L
Bromomethane	ND	5	Carbon Disulfide	ND	15
Bromobenzene	ND	5	Carbon tetrachloride	ND	5
Bromochloromethane	ND	5	Chlorobenzene	ND	5
2-Butanone (MEK)	ND	25	Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	5	Chloromethane	ND	5
2-Chlorotoluene	ND	5	cis-1,2-Dichloroethene	ND	5
2-Hexanone	ND	20	cis-1,3-Dichloropropene	ND	5
4-Chlorotoluene	ND	5	Dibromomethane	ND	5
4-Methyl-2-Pentanone	ND	20	Dichlorodifluoromethane	ND	5
Acrylonitrile	ND	5	Dimethyl Disulfide	ND	5
Benzene	ND	4	Ethylbenzene	ND	5
1,1,1,2-Tetrachloroethane	ND	5	Hexachlorobutadiene	ND	5
1,1,1-Trichloroethane	ND	5	Isopropylbenzene (Cumene)	ND	5
1,1,2,2- Tetrachloroethane	ND	5	m and p-Xylene	ND	5
1,1,2-Trichloroethane	ND	5	Methylene chloride	ND	20
1,1-Dichloroethane	ND	5	Methyl-tert-butylether	ND	5
1,1-Dichloroethene	ND	5	Naphthalene	ND	5
1,1-Dichloropropene	ND	5	n-Butylbenzene	ND	5
1,2,3-Trichlorobenzene	ND	5	n-Propylbenzene	ND	5
1,2,3-Trichloropropane	ND	5	o-Xylene	ND	5
1,2,4-Trichlorobenzene	ND	5	p-Isopropyltoluene	ND	5
1,2,4-Trimethylbenzene	ND	5	sec-Butylbenzene	ND	5
1,2-Dibromo-3-chloropropane	ND	5	Styrene	ND	5
1,2-Dibromoethane	ND	5	tert-Butylbenzene	ND	5
1,2-Dichlorobenzene	ND	5	Tetrachloroethene	ND	4
1,2-Dichloroethane	ND	5	Toluene	ND	5
1,2-Dichloropropane	ND	5	trans-1,2-Dichloroethene	ND	5
1,3,5-Trimethylbenzene	ND	5	trans-1,3-Dichloropropene	ND	5
1,3-Dichlorobenzene	ND	5	trans-1,4-Dichloro-2-butene	ND	5
1,3-Dichloropropane	ND	5	Trichloroethene	ND	5
1,4-Dichlorobenzene	ND	5	Trichlorofluoromethane	ND	5
1-Chlorohexane	ND	5	Vinyl chloride	ND	5
2,2-Dichloropropane	ND	5	Xylenes, total	ND	5

Date Analyzed: 12/12/03

Analyzed by: VRP

ND: non-detect
EPA Flags: none

Silver State Analytical Laboratory
Report Number: 03-3030
December 15, 2003

Method: 8260 GCMS

Sample ID: LLV-1A 20m

Compound	Result µg/L	Reporting Limits µg/L	Compound	Result µg/L	Reporting Limits µg/L
Bromomethane	ND	5	Carbon Disulfide	ND	15
Bromobenzene	ND	5	Carbon tetrachloride	ND	5
Bromochloromethane	ND	5	Chlorobenzene	ND	5
2-Butanone (MEK)	ND	25	Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	5	Chloromethane	ND	5
2-Chlorotoluene	ND	5	cis-1,2-Dichloroethene	ND	5
2-Hexanone	ND	20	cis-1,3-Dichloropropene	ND	5
4-Chlorotoluene	ND	5	Dibromomethane	ND	5
4-Methyl-2-Pentanone	ND	20	Dichlorodifluoromethane	ND	5
Acrylonitrile	ND	5	Dimethyl Disulfide	ND	5
Benzene	ND	4	Ethylbenzene	ND	5
1,1,1,2-Tetrachloroethane	ND	5	Hexachlorobutadiene	ND	5
1,1,1-Trichloroethane	ND	5	Isopropylbenzene (Cumene)	ND	5
1,1,2,2- Tetrachloroethane	ND	5	m and p-Xylene	ND	5
1,1,2-Trichloroethane	ND	5	Methylene chloride	ND	20
1,1-Dichloroethane	ND	5	Methyl-tert-butylether	ND	5
1,1-Dichloroethene	ND	5	Naphthalene	ND	5
1,1-Dichloropropene	ND	5	n-Butylbenzene	ND	5
1,2,3-Trichlorobenzene	ND	5	n-Propylbenzene	ND	5
1,2,3-Trichloropropane	ND	5	o-Xylene	ND	5
1,2,4-Trichlorobenzene	ND	5	p-Isopropyltoluene	ND	5
1,2,4-Trimethylbenzene	ND	5	sec-Butylbenzene	ND	5
1,2-Dibromo-3-chloropropane	ND	5	Styrene	ND	5
1,2-Dibromoethane	ND	5	tert-Butylbenzene	ND	5
1,2-Dichlorobenzene	ND	5	Tetrachloroethene	ND	4
1,2-Dichloroethane	ND	5	Toluene	ND	5
1,2-Dichloropropane	ND	5	trans-1,2-Dichloroethene	ND	5
1,3,5-Trimethylbenzene	ND	5	trans-1,3-Dichloropropene	ND	5
1,3-Dichlorobenzene	ND	5	trans-1,4-Dichloro-2-butene	ND	5
1,3-Dichloropropane	ND	5	Trichloroethene	ND	5
1,4-Dichlorobenzene	ND	5	Trichlorofluoromethane	ND	5
1-Chlorohexane	ND	5	Vinyl chloride	ND	5
2,2-Dichloropropane	ND	5	Xylenes, total	ND	5

Date Analyzed: 12/12/03

Analyzed by: VRP

ND: non-detect
EPA Flags: *none*

SVL Analytical, Inc.
One Government Gulch * P.O. Box 929 * Kellogg, Idaho 83837-0929 * Phone:(208) 784-1258 * Fax:(208) 783-0891

Certificate of Analysis

EPA Method 625 - Semi-Volatile Organic Compounds

Silver State Analytical
070 South Arville Street, Suite 6
as Vegas, NV 89118

SVL Job #: 109043
Sample Name: LLV-1A 0M
Lab #: W368804
Sampling Date: 12/09/03
Date Received: 12/11/03
Extraction Date: 12/15/03
Analysis Date: 12/19/03
Matrix: Water
Analyst: KBH/WOZ

