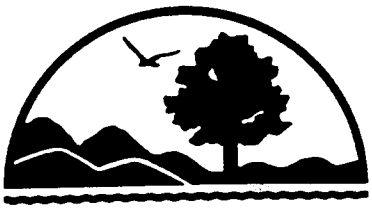
# ANNUAL REPORT ON OPERATIONS OF RUSSELL COUNTY REGIONAL TREATMENT PLANT AND ASSOCIATED ENVIRONMENTAL MONITORING



Natural Resources and
Environmental Protection Cabinet

DIVISION OF WATER

JULY 1994

# Annual Report on Operations of Russell County Regional Wastewater Treatment Plant and Associated Environmental Monitoring

Kentucky Department for Environmental Protection
Division of Water
Water Quality Branch

This report has been approved for release:

Jack A. Wilson, Director
Division of Water

July 20, 1994
Date

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## Executive Summary

The first year of operation of the Russell County Regional Wastewater Treatment Plant under final permit conditions was marked by several months of normal operations with minimal impact to the lake and the October 22, 1993 break in a section of pipeline submerged in the Lily Creek embayment. The pipeline break resulted in the relocation of the discharge for a period of almost four months to the old discharge location at Milepoint 7.4 of Lily Creek about three miles above the lake, a reduction in operations at Union Underwear, and a concentrated effort to repair the pipeline and determine the cause of the break. Complete treatment of the wastewater was maintained during the entire period. The pipeline was put back into operation on February 15, 1994. Evidence indicates that air was drawn into the pipeline, causing the pipe to flex and eventually break, but the reason for the pipeline drawing air was not conclusively determined. The pipeline was refitted with additional weights and an air trap and 8-inch vent line to ensure that air in the pipe is vacated. Foam has not been evident since the reactivation of the pipeline in February.

Operations at the treatment plant were rated satisfactory by the Division in several compliance inspections. Discharge monitoring data submitted by Jamestown to the Division were within permit limits except that copper and color slightly exceeded maximum daily limits during August 1993. Whole effluent toxicity has always been below the permit limit in testing done by both Jamestown and the Division.

Sampling of the thermally stratified lake by Jamestown and the Division in August and September 1993 indicated that the effluent mixes rapidly and remains well below the surface. Plume surveys detected increased conductivity and chloride at distances of almost 3000 feet from the diffuser, but chloride concentrations were usually in the range of 5-15 mg/l. The highest chloride concentrations found were about 40 mg/l at distances up to about 1500 feet from the diffuser. Chloride was concentrated in a thin (3-4 foot) vertical layer. Slightly higher concentrations could be expected from sampling the discrete layer (less than one foot) at which the highest conductivities were measured. The levels of chloride found in the surveys compare to background levels of about 4 mg/l and a chronic aquatic life water quality criterion of 600 mg/l. Copper increased from 0.002 mg/l in background samples to about 0.004 mg/l and remained well below the chronic water quality criterion of 0.010 mg/l. Concentrations of other metals and trihalomethanes were very low or undetectable in all samples.

Trophic state studies by the Division did not detect any appreciable differences in nutrient levels or phytoplankton biomass below the diffuser. Fish tissue, sediment, and plankton samples did not indicate any noticeable differences between samples collected up- and downstream of the diffuser. A decrease of nutrients and biomass in the Lily Creek embayment, which previously received the effluent via Lily Creek, was also found in the 1993 growing season.

The overall effect of the lake discharge on the water quality, sediment quality, and biological resources of Lake Cumberland has been minimal. However, several of the samples collected by Jamestown near the diffuser were apparently not collected in the wastewater plume, and further work must be conducted by both Jamestown and the Division in the near-field area of the diffuser to compare field data to model predictions. Further work will also be conducted by the Division during stratified lake conditions in the summer of 1994 and unstratified conditions in the winter of 1995 to determine the far-field dispersion of the plume in Lake Cumberland. The free-flowing reaches of Lily Creek will be surveyed in the spring of 1995 to document changes since relocation of the discharge to the lake.

# Introduction

The Russell County Regional Wastewater Treatment Plant (RCRWWTP), operated by the City of Jamestown, was issued a Kentucky Pollution Discharge Elimination System (KPDES) permit in October 1989 by the Kentucky Department for Environmental Protection (DEP), Division of Water (Division). The permit contained limits for typical components of sanitary wastewater and several constituents found in the large contribution from Union Underwear (Table 1). The limits applied to a discharge from a submerged multiport diffuser in the main body of Lake Cumberland. Final permit limits were to have taken effect on June 1, 1992. This date was required by Section 304(l) of the Clean Water Act following the Division's decision to place Lily Creek on the list of streams not meeting a water quality standard for a priority pollutant (copper) because of a point source discharge (RCRWWTP). Until June 1, 1992, the plant was to continue discharging to Lily Creek about three miles above the lake, the same location at which it had discharged since 1981 (Figure 1).

The change in location of the discharge was necessary because water quality criteria for chloride and several other constituents became effective after Jamestown's previous permit was issued in 1982. The RCRWWTP could not meet the revised chronic aquatic life criteria for chloride, copper, or whole effluent toxicity in Lily Creek because of inadequate dilution during low flow conditions. In other words, chronic criteria must be met at the end of the pipe in streams with zero 7-day 10-year low flows. Because of the cost and technical difficulty of removing salt from the wastewater, the RCRWWTP applied for a permit to discharge into the main body of Lake Cumberland, taking advantage of the large volume of dilution water available.

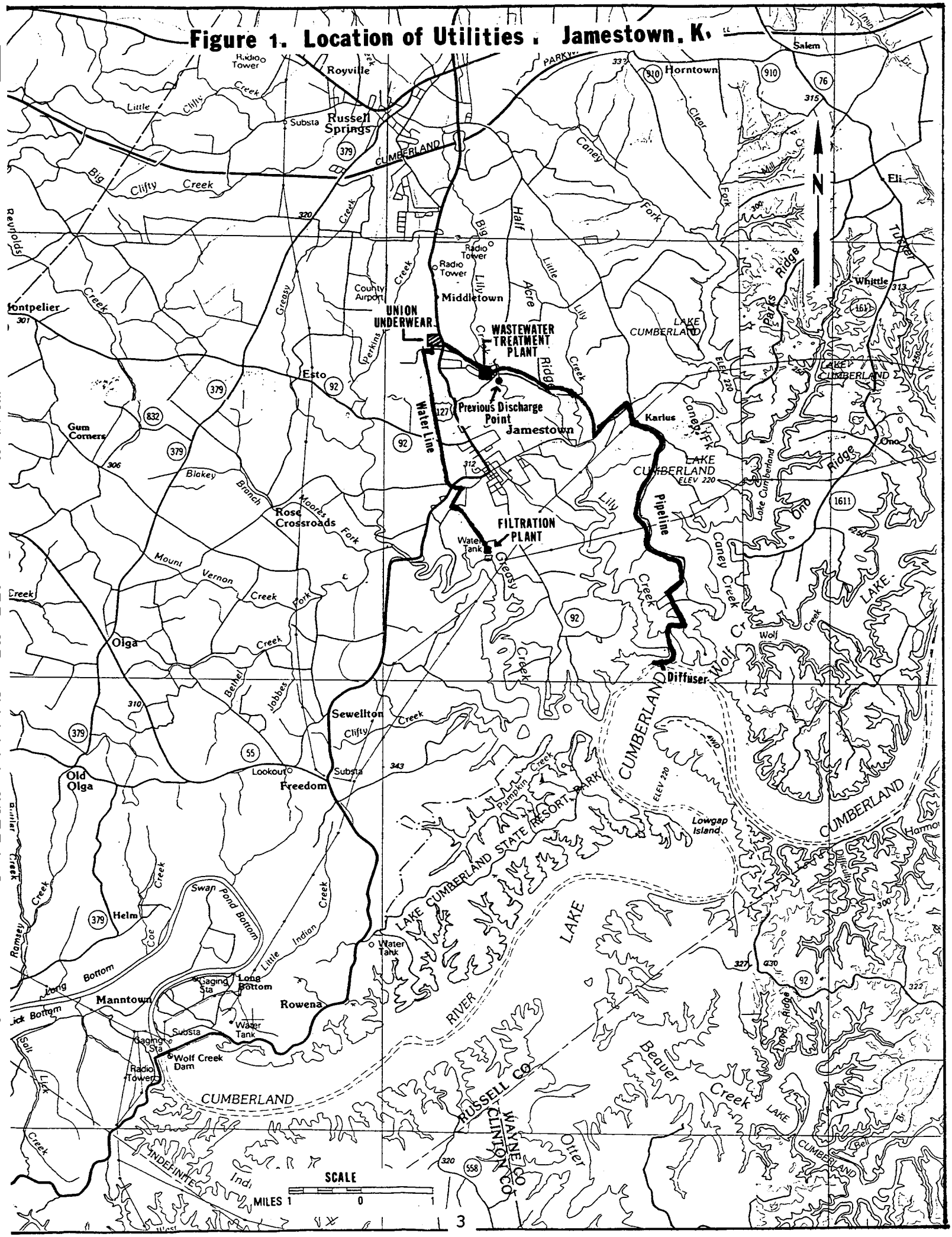
The Lake Cumberland Trust, a coalition of environmental organizations, appealed the permit and the issue was placed before a Natural Resources and Environmental Protection Cabinet hearing officer in 1991. After much testimony, the hearing officer recommended to the cabinet Secretary that the copper limit be reevaluated by the Division. He also stated in his final opinion that no significant testimony was presented indicating that the chloride allowed in the final permit would in any way degrade the water quality of the lake. An Agreed Order was signed in January 1992 that placed the issue in the hands of a Technical Advisory Committee (TAC) made up of two members of the Lake Cumberland Trust, one member each from the Town of Jamestown and Union Underwear, and the Assistant Director of the Division. After a year of extensive work, the TAC concluded that the final permit as initially issued by the Division was the proper course of action. This decision was based on evaluations of alternative treatment technologies, engineering reliability, costs, pollution prevention measures, and environmental considerations. It was noted that progress had been made toward improving effluent quality, especially copper and color. Other recommendations were that the Division prepare at least three annual reports and that Union Underwear continue waste minimization efforts. The TAC report was accepted by the Division, and the Secretary issued an order in February 1993 that the permit become effective with conditions as recommended by the TAC. The effective date of the final permit was delayed one year until June 1, 1993, although the main lake discharge was to become operational by April 19. Effluent was discharged through the pipeline beginning on April 2, 1993, and the system operated without problems until a break in the pipeline occurred on October 22 (discussed in detail later).

**Table 1. Final Permit Conditions**

| Constituent | Concentration [a] Monthly Average | Weekly Average | Sampling Frequency |
|---|---|---|---|
| CBOD - 5[b] | 30 | 45 | Weekly |
| Ammonia - nitrogen | 4[c]/11[d] | 6[c]/16.5[d] | Weekly |
| Dissolved oxygen | Not less than 7 | Not less than 7 | Weekly |
| Total Suspended Solids | 30 | 45 | Weekly |
| Color (ADMI Units) | 100 | 100[e] | 4/Day |
| pH (Standard Units) | 6-9 | 6-9 | Daily |
| Total Residual Chlorine | 0.010 | 0.019[e] | 4/Day |
| Fecal Coliform bacteria (Counts/100 ml) | 200 | 400 | Weekly |
| Chloride | 2531 | 5062[e] | Daily |
| Copper | 0.176 | 0.176[e] | Weekly |
| Toxicity (Acute Toxicity Units) | | 4.8 | Monthly[f] |

[a] mg/l unless noted otherwise
[b] Five-day carbonaceous biochemical oxygen demand
[c] May - October
[d] November - April
[e] Daily maximum
[f] First year; quarterly in subsequent years

# Figure 1. Location of Utilities, Jamestown, KY



## Russell County Regional Wastewater Treatment Plant

### Description of Treatment Facilities and Pipeline

The RCRWWTP upgrade and expansion was completed in the summer of 1992, well before the effective date of the final permit and relocation of the discharge to the main lake. Added treatment and new construction consists of a decolorization/dechlorination basin where chlorine is added to remove color and sulfur dioxide is added to remove excess chlorine, a new chemical feed building, additional aeration equipment in the biological treatment (carrousel) units, floating aerators to increase dissolved oxygen in the effluent, an effluent pump station, two belt filter presses for sludge dewatering, a backup power generator, and a new operations and laboratory building (Figure 2). The new basins allowed one of the four existing biological treatment units that had been used for chlorination and decolorization to be returned to biological treatment. The effect of this construction was to increase the hydraulic capacity from 2.5 to 3.6 million gallons per day (mgd) and the retention time from 30 to 38 hours when all basins are in use.

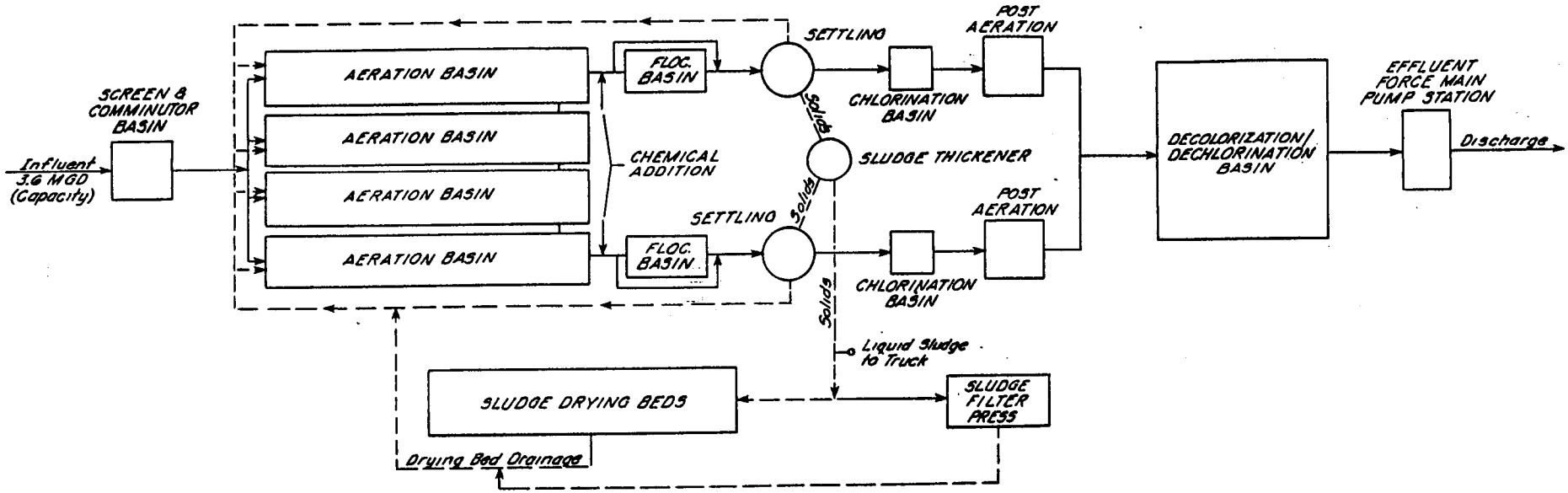
The 24-inch pipeline was completed in the spring of 1991 but was not put into operation for two years. It follows road right-of-ways for much of its length before entering the lake near the mouth of the Lily Creek embayment (Figure 1). The pipeline then crosses the embayment and terminates in a 300-foot multiport diffuser in the main lake. The diffuser lies on the steeply sloping lake bottom and angles out slightly into the lake at an elevation of 650 feet MSL on the upstream end and 620 feet MSL on the downstream end. At normal pool elevation of 723 feet MSL, the diffuser is 73 to 103 feet deep and lies less than 100 feet horizontally from the shoreline. During the late summer or fall, the depth is often reduced by 30 - 40 feet as the lake is gradually drawn to generate hydro-electricity. Sixteen two-inch ports spaced at 20-foot intervals distribute the wastewater in both horizontal and vertical dimensions.

### Influent from Industrial Sources

Jamestown is required to have a pretreatment program approved by the Division because of industrial wastewaters discharged into the sanitary sewer system. The city has two industrial contributors: Union Underwear and Garment Finishers.

Union Underwear, a subsidiary of Fruit of the Loom, has a textile facility in Russell County with manufacturing, bleaching, dyeing, and sewing operations. The facility employs over 3000 persons and supplies other Fruit of the Loom plants in the state with colored fabric. The plant has been in operation since 1981, when the RCRWWTP was constructed at its present location to handle the large volume of wastewater from Union Underwear. As in similar facilities worldwide, the dyeing operations use large amounts of salt (sodium chloride) to fix dyes in fabric. The salt then becomes a component of the wastewater, from which it is difficult and costly to remove. Also, the wastewater contains fairly high amounts of copper because of the presence of copper in several of the azo-dyes.

Figure 2. Schematic of Wastewater Flow (1993)
Russell County Regional Wastewater Treatment Plant
Jamestown, Kentucky
(Prepared by Kenvirons, Inc.)




Russell County
Regional Wastewater Treatment Plant

Expansion of the Union Underwear facility took place in 1987-88. Influent to the RCRWWTP increased from 1.5 to 2.0 mgd. Average salt use was expected to increase to about 35 tons per day, but the installation of several high-pressure dye pads has kept average salt use at 20-25 tons per day.

Union Underwear continues to comply with all local, state, and federal pretreatment program requirements. Currently, they are in compliance with all effluent limits established in the discharge permit issued to them by Jamestown.

Garment Finishers operates a jean washing facility that uses a recently developed process of fading jeans with an enzyme solution instead of stone washing. Problems with solids and color that are common to stone-washing facilities have not been present at Garment Finishers since the new process and improved pretreatment facilities went on line in 1991. The facility discharges about 0.03 mgd to the RCRWWTP and has been in compliance with the city's pretreatment requirements.

**Monitoring and Inspections**

The RCRWWTP is required to conduct regular sampling of constituents listed in Table 1. Results are submitted monthly to the Division in discharge monitoring reports (DMRs) and entered into the permit compliance system (PCS) database. Semiannual compliance sampling inspections (CSIs) and periodic compliance evaluation inspections (CEIs) are also performed by Division field office personnel. Biomonitoring results are obtained by personnel of the Division's Bioassay Section in conjunction with the CSIs.

Pretreatment audits are performed by Division personnel on an annual basis to determine compliance with the program. Pretreatment reports are also submitted semiannually to the Division's Pretreatment Section by the permittee. Results of extensive annual influent and effluent sample analyses are reported by the permittee in one of the semiannual reports.

Results. The DMR data from April 1993 through April 1994 are shown in Table 2. In only two instances were permit limits exceeded: one daily maximum value for copper and one value for color in August 1993. Because the permit limits were exceeded only once for each parameter and were not significant (less than a factor of 1.2 multiplied by the permit limit), no enforcement action was warranted. Except for periods when Union Underwear was closed for holiday break and in November when dyeing operations were curtailed because of the pipeline break, weekly average chloride concentrations ranged from 1400 to 2300 mg/l.

Inspections by Division personnel have found the plant to be operating satisfactorily. CSIs were performed in March and May 1993, before and after discharge relocation, and another was conducted in May 1994 (Appendix A). Biomonitoring results obtained in conjunction with the latter three CSIs showed toxicity well below the permit limit (Appendix A). Less detailed CEIs were also conducted in July and August 1993 and March 1994. All three inspections gave a satisfactory rating.

## Table 2. Discharge Monitoring Report Data
## April 1993 - April 1994[a,b]

| | Flow (mgd) | Total Residual Chlorine (mg/l) | | Chloride (mg/l) | | Ammonia-N (mg/l) | | Copper (mg/l) | | CBOD-5 (mg/l) | | Fecal Coliform Bacteria (#/100 ml) | | Color (ADMI Units) | Toxicity ($TU_a$) | Dissolved Oxygen (mg/l) | pH (Std Units) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Mo. Ave. | Mo. Ave. | Daily Max. | Mo. Ave. | Daily Max. | Mo. Ave. | Wk. Ave. | Mo. Ave. | Daily Max. | Mo. Ave. | Wk. Ave. | Mo. Ave. | Wk. Ave. | Daily Max. | Max. | Min. | Min. | Max. |
| 4/93 | 2.08 | <.010 | <.010 | 1505 | 1614 | 0 | 0 | .072 | .080 | 8 | 12 | 14 | 54 | 81 | <4.8 | 7.2 | 6.5 | 7.5 |
| 5/93 | 1.77 | <.010 | <.010 | 1673 | 1764 | .03 | .1 | .073 | .133 | 9 | 12 | 3 | 7 | 93 | <4.8 | 7.5 | 6.9 | 8.3 |
| 6/93 | 1.76 | <.010 | <.010 | 1648 | 1900 | 0 | 0 | .086 | .110 | 6 | 7 | 3 | 4 | 88 | <4.8 | 7.1 | 6.7 | 7.9 |
| 7/93 | 1.62 | <.010 | <.010 | 1305 | 2250 | 0 | 0 | .023 | .110 | 5 | 8 | 121 | 239 | 98 | <4.8 | 7.0 | 6.0 | 7.7 |
| 8/93 | 1.98 | <.010 | <.010 | 1915 | 2300 | 0 | 0 | .120 | .200 | 7 | 7 | 37 | 87 | 113 | <4.8 | 7.2 | 6.9 | 8.2 |
| 9/93 | 1.90 | <.010 | <.010 | 1835 | 2200 | 0 | 0 | .055 | .078 | 6 | 6 | 31 | 123 | 76 | <4.8 | 7.3 | 6.9 | 8.4 |
| 10/93 | 1.65 | <.010 | <.010 | 1635 | 2050 | .04 | .2 | .115 | .168 | 7 | 12 | 2 | 6 | 71 | 4.8 | 7.2 | 7.0 | 8.1 |
| 11/93 | 1.60 | <.010 | <.010 | 710 | 1050 | .1 | .3 | .067 | .116 | 7 | 10 | 56 | 199 | 38 | <4.8 | 8.4 | 6.0 | 7.9 |
| 12/93 | 1.46 | <.010 | <.010 | 509 | 675 | .03 | .14 | .035 | .042 | 8 | 11 | 28 | 74 | 68 | <4.8 | 8.8 | 6.0 | 7.4 |
| 1/94 | 1.73 | <.010 | <.010 | 360 | 650 | 0.1 | .1 | .022 | .025 | 11 | 13 | 69 | 266 | 50 | <4.8 | 8.9 | 6.0 | 7.3 |
| 2/94 | 2.10 | <.010 | <.010 | 805 | 1400 | 0 | .1 | .026 | .050 | 11 | 13 | 12 | 21 | 66 | <4.8 | 8.4 | 6.0 | 7.3 |
| 3/94 | 2.45 | <.010 | <.010 | 995 | 1550 | .1 | .2 | .047 | .060 | 12 | 18 | 7 | 16 | 68 | <4.8 | 10.6 | 6.1 | 7.2 |
| 4/94 | 2.24 | <.010 | <.010 | 1228 | 1800 | .03 | .1 | .047 | .060 | 13 | 17 | 26 | 102 | 84 | <4.8 | 7.4 | 6.0 | 7.8 |

[a] Data submitted by City of Jamestown

[b] Discharge to Lily Creek from October 22, 1993 - February 15, 1994

A pretreatment audit was performed in July 1993 which indicated that Jamestown was implementing its pretreatment program efficiently and effectively. At the time of the audit, it was noted that Union Underwear had begun adding polymer to its process discharge in an effort to reduce the levels of copper being discharged to the RCRWWTP. The positive effect of this polymer can be seen by comparing the copper results from sampling conducted before and after polymer addition began. Influent and effluent samples taken on December 31, 1991, before polymer addition had begun, resulted in copper concentrations of 0.28 and 0.0466 mg/l, respectively. Influent and effluent samples taken on June 30, 1993, after polymer addition had begun, resulted in copper concentrations of 0.22 and 0.028 mg/l, respectively. The decrease in copper concentration in the final effluent demonstrates that the polymer is having a noticeable effect on copper removal after reaching the RCRWWTP.

## Pipeline Break

On the morning of October 22, 1993, a break occurred in a section of pipe submerged in the Lily Creek embayment several hundred feet upstream of the diffuser. The pipeline was observed breaching the surface of the lake by fishermen, and the incident was reported to Jamestown and the Kentucky Water Patrol. Discharge through the pipeline was stopped later that morning and Union Underwear almost immediately ceased discharge to the RCRWWTP. Wastewater was routed from the pipeline to the former discharge point on Lily Creek (Figure 1). At no time was treatment of the wastewater interrupted.

Sampling of Lily Creek above the lake began on the afternoon of the pipeline break and continued until the pipeline was put back into operation. The Lily Creek embayment was not sampled during the period that the wastewater was discharged to Lily Creek because sampling in previous years when the discharge was into Lily Creek had not detected any significant environmental impacts to the embayment other than increased biological productivity.

Members of the Division's Bioassay Section traveled to the RCRWWTP on October 22 and, using a grab sample of wastewater, found no acute toxicity to fathead minnows and a low level of acute toxicity (1.2 TUa or 86.6% effluent) to water fleas. Samples were collected by the city twice each day from October 26 - November 23 from the effluent, an upstream station, and three downstream stations. Data were collected for chloride, copper, hardness, dissolved oxygen, temperature, and flow. (In addition, the effluent was sampled for chloride four other times each day on a four-hour schedule.) The sampling schedule was reduced to daily samples from November 24 - December 24, when instream sampling was suspended entirely until January 9 while Union Underwear was closed for holiday break. During this period, sampling of the effluent proceeded as required by the permit. Daily sampling resumed on January 10 at all stations and then the two lower downstream stations were eliminated from January 17 - February 7. The pipeline was reactivated on February 15.

Union Underwear shut down all operations from October 22-26. On the latter date, following a meeting between Division, Jamestown, and Union Underwear personnel, bleaching operations were resumed. This action was taken to supply hydraulic and organic loading to the

RCRWWTP that would be sufficient to maintain the biological treatment system. Greater problems would have resulted had the biological treatment system collapsed because of a lack of flow and nutrients. Partial dyeing operations resumed on November 6 so that the biological treatment system would remain acclimated to chlorides and to allow Union Underwear to bring more of their operations on-line and employees back to work.

Several days passed after cessation of dyeing operations before a reduction in chloride was evident at RCRWWTP. Chloride levels in the final effluent dropped from 1775 mg/l on October 25 to 600-700 mg/l in early November (Appendix B). Chloride levels then rose noticeably on November 5 and remained around 1000 mg/l until November 13. From November 16 until the effluent was redirected to the lake in February, chloride levels in the effluent were less than 700 mg/l.

The effluent was immediately diluted by natural flow in Lily Creek. Chloride levels in Lily Creek just downstream from the discharge dropped to less than 1000 mg/l on October 28 and were less than the Division's chronic criterion of 600 mg/l from November 14 until the discharge was re-routed to the lake in February. Concentrations at stations further downstream were even lower because of higher natural flows.

Effluent copper fell from over 0.1 mg/l to about 0.03 mg/l by the second week of November. Copper concentrations at the first downstream station decreased to less than 0.02 mg/l by the second week of November and, except for a few samples, remained low for the remaining period that the discharge was in Lily Creek.

Air drawn into the pipe, causing the line to float and flex, is believed to have been the reason for the pipeline break. The following discussion is based on a report submitted by Kenvirons (1994) to the Division. This report is provided in full in Appendix C.

The air/vacuum relief valve stations along the pipeline were inspected the day of the break by Kenvirons personnel and no unusual conditions were observed. On October 29, one end of the pipe was located by divers, floated, and secured to the bank; the other end was located and floated on November 3. The ends of the pipe were removed and sent to a materials laboratory for analysis. Flanges were then welded to the pipe ends and the line was bolted together. The pipeline was sunk by releasing inside air, and the effluent pumps were started on November 9. Upward movement was observed almost immediately by divers and pumping was ceased. It was determined that air was being drawn into the pipeline at the air/vacuum relief valves. The pipeline and diffuser were checked visually again to ensure that they were still in good shape.

The theory of flexing and subsequent breaking of the pipe is consistent with the materials testing report prepared by Dr. Dean Harper at the University of Louisville (see Appendix C). That report also concluded that material fatigue occurred not at a single instant, but over a relatively short period of time, and that there was no evidence of material abnormality or manufacturing defect in the pipe.

Investigations into the possible causes of air in the pipeline have not been conclusive. Samples of the effluent in the pipeline near the lake and at the wastewater treatment plant showed no significant differences. The effluent pumps were checked to see if they could possibly have been introducing air, but they were operating normally. Observations at the RCRWWTP did not reveal any unusual operating conditions, and discussions with industrial users did not reveal anything out of the ordinary.

Although the cause of air in the pipeline had not been determined, plans were developed to vent air through an air trap and to add more weights to the pipeline. The air trap is a 54-inch section of pipe submerged at elevation 650 feet MSL just after the pipe enters the Lily Creek embayment (Figure 3). An 8-inch vent line runs off the air trap and up the bank. The Division approved these plans on December 10. Work was completed by February, and the pumps were reactivated on February 3. Because the effluent in the pipe had been present since October and was known to be frothy, defoamer was present if needed. When pumping began, foam was forced up through the vent line and defoamer was applied at the manhole. However, it was found that city water sprayed through nozzles (at a rate of 4 gpm) in the mix tank controlled the foam and the defoamer was no longer required. The water runs down the vent pipe and back into the pipeline. Defoamer now is used at the RCRWWTP, where it had not been used in the seven months before the break.

Foaming in the pipeline at the lake ceased in less than a day, and the air/vacuum relief valves returned to their normal operation of breathing rather than drawing air. There have been no further problems since February.

Although the exact cause of the air in the pipeline was not conclusively determined, the air trap, vent line, and additional weights are intended to eliminate any future problems. Jamestown will continue to use defoamer at the plant, conduct routine inspections of the vent manhole, and increase security to minimize potential for unauthorized access. A permanent vent system with a buried manhole was completed by June 17. Installation of the spray nozzles was approved by the Division on July 7, 1994. Some further work involving concrete encasement of the vent line will take place in the fall when the lake is at a lower level.

## Intensive Survey of Lily Creek

On March 30, 1993, Division biologists visited the free-flowing reaches of Lily Creek to determine the impacts of the RCRWWTP on the biological community of the stream. The survey was done just prior to the relocation of the discharge to the main lake.

Sites were located upstream of the discharge, just downstream of the discharge, and two miles downstream at the KY 619 bridge. Sampling was conducted for fish, macroinvertebrates, and algae. Samples were collected and analyzed according to the methods specified by the Division (1993). Physicochemical samples were also collected at the three sites.

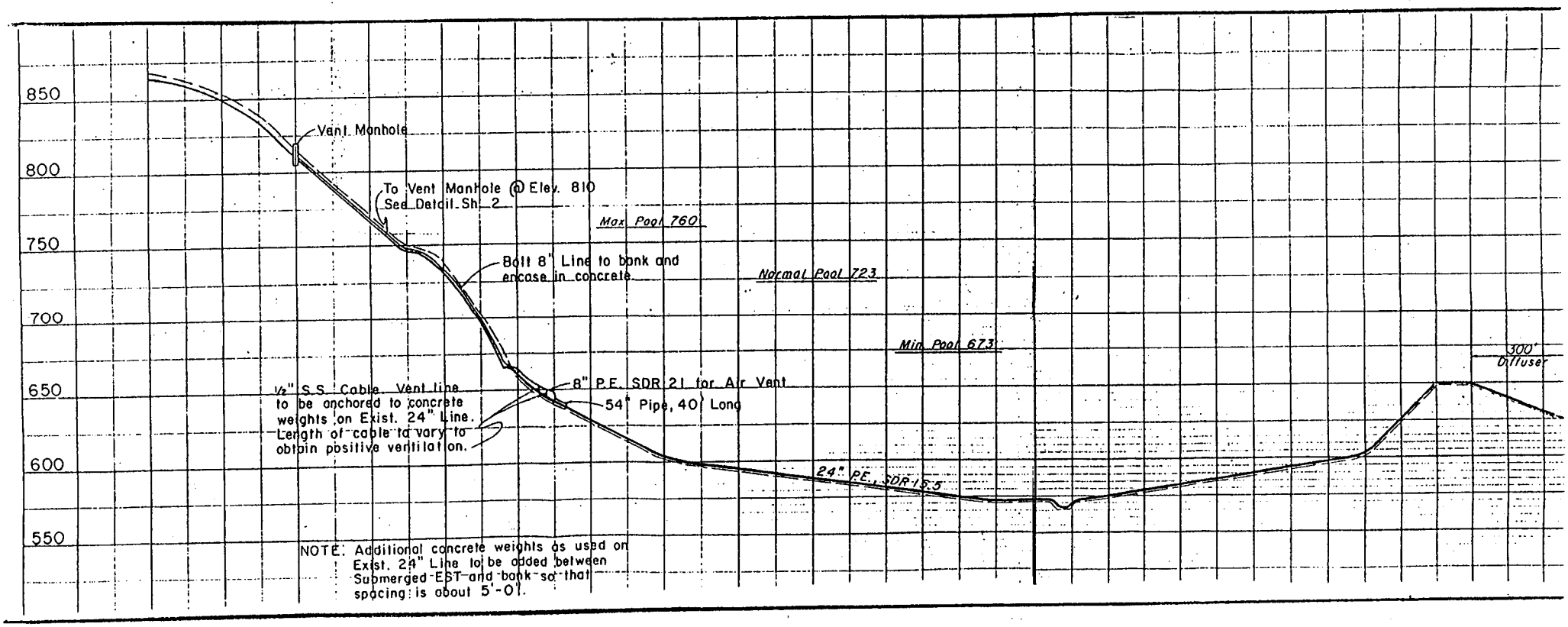



Figure 3.
JAMESTOWN EFFLUENT FORCE MAIN MODIFICATIONS
AIR VENT MANHOLE AND PIPELINE
PREPARED BY: KENVIRONS, INC.

Benthic chlorophyll-a measurements indicated nutrient enrichment downstream of the discharge and at the 619 bridge. Values were two to three times greater than at the upstream control site. In addition, nuisance algal growths were abundant at both downstream sites. Green algae were abundant just below the discharge, and long filaments of *Cladophera* were abundant at the 619 bridge site.

Macroinvertebrate sampling showed that the site below the discharge had reduced numbers of taxa and individuals when compared to the control site. The 619 site also had reduced numbers of taxa and individuals, but not as pronounced as the site just below the discharge. These data indicate that toxic conditions existed below the discharge but were less severe further downstream.

Fish collections showed that only a few species inhabited Lily Creek. A waterfall below the 619 bridge acts as a barrier to upstream migration and may be partially responsible. However, the station just below the discharge had fewer species than the upstream or the control sites.

Water quality at the control site was excellent, while the two sites below the discharge had poor water quality. Chloride exceeded the state's chronic criterion, and copper exceeded the acute criterion at the site just below the discharge. Copper again exceeded the acute criterion and pH exceeded the criterion of 9 Standard Units at the 619 site. Phosphorus concentrations were also very high below the discharge.

Another survey of the free-flowing portion of Lily Creek was to have been conducted one year after the discharge relocation to document changes to the biological community and water quality. However, effluent was discharged to Lily Creek at the old discharge location from October 22, 1993 to February 15, 1994. Recovery of the creek was therefore delayed and another survey will be performed in 1995.

## Lake Monitoring

### Water Quality

Monitoring of the lake environment was a condition of the final permit. A study plan was submitted and approved by the Division prior to sampling. The study plan called for quarterly water, sediment, and fish tissue samples to be collected by the permittee at an upstream control station and several downstream stations and for the biological community to be assessed in the vicinity of the discharge. Background conditions prior to the discharge relocation to the lake were also to be done. In addition, the Division was to conduct an independent assessment of environmental conditions and periodically examine the efficacy of the plume dispersion model that was used to derive the permit limits.

Samples collected prior to the discharge relocation showed low levels of most constituents (Appendix D). Chloride was usually less than 5 mg/l, and copper was usually less than 0.005

mg/l. Mercury was consistently detected at levels of 0.001 - 0.002 mg/l, greater than Kentucky's chronic criterion of 0.000012 mg/l.

Earlier studies done by the Division (1988a, 1990a) had shown that the chloride plume exiting Lily Creek was concentrated in a thin vertical layer in the metalimnion. The depth of maximum chloride concentration ranged from 25 to 50 feet depending on weather conditions for the particular year. At the approximate present location of the diffuser, chloride concentrations as high as 32 mg/l were found during stratified conditions (Figure 4). During other periods of the year, the plume would not be concentrated within a temperature density layer, but would be much more dispersed throughout the water column.

The first samples after the discharge relocation were taken by Jamestown on May 11-12, 1993. Replicate samples were collected at three locations along the length of the diffuser (Stations 1a, 1b, and 1c) at a distance of seven feet (south) from the diffuser. Two other stations were sampled. Station 2 was located about 1.2 miles upstream of the diffuser, and Station 3 was located about 2.5 miles downstream at the site of the old state park water intake. The seven-foot distance at Station 1 corresponds to the edge of the zone of initial dilution (ZID) where several permit limits based on acute aquatic life criteria apply. Chloride concentrations of 17 and 23 mg/l were found at the mid-pipe and lower-pipe areas, respectively (Appendix D). Background chloride concentrations were less than 5 mg/l. Metal (copper, arsenic, lead, mercury, and nickel) and trihalomethane concentrations were less than detection limits in all samples.

Samples were taken in triplicate in the next two quarterly sampling trips in August 1993 and March 1994 at a mid-pipe location corresponding to Station 1b in the May 1993 samples. (Samples were not collected in the fourth quarter of 1993 when the pipeline was not in operation.) Results from these samples showed lower chloride concentrations than in May 1993 (Appendix D). Because the chloride concentrations near the diffuser (Station 1) were no different than background on both dates, it appears that the samples were not collected in the plume.

Plume Surveys. Jamestown performed a more detailed plume study in August. Lake elevation during the study was about 707 feet MSL (COE 1994a), placing the diffuser at a depth of 57-87 feet. Flows through the dam were 6700-6900 cfs from August 16-18 (COE 1994a). Effluent chloride concentrations determined from 24-hour composite samples were 1900-2100 mg/l for the period of August 16-18 (Town of Jamestown 1994).

Conductivity results from this study indicated that the plume was greater than 60 feet deep and was most concentrated at 80-100 foot depths. The highest conductivity was 208 umhos/cm at a distance of 20 feet from the diffuser. This compares to measurements of 110-120 umhos/cm at the same depth at the control station. The plume was barely detectable at a distance of 2000 feet from the diffuser (Figure 5).

