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City of Monroe Wastewater Treatment Plant Class II Inspection, March 11-13, 1996

November 1996

Publication No. 96-351

printed on recycled paper

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City of Monroe Wastewater Treatment Plant Class II Inspection, March 11-13, 1996

by
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Water Body No. WA-07-1160

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Abstract

A Class II inspection was conducted at the City of Monroe (Monroe) Wastewater Treatment Plant (WWTP) on March 11-13, 1996. The plant was performing marginally during the inspection. Disinfection was inadequate as evidenced by high fecal coliform counts and variable chlorine residuals. Biochemical oxygen demand (BOD_5) concentrations in the effluent met weekly average permit limits but slightly exceeded monthly average limits. Total suspended solids (TSS) removal was good. Split samples showed generally good agreement, with the exception of the Monroe influent sample which was weak. There was evidence of degradation of both the Monroe influent and effluent composite samples.

A dye study in conjunction with this inspection indicated the possibility of damage to the diffuser from flooding in previous months, but a subsequent dye study by plant personnel during low flow conditions is reported to have shown that the diffuser is intact. Results of the initial dye study suggest that the diffuser is not creating adequate mixing. A dilution study is recommended based on these results and high metals concentrations at the mixing zone boundaries.

Organics scans showed generally low concentrations of volatile organic analysis (VOA) and base-neutral- acid extractable (BNA) compounds. Elevated concentrations of some metals were found in the influent and effluent. Based on dilution factors for the outfall configuration before the diffuser was relocated in 1995, copper, silver, and lead exceeded state water quality criteria.

Compost sampled met Class A sewage sludge requirements. All metals were found in concentrations below EPA sludge application limits and ceiling concentrations for land application of municipal sludge.

Summary

Assessment of Industrial Contributors

Aero Pacific has admitted discharging in recent years into the Monroe wastewater collection system without a permit. A representative of Aero Pacific Finishing has stated that the facility is no longer discharging wastewater. There was evidence during the inspection to support this claim.

It was determined prior to the March 1996 Class II inspection that no known industrial contributors to the Monroe wastewater collection system were discharging sufficient loadings as to warrant sampling during the inspection.

Flow Measurements

An Ecology check of instantaneous flow measurements was within 7 % of the Monroe flow meter measurement, indicating good agreement.

NPDES Permit Compliance / General Chemistry

The Monroe WWTP was performing marginally during the inspection. Disinfection was inadequate, as evidenced by high fecal coliform counts and variable chlorine residuals. BOD_5 concentrations in the effluent met weekly average permit limits but slightly exceeded monthly average limits.

The plant was operating well within design constraints reflected in the permit, and for this reason should be expected to be performing well. The plant was being operated at only partial capacity, however, with the facility's four rotating biological contactors out of operation.

Split Sample Results

Ecology and Monroe analyses for TSS, BOD_5 and NH_3-N compared closely indicating good agreement between the results of both laboratories. The Monroe Inf-M sample was weaker than the Ecology sample. The weak samples may be the result of low velocities in the collection lines or degradation of the sample in the long lines leading to the laboratory, where the sample was collected. Elevated NO_2 -NO_3 -N in both the Monroe influent and effluent composite samples is an indication of degradation in the samples.

Dye Study

The dye released into the effluent traveled downstream in a single narrow path, remaining away from the bank. The dye remained in a well-defined, narrow path 150 yards downstream of the diffuser.

Because the dye appeared on the water surface at a single location and traveled from the diffuser in a single path, there appeared to be the possibility that the diffuser was damaged by the flooding which occurred in the fall and winter of 1995-1996. Plant personnel examined the diffuser on August 21, 1996 during a period of low flow. The diffuser was partially exposed at the time. Evidence of flow from all four ports was reported, indicating that the diffuser was intact. The observation that injected dye did not readily disperse in the river may indicate problems with diffuser design or operation.

Priority Pollutant Scans

Organics

Twenty priority pollutant and other target volatile organic analysis (VOA) compounds were detected in the influent sample in low concentrations. Thirteen base-neutral acid extractables (BNAs) were detected in the influent sample. Benzoic acid was found in the influent at a concentration of 111 µg/L (est.). All other BNAs in the influent were detected at a concentration of 31 µg/L or lower.

Five priority pollutant and other target VOA compounds were detected in the effluent samples in low concentrations. Of the BNAs, seven compounds other than 3B-Coprostanol found in the effluent were in concentrations of 6.6 µg/L or lower. All VOAs and BNAs found in the effluent were found in concentrations below state water quality criteria.

Metals

Of the eight priority pollutant metals detected in the WWTP influent sample, zinc was found in the highest concentration (147 µg/L). Cadmium, copper, lead, mercury, nickel, silver, and zinc were found in the WWTP effluent sample.