Analyte	Results	Units	PQL	Cas #	Data Qualifier
Phenol	ND	µg/L	11.0	108-95-2	Q9
2-Chlorophenol	ND	µg/L	11.0	95-57-8	Q9
bis (2-chloroethyl)ether	ND	µg/L	5.49	11-44-4	Q9
1,3-Dichlorobenzene	ND	µg/L	5.49	541-73-1	Q9
1,4-Dichlorobenzene	ND	µg/L	5.49	106-46-7	Q9
1,2-Dichlorobenzene	ND	µg/L	5.49	95-50-1	Q9
bis (2-chloroisopropyl)ether	ND	µg/L	5.49	108-60-1	Q9
Hexachloroethane	ND	µg/L	5.49	67-72-1	Q9
Nitrobenzene	ND	µg/L	5.49	98-95-3	Q9
Isophorone	ND	µg/L	5.49	78-59-1	Q9
2-Nitrophenol	ND	µg/L	11.0	88-75-5	Q9
2,4-Dimethylphenol	ND	µg/L	11.0	105-67-9	Q9
bis (2-chloroethoxy)methane	ND	µg/L	5.49	111-91-1	Q9
2,4-Dichlorophenol	ND	µg/L	11.0	120-83-2	Q9
1,2,4-Trichlorobenzene	ND	µg/L	5.49	120-82-1	Q9
Naphthalene	ND	µg/L	5.49	91-20-3	Q9
Hexachlorobutadiene	ND	µg/L	5.49	87-68-3	Q9
4-Chloro-3-methylphenol	ND	µg/L	11.0	59-50-7	Q9
Hexachlorocyclopentadiene	ND	µg/L	5.49	77-47-4	Q9
2,4,6-Trichlorophenol	ND	µg/L	11.0	88-05-2	Q9
2-Chloronaphthalene	ND	µg/L	5.49	91-58-7	Q9
Dimethylphthalate	ND	µg/L	5.49	131-11-3	Q9
Acenaphthylene	ND	µg/L	5.49	208-96-8	Q9
2,6-Dinitrotoluene	ND	µg/L	5.49	606-20-2	Q9
Acenaphthene	ND	µg/L	5.49	83-32-9	Q9
2,4-Dinitrophenol	ND	µg/L	11.0	51-28-5	Q9
4-Nitrophenol	ND	µg/L	11.0	100-02-7	Q9
2,4-Dinitrotoluene	ND	µg/L	5.49	121-14-2	Q9
Diethylphthalate	ND	µg/L	5.49	84-66-2	Q9
Fluorene	ND	µg/L	5.49	86-73-7	Q9
4-Chlorophenylphenylether	ND	µg/L	5.49	7005-72-3	Q9
4,6-Dinitro-2-methylphenol	ND	µg/L	11.0	534-52-1	Q9
4-Bromophenylphenylether	ND	µg/L	5.49	101-55-3	Q9
Hexachlorobenzene	ND	µg/L	5.49	118-74-1	Q9
Pentachlorophenol	ND	µg/L	11.0	87-86-5	Q9
Phenanthrene	ND	µg/L	5.49	85-01-8	Q9
Anthracene	ND	µg/L	5.49	120-12-7	Q9
Di-n-butylphthalate	ND	µg/L	5.49	84-74-2	Q9
Fluoranthene	ND	µg/L	5.49	206-44-0	Q9
Pyrene	ND	µg/L	5.49	129-00-0	Q9
Butylbenzylphthalate	ND	µg/L	5.49	85-68-7	Q9
Benzo(a)anthracene	ND	µg/L	5.49	56-55-3	Q9
Chrysene	ND	µg/L	5.49	218-01-9	Q9
bis (2-ethylhexyl)phthalate	ND	µg/L	5.49	117-81-7	Q9
Di-n-octylphthalate	ND	µg/L	5.49	117-84-0	Q9
Benzo(b)fluoranthene	ND	µg/L	5.49	205-99-2	Q9
Benzo(k)fluroanthene	ND	µg/L	5.49	207-08-9	Q9
Benzo(a)pyrene	ND	µg/L	5.49	50-32-8	Q9
Ideno(1,2,3-c,d)pyrene	ND	µg/L	5.49	193-39-5	Q9
Dibenz(a,h)anthracene	ND	µg/L	5.49	53-70-3	Q9

ND = not detected at stated PQL
PQL - Practical Quantitation Limit

SVL Analytical, Inc.

One Government Gulch * P.O. Box 929 * Kellogg, Idaho 83837-0929 * Phone:(208) 784-1258 * Fax:(208) 783-0891

Certificate of Analysis

EPA Method 625 - Semi-Volatile Organic Compounds

Silver State Analytical
070 South Arville Street, Suite 6
as Vegas, NV 89118

SVL Job #: 109043
Sample Name: LLV-1A 0M
Lab #: W368804
Sampling Date: 12/09/03
Date Received: 12/11/03
Extraction Date: 12/15/03
Analysis Date: 12/19/03
Matrix: Water
Analyst: KBH/WOZ

Analyte	Results	Units	PQL	Cas #	Data Qualifier
Benzo(g,h,l)perylene	**ND**	µg/L	5.49	191-24-2	Q9
N-Nitrosodi-N-propylamine	**ND**	µg/L	5.49	621-64-7	Q9
N-Nitrosodiphenyl-amine	**ND**	µg/L	5.49	86-30-6	Q9
N-Nitrosodimethyl-amine	**ND**	µg/L	5.49	62-75-9	Q9
3,3,-Dichlorobenzidine	**ND**	µg/L	5.49	91-94-1	Q9, V1

Surrogate	%R	%R Limits	Data Qualifier
2-Fluorophenol (AS-1)	49.8%	0-131	
Phenol-d6 (AS-2)	56.1%	0-127	
Nitrobenzene (BS-1)	62.0%	0-154	
2-Fluorobiphenyl (BS-2)	60.7%	5-123	
2,4,6-Tribromophenol (AS-3)	80.9%	3-136	
Terpheny-d14 (BS-3)	82.3%	33-124	

OMMENTS:
1 = CCV recovery was above method acceptance limits. This target analyte was not detected in the sampe.
sufficient sample received to meet method QC requirements.

eviewed by: _____ Date: 12/22/03

vada Cert. # ID-19-2004-19; Washington Accred. # C074; Arizona Lic. # AZ0538; California Cert. # 2080; Idaho Accred. # ID00019; Montana Cert. # CERT0027; Colorado Cert. #08/13/03

ND = not detected at stated PQL
PQL - Practical Quantitation Limit

SVL Analytical, Inc.