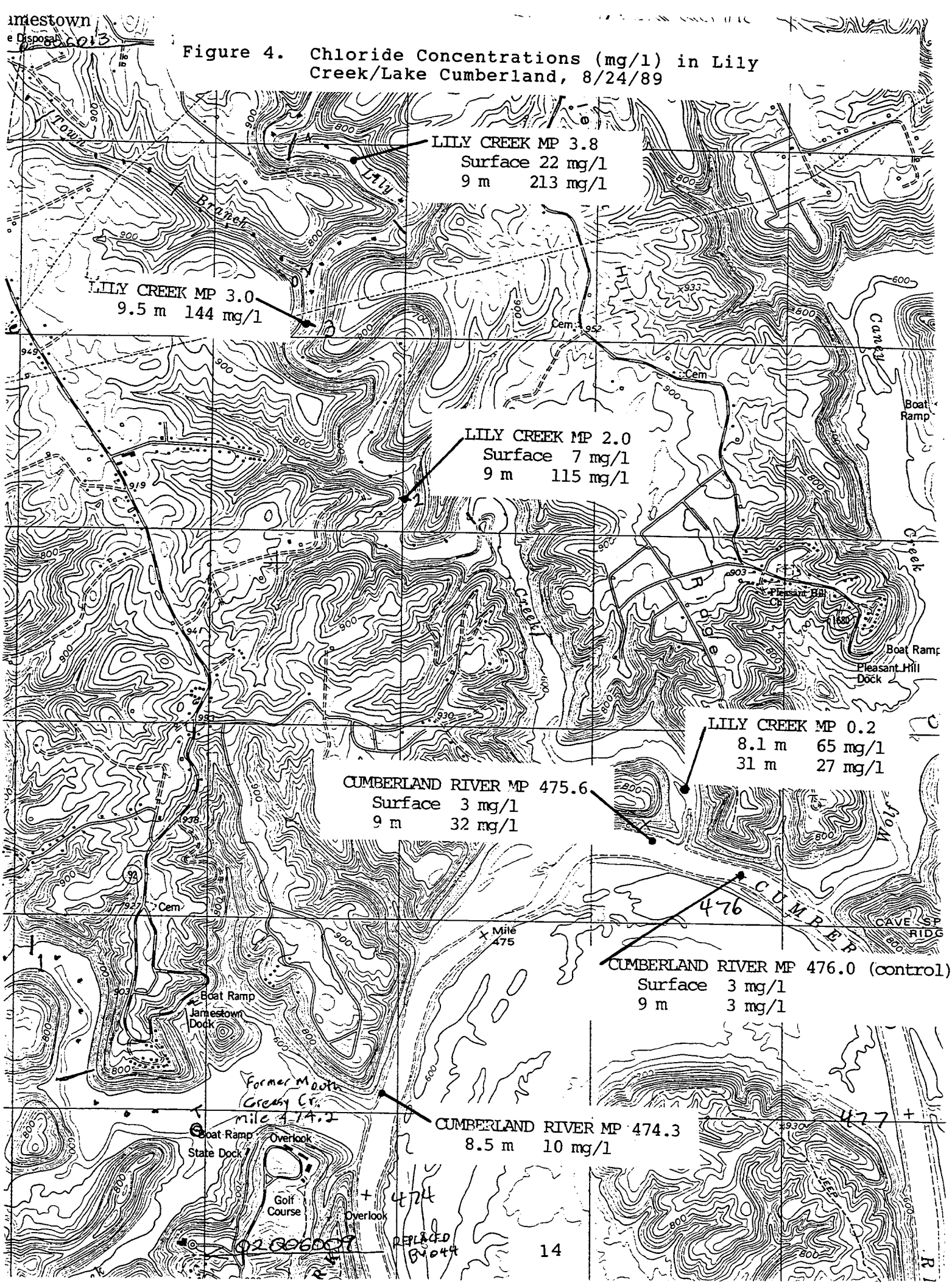



Figure 4. Chloride Concentrations (mg/1) in Lily Creek/Lake Cumberland, 8/24/89

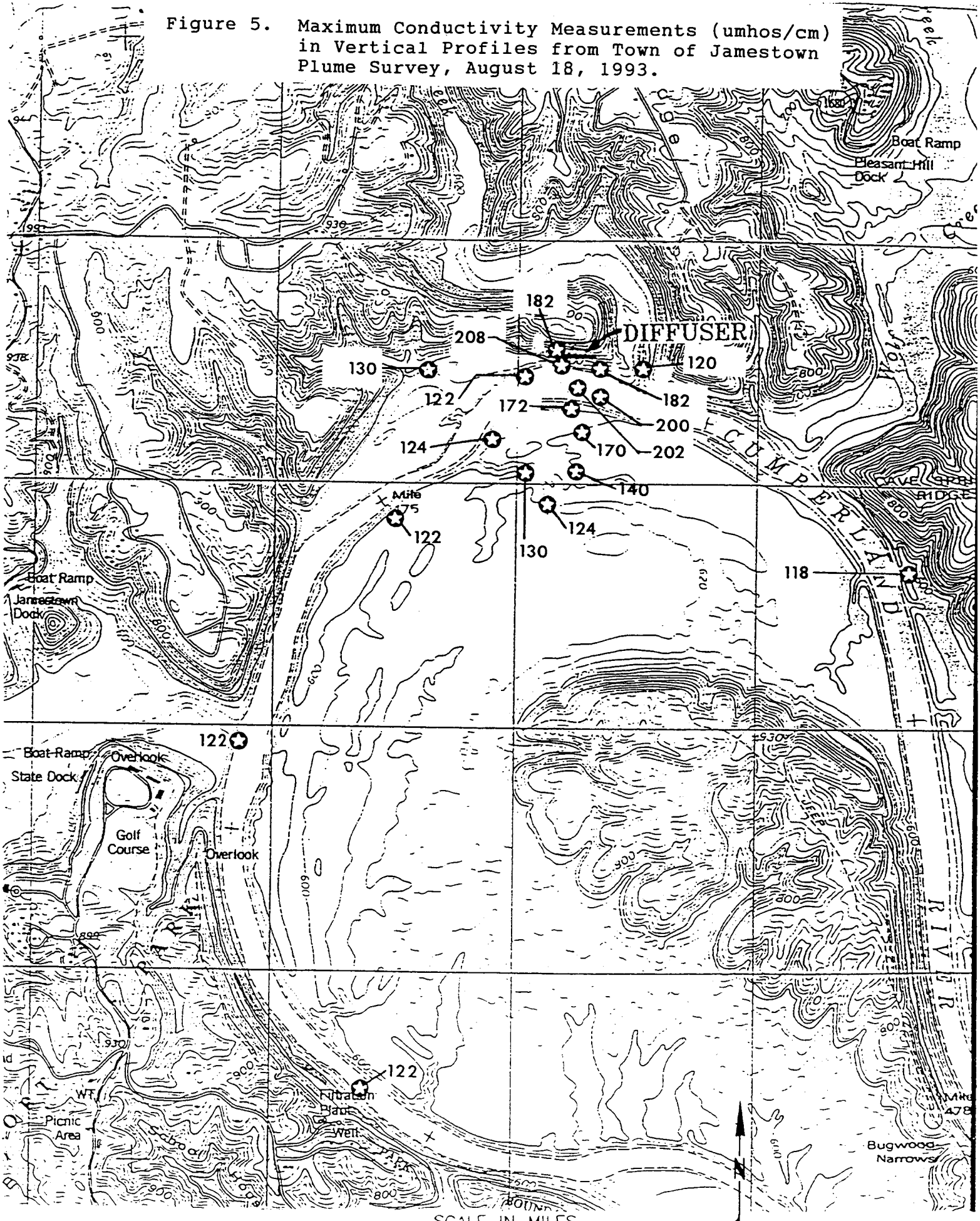
The Division also performed plume work on September 22-23. The plume was detected by specific conductivity measurements, and samples were taken for chloride, metals, trihalomethanes, and other constituents. The lake level during the survey was about 698 feet MSL (COE 1994a), placing the diffuser at a depth of 48-78 feet. Average daily flow through the dam on September 22 and 23 was 5640 and 5370 cfs, respectively, and was relatively consistent for several days (COE 1994a). The flow occurred over a ten- to twelve-hour period each day, meaning that for the power generation period, the average flow was about twice that given above. Chloride concentrations taken from 24-hour composite samples of the effluent from September 21-23 were 1800-1900 mg/l (Town of Jamestown 1994). Because of the large overall capacity of the treatment units, these concentrations should be relatively unchanged at any one period throughout the day.

The concentration of chloride at the upstream control station was about 4 mg/l, and most metals and trihalomethanes were present at less than detection levels (Figure 6). The control station located about 0.4 mile upstream of the diffuser had to be moved further upstream because higher conductivities were found there. This upstream dispersion of the plume was evident at the station located about 1000 feet offshore, but not in the old river channel about 200 feet from shore. At a distance of 70 feet from the diffuser, at the edge of the defined mixing zone where chronic aquatic life criteria apply, the plume was found at a depth of 50-75 feet. This corresponds well with the expected depth of the diffuser at a lake level of 698 ft MSL. The highest specific conductance measurement of 320 umhos/cm was recorded at this site at a depth of 64 feet, but chloride concentrations were only 12-16 mg/l. Copper was detected in the plume at 0.002-0.003 mg/l. No other metals or trihalomethanes were present above detection limits.

At a distance of 250 feet from the diffuser at a depth of 50 feet, 28 mg/l of chloride, 0.002 mg/l of copper, and a trace amount of chloroform (estimated by the DEP laboratory at 0.002 mg/l) were found, but no other constituents of concern were above detection limits. The highest concentrations of chloride and copper were found at a distance of about 350 feet from the diffuser. Here, at a depth of 50 feet, chloride was 39 mg/l and copper was 0.004 mg/l. Arsenic was measured at above detection limits for the only time during the survey at 0.002 mg/l, and trace amounts of chloroform were estimated at 0.003 mg/l. The chloride concentration decreased to 15 and 8 mg/l at distances of 500 and 850 feet, respectively, but at a distance of about 1200 feet, specific conductance measurements were similar to those at the edge-of-the mixing zone and the 350-foot station. Although no chloride sample was taken at the 1200-foot station, it is assumed that the chloride concentration was as high as 40 mg/l. The chloride plume was detected at low concentrations (5-15 mg/l) at several other stations over a distance of nearly 2000 feet south of the diffuser and at a transect 3000 feet downstream. All other constituents of concern were found in very low or undetectable concentrations. The plume was not detectable at the site just above Greasy Creek, a distance of just over one mile downstream of the diffuser.

Results of the plume study are affected by several factors, including hydropower releases at the dam, production type and schedule at Union Underwear, other lake hydrodynamics, and sampling methods. The samples are taken from a two- to three-foot layer, but the highest

Figure 5. Maximum Conductivity Measurements (umhos/cm) in Vertical Profiles from Town of Jamestown Plume Survey, August 18, 1993.



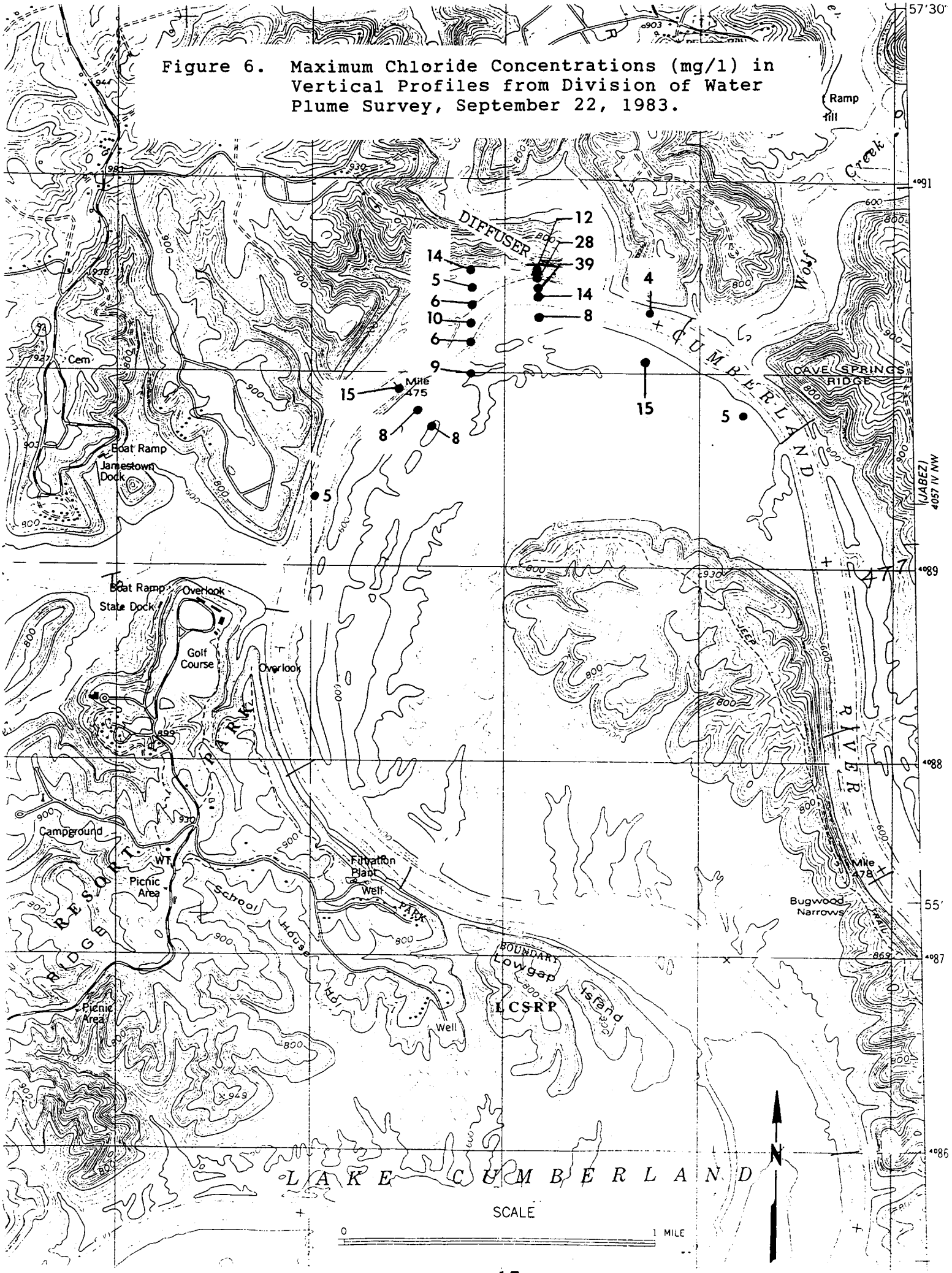



Figure 6. Maximum Chloride Concentrations (mg/1) in Vertical Profiles from Division of Water Plume Survey, September 22, 1983.

conductivities and most concentrated chloride plume is often only a few inches thick (Table 3). Although higher chloride concentrations might be expected from sampling a discrete layer, the plume surveys have shown that chloride concentrations in the lake are low. In the Division's survey, while a higher chloride concentration was found 350 feet from the diffuser than at the 70-foot edge-of-mixing zone or intermediate stations, specific conductances of 300-320 umhos/cm were found at the edge-of-mixing zone, 350-foot, and 1200-foot stations. Taking the maximum chloride concentration (about 40 mg/l) found at any of these stations, the effluent had undergone almost fifty dilutions. Model results used by the Division for deriving permit limits had predicted about 64 dilutions at the edge-of-mixing zone. The upstream and lateral extent of the plume was probably a result of relatively low flows through the dam during late September when power demand is down and dry weather conditions prevail. Assuming background concentrations of 4 mg/l chloride and 0.002 mg/l copper, a maximum of six percent of the assimilative capacity (based on concentration) was used for chloride, and 25 percent was used for copper at any of the monitoring sites.

One further data source exists that is relevant to this discussion. The U.S. Army Corps of Engineers (COE) performs vertical profile surveys at several sites on the lake. From downstream to upstream, these sites are: near the Wolf Creek dam (MP 461.4), MP 469.7 (5.8 miles downstream of the diffuser), MP 487.0 (11.5 miles upstream of the diffuser), and further upstream near Somerset. Conductivity measurements taken at 5-foot intervals have revealed no discernible differences at the sites up- and downstream of the diffuser. Appendix E presents the June 1994 field sheets provided by the COE (1994b).

**Sediment**

Sediment samples taken by the Division (1992a) in 1991 in Lake Cumberland revealed significantly higher copper levels (average of 35.1 mg/kg) in the sediments of Lily Creek as compared to a control station in the Caney Creek embayment (average of 11.4 mg/kg). The levels of copper in Lily Creek were in the moderately polluted category according to EPA (1977) guidelines for the Great Lakes, but below the limit of tolerance levels used by the Ontario Ministry of the Environment (Persaud et al. 1989).

Sediment sampling was performed in the main lake by Jamestown in January, twice in March, May, and August 1993 and March 1994. Several samples contained either nickel, copper, or arsenic in the moderately polluted category (according to EPA 1977), and a few samples showed nickel in the heavily polluted category (Appendix D). However, there was no pattern to the sites at which the higher values were found. Because higher levels were found both up- and downstream of the diffuser and both before and after the diffuser was placed in operation, the discharge does not appear to be the source. Samples split with the Division and analyzed by the DEP laboratory had values similar to those reported by Jamestown.

Table 3. Typical Veritical Profile in Effluent Plume[a]

| Depth (m) | Temperature (°C) | Specific Conductance (umhos/cm) | Dissolved Oxygen (mg/l) |
|---|---|---|---|
| Surface | 24.5 | 205 | 8.2 |
| 1 | 24.5 | 205 | 8.1 |
| 2 | 24.6 | 205 | 8.0 |
| 3 | 24.6 | 206 | 8.0 |
| 4 | 24.6 | 206 | 7.9 |
| 5 | 24.6 | 205 | 7.9 |
| 6 | 24.6 | 205 | 7.9 |
| 7 | 24.6 | 205 | 7.9 |
| 8 | 24.6 | 205 | 7.9 |
| 9 | 24.6 | 205 | 7.9 |
| 10 | 24.6 | 205 | 7.9 |
| 11 | 24.6 | 205 | 7.8 |
| 12 | 23.5 | 205 | 6.4 |
| 13 | 19.7 | 201 | 5.3 |
| 14.5 | 18.4 | 190 | 5.3 |
| 15 | 15.9 | 256 | 4.3 |
| 16.5 | 14.9 | 227 | 5.0 |
| 17 | 13.8 | 180 | 5.0 |
| 18 | 13.0 | 191 | 4.7 |
| 19 | 12.2 | 192 | 4.8 |
| 20 | 11.9 | 197 | 4.7 |
| 21 | 10.9 | 170 | 4.8 |
| 25 | 9.2 | 171 | 4.1 |
| 30 | 8.5 | 169 | 3.9 |
| 35 | 8.0 | 173 | 3.8 |
| 40 | 7.8 | 173 | 3.8 |

[a] from Division of Water survey September 22, 1993

## Fish Tissue

Fish tissue samples were previously analyzed from fish collected by the Division in 1990 and 1991 in the Lily Creek and Caney Creek embayments. Results did not indicate a problem for any of the many constituents tested or any significant differences between the two sites (Kentucky Division of Water 1992a). Concentrations of mercury at levels approaching one-half of the FDA action level of 1.0 mg/kg were found in fish from both locations.

Fish tissue samples were collected by Jamestown in March, May, and August 1993 and March 1994 by gill nets placed at the depth of the diffuser and at a depth mid-way between the diffuser and the surface. Low numbers of fish, including forage fish such as shad, were taken from the lower nets on all sampling dates. No differences were noted in the number of fish collected near the diffuser as compared to the other two sites. Neither were there any apparent differences in tissue concentrations in fish from the up- and downstream sites (Appendix D). The city's data show mercury was present in high concentrations (between 0.5 and 1.0 mg/kg) in several fish and exceeded the FDA action level of 1.0 mg/kg in a walleye from Station 1 and a striped bass from Station 4. However, the split samples analyzed by the DEP laboratory were usually less than one-half of the values reported by Jamestown. Samples will be split again in 1995 to help explain these differences.

## Plankton

Phytoplankton samples taken up- and downstream of the diffuser indicated community composition and abundance that would be expected in an oligotrophic lake (Appendix F). In one set of samples from the upstream site, two genera of blue green algae were abundant in one of the three replicates, but they were not present in the other two replicates. This may have been a result of sample variability. There was no indication of any effects of the discharge of effluent on the algal community.

Table 4 summarizes the zooplankton data from three quarterly collections in 1993 and from the first quarterly collection in 1994. Station 1 is near the diffuser within the mixing zone, Station 2 is a control area upstream from the diffuser, and Station 3 is 2.5 miles downstream near the old state park water intake. The data indicate that there has been no detrimental influence on the zooplankton community from diffuser operation. For instance, Table 3 shows that the number of rotifer species at the diffuser is similar to or greater than that at the two other sites, and the density of rotifers was greater at the diffuser site than at the other two sites on all sampling dates. Cladocerans and copepods at Station 1 showed similar densities to one or both other sites. The presence of copepod immature stages (the nauplii and copepodites) at similar or greater densities at Station 1 indicates that copepod reproduction has not been affected by the diffuser operation. Samples taken from the edge of the ZID and mixing zone in April 1993 showed no negative impacts when compared to the other two sites. In addition, the dominant rotifer and cladoceran species were the same at all stations on each sampling date, which indicates that community functions were not disrupted (see data in Appendix F).

## Table 4. Zooplankton Data Summary

| | Rotifers | | Cladocerans | Copepods | | | |
|---|---|---|---|---|---|---|---|
| Date/Station | Density* | No. of Species | Density | Adult Density | Copepodite Density | Nauplii Density | Total Density |
| March 1993 | | | | | | | |
| 1 | 2204 | 10 | 182 | 134 | 157 | 1003 | 3672 |
| 2 | 788 | 8 | 150 | 39 | 111 | 666 | 1757 |
| 3 | 1419 | 8 | 397 | 230 | 67 | 695 | 2832 |
| April 1993 | | | | | | | |
| 1-7** | 7800 | 10 | 3251 | 1452 | 336 | 2232 | 15,227 |
| 1-70** | 9030 | 9 | 5466 | 1917 | 227 | 3585 | 20,225 |
| 2 | 4869 | 6 | 27,710 | 3196 | 154 | 2658 | 38,589 |
| 3 | 4877 | 7 | 3322 | 1492 | 31 | 2438 | 12,160 |
| August 1993 | | | | | | | |
| 1 | 36,257 | 7 | 31,551 | 16,848 | 3295 | 14,344 | 103,295 |
| 2 | 22,775 | 4 | 94,098 | 17,112 | 3461 | 11,988 | 149,436 |
| 3 | 19,734 | 6 | 46,377 | 28,310 | 3617 | 14,594 | 112,633 |
| March 1994 | | | | | | | |
| 1 | 3979 | 9 | 388 | 292 | 426 | 944 | 6027 |
| 2 | 12,027 | 13 | 153 | 23 | 239 | 5521 | 17,963 |
| 3 | 7281 | 11 | 206 | 35 | 417 | 2662 | 10,600 |

* Density = Number/$m^3$ (average of 3 replicates)
** 1-7 is edge of ZID; 1-70 is edge of mixing zone

## Trophic State

The Division's Water Quality Branch has monitored the Lily Creek embayment of Lake Cumberland since 1985. Monitoring was initiated to assess trophic state and the impacts to water quality from the RCRWWTP.

A comparison of chemical, physical, and biological data collected in the two years prior to the construction of the pipeline to data collected in 1993, after the discharge had been relocated to the main lake indicates a trend of improved water quality and overall aesthetics associated with the removal of the discharge from Lily Creek. For the past several years, the Division (1994, 1992b, 1990b, 1988b, 1986) has classified the Lily Creek embayment as eutrophic, and the Kentucky Department of Fish and Wildlife Resources (KDFWR) has recognized the embayment as supporting one of the better fisheries on Lake Cumberland. However, once the nutrient input ceased, chlorophyll-a, total phosphorus, and soluble reactive phosphorus decreased in 1993 when compared to 1991 and 1992 (Table 5). Euphotic zone and secchi disk transparency depths also increased slightly in 1993. Creel data collected by the KDFWR from the Lily Creek embayment in 1994 and subsequent years will assess the effects of the discharge relocation and change in trophic state on the fishery. These data will be presented in the next annual report.

**TABLE 5. Growing Season (April - October) Averages of Chemical, Physical and Biological Parameters at MP 3.8 Lily Creek Embayment**

| | 1991 | 1992 | 1993[a] |
|---|---|---|---|
| Chlorophyll-a (ug/l) | 19.8 | 25.8 | 13.5 |
| Total Phosphorus (mg/l) | 0.17 | 0.08 | 0.05 |
| Soluble Reactive Phosphorus (mg/l) | 0.117 | 0.021 | <.005 |
| Euphotic Zone (feet) | 13.1 | 13.5 | 16.4 |
| Secchi Disk Transparency (feet) | 3.0 | 3.1 | 4.2 |

[a]Discharge relocated to main lake prior to 1993 growing season.

In May, August, and September 1993, three stations below the diffuser and a control station above the diffuser were sampled to monitor the effects on phytoplankton biomass of the diffuser discharge. These stations were located at River Mile (RM) 475.9 (control), 475.6 (600 feet below the diffuser), 475.0, and 474.4 of Lake Cumberland.

Chlorophyll-a concentrations were only slightly higher in May and August at stations located below the diffuser. Few differences were also found in the concentrations of nutrients. Thus, there appears to be very little effect on biomass in the main lake as a result of the discharge because the concentrations of nutrients are rapidly diluted and remain below the photic

zone. This was also demonstrated by higher conductivity measurements downstream of the diffuser at the depth of the diffuser throughout the growing season, indicating that the effluent remains mostly below the photic zone.

## Conclusions

Following an expansion and upgrade of treatment facilities, the Russell County Regional Wastewater Treatment Plant relocated its discharge to Lake Cumberland in April 1993. Data submitted by Jamestown and inspections conducted by the Division indicated that the facility operated satisfactorily. Monitoring in the lake for the first several months indicated no environmental problems associated with the discharge. In a plume study conducted by the Division in September 1993, about fifty dilutions were found at the edge-of-the mixing zone, slightly less than model predictions of sixty-four dilutions. The highest chloride concentrations in the lake were about 40 mg/l, and these were found only in a thin vertical layer. A break in the pipeline in the Lily Creek embayment then occurred in October 1993. Indications are that the break was caused by air being drawn into the pipeline, but the reason was not conclusively determined. The pipeline was put back into service in February 1994 after additional weights and a vent system were added. During the four months that the pipeline was not in operation, fully treated wastewater was discharged at the previous discharge point on Lily Creek above the lake and Union Underwear operated on a reduced schedule. Additional monitoring is needed and will be conducted by Jamestown and the Division in upcoming months to describe near-field mixing and to compare field data in that area to model predictions. The Division will also perform further far-field studies during stratified lake conditions in the summer of 1994 and during unstratified conditions in the winter of 1995.

## Literature Cited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____. 1990b. 1990 Kentucky Report to Congress on Water Quality.

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____. 1988b. 1988 Kentucky Report to Congress on Water Quality.

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Kenvirons. 1994. Jamestown Pipeline Break of October 22, 1993. Report submitted to Kentucky Division of Water, June 7, 1994.

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____. 1994b. Personal communication from Bob Sneed to Tom VanArsdall of Kentucky Division of Water, June 23, 1994.

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# APPENDIX A

## Division of Water Compliance Sampling Inspections and Biomonitoring Results

PHILLIP J. SHEPHERD
SECRETARY

BRERETON C. JONES
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
May 5, 1993

Honorable H. K. Popplewell
Mayor, City of Jamestown
Monument Square, Box 587
Jamestown, Kentucky 42629

RE: KPDES No. KY0062995

Dear Mayor Popplewell:

Please find enclosed your copy of the Compliance Sampling Inspection Report (including appropriate laboratory reports) conducted by James S. Woody of the Kentucky Division of Water at the Russell County Regional Wastewater Treatment Plant in Russell County, Kentucky on March 24, 1993. At the time of inspection your facility received a rating of Satisfactory.

If you have any questions regarding this report, please feel free to contact this office.

Sincerely,

Sara Gold

Sara E. Gold, Supervisor
Division of Water
Columbia Regional Office
P. O. Box 335
Columbia, Kentucky 42728
Phone: (502) 384-4734

SEG/bjb
Enclosure
cc: Mike Hom, USEPA
KPDES Branch, Division of Water
Frankfort Central Office files
Columbia Regional Office files

PHILLIP J. SHEPHERD
SECRETARY

BRERETON C. JONES
GOVERNOR

RECEIVED
APR 15 7 44 AM '93
D.E.P.

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY ROAD
FRANKFORT, KENTUCKY 40601

April 14, 1993

**Division of Environmental Services**
**Report Number:** A02-13640
**Sample Number:** 9301435

**TO:** Division of Water
Frankfort Office Park
Frankfort, Kentucky 40601

**RE:** Russell County Regional WWTP

**ATTN:** Sam Lester

**County:** Russell

**Facility:** KY0062995

**Collected by:** James S. Woody **Date:** 03/24/93 **Time:** 0900

**Delivered by:** James S. Woody **Date:** 03/24/93 **Time:** 1340

**Received by:** Polly Ellis **Date:** 03/24/93 **Time:** 1340

**Sample Matrix:** Water **Collection Method:** Composite

**Sample Identification:** MRI Influent 24 Hour Composite CSI

## REPORT OF ANALYSIS

| TOTAL CONSTITUENTS | CONCENTRATION |
|---|---|
| BOD-5 | 372 mg/L |
| Chloride | 1,040 mg/L |
| Color, Filtered @ ambient pH | 1,000 ADMI Color Units |
| Color, Filtered @ pH = 7.6 | 1,440 ADMI Color Units |
| pH | 8.5 S.U. |
| Total Suspended Solids | 256 mg/L |
| Organic Carbon | 188 mg/L |
| Ammonia-Nitrogen | 2.3 mg/L |
| Copper | 0.485 mg/L |

This report has been prepared and reviewed by personnel within the Division of Environmental Services. It has been approved for release.

William E. Davis

William E. Davis, Director
Division of Environmental Services

PHILLIP J. SHEPHERD
SECRETARY

BRERETON C. JONES
GOVERNOR

RECEIVED
APR 16 7 45 AM '93
D.E.P.

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY ROAD
FRANKFORT, KENTUCKY 40601

April 14, 1993

**Division of Environmental Services**
**Report Number:** A02-13641
**Sample Number:** 9301436

**TO:** Division of Water
Frankfort Office Park
Frankfort, Kentucky 40601

**RE:** Russell County Regional WWTP

**ATTN:** Sam Lester

**County:** Russell

**Facility:** KY0062995

**Collected by:** James S. Woody **Date:** 03/24/93 **Time:** 0900

**Delivered by:** James S. Woody **Date:** 03/24/93 **Time:** 1340

**Received by:** Polly Ellis **Date:** 03/24/93 **Time:** 1340

**Sample Matrix:** Water **Collection Method:** Composite

**Sample Identification:** MRE Effluent 24 Hour Composite CSI

## REPORT OF ANALYSIS

| TOTAL CONSTITUENTS | CONCENTRATION |
|---|---|
| BOD-5 | 9.45 mg/L |
| Chloride | 1,350 mg/L |
| Color, Filtered @ ambient pH | 131 ADMI Color Units |
| Color, Filtered @ pH = 7.6 | 112 ADMI Color Units |
| pH | 7.4 S.U. |
| Total Suspended Solids | 10 mg/L |
| Organic Carbon | 22.7 mg/L |
| Ammonia-Nitrogen | 0.4 mg/L |
| Copper | 0.059 mg/L |

This report has been prepared and reviewed by personnel within the Division of Environmental Services. It has been approved for release.

William E. Davis

William E. Davis, Director
Division of Environmental Services

PHILLIP J. SHEPHERD
SECRETARY

BRERETON C. JONES
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION

TO: James Woody Environmental Inspector I

FROM: Jack Reece, Laboratory Coordinator

DATE: 4/28/93

SUBJECT: Laboratory sample number 3538

Name of facility: Jamestown WWTP

Facility KPDES number: KY0006299

Sample location: Effluent

Sample taken by: James Woody

Date sample taken: 3/23/93 at 10:30 AM

Sample tested: 3/23/93 2:00 PM

Test run on sample: Fecal Coliform

Test results: 1.0 Colonies per 100 ML of sample

PHILLIP J. SHEPHERD
SECRETARY

BRERETON C. JONES
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY ROAD
FRANKFORT, KENTUCKY 40601

June 21, 1993

The Honorable H.K. Popplewell
Mayor, City of Jamestown
Monument Square Box 987
Jamestown, Kentucky 42629

RE: Jamestown STP KY 0062995, Biomonitoring Test Data Performed by the Kentucky Division of Water, Bioassay Section

Dear Mayor Popplewell:

Enclosed please find biomonitoring data for your facility, as determined by the Kentucky Division of Water, Bioassay Section. Your facility's data are summarized on the attached Toxicity Information Sheet.

The enclosed data is the summary of the acute toxicity test completed on 5/08/93 using fathead minnow (Pimephales promelas) and the water flea (Ceriodaphnia dubia). Test conditions, duration, and protocol are summarized on the attached sheets. Samples were collected 5/04-05/93. The results indicate that no mortality (ie. no toxicity) was detected in either grab, at any concentration, with the fathead minnow. In the water flea tests, $LC_{50}$ values were 76.4% and 74.8% for grab 1 and 2 respectively. These correspond to a $TU_a$ = 1.3 in both grabs, well below the permit limit of 4.8.

Please call if you have any questions regarding this matter.

Sincerely,

Charles A. Roth, Supervisor
Bioassay Section
Division of Water

CAR:SLC:mw

Enclosure

cc: Sara Gold, Columbia Regional Office
Clyde Baldwin, KPDES Branch
DOW Files

# TOXICITY TEST INFORMATION SHEET

Report Date: 06/21/93 Test Date: 05/06/93

## FACILITY INFORMATION

Facility: JAMESTOWN WWTP KPDES Permit #: 0062995
County: RUSSELL Receiving Stream: BIG LILLY CREEK
Permit Limit: 4.80 TUc ( 20.83% effluent)

## TEST RESULTS

Water Source: FINAL EFFLUENT

Species #1: C. dubia # Reps: 2
Test: ACUTE/STATIC/48 HR

| Exposure(%) | % Survival | % Survival |
|---|---|---|
| 100% | 0.00 | 5.00 |
| 60% | 95.00 | 90.00 |
| 21% | 100.00 | 95.00 |
| 14% | 100.00 | 95.00 |
| 7% | 85.00 | 90.00 |
| | 0.00 | 0.00 |
| | 0.00 | 0.00 |
| Control | 100.00 | 90.00 |
| | 0.00 | 0.00 |
| | 0.00 | 0.00 |
| LC50 = | 76.40 | 74.80 |

Species #2: P. promelas # Reps: 2
Test: ACUTE/STATIC/48 HR

| Exposure(%) | % Survival | % Survival |
|---|---|---|
| 100% | 100.00 | 100.00 |
| 60% | 100.00 | 100.00 |
| 21% | 100.00 | 100.00 |
| 14% | 100.00 | 100.00 |
| 7% | 100.00 | 100.00 |
| | 0.00 | 0.00 |
| | 0.00 | 0.00 |
| Control | 100.00 | 100.00 |
| | 0.00 | 0.00 |
| | 0.00 | 0.00 |
| LC50 = | >100.00 | >100.00 |

Physicochemical Data (Highest Concentration Only):

| | | | | |
|---|---|---|---|---|
| Temperature Range | #1 | 24.0-24.6 | #2 | 25.0-25.8 |
| D.O. Range | #1 | 7.91- 7.97 | #2 | 7.66- 8.02 |
| pH Range | #1 | 8.1- 8.5 | #2 | 7.5- 7.5 |
| Hardness Range | | 124- 132 mg/L CaCO3 | | |
| Alkalinity Range | | 232- 268 mg/L CaCO3 | | |
| Conductivity Range | | 4790- 5440 umhos/cm | | |
| Total Residual Chlorine | | < 0.02- 0.02 mg/L | | |

Statistical Method: Spearman-Karber

Compliance Status? PASS Additional Chemistry Data? NO

COMMENTS With a permit limit of 21%, permit compliance was achieved with both species. Grab #1 is in column 1 and Grab #2 is in column 2.

Experiments performed by: Colten, Cohn, Greer, Roth

Signature: _____ Date: 6/21/93

PHILLIP J. SHEPHERD
SECRETARY

BRERETON C. JONES
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
July 22, 1993

Honorable H. K. Popplewell
Mayor, City of Jamestown
Monument Square, Box 587
Jamestown, Kentucky 42629

RE: KPDES No. KY0062995

Dear Mayor Popplewell:

Please find enclosed your copy of the Compliance Sampling Inspection Report (including appropriate laboratory reports) conducted by James S. Woody of the Kentucky Division of Water at the Russell County Regional Wastewater Treatment Plant in Russell County, Kentucky on May 6, 1993. At the time of inspection your facility received a rating of Satisfactory. The analytical data from this inspection indicates compliance with your facility's KPDES permit.

If you have any questions regarding this report, please feel free to contact this office.

Sincerely,

Sara E. Gold, Supervisor
Division of Water
Columbia Regional Office
P. O. Box 335
Columbia, Kentucky 42728
Phone: (502) 384-4734

SEG/bjb
Enclosure
cc: USEPA, Atlanta, GA.
KPDES Branch, Division of Water
Frankfort Central Office files
Columbia Regional Office files

PHILLIP J. SHEPHERD
SECRETARY

BRERETON C. JONES
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
18 REILLY ROAD
FRANKFORT, KENTUCKY 40601

June 29, 1993

**Division of Environmental Services**
**Report Number:** A02-13771
**Sample Number:** 9302351

**TO:** Division of Water
Frankfort Office Park
Frankfort, Kentucky 40601

**RE:** Russell Co. Regional WWTP

**ATTN:** Sam Lester

**County:** Russell

**Facility:** KYD0062995

**Collected by:** James S Woody **Date:** 05/06/93 **Time:** 0900

**Delivered by:** Charles A Roth **Date:** 05/06/93 **Time:** 1430

**Received by:** James Mitchell **Date:** 05/06/93 **Time:** 1430

**Sample Matrix:** Water **Collection Method:** Composite

**Sample Identification:** 24 hr composite CSI influent

## REPORT OF ANALYSIS

| TOTAL CONSTITUENTS | CONCENTRATION |
|---|---|
| BOD-5 | 423 mg/L |
| Chloride | 1,500 mg/L |
| Color, Filtered @ ambient pH | 285 ADMI Color Units |
| pH | 7.5 S.U. |
| Total Suspended Solids | 170 mg/L |
| Organic Carbon | 247 mg/L |
| Ammonia-Nitrogen | 2.93 mg/L |
| Copper | 0.420 mg/L |

This report has been prepared and reviewed by personnel within the Division of Environmental Services. It has been approved for release.

William E. Davis

William E. Davis, Director
Division of Environmental Services

PHILLIP J. SHEPHERD
SECRETARY

BRERETON C. JONES
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
18 REILLY ROAD
FRANKFORT, KENTUCKY 40601

June 4, 1993

**Division of Environmental Services**
**Report Number:** A02-13772
**Sample Number:** 9302350

**TO:** Division of Water
Frankfort Office Park
Frankfort, Kentucky 40601

**RE:** Russell Co. Regional WWTP

**ATTN:** Sam Lester

**County:** Russell

**Facility:** KYD0062995

**Collected by:** James S. Woody **Date:** 05/06/93 **Time:** 0900

**Delivered by:** Charles A. Roth **Date:** 05/06/93 **Time:** 1430

**Received by:** James Mitchell **Date:** 05/06/93 **Time:** 1430

**Sample Matrix:** Water **Collection Method:** Composite

**Sample Identification:** 24 hr. composite CSI effluent

**REPORT OF ANALYSIS**

| TOTAL CONSTITUENTS | CONCENTRATION |
|---|---|
| BOD-5 | 7.3 mg/L |
| Chloride | 1,240 mg/L |
| Color, Filtered @ ambient pH | 62.3 ADMI Color Units |
| pH | 7.9 S.U. |
| Total Suspended Solids | 6 mg/L |
| Organic Carbon | 26.9 mg/L |
| Ammonia-Nitrogen | 0.16 mg/L |
| Copper | 0.044 mg/L |

**Comments:** Report revised 6-30-93 to correct sample identification.

This report has been prepared and reviewed by personnel within the Division of Environmental Services. It has been approved for release.

William E. Davis

William E. Davis, Director
Division of Environmental Services

PHILLIP J. SHEPHERD
SECRETARY

BRERETON C. JONES
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY ROAD
FRANKFORT, KENTUCKY 40601

**M E M O R A N D U M**

TO: Jack A. Wilson, Director
Division of Water

THROUGH: Robert W. Ware, Assistant Director
Division of Water

Terry P. Anderson, Manager TPA
Water Quality Branch

FROM: Charles A. Roth, Supervisor CAR
Bioassay Section

DATE: November 3, 1993

SUBJECT: Results of Toxicity Tests Conducted on Russell County Regional WWTP.

The following are results of toxicity tests conducted on a single grab sample collected from the Russell County Regional WWTP on October 22, 1993. The sample was collected at the treatment plant's discharge to Lily Creek. Collection was made after the break to the pipeline into Lake Cumberland occurred, but before the Union Underwear Facility ceased discharging to the wastewater plant.

Acute 48 hour toxicity tests were conducted on the fathead minnow (Pimephales promelas) and the daphnid (Ceriodaphnia dubia). Tests were run in duplicate on 4 concentrations of effluent (100%, 75%, 50% and 25%) and a control.

The following table summarizes the range in physicochemical parameters measured from the control to 100% effluent at test initiation.

DO (mg/l): 7.80 - 8.50
Temperature (°C): 23.6 - 24.0
pH (S. U.): 6.7 - 7.7
Conductivity (umhos/cm): 27.5 - 473.0
Hardness (mg/l): 92-104
Alkalinity (mg/l): 52-204
Total Residual Chlorine (mg/l): <0.02

Test results for the fathead minnow produced an $LC_{50}$ > 100%. Results for the Ceriodaphnia showed the $LC_{50}$ = 86.6% or 1.2 $TU_a$. This is below the permit limit of ~~3.3~~ 4.8 $TU_a$ for the discharge to the lake.

CAR:dh

cc: Tom VanArsdall
Sam Lester

PHILLIP J. SHEPHERD
SECRETARY

BRERETON C. JONES
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY ROAD
FRANKFORT, KENTUCKY 40601

June 23, 1994

The Honorable H. K. Popplewell
Mayor, City of Jamestown
Monument Square Box 987
Jamestown, KY 42629

RE: Russell County Regional WWTP KY 0062995, Biomonitoring Test Data Performed by the Kentucky Division of Water, Bioassay Section

Dear Mayor Popplewell:

The Division of Water, Bioassay Section, conducted acute toxicity tests on effluent from the Russell County Regional WWTP (Ky 0062995) from May 25-27, 1994. Samples were grabs collected May 24 and 25, 1994.

The results indicated that no toxicity was detected in either grab with the fathead minnow (Pimephales promelas): TUa<1.0. Data from the daphnid (Ceriodaphnia dubia) tests could not be utilized as the controls failed to meet the minimum requirements.

In addition, two samples were collected instead of the four stipulated in your permit requirements for biomonitoring. Therefore, these results will not be used for compliance purposes. We will reschedule another test for the next quarter if possible.

Please call if you have any questions regarding this report.