Applying dilution factors calculated for the outfall configuration before the diffuser was installed, copper (3.23 µg/L) and silver (0.29 µg/L) violated state acute criteria at the edge of the acute mixing zone. Lead (0.157 µg/L) violated state chronic criteria at the edge of the chronic mixing zone.

Effluent metals concentrations were generally higher during the 1996 inspection than during a 1993 Class II inspection. Metals including copper (55.5 µg/L), lead (21.4 µg/L) and zinc (147 μg/L) were elevated in the WWTP influent, indicating sources which have not been identified.

Sludge

Eleven priority pollutant metals were detected in the sludge sample. Zinc was found in the highest concentration (878 mg/Kg-dry). All metals were found in concentrations below EPA sludge application limits and ceiling concentrations for land application of municipal sludge.

Compost

The total coliform count of the compost sample was 1,300/100g. The fecal coliform count was <62/100g-dry, well within 1,000/g-dry (100,000/100g-dry) maximum limit for Class A sewage sludge in accordance with EPA regulations.

Eleven priority pollutant metals and molybdenum were detected in the compost sample. Zinc was found in the compost in the highest concentration (501 mg/Kg-dry). All metals were found in concentrations below EPA sludge application limits and ceiling concentrations for land application of municipal sludge.

Recommendations

- Chlorine dosages should be maintained to provide adequate disinfection.
- SBC operation should be reviewed to provide for effective BOD_5 removal.
- The influent sampling time interval should be increased from 15 minutes to 30 minutes to provide for larger subsample volumes and higher velocities in the collection line, as well as a lower proportion of subsample remaining in the line between samples. The line should be frequently bleached, then thoroughly rinsed to rid the line of biological growth.
- Diffuser design and operation should be investigated and if necessary modified to ensure adequate diffusion under all flow regimes.
- A new mixing zone study should be conducted to determine the potential for water quality criteria violations with the new diffuser configuration.
- Potential sources of priority pollutant metals including Aero Pacific should be investigated.

Introduction

A Class II inspection was conducted at the City of Monroe (Monroe) Wastewater Treatment Plant (WWTP) on March 11-13, 1996. Conducting the inspection were Steven Golding and Dale Clark of Ecology's Environmental Investigations and Laboratory Services Program. Assisting from the Monroe staff were Ivan Dannar (Senior Operator) and Linda Mount (Laboratory Analyst). Assisting from a contributing facility, the Monroe Consolidated wastewater treatment facility, was David Meeds. Ed Abbasi of Ecology's Northwest Regional Office requested the inspection.

The city of Monroe operates a wastewater treatment plant located on the south side of the city (Figure 1). The city is served by a combined sewer system. Wastewater entering the system is primarily domestic sewage from residential and light commercial activities. The facility receives wastewater from the city of Monroe service area including wastewater from the Evergreen Fairgrounds that contributes a significant flow and organic loading during fair operation in August. Monroe Consolidated, which includes the Washington State Reformatory, the Twin River Correction Center, and the Special Offenders Center, treats its wastewater in lagoons. Treated wastewater from the lagoons is discharged to the Monroe WWTP.

The Monroe WWTP was constructed in 1976, was modified in 1992, and modified again in 1995-early 1996. The existing facility and a planned phase II expansion are shown in Figure 2. The plant consists of an influent pumping station, an inlet structure with mechanical bar screen, an aerated grit chamber, three side-hill screens, two primary clarifiers, four rotating biological contactors (RBCs), four submerged biological contactors (SBCs), three secondary clarifiers, two chlorine contact chambers, an effluent pump station, three aerobic digesters, one sludge tank truck, and a control building. The digested sludge is dewatered with a screw press and composted by Monroe at Monroe Consolidated. The compost is made available for use by the public. The WWTP discharge to the Skykomish River is regulated by NPDES discharge permit #WA-002048-6. The permit was issued on February 22, 1994 and expires on February 22, 1999.

Assessment of Industrial Contributors

Aero Pacific has admitted discharging into the Monroe wastewater collection system without a permit, filing a guilty plea before a U.S. District Court on June 25, 1996. The U.S. Environmental Protection Agency found cadmium, chromium, and zinc in wastewater flowing from the plant in February and April 1994 and March 17, 1995 (Taylor, 1996). The data were limited and do not allow for a quantification of influent loading to the Monroe WWTP, however (Hilldorfer, 1996). An Ecology Class II inspection in August 1993 found Monroe WWTP effluent concentrations of cadmium, copper, lead, silver, and zinc greater than state water quality criteria.

The impacts of industrial contributors were assessed during an unannounced reconnaissance in January 1996. During the reconnaissance, a representative of Aero Pacific Finishing stated that the facility is no longer discharging wastewater. No discharges were found during the inspection. A large evaporator was observed in operation. Sludge from the evaporator was being held in barrels and a VWR truck was being loaded with barrels during the visit.