One Government Gulch * P.O. Box 929 * Kellogg, Idaho 83837-0929 * Phone:(208) 784-1258 * Fax:(208) 783-0891

Certificate of Analysis

EPA Method 625 - Semi-Volatile Organic Compounds

Silver State Analytical
5070 South Arville Street, Suite 6
Las Vegas, NV 89118

SVL Job #: 109043
Sample Name: LLV-1A 20M
Lab #: W368805
Sampling Date: 12/09/03
Date Received: 12/11/03
Extraction Date: 12/15/03
Analysis Date: 12/19/03
Matrix: Water
Analyst: KBH/WOZ

Analyte	Results	Units	PQL	Cas #	Data Qualifier
Phenol	ND	µg/L	11.6	108-95-2	Q9
2-Chlorophenol	ND	µg/L	11.6	95-57-8	Q9
bis (2-chloroethyl)ether	ND	µg/L	5.78	11-44-4	Q9
1,3-Dichlorobenzene	ND	µg/L	5.78	541-73-1	Q9
1,4-Dichlorobenzene	ND	µg/L	5.78	106-46-7	Q9
1,2-Dichlorobenzene	ND	µg/L	5.78	95-50-1	Q9
bis (2-chloroisopropyl)ether	ND	µg/L	5.78	108-60-1	Q9
Hexachloroethane	ND	µg/L	5.78	67-72-1	Q9
Nitrobenzene	ND	µg/L	5.78	98-95-3	Q9
Isophorone	ND	µg/L	5.78	78-59-1	Q9
2-Nitrophenol	ND	µg/L	11.6	88-75-5	Q9
2,4-Dimethylphenol	ND	µg/L	11.6	105-67-9	Q9
bis (2-chloroethoxy)methane	ND	µg/L	5.78	111-91-1	Q9
2,4-Dichlorophenol	ND	µg/L	11.6	120-83-2	Q9
1,2,4-Trichlorobenzene	ND	µg/L	5.78	120-82-1	Q9
Naphthalene	ND	µg/L	5.78	91-20-3	Q9
Hexachlorobutadiene	ND	µg/L	5.78	87-68-3	Q9
4-Chloro-3-methylphenol	ND	µg/L	11.6	59-50-7	Q9
Hexachlorocyclopentadiene	ND	µg/L	5.78	77-47-4	Q9
2,4,6-Trichlorophenol	ND	µg/L	11.6	88-05-2	Q9
2-Chloronaphthalene	ND	µg/L	5.78	91-58-7	Q9
Dimethylphthalate	ND	µg/L	5.78	131-11-3	Q9
Acenaphthylene	ND	µg/L	5.78	208-96-8	Q9
2,6-Dinitrotoluene	ND	µg/L	5.78	606-20-2	Q9
Acenaphthene	ND	µg/L	5.78	83-32-9	Q9
2,4-Dinitrophenol	ND	µg/L	11.6	51-28-5	Q9
4-Nitrophenol	ND	µg/L	11.6	100-02-7	Q9
2,4-Dinitrotoluene	ND	µg/L	5.78	121-14-2	Q9
Diethylphthalate	ND	µg/L	5.78	84-66-2	Q9
Fluorene	ND	µg/L	5.78	86-73-7	Q9
4-Chlorophenylphenylether	ND	µg/L	5.78	7005-72-3	Q9
4,6-Dinitro-2-methylphenol	ND	µg/L	11.6	534-52-1	Q9
4-Bromophenylphenylether	ND	µg/L	5.78	101-55-3	Q9
Hexachlorobenzene	ND	µg/L	5.78	118-74-1	Q9
Pentachlorophenol	ND	µg/L	11.6	87-86-5	Q9
Phenanthrene	ND	µg/L	5.78	85-01-8	Q9
Anthracene	ND	µg/L	5.78	120-12-7	Q9
Di-n-butylphthalate	ND	µg/L	5.78	84-74-2	Q9
Fluoranthene	ND	µg/L	5.78	206-44-0	Q9
Pyrene	ND	µg/L	5.78	129-00-0	Q9
Butylbenzylphthalate	ND	µg/L	5.78	85-68-7	Q9
Benzo(a)anthracene	ND	µg/L	5.78	56-55-3	Q9
Chrysene	ND	µg/L	5.78	218-01-9	Q9
bis (2-ethylhexyl)phthalate	ND	µg/L	5.78	117-81-7	Q9
Di-n-octylphthalate	ND	µg/L	5.78	117-84-0	Q9
Benzo(b)fluoranthene	ND	µg/L	5.78	205-99-2	Q9
Benzo(k)fluroanthene	ND	µg/L	5.78	207-08-9	Q9
Benzo(a)pyrene	ND	µg/L	5.78	50-32-8	Q9
Ideno(1,2,3-c,d)pyrene	ND	µg/L	5.78	193-39-5	Q9
Dibenz(a,h)anthracene	ND	µg/L	5.78	53-70-3	Q9

ND = not detected at stated PQL
PQL - Practical Quantitation Limit

SVL Analytical, Inc.

One Government Gulch * P.O. Box 929 * Kellogg, Idaho 83837-0929 * Phone:(208) 784-1258 * Fax:(208) 783-0891

Certificate of Analysis

EPA Method 625 - Semi-Volatile Organic Compounds

Silver State Analytical
070 South Arville Street, Suite 6
as Vegas, NV 89118

SVL Job #: 109043
Sample Name: LLV-1A 20M
Lab #: W368805
Sampling Date: 12/09/03
Date Received: 12/11/03
Extraction Date: 12/15/03
Analysis Date: 12/19/03
Matrix: Water
Analyst: KBH/WOZ

Analyte	Results	Units	PQL	Cas #	Data Qualifier
Benzo(g,h,i)perylene	**ND**	µg/L	5.78	191-24-2	Q9
N-Nitrosodi-N-propylamine	**ND**	µg/L	5.78	621-64-7	Q9
N-Nitrosodiphenyl-amine	**ND**	µg/L	5.78	86-30-6	Q9
N-Nitrosodimethyl-amine	**ND**	µg/L	5.78	62-75-9	Q9
3,3,-Dichlorobenzidine	**ND**	µg/L	5.78	91-94-1	Q9, V1

Surrogate	%R	%R Limits	Data Qualifier
2-Fluorophenol (AS-1)	46.7%	0-131	
Phenol-d6 (AS-2)	51.8%	0-127	
Nitrobenzene (BS-1)	58.2%	0-154	
2-Fluorobiphenyl (BS-2)	57.3%	5-123	
2,4,6-Tribromophenol (AS-3)	86.0%	3-136	
Terpheny-d14 (BS-3)	94.4%	33-124	

OMMENTS:
CCV recovery was above method acceptance limits. This target analyte was not detected in the sampe.
sufficient sample received to meet method QC requirements.

eviewed by: _____ Date: 12/22/03

ada Cert. # ID-19-2004-19; Washington Accred. # C074; Arizona Lic. # AZ0538; California Cert. # 2080; Idaho Accred. # ID00019; Montana Cert. # CERT0027; Colorado Cert. #08/13/03

ND = not detected at stated PQL
PQL - Practical Quantitation Limit

SVL Analytical, Inc.