Sincerely,

Charles A. Roth, Supervisor
Bioassay Section
Division of Water

CAR:car

cc: Tom VanArsdall, DOW
Sara Gold, Columbia Regional Office
Pretreatment Section, DOW
DOW Files

# APPENDIX B

## Water Quality Data from Lily Creek and RCRWWTP following the Pipeline Break

WATER QUALITY DATA FROM RCRWWTP AND LILY CREEK *

| | 10/22 | | 10/26 | | 10/27 | | 10/28 | | 10/29 | | 10/30 | | 10/31 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM |
| JAMESTOWN WWTP | | | | | | | | | | | | | | |
| Flow(gpm) | | | | 890 | 1216 | 988 | 1446 | 1404 | 986 | 630 | 270 | 390 | 300 | 380 |
| Chloride(mg/l) | | | | 1650 | 1450 | 1450 | 1200 | 1200 | 1100 | 1000 | 1000 | 800 | 850 | 850 |
| Chloride(mg/l)** | | 1440 | | 1610 | 1255 | 1260 | 1005 | 1070 | | 912 | 835 | | | 789 |
| Copper(mg/l) | | | | 0.123 | 0.093 | 0.09 | 0.091 | 0.089 | 0.067 | 0.048 | 0.048 | 0.05 | 0.048 | 0.034 |
| Dissolved Copper(mg/l) | | | | | | | 0.042 | 0.036 | 0.029 | 0.028 | 0.027 | 0.028 | 0.025 | 0.024 |
| Copper(mg/l)** | | 0.12 | | 0.113 | 0.075 | 0.073 | 0.053 | 0.052 | 0.042 | 0.043 | 0.043 | | | 0.044 |
| Hardness(mg/l) | | | | 78 | 93 | 97 | 78 | 93 | 93 | 97 | 81 | 89 | 850 | 97 |
| LILY CK UPSTREAM | | | | | | | | | | | | | | |
| Flow(gpm) | | | | 509 | 387 | 314 | 482 | 468 | 563 | 420 | 221 | 390 | 429 | 734 |
| Chloride(mg/l) | | | | (25 | 4 | 10 | 9 | 10 | 12 | 11 | 10 | 10 | 11 | 10 |
| Chloride(mg/l)** | | | | 8.5 | 9 | 8.5 | 9 | 8.4 | | 8.9 | 9.1 | | | 9.7 |
| Copper(mg/l) | | | | 0.013 | 0.012 | 0.01 | 0.02 | 0.02 | 0.016 | 0.01 | 0.013 | 0.034 | 0.012 | 0.011 |
| Dissolved Copper(mg/l) | | | | | | | 0.007 | 0.003 | 0.002 | 0.002 | (.001 | (.001 | (.001 | (.001 |
| Copper(mg/l)** | | | | 0.003 | 0.001 | 0.004 | 0.005 | 0.044 | ND@.001 | 0.005 | 0.002 | | | 0.003 |
| Hardness(mg/l) | | | | 60 | 71 | 97 | 66 | 104 | 97 | 91 | 75 | 63 | 75 | 97 |
| LILY CK DOWNSTREAM #1 | | | | | | | | | | | | | | |
| Flow(gpm) | | | | 1399 | 1603 | 1302 | 1928 | 1872 | 1549 | 1050 | 491 | 780 | 729 | 1114 |
| Chloride(mg/l) | | | | 1050 | 1100 | 1100 | 900 | 900 | 700 | 600 | 550 | 400 | 350 | 290 |
| Chloride(mg/l)** | | 512 | | 1010 | 880 | 904 | 805 | 842 | | 683 | 368 | | | 302 |
| Copper(mg/l) | | | | 0.088 | 0.067 | 0.055 | 0.056 | 0.059 | 0.04 | 0.04 | 0.033 | 0.079 | 0.03 | 0.021 |
| Copper Criteria | | | | 0.015 | 0.009 | 0.010 | 0.010 | 0.011 | 0.011 | 0.012 | 0.011 | 0.010 | 0.011 | 0.012 |
| Dissolved Copper(mg/l) | | | | | | | 0.026 | 0.026 | 0.02 | 0.016 | 0.015 | 0.009 | 0.005 | 0.007 |
| Copper(mg/l)** | | 0.047 | | 0.077 | 0.059 | 0.059 | 0.048 | 0.041 | 0.035 | 0.029 | 0.017 | | | 0.014 |
| Hardness(mg/l) | | | | 127 | 75 | 89 | 86 | 89 | 93 | 104 | 89 | 82 | 89 | 97 |
| LILY CK DOWNSTREAM #2 | | | | | | | | | | | | | | |
| Flow(gpm) | | | | 1958 | 1959 | 1791 | 3155 | 2407 | 2712 | 1260 | 900 | 1248 | 1020 | 2307 |
| Chloride(mg/l) | | | | 750 | 900 | 800 | 550 | 700 | 400 | 500 | 300 | 250 | 250 | 140 |
| Chloride(mg/l)** | | | | 429 | 570 | 720 | 425 | 516 | | 433 | 115 | | | 92.6 |
| Copper(mg/l) | | | | 0.046 | 0.037 | 0.038 | 0.035 | 0.03 | 0.023 | 0.024 | 0.048 | 0.021 | 0.013 | 0.009 |
| Dissolved Copper(mg/l) | | | | | | | 0.015 | 0.016 | 0.011 | 0.012 | 0.004 | 0.005 | 0.002 | 0.003 |
| Copper(mg/l)** | | | | 0.026 | 0.034 | 0.035 | 0.025 | 0.024 | 0.009 | 0.019 | 0.008 | | | 0.011 |
| Hardness(mg/l) | | | | 89 | 82 | 101 | 93 | 97 | 78 | 84 | 71 | 82 | 82 | 82 |
| LILY CK DOWNSTREAM #3 | | | | | | | | | | | | | | |
| Flow(gpm) | | | | 2937 | 2519 | 2047 | 2892 | 3063 | 2410 | 1400 | 900 | 1248 | 1275 | 2307 |
| Chloride(mg/l) | | | | 500 | 700 | 700 | 600 | 550 | 450 | 450 | 300 | 250 | 200 | 140 |
| Chloride(mg/l)** | | | | 258 | 570 | 561 | 450 | 425 | | 368 | 188 | | | 100 |
| Copper(mg/l) | | | | 0.028 | 0.034 | 0.043 | 0.044 | 0.024 | 0.025 | 0.023 | 0.028 | 0.03 | 0.012 | 0.015 |
| Dissolved Copper(mg/l) | | | | | | | 0.013 | 0.014 | 0.01 | 0.011 | 0.006 | 0.006 | 0.003 | 0.003 |
| Copper(mg/l)** | | | | 0.014 | 0.031 | 0.026 | 0.019 | 0.019 | 0.018 | 0.015 | 0.008 | | | 0.009 |
| Hardness(mg/l) | | | | 83 | 89 | 108 | 93 | 101 | 101 | 97 | 75 | 75 | 78 | 97 |

| | 11/1 | | 11/2 | | 11/3 | | 11/4 | | 11/5 | | 11/6 | | 11/7 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM |
| JAMESTOWN WWTP | | | | | | | | | | | | | | |
| Flow(gpm) | 1340 | 1326 | 1000 | 1000 | 1400 | 1726 | 1100 | 1400 | 1406 | 1436 | 1284 | 1206 | 270 | 278 |
| Chloride(mg/l) | 750 | 850 | 725 | 725 | 650 | 625 | 700 | 800 | 875 | 950 | 1050 | 1050 | 1025 | 950 |
| Chloride(mg/l)** | | 650 | 530 | | | 520 | 620 | | 795 | | | | | 127 |
| Copper(mg/l) | 0.052 | 0.045 | 0.028 | 0.028 | 0.055 | 0.052 | 0.036 | 0.049 | 0.057 | 0.038 | 0.035 | 0.04 | 0.026 | 0.031 |
| Dissolved Copper(mg/l) | 0.024 | 0.023 | 0.019 | 0.026 | 0.019 | 0.019 | 0.019 | 0.019 | 0.026 | 0.02 | | | | |
| Copper(mg/l)** | | 0.031 | 0.028 | | 92.7 | | 0.001 | | 0.048 | | | | | 0.02 |
| Hardness(mg/l) | 97 | 89 | 97 | 89 | 97 | 93 | 63 | 104 | 97 | 93 | 97 | 119 | 104 | 97 |
| LILY CK UPSTREAM | | | | | | | | | | | | | | |
| Flow(gpm) | 408 | 477 | 208 | 450 | 516 | 432 | 440 | 467 | 1328 | 747 | 456 | 377 | 191 | 278 |
| Chloride(mg/l) | 12 | 13 | 11 | 9 | 9 | 14 | 14 | 12 | 14 | 12 | 15 | 15 | 10 | 10 |
| Chloride(mg/l)** | | 9 | 7 | | | 9 | 9.5 | | 8 | | | | | 8.6 |
| Copper(mg/l) | 0.005 | 0.021 | 0.014 | 0.006 | 0.017 | 0.007 | 0.006 | 0.009 | 0.017 | 0.016 | 0.009 | 0.014 | 0.013 | 0.009 |
| Dissolved Copper(mg/l) | 0.008 | <.001 | <.001 | <.001 | <.001 | <.001 | <.001 | <.001 | <.001 | <.001 | | | | |
| Copper(mg/l)** | | 0.004 | 0.003 | | 0.001 | | 0.032 | | 0.003 | | | | | 0.002 |
| Hardness(mg/l) | 82 | 75 | 82 | 97 | 82 | 67 | 89 | 67 | 75 | 52 | 75 | 75 | 75 | 75 |
| LILY CK DOWNSTREAM #1 | | | | | | | | | | | | | | |
| Flow(gpm) | 1748 | 1803 | 1208 | 1450 | 1916 | 2158 | 1540 | 1867 | 2734 | 2183 | 1740 | 1583 | 461 | 556 |
| Chloride(mg/l) | 575 | 625 | 600 | 500 | 475 | 500 | 500 | 600 | 450 | 625 | 775 | 800 | 600 | 475 |
| Chloride(mg/l)** | | 470 | 380 | | | 365 | 435 | | 575 | | | | | 311 |
| Copper(mg/l) | 0.042 | 0.05 | 0.047 | 0.023 | 0.026 | 0.028 | 0.035 | 0.033 | 0.033 | 0.028 | 0.025 | 0.023 | 0.017 | 0.017 |
| Copper Criteria | 0.012 | 0.010 | 0.011 | 0.011 | 0.011 | 0.010 | 0.009 | 0.012 | 0.011 | 0.011 | 0.011 | 0.012 | 0.011 | 0.009 |
| Dissolved Copper(mg/l) | 0.015 | 0.016 | 0.013 | 0.013 | 0.014 | 0.013 | 0.013 | 0.011 | 0.016 | | | | | |
| Copper(mg/l)** | | 0.023 | 0.019 | | 0.019 | | 0.02 | | 0.032 | | | | | 0.011 |
| Hardness(mg/l) | 97 | 82 | 89 | 89 | 92 | 82 | 75 | 97 | 89 | 89 | 93 | 97 | 89 | 75 |
| LILY CK DOWNSTREAM #2 | | | | | | | | | | | | | | |
| Flow(gpm) | 2871 | 2505 | 2071 | 1813 | 3033 | 2538 | 2200 | 2489 | 3076 | 2728 | 2345 | 1948 | 1006 | 1174 |
| Chloride(mg/l) | 350 | 450 | 350 | 400 | 300 | 425 | 350 | 450 | 400 | 500 | 575 | 650 | 275 | 225 |
| Chloride(mg/l)** | | 330 | 260 | | | 275 | 305 | | 345 | | | | | 269 |
| Copper(mg/l) | 0.042 | 0.029 | 0.031 | 0.018 | 0.025 | 0.023 | 0.023 | 0.027 | 0.022 | 0.024 | 0.024 | 0.026 | 0.016 | 0.017 |
| Dissolved Copper(mg/l) | 0.008 | 0.011 | 0.008 | 0.009 | 0.008 | 0.009 | 0.009 | 0.01 | 0.013 | 0.011 | | | | |
| Copper(mg/l)** | | 0.016 | 0.013 | | 0.012 | | 0.014 | | 0.013 | | | | | 0.007 |
| Hardness(mg/l) | 97 | 82 | 93 | 89 | 82 | 82 | 82 | 89 | 89 | 89 | 89 | 101 | 82 | 63 |
| LILY CK DOWNSTREAM #3 | | | | | | | | | | | | | | |
| Flow(gpm) | 3350 | 3006 | 1933 | 2071 | 3033 | 2538 | 2200 | 3200 | 3076 | 3032 | 2696 | 2412 | 923 | 1761 |
| Chloride(mg/l) | 300 | 375 | 375 | 350 | 300 | 425 | 350 | 350 | 400 | 450 | 500 | 525 | 300 | 150 |
| Chloride(mg/l)** | | 250 | 270 | | | 195 | 255 | | 330 | | | | | 358 |
| Copper(mg/l) | 0.029 | 0.043 | 0.032 | 0.013 | 0.041 | 0.015 | 0.021 | 0.031 | 0.024 | 0.021 | 0.019 | 0.028 | 0.017 | 0.018 |
| Dissolved Copper(mg/l) | 0.006 | 0.007 | 0.007 | 0.008 | 0.008 | 0.009 | 0.007 | 0.008 | 0.015 | 0.01 | | | | |
| Copper(mg/l)** | | 0.011 | 0.011 | | 0.011 | | 0.012 | | 0.013 | | | | | 0.011 |
| Hardness(mg/l) | 82 | 89 | 89 | 82 | 82 | 86 | 89 | 97 | 82 | 93 | 89 | 97 | 89 | 63 |

| | 11/8 | | 11/9 | | 11/10 | | 11/11 | | 11/12 | | 11/13 | | 11/14 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM |
| JAMESTOWN WWTP | | | | | | | | | | | | | | |
| Flow(gpm) | 1852 | 1562 | 960 | 1360 | 1520 | 1422 | 1400 | 1688 | 1366 | 1364 | 1244 | 1260 | 240 | 250 |
| Chloride(mg/l) | 950 | 1050 | 1050 | 900 | 950 | 975 | 1025 | 1050 | 1000 | 1025 | 950 | 875 | 800 | 800 |
| Chloride(mg/l)** | | 965 | 911 | | | | 995 | | | 1000 | | | | |
| Copper(mg/l) | 0.037 | 0.032 | 0.02 | 0.022 | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | 0.018 | 0.018 | | | 0.018 | 0.011 | 0.011 | | 0.013 | | | | |
| Hardness(mg/l) | 97 | 97 | 111 | 112 | 111 | 112 | 119 | 104 | 97 | 97 | 104 | 97 | 97 | 97 |
| LILY CK UPSTREAM | | | | | | | | | | | | | | |
| Flow(gpm) | 494 | 488 | 226 | 328 | 472 | 632 | 513 | 397 | 397 | 440 | 444 | 578 | 720 | 477 |
| Chloride(mg/l) | 11 | 14 | 15 | 11 | 11 | 9 | 12 | 9 | 8 | 10 | 11 | 12 | 12 | 11 |
| Chloride(mg/l)** | | 9.1 | 8.8 | | | | 35 | | | 10 | | | | |
| Copper(mg/l) | 0.008 | 0.011 | 0.011 | 0.008 | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | 0.003 | 0.001 | | | 0.002 | ND@.001 | ND@.001 | | 0.004 | | | | |
| Hardness(mg/l) | 68 | 82 | 75 | 75 | 75 | 75 | 75 | 60 | 69 | 75 | 75 | 75 | 75 | 52 |
| LILY CK DOWNSTREAM #1 | | | | | | | | | | | | | | |
| Flow(gpm) | 2346 | 2050 | 1186 | 1688 | 1992 | 2054 | 1913 | 2085 | 1763 | 1894 | 1688 | 1938 | 960 | 727 |
| Chloride(mg/l) | 750 | 800 | 850 | 725 | 725 | 675 | 750 | 850 | 775 | 775 | 700 | 600 | 200 | 275 |
| Chloride(mg/l)** | | 697 | 670 | | | | | 695 | | | | | | |
| Copper(mg/l) | 0.021 | 0.021 | 0.018 | 0.017 | | | | | | | | | | |
| Copper Criteria | 0.010 | 0.011 | 0.011 | 0.011 | 0.012 | 0.012 | 0.012 | 0.011 | 0.011 | 0.011 | 0.011 | 0.011 | 0.010 | 0.009 |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | 0.017 | 0.013 | | | 0.015 | 0.009 | 0.009 | | 0.01 | | | | |
| Hardness(mg/l) | 82 | 93 | 93 | 93 | 104 | 97 | 97 | 93 | 89 | 93 | 93 | 93 | 82 | 69 |
| LILY CK DOWNSTREAM #2 | | | | | | | | | | | | | | |
| Flow(gpm) | 4140 | 2430 | 1680 | 2448 | 2750 | 2641 | 2392 | 2626 | 1951 | 2151 | 2149 | 2205 | 1280 | 889 |
| Chloride(mg/l) | 425 | 675 | 600 | 500 | 525 | 525 | 600 | 675 | 700 | 650 | 550 | 500 | 150 | 225 |
| Chloride(mg/l)** | | 624 | 200 | | | | | 535 | | 590 | | | | |
| Copper(mg/l) | 0.04 | 0.021 | 0.014 | 0.014 | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | 0.014 | 0.006 | | | 0.011 | 0.003 | 0.003 | | 0.008 | | | | |
| Hardness(mg/l) | 86 | 93 | 89 | 89 | 93 | 89 | 89 | 97 | 82 | 89 | 97 | 93 | 69 | 82 |
| LILY CK DOWNSTREAM #3 | | | | | | | | | | | | | | |
| Flow(gpm) | 5414 | 3453 | 1680 | 2331 | 2888 | 3697 | 2496 | 3223 | 2484 | 2330 | 2488 | 2940 | 1280 | 1600 |
| Chloride(mg/l) | 325 | 475 | 600 | 525 | 500 | 375 | 575 | 550 | 550 | 600 | 475 | 375 | 150 | 125 |
| Chloride(mg/l)** | | 394 | 494 | | | | | 490 | | 530 | | | | |
| Copper(mg/l) | 0.013 | 0.017 | 0.016 | 0.015 | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | 0.01 | 0.012 | | | 0.01 | 0.006 | 0.006 | | 0.007 | | | | |
| Hardness(mg/l) | 86 | 86 | 89 | 97 | 89 | 82 | 89 | 93 | 89 | 89 | 89 | 82 | 75 | 63 |

| | 11/15 | | 11/16 | | 11/17 | | 11/18 | | 11/19 | | 11/20 | | 11/21 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM |
| JAMESTOWN WWTP | | | | | | | | | | | | | | |
| Flow(gpm) | 825 | 1972 | 1872 | 1900 | 1920 | 2214 | 1530 | 1514 | 1272 | 1620 | 676 | 500 | 475 | 564 |
| Chloride(mg/l) | 1900 | 775 | 675 | 650 | 600 | 600 | 550 | 600 | 575 | 625 | 500 | 620 | 676 | 525 |
| Chloride(mg/l)** | | | | | | 555 | | | 552.5 | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | | | | | 0.122 | | | | | | | | |
| Hardness(mg/l) | 104 | 89 | 111 | 97 | 111 | 111 | 104 | 104 | 97 | 104 | 104 | 89 | 104 | 97 |
| LILY CK UPSTREAM | | | | | | | | | | | | | | |
| Flow(gpm) | 2280 | 1849 | 1738 | 1393 | 4663 | 1873 | 1530 | 398 | 1166 | 1273 | 553 | 413 | 394 | 647 |
| Chloride(mg/l) | 8 | 6 | 6 | 12 | 8 | 7 | 12 | 10 | 12 | 9 | 8 | 7 | 10 | 6 |
| Chloride(mg/l)** | | | | | | 5 | | | 6 | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | | | | | 0.004 | | | | | | | | |
| Hardness(mg/l) | 69 | 75 | 75 | 69 | 63 | 69 | 82 | 69 | 75 | 75 | 69 | 75 | 75 | 75 |
| LILY CK DOWNSTREAM #1 | | | | | | | | | | | | | | |
| Flow(gpm) | 4180 | 3821 | 3610 | 3293 | 6563 | 4087 | 3060 | 1912 | 2438 | 2893 | 1229 | 1033 | 1070 | 911 |
| Chloride(mg/l) | 375 | 400 | 350 | 375 | 175 | 325 | 275 | 475 | 300 | 350 | 275 | 300 | 300 | 325 |
| Chloride(mg/l)** | | | | | | 255 | | | 353.5 | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Copper Criteria | 0.009 | 0.011 | 0.009 | 0.009 | 0.009 | 0.009 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.009 | 0.011 | 0.011 |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | | | | | 0.056 | | | | | | | | |
| Hardness(mg/l) | 75 | 89 | 75 | 75 | 69 | 75 | 82 | 82 | 82 | 82 | 82 | 75 | 93 | 89 |
| LILY CK DOWNSTREAM #2 | | | | | | | | | | | | | | |
| Flow(gpm) | 10450 | 8733 | 5054 | 5489 | 9216 | 8856 | 6732 | 4542 | 4179 | 5796 | 2704 | 2067 | 2569 | 1974 |
| Chloride(mg/l) | 150 | 175 | 250 | 225 | 125 | 150 | 125 | 200 | 175 | 175 | 125 | 150 | 125 | 150 |
| Chloride(mg/l)** | | | | | | 68 | | | 157.5 | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | | | | | 0.016 | | | | | | | | |
| Hardness(mg/l) | 69 | 83 | 69 | 69 | 63 | 69 | 75 | 75 | 75 | 75 | 82 | 78 | 89 | 82 |
| LILY CK DOWNSTREAM #3 | | | | | | | | | | | | | | |
| Flow(gpm) | 20900 | 12226 | 7221 | 7057 | 23040 | 13284 | 8415 | 6056 | 5851 | 6750 | 3360 | 3100 | 4281 | 2961 |
| Chloride(mg/l) | 75 | 125 | 175 | 175 | 50 | 100 | 100 | 150 | 125 | 150 | 100 | 100 | 75 | 100 |
| Chloride(mg/l)** | | | | | | 56 | | | 129.5 | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | | | | | 0.011 | | | | | | | | |
| Hardness(mg/l) | 69 | 69 | 69 | 75 | 63 | 69 | 69 | 82 | 82 | 75 | 78 | 78 | 89 | 82 |

| | 11/22 | | 11/23 | | 11/24 | | 11/25 | | 11/26 | | 11/27 | | 11/28 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM | 10 AM | 2 PM |
| JAMESTOWN WWTP | | | | | | | | | | | | | | |
| Flow(gpm) | 1260 | 1630 | 1354 | 1550 | 1622 | 1410 | 640 | 488 | 534 | 564 | 808 | 864 | 600 | 700 |
| Chloride(mg/l) | 475 | 500 | 500 | 525 | 500 | 600 | 550 | 550 | 525 | 550 | 475 | 625 | 500 | 475 |
| Chloride(mg/l)** | | | | 430 | 495 | | | | | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | | | 0.025 | 0.025 | | | | | | | | | |
| Hardness(mg/l) | 104 | 97 | 97 | 89 | 82 | | 97 | | 101 | | 93 | | 97 | |
| LILY CK UPSTREAM | | | | | | | | | | | | | | |
| Flow(gpm) | 582 | 1087 | 580 | 484 | 695 | | 533 | | 485 | | 2262 | | 900 | |
| Chloride(mg/l) | 8 | 8 | 10 | 7 | 7 | | 10 | | 9 | | 15 | | 8 | |
| Chloride(mg/l)** | | | | 7.5 | 6 | | | | | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | | | ND@.001 | ND@.001 | | | | | | | | | |
| Hardness(mg/l) | 69 | 69 | 75 | 69 | 69 | | 69 | | 75 | | 58 | | 89 | |
| LILY CK DOWNSTREAM #1 | | | | | | | | | | | | | | |
| Flow(gpm) | 1842 | 2717 | 1934 | 2034 | 2317 | | 1173 | | 1019 | | 3070 | | 1500 | |
| Chloride(mg/l) | 325 | 300 | 350 | 400 | 350 | | 300 | | 275 | | 125 | | 200 | |
| Chloride(mg/l)** | | | | 315 | 335 | | | | | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Copper Criteria | 0.011 | 0.011 | 0.009 | 0.011 | 0.010 | | 0.009 | | 0.010 | | 0.007 | | 0.012 | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | | | 0.017 | 0.015 | | | | | | | | | |
| Hardness(mg/l) | 89 | 93 | 75 | 89 | 82 | | 75 | | 82 | | 53 | | 97 | |
| LILY CK DOWNSTREAM #2 | | | | | | | | | | | | | | |
| Flow(gpm) | 2993 | 4657 | 3385 | 2713 | 3244 | | 3520 | | 2804 | | 15352 | | 3000 | |
| Chloride(mg/l) | 200 | 175 | 200 | 300 | 250 | | 100 | | 100 | | 25 | | 100 | |
| Chloride(mg/l)** | | | | 185 | 185 | | | | | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | | | 0.012 | 0.011 | | | | | | | | | |
| Hardness(mg/l) | 75 | 93 | 89 | 75 | 69 | | 69 | | 75 | | 53 | | 89 | |
| LILY CK DOWNSTREAM #3 | | | | | | | | | | | | | | |
| Flow(gpm) | 3420 | 5433 | 3869 | 2959 | 3604 | | 4693 | | 5607 | | 35587 | | 4000 | |
| Chloride(mg/l) | 175 | 150 | 175 | 275 | 225 | | 75 | | 50 | | 15 | | 75 | |
| Chloride(mg/l)** | | | | 165 | 170 | | | | | | | | | |
| Copper(mg/l) | | | | 0.009 | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | | | | 0.008 | | | | | | | | | |
| Hardness(mg/l) | 75 | 85 | 82 | 69 | 75 | | 75 | | 82 | | 53 | | 82 | |

| | 29-Nov 10 AM | 30-Nov 10 AM | 01-Dec 10 AM | 02-Dec 10 AM | 03-Dec 10 AM | 04-Dec 10 AM | 05-Dec 10 AM | 06-Dec 10 AM | 07-Dec 10 AM | 08-Dec 10 AM | 09-Dec 10 AM | 10-Dec 10 AM | 11-Dec 10 AM | 12-Dec 10 AM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JAMESTOWN WWTP | | | | | | | | | | | | | | |
| Flow(gpm) | 1360 | 1400 | 1260 | 1600 | 1486 | 1214 | 1442 | 1814 | 1860 | 1600 | 1700 | 2080 | 1820 | 628 |
| Chloride(mg/l) | 475 | 400 | 500 | 600 | 575 | 650 | 650 | 500 | 500 | 525 | 575 | 675 | 575 | 600 |
| Chloride(mg/l)** | 515 | | | 535 | | | | | 360 | | 545 | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | 0.03 | | | 0.018 | | | | | 0.018 | | 0.035 | | | |
| Hardness(mg/l) | 97 | 104 | 97 | 104 | 93 | 82 | 104 | 104 | 97 | 111 | 89 | 97 | 97 | 111 |
| LILY CK UPSTREAM | | | | | | | | | | | | | | |
| Flow(gpm) | 793 | 840 | 540 | 800 | 524 | 3295 | 3245 | 2217 | 1240 | 985 | 1093 | 2600 | 1668 | 2386 |
| Chloride(mg/l) | 11 | 11 | 14 | 9 | 11 | 5 | 8 | 4 | 6 | 8 | 7 | 4 | 9 | 5 |
| Chloride(mg/l)** | 6.5 | | | 7 | | | | | 6.5 | | 8 | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | 0.003 | | | 0.001 | | | | | ND @.001 | | ND @.001 | | | |
| Hardness(mg/l) | 53 | 63 | 69 | 63 | 63 | 37 | 45 | 45 | 45 | 52 | 69 | 45 | 45 | 69 |
| LILY CK DOWNSTREAM #1 | | | | | | | | | | | | | | |
| Flow(gpm) | 2153 | 2240 | 1800 | 2400 | 2010 | 4509 | 4687 | 4301 | 3100 | 2585 | 2793 | 4680 | 3488 | 3014 |
| Chloride(mg/l) | 300 | 250 | 350 | 400 | 425 | 175 | 200 | 225 | 300 | 325 | 350 | 300 | 300 | 125 |
| Chloride(mg/l)** | 335 | | | 355 | | | | | 70 | | 410 | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Copper Criteria | 0.009 | 0.010 | 0.011 | 0.011 | 0.011 | 0.007 | 0.009 | 0.010 | 0.010 | 0.010 | 0.009 | 0.009 | 0.009 | 0.009 |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | 0.016 | | | 0.012 | | | | | 0.003 | | 0.02 | | | |
| Hardness(mg/l) | 75 | 79 | 89 | 89.00 | 89 | 52 | 75 | 82 | 79 | 79 | 75 | 69 | 75 | 75 |
| LILY CK DOWNSTREAM #2 | | | | | | | | | | | | | | |
| Flow(gpm) | 2871 | 3200 | 2520 | 3200 | 2629 | 15702 | 18746 | 12093 | 4133 | 3360 | 3555 | 9360 | 8372 | 3768 |
| Chloride(mg/l) | 225 | 175 | 250 | 300 | 325 | 50 | 50 | 75 | 225 | 250 | 275 | 150 | 125 | 100 |
| Chloride(mg/l)** | 160 | | | 240 | | | | | 60 | | 165 | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | 0.007 | | | 0.009 | | | | | 0.016 | | 0.019 | | | |
| Hardness(mg/l) | 75 | 75 | 75 | 75 | 75 | 37 | 45 | 63 | 59 | 63 | 75 | 45 | 63 | 75 |
| LILY CK DOWNSTREAM #3 | | | | | | | | | | | | | | |
| Flow(gpm) | 4307 | 4480 | 3150 | 3200 | 3107 | 52607 | 37492 | 36280 | 5314 | 4200 | 4888 | 18720 | 10465 | 15072 |
| Chloride(mg/l) | 150 | 125 | 200 | 300 | 275 | 15 | 25 | 25 | 175 | 200 | 200 | 75 | 100 | 25 |
| Chloride(mg/l)** | 135 | | | 190 | | | | | 55 | | 619 | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | 0.005 | | | 0.006 | | | | | 0.002 | | 0.01 | | | |
| Hardness(mg/l) | 75 | 75 | 75 | 69 | 75 | 37 | 63 | 69 | 59 | 52 | 69 | 37 | 45 | 69 |

| | 13-Dec 10 AM | 14-Dec 10 AM | 15-Dec 10 AM | 16-Dec 10 AM | 17-Dec 10 AM | 18-Dec 10 AM | 19-Dec 10 AM | 20-Dec 10 AM | 21-Dec 10 AM | 22-Dec 10 AM | 23-Dec 10 AM | 24-Dec 10 AM | 25-Dec 10 AM | 26-Dec 10 AM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JAMESTOWN WWTP | | | | | | | | | | | | | | |
| Flow(gpm) | 1646 | 2050 | 2200 | 1950 | 1440 | 1120 | 256 | 500 | 600 | 945 | | 735 | | |
| Chloride(mg/l) | 550 | 500 | 650 | 625 | 650 | 550 | 550 | 525 | 500 | 475 | | 315 | | |
| Chloride(mg/l)** | 555 | | 594 | | | | | | | 470 | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | 0.026 | | 0.015 | | | | | | | 0.035 | | | | |
| Hardness(mg/l) | 104 | 104 | 97 | 104 | 93 | 89 | 113 | 97 | 83 | 83 | | 97 | | |
| LILY CK UPSTREAM | | | | | | | | | | | | | | |
| Flow(gpm) | 941 | 1677 | 1613 | 2113 | 1056 | 1618 | 448 | 667 | 1800 | 1095 | | 919 | | |
| Chloride(mg/l) | 7 | 8 | 10 | 8 | 12 | 10 | 8 | 9 | 12 | 10 | | 7 | | |
| Chloride(mg/l)** | 5.5 | | 7 | | | | | | | 6 | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | ND @.001 | | ND @.001 | | | | | | | ND @.001 | | | | |
| Hardness(mg/l) | 63 | 52 | 67 | 63 | 69 | 75 | 75 | 63 | 69 | 69 | | 69 | | |
| LILY CK DOWNSTREAM #1 | | | | | | | | | | | | | | |
| Flow(gpm) | 2587 | 3727 | 3813 | 4063 | 2496 | 2730 | 704 | 1167 | 2400 | 2040 | | 1654 | | |
| Chloride(mg/l) | 350 | 275 | 375 | 300 | 375 | 225 | 200 | 225 | 125 | 220 | | 140 | | |
| Chloride(mg/l)** | 410 | | 453 | | | | | | | 205 | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Copper Criteria | 0.010 | 0.010 | 0.009 | 0.011 | 0.010 | 0.009 | 0.011 | 0.009 | 0.009 | 0.009 | | 0.010 | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | 0.016 | | 0.011 | | | | | | | 0.007 | | | | |
| Hardness(mg/l) | 82 | 82 | 75 | 89 | 82 | 75 | 89 | 75 | 75 | 75 | | 82 | | |
| LILY CK DOWNSTREAM #2 | | | | | | | | | | | | | | |
| Flow(gpm) | 4527 | 4556 | 5200 | 4875 | 3404 | 3080 | 939 | 1750 | 4000 | 4489 | | 5788 | | |
| Chloride(mg/l) | 200 | 225 | 275 | 250 | 275 | 200 | 150 | 150 | 75 | 100 | | 40 | | |
| Chloride(mg/l)** | 170 | | 136 | | | | | | | 100 | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | 0.006 | | 0.002 | | | | | | | 0.003 | | | | |
| Hardness(mg/l) | 75 | 75 | 67 | 75 | 75 | 75 | 75 | 69 | 69 | 69 | | 75 | | |
| LILY CK DOWNSTREAM #3 | | | | | | | | | | | | | | |
| Flow(gpm) | 7242 | 5125 | 6356 | 6094 | 4160 | 3520 | 1126 | 2100 | 12000 | 6413 | | 11576 | | |
| Chloride(mg/l) | 125 | 200 | 225 | 200 | 225 | 175 | 125 | 125 | 25 | 70 | | 20 | | |
| Chloride(mg/l)** | 145 | | 128 | | | | | | | 60 | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | 0.004 | | 0.004 | | | | | | | 0.001 | | | | |
| Hardness(mg/l) | 71 | 75 | 53 | 69 | 75 | 75 | 75 | 69 | 69 | 69 | | 75 | | |

| | 27-Dec 10 AM | 28-Dec 10 AM | 29-Dec 10 AM | 30-Dec 10 AM | 31-Dec 10 AM | 01-Jan 10 AM | 02-Jan 10 AM | 03-Jan 10 AM | 04-Jan 10 AM | 05-Jan 10 AM | 06-Jan 10 AM | 07-Jan 10 AM | 08-Jan 10 AM | 09-Jan 10 AM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JAMESTOWN WWTP | | | | | | | | | | | | | | |
| Flow(gpm) | | | | | | | | | | | | | | |
| Chloride(mg/l) | | | | | | | | | | | | | | |
| Chloride(mg/l)** | | | | | | | | | | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | | | | | | | | | | | | | |
| Hardness(mg/l) | | | | | | | | | | | | | | |
| LILY CK UPSTREAM | | | | | | | | | | | | | | |
| Flow(gpm) | | | | | | | | | | | | | | |
| Chloride(mg/l) | | | | | | | | | | | | | | |
| Chloride(mg/l)** | | | | | | | | | | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | | | | | | | | | | | | | |
| Hardness(mg/l) | | | | | | | | | | | | | | |
| LILY CK DOWNSTREAM #1 | | | | | | | | | | | | | | |
| Flow(gpm) | | | | | | | | | | | | | | |
| Chloride(mg/l) | | | | | | | | | | | | | | |
| Chloride(mg/l)** | | | | | | | | | | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Copper Criteria | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | | | | | | | | | | | | | |
| Hardness(mg/l) | | | | | | | | | | | | | | |
| LILY CK DOWNSTREAM #2 | | | | | | | | | | | | | | |
| Flow(gpm) | | | | | | | | | | | | | | |
| Chloride(mg/l) | | | | | | | | | | | | | | |
| Chloride(mg/l)** | | | | | | | | | | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | | | | | | | | | | | | | |
| Hardness(mg/l) | | | | | | | | | | | | | | |
| LILY CK DOWNSTREAM #3 | | | | | | | | | | | | | | |
| Flow(gpm) | | | | | | | | | | | | | | |
| Chloride(mg/l) | | | | | | | | | | | | | | |
| Chloride(mg/l)** | | | | | | | | | | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | | | | | | | | | | | | | |
| Hardness(mg/l) | | | | | | | | | | | | | | |

| | 10-Jan 10 AM | 11-Jan 10 AM | 12-Jan 10 AM | 13-Jan 10 AM | 14-Jan 10 AM | 15-Jan 10 AM | 16-Jan 10 AM | 17-Jan 10 AM | 18-Jan 10 AM | 19-Jan 10 AM | 20-Jan 10 AM | 21-Jan 10 AM | 22-Jan 10 AM | 23-Jan 10 AM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JAMESTOWN WWTP | | | | | | | | | | | | | | |
| Flow(gpm) | 1435 | 1860 | 2115 | 2004 | | 895 | 764 | 1327 | 1362 | 1197 | 1400 | 970 | 606 | 678 |
| Chloride(mg/l) | 145 | 210 | 350 | 490 | | 500 | 470 | 490 | 480 | 430 | 400 | 330 | 430 | 440 |
| Chloride(mg/l)** | 130 | | | 470 | | | | | | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | 0.009 | | | 0.003 | | | | | | | | | | |
| Hardness(mg/l) | 119 | 112 | 149 | 121 | | 141 | 97 | 112 | 141 | 104 | 149 | 112 | 112 | 104 |
| LILY CK UPSTREAM | | | | | | | | | | | | | | |
| Flow(gpm) | 755 | 1395 | 2512 | 1775 | | 895 | 1480 | 1500 | 2270 | 1143 | 1145 | 1698 | 1443 | 974 |
| Chloride(mg/l) | 11 | 11 | 18 | 14 | | 14 | 18 | 26 | 22 | 20 | 21 | 14 | 75 | 16 |
| Chloride(mg/l)** | 10 | | | 11 | | | | | | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | ND@.001 | | | ND@.001 | | | | | | | | | | |
| Hardness(mg/l) | 69 | 69 | 45 | 69 | | 63 | 62 | 75 | 59 | 75 | 75 | 75 | 75 | 75 |
| LILY CK DOWNSTREAM #1 | | | | | | | | | | | | | | |
| Flow(gpm) | 2190 | 3255 | 4627 | 3781 | | 1790 | 2244 | 2827 | 3632 | 2340 | 2545 | 2668 | 2049 | 1652 |
| Chloride(mg/l) | 95 | 120 | 160 | 260 | | 250 | 160 | 230 | 180 | 220 | 220 | 120 | 180 | 190 |
| Chloride(mg/l)** | 85 | | | 230 | | | | | | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Copper Criteria | 0.011 | 0.011 | 0.011 | 0.011 | | 0.011 | 0.010 | 0.011 | 0.010 | 0.009 | 0.012 | 0.011 | 0.011 | 0.011 |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | 0.004 | | | 0.025 | | | | | | | | | | |
| Hardness(mg/l) | 96 | 89 | 89 | 89 | | 89 | 82 | 89 | 82 | 75 | 97 | 89 | 89 | 89 |
| LILY CK DOWNSTREAM #2 | | | | | | | | | | | | | | |
| Flow(gpm) | 5202 | 4340 | 9253 | 8191 | | 2797 | 2992 | | | | | | | |
| Chloride(mg/l) | 40 | 90 | 80 | 120 | | 160 | 120 | | | | | | | |
| Chloride(mg/l)** | 35 | | | 100 | | | | | | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | 0.003 | | | 0.019 | | | | | | | | | | |
| Hardness(mg/l) | 75 | 75 | 69 | 82 | | 89 | 75 | | | | | | | |
| LILY CK DOWNSTREAM #3 | | | | | | | | | | | | | | |
| Flow(gpm) | 5202 | 6510 | 12338 | 10722 | | 4068 | 5985 | | | | | | | |
| Chloride(mg/l) | 40 | 60 | 60 | 90 | | 110 | 60 | | | | | | | |
| Chloride(mg/l)** | 20 | | | 75 | | | | | | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | 0.002 | | | 0.007 | | | | | | | | | | |
| Hardness(mg/l) | 62 | 75 | 45 | 75 | | 69 | 75 | | | | | | | |

| | 24-Jan 10 AM | 25-Jan 10 AM | 26-Jan 10 AM | 27-Jan 10 AM | 28-Jan 10 AM | 29-Jan 10 AM | 30-Jan 10 AM | 31-Jan 10 AM | 01-Feb 10 AM | 02-Feb 10 AM | 03-Feb 10 AM | 04-Feb 10 AM | 05-Feb 10 AM | 06-Feb 10 AM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JAMESTOWN WWTP | | | | | | | | | | | | | | |
| Flow(gpm) | 1630 | 2888 | 2544 | 1851 | 1323 | 1413 | 927 | 1737 | 1675 | 1905 | 1590 | | 516 | 416 |
| Chloride(mg/l) | 370 | 430 | 630 | 720 | 630 | 610 | 410 | 300 | 340 | 540 | 620 | | 675 | 670 |
| Chloride(mg/l)** | | 410 | | | | | | 240 | | | 625 | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | 0.017 | | | | | | 0.008 | | | 0.019 | | | |
| Hardness(mg/l) | 114 | 104 | 134 | 114 | 114 | 119 | 112 | 104 | 119 | 119 | 113 | | 104 | 112 |
| LILY CK UPSTREAM | | | | | | | | | | | | | | |
| Flow(gpm) | 3295 | 9403 | 3276 | 7119 | 13182 | 1766 | 4120 | 1256 | 1576 | 974 | 718 | | 953 | 1206 |
| Chloride(mg/l) | 86 | 64 | 26 | 27 | 27 | 16 | 18 | 14 | 10 | 8 | 9 | | 20 | 11 |
| Chloride(mg/l)** | | 56.5 | | | | | | 10 | | | 8 | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | 0.005 | | | | | | 0.003 | | | ND@.001 | | | |
| Hardness(mg/l) | 75 | 75 | 59 | 59 | 59 | 52 | 63 | 59 | 59 | 75 | 75 | | 75 | 75 |
| LILY CK DOWNSTREAM #1 | | | | | | | | | | | | | | |
| Flow(gpm) | 4925 | 12291 | 5820 | 8970 | 14505 | 3179 | 5047 | 2993 | 2251 | 2879 | 2308 | | 1469 | 1622 |
| Chloride(mg/l) | 180 | 150 | 290 | 170 | 82 | 280 | 90 | 180 | 180 | 360 | 430 | | 250 | 180 |
| Chloride(mg/l)** | | 115 | | | | | | 255 | | | 405 | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Copper Criteria | 0.011 | 0.009 | 0.011 | 0.010 | 0.010 | 0.010 | 0.009 | 0.009 | 0.011 | 0.011 | 0.012 | | 0.010 | 0.010 |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | 0.007 | | | | | | 0.003 | | | 0.012 | | | |
| Hardness(mg/l) | 89 | 69 | 89 | 82 | 82 | 82 | 75 | 75 | 89 | 89 | 97 | | 82 | 82 |
| LILY CK DOWNSTREAM #2 | | | | | | | | | | | | | | |
| Flow(gpm) | | | | | | | | | | | | | | |
| Chloride(mg/l) | | | | | | | | | | | | | | |
| Chloride(mg/l)** | | | | | | | | | | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | | | | | | | | | | | | | |
| Hardness(mg/l) | | | | | | | | | | | | | | |
| LILY CK DOWNSTREAM #3 | | | | | | | | | | | | | | |
| Flow(gpm) | | | | | | | | | | | | | | |
| Chloride(mg/l) | | | | | | | | | | | | | | |
| Chloride(mg/l)** | | | | | | | | | | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | | | | | | | | | | | | | |
| Hardness(mg/l) | | | | | | | | | | | | | | |

| | 07-Feb 10 AM | 08-Feb 10 AM | 09-Feb 10 AM | 10-Feb 10 AM | 11-Feb 10 AM | 12-Feb 10 AM | 13-Feb 10 AM | 14-Feb 10 AM | 15-Feb 10 AM | 16-Feb 10 AM | 17-Feb 10 AM | 18-Feb 10 AM | 19-Feb 10 AM | 20-Feb 10 AM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JAMESTOWN WWTP | | | | | | | | | | | | | | |
| Flow(gpm) | 1017 | | | | | | | | | | | | | |
| Chloride(mg/l) | 750 | | | | | | | | | | | | | |
| Chloride(mg/l)** | | | | | | | | | | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | | | | | | | | | | | | | |
| Hardness(mg/l) | 104 | | | | | | | | | | | | | |
| LILY CK UPSTREAM | | | | | | | | | | | | | | |
| Flow(gpm) | 601 | | | | | | | | | | | | | |
| Chloride(mg/l) | 10 | | | | | | | | | | | | | |
| Chloride(mg/l)** | | | | | | | | | | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | | | | | | | | | | | | | |
| Hardness(mg/l) | 75 | | | | | | | | | | | | | |
| LILY CK DOWNSTREAM #1 | | | | | | | | | | | | | | |
| Flow(gpm) | 1618 | | | | | | | | | | | | | |
| Chloride(mg/l) | 475 | | | | | | | | | | | | | |
| Chloride(mg/l)** | | | | | | | | | | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Copper Criteria | 0.012 | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | | | | | | | | | | | | | |
| Hardness(mg/l) | 97 | | | | | | | | | | | | | |
| LILY CK DOWNSTREAM #2 | | | | | | | | | | | | | | |
| Flow(gpm) | | | | | | | | | | | | | | |
| Chloride(mg/l) | | | | | | | | | | | | | | |
| Chloride(mg/l)** | | | | | | | | | | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | | | | | | | | | | | | | |
| Hardness(mg/l) | | | | | | | | | | | | | | |
| LILY CK DOWNSTREAM #3 | | | | | | | | | | | | | | |
| Flow(gpm) | | | | | | | | | | | | | | |
| Chloride(mg/l) | | | | | | | | | | | | | | |
| Chloride(mg/l)** | | | | | | | | | | | | | | |
| Copper(mg/l) | | | | | | | | | | | | | | |
| Dissolved Copper(mg/l) | | | | | | | | | | | | | | |
| Copper(mg/l)** | | | | | | | | | | | | | | |
| Hardness(mg/l) | | | | | | | | | | | | | | |

---

* Data submitted by Jamestown

** Data submitted by Division of Water, Columbia Field Office

# APPENDIX C

## Jamestown Pipeline Break Report

KENVIRONS
INCORPORATED
452 Versailles Road, Frankfort, Kentucky 40601 Phone: 502/695-4357 Fax: 502/695-4363

June 7, 1994

Mr. Jack A. Wilson
Director
Division of Water
18 Reilly Road
Frankfort, Kentucky 40601

RE: Jamestown Pipeline Break Report

Dear Mr. Wilson:

Enclosed on behalf of the Town of Jamestown is a copy of the above referenced report.