Circle Sea Food operates a fish packing facility that discharges to the Monroe wastewater collection system. Because the fish are frozen, the facility's contribution is small. Another fish packing operation in Monroe is not discharging to the Monroe WWTP.

It was determined that no known industrial contributors to the Monroe wastewater collection system were discharging sufficient loadings to warrant sampling during the March 1966 Class II inspection.

Objectives

Objectives of the inspection included:

- Evaluate NPDES permit compliance.
- Monitor effluent and sludge metals concentrations to assess success of eliminating industrial metals sources.
- Evaluate sampling and laboratory procedures with split samples.
- Characterize wastewater toxicity with priority pollutant scans.
- Evaluate diffuser operation and mixing.

Procedures

Composite and grab samples were collected by Ecology at influent (Inf), primary clarifier effluent (Prmclar), and final effluent (Eff) locations (Figure 2). Grab samples were collected for sludge (Sludge) on site as well as compost (Compost) at an offsite composting facility. Ecology conducted field measurements on influent, primary clarifier effluent, and final effluent samples. Monroe collected composite samples of influent (Inf-M) and final effluent (Eff-M). Composite samples of treated wastewater from Monroe Consolidated were also collected by Ecology and field measurements were conducted.

A more detailed description of sampling procedures appears in Appendix A. Sampling station descriptions appear in Table 1. The sampling schedule, parameters analyzed, and sample splits are included in Appendix B. Ecology analytical methods and laboratories performing the analyses are summarized in Appendix C. Ecology field and laboratory QA/QC are summarized in Appendix D. Quality assurance cleaning procedures are included in Appendix E. A glossary appears in Appendix H.

Results and Discussion

Flow Measurements

The Monroe totalizing flow meter measures depth above the two chlorine contact chamber V-notch weirs with one ultrasonic detector above each chamber. Measurements from the detectors are averaged. The flow meter was checked by simultaneously recording instantaneous flow from the flow meter and measuring depth with a stick. Flows and depths were recorded every 30 seconds for 5 minutes. Because the depths were the same in both chlorine contact chambers, flow was calculated from depth measurements in one contact chamber and then multiplied by two. The resulting flows were 1.27 MGD averaged from the plant flow meter and 1.19 MGD calculated from average stick readings. The two flow determinations are within 7%, indicating good agreement.

The effluent flow totalizer indicated 1.050 MGD from 0800 on March 12, 1996 to 0800 on March 13, 1996. The flow measurements from the Parshall flume at the Monroe Consolidated wastewater treatment facility were not checked.

NPDES Permit Compliance / General Chemistry

The Monroe WWTP was performing marginally during the inspection. Disinfection was inadequate as evidenced by high fecal coliform counts (Table 2). Fecal coliform counts from two samples both exceeded monthly and weekly average National Pollutant Discharge Elimination System (NPDES) permit limits (Table 3). It is recommended that chlorine dosages be maintained so as to provide adequate disinfection.

TSS removal was good but the 24-hour composite sample showed that biochemical oxygen demand (BOD_5) was within weekly average NPDES permit limits while slightly exceeding monthly average limits. The effluent met permit limits for TSS and for percentage removal of both TSS and BOD_5 (Table 3).

The plant was operating well within the design constraints reflected in the permit. Effluent BOD_5 loadings (280 lbs/day) were well within permitted monthly average BOD_5 loadings (423 lbs/day) and weekly average BOD_5 loadings (635 lbs/day). TSS effluent loadings were similarly well below permitted loadings. BOD_5 removal efficiency was 87%, just above the permitted monthly average removal efficiency of 85%. Because the plant was operating well below design capacity it should be expected to be performing well rather than marginally. The plant was being operated at only partial capacity, however, with the facility's four RBCs out of operation. The RBCs were expected to be back in operation in July 1996 (Dannar, 1996). It is recommended that SBC operation be reviewed to provide for effective BOD_5 removal.

A comparison of 24-hour composite influent and effluent ammonia and nitrate-nitrite concentrations indicates that there was no significant reduction in ammonia concentrations by nitrification across the plant. There are no limits for ammonia in the current permit.

Monroe Consolidated was found to be contributing 264,000 gpd of wastewater with 73 mg/L BOD_5, 38 mg/L TSS, and 24 mg/L NH_3 to the Monroe WWTP (Table 2). The Monroe Consolidated contribution accounted for 25% of the total plant flow, 8% of the total BOD_5 load, 4% of the total TSS load, and 30% of the NH_3 total pounds of load to the plant at the time of the inspection.

Split Sample Results

Samples were split to determine the comparability of Ecology and permittee laboratory results and sampling methods (Table 4). Ecology and Monroe analyses for TSS, BOD_5 and NH_3-N showed good agreement between the results of both laboratories. The comparison of BOD_5 analyses of the Monroe influent (Inf-M) was the exception, with the Ecology laboratory result lower than the other three influent results. The discrepancy is likely the result of uneven splitting of the sample or the nonhomogeneous nature of municipal wastewater influent, causing the Ecology analysis of Inf-M to be nonrepresentative..