One Government Gulch * P.O. Box 929 * Kellogg, Idaho 83837-0929 * Phone:(208) 784-1258 * Fax:(208) 783-0891

Certificate of Analysis

EPA Method 625 - Semi-Volatile Organic Compounds

Silver State Analytical
070 South Arville Street, Suite 6
as Vegas, NV 89118

SVL Job #: 109043
Sample Name: Method Blank
Lab #: W121503P
Sampling Date:
Date Received:
Extraction Date: 12/15/03
Analysis Date: 12/19/03
Matrix: Water
Analyst: KBH/WOZ

Analyte	Results	Units	PQL	Cas #	Data Qualifier
Phenol	ND	µg/L	10.0	108-95-2	
2-Chlorophenol	ND	µg/L	10.0	95-57-8	
bis (2-chloroethyl)ether	ND	µg/L	5.00	11-44-4	
1,3-Dichlorobenzene	ND	µg/L	5.00	541-73-1	
1,4-Dichlorobenzene	ND	µg/L	5.00	106-46-7	
1,2-Dichlorobenzene	ND	µg/L	5.00	95-50-1	
bis (2-chloroisopropyl)ether	ND	µg/L	5.00	108-60-1	
Hexachloroethane	ND	µg/L	5.00	67-72-1	
Nitrobenzene	ND	µg/L	5.00	98-95-3	
Isophorone	ND	µg/L	5.00	78-59-1	
2-Nitrophenol	ND	µg/L	10.0	88-75-5	
2,4-Dimethylphenol	ND	µg/L	10.0	105-67-9	
bis (2-chloroethoxy)methane	ND	µg/L	5.00	111-91-1	
2,4-Dichlorophenol	ND	µg/L	10.0	120-83-2	
1,2,4-Trichlorobenzene	ND	µg/L	5.00	120-82-1	
Naphthalene	ND	µg/L	5.00	91-20-3	
Hexachlorobutadiene	ND	µg/L	5.00	87-68-3	
4-Chloro-3-methylphenol	ND	µg/L	10.0	59-50-7	
Hexachlorocyclopentadiene	ND	µg/L	5.00	77-47-4	
2,4,6-Trichlorophenol	ND	µg/L	10.0	88-05-2	
2-Chloronaphthalene	ND	µg/L	5.00	91-58-7	
Dimethylphthalate	ND	µg/L	5.00	131-11-3	
Acenaphthylene	ND	µg/L	5.00	208-96-8	
2,6-Dinitrotoluene	ND	µg/L	5.00	606-20-2	
Acenaphthene	ND	µg/L	5.00	83-32-9	
2,4-Dinitrophenol	ND	µg/L	10.0	51-28-5	
4-Nitrophenol	ND	µg/L	10.0	100-02-7	
2,4-Dinitrotoluene	ND	µg/L	5.00	121-14-2	
Diethylphthalate	ND	µg/L	5.00	84-66-2	
Fluorene	ND	µg/L	5.00	86-73-7	
4-Chlorophenylphenylether	ND	µg/L	5.00	7005-72-3	
4,6-Dinitro-2-methylphenol	ND	µg/L	10.0	534-52-1	
4-Bromophenylphenylether	ND	µg/L	5.00	101-55-3	
Hexachlorobenzene	ND	µg/L	5.00	118-74-1	
Pentachlorophenol	ND	µg/L	10.0	87-86-5	
Phenanthrene	ND	µg/L	5.00	85-01-8	
Anthracene	ND	µg/L	5.00	120-12-7	
Di-n-butylphthalate	ND	µg/L	5.00	84-74-2	
Fluoranthene	ND	µg/L	5.00	206-44-0	
Pyrene	ND	µg/L	5.00	129-00-0	
Butylbenzylphthalate	ND	µg/L	5.00	85-68-7	
Benzo(a)anthracene	ND	µg/L	5.00	56-55-3	
Chrysene	ND	µg/L	5.00	218-01-9	
bis (2-ethylhexyl)phthalate	ND	µg/L	5.00	117-81-7	
Di-n-octylphthalate	ND	µg/L	5.00	117-84-0	
Benzo(b)fluoranthene	ND	µg/L	5.00	205-99-2	
Benzo(k)fluroanthene	ND	µg/L	5.00	207-08-9	
Benzo(a)pyrene	ND	µg/L	5.00	50-32-8	
Ideno(1,2,3-c,d)pyrene	ND	µg/L	5.00	193-39-5	
Dibenz(a,h)anthracene	ND	µg/L	5.00	53-70-3	
Benzo(g,h,I)perylene	ND	µg/L	5.00	191-24-2	

ND = not detected at stated PQL
PQL - Practical Quantitation Limit

SVL Analytical, Inc.

One Government Gulch * P.O. Box 929 * Kellogg, Idaho 83837-0929 * Phone:(208) 784-1258 * Fax:(208) 783-0891

Certificate of Analysis

EPA Method 625 - Semi-Volatile Organic Compounds

Silver State Analytical
070 South Arville Street, Suite 6
as Vegas, NV 89118

SVL Job #: 109043
Sample Name: Method Blank
Lab #: W121503P
Sampling Date:
Date Received:
Extraction Date: 12/15/03
Analysis Date: 12/19/03
Matrix: Water
Analyst: KBH/WOZ

Analyte	Results	Units	PQL	Cas #	Data Qualifier
N-Nitrosodi-N-propylamine	ND	µg/L	5.00	621-64-7	
N-Nitrosodiphenyl-amine	ND	µg/L	5.00	86-30-6	
N-Nitrosodimethyl-amine	ND	µg/L	5.00	62-75-9	
3,3,-Dichlorobenzidine	ND	µg/L	5.00	91-94-1	V1

Surrogate	%R	%R Limits	Data Qualifier
2-Fluorophenol (AS-1)	42.8%	0-131	
Phenol-d6 (AS-2)	49.5%	0-127	
Nitrobenzene (BS-1)	52.5%	0-154	
2-Fluorobiphenyl (BS-2)	52.3%	5-123	
2,4,6-Tribromophenol (AS-3)	53.4%	3-136	
Terpheny-d14 (BS-3)	96.9%	33-124	

OMMENTS:
= CCV recovery was above method acceptance limits. This target analyte was not detected in the sampe.

wed by: _____ Date: 12/22/03

ND = not detected at stated PQL
PQL - Practical Quantitation Limit

SVL Analytical, Inc.