Sincerely,

Harold T. Snodgrass, P.E.
Vice President

HTS:sp

Enclosure

cc: Donnie Wilkerson, Mayor
Terry Lawless, Public Works Supervisor

# REPORT
# JAMESTOWN PIPELINE BREAK
# OF OCTOBER 22, 1993

JUNE 7, 1994

## INTRODUCTION

The purpose of this report is to summarize the actions taken and the investigations made from October 22, 1993, the date the effluent force main break was discovered, through May, 1994, and the conclusions drawn from those efforts. This period covers from receipt of notification of the break to the start of work to cover the vent line above water and includes the work on and under water. The report is being prepared by Kenvirons, Inc. on behalf of the Town of Jamestown.

## PARTICIPANTS

Numerous people and organizations were interested in the break and participated in the repair work and in the investigation to some degree. However, the following groups or persons were involved on an almost day to day basis during the initial work and some continued to be involved until resumption of the lake discharge in February, 1994.

These organizations and their contacts were:

Town of Jamestown - Terry Lawless

Kenvirons, Inc. - Harold T. Snodgrass

Brock Excavating, Inc. - Hugh Brock

Williams and Schultheiss - Bram Williams

Union Underwear Company - Bobby Parsons

Division of Water - Jack Wilson, Sarah Gold

Division of Water Patrol - Tony Wright

Corps of Engineers - Tom Wilkerson

Irrigation Supply, Inc. - Jim Fletcher

Chemodynamics, Inc. - Hugh Spencer

Kenvirons had provided the initial design and construction review of the project; Brock Excavating had installed the pipeline; and Irrigation Supply had furnished the polyethylene pipe.

ACTIVITIES AND OBSERVATIONS

On October 22, 1993, Kenvirons' personnel were notified of a break in the underwater portion of the wastewater treatment plant effluent force main by Mr. Terry Lawless, Town of Jamestown. Kenvirons' personnel arrived in Jamestown that evening, observed a portion of the line on the lake, talked with plant personnel and inspected the air/vacuum relief valve stations along the pipeline route. No unusual conditions were observed in and around the stations.

Divers were contacted and attempts were made to locate the ends of the line for repairs. The major portion of the underwater work was performed by Williams and Schultheiss Diving of Rockport, Indiana.

On October 29, 1993, one end of the line was located, floated, and secured to the bank and on November 3, 1993 the other end (diffuser side) was located and floated. The break had occurred near and in a heat fused (welded) joint. The ends of the pipe were removed for transfer to a materials

laboratory for evaluation to determine if a materials or construction defect caused or contributed to the break.

The pipe ends were prepared, flanges were welded to them, and the line was bolted together to repair the break. Then the weights were adjusted, and the pipeline was floated into place and the air inside the pipeline was released allowing the pipeline to sink.

The diffuser and the line were checked by the diving team and on November 9, 1993 the effluent pumps were started. Almost immediately, upward movement of the line was observed by the divers and pumping was stopped.

Attempts were made to determine the cause of the upward movement. At this time, personnel stationed at the air/vacuum relief valve near the lake reported that the air/vacuum relief valve near the lake was pulling a large volume of air. The valve and a small section of the top of the pipe was removed. Personnel were then stationed at the air/vacuum relief valve further up the line on Apple Lane to observe the functioning of the valve. The pumps were turned on again for approximately twenty minutes. It was observed that the effluent in the pipeline near the lake was frothing and surging, and that tremendous amounts of air were being pulled into the pipeline. The valve on Apple Lane was also pulling in air. These observations and the movement of the pipeline, almost immediately after the pumping was initiated,

indicated that the break was likely caused by the forcing of air into the pipeline which caused the line to float and flex. This was consistent with the letter report prepared by Doctor Dean O. Harper of the University of Louisville on the broken section of pipe. Dr. Harper's letter report indicated that this flexing action could have caused the break that occurred on October 22, 1993. See attached letter report.

In an effort to determine the source of the air, the effluent pump station was checked on November 10, 1993, to determine if the pumps could have been the source of air. Also, samples of the effluent in the pipeline were obtained on November 10 and taken to a laboratory for analysis. Inspection of the pumps indicated that they were functioning properly, and analysis of the samples of the effluent did not indicate anything out of the ordinary.

During the period from November 10, 1993 through December 10, 1993, efforts were focused on determining the potential physical causes that could contribute to air being pulled into the pipeline, and possible methods to remedy the situation. Additional samples of the effluent in the pipeline near the wastewater treatment plant were collected on November 16, 1993, and the results compared to those taken on November 10 in the pipeline near the lake. Analyses of these samples indicated the effluent in the pipeline at the lake and near the treatment plant were virtually the same for

the parameters analyzed. See attached. Physical observations at the wastewater treatment plant at the time of the break reportedly did not reveal any unusual operating conditions. Additionally, discussions with the industrial users of the treatment plant did not reveal any unusual circumstances or changes in operating methods.

Plans were developed to provide an air trap with a vent to the atmosphere and to add additional weights to the line as a contingency to offset increased buoyancy which could be caused by air surges. Personnel involved in the evaluation agreed that regardless of the exact nature of the mechanics that caused the air to be forced into the underwater section of the pipeline, the proposed modifications would allow for the release of any air introduced into the underwater section of the pipeline during unusual operating conditions. (Since the pipeline had operated properly for seven months prior to the incident, it was believed the cause of the air was associated with some unidentified change in conditions.)

The modifications were approved by the Division of Water on December 10, 1993 and work was started to prepare the weights and construction of the surge tank in accordance with the approved plans. Work began at the lake again on December 16, 1993, and continued through February 3, 1994. On February 3, 1994, following completion of the work, pumps were to be started again to test the line. At this point in time, the effluent in the pipeline was the same as that

which existed in October, 1993. Because of the frothing that was observed in the line on November 9, 1993, and the age of the effluent, contingencies were made to address the potential for further foaming when the pumps were reactivated.

Almost immediately after initiation of pumping, air came through the vent line from the surge tank and, shortly thereafter, foam was forced up through the vent line. Defoamer was then applied at the manhole and pumping was ceased. The vent line was then connected to a temporary mix tank installed near the manhole. Spray nozzles connected to the town's water supply were installed in the mix tank. The water sprays were turned on when pumping was reinitiated and the condensed liquid was allowed to run back down the vent line. The water spray controlled the foam and defoamer was no longer applied at the manhole. However, defoamer was being applied at the wastewater treatment plant. (No defoamer had previously been added to the effluent at the wastewater treatment plant during the seven month period the plant discharged to the pipeline.)

In less than a day, foaming at the pipeline/lake interface ceased and the air/vacuum relief valves near the lake and on Apple Lane returned to the normal operation of "breathing" rather than sucking air. Almost daily checks since February, 1994 have not revealed any further forced air or foaming

conditions, and the air/vacuum relief valves continue their normal operation. Investigations since that time have also failed to reveal a cause of the conditions that led to the break. Jamestown has now submitted plans to allow the water spray station to remain as a permanent part of the design.

Lake elevations were high during the spring, but had dropped significantly by June 1, 1994, and a diver was sent down at that time to observe the underwater surge tank and vent line. Both were found in a satisfactory condition and he stated that silt was evident and collecting on and around the surge tank and on the vent line indicating no apparent movement.

To date, we have not been able to isolate the exact cause of air entrapment in the pipeline. However, the modifications are intended to eliminate the potential for a recurrence. Additionally, Jamestown will continue use of defoamer at the WWTP as long as necessary, continue routine inspection of the vent manhole, and will increase security to minimize potential for unauthorized access to the system.

Chemical Engineering

Speed Scientific School
University of Louisville
Louisville, Kentucky 40292
(502) 852-6347
FAX: (502) 852-6355

# UNIVERSITY of LOUISVILLE

07 January 1994

Terry Lawless
City of Jamestown
City Hall Building
P. O. Box 587
Jamestown KY 42629

Dear Mr. Lawless:

At the request of Harold T. Snodgrass(*), I have visually inspected the two (2) pieces of P.E. pipe (24" nominal diameter) that Dr. Hugh Spencer delivered to the Materials Research Laboratory of the University of Louisville. My conclusions are summarized in this letter, rather than in a separate report.

The presence of pairs of parabolic ridges on the fracture surface - pairs which "point" in opposite directions - is evidence that the failure occurred over a period of time, not at single instant. Such a failure is consistent with a developing cycle of stresses, which gradually weaken the pipe until the remaining surface area can no longer bear the load on it; the name given to such a phenomenon is fatigue. In this case, the 15 to 20 ridges on one side of the final rupture, and the five or so on the other, indicate that this fatigue failure occurred over a relatively short period of time.

There is no evidence of a material abnormality, nor the presence of a manufacturing defect. Also, the performance of the inner alignment ring and the outer ring appear to have been satisfactory; their failures are a result of the final act of pipe rupture.

I hope this summary analysis is sufficient for your needs. If not, please let me know. Thank you for letting the MRL be of service.

Respectfully yours,

Dean Owen Harper

Dean Owen Harper
Materials Research Laboratory
P.E. #9375 (KY) Chemical
Professor, Chemical Engineering

(*) Harold T. Snodgrass
Kenvirons Inc.
452 Versailles Road
Frankfort KY 40601
502/695-4357

452 Versailles Road
Frankfort, Ky. 40601
Phone: 502/695-4357
Fax: 502/695-4363

KENVIRONS
INCORPORATED

# LABORATORY ANALYSIS
11/17/93

CITY OF JAMESTOWN

JAMESTOWN
KY
Attn:

PROJECT NO.: 86123
LAB. NUMBER: 38604
DATE RECEIVED: 11/11/93
DATE SAMPLED:
SAMPLED BY: HTS

SAMPLE IDENTIFICATION:

LAKE AIR RELEASE

FIELD DATA
D.O.-9.3

| PARAMETER NAME | LAB. RESULTS | UNITS | DATE | ANALYST | METHOD |
|---|---|---|---|---|---|
| ALKALINITY-BICARBONATE | 204. | MG/L | 11/11/93 | DES | E-310.1 |
| ALKALINITY-CARBONATE | 0. | MG/L | 11/11/93 | DES | E-310.1 |
| ALKALINITY-HYDROXIDE | 0. | MG/L | 11/11/93 | DES | E-310.1 |
| ALKALINITY-TOTAL | 204. | MG/L | 11/11/93 | DES | E-310.1 |
| CHLORIDE | 1375. | MG/L | 11/12/93 | RBB | E-325.3 |
| pH | 7.32 | SU | 11/11/93 | DES | E-150.1 |
| SODIUM | 1064. | MG/L | 11/11/93 | LW | E-273.1 |
| SOLIDS-DISSOLVED | 3245. | MG/L | 11/12/93 | RBB | E-160.1 |
| SULFATE | 469. | MG/L | 11/12/93 | RBB | E-375.3 |
| SURFACTANTS-MBAS | 0.84 | MG/L | 11/11/93 | RBB | E-425.1 |

ANALYSIS BY :
E-EPA METHODOLOGY

SUBMITTED C H Lee DATE 11-17-93

452 Versailles Road
Frankfort, Ky. 40601
Phone: 502/695-4357
Fax: 502/695-4363

KENVIRONS
INCORPORATED

# LABORATORY ANALYSIS
11/17/93

CITY OF JAMESTOWN

JAMESTOWN
KY
Attn:

PROJECT NO.: 86123
LAB. NUMBER: 38605
DATE RECEIVED: 11/11/93
DATE SAMPLED:
SAMPLED BY: HTS

SAMPLE IDENTIFICATION:

LITTLE LILY CREEK

FIELD DATA
D.O.-9.0

| PARAMETER NAME | LAB. RESULTS | UNITS | DATE | ANALYST | METHOD |
|---|---|---|---|---|---|
| ALKALINITY-BICARBONATE | 195. | MG/L | 11/11/93 | DES | E-310.1 |
| ALKALINITY-CARBONATE | 0. | MG/L | 11/11/93 | DES | E-310.1 |
| ALKALINITY-HYDROXIDE | 0. | MG/L | 11/11/93 | DES | E-310.1 |
| ALKALINITY-TOTAL | 195. | MG/L | 11/11/93 | DES | E-310.1 |
| CHLORIDE | 1426. | MG/L | 11/12/93 | RBB | E-325.3 |
| pH | 6.99 | SU | 11/11/93 | DES | E-150.1 |
| SODIUM | 1049. | MG/L | 11/11/93 | LW | E-273.1 |
| SOLIDS-DISSOLVED | 3290. | MG/L | 11/12/93 | RBB | E-160.1 |
| SULFATE | 450. | MG/L | 11/12/93 | RBB | E-375.3 |
| SURFACTANTS-MBAS | 1.04 | MG/L | 11/11/93 | RBB | E-425.1 |

ANALYSIS BY :
E-EPA METHODOLOGY

SUBMITTED C N Lee DATE 11-17-93

452 Versailles Road
Frankfort, Ky. 40601
Phone: 502/695-4357
Fax: 502/695-4363

KENVIRONS
INCORPORATED

# LABORATORY ANALYSIS

12/03/93

CITY OF JAMESTOWN

JAMESTOWN
KY
Attn:

PROJECT NO.: 86123
LAB. NUMBER: 38606
DATE RECEIVED: 11/11/93
DATE SAMPLED:
SAMPLED BY: HTS

SAMPLE IDENTIFICATION: FIELD DATA

SNOW AIR VALVE

| PARAMETER NAME | LAB. RESULTS | UNITS | DATE | ANALYST | METHOD |
|---|---|---|---|---|---|
| ALKALINITY-BICARBONATE | 200. | MG/L | 11/11/93 | DES | E-310.1 |
| ALKALINITY-CARBONATE | 0. | MG/L | 11/11/93 | DES | E-310.1 |
| ALKALINITY-HYDROXIDE | 0. | MG/L | 11/11/93 | DES | E-310.1 |
| ALKALINITY-TOTAL | 200. | MG/L | 11/11/93 | DES | E-310.1 |
| AMMONIA-N | < 1. | MG/L | 11/23/93 | RBB | E-350.2 |
| BOD-5DAY | 11.7 | MG/L | 11/17/93 | RBB | E-405.1 |
| CHLORIDE | 1283. | MG/L | 11/12/93 | RBB | E-325.3 |
| CHEMICAL OXYGEN DEMAND | 233. | MG/L | 11/18/93 | RBB | E-410.1.2.3 |
| DISSOLVED OXYGEN | 9.06 | MG/L | 11/12/93 | RBB | E-360.1 |
| OIL & GREASE | < 0.5 | MG/L | 11/17/93 | DES | E-413.1 |
| pH | 7.19 | SU | 11/11/93 | RBB | E-150.1 |
| PHOSPHATE | 9.4 | MG/L | 11/17/93 | RBB | E-365.3 |
| SODIUM | 1064. | MG/L | 11/11/93 | LW | E-273.1 |
| SOLIDS-DISSOLVED | 3285. | MG/L | 11/12/93 | RBB | E-160.1 |
| SULFATE | 483. | MG/L | 11/12/93 | RBB | E-375.3 |
| SURFACTANTS-MBAS | 0.88 | MG/L | 11/11/93 | RBB | E-425.1 |

ANALYSIS BY :
E-EPA METHODOLOGY

SUBMITTED C Z Lee DATE 12-3-93

452 Versailles Road
Frankfort, Ky. 40601
Phone: 502/695-4357
Fax: 502/695-4363

KENVIRONS
INCORPORATED

# LABORATORY ANALYSIS

11/30/93

CITY OF JAMESTOWN

JAMESTOWN
KY
Attn:

PROJECT NO.: 86123
LAB. NUMBER: 38603
DATE RECEIVED: 11/11/93
DATE SAMPLED:
SAMPLED BY: HTS

SAMPLE IDENTIFICATION:

WWTP 4

FIELD DATA
D.O.-9.1

| PARAMETER NAME | LAB. RESULTS | UNITS | DATE | ANALYST | METHOD |
|---|---|---|---|---|---|
| ALKALINITY-BICARBONATE | 87.2 | MG/L | 11/11/93 | DES | E-310.1 |
| ALKALINITY-CARBONATE | 0. | MG/L | 11/11/93 | DES | E-310.1 |
| ALKALINITY-HYDROXIDE | 0. | MG/L | 11/11/93 | DES | E-310.1 |
| ALKALINITY-TOTAL | 87.2 | MG/L | 11/11/93 | DES | E-310.1 |
| AMMONIA-N | < 1. | MG/L | 11/23/93 | RBB | E-350.2 |
| BOD-5DAY | 5.2 | MG/L | 11/17/93 | RBB | E-405.1 |
| CHLORIDE | 997. | MG/L | 11/12/93 | RBB | E-325.3 |
| CHEMICAL OXYGEN DEMAND | 221. | MG/L | 11/18/93 | RBB | E-410.1.2.3 |
| DISSOLVED OXYGEN | 7.42 | MG/L | 11/12/93 | RBB | E-360.1 |
| OIL & GREASE | 2.86 | MG/L | 11/17/93 | DES | E-413.1 |
| pH | 1ST 7.09 | SU | 11/11/93 | DES | E-150.1 |
| pH | 2ND 7.35 | SU | 11/12/93 | DES | E-150.1 |
| PHOSPHATE | 2.67 | MG/L | 11/17/93 | RBB | E-365.3 |
| SODIUM | 744. | MG/L | 11/11/93 | LW | E-273.1 |
| SOLIDS-DISSOLVED | 2470. | MG/L | 11/12/93 | RBB | E-160.1 |
| SULFATE | 391. | MG/L | 11/12/93 | RBB | E-375.3 |
| SURFACTANTS-MBAS | 0.66 | MG/L | 11/11/93 | RBB | E-425.1 |

ANALYSIS BY :
E-EPA METHODOLOGY

SUBMITTED C. Lee

DATE 11-30-93

452 Versailles Road
Frankfort, Ky. 40601
Phone: 502/695-4357
Fax: 502/695-4363

KENVIRONS
INCORPORATED

# LABORATORY ANALYSIS
11/19/93

CITY OF JAMESTOWN

JAMESTOWN
KY
Attn:

PROJECT NO.: 86123
LAB. NUMBER: 38705
DATE RECEIVED: 11/17/93
DATE SAMPLED: 11/16/93
SAMPLED BY: BFK

SAMPLE IDENTIFICATION: FIELD DATA

WATER AFTER PUMP

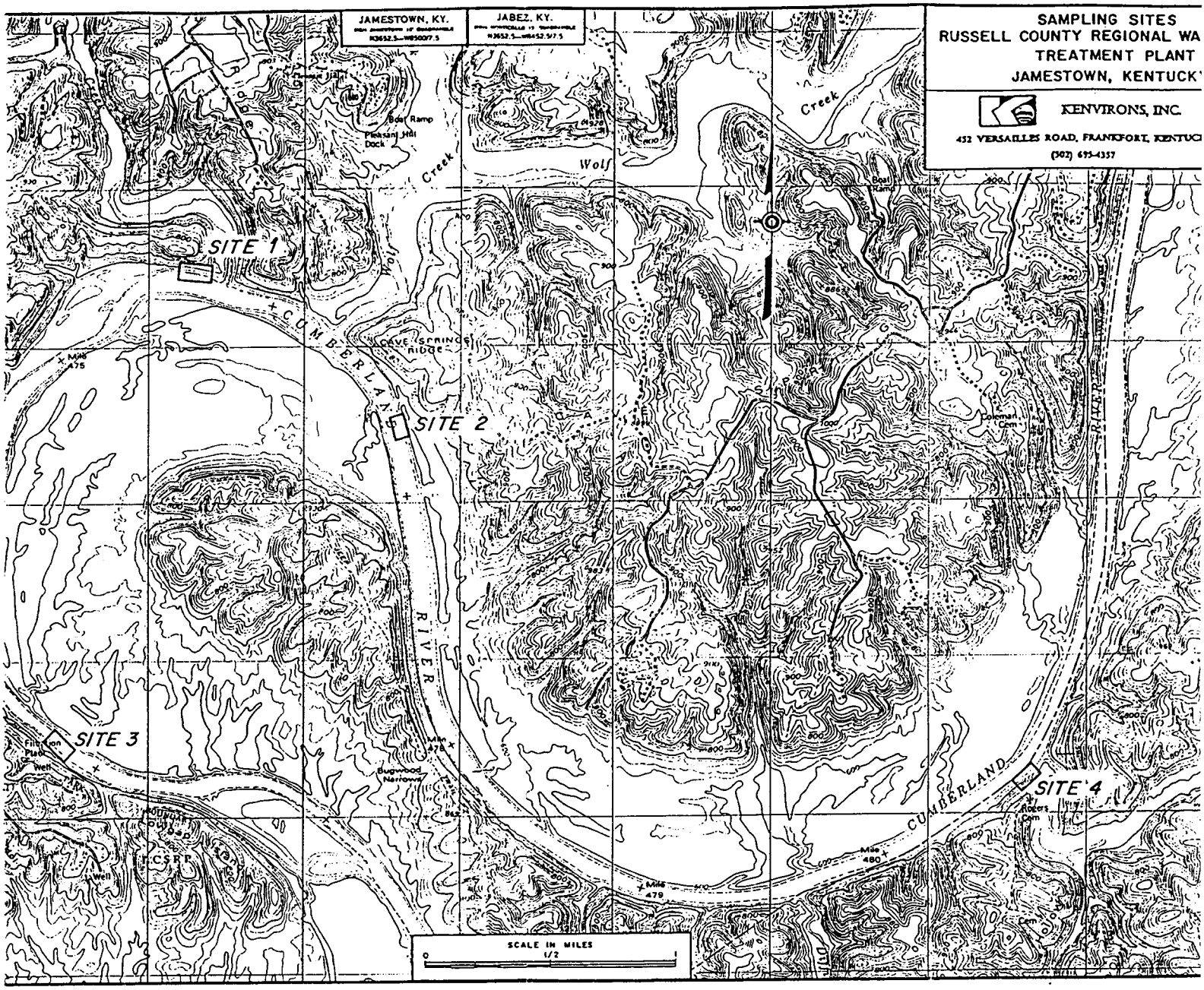
| PARAMETER NAME | LAB. RESULTS | UNITS | DATE | ANALYST | METHOD |
|---|---|---|---|---|---|
| BICARBONATE ALKALINITY | 201. | MG/L | 11/18/93 | RBB | E-310.1 |

ANALYSIS BY :
E-EPA METHODOLOGY

SUBMITTED C H Lee DATE 11-19-93

# APPENDIX D

## Water Quality, Fish Tissue and Sediment Data Collected in Lake Cumberland by the Town of Jamestown


JAMESTOWN, KY.
JABEZ, KY.
SAMPLING SITES
RUSSELL COUNTY REGIONAL WA
TREATMENT PLANT
JAMESTOWN, KENTUCK
KENVIRONS, INC.
452 VERSAILLES ROAD, FRANKFORT, KENTUC
(502) 695-4357
SITE 1
SITE 2
SITE 3
SITE 4
CUMBERLAND RIVER
Wolf Creek
Boat Ramp
Pleasant Hill Dock
COVE SPRING RIDGE
Mile 475
Mile 478
Mile 479
Mile 480
Bugwood Narrows
Coleman Cem.
Rogers Cem.
Filtration Plant Well
Well
C.S.R.R.
SCALE IN MILES
1/2

CITY OF JAMESTOWN
SAMPLING RESULTS

SITE 1 (WATER)

| PARAMETER | Site #1 #35302 01/27/93 | Site 1.1 #35645 03/03/93 | Site 1.2 #35647 03/03/93 | Site 1.3 #35649 03/02/93 | Site 1A #35933 03/29/93 | Site 1B #35934 03/29/93 | Site 1C #35935 03/29/93 | Site 1A #36504 05/11/93 | Site 1A.4 #36486 05/11/93 | Site 1B #36505 05/11/93 | Site 1B.4 #36491 05/11/93 | Site 1C #36506 05/11/93 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 |
| Chloride | 4.42 | 1.53 | 2.45 | 4.91 | 2.55 | 4.14 | 2.83 | 3.62 | 5.42 | 22.9 | 3.96 | 17.4 |
| Copper | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | 0.001 | < 0.001 | < 0.001 |
| Lead | < 0.005 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| Mercury | < 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.0015 | 0.0013 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| Nickel | < 0.02 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 |
| pH | 6.76 | 7.59 | 7.59 | 7.59 | 6.94 | 7.57 | 7.62 | 7.21 | 7.21 | 7.21 | 7.21 | 7.21 |
| Specific Conductivity | 177 | 114 | 114 | 114 | 0.116 | 0.118 | 0.114 | 116 | 116 | 116 | 116 | 116 |
| Bromodichloromethane | < 1 | < 1 | | | | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 |
| Bromoform | < 1 | < 1 | | | | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 |
| Chlorodibromomethane | < 1 | < 1 | | | | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 |
| Chloroform | < 1 | < 1 | | | | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 |

SITE 2 (WATER)

| PARAMETER | Site #2 #35303 01/27/93 | Site 2.1 #35651 03/03/93 | Site 2.2 #35653 03/03/93 | Site 2.3 #35655 03/03/93 | Site 2.1 #35936 03/29/93 | Site 2.2 #35937 03/29/93 | Site 2.3 #35938 03/29/93 | Site 2A #36498 05/12/93 | | Site 2B #36499 05/12/93 | | Site 2C #36500 05/12/93 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | | < 0.005 | | < 0.005 |
| Chloride | 3.64 | 4.6 | 4.91 | 4.76 | 3.26 | 2.37 | 3.09 | 3.29 | | 3.28 | | 3.45 |
| Copper | < 0.001 | 0.002 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | | < 0.001 | | < 0.001 |
| Lead | < 0.005 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | | < 0.001 | | < 0.001 |
| Mercury | < 0.001 | 0.001 | 0.001 | 0.001 | < 0.001 | < 0.001 | 0.0016 | < 0.001 | | < 0.001 | | < 0.001 |
| Nickel | < 0.02 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | | < 0.005 | | < 0.005 |
| pH | 6.47 | 7.81 | 7.81 | 7.81 | 7.96 | | | 7.58 | | 7.58 | | 7.58 |
| Specific Conductivity | 163 | 114 | 114 | 114 | 0.108 | | | 116 | | 116 | | 116 |
| Bromodichloromethane | < 1 | < 1 | | | < 5 | < 5 | < 5 | < 5 | | < 5 | | < 5 |
| Bromoform | < 1 | < 1 | | | < 5 | < 5 | < 5 | < 5 | | < 5 | | < 5 |
| Chlorodibromomethane | < 1 | < 1 | | | < 5 | < 5 | < 5 | < 5 | | < 5 | | < 5 |
| Chloroform | < 1 | < 1 | | | < 5 | < 5 | < 5 | < 5 | | < 5 | | < 5 |

SITE 3 (WATER)

| PARAMETER | Site #3 #35304 01/27/93 | Site 3.1 #35657 03/03/93 | Site 3.2 #35658 03/03/93 | Site 3.3 #35659 03/03/93 | Site 3.1 #35939 03/29/93 | Site 3.2 #35940 03/29/93 | Site 3.3 #35941 03/29/93 | Site 3A #36501 05/12/93 | | Site 3B #36502 05/12/93 | | Site 3C #36503 05/12/93 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | | < 0.005 | | < 0.005 |
| Chloride | 3.41 | 5.21 | 5.52 | 4.91 | 3.15 | 3.37 | 2.71 | 3.56 | | 4.11 | | 2.17 |
| Copper | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | | < 0.001 | | < 0.001 |
| Lead | < 0.005 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | | < 0.001 | | < 0.001 |
| Mercury | < 0.001 | < 0.001 | 0.002 | 0.002 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | | < 0.001 | | < 0.001 |
| Nickel | < 0.02 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | | < 0.005 | | < 0.005 |
| pH | 6.15 | 7.12 | 7.12 | 7.12 | 7.73 | | | 7.19 | | 7.19 | | 7.19 |
| Specific Conductivity | 162 | 116 | 116 | 116 | 0.114 | | | 120 | | 120 | | 120 |
| Bromodichloromethane | < 1 | < 1 | | | < 5 | < 5 | < 5 | < 5 | | < 5 | | < 5 |
| Bromoform | < 1 | < 1 | | | < 5 | < 5 | < 5 | < 5 | | < 5 | | < 5 |
| Chlorodibromomethane | < 1 | < 1 | | | < 5 | < 5 | < 5 | < 5 | | < 5 | | < 5 |
| Chloroform | < 1 | < 1 | | | < 5 | < 5 | < 5 | < 5 | | < 5 | | < 5 |

All units in mg/kg.

CITY OF JAMESTOWN
SAMPLING RESULTS

SITE 1 (WATER)

| PARAMETER | Site 1C.4 #36496 05/11/93 | Sta. 1.1 #37758 08/18/93 | Sta. 1.2 #37759 08/18/93 | Sta. 1.3 #37760 08/18/93 | Sta. 1.1 #40260 03/16/94 | Sta. 1.2 #40262 03/16/94 | Sta. 1.3 #40264 03/16/94 |
|---|---|---|---|---|---|---|---|
| Arsenic | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 |
| Chloride | 8.68 | 4.15 | 3.8 | 3.25 | 1.84 | 1.66 | 2.21 |
| Copper | < 0.001 | < 0.005 | < 0.005 | < 0.005 | 0.002 | 0.002 | 0.003 |
| Lead | < 0.001 | < 0.001 | 0.001 | 0.002 | 0.002 | 0.01 | 0.02 |
| Mercury | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| Nickel | < 0.005 | < 0.005 | < 0.005 | < 0.005 | 0.007 | < 0.02 | 0.02 |
| pH | 7.21 | | | | | | |
| Specific Conductivity | 116 | | | | | | |
| Bromodichloromethane | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 |
| Bromoform | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 |
| Chlorodibromomethane | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 |
| Chloroform | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 |

SITE 2 (WATER)

| PARAMETER | | Sta. 2.1 #37761 08/18/93 | Sta. 2.2 #37762 08/18/93 | Sta. 2.3 #37763 08/18/93 | Sta. 2.1 #40266 03/16/94 | Sta. 2.2 #40268 03/16/94 | Sta. 2.3 #40270 03/16/94 |
|---|---|---|---|---|---|---|---|
| Arsenic | | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 |
| Chloride | | 2.71 | 2.51 | 3.67 | 3.07 | 1.19 | 2.94 |
| Copper | | < 0.005 | < 0.005 | < 0.005 | 0.005 | 0.002 | 0.001 |
| Lead | | 0.004 | 0.001 | 0.001 | 0.02 | 0.01 | < 0.005 |
| Mercury | | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| Nickel | | < 0.005 | < 0.005 | < 0.005 | 0.02 | 0.02 | 0.02 |
| pH | | | | | | | |
| Specific Conductivity | | | | | | | |
| Bromodichloromethane | | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 |
| Bromoform | | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 |
| Chlorodibromomethane | | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 |
| Chloroform | | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 |

SITE 3 (WATER)

| PARAMETER | | Sta. 3.1 #37764 08/18/93 | Sta. 3.2 #37765 08/18/93 | Sta. 3.3 #37766 08/18/93 | Sta. 3.1 #40272 03/17/94 | Sta. 3.2 #40274 03/17/94 | Sta. 3.3 #40276 03/17/94 |
|---|---|---|---|---|---|---|---|
| Arsenic | | 0.007 | 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 |
| Chloride | | 4.81 | 3.8 | 4.84 | 3.99 | 2.33 | 2.3 |
| Copper | | < 0.005 | < 0.005 | 0.002 | 0.009 | 0.001 | 0.001 |
| Lead | | 0.001 | 0.002 | 0.001 | 0.009 | < 0.005 | 0.005 |
| Mercury | | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| Nickel | | < 0.005 | < 0.005 | < 0.005 | 0.01 | 0.005 | 0.007 |
| pH | | | | | | | |
| Specific Conductivity | | | | | | | |
| Bromodichloromethane | | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 |
| Bromoform | | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 |
| Chlorodibromomethane | | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 |
| Chloroform | | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 |

All units in mg/kg.

CITY OF JAMESTOWN
SAMPLING RESULTS

SITE 1 (SEDIMENT)

| PARAMETER | Site 1-150' #35312 01/27/93 | Site 1-220' #35313 01/27/93 | Site 1-400' #35314 01/27/93 | Site 1.1 (T) #35646 03/02/93 | Site 1.2 (T) #35648 03/02/93 | Site 1.3 (T) #35933 03/02/93 | Site 1.1 (B) #35791 03/03/93 | Site 1.2 (B) #35792 03/03/93 | Site 1.3 (B) #35793 03/03/93 | Site 1.1 #35948 03/29/93 | Site 1.2 #35949 03/29/93 | Site 1.3 #35950 03/29/93 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 5.78 | 6.11 | 4.74 | 11.8 | 7.67 | 11.8 | 2.47 | 9.98 | 11.6 | 2.59 | 3.82 | 3.74 |
| Copper | 9.28 | 9.92 | 8.83 | 18.6 | 19.5 | 18 | 21.4 | 20.6 | 21.3 | 25 | 25.2 | 36.7 |
| Lead | 8.18 | 9.65 | 7.8 | 15 | 16.1 | 14.6 | 20.2 | 20.2 | 20.7 | 23.7 | 24.2 | 27.2 |
| Mercury | 0.06 | 0.05 | < 0.025 | 0.12 | 0.09 | 0.12 | 0.12 | 0.12 | 0.12 | < 0.05 | 0.05 | < 0.05 |
| 4,4'-DDD | | | | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 |
| 4,4'-DDE | | | | ND< 0.1 | ND< 0.1 | ND< 0.1 | ND< 0.1 | ND< 0.1 | ND< 0.1 | ND< 0.1 | ND< 0.1 | ND< 0.1 |
| 4,4'-DDT | | | | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 |
| Aldrin | | | | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 |
| Alpha-BHC | | | | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 |
| Aroclor-1016 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1221 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1232 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1242 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1248 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1254 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1260 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Beta-BHC | | | | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 |
| Chlordane (Technical) | ND< 1 | ND< 0.1 | ND< 0.1 | ND< 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 |
| Delta-BHC (Lindane) | | | | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 |
| Dieldrin | | | | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 |
| Endosulfan I | | | | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 |
| Endosulfan II | | | | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 |
| Endosulfan Sulfate | | | | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 |
| Endrin | | | | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 |
| Endrin Aldehyde | | | | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 |
| Gamma-BHC | | | | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 |
| Heptachlor | | | | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 |
| Heptachlor Epoxide | | | | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 |
| Methoxychlor | | | | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Toxaphene | | | | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Nickel | 18.2 | 18.4 | 18.7 | 42.9 | 45.6 | 48.9 | 47.9 | 44.3 | 47.9 | 51.6 | 66 | 73.9 |
| Solids | 38 | 37 | 34 | 44.7 | 47 | 50.3 | 41.9 | 43.5 | 43.9 | 37 | 33 | 37 |
| Total Organic Carbon (Dry) | 16500 | 17600 | 15000 | 17600 | 22600 | 17600 | | | | 5540 | 12500 | 11800 |

All units in mg/kg, except solids which are in %.
T = Top of sediment
B = @ a depth of about 6"

CITY OF JAMESTOWN
SAMPLING RESULTS

SITE 1 (SEDIMENT)

| PARAMETER | Site 1B.1 #35942 03/29/93 | Site 1B.2 #35943 03/29/93 | Site 1B.3 #35944 03/29/93 | Site 1C.1 #35945 03/29/93 | Site 1C.2 #35946 03/29/93 | Site 1C.3 #35947 03/29/93 | Site 1A.1 #36507 05/11/93 | Site 1A.2 #36508 05/11/93 | Site 1A.3 #36509 05/11/93 | Site 1B.1 #36510 05/11/93 | Site 1B.2 #36511 05/11/93 | Site 1B.3 #36512 05/11/93 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 1.37 | 1.88 | 1.94 | 13.2 | 9.76 | 4.42 | 3.71 | < 1.25 | 3.22 | 4.3 | 2.46 | 9.23 |
| Copper | 18.2 | 20.7 | 25.4 | 25.9 | 19.2 | 23.4 | 21.2 | 24.5 | 19.5 | 19.8 | 24.8 | 16.1 |
| Lead | 17.7 | 20.7 | 24.8 | 24.5 | 16.9 | 22.9 | 18.3 | 20.8 | 17.9 | 17.6 | 22.2 | 17.2 |
| Mercury | < 0.05 | < 0.05 | 0.05 | < 0.06 | < 0.05 | < 0.05 | 0.05 | 0.07 | 0.03 | 0.04 | 0.05 | 0.06 |
| 4,4'-DDD | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | | | | | | |
| 4,4'-DDE | ND< 0.1 | ND< 0.1 | ND< 0.1 | ND< 0.1 | ND< 0.1 | ND< 0.1 | | | | | | |
| 4,4'-DDT | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | | | | | | |
| Aldrin | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | | | | | | |
| Alpha-BHC | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | | | | | | |
| Aroclor-1016 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 |
| Aroclor-1221 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 |
| Aroclor-1232 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 |
| Aroclor-1242 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 |
| Aroclor-1248 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 |
| Aroclor-1254 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 |
| Aroclor-1260 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 |
| Beta-BHC | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | | | | | | |
| Chlordane (Technical) | ND< 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 | < 0.3 | < 0.3 | < 0.3 | < 0.3 | < 0.3 | < 0.3 |
| Delta-BHC (Lindane) | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | | | | | | |
| Dieldrin | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | | | | | | |
| Endosulfan I | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | | | | | | |
| Endosulfan II | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | | | | | | |
| Endosulfan Sulfate | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | | | | | | |
| Endrin | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | | | | | | |
| Endrin Aldehyde | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | | | | | | |
| Gamma-BHC | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | | | | | | |
| Heptachlor | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | | | | | | |
| Heptachlor Epoxide | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | | | | | | |
| Methoxychlor | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | | | | | | |
| Toxaphene | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | | | | | | |
| Nickel | 46.6 | 48.5 | 52.8 | 55.3 | 46.7 | 53.6 | 42.8 | 47.2 | 38.5 | 37.8 | 47.7 | 37.2 |
| Solids | 52 | 46 | 44 | 46 | 58 | 38 | 52 | 48 | 48 | 60 | 47 | 56 |
| Total Organic Carbon (Dry) | 15800 | 9280 | 8920 | 11000 | 10500 | 9390 | 15000 | 11900 | 11200 | 10500 | 13600 | 18600 |

CITY OF JAMESTOWN
SAMPLING RESULTS

SITE 1 (SEDIMENT)

| PARAMETER | Site 1C.1 #36513 05/11/93 | Site 1C.2 #36514 05/11/93 | Site 1C.3 #36515 05/11/93 | Sta. 1.1 #37767 08/18/93 | Sta. 1.2 #37768 08/18/93 | Sta. 1.3 #37769 08/18/93 | Sta. 1.1 #40259 03/16/94 | Sta. 1.2 #40261 03/16/94 | Sta. 1.3 #40263 03/16/94 |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 4.93 | 9.66 | 4.91 | 0.88 | 1.64 | 0.78 | 3.62 | 2.08 | < 0.125 |
| Copper | 23.2 | 24.2 | 23.5 | 21.7 | 33.3 | 32.9 | 26.1 | 25 | 25.5 |
| Lead | 19.3 | 21.5 | 21.5 | 9.53 | 28.2 | 26.5 | 24.5 | 21 | 23.1 |
| Mercury | 0.05 | 0.06 | 0.05 | 0.09 | 0.11 | 0.07 | 0.08 | 0.04 | 0.07 |
| 4,4'-DDD | | | | | | | | | |
| 4,4'-DDE | | | | | | | | | |
| 4,4'-DDT | | | | | | | | | |
| Aldrin | | | | | | | | | |
| Alpha-BHC | | | | | | | | | |
| Aroclor-1016 | < 1 | < 1 | < 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1221 | < 1 | < 1 | < 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1232 | < 1 | < 1 | < 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1242 | < 1 | < 1 | < 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1248 | < 1 | < 1 | < 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1254 | < 1 | < 1 | < 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1260 | < 1 | < 1 | < 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Beta-BHC | | | | | | | | | |
| Chlordane (Technical) | < 0.3 | < 0.3 | < 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 |
| Delta-BHC (Lindane) | | | | | | | | | |
| Dieldrin | | | | | | | | | |
| Endosulfan I | | | | | | | | | |
| Endosulfan II | | | | | | | | | |
| Endosulfan Sulfate | | | | | | | | | |
| Endrin | | | | | | | | | |
| Endrin Aldehyde | | | | | | | | | |
| Gamma-BHC | | | | | | | | | |
| Heptachlor | | | | | | | | | |
| Heptachlor Epoxide | | | | | | | | | |
| Methoxychlor | | | | | | | | | |
| Toxaphene | | | | | | | | | |
| Nickel | 47.5 | 45.9 | 44.3 | 46.3 | 56.6 | 52 | 59 | 60 | 60 |
| Solids | 44 | 44 | 46 | 47 | 34 | 42 | 48 | 49.3 | 39.6 |
| Total Organic Carbon (Dry) | 14400 | 12500 | 11500 | 14800 | 14000 | 12400 | 725 | 745 | 670 |

CITY OF JAMESTOWN
SAMPLING RESULTS

SITE 2 (SEDIMENT)

| PARAMETER | Site 2-100' #35315 01/27/93 | Site 2-200' #35316 01/27/93 | Site 2-300' #35317 01/27/93 | Site 2.1 (T) #35652 03/02/93 | Site 2.2 (T) #35654 03/02/93 | Site 2.3 (T) #35656 03/02/93 | Site 2.1 (B) #35794 03/03/93 | Site 2.2 (B) #35795 03/03/93 | Site 2.3 (B) #35796 03/03/93 | Site 2.1 #35951 03/30/93 | Site 2.2 #35952 03/30/93 | Site 2.3 #35953 03/30/93 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 5.22 | 6.34 | 5.98 | 10.1 | 10 | 3.69 | 11.7 | 8.49 | 2.36 | 3.21 | 14.3 | 13.2 |
| Copper | 11.9 | 11.2 | 9.89 | 19.7 | 21.7 | 22.8 | 20.8 | 18.8 | 18 | 26.9 | 23.6 | 24.9 |
| Lead | 11.5 | 9.95 | 8.93 | 7.83 | 17.8 | 20.6 | 14.2 | 16.6 | 16.7 | 24.8 | 23.1 | 24.6 |
| Mercury | 0.04 | 0.04 | 0.05 | 0.12 | 0.14 | 0.13 | 0.12 | 0.16 | 0.12 | < 0.05 | 0.05 | < 0.05 |
| 4,4'-DDD | | | | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 |
| 4,4'-DDE | | | | ND< 0.1 | ND< 0.1 | ND< 0.1 | ND< 0.1 | ND< 0.1 | ND< 0.1 | ND< 0.1 | ND< 0.1 | ND< 0.1 |
| 4,4'-DDT | | | | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 | ND< 0.01 |
| Aldrin | | | | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 |
| Alpha-BHC | | | | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 |
| Aroclor-1016 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1221 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1232 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1242 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1248 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1254 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1260 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Beta-BHC | | | | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 |
| Chlordane (Technical) | ND< 0.1 | ND< 0.1 | ND< 0.1 | ND< 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 |
| Delta-BHC (Lindane) | | | | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 |
| Dieldrin | | | | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 | ND< 0.002 |
| Endosulfan I | | | | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 |
| Endosulfan II | | | | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 |
| Endosulfan Sulfate | | | | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 | ND< 0.2 |
| Endrin | | | | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 |
| Endrin Aldehyde | | | | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 | ND< 0.02 |
| Gamma-BHC | | | | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 | ND< 0.4 |
| Heptachlor | | | | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 |
| Heptachlor Epoxide | | | | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 | ND< 0.005 |
| Methoxychlor | | | | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Toxaphene | | | | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Nickel | 23.5 | 22.8 | 21 | 46.7 | 52.9 | 53.1 | 44.5 | 44.7 | 36.1 | 71.5 | 46.7 | 58.6 |
| Solids | 36 | 39 | 33 | 41.5 | 41.3 | 42.1 | 41.7 | 49 | 56 | 30 | 37 | 34 |
| Total Organic Carbon (Dry) | 14600 | 17800 | 14300 | 18200 | 14700 | 17000 | | | | 10300 | 10000 | 7730 |

All units in mg/kg, except solids which are in %.
T = Top of sediment
B = @ a depth of about 6"

CITY OF JAMESTOWN
SAMPLING RESULTS

SITE 2 (SEDIMENT)

| PARAMETER | Site 2A #36516 05/12/93 | Site 2B #36517 05/12/93 | Site 2C #36518 05/12/93 | Sta. 2.1 #37770 08/18/93 | Sta. 2.2 #37771 08/18/93 | Sta. 2.3 #37772 08/18/93 | Sta. 2.1 #40265 03/16/94 | Sta. 2.2 #40267 03/16/94 | Sta. 2.3 #40269 03/16/94 |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 7.61 | 10.9 | 3.29 | 1.25 | 1.05 | 1.11 | < 0.125 | < 0.125 | < 0.125 |
| Copper | 23.1 | 21.7 | 14.5 | 34.9 | 25.9 | 35.8 | 23.5 | 24.3 | 27.5 |
| Lead | 20.8 | 19.5 | 12.8 | 26.9 | 22.8 | 14.2 | 15.9 | 23.1 | 22.2 |
| Mercury | 0.07 | 0.05 | 0.04 | 0.07 | 0.09 | 0.11 | 0.08 | 0.07 | 0.1 |
| 4,4'-DDD | | | | | | | | | |
| 4,4'-DDE | | | | | | | | | |
| 4,4'-DDT | | | | | | | | | |
| Aldrin | | | | | | | | | |
| Alpha-BHC | | | | | | | | | |
| Aroclor-1016 | < 1 | < 1 | < 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1221 | < 1 | < 1 | < 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1232 | < 1 | < 1 | < 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1242 | < 1 | < 1 | < 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1248 | < 1 | < 1 | < 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1254 | < 1 | < 1 | < 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1260 | < 1 | < 1 | < 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 |
| Beta-BHC | | | | | | | | | |
| Chlordane (Technical) | < 0.3 | < 0.3 | < 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 |
| Delta-BHC (Lindane) | | | | | | | | | |
| Dieldrin | | | | | | | | | |
| Endosulfan I | | | | | | | | | |
| Endosulfan II | | | | | | | | | |
| Endosulfan Sulfate | | | | | | | | | |
| Endrin | | | | | | | | | |
| Endrin Aldehyde | | | | | | | | | |
| Gamma-BHC | | | | | | | | | |
| Heptachlor | | | | | | | | | |
| Heptachlor Epoxide | | | | | | | | | |
| Methoxychlor | | | | | | | | | |
| Toxaphene | | | | | | | | | |
| Nickel | 57.6 | 54 | 51.8 | 59.3 | 57.9 | 57.8 | 58.5 | 49 | 58.4 |
| Solids | 50 | 45 | 60 | 42 | 36 | 36 | 51.3 | 44.5 | 33 |
| Total Organic Carbon (Dry) | 13119 | 16800 | 20700 | 12400 | 11000 | 11100 | 680 | 780 | 745 |

CITY OF JAMESTOWN
SAMPLING RESULTS

SITE 3 (SEDIMENT)

| PARAMETER | Site 3-200' #35318 01/27/93 | Site 3-400' #35319 01/27/93 | Site 3.1 #35857 03/03/93 | Site 3.1 #35954 03/30/93 | Site 3.2 #35955 03/30/93 | Site 3.3 #35956 03/30/93 | Site 3A #36519 05/12/93 | Site 3B #36520 05/12/93 | Site 3C #36521 05/12/93 | Sta. 3.1 #37773 08/18/93 | Sta. 3.2 #37774 08/18/93 | Sta. 3.3 #37775 08/18/93 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 6.29 | 4.78 | 4.78 | 3.34 | 15.6 | 3.97 | 4.92 | 5.22 | 5.21 | 2.05 | 0.88 | 1.47 |
| Copper | 8.7 | 8.9 | 8.9 | 22 | 23.7 | 19.6 | 19.1 | 19.3 | 22.1 | 35 | 34.3 | 33 |
| Lead | 9.85 | 7.93 | 7.93 | 22.4 | 26.4 | 20.3 | 17 | 20.8 | 22.2 | 28.6 | 27.1 | 24.6 |
| Mercury | 0.04 | 0.03 | 0.03 | < 0.05 | 0.06 | 0.05 | 0.05 | 0.06 | 0.05 | 0.13 | 0.11 | 0.15 |
| 4,4'-DDD | | | | ND< 0.01 | ND< 0.01 | ND< 0.01 | | | | | | |
| 4,4'-DDE | | | | ND< 0.1 | ND< 0.1 | ND< 0.1 | | | | | | |
| 4,4'-DDT | | | | ND< 0.01 | ND< 0.01 | ND< 0.01 | | | | | | |
| Aldrin | | | | ND< 0.002 | ND< 0.002 | ND< 0.002 | | | | | | |
| Alpha-BHC | | | | ND< 0.4 | ND< 0.4 | ND< 0.4 | | | | | | |
| Aroclor-1016 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | < 1 | < 1 | < 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1221 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | < 1 | < 1 | < 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1232 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | < 1 | < 1 | < 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1242 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | < 1 | < 1 | < 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1248 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | < 1 | < 1 | < 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1254 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | < 1 | < 1 | < 1 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1260 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | ND< 1 | < 1 | < 1 | < 1 | ND< 1 | ND< 1 | ND< 1 |
| Beta-BHC | | | | ND< 0.4 | ND< 0.4 | ND< 0.4 | | | | | | |
| Chlordane (Technical) | ND< 0.1 | ND< 0.1 | ND< 0.1 | ND< 0.3 | ND< 0.3 | ND< 0.3 | < 0.3 | < 0.3 | < 0.3 | ND< 0.3 | ND< 0.3 | ND< 0.3 |
| Delta-BHC (Lindane) | | | | ND< 0.4 | ND< 0.4 | ND< 0.4 | | | | | | |
| Dieldrin | | | | ND< 0.002 | ND< 0.002 | ND< 0.002 | | | | | | |
| Endosulfan I | | | | ND< 0.2 | ND< 0.2 | ND< 0.2 | | | | | | |
| Endosulfan II | | | | ND< 0.2 | ND< 0.2 | ND< 0.2 | | | | | | |
| Endosulfan Sulfate | | | | ND< 0.2 | ND< 0.2 | ND< 0.2 | | | | | | |
| Endrin | | | | ND< 0.02 | ND< 0.02 | ND< 0.02 | | | | | | |
| Endrin Aldehyde | | | | ND< 0.02 | ND< 0.02 | ND< 0.02 | | | | | | |
| Gamma-BHC | | | | ND< 0.4 | ND< 0.4 | ND< 0.4 | | | | | | |
| Heptachlor | | | | ND< 0.005 | ND< 0.005 | ND< 0.005 | | | | | | |
| Heptachlor Epoxide | | | | ND< 0.005 | ND< 0.005 | ND< 0.005 | | | | | | |
| Methoxychlor | | | | ND< 1 | ND< 1 | ND< 1 | | | | | | |
| Toxaphene | | | | ND< 1 | ND< 1 | ND< 1 | | | | | | |
| Nickel | 17.7 | 19.7 | 19.7 | 63.5 | 61.9 | < 1.25 | 40.1 | 40.6 | 44.7 | 59.7 | 60.2 | 54 |
| Solids | 33 | 27 | 27 | 30 | 33 | 34 | 36 | 37 | 36 | 31 | 30 | 28 |
| Total Organic Carbon (Dry) | 24600 | 19000 | 19000 | 10200 | 10600 | 10700 | 25500 | 27500 | 17800 | 15000 | 16700 | 14700 |

All units in mg/kg, except solids which are in %.
T = Top of sediment
B = @ a depth of about 6"

CITY OF JAMESTOWN
SAMPLING RESULTS

SITE 3 (SEDIMENT)

| PARAMETER | Sta. 3.1 #40271 03/17/94 | Sta. 3.2 #40273 03/17/94 | Sta. 3.3 #40275 03/17/94 |
|---|---|---|---|
| Arsenic | 0.22 | < 0.125 | < 0.125 |
| Copper | 31 | 27.3 | 23 |
| Lead | 28.4 | 21.9 | 16.8 |
| Mercury | 0.08 | 0.12 | 0.08 |
| 4,4'-DDD | | | |
| 4,4'-DDE | | | |
| 4,4'-DDT | | | |
| Aldrin | | | |
| Alpha-BHC | | | |
| Aroclor-1016 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1221 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1232 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1242 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1248 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1254 | ND< 1 | ND< 1 | ND< 1 |
| Aroclor-1260 | ND< 1 | ND< 1 | ND< 1 |
| Beta-BHC | | | |
| Chlordane (Technical) | ND< 0.3 | ND< 0.3 | ND< 0.3 |
| Delta-BHC (Lindane) | | | |
| Dieldrin | | | |
| Endosulfan I | | | |
| Endosulfan II | | | |
| Endosulfan Sulfate | | | |
| Endrin | | | |
| Endrin Aldehyde | | | |
| Gamma-BHC | | | |
| Heptachlor | | | |
| Heptachlor Epoxide | | | |
| Methoxychlor | | | |
| Toxaphene | | | |
| Nickel | 48.5 | 58.7 | 48.5 |
| Solids | 44.3 | 31.6 | 30.7 |
| Total Organic Carbon (Dry) | 680 | 585 | 585 |

# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93107540

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: May 24, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 1/Walleye Fillet
SOURCE OF SAMPLE: 2 lbs. 4 oz. 15.5''
SAMPLE MATRIX: Solid

NOTE: Lake Cumberland Project

DATE OF COLLECTION: 03/30/93
COLLECTION TIME: Unknown
COLLECTED BY: CLIENT
DATE RECEIVED: 04/01/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93107540 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (ICP) | < | 1.1 | mg/Kg a r | 1.1 | Unk | Mod. SW6010 | 04/28/93 | MEC |
| Total Copper (ICP) | | 0.4 | mg/Kg a r | 0.1 | Unk | Mod. SW6010 | 04/26/93 | RTV |
| Total Lead (ICP) | | 1.2 | mg/Kg a r | 1 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| Total Mercury (Cold Vapor) | | 0.56 | mg/Kg a r | 0.1 | Unk | Mod. SW6010 | 05/03/93 | VDA/RTV |
| Total Nickel (ICP) | < | 0.2 | mg/Kg a r | 0.2 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| ORGANIC - PCB'S | | | | | | | | |
| PCB, Arochlor 1016/1242 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1221 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1232 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1248 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1254 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1260 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-Chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Chlordane | < | 0.160 | mg/Kg a r | 0.16 | Unk | SW8080 | 05/13/93 | LMO |
| Chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Cis-chlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Cis-nonachlor | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Gamma-chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Lipid, Total | | 2 | % Lipids | 1 | Unk | AOAC18.046 | 05/06/93 | JLH |
| Oxychlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Unk | SW3540 | 04/21/93 | JLH |
| Trans-chlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Trans-nonachlor | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |

2520 Regency Road
Lexington, Kentucky 40503-2921

(606) 276-3506
Fax: (606) 278-5665

# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93107541

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: May 24, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 1/Walleye Whole Body
SOURCE OF SAMPLE: 2 lbs. 4 oz. 15.5''
SAMPLE MATRIX: Solid

NOTE: Lake Cumberland Project

DATE OF COLLECTION: 03/30/93
COLLECTION TIME: Unknown
COLLECTED BY: CLIENT
DATE RECEIVED: 04/01/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93107541 | | | | | | | | |
| METALS | | | | | | | | |
| tal Arsenic (ICP) | < | 1.1 | mg/Kg a r | 1.1 | Unk | Mod. SW6010 | 04/28/93 | MEC |
| Total Copper (ICP) | | 0.4 | mg/Kg a r | 0.1 | Unk | Mod. SW6010 | 04/26/93 | RTV |
| Total Lead (ICP) | < | 1 | mg/Kg a r | 1 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| Total Mercury (Cold Vapor) | | 0.37 | mg/Kg a r | 0.13 | Unk | Mod. SW6010 | 05/03/93 | VDA/RTV |
| Total Nickel (ICP) | < | 0.2 | mg/Kg a r | 0.2 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| ORGANIC - PCB'S | | | | | | | | |
| PCB, Arochlor 1016/1242 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1221 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1232 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1248 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1254 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1260 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-Chlordene | < | 0.350 | mg/Kg a r | 0.35 | Unk | SW8080 | 05/17/93 | LMO |
| Chlordane | < | 0.350 | mg/Kg a r | 0.35 | Unk | SW8080 | 05/17/93 | LMO |
| Chlordene | < | 0.350 | mg/Kg a r | 0.35 | Unk | SW8080 | 05/17/93 | LMO |
| Cis-chlordane | < | 0.350 | mg/Kg a r | 0.35 | Unk | SW8080 | 05/17/93 | LMO |
| Cis-nonachlor | < | 0.350 | mg/Kg a r | 0.35 | Unk | SW8080 | 05/17/93 | LMO |
| Gamma-chlordene | < | 0.350 | mg/Kg a r | 0.35 | Unk | SW8080 | 05/17/93 | LMO |
| Lipid, Total | | 8 | % Lipids | 1 | Unk | AOAC18.046 | 05/06/93 | JLH |
| Oxychlordane | < | 0.350 | mg/Kg a r | 0.35 | Unk | SW8080 | 05/17/93 | LMO |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Unk | SW3540 | 04/21/93 | JLH |
| Trans-chlordane | < | 0.350 | mg/Kg a r | 0.35 | Unk | SW8080 | 05/17/93 | LMO |
| Trans-nonachlor | < | 0.350 | mg/Kg a r | 0.35 | Unk | SW8080 | 05/17/93 | LMO |

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Fax: (606) 278-5665

# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93107545

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: May 24, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 1/Walleye Whole Body
SOURCE OF SAMPLE: 2 lbs. 4 oz. 15.5''
SAMPLE MATRIX: Solid

NOTE: Lake Cumberland Project

DATE OF COLLECTION: 04/01/93
COLLECTION TIME: Unknown
COLLECTED BY: CLIENT
DATE RECEIVED: 04/01/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93107545 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (ICP) | < | 1.0 | mg/Kg a r | 1 | Unk | Mod. SW6010 | 04/28/93 | MEC |
| Total Copper (ICP) | | 0.3 | mg/Kg a r | 0.1 | Unk | Mod. SW6010 | 04/26/93 | RTV |
| Total Lead (ICP) | < | 0.99 | mg/Kg a r | 0.99 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| Total Mercury (Cold Vapor) | | 1.2 | mg/Kg a r | 0.13 | Unk | Mod. SW6010 | 05/03/93 | VDA/RTV |
| Total Nickel (ICP) | < | 0.2 | mg/Kg a r | 0.2 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| ORGANIC - PCB'S | | | | | | | | |
| PCB, Arochlor 1016/1242 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1221 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1232 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1248 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1254 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1260 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-Chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Chlordane | < | 0.350 | mg/Kg a r | 0.35 | Unk | SW8080 | 05/17/93 | LMO |
| Chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Cis-chlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Cis-nonachlor | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Gamma-chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Lipid, Total | | 12 | % Lipids | 1 | Unk | AOAC18.046 | 05/06/93 | JLH |
| Oxychlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Unk | SW3540 | 04/23/93 | JLH |
| Trans-chlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Trans-nonachlor | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |

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COMMONWEALTH TECHNOLOGY, INC.
*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93107546

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: May 24, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 1/Walleye Fillet
SOURCE OF SAMPLE: 2 lbs. 6 oz. 15.5''
SAMPLE MATRIX: Solid

NOTE: Lake Cumberland Project

DATE OF COLLECTION: Unknown
COLLECTION TIME: Unknown
COLLECTED BY: CLIENT
DATE RECEIVED: 04/01/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93107546 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (ICP) | < | 1.1 | mg/Kg a r | 1.1 | Unk | Mod. SW6010 | 04/28/93 | MEC |
| Total Copper (ICP) | | 0.6 | mg/Kg a r | 0.1 | Unk | Mod. SW6010 | 04/26/93 | RTV |
| Total Lead (ICP) | < | 1.0 | mg/Kg a r | 1 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| Total Mercury (Cold Vapor) | | 0.49 | mg/Kg a r | 0.1 | Unk | Mod. SW6010 | 05/05/93 | VDA |
| Total Nickel (ICP) | < | 0.2 | mg/Kg a r | 0.2 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| ORGANIC - PCB'S | | | | | | | | |
| PCB, Arochlor 1016/1242 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1221 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1232 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1248 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1254 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1260 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-Chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Chlordane | < | 0.160 | mg/Kg a r | 0.16 | Unk | SW8080 | 05/13/93 | LMO |
| Chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Cis-chlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Cis-nonachlor | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Gamma-chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Lipid, Total | | 14 | % Lipids | 1 | Unk | AOAC18.046 | 05/06/93 | JLH |
| Oxychlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Unk | SW3540 | 04/23/93 | JLH |
| Trans-chlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Trans-nonachlor | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |

# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93107543

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: May 24, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 1/Walleye Whole Body
SOURCE OF SAMPLE: 2 lbs. 4 oz. 16.5''
SAMPLE MATRIX: Solid

NOTE: Lake Cumberland Project

DATE OF COLLECTION: 04/01/93
COLLECTION TIME: Unknown
COLLECTED BY: CLIENT
DATE RECEIVED: 04/01/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93107543 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (ICP) | < | 0.94 | mg/Kg a r | 0.94 | Unk | Mod. SW6010 | 04/28/93 | MEC |
| Total Copper (ICP) | | 0.5 | mg/Kg a r | 0.1 | Unk | Mod. SW6010 | 04/26/93 | RTV |
| Total Lead (ICP) | | 1.0 | mg/Kg a r | 1 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| Total Mercury (Cold Vapor) | | 0.64 | mg/Kg a r | 0.1 | Unk | Mod. SW6010 | 05/03/93 | VDA/RTV |
| Total Nickel (ICP) | < | 0.2 | mg/Kg a r | 0.2 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| ORGANIC - PCB'S | | | | | | | | |
| PCB, Arochlor 1016/1242 | < | 0.240 | mg/Kg a r | 0.24 | Unk | SW8080 | 05/04/93 | KRH |
| PCB, Arochlor 1221 | < | 0.240 | mg/Kg a r | 0.24 | Unk | SW8080 | 05/04/93 | KRH |
| PCB, Arochlor 1232 | < | 0.240 | mg/Kg a r | 0.24 | Unk | SW8080 | 05/04/93 | KRH |
| PCB, Arochlor 1248 | < | 0.240 | mg/Kg a r | 0.24 | Unk | SW8080 | 05/04/93 | KRH |
| PCB, Arochlor 1254 | < | 0.240 | mg/Kg a r | 0.24 | Unk | SW8080 | 05/04/93 | KRH |
| PCB, Arochlor 1260 | | 1.1 | mg/Kg a r | 0.24 | Unk | SW8080 | 05/04/93 | KRH |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-Chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Chlordane | < | 0.250 | mg/Kg a r | 0.25 | Unk | SW8080 | 05/17/93 | LMO |
| Chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Cis-chlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Cis-nonachlor | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Gamma-chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Lipid, Total | | 8 | % Lipids | 1 | Unk | AOAC18.046 | 05/06/93 | JLH |
| Oxychlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Unk | SW3540 | 04/21/93 | JLH |
| Trans-chlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Trans-nonachlor | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |

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COMMONWEALTH TECHNOLOGY, INC.
*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93107544

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: May 24, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 1/Walleye Fillet
SOURCE OF SAMPLE: 2 lbs. 4 oz. 16.5''
SAMPLE MATRIX: Solid

NOTE: Lake Cumberland Project

DATE OF COLLECTION: 04/01/93
COLLECTION TIME: Unknown
COLLECTED BY: CLIENT
DATE RECEIVED: 04/01/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93107544 | | | | | | | | |
| METALS | | | | | | | | |
| tal Arsenic (ICP) | < | 1.0 | mg/Kg a r | 1 | Unk | Mod. SW6010 | 04/28/93 | MEC |
| Total Copper (ICP) | | 0.3 | mg/Kg a r | 0.1 | Unk | Mod. SW6010 | 04/26/93 | RTV |
| Total Lead (ICP) | < | 0.99 | mg/Kg a r | 0.99 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| Total Mercury (Cold Vapor) | | 1.1 | mg/Kg a r | 0.09 | Unk | Mod. SW6010 | 05/03/93 | VDA/RTV |
| Total Nickel (ICP) | < | 0.2 | mg/Kg a r | 0.2 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| ORGANIC - PCB'S | | | | | | | | |
| PCB, Arochlor 1016/1242 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1221 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1232 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1248 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1254 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1260 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-Chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Chlordane | < | 0.065 | mg/Kg a r | 0.065 | Unk | SW8080 | 05/13/93 | LMO |
| Chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Cis-chlordane | < | 0.080 | mg/Kg a r | 0.08 | Grab | SW8080 | 05/13/93 | LMO |
| Cis-nonachlor | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Gamma-chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Lipid, Total | | 2 | % Lipids | 1 | Unk | AOAC18.046 | 05/06/93 | JLH |
| Oxychlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Unk | SW3540 | 04/23/93 | JLH |
| Trans-chlordane | < | 0.080 | mg/Kg a r | 0.08 | Grab | SW8080 | 05/13/93 | LMO |
| Trans-nonachlor | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |

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# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93107542

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: May 24, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 1/Longnose Gar Whole Body
SOURCE OF SAMPLE: 15 lbs. 4 oz.
SAMPLE MATRIX: Solid

NOTE: Lake Cumberland Project

DATE OF COLLECTION: 03/31/93
COLLECTION TIME: Unknown
COLLECTED BY: CLIENT
DATE RECEIVED: 04/01/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93107542 | | | | | | | | |
| METALS | | | | | | | | |
| tal Arsenic (ICP) | < | 0.95 | mg/Kg a r | 0.95 | Unk | Mod. SW6010 | 04/28/93 | MEC |
| Total Copper (ICP) | | 0.4 | mg/Kg a r | 0.1 | Unk | Mod. SW6010 | 04/26/93 | RTV |
| Total Lead (ICP) | | 1.0 | mg/Kg a r | 1 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| Total Mercury (Cold Vapor) | | 0.38 | mg/Kg a r | 0.09 | Unk | Mod. SW6010 | 05/03/93 | VDA/RTV |
| Total Nickel (ICP) | | 0.4 | mg/Kg a r | 0.2 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| ORGANIC - PCB'S | | | | | | | | |
| PCB, Arochlor 1016/1242 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1221 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1232 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1248 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1254 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| PCB, Arochlor 1260 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/28/93 | KRH |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-Chlordene | < | 0.250 | mg/Kg a r | 0.25 | Unk | SW8080 | 05/17/93 | LMO |
| Chlordane | < | 1.25 | mg/Kg a r | 1.25 | Unk | SW8080 | 05/17/93 | LMO |
| Chlordene | < | 0.250 | mg/Kg a r | 0.25 | Unk | SW8080 | 05/17/93 | LMO |
| Cis-chlordane | < | 0.250 | mg/Kg a r | 0.25 | Unk | SW8080 | 05/17/93 | LMO |
| Cis-nonachlor | < | 0.250 | mg/Kg a r | 0.25 | Unk | SW8080 | 05/17/93 | LMO |
| Gamma-chlordene | < | 0.250 | mg/Kg a r | 0.25 | Unk | SW8080 | 05/17/93 | LMO |
| Lipid, Total | | 20 | % Lipids | 1 | Unk | AOAC18.046 | 05/06/93 | JLH |
| Oxychlordane | < | 0.250 | mg/Kg a r | 0.25 | Unk | SW8080 | 05/17/93 | LMO |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Unk | SW3540 | 04/21/93 | JLH |
| Trans-chlordane | < | 0.250 | mg/Kg a r | 0.25 | Unk | SW8080 | 05/17/93 | LMO |
| Trans-nonachlor | < | 0.250 | mg/Kg a r | 0.25 | Unk | SW8080 | 05/17/93 | LMO |

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# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93107547

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: May 24, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 1-2/Walleye Whole Body
SOURCE OF SAMPLE: 2 lbs. 6 oz. 15.5''
SAMPLE MATRIX: Solid

NOTE: Lake Cumberland Project

DATE OF COLLECTION: Unknown
COLLECTION TIME: Unknown
COLLECTED BY: CLIENT
DATE RECEIVED: 04/01/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93107547 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (ICP) | < | 1.1 | mg/Kg a r | 1.1 | Unk | Mod. SW6010 | 04/28/93 | MEC |
| Total Copper (ICP) | | 0.3 | mg/Kg a r | 0.1 | Unk | Mod. SW6010 | 04/26/93 | RTV |
| Total Lead (ICP) | < | 0.98 | mg/Kg a r | 0.98 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| Total Mercury (Cold Vapor) | | 0.27 | mg/Kg a r | 0.1 | Unk | Mod. SW6010 | 05/05/93 | VDA |
| Total Nickel (ICP) | < | 0.2 | mg/Kg a r | 0.2 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| ORGANIC - PCB'S | | | | | | | | |
| PCB, Arochlor 1016/1242 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/03/93 | KRH |
| PCB, Arochlor 1221 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/03/93 | KRH |
| PCB, Arochlor 1232 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/03/93 | KRH |
| PCB, Arochlor 1248 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/03/93 | KRH |
| PCB, Arochlor 1254 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/03/93 | KRH |
| PCB, Arochlor 1260 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/03/93 | KRH |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-Chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Chlordane | < | 0.250 | mg/Kg a r | 0.25 | Unk | SW8080 | 05/17/93 | LMO |
| Chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Cis-chlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Cis-nonachlor | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Gamma-chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Lipid, Total | | 8 | % Lipids | 1 | Unk | AOAC18.046 | 05/06/93 | JLH |
| Oxychlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Unk | SW3540 | 04/23/93 | JLH |
| Trans-chlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Trans-nonachlor | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |

2520 Regency Road
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(606) 276-3506
Fax: (606) 278-5665

# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93107548

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: May 24, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 1-3/Walleye Fillet
SOURCE OF SAMPLE: 2 lbs. 4 oz. 15.5''
SAMPLE MATRIX: Solid

NOTE: Lake Cumberland Project

DATE OF COLLECTION: 04/01/93
COLLECTION TIME: Unknown
COLLECTED BY: CLIENT
DATE RECEIVED: 04/01/93

## REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93107548 | | | | | | | | |
| METALS | | | | | | | | |
| tal Arsenic (ICP) | < | 0.89 | mg/Kg a r | 0.89 | Unk | Mod. SW6010 | 04/28/93 | MEC |
| Total Copper (ICP) | | 0.3 | mg/Kg a r | 0.1 | Unk | Mod. SW6010 | 04/26/93 | RTV |
| Total Lead (ICP) | < | 1.0 | mg/Kg a r | 1 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| Total Mercury (Cold Vapor) | | 0.37 | mg/Kg a r | 0.11 | Unk | Mod. SW6010 | 05/05/93 | VDA |
| Total Nickel (ICP) | < | 0.2 | mg/Kg a r | 0.2 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| ORGANIC - PCB'S | | | | | | | | |
| PCB, Arochlor 1016/1242 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/30/93 | KRH |
| PCB, Arochlor 1221 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/30/93 | KRH |
| PCB, Arochlor 1232 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/30/93 | KRH |
| PCB, Arochlor 1248 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/30/93 | KRH |
| PCB, Arochlor 1254 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/30/93 | KRH |
| PCB, Arochlor 1260 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 04/30/93 | KRH |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-Chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Chlordane | < | 0.350 | mg/Kg a r | 0.35 | Unk | SW8080 | 05/13/93 | LMO |
| Chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Cis-chlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Cis-nonachlor | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Gamma-chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Lipid, Total | | 2 | % Lipids | 1 | Unk | AOAC18.046 | 05/06/93 | JLH |
| Oxychlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Unk | SW3540 | 04/21/93 | JLH |
| Trans-chlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Trans-nonachlor | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |

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# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93107549

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: May 24, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 4/Walleye Whole Body
SOURCE OF SAMPLE: 2 lbs. 6 oz. 16''
SAMPLE MATRIX: Solid

NOTE: Lake Cumberland Project

DATE OF COLLECTION: 03/30/93
COLLECTION TIME: Unknown
COLLECTED BY: CLIENT
DATE RECEIVED: 04/01/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93107549 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (ICP) | < | 1.1 | mg/Kg a r | 1.1 | Unk | Mod. SW6010 | 04/28/93 | MEC |
| Total Copper (ICP) | | 0.34 | mg/Kg a r | 0.01 | Unk | Mod. SW6010 | 04/26/93 | RTV |
| Total Lead (ICP) | | 1.50 | mg/Kg a r | 0.99 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| Total Mercury (Cold Vapor) | | 0.63 | mg/Kg a r | 0.12 | Unk | Mod. SW6010 | 05/05/93 | VDA |
| Total Nickel (ICP) | | 0.2 | mg/Kg a r | 0.2 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| ORGANIC - PCB'S | | | | | | | | |
| PCB, Arochlor 1016/1242 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/07/93 | KRH |
| PCB, Arochlor 1221 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/07/93 | KRH |
| PCB, Arochlor 1232 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/07/93 | KRH |
| PCB, Arochlor 1248 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/07/93 | KRH |
| PCB, Arochlor 1254 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/07/93 | KRH |
| PCB, Arochlor 1260 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/07/93 | KRH |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-Chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Chlordane | < | 0.250 | mg/Kg a r | 0.25 | Unk | SW8080 | 05/17/93 | LMO |
| Chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Cis-chlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Cis-nonachlor | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Gamma-chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Lipid, Total | | 18 | % Lipids | 1 | Unk | AOAC18.046 | 05/06/93 | JLH |
| Oxychlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Unk | SW3540 | 04/22/93 | JLH |
| Trans-chlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Trans-nonachlor | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |

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# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93107550

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: May 24, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 4/Walleye Fillet
SOURCE OF SAMPLE: 2 lbs. 6 oz. 16''
SAMPLE MATRIX: Solid

NOTE: Lake Cumberland Project

DATE OF COLLECTION: 03/30/93
COLLECTION TIME: Unknown
COLLECTED BY: CLIENT
DATE RECEIVED: 04/01/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93107550 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (ICP) | < | 1.1 | mg/Kg a r | 1.1 | Unk | Mod. SW6010 | 04/28/93 | MEC |
| Total Copper (ICP) | | 0.51 | mg/Kg a r | 0.01 | Unk | Mod. SW6010 | 04/26/93 | RTV |
| Total Lead (ICP) | < | 1.0 | mg/Kg a r | 1 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| Total Mercury (Cold Vapor) | | 0.27 | mg/Kg a r | 0.11 | Unk | Mod. SW6010 | 05/05/93 | VDA |
| Total Nickel (ICP) | | 0.2 | mg/Kg a r | 0.2 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| ORGANIC - PCB'S | | | | | | | | |
| PCB, Arochlor 1016/1242 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/05/93 | KRH |
| PCB, Arochlor 1221 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/05/93 | KRH |
| PCB, Arochlor 1232 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/05/93 | KRH |
| PCB, Arochlor 1248 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/05/93 | KRH |
| PCB, Arochlor 1254 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/05/93 | KRH |
| PCB, Arochlor 1260 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/05/93 | KRH |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-Chlordene | < | 0.040 | mg/Kg a r | 0.04 | Unk | SW8080 | 05/17/93 | LMO |
| Chlordane | < | 0.160 | mg/Kg a r | 0.16 | Unk | SW8080 | 05/17/93 | LMO |
| Chlordene | < | 0.040 | mg/Kg a r | 0.04 | Unk | SW8080 | 05/17/93 | LMO |
| Cis-chlordane | < | 0.040 | mg/Kg a r | 0.04 | Unk | SW8080 | 05/17/93 | LMO |
| Cis-nonachlor | < | 0.040 | mg/Kg a r | 0.04 | Unk | SW8080 | 05/17/93 | LMO |
| Gamma-chlordene | < | 0.040 | mg/Kg a r | 0.04 | Unk | SW8080 | 05/17/93 | LMO |
| Lipid, Total | | 2 | % Lipids | 1 | Unk | AOAC18.046 | 05/06/93 | JLH |
| Oxychlordane | < | 0.040 | mg/Kg a r | 0.04 | Unk | SW8080 | 05/17/93 | LMO |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Unk | SW3540 | 04/22/93 | JLH |
| Trans-chlordane | < | 0.040 | mg/Kg a r | 0.04 | Unk | SW8080 | 05/17/93 | LMO |
| Trans-nonachlor | < | 0.040 | mg/Kg a r | 0.04 | Unk | SW8080 | 05/17/93 | LMO |

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COMMONWEALTH TECHNOLOGY, INC.
*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93107551

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: May 24, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 4/Longnose Gar Whole Body
SOURCE OF SAMPLE: 7 lbs. 8 oz.
SAMPLE MATRIX: Solid

NOTE: Lake Cumberland Project

DATE OF COLLECTION: 03/31/93
COLLECTION TIME: Unknown
COLLECTED BY: CLIENT
DATE RECEIVED: 04/01/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93107551 | | | | | | | | |
| METALS | | | | | | | | |
| otal Arsenic (ICP) | < | 0.98 | mg/Kg a r | 0.98 | Unk | Mod. SW6010 | 04/28/93 | MEC |
| Total Copper (ICP) | | 0.56 | mg/Kg a r | 0.01 | Unk | Mod. SW6010 | 04/26/93 | RTV |
| Total Lead (ICP) | < | 0.99 | mg/Kg a r | 0.99 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| Total Mercury (Cold Vapor) | | 0.48 | mg/Kg a r | 0.14 | Unk | Mod. SW6010 | 05/05/93 | VDA |
| Total Nickel (ICP) | | 0.6 | mg/Kg a r | 0.2 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| ORGANIC - PCB'S | | | | | | | | |
| PCB, Arochlor 1016/1242 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/03/93 | KRH |
| PCB, Arochlor 1221 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/03/93 | KRH |
| PCB, Arochlor 1232 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/03/93 | KRH |
| PCB, Arochlor 1248 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/03/93 | KRH |
| PCB, Arochlor 1254 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/03/93 | KRH |
| PCB, Arochlor 1260 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/03/93 | KRH |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-Chlordene | < | 0.160 | mg/Kg a r | 0.16 | Unk | SW8080 | 05/13/93 | LMO |
| Chlordane | < | 0.600 | mg/Kg a r | 0.6 | Unk | SW8080 | 05/13/93 | LMO |
| Chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Cis-chlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Cis-nonachlor | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Gamma-chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Lipid, Total | | 20 | % Lipids | 1 | Unk | AOAC18.046 | 05/06/93 | JLH |
| Oxychlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Unk | SW3540 | 04/23/93 | JLH |
| Trans-chlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |
| Trans-nonachlor | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/13/93 | LMO |

COMMONWEALTH TECHNOLOGY, INC.
*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93107552

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: May 24, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 4/Longnose Gar Whole Body
SOURCE OF SAMPLE: 5 lbs. 12 oz. 34.5''
SAMPLE MATRIX: Solid

NOTE: Lake Cumberland Project

DATE OF COLLECTION: 04/01/93
COLLECTION TIME: Unknown
COLLECTED BY: CLIENT
DATE RECEIVED: 04/01/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93107552 | | | | | | | | |
| METALS | | | | | | | | |
| otal Arsenic (ICP) | < | 1.0 | mg/Kg a r | 1 | Unk | Mod. SW6010 | 04/28/93 | MEC |
| Total Copper (ICP) | | 0.50 | mg/Kg a r | 0.01 | Unk | Mod. SW6010 | 04/26/93 | RTV |
| Total Lead (ICP) | < | 0.98 | mg/Kg a r | 0.98 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| Total Mercury (Cold Vapor) | | 0.47 | mg/Kg a r | 0.12 | Unk | Mod. SW6010 | 05/05/93 | VDA |
| Total Nickel (ICP) | | 0.5 | mg/Kg a r | 0.2 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| ORGANIC - PCB'S | | | | | | | | |
| PCB, Arochlor 1016/1242 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/07/93 | KRH |
| PCB, Arochlor 1221 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/07/93 | KRH |
| PCB, Arochlor 1232 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/07/93 | KRH |
| PCB, Arochlor 1248 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/07/93 | KRH |
| PCB, Arochlor 1254 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/07/93 | KRH |
| PCB, Arochlor 1260 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/07/93 | KRH |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-Chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Chlordane | < | 0.350 | mg/Kg a r | 0.35 | Unk | SW8080 | 05/17/93 | LMO |
| Chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Cis-chlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Cis-nonachlor | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Gamma-chlordene | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Lipid, Total | | 11 | % Lipids | 1 | Unk | AOAC18.046 | 05/06/93 | JLH |
| Oxychlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Unk | SW3540 | 04/22/93 | JLH |
| Trans-chlordane | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |
| Trans-nonachlor | < | 0.080 | mg/Kg a r | 0.08 | Unk | SW8080 | 05/17/93 | LMO |

# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93107553

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: May 24, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 4/G. Shad
SOURCE OF SAMPLE: 8-4''
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 04/01/93
COLLECTION TIME: Unknown
COLLECTED BY: CLIENT
DATE RECEIVED: 04/01/93