One Government Gulch * P.O. Box 929 * Kellogg, Idaho 83837-0929 * Phone:(208) 784-1258 * Fax:(208) 783-0891

Certificate of Analysis

EPA Method 625 - Semi-Volatile Organic Compounds

ilver State Analytical
070 South Arville Street, Suite 6
as Vegas, NV 89118

SVL Job #: 109043
Sample Name: Lab Control Sample
Lab #: W121503C

Sampling Date:
Date Received:
Extraction Date: 12/15/03
Analysis Date: 12/19/03
Matrix: Water
Analyst: KBH/WOZ

Analyte	Results	Units	PQL	Cas #	Data Qualifier
Phenol	**56.0**	µg/L	50.0	108-95-2	D2
2-Chlorophenol	**54.5**	µg/L	50.0	95-57-8	D2
1,4-Dichlorobenzene	**52.8**	µg/L	25.0	106-46-7	D2
N-Nitroso-Di-n-propylamine	**60.7**	µg/L	25.0	621-64-7	D2
1,2,4-Trichlorobenzene	**54.2**	µg/L	25.0	120-82-1	D2
4-Chloro-3-Methylphenol	**74.6**	µg/L	50.0	59-50-7	D2
Acenaphthene	**76.5**	µg/L	25.0	83-32-9	D2
2,4-Dinitrotoluene	**97.5**	µg/L	25.0	121-14-2	D2
4-Nitrophenol	**89.6**	µg/L	50.0	88-75-5	D2
Pentachlorophenol	**88.9**	µg/L	50.0	87-86-5	D2
Pyrene	**102**	µg/L	25.0	129-00-0	D2

Surrogate	%R	%R Limits	Data Qualifier
2-Fluorophenol (AS-1)	49.6%	0-131	
Phenol-d6 (AS-2)	57.0%	0-127	
Nitrobenzene (BS-1)	56.0%	0-154	
2-Fluorobiphenyl (BS-2)	61.8%	5-123	
2,4,6-Tribromophenol (AS-3)	94.2%	3-136	
Terpheny-d14 (BS-3)	92.5%	33-124	

MMENTS:

= Sample required dilution due to high concentration of target analyte.

viewed by: _____ Date: 12/22/03

ND = not detected at stated PQL
PQL - Practical Quantitation Limit

SVL Analytical, Inc.

One Government Gulch * P.O. Box 929 * Kellogg, Idaho 83837-0929 * Phone:(208) 784-1258 * Fax:(208) 783-0891

Quality Control Results

EPA Method 625 - Semi-Volatile Organic Compounds

ilver State Analytical
070 South Arville Street, Suite 6
as Vegas, NV 89118

SVL Job #: 109043
Sample Name: Lab Control Sample
Lab #: W121503C
Analysis Date: 12/19/03
Units: µg/L
Analyst: KBH/WOZ

Analyte	Blank	Conc. Added	LCS	LCS %R	%R Limits	Data Qualifier
enol	ND	100	56.0	56.0%	5 - 112	
Chlorophenol	ND	100	54.5	54.5%	23 - 134	
4-Dichlorobenzene	ND	100	52.8	52.8%	20 - 124	
Nitroso-Di-n-propylamine	ND	100	60.7	60.7%	D - 230	
2,4-Trichlorobenzene	ND	100	54.2	54.2%	44 - 142	
Chloro-3-Methylphenol	ND	100	74.6	74.6%	22 - 147	
enaphthene	ND	100	76.5	76.5%	47 - 145	
4-Dinitrotoluene	ND	100	97.5	97.5%	39 - 139	
Nitrophenol	ND	100	89.6	89.6%	D - 132	
ntachlorophenol	ND	100	88.9	88.9%	14 - 176	
rene	ND	100	102	102%	52 - 115	

MMENTS:

eviewed by: Date: 12/22/03

Cert. # ID-19-2004-19; Washington Accred. # C074; Arizona Lic. # AZ0638; California Cert. # 2080; Idaho Accred. # ID00019; Montana Cert. # CERT0027; Colorado Cert. #08/13/03

ND = not detected at stated PQL
PQL - Practical Quantitation Limit
LCS - Laboratory Control Sample

SVL Analytical, Inc.

One Government Gulch * P.O. Box 929 * Kellogg, Idaho 83837-0929 * Phone:(208) 784-1258 * Fax:(208) 783-0891

Certificate of Analysis

EPA Method 608 - Chlorinated Pesticides and PCBs

Silver State Analytical
5070 South Arville, Suite 6
Las Vegas, Nevada 89118

SVL Job #: 109043
Sample Name: LLV-1A 0M
Lab #: W368804
Sampling Date: 12/09/03
Date Received: 12/11/03
Extraction Date: 12/15/03
Analysis Date: 12/16/03
Matrix Water
Analyst: CDC

Analyte	Results	Units	PQL	CAS Number	Data Qualifier
alpha-BHC	ND	µg/L	0.009	319-84-6	Q9
gamma-BHC (Lindane)	ND	µg/L	0.009	58-89-9	Q9
beta-BHC	ND	µg/L	0.009	319-85-7	Q9
delta-BHC	ND	µg/L	0.009	319-86-8	Q9
Heptachlor	ND	µg/L	0.009	76-44-8	Q9
Aldrin	ND	µg/L	0.009	309-00-2	Q9
Heptachlor epoxide	ND	µg/L	0.009	1024-57-3	Q9
Chlordane (gamma)	ND	µg/L	0.009	5103-74-2	Q9
Chlordane (alpha)	ND	µg/L	0.009	5103-71-9	Q9
4,4'-DDE	ND	µg/L	0.018	72-55-9	Q9
Endosulfan I	ND	µg/L	0.009	959-98-8	Q9
Dieldrin	ND	µg/L	0.018	60-57-1	Q9
Endrin	ND	µg/L	0.018	72-20-8	Q9
4,4'-DDD	ND	µg/L	0.018	72-54-8	Q9
Endosulfan II	ND	µg/L	0.018	33212-65-9	Q9
4,4'-DDT	ND	µg/L	0.018	50-29-3	Q9
Endrin aldehyde	ND	µg/L	0.018	7421-93-4	Q9
Methoxychlor	ND	µg/L	0.091	72-43-5	Q9
Endosulfan sulfate	ND	µg/L	0.018	1031-07-8	Q9
Endrin ketone	ND	µg/L	0.018	53494-70-5	Q9

Surrogates	%R	%R Limits	Data Qualifier
Tetrachloro-m-xylene	21.5	D - 129	
Decachlorobiphenyl	72.1	62 - 149	

COMMENTS:

Q9 = Insufficient sample received to meet method QC requirements

Reviewed by: Wendy Dyminkowski Date: 12/22/03

Nevada Cert. # ID-19-2004-19 Washington Accred. # C074 Arizona Lic. # AZ0538 California Cert. # 2080 Idaho Cert. # ID00019 Montana Cert. # CERT0027 Colorado Cert # 08/13/03

ND = not detected at stated PQL
PQL - Practical Quantitation Limit

SVL Analytical, Inc.