NOTE: Lake Cumberland Project

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93107553 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (ICP) | < | 4.95 | mg/Kg a r | 4.95 | Unk | Mod. SW6010 | 04/28/93 | MEC |
| Total Copper (ICP) | | 37 | mg/Kg a r | 0.01 | Unk | Mod. SW6010 | 04/26/93 | RTV |
| Total Lead (ICP) | | 2.0 | mg/Kg a r | 1 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| Total Mercury (Cold Vapor) | | 0.44 | mg/Kg a r | 0.1 | Unk | Mod. SW6010 | 05/05/93 | VDA |
| Total Nickel (ICP) | | 5.3 | mg/Kg a r | 0.2 | Unk | Mod. SW6010 | 04/27/93 | RTV |
| ORGANIC - PCB'S | | | | | | | | |
| PCB, Arochlor 1016/1242 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/05/93 | KRH |
| PCB, Arochlor 1221 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/05/93 | KRH |
| PCB, Arochlor 1232 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/05/93 | KRH |
| PCB, Arochlor 1248 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/05/93 | KRH |
| PCB, Arochlor 1254 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/05/93 | KRH |
| PCB, Arochlor 1260 | < | 0.060 | mg/Kg a r | 0.06 | Unk | SW8080 | 05/05/93 | KRH |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-Chlordene | < | 0.125 | mg/Kg a r | 0.125 | Unk | SW8080 | 05/17/93 | LMO |
| Chlordane | < | 0.900 | mg/Kg a r | 0.9 | Unk | SW8080 | 05/17/93 | LMO |
| Chlordene | < | 0.125 | mg/Kg a r | 0.125 | Unk | SW8080 | 05/17/93 | LMO |
| Cis-chlordane | < | 0.125 | mg/Kg a r | 0.125 | Unk | SW8080 | 05/17/93 | LMO |
| Cis-nonachlor | < | 0.125 | mg/Kg a r | 0.125 | Unk | SW8080 | 05/17/93 | LMO |
| Gamma-chlordene | < | 0.125 | mg/Kg a r | 0.125 | Unk | SW8080 | 05/17/93 | LMO |
| Lipid, Total | | 6 | % Lipids | 1 | Unk | AOAC18.046 | 05/06/93 | JLH |
| Oxychlordane | < | 0.125 | mg/Kg a r | 0.125 | Unk | SW8080 | 05/17/93 | LMO |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Unk | SW3540 | 04/22/93 | JLH |
| Trans-chlordane | < | 0.125 | mg/Kg a r | 0.125 | Unk | SW8080 | 05/17/93 | LMO |
| Trans-nonachlor | < | 0.125 | mg/Kg a r | 0.125 | Unk | SW8080 | 05/17/93 | LMO |

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Fax: (606) 278-5665

# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93113676

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: August 10, 1993

P. O. NO: N/A

SAMPLE ID: Long Nose Gar/Whole Body
SOURCE OF SAMPLE: 24''-1.5 lbs.
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 05/12/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 05/13/93

NOTE: Lake Cumberland Project
NOTE: Sample Submitted For Lab Analysis On July 12, 1993

## REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93113676 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (Furnace) | | 3.8 | mg/Kg a r | 0.05 | Grab | SW7060 | 07/27/93 | VDA |
| Total Copper (ICP) | | 1.78 | mg/Kg a r | 0.25 | Grab | SW6010 | 07/19/93 | RTV |
| Total Lead (ICP) | < | 2.5 | mg/Kg a r | 2.5 | Grab | SW6010 | 07/26/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.167 | mg/Kg a r | 0.167 | Grab | SW7471 | 07/21/93 | RTV |
| Total Nickel (ICP) | | 3.2 | mg/Kg a r | 0.5 | Grab | SW6010 | 07/19/93 | VDA |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.076 | mg/Kg a r | 0.076 | Grab | SW8080 | 08/03/93 | XSQ |
| Aroclor-1016 | < | 0.240 | mg/Kg a r | 0.24 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1221 | < | 0.240 | mg/Kg a r | 0.24 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1232 | < | 0.240 | mg/Kg a r | 0.24 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1242 | < | 0.240 | mg/Kg a r | 0.24 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1248 | < | 0.240 | mg/Kg a r | 0.24 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1254 | < | 0.240 | mg/Kg a r | 0.24 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1260 | < | 0.240 | mg/Kg a r | 0.24 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Chlordane | < | 0.076 | mg/Kg a r | 0.076 | Grab | SW8080 | 08/03/93 | XSQ |
| Chlordene | < | 0.076 | mg/Kg a r | 0.076 | Grab | SW8080 | 08/03/93 | XSQ |
| Cis-chlordane | < | 0.195 | mg/Kg a r | 0.195 | Grab | SW8080 | 08/03/93 | XSQ |
| Cis-nonachlor | < | 0.076 | mg/Kg a r | 0.076 | Grab | SW8080 | 08/03/93 | XSQ |
| Gamma-chlordene | < | 0.076 | mg/Kg a r | 0.076 | Grab | SW8080 | 08/03/93 | XSQ |
| Lipids, Total | | 72 | % Lipids | 1 | Grab | AOAC18.046 | 07/15/93 | JLH |
| Oxychlordane | < | 0.076 | mg/Kg a r | 0.076 | Grab | SW8080 | 08/03/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab | SW3540 | 07/15/93 | JHL |
| Trans-chlordane | < | 0.076 | mg/Kg a r | 0.076 | Grab | SW8080 | 08/03/93 | XSQ |
| Trans-nonachlor | < | 0.076 | mg/Kg a r | 0.076 | Grab | SW8080 | 08/03/93 | XSQ |

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# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

CCT#: CKENC

CTI LAB NO: 93113677

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: August 10, 1993

P. O. NO: N/A

SAMPLE ID: Walleye/Whole Body
SOURCE OF SAMPLE: 15.5''-2 lbs.
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 05/11/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 05/13/93

NOTE: Lake Cumberland Project
NOTE: Sample Submitted For Lab Analysis On July 12, 1993

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93113677 | | | | | | | | |
| METALS | | | | | | | | |
| tal Arsenic (Furnace) | | 0.27 | mg/Kg a r | 0.05 | Grab | SW7060 | 07/27/93 | VDA |
| Total Copper (ICP) | | 0.56 | mg/Kg a r | 0.25 | Grab | SW6010 | 07/19/93 | RTV |
| Total Lead (ICP) | < | 2.5 | mg/Kg a r | 2.5 | Grab | SW6010 | 07/26/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.167 | mg/Kg a r | 0.167 | Grab | SW7471 | 07/21/93 | RTV |
| Total Nickel (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Grab | SW6010 | 07/19/93 | VDA |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.048 | mg/Kg a r | 0.048 | Grab | SW8080 | 08/03/93 | XSQ |
| Aroclor-1016 | < | 0.243 | mg/Kg a r | 0.243 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1221 | < | 0.243 | mg/Kg a r | 0.243 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1232 | < | 0.243 | mg/Kg a r | 0.243 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1242 | < | 0.243 | mg/Kg a r | 0.243 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1248 | < | 0.243 | mg/Kg a r | 0.243 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1254 | | 0.518 | mg/Kg a r | 0.243 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1260 | < | 0.243 | mg/Kg a r | 0.243 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Chlordane | < | 0.076 | mg/Kg a r | 0.076 | Grab | SW8080 | 08/03/93 | XSQ |
| Chlordene | < | 0.048 | mg/Kg a r | 0.048 | Grab | SW8080 | 08/03/93 | XSQ |
| Cis-chlordane | < | 0.048 | mg/Kg a r | 0.048 | Grab | SW8080 | 08/03/93 | XSQ |
| Cis-nonachlor | < | 0.048 | mg/Kg a r | 0.048 | Grab | SW8080 | 08/03/93 | XSQ |
| Gamma-chlordene | < | 0.048 | mg/Kg a r | 0.048 | Grab | SW8080 | 08/03/93 | XSQ |
| Lipids, Total | | 21 | % Lipids | 1 | Grab | AOAC18.046 | 07/15/93 | JLH |
| Oxychlordane | < | 0.048 | mg/Kg a r | 0.048 | Grab | SW8080 | 08/03/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab | SW3540 | 07/15/93 | JHL |
| Trans-chlordane | < | 0.048 | mg/Kg a r | 0.048 | Grab | SW8080 | 08/03/93 | XSQ |
| Trans-nonachlor | < | 0.048 | mg/Kg a r | 0.048 | Grab | SW8080 | 08/03/93 | XSQ |

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# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93113678

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: August 10, 1993

P. O. NO: N/A

SAMPLE ID: Walleye/Whole Body
SOURCE OF SAMPLE: 18''-3 lbs. 4 oz.
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 05/11/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 05/13/93

NOTE: Lake Cumberland Project
NOTE: Sample Submitted For Lab Analysis On July 12, 1993

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93113678 | | | | | | | | |
| METALS | | | | | | | | |
| tal Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Grab | SW7060 | 08/03/93 | RTV |
| Total Copper (ICP) | | 2.56 | mg/Kg a r | 0.25 | Grab | SW6010 | 07/19/93 | RTV |
| Total Lead (ICP) | < | 2.5 | mg/Kg a r | 2.5 | Grab | SW6010 | 07/26/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.167 | mg/Kg a r | 0.167 | Grab | SW7471 | 07/21/93 | RTV |
| Total Nickel (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Grab | SW6010 | 07/19/93 | VDA |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.075 | mg/Kg a r | 0.075 | Grab | SW8080 | 08/03/93 | XSQ |
| Aroclor-1016 | < | 0.120 | mg/Kg a r | 0.12 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1221 | < | 0.120 | mg/Kg a r | 0.12 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1232 | < | 0.120 | mg/Kg a r | 0.12 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1242 | < | 0.120 | mg/Kg a r | 0.12 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1248 | < | 0.120 | mg/Kg a r | 0.12 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1254 | | 0.295 | mg/Kg a r | 0.12 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1260 | < | 0.120 | mg/Kg a r | 0.12 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Chlordane | < | 0.075 | mg/Kg a r | 0.075 | Grab | SW8080 | 08/03/93 | XSQ |
| Chlordene | < | 0.075 | mg/Kg a r | 0.075 | Grab | SW8080 | 08/03/93 | XSQ |
| Cis-chlordane | < | 0.075 | mg/Kg a r | 0.075 | Grab | SW8080 | 08/03/93 | XSQ |
| Cis-nonachlor | < | 0.075 | mg/Kg a r | 0.075 | Grab | SW8080 | 08/03/93 | XSQ |
| Gamma-chlordene | < | 0.075 | mg/Kg a r | 0.075 | Grab | SW8080 | 08/03/93 | XSQ |
| Lipids, Total | | 11 | % Lipids | 1 | Grab | AOAC18.046 | 07/15/93 | JLH |
| Oxychlordane | < | 0.075 | mg/Kg a r | 0.075 | Grab | SW8080 | 08/03/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab | SW3540 | 07/15/93 | JHL |
| Trans-chlordane | < | 0.075 | mg/Kg a r | 0.075 | Grab | SW8080 | 08/03/93 | XSQ |
| Trans-nonachlor | < | 0.075 | mg/Kg a r | 0.075 | Grab | SW8080 | 08/03/93 | XSQ |

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# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93113679

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: August 10, 1993

P. O. NO: N/A

SAMPLE ID: Walleye/Fillet
SOURCE OF SAMPLE: 15.5''-2 lbs.
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 05/11/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 05/13/93

NOTE: Lake Cumberland Project
NOTE: Sample Submitted For Lab Analysis On July 12, 1993

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93113679 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Grab | SW7060 | 08/03/93 | RTV |
| Total Copper (ICP) | < | 0.25 | mg/Kg a r | 0.25 | Grab | SW6010 | 07/19/93 | RTV |
| Total Lead (ICP) | < | 2.5 | mg/Kg a r | 2.5 | Grab | SW6010 | 07/26/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.167 | mg/Kg a r | 0.167 | Grab | SW7471 | 07/21/93 | RTV |
| Total Nickel (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Grab | SW6010 | 07/19/93 | VDA |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/03/93 | XSQ |
| Aroclor-1016 | < | 0.121 | mg/Kg a r | 0.121 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1221 | < | 0.121 | mg/Kg a r | 0.121 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1232 | < | 0.121 | mg/Kg a r | 0.121 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1242 | < | 0.121 | mg/Kg a r | 0.121 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1248 | < | 0.121 | mg/Kg a r | 0.121 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1254 | < | 0.121 | mg/Kg a r | 0.121 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Aroclor-1260 | < | 0.121 | mg/Kg a r | 0.121 | Grab | SW8080 | 07/21/93 | JMR/XSQ |
| Chlordane | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/03/93 | XSQ |
| Chlordene | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/03/93 | XSQ |
| Cis-chlordane | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/03/93 | XSQ |
| Cis-nonachlor | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/03/93 | XSQ |
| Gamma-chlordene | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/03/93 | XSQ |
| Lipids, Total | | 5 | % Lipids | 1 | Grab | AOAC18.046 | 07/15/93 | JLH |
| Oxychlordane | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/03/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab | SW3540 | 07/15/93 | JHL |
| Trans-chlordane | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/03/93 | XSQ |
| Trans-nonachlor | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/03/93 | XSQ |

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# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93113680

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: August 10, 1993

P. O. NO: N/A

SAMPLE ID: Walleye/Fillet
SOURCE OF SAMPLE: 17''-3 lbs. 2 oz.
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 05/11/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 05/13/93

NOTE: Lake Cumberland Project
NOTE: Sample Submitted For Lab Analysis On July 12, 1993

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93113680 | | | | | | | | |
| METALS | | | | | | | | |
| tal Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Grab | SW7060 | 08/03/93 | RTV |
| Total Copper (ICP) | | 0.75 | mg/Kg a r | 0.25 | Grab | SW6010 | 07/19/93 | RTV |
| Total Lead (ICP) | < | 2.5 | mg/Kg a r | 2.5 | Grab | SW6010 | 07/26/93 | MEC |
| Total Mercury (Cold Vapor) | | 0.209 | mg/Kg a r | 0.167 | Grab | SW7471 | 07/21/93 | RTV |
| Total Nickel (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Grab | SW6010 | 07/19/93 | VDA |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.036 | mg/Kg a r | 0.036 | Grab | SW8080 | 08/03/93 | XSQ |
| Aroclor-1016 | < | 0.243 | mg/Kg a r | 0.243 | Grab | SW8080 | 07/23/93 | JMR |
| Aroclor-1221 | < | 0.243 | mg/Kg a r | 0.243 | Grab | SW8080 | 07/23/93 | JMR |
| Aroclor-1232 | < | 0.243 | mg/Kg a r | 0.243 | Grab | SW8080 | 07/23/93 | JMR |
| Aroclor-1242 | < | 0.243 | mg/Kg a r | 0.243 | Grab | SW8080 | 07/23/93 | JMR |
| Aroclor-1248 | < | 0.243 | mg/Kg a r | 0.243 | Grab | SW8080 | 07/23/93 | JMR |
| Aroclor-1254 | < | 0.243 | mg/Kg a r | 0.243 | Grab | SW8080 | 07/23/93 | JMR |
| Aroclor-1260 | < | 0.243 | mg/Kg a r | 0.243 | Grab | SW8080 | 07/23/93 | JMR |
| Chlordane | < | 0.036 | mg/Kg a r | 0.036 | Grab | SW8080 | 08/03/93 | XSQ |
| Chlordene | < | 0.036 | mg/Kg a r | 0.036 | Grab | SW8080 | 08/03/93 | XSQ |
| Cis-chlordane | < | 0.036 | mg/Kg a r | 0.036 | Grab | SW8080 | 08/03/93 | XSQ |
| Cis-nonachlor | < | 0.036 | mg/Kg a r | 0.036 | Grab | SW8080 | 08/03/93 | XSQ |
| Gamma-chlordene | < | 0.036 | mg/Kg a r | 0.036 | Grab | SW8080 | 08/03/93 | XSQ |
| Lipids, Total | | 3 | % Lipids | 1 | Grab | AOAC18.046 | 07/15/93 | JLH |
| Oxychlordane | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/03/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab | SW3540 | 07/15/93 | JHL |
| Trans-chlordane | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/03/93 | XSQ |
| Trans-nonachlor | < | 0.036 | mg/Kg a r | 0.036 | Grab | SW8080 | 08/03/93 | XSQ |

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Fax: (606) 278-5665

# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93113681

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: August 10, 1993

P. O. NO: N/A

SAMPLE ID: Walleye/Fillet
SOURCE OF SAMPLE: 18''-3 lbs. 4 oz.
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 05/11/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 05/13/93

NOTE: Lake Cumberland Project
NOTE: Sample Submitted For Lab Analysis On July 12, 1993

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93113681 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Grab | SW7060 | 08/03/93 | RTV |
| Total Copper (ICP) | | 0.47 | mg/Kg a r | 0.25 | Grab | SW6010 | 07/19/93 | RTV |
| Total Lead (ICP) | < | 2.5 | mg/Kg a r | 2.5 | Grab | SW6010 | 07/26/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.167 | mg/Kg a r | 0.167 | Grab | SW7471 | 07/21/93 | RTV |
| Total Nickel (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Grab | SW6010 | 07/19/93 | VDA |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/04/93 | XSQ |
| Aroclor-1016 | < | 0.121 | mg/Kg a r | 0.121 | Grab | SW8080 | 07/23/93 | JMR |
| Aroclor-1221 | < | 0.121 | mg/Kg a r | 0.121 | Grab | SW8080 | 07/23/93 | JMR |
| Aroclor-1232 | < | 0.121 | mg/Kg a r | 0.121 | Grab | SW8080 | 07/23/93 | JMR |
| Aroclor-1242 | < | 0.121 | mg/Kg a r | 0.121 | Grab | SW8080 | 07/23/93 | JMR |
| Aroclor-1248 | < | 0.121 | mg/Kg a r | 0.121 | Grab | SW8080 | 07/23/93 | JMR |
| Aroclor-1254 | < | 0.121 | mg/Kg a r | 0.121 | Grab | SW8080 | 07/23/93 | JMR |
| Aroclor-1260 | < | 0.121 | mg/Kg a r | 0.121 | Grab | SW8080 | 07/23/93 | JMR |
| Chlordane | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/04/93 | XSQ |
| Chlordene | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/04/93 | XSQ |
| Cis-chlordane | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/04/93 | XSQ |
| Cis-nonachlor | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/04/93 | XSQ |
| Gamma-chlordene | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/04/93 | XSQ |
| Lipids, Total | | 1 | % Lipids | 1 | Grab | AOAC18.046 | 07/15/93 | JLH |
| Oxychlordane | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 07/15/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab | SW3540 | 07/15/93 | JHL |
| Trans-chlordane | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/04/93 | XSQ |
| Trans-nonachlor | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/04/93 | XSQ |

# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93113682

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: August 10, 1993

P. O. NO: N/A

SAMPLE ID: White Bass/Whole Body
SOURCE OF SAMPLE: 361 grams
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 05/11/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 05/13/93

NOTE: Lake Cumberland Project
NOTE: Sample Submitted For Lab Analysis On July 12, 1993

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93113682 | | | | | | | | |
| METALS | | | | | | | | |
| tal Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Grab | SW7060 | 08/03/93 | RTV |
| Total Copper (ICP) | | 1.56 | mg/Kg a r | 0.25 | Grab | SW6010 | 07/19/93 | RTV |
| Total Lead (ICP) | < | 2.5 | mg/Kg a r | 2.5 | Grab | SW6010 | 07/26/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.167 | mg/Kg a r | 0.167 | Grab | SW7471 | 07/21/93 | RTV |
| Total Nickel (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Grab | SW6010 | 07/19/93 | VDA |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/03/93 | XSQ |
| Aroclor-1016 | < | 0.121 | mg/Kg a r | 0.121 | Grab | SW8080 | 07/26/93 | JMR |
| Aroclor-1221 | < | 0.121 | mg/Kg a r | 0.121 | Grab | SW8080 | 07/26/93 | JMR |
| Aroclor-1232 | < | 0.121 | mg/Kg a r | 0.121 | Grab | SW8080 | 07/26/93 | JMR |
| Aroclor-1242 | < | 0.121 | mg/Kg a r | 0.121 | Grab | SW8080 | 07/26/93 | JMR |
| Aroclor-1248 | < | 0.121 | mg/Kg a r | 0.121 | Grab | SW8080 | 07/26/93 | JMR |
| Aroclor-1254 | | 0.181 | mg/Kg a r | 0.121 | Grab | SW8080 | 07/26/93 | JMR |
| Aroclor-1260 | < | 0.121 | mg/Kg a r | 0.121 | Grab | SW8080 | 07/26/93 | JMR |
| Chlordane | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/03/93 | XSQ |
| Chlordene | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/03/93 | XSQ |
| Cis-chlordane | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/03/93 | XSQ |
| Cis-nonachlor | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/03/93 | XSQ |
| Gamma-chlordene | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/03/93 | XSQ |
| Lipids, Total | | 2 | % Lipids | 1 | Grab | AOAC18.046 | 07/15/93 | JLH |
| Oxychlordane | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/03/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab | SW3540 | 07/15/93 | JHL |
| Trans-chlordane | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/03/93 | XSQ |
| Trans-nonachlor | < | 0.024 | mg/Kg a r | 0.024 | Grab | SW8080 | 08/03/93 | XSQ |

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# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93113683

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: August 10, 1993

P. O. NO: N/A

SAMPLE ID: White Bass
SOURCE OF SAMPLE: 2.75''-105 grams
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 05/11/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 05/13/93

NOTE: Lake Cumberland Project
NOTE: Sample Submitted For Lab Analysis On July 12, 1993

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93113683 | | | | | | | | |
| METALS | | | | | | | | |
| tal Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Grab | SW7060 | 08/03/93 | RTV |
| Total Copper (ICP) | | 0.81 | mg/Kg a r | 0.25 | Grab | SW6010 | 07/19/93 | RTV |
| Total Lead (ICP) | < | 2.5 | mg/Kg a r | 2.5 | Grab | SW6010 | 07/26/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.167 | mg/Kg a r | 0.167 | Grab | SW7471 | 07/21/93 | RTV |
| Total Nickel (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Grab | SW6010 | 07/19/93 | VDA |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.075 | mg/Kg a r | 0.075 | Grab | SW8080 | 08/03/93 | XSQ |
| Aroclor-1016 | < | 0.120 | mg/Kg a r | 0.12 | Grab | SW8080 | 07/26/93 | JMR |
| Aroclor-1221 | < | 0.120 | mg/Kg a r | 0.12 | Grab | SW8080 | 07/26/93 | JMR |
| Aroclor-1232 | < | 0.120 | mg/Kg a r | 0.12 | Grab | SW8080 | 07/26/93 | JMR |
| Aroclor-1242 | < | 0.120 | mg/Kg a r | 0.12 | Grab | SW8080 | 07/26/93 | JMR |
| Aroclor-1248 | < | 0.120 | mg/Kg a r | 0.12 | Grab | SW8080 | 07/26/93 | JMR |
| Aroclor-1254 | < | 0.120 | mg/Kg a r | 0.12 | Grab | SW8080 | 07/26/93 | JMR |
| Aroclor-1260 | < | 0.120 | mg/Kg a r | 0.12 | Grab | SW8080 | 07/26/93 | JMR |
| Chlordane | < | 0.075 | mg/Kg a r | 0.075 | Grab | SW8080 | 08/03/93 | XSQ |
| Chlordene | < | 0.075 | mg/Kg a r | 0.075 | Grab | SW8080 | 08/03/93 | XSQ |
| Cis-chlordane | < | 0.075 | mg/Kg a r | 0.075 | Grab | SW8080 | 08/03/93 | XSQ |
| Cis-nonachlor | < | 0.075 | mg/Kg a r | 0.075 | Grab | SW8080 | 08/03/93 | XSQ |
| Gamma-chlordene | < | 0.075 | mg/Kg a r | 0.075 | Grab | SW8080 | 08/03/93 | XSQ |
| Lipids, Total | | 8 | % Lipids | 1 | Grab | AOAC18.046 | 07/15/93 | JLH |
| Oxychlordane | < | 0.075 | mg/Kg a r | 0.075 | Grab | SW8080 | 08/03/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab | SW3540 | 07/15/93 | JHL |
| Trans-chlordane | < | 0.075 | mg/Kg a r | 0.075 | Grab | SW8080 | 08/03/93 | XSQ |
| Trans-nonachlor | < | 0.075 | mg/Kg a r | 0.075 | Grab | SW8080 | 08/03/93 | XSQ |

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# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93113684

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: August 10, 1993

P. O. NO: N/A

SAMPLE ID: Shad 50/Sta. 1
SOURCE OF SAMPLE: 1.5 lbs.
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 05/11/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 05/13/93

NOTE: Lake Cumberland Project
NOTE: Sample Submitted For Lab Analysis On July 12, 1993

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93113684 | | | | | | | | |
| METALS | | | | | | | | |
| tal Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Comp | SW7060 | 08/03/93 | RTV |
| Total Copper (ICP) | | 2.41 | mg/Kg a r | 0.25 | Comp | SW6010 | 07/19/93 | RTV |
| Total Lead (ICP) | < | 2.5 | mg/Kg a r | 2.5 | Comp | SW6010 | 07/26/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.167 | mg/Kg a r | 0.167 | Comp | SW7471 | 07/21/93 | RTV |
| Total Nickel (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp | SW6010 | 07/19/93 | VDA |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.100 | mg/Kg a r | 0.1 | Comp | SW8080 | 08/04/93 | XSQ |
| Aroclor-1016 | < | 0.120 | mg/Kg a r | 0.12 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1221 | < | 0.120 | mg/Kg a r | 0.12 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1232 | < | 0.120 | mg/Kg a r | 0.12 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1242 | < | 0.120 | mg/Kg a r | 0.12 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1248 | < | 0.120 | mg/Kg a r | 0.12 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1254 | < | 0.120 | mg/Kg a r | 0.12 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1260 | < | 0.120 | mg/Kg a r | 0.12 | Comp | SW8080 | 07/27/93 | JMR |
| Chlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Chlordene | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Cis-chlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Cis-nonachlor | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Gamma-chlordene | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Lipids, Total | | 7 | % Lipids | 1 | Comp | AOAC18.046 | 07/20/93 | JLH |
| Oxychlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Comp | SW3540 | 07/20/93 | JLH |
| Trans-chlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Trans-nonachlor | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |

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# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93113688

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: August 10, 1993

P. O. NO: N/A

SAMPLE ID: Shad/50/Sta. 1
SOURCE OF SAMPLE: 1 lb.
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 05/12/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 05/13/93

NOTE: Lake Cumberland Project
NOTE: Sample Submitted For Lab Analysis On July 12, 1993

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93113688 | | | | | | | | |
| METALS | | | | | | | | |
| tal Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Comp | SW7060 | 08/03/93 | RTV |
| Total Copper (ICP) | | 1.03 | mg/Kg a r | 0.25 | Comp | SW6010 | 07/19/93 | RTV |
| Total Lead (ICP) | < | 2.5 | mg/Kg a r | 2.5 | Comp | SW6010 | 07/26/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.167 | mg/Kg a r | 0.167 | Comp | SW7471 | 07/21/93 | RTV |
| Total Nickel (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp | SW6010 | 07/19/93 | VDA |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Aroclor-1016 | < | 0.240 | mg/Kg a r | 0.24 | Comp | SW8080 | 07/28/93 | JMR |
| Aroclor-1221 | < | 0.240 | mg/Kg a r | 0.24 | Comp | SW8080 | 07/28/93 | JMR |
| Aroclor-1232 | < | 0.240 | mg/Kg a r | 0.24 | Comp | SW8080 | 07/28/93 | JMR |
| Aroclor-1242 | < | 0.240 | mg/Kg a r | 0.24 | Comp | SW8080 | 07/28/93 | JMR |
| Aroclor-1248 | < | 0.240 | mg/Kg a r | 0.24 | Comp | SW8080 | 07/28/93 | JMR |
| Aroclor-1254 | < | 0.240 | mg/Kg a r | 0.24 | Comp | SW8080 | 07/28/93 | JMR |
| Aroclor-1260 | < | 0.240 | mg/Kg a r | 0.24 | Comp | SW8080 | 07/28/93 | JMR |
| Chlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Chlordene | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Cis-chlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Cis-nonachlor | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Gamma-chlordene | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Lipids, Total | | 8 | % Lipids | 1 | Comp | AOAC18.046 | 07/21/93 | JLH |
| Oxychlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Comp | SW3540 | 07/21/93 | JLH |
| Trans-chlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Trans-nonachlor | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |

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COMMONWEALTH TECHNOLOGY, INC.
*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93113689

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: August 10, 1993

P. O. NO: N/A

SAMPLE ID: Shad/42/Sta. 1
SOURCE OF SAMPLE: 3.5''-4''
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 05/11/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 05/13/93

NOTE: Lake Cumberland Project
NOTE: Sample Submitted For Lab Analysis On July 12, 1993

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93113689 | | | | | | | | |
| METALS | | | | | | | | |
| tal Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Comp | SW7060 | 08/03/93 | RTV |
| Total Copper (ICP) | | 1.28 | mg/Kg a r | 0.25 | Comp | SW6010 | 07/19/93 | RTV |
| Total Lead (ICP) | < | 2.5 | mg/Kg a r | 2.5 | Comp | SW6010 | 07/26/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.167 | mg/Kg a r | 0.167 | Comp | SW7471 | 07/21/93 | RTV |
| Total Nickel (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp | SW6010 | 07/19/93 | VDA |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Aroclor-1016 | < | 0.240 | mg/Kg a r | 0.24 | Comp | SW8080 | 07/28/93 | JMR |
| Aroclor-1221 | < | 0.240 | mg/Kg a r | 0.24 | Comp | SW8080 | 07/28/93 | JMR |
| Aroclor-1232 | < | 0.240 | mg/Kg a r | 0.24 | Comp | SW8080 | 07/28/93 | JMR |
| Aroclor-1242 | < | 0.240 | mg/Kg a r | 0.24 | Comp | SW8080 | 07/28/93 | JMR |
| Aroclor-1248 | < | 0.240 | mg/Kg a r | 0.24 | Comp | SW8080 | 07/28/93 | JMR |
| Aroclor-1254 | < | 0.240 | mg/Kg a r | 0.24 | Comp | SW8080 | 07/28/93 | JMR |
| Aroclor-1260 | < | 0.240 | mg/Kg a r | 0.24 | Comp | SW8080 | 07/28/93 | JMR |
| Chlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Chlordene | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Cis-chlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Cis-nonachlor | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Gamma-chlordene | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Lipids, Total | | 9 | % Lipids | 1 | Comp | AOAC18.046 | 07/21/93 | JLH |
| Oxychlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Comp | SW3540 | 07/21/93 | JLH |
| Trans-chlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Trans-nonachlor | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |

# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93113690

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: August 10, 1993

P. O. NO: N/A

SAMPLE ID: Shad/34/Sta. 1
SOURCE OF SAMPLE: 1 lb.
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 05/13/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 05/13/93

NOTE: Lake Cumberland Project
NOTE: Sample Submitted For Lab Analysis On July 12, 1993

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93113690 | | | | | | | | |
| METALS | | | | | | | | |
| tal Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Comp | SW7060 | 08/03/93 | RTV |
| otal Copper (ICP) | | 0.81 | mg/Kg a r | 0.25 | Comp | SW6010 | 07/19/93 | RTV |
| Total Lead (ICP) | < | 2.5 | mg/Kg a r | 2.5 | Comp | SW6010 | 07/26/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.167 | mg/Kg a r | 0.167 | Comp | SW7471 | 07/21/93 | RTV |
| Total Nickel (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp | SW6010 | 07/19/93 | VDA |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Aroclor-1016 | < | 0.120 | mg/Kg a r | 0.12 | Comp | SW8080 | 07/28/93 | JMR |
| Aroclor-1221 | < | 0.120 | mg/Kg a r | 0.12 | Comp | SW8080 | 07/28/93 | JMR |
| Aroclor-1232 | < | 0.120 | mg/Kg a r | 0.12 | Comp | SW8080 | 07/28/93 | JMR |
| Aroclor-1242 | < | 0.120 | mg/Kg a r | 0.12 | Comp | SW8080 | 07/28/93 | JMR |
| Aroclor-1248 | < | 0.120 | mg/Kg a r | 0.12 | Comp | SW8080 | 07/28/93 | JMR |
| Aroclor-1254 | < | 0.120 | mg/Kg a r | 0.12 | Comp | SW8080 | 07/28/93 | JMR |
| Aroclor-1260 | < | 0.120 | mg/Kg a r | 0.12 | Comp | SW8080 | 07/28/93 | JMR |
| Chlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Chlordene | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Cis-chlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Cis-nonachlor | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Gamma-chlordene | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Lipids, Total | | 8 | % Lipids | 1 | Comp | AOAC18.046 | 07/21/93 | JLH |
| Oxychlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Comp | SW3540 | 07/21/93 | JLH |
| Trans-chlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Trans-nonachlor | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |

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# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93113685

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: August 10, 1993

P. O. NO: N/A

SAMPLE ID: Shad 50/Sta. 4
SOURCE OF SAMPLE: 10-12 g
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 05/11/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 05/13/93

NOTE: Lake Cumberland Project
NOTE: Sample Submitted For Lab Analysis On July 12, 1993

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93113685 | | | | | | | | |
| METALS | | | | | | | | |
| tal Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Comp | SW7060 | 08/03/93 | RTV |
| Total Copper (ICP) | | 0.78 | mg/Kg a r | 0.25 | Comp | SW6010 | 07/19/93 | RTV |
| Total Lead (ICP) | < | 2.5 | mg/Kg a r | 2.5 | Comp | SW6010 | 07/26/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.167 | mg/Kg a r | 0.167 | Comp | SW7471 | 07/21/93 | RTV |
| Total Nickel (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp | SW6010 | 07/19/93 | VDA |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.200 | mg/Kg a r | 0.2 | Comp | SW8080 | 08/04/93 | XSQ |
| Aroclor-1016 | < | 0.121 | mg/Kg a r | 0.121 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1221 | < | 0.121 | mg/Kg a r | 0.121 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1232 | < | 0.121 | mg/Kg a r | 0.121 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1242 | < | 0.121 | mg/Kg a r | 0.121 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1248 | < | 0.121 | mg/Kg a r | 0.121 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1254 | < | 0.121 | mg/Kg a r | 0.121 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1260 | < | 0.121 | mg/Kg a r | 0.121 | Comp | SW8080 | 07/27/93 | JMR |
| Chlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Chlordene | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Cis-chlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Cis-nonachlor | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Gamma-chlordene | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Lipids, Total | | 9 | % Lipids | 1 | Comp | AOAC18.046 | 07/20/93 | JLH |
| Oxychlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Comp | SW3540 | 07/20/93 | JLH |
| Trans-chlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Trans-nonachlor | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |

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# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93113686

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: August 10, 1993

P. O. NO: N/A

SAMPLE ID: Shad 50/Sta. 4
SOURCE OF SAMPLE: 1 lbs. 8 oz.
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 05/13/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 05/13/93

NOTE: Lake Cumberland Project
NOTE: Sample Submitted For Lab Analysis On July 12, 1993

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93113686 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Comp | SW7060 | 08/03/93 | RTV |
| Total Copper (ICP) | | 0.79 | mg/Kg a r | 0.25 | Comp | SW6010 | 07/19/93 | RTV |
| Total Lead (ICP) | < | 2.5 | mg/Kg a r | 2.5 | Comp | SW6010 | 07/26/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.167 | mg/Kg a r | 0.167 | Comp | SW7471 | 07/21/93 | RTV |
| Total Nickel (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp | SW6010 | 07/19/93 | VDA |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Aroclor-1016 | < | 0.121 | mg/Kg a r | 0.121 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1221 | < | 0.121 | mg/Kg a r | 0.121 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1232 | < | 0.121 | mg/Kg a r | 0.121 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1242 | < | 0.121 | mg/Kg a r | 0.121 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1248 | < | 0.121 | mg/Kg a r | 0.121 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1254 | < | 0.121 | mg/Kg a r | 0.121 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1260 | < | 0.121 | mg/Kg a r | 0.121 | Comp | SW8080 | 07/27/93 | JMR |
| Chlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Chlordene | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Cis-chlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Cis-nonachlor | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Gamma-chlordene | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/03/93 | XSQ |
| Lipids, Total | | 11 | % Lipids | 1 | Comp | AOAC18.046 | 07/20/93 | JLH |
| Oxychlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Comp | SW3540 | 07/20/93 | JLH |
| Trans-chlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Trans-nonachlor | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |

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# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93113687

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: August 10, 1993

P. O. NO: N/A

SAMPLE ID: Shad 50/Sta. 4
SOURCE OF SAMPLE: 1 lbs. 12 oz.
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 05/13/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 05/13/93

NOTE: Lake Cumberland Project
NOTE: Sample Submitted For Lab Analysis On July 12, 1993

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93113687 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Comp | SW7060 | 08/03/93 | RTV |
| Total Copper (ICP) | | 1.34 | mg/Kg a r | 0.25 | Comp | SW6010 | 07/19/93 | RTV |
| Total Lead (ICP) | < | 2.5 | mg/Kg a r | 2.5 | Comp | SW6010 | 07/26/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.167 | mg/Kg a r | 0.167 | Comp | SW7471 | 07/21/93 | RTV |
| Total Nickel (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp | SW6010 | 07/19/93 | VDA |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Aroclor-1016 | < | 0.120 | mg/Kg a r | 0.12 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1221 | < | 0.120 | mg/Kg a r | 0.12 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1232 | < | 0.120 | mg/Kg a r | 0.12 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1242 | < | 0.120 | mg/Kg a r | 0.12 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1248 | < | 0.120 | mg/Kg a r | 0.12 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1254 | < | 0.120 | mg/Kg a r | 0.12 | Comp | SW8080 | 07/27/93 | JMR |
| Aroclor-1260 | < | 0.120 | mg/Kg a r | 0.12 | Comp | SW8080 | 07/27/93 | JMR |
| Chlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Chlordene | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Cis-chlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Cis-nonachlor | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Gamma-chlordene | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Lipids, Total | | 9 | % Lipids | 1 | Comp | AOAC18.046 | 07/21/93 | JLH |
| Oxychlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Comp | SW3540 | 07/21/93 | JLH |
| Trans-chlordane | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |
| Trans-nonachlor | < | 0.076 | mg/Kg a r | 0.076 | Comp | SW8080 | 08/04/93 | XSQ |

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# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93118454

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: October 12, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 1-Skip Jack(2)
SOURCE OF SAMPLE: Lake Cumberland
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 08/19/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 08/19/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|
| 93118454 | | | | | | | |
| METALS | | | | | | | |
| Total Arsenic (Furnace) | | 1.4 | mg/Kg a r | 0.05 | Comp SW7060 | 10/04/93 | RTV |
| Total Copper (ICP) | | 1.0 | mg/Kg a r | 0.5 | Comp SW6010 | 09/30/93 | MEC |
| Total Lead (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp SW6010 | 10/01/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.24 | mg/Kg a r | 0.24 | Comp SW7471 | 10/01/93 | VDA/RTV |
| Total Nickel (ICP) | < | 0.1 | mg/Kg a r | 0.1 | Comp SW6010 | 09/30/93 | MEC |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Lipids, Total | | 14 | % Lipids | 1 | Comp AOAC18.046 | 09/22/93 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Comp SW3540 | 09/22/93 | JLH |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |

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# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93118450

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: October 12, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 1-Skip Jack(2)
SOURCE OF SAMPLE: Lake Cumberland
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 08/17/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 08/19/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93118450 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (Furnace) | | 0.15 | mg/Kg a r | 0.05 | Comp | SW7060 | 10/06/93 | MEC |
| Total Copper (ICP) | | 0.6 | mg/Kg a r | 0.5 | Comp | SW6010 | 09/30/93 | MEC |
| Total Lead (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp | SW6010 | 10/01/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.26 | mg/Kg a r | 0.26 | Comp | SW7471 | 10/01/93 | VDA/RTV |
| Total Nickel (ICP) | | 0.1 | mg/Kg a r | 0.1 | Comp | SW6010 | 09/30/93 | MEC |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/27/93 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/27/93 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/27/93 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/27/93 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/27/93 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/27/93 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/27/93 | XSQ |
| Chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Lipids, Total | | 9 | % Lipids | 1 | Comp | AOAC18.046 | 09/21/93 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Comp | SW3540 | 09/21/93 | JLH |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |

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COMMONWEALTH TECHNOLOGY, INC.
*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93118455

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: October 12, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 1-Skip Jack(6)
SOURCE OF SAMPLE: Lake Cumberland
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 08/18/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 08/19/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|
| 93118455 | | | | | | | |
| METALS | | | | | | | |
| Total Arsenic (Furnace) | | 0.89 | mg/Kg a r | 0.05 | Comp SW7060 | 10/04/93 | RTV |
| Total Copper (ICP) | | 0.6 | mg/Kg a r | 0.5 | Comp SW6010 | 09/30/93 | MEC |
| Total Lead (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp SW6010 | 10/01/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.22 | mg/Kg a r | 0.22 | Comp SW7471 | 10/01/93 | VDA/RTV |
| Total Nickel (ICP) | | 0.1 | mg/Kg a r | 0.1 | Comp SW6010 | 09/30/93 | MEC |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Lipids, Total | | 15 | % Lipids | 1 | Comp AOAC18.046 | 09/22/93 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Comp SW3540 | 09/22/93 | JLH |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |

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COMMONWEALTH TECHNOLOGY, INC.
*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93118456

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: October 12, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 1-Skip Jack(23)
SOURCE OF SAMPLE: Lake Cumberland
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 08/18/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 08/19/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|
| 93118456 | | | | | | | |
| METALS | | | | | | | |
| Total Arsenic (Furnace) | | 0.47 | mg/Kg a r | 0.05 | Comp SW7060 | 10/04/93 | RTV |
| Total Copper (ICP) | | 0.6 | mg/Kg a r | 0.5 | Comp SW6010 | 09/30/93 | MEC |
| Total Lead (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp SW6010 | 10/01/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.27 | mg/Kg a r | 0.27 | Comp SW7471 | 10/01/93 | VDA/RTV |
| Total Nickel (ICP) | | 0.1 | mg/Kg a r | 0.1 | Comp SW6010 | 09/30/93 | MEC |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Lipids, Total | | 11 | % Lipids | 1 | Comp AOAC18.046 | 09/22/93 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Comp SW3540 | 09/22/93 | JLH |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |

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COMMONWEALTH TECHNOLOGY, INC.
*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93118457

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: October 12, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 1-Stripper-4.5 lbs.-Fillet
SOURCE OF SAMPLE: Lake Cumberland
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 08/19/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 08/19/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|
| 93118457 | | | | | | | |
| METALS | | | | | | | |
| Total Arsenic (Furnace) | | 0.26 | mg/Kg a r | 0.05 | Comp SW7060 | 10/04/93 | RTV |
| Total Copper (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp SW6010 | 09/30/93 | MEC |
| Total Lead (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp SW6010 | 10/01/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.25 | mg/Kg a r | 0.25 | Comp SW7471 | 10/01/93 | VDA/RTV |
| Total Nickel (ICP) | | 0.2 | mg/Kg a r | 0.1 | Comp SW6010 | 09/30/93 | MEC |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Lipids, Total | | 12 | % Lipids | 1 | Comp AOAC18.046 | 09/22/93 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Comp SW3540 | 09/22/93 | JLH |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |

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# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93118459

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: October 12, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 1-Walleye (605.5 grams)
SOURCE OF SAMPLE: Lake Cumberland
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 08/19/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 08/19/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93118459 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (Furnace) | | 0.47 | mg/Kg a r | 0.05 | Comp | SW7060 | 10/04/93 | RTV |
| Total Copper (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp | SW6010 | 09/30/93 | MEC |
| Total Lead (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp | SW6010 | 10/01/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.21 | mg/Kg a r | 0.21 | Comp | SW7471 | 10/01/93 | VDA/RTV |
| Total Nickel (ICP) | < | 0.1 | mg/Kg a r | 0.1 | Comp | SW6010 | 09/30/93 | MEC |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/28/93 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/28/93 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/28/93 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/28/93 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/28/93 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/28/93 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/28/93 | XSQ |
| Chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Lipids, Total | | 12 | % Lipids | 1 | Comp | AOAC18.046 | 09/23/93 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Comp | SW3550 | 09/23/93 | JLH |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |

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COMMONWEALTH TECHNOLOGY, INC.
*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93118460

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: October 12, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 1-Walleye Fillet
SOURCE OF SAMPLE: Lake Cumberland
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 08/19/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 08/19/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|
| 93118460 | | | | | | | |
| METALS | | | | | | | |
| Total Arsenic (Furnace) | | 7.1 | mg/Kg a r | 0.05 | Comp SW7060 | 10/04/93 | RTV |
| Total Copper (ICP) | | 0.5 | mg/Kg a r | 0.5 | Comp SW6010 | 09/30/93 | MEC |
| Total Lead (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp SW6010 | 10/01/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.21 | mg/Kg a r | 0.21 | Comp SW7471 | 10/01/93 | VDA/RTV |
| Total Nickel (ICP) | | 0.3 | mg/Kg a r | 0.1 | Comp SW6010 | 09/30/93 | MEC |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Lipids, Total | | 1 | % Lipids | 1 | Comp AOAC18.046 | 09/23/93 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Comp SW3550 | 09/23/93 | JLH |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |

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# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93118461

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: October 12, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 1-Stripper 4.5lbs.Whole Body
SOURCE OF SAMPLE: Lake Cumberland
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 08/19/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 08/19/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93118461 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (Furnace) | | 0.57 | mg/Kg a r | 0.05 | Comp | SW7060 | 10/04/93 | RTV |
| Total Copper (ICP) | | 0.5 | mg/Kg a r | 0.5 | Comp | SW6010 | 09/30/93 | MEC |
| Total Lead (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp | SW6010 | 10/01/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.27 | mg/Kg a r | 0.27 | Comp | SW7471 | 10/01/93 | VDA/RTV |
| Total Nickel (ICP) | | 0.1 | mg/Kg a r | 0.1 | Comp | SW6010 | 09/30/93 | MEC |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/28/93 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/28/93 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/28/93 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/28/93 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/28/93 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/28/93 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/28/93 | XSQ |
| Chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Lipids, Total | | 25 | % Lipids | 1 | Comp | AOAC18.046 | 09/23/93 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Comp | SW3550 | 09/23/93 | JLH |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |

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# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93118448

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: October 12, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 4-Skip Jack(26)
SOURCE OF SAMPLE: Lake Cumberland
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 08/17/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 08/19/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|
| 93118448 | | | | | | | |
| METALS | | | | | | | |
| Total Arsenic (Furnace) | | 0.14 | mg/Kg a r | 0.05 | Comp SW7060 | 10/04/93 | RTV |
| Total Copper (ICP) | | 0.6 | mg/Kg a r | 0.5 | Comp SW6010 | 09/30/93 | MEC |
| Total Lead (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp SW6010 | 10/01/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.23 | mg/Kg a r | 0.23 | Comp SW7471 | 10/01/93 | VDA/RTV |
| Total Nickel (ICP) | | 0.1 | mg/Kg a r | 0.1 | Comp SW6010 | 09/30/93 | MEC |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/27/93 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/27/93 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/27/93 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/27/93 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/27/93 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/27/93 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/27/93 | XSQ |
| Chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Lipids, Total | | 13 | % Lipids | 1 | Comp AOAC18.046 | 09/21/93 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Comp SW3540 | 09/21/93 | JLH |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |

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# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93118449

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: October 12, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 4-Skip Jack(5)
SOURCE OF SAMPLE: Lake Cumberland
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 08/19/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 08/19/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|
| 93118449 | | | | | | | |
| METALS | | | | | | | |
| Total Arsenic (Furnace) | | 0.11 | mg/Kg a r | 0.05 | Comp SW7060 | 10/04/93 | RTV |
| Total Copper (ICP) | | 0.5 | mg/Kg a r | 0.5 | Comp SW6010 | 09/30/93 | MEC |
| Total Lead (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp SW6010 | 10/01/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.22 | mg/Kg a r | 0.22 | Comp SW7471 | 10/01/93 | VDA/RTV |
| Total Nickel (ICP) | < | 0.1 | mg/Kg a r | 0.1 | Comp SW6010 | 09/30/93 | MEC |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/27/93 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/27/93 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/27/93 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/27/93 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/27/93 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/27/93 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/27/93 | XSQ |
| Chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Lipids, Total | | 12 | % Lipids | 1 | Comp AOAC18.046 | 09/21/93 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Comp SW3540 | 09/21/93 | JLH |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |

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# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93118451

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: October 12, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 4-Skip Jack(5)
SOURCE OF SAMPLE: Lake Cumberland
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 08/18/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 08/19/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93118451 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (Furnace) | | 0.35 | mg/Kg a r | 0.05 | Comp | SW7060 | 10/04/93 | RTV |
| Total Copper (ICP) | | 0.9 | mg/Kg a r | 0.5 | Comp | SW6010 | 09/30/93 | MEC |
| Total Lead (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp | SW6010 | 10/01/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.27 | mg/Kg a r | 0.27 | Comp | SW7471 | 10/01/93 | VDA/RTV |
| Total Nickel (ICP) | | 0.1 | mg/Kg a r | 0.1 | Comp | SW6010 | 09/30/93 | MEC |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/27/93 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/27/93 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/27/93 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/27/93 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/27/93 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/27/93 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/27/93 | XSQ |
| Chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Lipids, Total | | 13 | % Lipids | 1 | Comp | AOAC18.046 | 09/21/93 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Comp | SW3540 | 09/21/93 | JLH |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |

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COMMONWEALTH TECHNOLOGY, INC.
*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93118452

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: October 12, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 4-Shad (573g)
SOURCE OF SAMPLE: Lake Cumberland
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 08/18/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 08/19/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93118452 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (Furnace) | | 0.37 | mg/Kg a r | 0.05 | Comp | SW7060 | 10/04/93 | RTV |
| Total Copper (ICP) | | 0.7 | mg/Kg a r | 0.5 | Comp | SW6010 | 09/30/93 | MEC |
| Total Lead (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp | SW6010 | 10/01/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.3 | mg/Kg a r | 0.3 | Comp | SW7471 | 10/01/93 | VDA/RTV |
| Total Nickel (ICP) | < | 0.1 | mg/Kg a r | 0.1 | Comp | SW6010 | 09/30/93 | MEC |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/27/93 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/27/93 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/27/93 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/27/93 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/27/93 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/27/93 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/27/93 | XSQ |
| Chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Lipids, Total | | 3 | % Lipids | 1 | Comp | AOAC18.046 | 09/21/93 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Comp | SW3540 | 09/21/93 | JLH |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |

# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93118453

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: October 12, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 4-Skip Jack(5)
SOURCE OF SAMPLE: Lake Cumberland
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 08/18/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 08/19/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 93118453 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (Furnace) | | 0.4 | mg/Kg a r | 0.05 | Comp | SW7060 | 10/04/93 | RTV |
| Total Copper (ICP) | | 0.7 | mg/Kg a r | 0.5 | Comp | SW6010 | 09/30/93 | MEC |
| Total Lead (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp | SW6010 | 10/01/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.26 | mg/Kg a r | 0.26 | Comp | SW7471 | 10/01/93 | VDA/RTV |
| Total Nickel (ICP) | < | 0.1 | mg/Kg a r | 0.1 | Comp | SW6010 | 09/30/93 | MEC |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/28/93 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/28/93 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/28/93 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/28/93 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/28/93 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/28/93 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Comp | SW8080 | 09/28/93 | XSQ |
| Chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Lipids, Total | | 11 | % Lipids | 1 | Comp | AOAC18.046 | 09/22/93 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Comp | SW3540 | 09/22/93 | JLH |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp | SW8080 | 10/07/93 | XSQ |

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# COMMONWEALTH TECHNOLOGY, INC.

*Laboratory Results*

ACCT#: CKENC

CTI LAB NO: 93118458

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: October 12, 1993

P. O. NO: N/A

SAMPLE ID: Sta. 4-Skip Jack(4)
SOURCE OF SAMPLE: Lake Cumberland
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 08/17/93
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 08/19/93

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|
| 93118458 | | | | | | | |
| METALS | | | | | | | |
| Total Arsenic (Furnace) | | 1.3 | mg/Kg a r | 0.05 | Comp SW7060 | 10/04/93 | RTV |
| Total Copper (ICP) | | 0.8 | mg/Kg a r | 0.5 | Comp SW6010 | 09/30/93 | MEC |
| Total Lead (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Comp SW6010 | 10/01/93 | MEC |
| Total Mercury (Cold Vapor) | < | 0.22 | mg/Kg a r | 0.22 | Comp SW7471 | 10/01/93 | VDA/RTV |
| Total Nickel (ICP) | | 0.2 | mg/Kg a r | 0.1 | Comp SW6010 | 09/30/93 | MEC |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Comp SW8080 | 09/28/93 | XSQ |
| Chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Lipids, Total | | 24 | % Lipids | 1 | Comp AOAC18.046 | 09/23/93 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Comp SW3550 | 09/23/93 | JLH |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Comp SW8080 | 10/07/93 | XSQ |

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# COMMONWEALTH TECHNOLOGY, INC.

ACCT#: CKENC

CTI LAB NO: 94106185

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: April 14, 1994

P. O. NO: N/A

SAMPLE ID: Carp-Whole Body
SOURCE OF SAMPLE: Sta 2/7.41b/49cm
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 03/17/94
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 03/18/94

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 94106185 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Grab | SW7060 | 04/05/94 | MEC |
| Total Copper (ICP) | | 1.2 | mg/Kg a r | 0.5 | Grab | SW6010 | 04/06/94 | GLM |
| Total Lead (ICP) | < | 5 | mg/Kg a r | 5 | Grab | SW6010 | 04/06/94 | GLM |
| Total Mercury (Cold Vapor) | | 0.75 | mg/Kg a r | 0.21 | Grab | SW7471 | 04/07/94 | DJM |
| Total Nickel (ICP) | < | 1 | mg/Kg a r | 1 | Grab | SW6010 | 04/06/94 | GLM |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Chlordane | < | 0.125 | mg/Kg a r | 0.125 | Grab | SW8080 | 04/11/94 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Lipids, Total | | 7 | % Lipids | 1 | Grab | AOAC18.046 | 04/07/94 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab | SW3550 | 04/04/94 | SC/DLJ |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |

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Lexington, Kentucky 40503-2921

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# COMMONWEALTH TECHNOLOGY, INC.

ACCT#: CKENC

CTI LAB NO: 94106183

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: April 14, 1994

P. O. NO: N/A

SAMPLE ID: Carp-Fillet
SOURCE OF SAMPLE: Sta 2/7.41b/49cm
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 03/17/94
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 03/18/94

## REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 94106183 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Grab | SW7060 | 04/05/94 | MEC |
| Total Copper (ICP) | | 0.5 | mg/Kg a r | 0.5 | Grab | SW6010 | 04/06/94 | GLM |
| Total Lead (ICP) | < | 5 | mg/Kg a r | 5 | Grab | SW6010 | 04/06/94 | GLM |
| Total Mercury (Cold Vapor) | | 0.79 | mg/Kg a r | 0.21 | Grab | SW7471 | 04/07/94 | DJM |
| Total Nickel (ICP) | < | 1 | mg/Kg a r | 1 | Grab | SW6010 | 04/06/94 | GLM |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1254 | < | 0.290 | mg/Kg a r | 0.29 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Lipids, Total | | 6 | % Lipids | 1 | Grab | AOAC18.046 | 04/07/94 | JLE |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab | SW3550 | 04/04/94 | SC/DLJ |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |

COMMONWEALTH TECHNOLOGY, INC.

ACCT#: CKENC

CTI LAB NO: 94106181

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: April 14, 1994

P. O. NO: N/A

SAMPLE ID: Carp-Whole Body
SOURCE OF SAMPLE: Sta 2/7.4lb/49cm
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 03/17/94
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 03/18/94

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 94106181 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Grab | SW7060 | 04/05/94 | MEC |
| Total Copper (ICP) | | 0.8 | mg/Kg a r | 0.5 | Grab | SW6010 | 04/06/94 | GLM |
| Total Lead (ICP) | < | 5 | mg/Kg a r | 5 | Grab | SW6010 | 04/06/94 | GLM |
| Total Mercury (Cold Vapor) | | 0.84 | mg/Kg a r | 0.21 | Grab | SW7471 | 04/07/94 | DJM |
| Total Nickel (ICP) | < | 1 | mg/Kg a r | 1 | Grab | SW6010 | 04/06/94 | GLM |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1254 | < | 0.440 | mg/Kg a r | 0.44 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Chlordane | < | 0.125 | mg/Kg a r | 0.125 | Grab | SW8080 | 04/11/94 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Lipids, Total | | 9 | % Lipids | 1 | Grab | AOAC18.046 | 04/07/94 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab | SW3550 | 04/04/94 | SC/DLJ |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |

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COMMONWEALTH TECHNOLOGY, INC.

ACCT#: CKENC

CTI LAB NO: 94106180

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: April 14, 1994

P. O. NO: N/A

SAMPLE ID: Stripe-Whole Body
SOURCE OF SAMPLE: Sta 4/3.4lb/40cm
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 03/17/94
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 03/18/94

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|
| 94106180 | | | | | | | |
| METALS | | | | | | | |
| Total Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Grab SW7060 | 04/05/94 | MEC |
| Total Copper (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Grab SW6010 | 04/06/94 | GLM |
| Total Lead (ICP) | < | 5 | mg/Kg a r | 5 | Grab SW6010 | 04/06/94 | GLM |
| Total Mercury (Cold Vapor) | | 0.57 | mg/Kg a r | 0.21 | Grab SW7471 | 04/07/94 | DJM |
| Total Nickel (ICP) | < | 1 | mg/Kg a r | 1 | Grab SW6010 | 04/06/94 | GLM |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/13/94 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/13/94 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/13/94 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/13/94 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/13/94 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/13/94 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/13/94 | XSQ |
| Chlordane | < | 0.125 | mg/Kg a r | 0.125 | Grab SW8080 | 04/11/94 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Lipids, Total | | 9 | % Lipids | 1 | Grab AOAC18.046 | 04/07/94 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab SW3550 | 04/04/94 | SC/DLJ |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |

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# COMMONWEALTH TECHNOLOGY, INC.

ACCT#: CKENC

CTI LAB NO: 94106179

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: April 14, 1994

P. O. NO: N/A

SAMPLE ID: Walleye Filet
SOURCE OF SAMPLE: Sta 4/2.75lb/40cm
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 03/18/94
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 03/18/94

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 94106179 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Grab | SW7060 | 04/05/94 | MEC |
| Total Copper (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Grab | SW6010 | 04/06/94 | GLM |
| Total Lead (ICP) | < | 5 | mg/Kg a r | 5 | Grab | SW6010 | 04/06/94 | GLM |
| Total Mercury (Cold Vapor) | | 0.82 | mg/Kg a r | 0.21 | Grab | SW7471 | 04/07/94 | DJM |
| Total Nickel (ICP) | < | 1 | mg/Kg a r | 1 | Grab | SW6010 | 04/06/94 | GLM |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/11/94 | XSQ |
| Chlordane | < | 0.125 | mg/Kg a r | 0.125 | Grab | SW8080 | 04/11/94 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Lipids, Total | | 3 | % Lipids | 1 | Grab | AOAC18.046 | 04/07/94 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab | SW3550 | 04/04/94 | SC/DLJ |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |

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# COMMONWEALTH TECHNOLOGY, INC.

ACCT#: CKENC

CTI LAB NO: 94106178

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: April 14, 1994

P. O. NO: N/A

SAMPLE ID: Carp-Whole Body
SOURCE OF SAMPLE: Sta 4/6.5lb/47cm
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 03/18/94
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 03/18/94

## REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 94106178 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Grab | SW7060 | 04/05/94 | MEC |
| Total Copper (ICP) | | 2.3 | mg/Kg a r | 0.5 | Grab | SW6010 | 04/06/94 | GLM |
| Total Lead (ICP) | < | 5 | mg/Kg a r | 5 | Grab | SW6010 | 04/06/94 | GLM |
| Total Mercury (Cold Vapor) | | 0.46 | mg/Kg a r | 0.21 | Grab | SW7471 | 04/07/94 | DJM |
| Total Nickel (ICP) | < | 1 | mg/Kg a r | 1 | Grab | SW6010 | 04/06/94 | GLM |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Chlordane | < | 0.125 | mg/Kg a r | 0.125 | Grab | SW8080 | 04/11/94 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Lipids, Total | | 12 | % Lipids | 1 | Grab | AOAC18.046 | 04/07/94 | JLE |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab | SW3550 | 04/04/94 | SC/DLJ |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |

# COMMONWEALTH TECHNOLOGY, INC.

ACCT#: CKENC

CTI LAB NO: 94106182

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: April 14, 1994

P. O. NO: N/A

SAMPLE ID: Walleye-Whole Body
SOURCE OF SAMPLE: Sta 4/2.75lb/40cm
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 03/18/94
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 03/18/94

## REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 94106182 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Grab | SW7060 | 04/05/94 | MEC |
| Total Copper (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Grab | SW6010 | 04/06/94 | GLM |
| Total Lead (ICP) | < | 5 | mg/Kg a r | 5 | Grab | SW6010 | 04/06/94 | GLM |
| Total Mercury (Cold Vapor) | | 0.62 | mg/Kg a r | 0.21 | Grab | SW7471 | 04/07/94 | DJM |
| Total Nickel (ICP) | < | 1 | mg/Kg a r | 1 | Grab | SW6010 | 04/06/94 | GLM |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Chlordane | < | 0.125 | mg/Kg a r | 0.125 | Grab | SW8080 | 04/11/94 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Lipids, Total | | 8 | % Lipids | 1 | Grab | AOAC18.046 | 04/07/94 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab | SW3550 | 04/04/94 | SC/DLJ |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |

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COMMONWEALTH TECHNOLOGY, INC.

ACCT#: CKENC

CTI LAB NO: 94106184

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: April 14, 1994

P. O. NO: N/A

SAMPLE ID: Carp-Fillet
SOURCE OF SAMPLE: Sta 4/6.5lb/47cm
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 03/18/94
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 03/18/94

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 94106184 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Grab | SW7060 | 04/05/94 | MEC |
| Total Copper (ICP) | | 0.7 | mg/Kg a r | 0.5 | Grab | SW6010 | 04/06/94 | GLM |
| Total Lead (ICP) | < | 5 | mg/Kg a r | 5 | Grab | SW6010 | 04/06/94 | GLM |
| Total Mercury (Cold Vapor) | | 0.66 | mg/Kg a r | 0.21 | Grab | SW7471 | 04/07/94 | DJM |
| Total Nickel (ICP) | < | 1 | mg/Kg a r | 1 | Grab | SW6010 | 04/06/94 | GLM |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1254 | | 0.380 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Lipids, Total | | 7 | % Lipids | 1 | Grab | AOAC18.046 | 04/07/94 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab | SW3550 | 04/04/94 | SC/DLJ |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |

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Lexington, Kentucky 40503-2921

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COMMONWEALTH TECHNOLOGY, INC.

ACCT#: CKENC

CTI LAB NO: 94106186

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: April 14, 1994

P. O. NO: N/A

SAMPLE ID: Walleye-Whole Body
SOURCE OF SAMPLE: Sta 4/3.01b/42cm
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 03/18/94
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 03/18/94

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|
| 94106186 | | | | | | | |
| METALS | | | | | | | |
| Total Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Grab SW7060 | 04/05/94 | MEC |
| Total Copper (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Grab SW6010 | 04/06/94 | GLM |
| Total Lead (ICP) | < | 5 | mg/Kg a r | 5 | Grab SW6010 | 04/06/94 | GLM |
| Total Mercury (Cold Vapor) | | 0.94 | mg/Kg a r | 0.21 | Grab SW7471 | 04/07/94 | DJM |
| Total Nickel (ICP) | < | 1 | mg/Kg a r | 1 | Grab SW6010 | 04/06/94 | GLM |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/11/94 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/11/94 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/11/94 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/11/94 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/11/94 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/11/94 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/11/94 | XSQ |
| Chlordane | < | 0.125 | mg/Kg a r | 0.125 | Grab SW8080 | 04/11/94 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Lipids, Total | | 3 | % Lipids | 1 | Grab AOAC18.046 | 04/07/94 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab SW3550 | 04/04/94 | SC/DLJ |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |

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Lexington, Kentucky 40503-2921

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# COMMONWEALTH TECHNOLOGY, INC.

ACCT#: CKENC

CTI LAB NO: 94106187

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: April 14, 1994

P. O. NO: N/A

SAMPLE ID: Golden Red Horse-Whole Body
SOURCE OF SAMPLE: Sta 4/1.61b/32cm
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 03/17/94
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 03/18/94

## REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 94106187 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Grab | SW7060 | 04/05/94 | MEC |
| Total Copper (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Grab | SW6010 | 04/06/94 | GLM |
| Total Lead (ICP) | < | 5 | mg/Kg a r | 5 | Grab | SW6010 | 04/06/94 | GLM |
| Total Mercury (Cold Vapor) | < | 0.21 | mg/Kg a r | 0.21 | Grab | SW7471 | 04/07/94 | DJM |
| Total Nickel (ICP) | < | 1 | mg/Kg a r | 1 | Grab | SW6010 | 04/06/94 | GLM |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Chlordane | < | 0.125 | mg/Kg a r | 0.125 | Grab | SW8080 | 04/11/94 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Lipids, Total | | 4 | % Lipids | 1 | Grab | AOAC18.046 | 04/07/94 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab | SW3550 | 04/04/94 | SC/DLJ |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |

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COMMONWEALTH TECHNOLOGY, INC.

ACCT#: CKENC

CTI LAB NO: 94106188

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: April 14, 1994

P. O. NO: N/A

SAMPLE ID: Walleye Fillet
SOURCE OF SAMPLE: Sta 4/3.01b/42cm
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 03/18/94
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 03/18/94

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|
| 94106188 | | | | | | | |
| METALS | | | | | | | |
| Total Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Grab SW7060 | 04/05/94 | MEC |
| Total Copper (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Grab SW6010 | 04/06/94 | GLM |
| Total Lead (ICP) | < | 5 | mg/Kg a r | 5 | Grab SW6010 | 04/06/94 | GLM |
| Total Mercury (Cold Vapor) | | 0.85 | mg/Kg a r | 0.21 | Grab SW7471 | 04/07/94 | DJM |
| Total Nickel (ICP) | < | 1 | mg/Kg a r | 1 | Grab SW6010 | 04/06/94 | GLM |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/11/94 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/11/94 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/11/94 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/11/94 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/11/94 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/11/94 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/11/94 | XSQ |
| Chlordane | < | 0.125 | mg/Kg a r | 0.125 | Grab SW8080 | 04/11/94 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Lipids, Total | | 1 | % Lipids | 1 | Grab AOAC18.046 | 04/07/94 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab SW3550 | 04/04/94 | SC/DLJ |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |

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# COMMONWEALTH TECHNOLOGY, INC.

ACCT#: CKENC

CTI LAB NO: 94106189

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: April 14, 1994

P. O. NO: N/A

SAMPLE ID: Golden Red Horse-Fillet
SOURCE OF SAMPLE: Sta 4/1.61b/32cm
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 03/17/94
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 03/18/94

## REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 94106189 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (Furnace) | | 0.08 | mg/Kg a r | 0.05 | Grab | SW7060 | 04/05/94 | MEC |
| Total Copper (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Grab | SW6010 | 04/06/94 | GLM |
| Total Lead (ICP) | < | 5 | mg/Kg a r | 5 | Grab | SW6010 | 04/06/94 | GLM |
| Total Mercury (Cold Vapor) | | 0.60 | mg/Kg a r | 0.21 | Grab | SW7471 | 04/07/94 | DJM |
| Total Nickel (ICP) | < | 1 | mg/Kg a r | 1 | Grab | SW6010 | 04/06/94 | GLM |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/11/94 | XSQ |
| Chlordane | < | 0.125 | mg/Kg a r | 0.125 | Grab | SW8080 | 04/11/94 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Lipids, Total | | 2 | % Lipids | 1 | Grab | AOAC18.046 | 04/07/94 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab | SW3550 | 04/04/94 | SC/DLJ |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |

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COMMONWEALTH TECHNOLOGY, INC.

ACCT#: CKENC

CTI LAB NO: 94106190

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: April 14, 1994

P. O. NO: N/A

SAMPLE ID: Striper-Fillet
SOURCE OF SAMPLE: Sta 4/2.5lb/37cm
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 03/18/94
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 03/18/94

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 94106190 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (Furnace) | | 0.4 | mg/Kg a r | 0.05 | Grab | SW7060 | 04/05/94 | MEC |
| Total Copper (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Grab | SW6010 | 04/06/94 | GLM |
| Total Lead (ICP) | < | 5 | mg/Kg a r | 5 | Grab | SW6010 | 04/06/94 | GLM |
| Total Mercury (Cold Vapor) | | 1.0 | mg/Kg a r | 0.21 | Grab | SW7471 | 04/07/94 | DJM |
| Total Nickel (ICP) | < | 1 | mg/Kg a r | 1 | Grab | SW6010 | 04/06/94 | GLM |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1254 | | 0.260 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Chlordane | < | 0.125 | mg/Kg a r | 0.125 | Grab | SW8080 | 04/11/94 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Lipids, Total | | 5 | % Lipids | 1 | Grab | AOAC18.046 | 04/07/94 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab | SW3550 | 04/04/94 | SC/DLJ |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |

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COMMONWEALTH TECHNOLOGY, INC.

ACCT#: CKENC

CTI LAB NO: 94106191

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: April 14, 1994

P. O. NO: N/A

SAMPLE ID: Striper-Fillet
SOURCE OF SAMPLE: Sta 4/3.4lb/40cm
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 03/17/94
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 03/18/94

## REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE | METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|---|
| 94106191 | | | | | | | | |
| METALS | | | | | | | | |
| Total Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Grab | SW7060 | 04/05/94 | MEC |
| Total Copper (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Grab | SW6010 | 04/06/94 | GLM |
| Total Lead (ICP) | < | 5 | mg/Kg a r | 5 | Grab | SW6010 | 04/06/94 | GLM |
| Total Mercury (Cold Vapor) | | 0.38 | mg/Kg a r | 0.21 | Grab | SW7471 | 04/07/94 | DJM |
| Total Nickel (ICP) | < | 1 | mg/Kg a r | 1 | Grab | SW6010 | 04/06/94 | GLM |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Grab | SW8080 | 04/13/94 | XSQ |
| Chlordane | < | 0.125 | mg/Kg a r | 0.125 | Grab | SW8080 | 04/11/94 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Lipids, Total | | 6 | % Lipids | 1 | Grab | AOAC18.046 | 04/07/94 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab | SW3550 | 04/04/94 | SC/DLJ |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab | SW8080 | 04/11/94 | XSQ |

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COMMONWEALTH TECHNOLOGY, INC.

ACCT#: CKENC

CTI LAB NO: 94106192

ATTN: Ms. Cindy Lee
TO: Kenvirons, Inc.
P.O. Drawer V
Frankfort KY 40601

DATE: April 14, 1994

P. O. NO: N/A

SAMPLE ID: Striped Bass-Whole Body
SOURCE OF SAMPLE: Sta 4/2.5lb/37cm
SAMPLE MATRIX: Solid

DATE OF COLLECTION: 03/18/94
COLLECTION TIME: Unknown
COLLECTED BY: Client
DATE RECEIVED: 03/18/94

REPORT OF ANALYTICAL RESULTS

| CTI LAB NO./ ANALYTICAL TEST | | RESULTS | UNITS | DETECT LIMIT | SAMP TYPE METHOD | ANALYSIS DATE | BY |
|---|---|---|---|---|---|---|---|
| 94106192 | | | | | | | |
| METALS | | | | | | | |
| Total Arsenic (Furnace) | < | 0.05 | mg/Kg a r | 0.05 | Grab SW7060 | 04/05/94 | MEC |
| Total Copper (ICP) | < | 0.5 | mg/Kg a r | 0.5 | Grab SW6010 | 04/06/94 | GLM |
| Total Lead (ICP) | < | 5 | mg/Kg a r | 5 | Grab SW6010 | 04/06/94 | GLM |
| Total Mercury (Cold Vapor) | | 0.25 | mg/Kg a r | 0.21 | Grab SW7471 | 04/07/94 | DJM |
| Total Nickel (ICP) | < | 1 | mg/Kg a r | 1 | Grab SW6010 | 04/06/94 | GLM |
| ORGANIC - PESTICIDES/PCB'S | | | | | | | |
| Alpha-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Aroclor-1016 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/13/94 | XSQ |
| Aroclor-1221 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/13/94 | XSQ |
| Aroclor-1232 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/13/94 | XSQ |
| Aroclor-1242 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/13/94 | XSQ |
| Aroclor-1248 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/13/94 | XSQ |
| Aroclor-1254 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/13/94 | XSQ |
| Aroclor-1260 | < | 0.250 | mg/Kg a r | 0.25 | Grab SW8080 | 04/13/94 | XSQ |
| Chlordane | < | 0.125 | mg/Kg a r | 0.125 | Grab SW8080 | 04/11/94 | XSQ |
| Chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Cis-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Cis-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Gamma-chlordene | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Lipids, Total | | 12 | % Lipids | 1 | Grab AOAC18.046 | 04/07/94 | JLH |
| Oxychlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Pesticides/PCBs Sample Preparation | | N/A | N/A | N/A | Grab SW3550 | 04/04/94 | SC/DLJ |
| Trans-chlordane | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |
| Trans-nonachlor | < | 0.050 | mg/Kg a r | 0.05 | Grab SW8080 | 04/11/94 | XSQ |

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# APPENDIX E

## Vertical Profile Data from the U.S. Army Corps of Engineers at Three Sites in Lake Cumberland 6/8/94

NASHVILLE DISTRICT

# WATER QUALITY FIELD DATA

CORPS OF ENGINEERS

LOCATION WOL WQ 2 - CRM 461.4 BY RBS, MDC

WEATHER Overcast

WIND VELOCITY 0 AIR TEMPERATURE 70's

COLOR green CURRENT SPEED BAROMETER

REMARKS DUPLICATE ALKALINITY @ 120'

PHTH - 0

TOTAL - 36

(Zero - fill columns 1 - 22)

| STATION | DATE | TIME | DUPLICATE COLUMNS 1-19 ON ALL CARDS |
|---|---|---|---|
| 1 2 3 4 5 6 7 8 9 | 10 11 12 13 14 15 | 16 17 18 19 | |
| 3 M 1 0 1 - 1 2 0 1 0 1 0 | 9 4 0 6 1 0 8 | 1 1 0 1 0 | |

| DEP | TEMP. | D.O. | COND. | PH | ORP | TOT. ALK. | PHTH. ALK. | MAX. DEP. | DIST. BET. BANKS | DIST. FROM L.BANK | SECCHI DISK | WATER SURFACE ELEVATION | INST. DISCHARGE | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 21 22 | 23 24 25 26 | 27 28 29 30 | 31 32 33 34 | 35 36 37 38 | 39 40 41 42 | 43 44 45 | 46 47 48 | 49 50 51 | 52 53 54 55 | 56 57 58 59 | 60 61 62 63 | 64 65 66 67 68 69 | 70 71 72 73 74 75 76 77 78 79 80 | |
| 0 1 0 | 21.1 | 19.2 | 1147 | 18.8 | | 132 | 12 | 18.0 | | | 6.0 | 722.18 | | |
| 0 1 5 | 21.0 | 19.2 | 1148 | 18.8 | | | | | | | | | | |
| 0 1 10 | 21.0 | 19.3 | 1147 | 18.8 | | | | | | | | | | |
| 0 1 15 | 21.5 | 10.0 | 1149 | 18.6 | | | | | | | | | | |
| 0 2 0 | 19.4 | 19.1 | 1149 | 18.1 | | | | | | | | | | |
| 0 2 5 | 17.9 | 18.0 | 1150 | 17.8 | | | | | | | | | | |
| 0 3 0 | 16.1 | 17.3 | 1146 | 17.6 | | | | | | | | | | |
| 0 3 5 | 15.1 | 17.2 | 1146 | 17.5 | | | | | | | | | | |
| 0 4 0 | 14.3 | 17.5 | 1145 | 17.4 | | 130 | 10 | | | | | | | |
| 0 4 5 | 13.9 | 17.6 | 1144 | 17.3 | | | | | | | | | | |
| 0 5 0 | 13.5 | 17.8 | 1144 | 17.3 | | | | | | | | | | |
| 0 5 5 | 12.9 | 18.1 | 1143 | 17.3 | | | | | | | | | | |
| 0 6 0 | 12.4 | 18.2 | 1145 | 17.2 | | | | | | | | | | |
| 0 6 5 | 12.0 | 18.5 | 1147 | 17.2 | | | | | | | | | | |
| 0 7 0 | 11.3 | 18.7 | 1149 | 17.2 | | | | | | | | | | |
| 0 7 5 | 10.9 | 19.0 | 1149 | 17.2 | | | | | | | | | | |
| 0 8 0 | 10.5 | 19.1 | 1152 | 17.2 | | 132 | 10 | | | | | | | |
| 0 8 5 | 10.1 | 19.2 | 1153 | 17.2 | | | | | | | | | | |
| 0 9 0 | 9.8 | 19.4 | 1155 | 17.2 | | | | | | | | | | |
| 0 9 5 | 9.5 | 19.4 | 1155 | 17.2 | | | | | | | | | | |
| 1 0 0 | 9.1 | 19.4 | 1157 | 17.2 | | | | | | | | | | |
| 1 0 5 | 8.9 | 19.4 | 1157 | 17.2 | | | | | | | | | | |
| 1 1 0 | 8.7 | 19.3 | 1158 | 17.2 | | | | | | | | | | |
| 1 1 5 | 8.3 | 19.1 | 1161 | 17.1 | | | | | | | | | | |
| 1 2 0 | 8.0 | 18.8 | 1165 | 17.1 | | 136 | 10 | | | | | | | |

ORN Form 561

CEORN-ED-E

CRM 461.4

| DEP. | TEMP. | D.O. | COND. | PH | ORP | TOT. ALK. | PHTH. ALK. | MAX. DEP. | DIST. BET. BANKS | DIST. FROM L.BANK | SECCHI DISK | WATER SURFACE ELEVATION | INST. DISCHARGE | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 21 22 23 24 25 26 | 27 28 29 30 | 31 32 33 34 | 35 36 37 38 | 39 40 41 42 | 43 44 45 46 | 47 48 49 50 | 51 52 53 54 55 | 56 57 58 59 | 60 61 62 63 | 64 65 66 67 68 69 | 70 71 72 73 74 75 | 76 77 78 79 80 | | |
| 12 15 | 17.14 | 17.17 | 1616 | 17.11 | | | | | | | | | | |
| 13 10 | 17.18 | 18.16 | 1617 | 17.11 | | | | | | | | | | |
| 13 15 | 17.17 | 17.15 | 1619 | 17.11 | | | | | | | | | | |
| 14 10 | 17.17 | 18.14 | 1710 | 17.11 | | | | | | | | | | |
| 14 15 | 17.17 | 18.14 | 1710 | 17.11 | | | | | | | | | | |
| 15 10 | 17.17 | 18.13 | 1711 | 17.11 | | | | | | | | | | |
| 15 15 | 17.16 | 18.13 | 1712 | 17.11 | | | | | | | | | | |
| 16 10 | 17.16 | 18.12 | 1711 | 17.10 | | 142 | 10 | | | | | | | |
| 16 15 | 17.16 | 18.12 | 1711 | 17.10 | | | | | | | | | | |
| 17 10 | 17.16 | 18.12 | 1712 | 17.10 | | | | | | | | | | |
| 17 15 | 17.15 | 17.12 | 1713 | 17.10 | | | | | | | | | | |
| 18 10 | 17.15 | 17.17 | 1713 | 17.10 | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

NASHVILLE DISTRICT

# WATER QUALITY FIELD DATA

CORPS OF ENGINEERS

LOCATION WOL WQ 3 - CRM 469.7 BY MDC, RBS

WEATHER PARTLY CLOUDY

WIND VELOCITY 0-5 AIR TEMPERATURE ≈80

COLOR GREEN / CLEAR CURRENT SPEED BAROMETER

REMARKS

(Zero - fill columns 1 - 22)

| STATION (1-9) | DATE (10-15) | TIME (16-19) | DUPLICATE COLUMNS 1-19 ON ALL CARDS |
|---|---|---|---|
| 3W0L420003 | 940608 | 1230 | |

| DEP. (23-26) | TEMP. (27-30) | D.O. (31-34) | COND. (35-38) | PH (39-42) | ORP (43-46) | TOT. ALK. (47-50) | PHTH ALK. (51-54) | MAX. DEP. (55-58) | DIST. BET. BANKS (59-62) | DIST. FROM L. BANK (63-66) | SECCHI DISK (67-70) | WATER SURFACE ELEVATION (71-76) | INST. DISCHARGE (77-80) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | 24.8 | 8.5 | 1142 | 8.8 | | | | 1184 | | | 5.1 | 1722.8 | |
| 005 | 24.8 | 9.4 | 1150 | 8.8 | | | | | | | | | |
| 010 | 23.9 | 9.7 | 1150 | 8.8 | | | | | | | | | |
| 015 | 20.5 | 10.0 | 1147 | 8.6 | | | | | | | | | |
| 020 | 19.2 | 9.3 | 1146 | 8.3 | | | | | | | | | |
| 025 | 17.6 | 8.4 | 1145 | 8.10 | | | | | | | | | |
| 030 | 16.2 | 7.4 | 1143 | 7.9 | | | | | | | | | |
| 035 | 15.3 | 7.1 | 1141 | 7.7 | | | | | | | | | |
| 040 | 14.1 | 7.7 | 1144 | 7.6 | | | | | | | | | |
| 045 | 13.8 | 7.8 | 1140 | 7.6 | | | | | | | | | |
| 050 | 13.2 | 8.2 | 1138 | 7.5 | | | | | | | | | |
| 055 | 12.7 | 8.4 | 1139 | 7.5 | | | | | | | | | |
| 060 | 12.2 | 8.5 | 1143 | 7.4 | | | | | | | | | |
| 065 | 11.9 | 8.6 | 1145 | 7.4 | | | | | | | | | |
| 070 | 11.3 | 8.7 | 1151 | 7.3 | | | | | | | | | |
| 075 | 11.0 | 8.8 | 1152 | 7.3 | | | | | | | | | |
| 080 | 10.6 | 9.1 | 1151 | 7.3 | | | | | | | | | |
| 085 | 10.2 | 9.2 | 1151 | 7.3 | | | | | | | | | |
| 090 | 9.6 | 9.4 | 1152 | 7.3 | | | | | | | | | |
| 095 | 9.3 | 9.4 | 1154 | 7.2 | | | | | | | | | |
| 100 | 8.9 | 9.2 | 1153 | 7.2 | | | | | | | | | |
| 105 | 8.3 | 9.10 | 1154 | 7.2 | | | | | | | | | |
| 110 | 8.1 | 8.7 | 1157 | 7.1 | | | | | | | | | |
| 115 | 8.0 | 8.6 | 1156 | 7.1 | | | | | | | | | |
| 120 | 7.9 | 8.4 | 1157 | 7.1 | | | | | | | | | |