One Government Gulch * P.O. Box 929 * Kellogg, Idaho 83837-0929 * Phone:(208) 784-1258 * Fax:(208) 783-0891

Certificate of Analysis

EPA Method 608 - Chlorinated Pesticides and PCBs

Silver State Analytical
5070 South Arville, Suite 6
Las Vegas, Nevada 89118

SVL Job #: 109043
Sample Name: LLV-1A 0M
Lab #: W368804
Sampling Date: 12/09/03
Date Received: 12/11/03
Extraction Date: 12/15/03
Analysis Date: 12/17/03
Matrix Water
Analyst: CDC

Analyte	Results	Units	PQL	CAS Number	Data Qualifier
Chlordane (technical)	ND	µg/L	0.227	57-74-9	Q9
Toxaphene	ND	µg/L	1.14	8001-35-2	Q9
Aroclor-1016	ND	µg/L	0.227	12674-11-2	Q9
Aroclor-1221	ND	µg/L	0.455	1104-28-2	Q9
Aroclor-1232	ND	µg/L	0.227	11141-16-5	Q9
Aroclor 1242	ND	µg/L	0.227	53469-21-9	Q9
Aroclor 1248	ND	µg/L	0.227	12672-29-6	Q9
Aroclor 1254	ND	µg/L	0.227	11097-69-1	Q9
Aroclor 1260	ND	µg/L	0.227	11096-82-5	Q9

Surrogates	%R	%R Limits	Data Qualifier
Tetrachloro-m-xylene	19.2	D - 129	
Decachlorobiphenyl	67.4	62 - 149	

MMENTS:
Q9 = Insufficient sample received to meet method QC requirements

Reviewed by: Wendy Dymkowski Date: 12/22/03

Nevada Cert. # ID-19-2004-19 Washington Accred. # C074 Arizona Lic. # AZ0538 California Cert. # 2080 Idaho Cert. # ID00019 Montana Cert. # CERT0027 Colorada Cert.# 08/13/03

ND = not detected at stated PQL
PQL - Practical Quantitation Limit

SVL Analytical, Inc.

One Government Gulch * P.O. Box 929 * Kellogg, Idaho 83837-0929 * Phone:(208) 784-1258 * Fax:(208) 783-0891

Certificate of Analysis

EPA Method 608 - Chlorinated Pesticides and PCBs

Silver State Analytical
5070 South Arville, Suite 6
Las Vegas, Nevada 89118

SVL Job #: 109043
Sample Name: LLV-1A 20M
Lab #: W368805
Sampling Date: 12/09/03
Date Received: 12/11/03
Extraction Date: 12/15/03
Analysis Date: 12/16/03
Matrix Water
Analyst: CDC

Analyte	Results	Units	PQL	CAS Number	Data Qualifier
alpha-BHC	ND	µg/L	0.009	319-84-6	Q9
gamma-BHC (Lindane)	ND	µg/L	0.009	58-89-9	Q9
beta-BHC	ND	µg/L	0.009	319-85-7	Q9
delta-BHC	ND	µg/L	0.009	319-86-8	Q9
Heptachlor	ND	µg/L	0.009	76-44-8	Q9
Aldrin	ND	µg/L	0.009	309-00-2	Q9
Heptachlor epoxide	ND	µg/L	0.009	1024-57-3	Q9
Chlordane (gamma)	ND	µg/L	0.009	5103-74-2	Q9
Chlordane (alpha)	ND	µg/L	0.009	5103-71-9	Q9
4,4'-DDE	ND	µg/L	0.018	72-55-9	Q9
Endosulfan I	ND	µg/L	0.009	959-98-8	Q9
Dieldrin	ND	µg/L	0.018	60-57-1	Q9
Endrin	ND	µg/L	0.018	72-20-8	Q9
4,4'-DDD	ND	µg/L	0.018	72-54-8	Q9
Endosulfan II	ND	µg/L	0.018	33212-65-9	Q9
4,4'-DDT	ND	µg/L	0.018	50-29-3	Q9
Endrin aldehyde	ND	µg/L	0.018	7421-93-4	Q9
Methoxychlor	ND	µg/L	0.088	72-43-5	Q9
Endosulfan sulfate	ND	µg/L	0.018	1031-07-8	Q9
Endrin ketone	ND	µg/L	0.018	53494-70-5	Q9

Surrogates	%R	%R Limits	Data Qualifier
Tetrachloro-m-xylene	12.8	D - 129	
Decachlorobiphenyl	70.2	62 - 149	

COMMENTS:

Q9 = Insufficient sample received to meet method QC requirements

Reviewed by: Wendy Dyminkowski Date: 12/22/03

ND = not detected at stated PQL
PQL - Practical Quantitation Limit

SVL Analytical, Inc.

One Government Gulch * P.O. Box 929 * Kellogg, Idaho 83837-0929 * Phone:(208) 784-1258 * Fax:(208) 783-0891

Certificate of Analysis

EPA Method 608 - Chlorinated Pesticides and PCBs

Silver State Analytical
5070 South Arville, Suite 6
Las Vegas, Nevada 89113

SVL Job #: 109043
Sample Name: LLV-1A 20M
Lab #: W368805
Sampling Date: 12/09/03
Date Received: 12/11/03
Extraction Date: 12/15/03
Analysis Date: 12/17/03
Matrix Water
Analyst: CDC

Analyte	Results	Units	PQL	CAS Number	Data Qualifier
Chlordane (technical)	ND	µg/L	0.220	57-74-9	Q9
Toxaphene	ND	µg/L	1.10	8001-35-2	Q9
Aroclor-1016	ND	µg/L	0.220	12674-11-2	Q9
Aroclor-1221	ND	µg/L	0.440	1104-28-2	Q9
Aroclor-1232	ND	µg/L	0.220	11141-16-5	Q9
Aroclor 1242	ND	µg/L	0.220	53469-21-9	Q9
Aroclor 1248	ND	µg/L	0.220	12672-29-6	Q9
Aroclor 1254	ND	µg/L	0.220	11097-69-1	Q9
Aroclor 1260	ND	µg/L	0.220	11096-82-5	Q9

Surrogates	%R	%R Limits	Data Qualifier
Tetrachloro-m-xylene	10.3	D - 129	
Decachlorobiphenyl	60.6	62 - 149	S7

MMENTS:

Q9 = Insufficient sample received to meet method QC requirements

S7 = Surrogate recovery was below laboratory and method acceptance limits. Unable to confirm matrix effect.

Reviewed by: Wendy Dominkowski Date: 12/22/03

Nevada Cert # ID-19-2004-19 Washington Accred # C074 Arizona Lic. # AZ0538 California Cert. # 2080 Idaho Cert # ID00019 Montana Cert # CERT0027 Colorado Cert.# 08/13/03

ND = not detected at stated PQL
PQL - Practical Quantitation Limit

SVL Analytical, Inc.

One Government Gulch * P.O. Box 929 * Kellogg, Idaho 83837-0929 * Phone:(208) 784-1258 * Fax:(208) 783-0891

Certificate of Analysis

EPA Method 608 - Chlorinated Pesticides and PCBs

Silver State Analytical
5070 South Arville, Suite 6
Las Vegas, Nevada 89118

SVL Job #: 109043
Sample Name: Method Blank
Lab #: W121503P
Sampling Date:
Date Received:
Extraction Date: 12/15/03
Analysis Date: 12/16/03
Matrix Water
Analyst: CDC

Analyte	Results	Units	PQL	CAS Number	Data Qualifier
alpha-BHC	ND	µg/L	0.008	319-84-6	
gamma-BHC (Lindane)	ND	µg/L	0.008	58-89-9	
beta-BHC	ND	µg/L	0.008	319-85-7	
delta-BHC	ND	µg/L	0.008	319-86-8	
Heptachlor	ND	µg/L	0.016	76-44-8	
Aldrin	ND	µg/L	0.008	309-00-2	
Heptachlor epoxide	ND	µg/L	0.008	1024-57-3	
Chlordane (gamma)	ND	µg/L	0.008	5103-74-2	
Chlordane (alpha)	ND	µg/L	0.008	5103-71-9	
4,4'-DDE	ND	µg/L	0.016	72-55-9	
Endosulfan I	ND	µg/L	0.008	959-98-8	
Dieldrin	ND	µg/L	0.016	60-57-1	
Endrin	ND	µg/L	0.016	72-20-8	
4,4'-DDD	ND	µg/L	0.016	72-54-8	
Endosulfan II	ND	µg/L	0.016	33212-65-9	
4,4'-DDT	ND	µg/L	0.016	50-29-3	
Endrin aldehyde	ND	µg/L	0.016	7421-93-4	
Methoxychlor	ND	µg/L	0.080	72-43-5	
Endosulfan sulfate	ND	µg/L	0.016	1031-07-8	
Endrin ketone	ND	µg/L	0.016	53494-70-5	

Surrogates	%R	%R Limits	Data Qualifier
Tetrachloro-m-xylene	11.7	D - 129	
Decachlorobiphenyl	83.0	62 - 149	

COMMENTS:

Reviewed by: Wendy Yaminkowski Date: 12/22/03

Nevada Cert. # ID-19-2004-19 Washington Accred. # C074 Arizona Lic. # AZ0538 California Cert. # 2080 Idaho Cert. # ID00019 Montana Cert. # CERT0027 Colorado Cert # 08/13/03

ND = not detected at stated PQL
PQL - Practical Quantitation Limit

SVL Analytical, Inc.

One Government Gulch * P.O. Box 929 * Kellogg, Idaho 83837-0929 * Phone:(208) 784-1258 * Fax:(208) 783-0891

Certificate of Analysis

EPA Method 608 - Chlorinated Pesticides and PCBs

Silver State Analytical
5070 South Arville, Suite 6
Las Vegas, Nevada 89118

SVL Job #: 109043
Sample Name: Method Blank
Lab #: W121503P
Sampling Date:
Date Received:
Extraction Date: 12/15/03
Analysis Date: 12/17/03
Matrix Water
Analyst: CDC

Analyte	Results	Units	PQL	CAS Number	Data Qualifier
Chlordane (technical)	ND	µg/L	0.200	57-74-9	
Aroclor-1016	ND	µg/L	0.200	12674-11-2	
Aroclor-1221	ND	µg/L	0.400	1104-28-2	
Aroclor-1232	ND	µg/L	0.200	11141-16-5	
Aroclor 1242	ND	µg/L	0.200	53469-21-9	
Aroclor 1248	ND	µg/L	0.200	12672-29-6	
Aroclor 1254	ND	µg/L	0.200	11097-69-1	
Aroclor 1260	ND	µg/L	0.200	11096-82-5	

Surrogates	%R	%R Limits	Data Qualifier
Tetrachloro-m-xylene	9.25	D - 129	
Decachlorobiphenyl	76.3	62 - 149	

COMMENTS:

Reviewed by: Wendy Ogminskowski Date: 12/22/03

Nevada Cert. # ID-19-2004-19 Washington Accred. # C074 Arizona Lic. # AZ0538 California Cert. # 2080 Idaho Cert. # ID00019 Montana Cert. # CERT0027 Colorada Cert.# 08/13/03

ND = not detected at stated PQL
PQL - Practical Quantitation Limit

SVL Analytical, Inc.

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Certificate of Analysis

EPA Method 608 - Chlorinated Pesticides and PCBs

Silver State Analytical
5070 South Arville, Suite 6
Las Vegas, Nevada 89118

SVL Job #: 109043
Sample Name: Lab Control Sample
Lab #: W121503C Pest
Sampling Date:
Date Received:
Extraction Date: 12/15/03
Analysis Date: 12/16/03
Matrix Water
Analyst: CDC

Analyte	Results	Units	PQL	CAS Number	Data Qualifier
alpha-BHC	0.065	µg/L	0.008	319-84-6	
gamma-BHC	0.062	µg/L	0.008	58-89-9	
beta-BHC	0.064	µg/L	0.008	319-85-7	
delta-BHC	0.066	µg/L	0.008	319-86-8	
Heptachlor	0.055	µg/L	0.016	76-44-8	
Aldrin	0.048	µg/L	0.008	309-00-2	
Heptachlor Epoxide	0.066	µg/L	0.008	1024-57-3	
gamma-Chlordane	0.062	µg/L	0.008	309-00-2	
alpha-Chlordane	0.062	µg/L	0.008	1024-57-3	
4,4-DDE	0.063	µg/L	0.016	1024-57-3	
Endosulfan I	0.060	µg/L	0.008	1024-57-3	
Dieldrin	0.068	µg/L	0.016	57-74-9	
Endrin	0.074	µg/L	0.016	72-55-9	
4,4'-DDD	0.068	µg/L	0.016	959-98-8	
Endosulfan II	0.068	µg/L	0.016	60-57-1	
4,4'-DDT	0.070	µg/L	0.016	72-20-8	
Endrin Aldehyde	0.071	µg/L	0.016	72-54-8	
Methoxychlor	0.073	µg/L	0.080	33212-65-9	E4
Endosulfan Sulfate	0.072	µg/L	0.016	50-29-3	
Endrin Ketone	0.066	µg/L	0.016	7421-93-4	

Surrogates	%R	%R Limits	Data Qualifier
Tetrachloro-m-xylene	17.3	D - 129	
Decachlorobiphenyl	75.3	62 - 149	

COMMENTS:

E4 = Concentration estimated. Analyte was detected below reporting limit.