SENT BY:ORNIM ; 6-23-94 ;10:59AM ; CORPS OF ENGINEERS→ FRANKFORT, KY;# 6

CRM 469.7

| DEP. | TEMP. | D.O. | COND. | PH | ORP | TOT. ALK. | PHTH. ALK. | MAX. DEP. | DIST. BET. BANKS | DIST. FROM L.BANK | SECCHI DISK | WATER SURFACE ELEVATION | INST. DISCHARGE | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1125 | 17.8 | 18.2 | 1158 | 17.1 | | | | | | | | | | |
| 1130 | 17.8 | 18.3 | 1157 | 17.1 | | | | | | | | | | |
| 1135 | 17.7 | 18.3 | 1158 | 17.1 | | | | | | | | | | |
| 1140 | 17.5 | 18.4 | 1160 | 17.0 | | | | | | | | | | |
| 1145 | 17.5 | 18.4 | 1160 | 17.0 | | | | | | | | | | |
| 1150 | 17.4 | 18.3 | 1160 | 17.0 | | | | | | | | | | |
| 1155 | 17.4 | 18.2 | 1162 | 17.0 | | | | | | | | | | |
| 1200 | 17.3 | 18.1 | 1163 | 17.0 | | | | | | | | | | |
| 1205 | 17.3 | 18.0 | 1163 | 17.0 | | | | | | | | | | |
| 1210 | 17.3 | 17.9 | 1163 | 17.0 | | | | | | | | | | |
| 1215 | 17.3 | 17.8 | 1165 | 17.0 | | | | | | | | | | |
| 1218 | 17.3 | 17.6 | 1165 | 17.0 | | | | | | | | | | |

NASHVILLE DISTRICT

# WATER QUALITY FIELD DATA

CORPS OF ENGINEERS

LOCATION WOL WQ 4 - CRM 487.0 BY MOC, RBS

WEATHER PARTLY CLOUDY

WIND VELOCITY 0-5 AIR TEMPERATURE 80's

COLOR GREEN / CLEAR CURRENT SPEED BAROMETER

REMARKS

(Zero-fill columns 1-22)

| STATION (1-9) | DATE (10-15) | TIME (16-19) | DUPLICATE COLUMNS 1-19 ON ALL CARDS |
|---|---|---|---|
| 3WQL2 | 990494 | 0605 | 1530 |

| DEP. (20-22) | TEMP. (23-26) | D.O. (27-30) | COND. (31-34) | PH (35-38) | ORP (39-41) | TOT. ALK. (42-45) | PHTH. ALK. (46-48) | MAX. DEP. (49-51) | DIST. BET. BANKS (52-55) | DIST. FROM L.BANK (55-59) | SECCHI DISK (60-63) | WATER SURFACE ELEVATION (64-69) | INST. DISCHARGE (70-75) | (76-80) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | 25.9 | 9.2 | 1.161 | 8.8 | | 38 | 14 | 156 | | | 6.7 | 722.8 | | |
| 005 | 25.3 | 9.4 | 1.158 | 8.8 | | | | | | | | | | |
| 010 | 25.1 | 9.5 | 1.156 | 8.7 | | | | | | | | | | |
| 015 | 24.9 | 10.6 | 1.163 | 8.7 | | | | | | | | | | |
| 020 | 18.9 | 9.3 | 1.150 | 8.10 | | | | | | | | | | |
| 025 | 17.9 | 8.2 | 1.153 | 7.8 | | | | | | | | | | |
| 030 | 16.7 | 7.0 | 1.177 | 7.6 | | | | | | | | | | |
| 035 | 15.6 | 6.6 | 1.184 | 7.5 | | | | | | | | | | |
| 040 | 14.7 | 6.9 | 1.185 | 7.4 | | 38 | 10 | | | | | | | |
| 045 | 14.1 | 7.2 | 1.179 | 7.3 | | | | | | | | | | |
| 050 | 13.4 | 7.6 | 1.163 | 7.3 | | | | | | | | | | |
| 055 | 12.5 | 8.4 | 1.139 | 7.3 | | | | | | | | | | |
| 060 | 12.1 | 8.7 | 1.140 | 7.2 | | | | | | | | | | |
| 065 | 11.7 | 8.8 | 1.145 | 7.2 | | | | | | | | | | |
| 070 | 11.3 | 8.9 | 1.146 | 7.2 | | | | | | | | | | |
| 075 | 10.9 | 9.1 | 1.147 | 7.2 | | | | | | | | | | |
| 080 | 10.5 | 9.2 | 1.148 | 7.1 | | 32 | 0 | | | | | | | |
| 085 | 10.1 | 8.9 | 1.148 | 7.1 | | | | | | | | | | |
| 090 | 9.2 | 8.6 | 1.151 | 7.1 | | | | | | | | | | |
| 095 | 8.9 | 8.5 | 1.152 | 7.0 | | | | | | | | | | |
| 100 | 8.8 | 8.4 | 1.152 | 7.0 | | | | | | | | | | |
| 105 | 8.6 | 8.4 | 1.153 | 7.0 | | | | | | | | | | |
| 110 | 8.3 | 8.5 | 1.153 | 6.9 | | | | | | | | | | |
| 115 | 8.2 | 8.5 | 1.153 | 6.9 | | | | | | | | | | |
| 120 | 8.1 | 8.5 | 1.155 | 6.9 | | 32 | 0 | | | | | | | |

CRM 487.0

| DEP | TEMP. | D.O. | COND. | PH | ORP | TOT. ALK. | PHTH. ALK. | MAX. DEP. | DIST. BET. BANKS | DIST. FROM L.BANK | SECCHI DISK | WATER SURFACE ELEVATION | INST. DISCHARGE | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 21 22 | 23 24 25 26 | 27 28 29 30 | 31 32 33 34 | 35 36 37 38 | 39 40 41 42 | 43 44 45 | 46 47 48 | 49 50 51 | 52 53 54 55 | 56 57 58 59 | 60 61 62 63 | 64 65 66 67 68 69 | 70 71 72 73 74 75 | 76 77 78 79 80 |
| 1 0 15 | 17.17 | 18.15 | 1.517 | 16.19 | | | | | | | .1 | 1.1 | | |
| 1 2 10 | 17.18 | 17.15 | 1.517 | 16.19 | | | | | | | .1 | 1.1 | | |
| 1 3 15 | 17.17 | 18.15 | 1.517 | 16.19 | | | | | | | .1 | 1.1 | | |
| 1 4 10 | 17.17 | 18.15 | 1.517 | 16.19 | | | | | | | .1 | 1.1 | | |
| 1 4 15 | 17.16 | 18.13 | 1.518 | 16.19 | | | | | | | .1 | 1.1 | | |
| 1 5 10 | 17.16 | 18.13 | 1.518 | 16.19 | | 34 | 0 | | | | .1 | 1.1 | | |
| 1 5 15 | 17.16 | 18.12 | 1.518 | 16.19 | | | | | | | .1 | 1.1 | | |
| | .1 | .1 | | .1 | | | | | | | .1 | 1.1 | | |
| | .1 | .1 | | .1 | | | | | | | .1 | 1.1 | | |
| | .1 | .1 | | .1 | | | | | | | .1 | 1.1 | | |
| | .1 | .1 | | .1 | | | | | | | .1 | 1.1 | | |
| | .1 | .1 | | .1 | | | | | | | .1 | 1.1 | | |
| | .1 | .1 | | .1 | | | | | | | .1 | 1.1 | | |
| | .1 | .1 | | .1 | | | | | | | .1 | 1.1 | | |
| | .1 | .1 | | .1 | | | | | | | .1 | 1.1 | | |

# APPENDIX F

## Phyto- and Zooplankton Data

## Collected by the Town of Jamestown

SPECIES LIST FOR LAKE CUMBERLAND ZOOPLANKTON SAMPLES

GROUP
R = ROTIFERS
CL = CLADOCERN
CO= COPEPODS

| GROUP | CODE | GENUS SPECIES |
|---|---|---|
| R | ASPLSPP | Asplanchna spp. |
| | FILILONG | Filinia longiseta |
| | FILIOPOL | Filinia opolensis |
| | FILISPP | Filinia spp. |
| | KELLLONG | Kellicottia longispina |
| | KERACOCH | Keratella cochlearis |
| | KERAHIEM | Keratella hiemalis |
| | LECASPP | Lecane spp. |
| | MONOSPP | Monostyla spp. |
| | NOTHACUM | Notholca accuminata |
| | PHILSPP | Philodina spp. |
| | POLYSPP | Polyarthra spp. |
| | SYNCSPP | Synchaeta spp. |
| | TRICSPP | Trichocera spp. |
| CL | BOSMLONG | Bosmina longirostris |
| | BOSMIMMA | Bosmina immatures |
| | DAPHGAME | Daphnia galeata mendotae |
| | DIAPIMMA | Daphnia immatures |
| CO | CALOCOPE | Calanoid copepods |
| | CYCLCOPE | Cyclopoid copepods |
| | COPEPODI | copepodites |
| | NAUPSP1 | nauplii sp. 1 |
| | NAUPSP2 | nauplii sp. 2 |

KENVIRON LAKE CUMBERLAND ZOOPLANKTON SAMPLES
DENSITY DATA IN ORGANISMS PER CUBIC METER

| Date | [ | 3-29-93 | ] | [ | | 3-30-93 | | ] |
|---|---|---|---|---|---|---|---|---|
| ID | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| STATION | STA 1-R1 | STA 1-R2 | STA 1-R3 | STA 2-R1 | STA 2-R2 | STA 2-R3 | STA 3-R1 | STA 3-R2 |
| ASPLSPP | 73 | 272 | 277 | 41 | 24 | 27 | 116 | 147 |
| FILILONG | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FILIOPOL | 73 | 78 | 40 | 24 | 24 | 18 | 12 | 0 |
| FILISPP | 12 | 39 | 0 | 0 | 0 | 0 | 0 | 0 |
| KELLLON | 159 | 97 | 119 | 138 | 73 | 109 | 58 | 171 |
| KERACOC | 550 | 1264 | 968 | 446 | 391 | 345 | 475 | 550 |
| KERAHIE | 0 | 39 | 59 | 8 | 41 | 27 | 12 | 0 |
| LECASPP | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MONOSP | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NOTHAC | 0 | 0 | 20 | 0 | 8 | 0 | 81 | 0 |
| PHILSPP | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| POLYSPP | 24 | 97 | 375 | 89 | 41 | 109 | 0 | 147 |
| SYNCSPP | 147 | 739 | 1027 | 105 | 139 | 145 | 440 | 452 |
| TRICSPP | 0 | 19 | 20 | 0 | 0 | 0 | 0 | 0 |
| BOSMLO | 98 | 97 | 158 | 162 | 49 | 127 | 162 | 330 |
| BOSMIMM | 0 | 19 | 0 | 0 | 0 | 0 | 0 | 0 |
| DAPHGA | 37 | 19 | 138 | 41 | 8 | 18 | 69 | 49 |
| DIAPIMMA | 0 | 0 | 0 | 0 | 0 | 45 | 81 | 86 |
| CALOCOP | 0 | 0 | 0 | 0 | 0 | 0 | 35 | 0 |
| CYCLCOP | 147 | 136 | 119 | 32 | 49 | 36 | 231 | 147 |
| COPEPO | 196 | 156 | 79 | 146 | 114 | 73 | 81 | 37 |
| NAUPSP1 | 697 | 1011 | 1047 | 551 | 464 | 617 | 671 | 599 |
| NAUPSP2 | 37 | 97 | 119 | 113 | 90 | 163 | 23 | 0 |
| DENSITY | 2273 | 4181 | 4563 | 1896 | 1516 | 1860 | 2546 | 2713 |

KENVIRON LAKE CUMBERLAND ZOOPLANKTON SAMPLES
DENSITY DATA IN ORGANISMS PER CUBIC METER

| Date | 3-30-93 | [ | | | 5-11-93 | | ] |
|---|---|---|---|---|---|---|---|
| ID | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| STATION | STA 3-R3 | STA 1-7-1 | STA 1-7-2 | STA 1-7-3 | STA 1-70-1 | STA 1-70-2 | STA 1-70-3 |
| ASPLSPP | 28 | 114 | 164 | 178 | 134 | 600 | 259 |
| FILILONG | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FILIOPOL | 28 | 0 | 0 | 178 | 0 | 0 | 37 |
| FILISPP | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| KELLLON | 83 | 1142 | 740 | 415 | 738 | 1200 | 963 |
| KERACO | 597 | 1713 | 822 | 2370 | 2350 | 1500 | 1741 |
| KERAHIE | 0 | 343 | 740 | 948 | 134 | 200 | 815 |
| LECASPP | 0 | 285 | 411 | 59 | 134 | 300 | 37 |
| MONOSP | 0 | 914 | 1972 | 178 | 2954 | 2900 | 259 |
| NOTHAC | 28 | 0 | 82 | 0 | 0 | 0 | 0 |
| PHILSPP | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| POLYSPP | 111 | 2512 | 3780 | 2430 | 2350 | 2600 | 2407 |
| SYNCSPP | 722 | 457 | 575 | 178 | 671 | 1400 | 407 |
| TRICSPP | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BOSMLO | 333 | 114 | 82 | 59 | 67 | 0 | 111 |
| BOSMIM | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DAPHGA | 125 | 1884 | 1890 | 1244 | 4095 | 4300 | 1667 |
| DIAPIMM | 28 | 1884 | 1233 | 1363 | 2148 | 2900 | 1111 |
| CALOCO | 56 | 171 | 0 | 0 | 0 | 0 | 0 |
| CYCLCOP | 222 | 2398 | 1068 | 889 | 2685 | 2400 | 667 |
| COPEPO | 83 | 514 | 493 | 0 | 269 | 300 | 111 |
| NAUPSP1 | 750 | 285 | 3862 | 2548 | 3558 | 4900 | 2296 |
| NAUPSP2 | 42 | 0 | 0 | 0 | 0 | 0 | 0 |
| DENSITY | 3236 | 14731 | 17914 | 13037 | 22287 | 25500 | 12889 |

KENVIRON LAKE CUMBERLAND ZOOPLANKTON SAMPLES
DENSITY DATA IN ORGANISMS PER CUBIC METER

| Date | [ | | | 5-12-93 | | ] | [ 8-18-93 ] | |
|---|---|---|---|---|---|---|---|---|
| ID | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| STATION | STA II | STA II-3 | STA II-6 | STA 3-1 | STA 3-2 | STA 3-3 | STA 1-1 | STA 1-2 |
| ASPLSPP | 259 | 0 | 0 | 120 | 81 | 0 | 0 | 0 |
| FILILONG | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FILIOPOL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FILISPP | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| KELLLON | 778 | 0 | 708 | 271 | 365 | 1242 | 1181 | 2199 |
| KERACOC | 1037 | 1333 | 1314 | 1384 | 1215 | 745 | 8264 | 15394 |
| KERAHIE | 0 | 148 | 202 | 421 | 324 | 373 | 590 | 440 |
| LECASPP | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 440 |
| MONOSP | 0 | 0 | 0 | 0 | 0 | 124 | 0 | 440 |
| NOTHAC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PHILSPP | 0 | 0 | 0 | 30 | 0 | 0 | 0 | 0 |
| POLYSPP | 3111 | 1630 | 2426 | 2197 | 1904 | 2547 | 17118 | 24190 |
| SYNCSPP | 259 | 593 | 809 | 301 | 365 | 621 | 2951 | 4398 |
| TRICSPP | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BOSMLO | 0 | 0 | 101 | 0 | 0 | 0 | 590 | 1759 |
| BOSMIMM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DAPHGA | 13222 | 6963 | 7379 | 1083 | 3038 | 1863 | 33056 | 21111 |
| DIAPIMMA | 28778 | 16889 | 9805 | 963 | 1094 | 1926 | 4132 | 4838 |
| CALOCOP | 0 | 0 | 0 | 0 | 0 | 0 | 590 | 0 |
| CYCLCOP | 3370 | 4296 | 1921 | 993 | 1620 | 1863 | 22431 | 16273 |
| COPEPO | 259 | 0 | 202 | 30 | 0 | 62 | 3542 | 1759 |
| NAUPSP1 | 2593 | 3259 | 2123 | 1505 | 2269 | 3541 | 17708 | 14074 |
| NAUPSP2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DENSITY | 53667 | 35111 | 26988 | 9299 | 12274 | 14907 | 112153 | 107315 |

KENVIRON LAKE CUMBERLAND ZOOPLANKTON SAMPLES
DENSITY DATA IN ORGANISMS PER CUBIC METER

| Date | [ | | | 8-18-93 | | | ] | 3-16-94 |
|---|---|---|---|---|---|---|---|---|
| ID | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| STATION | STA 1-3 | STA 2-1 | STA 2-2 | STA 2-3 | STA 3-1 | STA 3-2 | STA 3-3 | STA 1A |
| ASPLSPP | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 37 |
| FILILONG | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 37 |
| FILIOPOL | 0 | 0 | 0 | 0 | 1181 | 295 | 347 | 147 |
| FILISPP | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| KELLLON | 1250 | 1875 | 425 | 729 | 2361 | 1476 | 1736 | 810 |
| KERACOC | 12500 | 2813 | 4253 | 4375 | 12396 | 11806 | 7639 | 2503 |
| KERAHIE | 833 | 0 | 0 | 0 | 0 | 590 | 0 | 184 |
| LECASPP | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MONOSP | 417 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NOTHAC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PHILSPP | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| POLYSPP | 17083 | 15938 | 19141 | 16771 | 5903 | 5608 | 4514 | 258 |
| SYNCSPP | 2083 | 0 | 1276 | 729 | 1181 | 1476 | 694 | 147 |
| TRICSPP | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BOSMLO | 1250 | 0 | 425 | 2188 | 2951 | 3837 | 5208 | 184 |
| BOSMIMM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DAPHGA | 25000 | 99375 | 58698 | 79479 | 33646 | 32170 | 52083 | 331 |
| DIAPIMMA | 2917 | 20625 | 12760 | 8750 | 1771 | 2951 | 4514 | 37 |
| CALOCOP | 0 | 938 | 0 | 0 | 0 | 0 | 0 | 0 |
| CYCLCOP | 11250 | 14063 | 19566 | 16771 | 32465 | 25382 | 27083 | 147 |
| COPEPO | 4583 | 1875 | 3403 | 5104 | 3542 | 3837 | 3472 | 221 |
| NAUPSP1 | 11250 | 15000 | 11484 | 9479 | 20660 | 10625 | 12500 | 957 |
| NAUPSP2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DENSITY | 90417 | 172500 | 131432 | 144375 | 118056 | 100052 | 119792 | 5999 |

KENVIRON LAKE CUMBERLAND ZOOPLANKTON SAMPLES
DENSITY DATA IN ORGANISMS PER CUBIC METER

| Date | [ | | 3-16-94 | | ] | [ | 3-17-94 | ] |
|---|---|---|---|---|---|---|---|---|
| ID | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 |
| STATION | STA 1B | STA 1C | STA 2A | STA 2B | STA 2C | STA 3A | STA 3B | STA 3C |
| ASPLSPP | 35 | 0 | 174 | 87 | 694 | 231 | 313 | 243 |
| FILILONG | 0 | 0 | 116 | 0 | 0 | 0 | 0 | 0 |
| FILIOPOL | 278 | 0 | 347 | 521 | 694 | 324 | 208 | 208 |
| FILISPP | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| KELLLON | 417 | 188 | 926 | 1042 | 1042 | 1435 | 1563 | 903 |
| KERACOC | 3021 | 3000 | 7581 | 8420 | 8056 | 3935 | 4688 | 2396 |
| KERAHIE | 243 | 63 | 463 | 87 | 69 | 278 | 573 | 417 |
| LECASPP | 0 | 0 | 116 | 260 | 0 | 93 | 52 | 174 |
| MONOSP | 69 | 0 | 58 | 0 | 0 | 0 | 104 | 0 |
| NOTHAC | 0 | 0 | 0 | 87 | 69 | 0 | 0 | 0 |
| PHILSPP | 0 | 0 | 405 | 434 | 208 | 139 | 260 | 69 |
| POLYSPP | 35 | 63 | 1736 | 521 | 1111 | 417 | 469 | 521 |
| SYNCSPP | 278 | 125 | 116 | 87 | 347 | 185 | 365 | 174 |
| TRICSPP | 0 | 0 | 0 | 0 | 208 | 463 | 365 | 278 |
| BOSMLO | 208 | 0 | 0 | 174 | 0 | 46 | 52 | 69 |
| BOSMIMM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DAPHGA | 243 | 0 | 0 | 0 | 0 | 0 | 0 | 69 |
| DIAPIMMA | 35 | 125 | 58 | 87 | 139 | 0 | 208 | 174 |
| CALOCOP | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CYCLCOP | 729 | 0 | 0 | 0 | 69 | 0 | 0 | 104 |
| COPEPO | 243 | 813 | 231 | 0 | 486 | 694 | 417 | 139 |
| NAUPSP1 | 1875 | 0 | 4687 | 5122 | 6597 | 1806 | 3906 | 2188 |
| NAUPSP2 | 0 | 0 | 0 | 87 | 69 | 0 | 52 | 35 |
| DENSITY | 7708 | 4375 | 17014 | 17014 | 19861 | 10046 | 13594 | 8160 |

DATA FOR LAKE CUMBERLAND PHYTOPLANKTON
AUG 1993 SAMPLES

ALL VALUES ARE CELLS / LITER

CODE CLASS
BAC = Bacillariophyceae
CHL = Chlorophyceae
CHR = Chrysophyceae
CRY = Cryptophyceae
CYA = Cyanophyceae
EUG = Euglenophyceae
DIN = Pyrrophyceae

| ID | | A1 | A2 | A3 | B1 | B2 | B3 | C1 | C2 | C3 |
|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE | | Sta 1-1 | Sta 1-2 | Sta 1-3 | Sta1 2-1 | Sta 2-2 | Sta 2-3 | Sta 3-1 | Sta 3-2 | Sta 3-3 |
| DATE | | 081893 | 081893 | 081893 | 081893 | 081893 | 081893 | 081893 | 081893 | 081893 |
| | GENUS | | | | | | | | | |
| CYA | Aphanacapsa | 0 | 0 | 0 | 0 | 0 | 30838 | 0 | 0 | 0 |
| CYA | Chroococcus | 622 | 1050 | 430 | 614 | 2640 | 771 | 2088 | 2184 | 1693 |
| CYA | Dactylococcopsis | 207 | 263 | 0 | 102 | 720 | 0 | 0 | 514 | 199 |
| CYA | Microcystis | 0 | 0 | 0 | 0 | 0 | 30838 | 0 | 0 | 0 |
| CYA | Stytonema | 0 | 0 | 0 | 0 | 4321 | 0 | 0 | 0 | 0 |
| CHR | Dinobryon | 0 | 131 | 323 | 205 | 960 | 514 | 161 | 0 | 0 |
| CHL | Chlamydomonas | 2697 | 788 | 968 | 307 | 3841 | 2570 | 1927 | 771 | 1493 |
| CHL | Cosmarium | 0 | 0 | 108 | 0 | 240 | 0 | 0 | 128 | 0 |
| CHL | Eudorina | 10582 | 2101 | 1613 | 3275 | 4801 | 7196 | 2088 | 0 | 0 |
| CHL | Oocystis | 1037 | 525 | 108 | 921 | 0 | 257 | 0 | 642 | 299 |
| CHL | Sphaerocystis | 0 | 0 | 0 | 512 | 0 | 1028 | 0 | 6168 | 0 |
| CHL | Coccoid Palmate Greens | 11204 | 37946 | 19244 | 23130 | 85455 | 61934 | 22647 | 13620 | 6970 |
| EUG | Euglena | 0 | 131 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EUG | Trachelomonas | 0 | 263 | 0 | 0 | 0 | 0 | 161 | 0 | 0 |
| DIN | Peridinium | 0 | 0 | 108 | 0 | 0 | 0 | 0 | 0 | 0 |
| BAC | Achnanthes | 0 | 0 | 0 | 102 | 0 | 0 | 0 | 0 | 996 |
| BAC | Asterionella | 1660 | 0 | 215 | 0 | 1200 | 514 | 0 | 2955 | 0 |
| BAC | Aulocosira | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 257 | 0 |
| BAC | Aulocosira | 2282 | 0 | 1290 | 0 | 0 | 0 | 0 | 514 | 0 |
| BAC | Cocconeis | 0 | 131 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BAC | Cyclotella | 1660 | 1444 | 860 | 102 | 960 | 257 | 482 | 642 | 0 |
| BAC | Cyclotella | 830 | 394 | 430 | 921 | 1920 | 257 | 1927 | 1413 | 398 |
| BAC | Cymbella | 0 | 0 | 0 | 102 | 240 | 0 | 161 | 0 | 100 |
| BAC | Fragilaria | 88596 | 19564 | 28705 | 29373 | 35286 | 53453 | 54931 | 43559 | 42116 |
| BAC | Navicula | 3320 | 657 | 645 | 102 | 1440 | 1285 | 321 | 899 | 299 |
| BAC | Nitzschia | 622 | 263 | 108 | 0 | 0 | 257 | 161 | 128 | 0 |
| | TOTAL | 125320 | 65651 | 55152 | 59769 | 144026 | 191969 | 87054 | 74398 | 54561 |

Species List and Code for Lake Cumberland Phytoplankton

| CODE | CLASS |
|---|---|
| BAC | = Bacillariophyceae |
| CHL | = Chlorophyceae |
| CHR | = Chrysophyceae |
| CRY | = Cryptophyceae |
| CYA | = Cyanophyceae |
| DIN | = Dinophyceae |
| EUG | = Euglenophyceae |

| CLASS CODE | TAXON CODE | GENUS | SPECIES |
|---|---|---|---|
| CYA | OSCILLAT | Oscillatoria | |
| CHR | DINOBRYO | Dinobryon | |
| CHR | ONCHOROM | Ochromonas | |
| CHL | CHLAMYDE | Chlamydomonas | |
| CHL | CLOSTERI | Closterium | |
| CHL | DICTYOSP | Dictyosphaerium | |
| CHL | EUDORINA | Eudorina | |
| CHL | GONIUM | Gonium | |
| CHL | SCENEDES | Scenedesmus | |
| CRY | CRYPTOMO | Cryptomonas | |
| EUG | EUGLENA | Euglena | |
| EUG | PHACUS | Phacus | |
| EUG | TRACHLEM | Trachelomonas | |
| DIN | GLENODIN | Glenodinium | |
| DIN | GYMNODIN | Gymnodinium | |
| BAC | ACHNANTH | Achnanthes | |
| BAC | AMPHORA | Amphora | |
| BAC | ANOMOEON | Anomoeoneis | |
| BAC | ASTEFORM | Asterionella | formosa Hass. |
| BAC | AULODIST | Aulocosira | distans |
| BAC | AULOITAL | Aulocosira | italica |
| BAC | CALONEIS | Caloneis | |
| BAC | CYCLCOMT | Cyclotella | comta (Ehr.) Kutz. |
| BAC | CYCLOTEL | Cyclotella | stelligera (Cl. and Grun.) V. H. |
| BAC | CYMBELLA | Cymbella | affinis Kutz. |
| BAC | CYMBELLA | Cymbella | microcephala Grun. |
| BAC | CYMBELLA | Cymbella | cymbiformis Ag. |
| BAC | DIATOMA | Diatoma | anceps (Ehr.) Kirchn. |
| BAC | ENTOMONE | Entomoneis | |
| BAC | EUNOTIA | Eunotia | |
| BAC | FRAGCROT | Fragilaria | crotonensis Kitton |
| BAC | GOMPHONE | Gomphonema | |
| BAC | MELOVARI | Melosira | varians C. D. Agardh |
| BAC | NAVICULA | Navicula | |
| BAC | NITZSCHI | Nitzschia | |
| BAC | PINNULAR | Pinnularia | |
| BAC | STEPHANO | Stephanodiscus | |
| BAC | SURIRELL | Surirella | |
| BAC | SYNEDRA | Synedra | ulna (Nitz.) Ehr. |
| BAC | SYNERUFA | Synedra | rumpens var. familiaris (Kutz.) Hust. |

RAW DATA FOR LAKE CUMBERLAND PHYTOPLANKTON SAMPLES
L=LIVE CELLS  D=DEAD CELLS

| ID | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE | Sta 1 | | Sta 1 | | Sta 2 | | Sta 3 | | Sta 1 | | Sta 1-70 | | Sta 1-70 | | Sta 1-7-1 | | Sta 1-7-3 | | Sta 2-1 | | Sta 2-2 | | Sta 2-2 | | |
| DATE | 032993 | | 032993 | | 033093 | | 033093 | | 051193 | | 051193 | | 051193 | | 051193 | | 051293 | | 051293 | | 051293 | | 051293 | | |
| SLIDE VOL | 0.02 | | 0.02 | | 0.02 | | 0.02 | | 0.02 | | 0.02 | | 0.02 | | 0.02 | | 0.02 | | 0.02 | | 0.02 | | 0.02 | | |
| AREA | | | | | | | | | | | | | | | | | | | | | | | | | |
| TAXON | L | D | L | D | L | D | L | D | L | D | L | D | L | D | L | D | L | D | L | D | L | D | L | D | L |
| CODE | | | | | | | | | | | | | | | | | 320 | | | | | | | | |
| OSCILLAT | | | | | | | | | | | | 2 | | 2 | | | | 4 | | | | 1 | | | |
| DINOBRYO | | | | | | | | | | | | 1 | | | | | | | | | | | | | |
| ONCHOROM | | | | | 1 | | | | | | | | | | | | | | | | | | | | |
| CHLAMYDE | | | | | | 1 | | | | | | | | | 1 | | | | | | | | | | |
| CLOSTERI | | | | | | | | | | | | | 6 | | | | | | | | | | | | |
| DICTYOSP | | | | | | | | | | | | | | | | | | | | | | | | | |
| EUDORINA | 30 | | | | | | | | | | | | | | | | 4 | | | | | | | | |
| GONIUM | | | 4 | | | | | | | | | | | | | | 2 | | | | | | | | |
| SCENEDES | | | | | | | 1 | | 34 | | 99 | | 179 | | 169 | | 156 | | 245 | | 196 | | 260 | | 227 |
| CRYPTOMO | | | | | | | | | 15 | | 1 | | 8 | | 3 | | 2 | | 4 | | 3 | | 2 | | 2 |
| EUGLENA | 1 | | | | 2 | | | | 1 | | 1 | | | | | | | | | | | | | | |
| PHACUS | 2 | | | | | 1 | | | 1 | | | | 1 | | 2 | | 1 | | 4 | | 8 | | 8 | | 8 |
| TRACHELM | | | | | | | 1 | | 1 | | | 1 | | | | | 2 | | 2 | | | | | | 1 |
| GLENODIN | 1 | 1 | | | 2 | | 5 | | 3 | | 6 | | 3 | | 5 | | 9 | | 7 | | 6 | | 12 | | 15 |
| GYMNODIN | | | | | | | | | | | | | | | | | | | 2 | | | | | | 39 |
| ACHNANTH | | 6 | | 4 | | 7 | | 6 | | | | | | | | | | | | | | | | | |
| AMPHORA | | | | | | 1 | | | | | | | | | | | | | | | | | | | |
| ANOMOEON | | | | | | | | 1 | | | | | 3 | 7 | 6 | 2 | 3 | 1 | 11 | 2 | | | 7 | | 4 |
| ASTEFORM | 5 | 5 | 18 | 1 | 19 | | 27 | 1 | 7 | 1 | | | 19 | 3 | 55 | 13 | 42 | 13 | 6 | 1 | 5 | 1 | 1 | | |
| AULCOIST | 2 | 2 | | | | | 27 | 1 | 32 | 16 | 47 | 16 | 56 | 10 | 57 | 15 | 52 | 17 | 22 | 4 | 32 | 3 | 17 | 4 | |
| AULOITAL | 10 | 6 | 22 | 3 | 6 | | 96 | 3 | 71 | 37 | 71 | 23 | | | | | | | | | | | | | |
| CALONEIS | | 1 | | | | | | | | 1 | | | | | | | 12 | 3 | 1 | 3 | 2 | | 1 | 1 | 2 |
| CYCLCOMT | | | | | 1 | | 1 | | 3 | 1 | 4 | | 2 | | 2 | | | 19 | 4 | | | 12 | | 6 | |
| CYCLOTEL | | 17 | | 5 | | 14 | | 18 | | 20 | 1 | 19 | | 3 | | 14 | | | | | | | | 1 | |
| CYMBELLA | 1 | 2 | | 1 | 2 | 1 | 2 | 4 | | | | | | | | | | | | | | | | | |
| CYMBELLA | | 7 | | | | | | | | | | | | | | | | | | | | | | | |
| CYMBELLA | | | | | | 2 | | 2 | | | | | | | | | | | | | | | | | |
| DIATOMA | | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| ENTOMONE | | | | | | | | | | 1 | | | | | | | | | | | | | | | |
| EUNOTIA | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| FRAGCROT | | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| GOMPHONE | | 2 | | 1 | 2 | 1 | 3 | 2 | | 1 | | | | | | | | 1 | | | | | | 2 | |
| MELOVARI | | | | | | | 3 | | | | | | | 2 | | | | | | | | | | 5 | |
| NAVICULA | 1 | 7 | | 2 | 1 | 16 | | 13 | | | | | | 1 | | | | 1 | | | | | | | |
| NITZSCHI | | 19 | | | | 7 | 4 | 10 | | 3 | | | | | | | | | | | | | | | |
| PINNULAR | | 1 | | | | | | | | | | 1 | | | | | | | | | | | | | |
| STEPHANO | | | | | | | | 1 | | | | | | | | | | | | | | | | | |
| SURIRELL | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| SYNEDRA | 1 | | 2 | 1 | 4 | 3 | 11 | 3 | 4 | 9 | 5 | 6 | 4 | | 4 | | 8 | 1 | 4 | 1 | 3 | | 3 | | |
| SYNERUFA | 1 | 2 | 3 | 2 | | 30 | 4 | 7 | | 2 | | 1 | | | | | | | | | 1 | 4 | | | |
| ROW TOTAL | 55 | 82 | 49 | 20 | 40 | 84 | 185 | 72 | 172 | 92 | 235 | 70 | 281 | 28 | 304 | 44 | 613 | 60 | 312 | 11 | 256 | 21 | 311 | 20 | 300 |
| SAMPLE TOTAL | 137 | | 69 | | 124 | | 257 | | 264 | | 305 | | 309 | | 348 | | 673 | | 323 | | 277 | | 331 | | 334 |

RAW DATA FOR LAKE CUMBERLAND PHYTOPLANKTON SAMPLES
L=LIVE CELLS  D=DEAD CELLS

| | | | | |
|---|---|---|---|---|
| ID | 14 | | 15 | |
| SAMPLE | Sta 3-2 | | Sta 3-3 | |
| DATE | 051293 | | 051293 | |
| SLIDE VOL | 0.02 | | 0.02 | |
| AREA | | | | |
| TAXON CODE | L | D | L | D |
| OSCILLAT | | | | |
| DINOBRYO | 1 | 1 | | |
| ONCHOROM | | | | |
| CHLAMYDE | | | | |
| CLOSTERI | | | | |
| DICTYOSP | | | | |
| EUDORINA | | | 8 | |
| GONIUM | | | | |
| SCENEDES | | | | |
| CRYPTOMO | 231 | | 286 | |
| EUGLENA | 3 | | 6 | |
| PHACUS | | | | |
| TRACHLEM | 5 | | 8 | |
| GLENODIN | 2 | 1 | 2 | |
| GYMNODIN | 6 | | 5 | |
| ACHNANTH | | | 1 | 1 |
| AMPHORA | | | | |
| ANOMOEON | | | | |
| ASTEFORM | | | | |
| AULCOIST | 14 | 3 | 2 | 1 |
| AULOITAL | 45 | 8 | 38 | 10 |
| CALONEIS | | | | |
| CYCLCOMT | 1 | 3 | 2 | |
| CYCLOTEL | 2 | 2 | | 3 |
| CYMBELLA | | | | |
| CYMBELLA | | | | |
| CYMBELLA | | | 1 | |
| DIATOMA | | | | |
| ENTOMONE | | | 1 | |
| EUNOTIA | | | | |
| FRAGCROT | | | | |
| GOMPHONE | 1 | | 2 | |
| MELOVARI | | | | |
| NAVICULA | | | 4 | 1 |
| NITZSCHI | | | | |
| PINNULAR | | | | |
| STEPHANO | | | | |
| SURIRELL | 1 | | 1 | |
| SYNEDRA | 2 | 1 | | |
| SYNEKUFA | | | | 1 |
| ROW TOTAL | 314 | 19 | 367 | 17 |
| SAMPLE TOTAL | 333 | | 384 | |

TAXONOMIC LISTING FOR LAKE CUMBERLAND PHYTOPLANKTON SAMPLES

CLASS CODE

G = GREEN ALGAE (CHLOROPHYCEAE)
E = EUGLENOIDS (EUGLENOPHYCEAE)
D = DIATOMS (BACILLARIOPHY
C = CHRYSOPHYTES (CHRYSO

| CODE | TAXON CODE | GENUS | SPECIES | AUTHORITY |
|---|---|---|---|---|
| G | CHLAMYD | Chlamydomonas | | |
| G | OOCYSTI | Oocystis | | |
| C | DINOBRY | Dinobryon | | |
| E | EUGLENA | Euglena | | |
| D | ACMINUTI | Achnanthe | minutissima | Kutz. |
| D | AMSUBM | Amphora | submontana | Hust. |
| D | ASFORMO | Asterionell | formosa | Hass. |
| D | AUDISTAN | Aulacosira | distans | (Ehr.) Simon. |
| D | AUITALIC | Aulacosira | italica | (Ehr.) Simon. |
| D | CBAFFINI | Cymbella | affinis | Kutz. |
| D | CBCYMBI | Cymbella | cymbiformis | Agrdh. |
| D | CBSPK | Cymbella | sp. K | |
| D | CYBODAN | Cyclotella | bodanica | Grun. |
| D | FRCROTE | Fragilaria | crotonensis | Kitt. |
| D | GOSP | Gomphon | spp. | |
| D | NACRYPT | Navicula | cryptocephala | Kutz. |
| D | NASPP | Navicula | spp. | |
| D | NIAPICUL | Nitzschia | apiculata | (Greg.) Grun. |
| D | NISPP | Nitzschia | spp. | |
| D | SUMINIMA | Surirella | minuta | Breb. |
| D | SYACUS | Synedra | acus | Kutz. |
| D | SYRUMPE | Synedra | rumpens | Kutz. |

KENVIRON DATA LAKE CUMBERLAND PHYTOPLANKTON SAMPLES
MARCH 16-17, 1994

| | SAMPLE | STA 1 | STA 1B | STA 1C | STA 2A | STA 2B | STA 2C | STA 3A |
|---|---|---|---|---|---|---|---|---|
| | DATE | 031694 | 031694 | 031694 | 031694 | 031694 | 031694 | 031794 |
| | FACTOR | 137 | 101 | 136 | 111 | 98 | 98 | 105 |
| | | DENSITY | DENSITY | DENSITY | DENSITY | DENSITY | DENSITY | DENSITY |
| CODE | TAXON | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| G | CHLAMYD | 0 | 0 | 0 | 0 | 196 | 0 | 0 |
| | OOCYSTI | 0 | 0 | 0 | 0 | 0 | 392 | 0 |
| E | EUGLENA | 0 | 0 | 0 | 0 | 98 | 0 | 0 |
| C | DINOBRY | 0 | 0 | 0 | 0 | 0 | 196 | 210 |
| B | ACMINUTI | 0 | 101 | 136 | 111 | 98 | 0 | 210 |
| | AMSUBM | 411 | 0 | 0 | 111 | 0 | 0 | 0 |
| | ASFORM | 0 | 0 | 0 | 111 | 392 | 294 | 315 |
| | AUITALIC | 5069 | 1818 | 1088 | 9435 | 13230 | 1078 | 1260 |
| | AUDISTA | 0 | 404 | 0 | 2997 | 5194 | 686 | 315 |
| | CBAFFINI | 0 | 0 | 136 | 0 | 0 | 0 | 0 |
| | CBCYMBI | 0 | 101 | 136 | 111 | 0 | 0 | 0 |
| | CBSPK | 0 | 0 | 0 | 0 | 0 | 0 | 105 |
| | CYBODA | 1096 | 202 | 136 | 1110 | 2352 | 294 | 315 |
| | FRCROTE | 5891 | 2323 | 272 | 0 | 0 | 98 | 0 |
| | GOSPP | 0 | 101 | 0 | 0 | 98 | 196 | 0 |
| | NACRYPT | 411 | 0 | 0 | 111 | 0 | 98 | 0 |
| | NASPP | 274 | 101 | 0 | 0 | 0 | 196 | 105 |
| | NIAPICUL | 137 | 0 | 0 | 0 | 0 | 0 | 0 |
| | NISPP | 1233 | 101 | 272 | 222 | 0 | 0 | 210 |
| | SUMINUT | 0 | 0 | 0 | 0 | 98 | 0 | 0 |
| | SYACUS | 0 | 0 | 272 | 444 | 98 | 0 | 0 |
| | SYRUMPE | 137 | 101 | 0 | 0 | 98 | 98 | 0 |
| | TOTAL | 14659 | 5353 | 2448 | 14763 | 21952 | 3626 | 3045 |

KENVIRON DATA LAKE CUMBERLAND PHYTOPLANKTON SAMPLES
MARCH 16-17, 1994

| | SAMPLE | STA 3B | STA 3C |
|---|---|---|---|
| | DATE | 031794 | 031794 |
| | FACTOR | 109 | 102 |
| | | DENSITY | DENSITY |
| CODE | TAXON | 0 | 0 |
| G | CHLAMYD | 0 | 0 |
| | OOCYSTI | 0 | 0 |
| E | EUGLENA | 0 | 0 |
| C | DINOBRY | 0 | 102 |
| B | ACMINUTI | 109 | 0 |
| | AMSUBM | 0 | 0 |
| | ASFORM | 109 | 204 |
| | AUITALIC | 218 | 2448 |
| | AUDISTA | 109 | 510 |
| | CBAFFINI | 0 | 0 |
| | CBCYMBI | 0 | 0 |
| | CBSPK | 0 | 102 |
| | CYBODA | 109 | 510 |
| | FRCROTE | 109 | 102 |
| | GOSPP | 0 | 204 |
| | NACRYPT | 0 | 0 |
| | NASPP | 109 | 102 |
| | NIAPICUL | 0 | 0 |
| | NISPP | 327 | 306 |
| | SUMINUT | 0 | 0 |
| | SYACUS | 0 | 204 |
| | SYRUMPE | 0 | 102 |
| | TOTAL | 1199 | 4896 |