Reviewed by: Kindy Ozminkowski Date: 12/22/03

Nevada Cert. # ID-19-2004-19 Washington Accred. # C074 Arizona Lic. # AZ0538 California Cert. # 2080 Idaho Cert. # ID00019 Montana Cert. # CERT0027 Colorado Cert.# 08/13/

ND = not detected at stated PQL
PQL - Practical Quantitation Limit

SVL Analytical, Inc.

One Government Gulch * P.O. Box 929 * Kellogg, Idaho 83837-0929 * Phone:(208) 784-1258 * Fax:(208) 783-0891

Certificate of Analysis

EPA Method 608 - Chlorinated Pesticides and PCBs

Silver State Analytical
5070 South Arville, Suite 6
Las Vegas, Nevada 89118

SVL Job #: 109043
Sample Name: Lab Control Sample
Lab #: W121503C PCB
Sampling Date:
Date Received:
Extraction Date: 12/15/03
Analysis Date: 12/17/03
Matrix Water
Analyst: CDC

Analyte	Results	Units	PQL	CAS Number	Data Qualifier
Arochlor 1260	1.42	µg/L	0.200	319-84-6	

Surrogates	%R	%R Limits	Data Qualifier
Tetrachloro-m-xylene	5.61	D - 129	
Decachlorobiphenyl	62.9	62 - 149	

COMMENTS:

Reviewed by: Wendy Ogminkowski Date: 12/22/03

ND = not detected at stated PQL
PQL - Practical Quantitation Limit

SVL Analytical, Inc.

One Government Gulch * P.O. Box 929 * Kellogg, Idaho 83837-0929 * Phone:(208) 784-1258 * Fax:(208) 783-0891

Quality Control Results

EPA Method 608 - Chlorinated Pesticides and PCBs

Silver State Analytical
5070 South Arville, Suite 6
Las Vegas, Nevada 89118

SVL Job #: 109043
Sample Name: Lab Control Sample
Lab #: W121503C Pest
Analysis Date: 12/16/03
Matrix Water
Analyst: CDC
Units: µg/L

Analyte	Blank	Conc. Added	LCS	LCS %R	%R Limits	Data Qualifier
alpha-BHC	ND	0.100	0.065	64.6%	6 - 148	
gamma-BHC	ND	0.100	0.062	61.8%	11 - 115	
beta-BHC	ND	0.100	0.064	64.5%	39 - 131	
delta-BHC	ND	0.100	0.066	65.5%	16 - 122	
Heptachlor	ND	0.100	0.055	55.4%	13 - 121	
Aldrin	ND	0.100	0.048	47.5%	D - 130	
Heptachlor Epoxide	ND	0.100	0.066	65.5%	21 - 121	
gamma-Chlordane	ND	0.100	0.062	61.7%	D - 130	
alpha-Chlordane	ND	0.100	0.062	61.7%	21 - 121	
Dieldrin	ND	0.100	0.068	68.4%	46 - 119	
Endrin	ND	0.100	0.074	74.1%	49 - 140	
4,4'-DDD	ND	0.100	0.068	68.1%	66 - 133	
Endosulfan II	ND	0.100	0.068	68.0%	56 - 115	
4,4'-DDT	ND	0.100	0.070	69.6%	67 - 134	
Endrin Aldehyde	ND	0.100	0.071	71.4%	48 - 148	
Methoxychlor	ND	0.100	0.073	73.3%	D - 197	
Endosulfan Sulfate	ND	0.100	0.072	71.7%	60 - 124	
Endrin Ketone	ND	0.100	0.066	65.5%	59 - 153	

Sample Name: Lab Control Sample
Lab #: W121503C PCB
Analysis Date: 12/17/03
Matrix Water
Analyst: CDC
Units: µg/L

Analyte	Blank	Conc. Added	LCS	LCS %R	%R Limits	Data Qualifier
Arochlor 1260	ND	2.00	1.42	70.8%	70 - 127	

COMMENTS:

Reviewed by: Wendy Ogminskowski Date: 12/22/03

Nevada Cert. # ID-19-2004-19 Washington Accred. # C074 Arizona Lic. # AZ0538 California Cert. # 2080 Idaho Cert. # ID00019 Montana Cert. # CERT0027 Colorado Cert.#

ND = not detected at stated PQL
PQL - Practical Quantitation Limit
LCS - Lab Control Sample

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com
504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

SILVER STATE ANALYTICAL LABS
RON WINTER
5070 S ARVILLE STE 6
LAS VEGAS NV 89118

Project: 8151A

Certificate of Analysis

EPA Method 8151A - Phenoxy Acid Herbicides

Sample Name: LLV-1A 0M
Sample Location: 3030-1
Sampling Date: 12/9/2003
Sampling Time: 9:25
Date Received: 12/11/2003
Lab #: 03X2635-01
Matrix: WASTE WATER
Analyst: SAT
Extract Date: 12/15/2003
Analysis Date: 12/15/2003

Analyte	Result	Units	PQL
Dalapon:	ND	ug/L	0.05
Dicamba:	ND	ug/L	0.05
Dichlorprop:	ND	ug/L	0.05
2,4-D:	ND	ug/L	0.10
MCPA:	ND	ug/L	5.00
Pentachlorophenol:	ND	ug/L	0.05
Silvex:	ND	ug/L	0.05
2,4,5-T:	ND	ug/L	0.05
2,4-DB:	ND	ug/L	0.10
Dinoseb:	ND	ug/L	0.10
Dacthal:	ND	ug/L	0.05
Picloram:	ND	ug/L	0.05

Surrogate Standard	% Recovery
DCPA %R	105

Sample Name: LLV-1A 20M
Sample Location: 3030-2
Sampling Date: 12/9/2003
Sampling Time: 10:05
Date Received: 12/11/2003
Lab #: 03X2635-02
Matrix: WASTE WATER
Analyst: SAT
Extract Date: 12/15/2003
Analysis Date: 12/15/2003

Analyte	Result	Units	PQL
Dalapon:	ND	ug/L	0.05
Dicamba:	ND	ug/L	0.05
Dichlorprop:	ND	ug/L	0.05
2,4-D:	ND	ug/L	0.10
MCPA:	ND	ug/L	5.00
Pentachlorophenol:	ND	ug/L	0.05
Silvex:	ND	ug/L	0.05
2,4,5-T:	ND	ug/L	0.05
2,4-DB:	ND	ug/L	0.10
Dinoseb:	ND	ug/L	0.10
Dacthal:	ND	ug/L	0.05
Picloram:	ND	ug/L	0.05

Surrogate Standard	% Recovery
DCPA %R	96.3

Lab Supervisor:

Report Date: 18-Dec-03

ND Not Detected PQL Practical Quantitation Limit