There was a discrepancy between the Ecology and Monroe influent samples for all three parameters. In all six cases of analyses of influent TSS, BOD_5, and NH_3-N by both Ecology and Monroe, the Monroe sample (Inf-M) resulted in lower concentrations, indicating a weaker sample than the Ecology sample (Inf-E). Analyses for the Monroe composite effluent sample were in good agreement with those for the Ecology composite effluent sample. However, in all six cases of analyses of effluent TSS, BOD_5, and NH_3-N by both Ecology and Monroe, the Monroe sample (Eff-M) resulted in lower concentrations, indicating a weaker sample than the Ecology sample (Eff-E).

The relative weakness of the Monroe composite influent and effluent samples may be the result of low velocities in the collection lines, resulting in a nonrepresentative low solids inclusion in the samples. This is supported by the relatively low TSS of the Inf-M sample. Another source of weakened samples may be degradation of the samples in the long lines leading to the laboratory, where the samples are collected. Both the Monroe influent and effluent composite samples were found to have greater than ten times the $NO_2 + N0_3$ -N concentrations than the Ecology composite samples. This is an indication that nitrification was occurring in the Monroe samples. It is recommended that the influent sampling time interval be increased from 15 minutes to 30 minutes to provide for larger subsample volumes and higher velocities in the collection line, as well as a lower proportion of subsample remaining in the line between samples. Both influent and effluent lines should be frequently bleached, then thoroughly rinsed to rid the lines of biological growth.

Dye Study

A dye study was carried out March 11 to physically locate the WWTP discharge, to determine whether the diffuser structures were in place after the severe flooding during the fall and winter of 1995-1996, and to assess mixing of effluent in the river. The Monroe WWTP outfall into the Skykomish River consists of a submerged pipe with a four-port diffuser. The diffuser ports are spaced approximately 16 feet apart.

A 250 ml dose of rhodamine dye was released into a manhole upstream of the diffuser. The dye appeared in a single location approximately 70 feet out from the bank of the river. The dye was observed and photographed as it traveled downstream. The dye traveled downstream in a single narrow path, remaining away from the bank. The dye remained in a well-defined, narrow path 150 yards downstream of the diffuser as determined with a rangefinder. The maximum distance allowable for any river or stream chronic mixing zone is less than 150 yards: 300 feet plus depth at critical condition (Ecology, 1994b).

Average WWTP flow on the day of the dye release was 1.050 MGD. While there is no flow recording station for the Skykomish River near Monroe, flow in the Snohomish River near Monroe (12,100 cfs) was higher than the 1963-1979 mean flow (9,951 cfs - USGS, 1996). This serves as an indication that the flow in the Skykomish River at Monroe was higher than mean flow at the time of the dye study..

The observation that the dye appeared on the water surface at a single location and traveled from the diffuser in a single path indicated that the diffuser may have been damaged by the flooding which occurred in the fall and winter of 1995-1996 or that several of the ports were covered with silt or sand and nonfunctional. The relatively high stage of the river at the time of the dye study prevented a close examination of the diffuser. Plant personnel report examining the diffuser on August 21, 1996 during a period of low flow when the diffuser was partially exposed. Evidence of flow from all four ports was reported, indicating that the diffuser was intact (Dannar, 1996).

The observation that the injected dye did not readily disperse in the river may indicate that although the diffuser may be intact, it is not providing proper mixing. Diffuser design and operation should be investigated and if necessary modified to ensure adequate diffusion under all flow regimes.

Priority Pollutant Scans

Organics

Twenty priority pollutant and other target volatile organic analysis (VOA) compounds were detected in the influent sample (Table 5). Acetone was found in the highest concentration (96 µg/L). Because acetone was used in cleaning the collection beaker, the concentration found may not be representative of the influent. The other VOA compounds detected were in low concentrations (9.6 µg/L or lower). Thirteen base-neutral acid extractables (BNAs) were detected in the influent sample. Of the BNA compounds found in the influent, 3-B-Coprostanol (334 µg/L est.) was in the highest concentration. Caffeine (5.6 µg/L) and 3-B Coprostanol are non-priority pollutant organics used as tracers of domestic wastewater effluents in receiving waters. Benzoic acid was found in the influent at a concentration of 111 µg/L (est.). All other BNAs in the influent were detected at a concentration of 31 µg/L or lower.

Five priority pollutant and other target VOA compounds were detected in the effluent samples. Other than acetone (39 µg/L est.), the VOA compounds detected in the effluent were at a concentration of 2.2 µg/L or lower. Of the BNAs in the effluent, 3B-Coprostanol was found in the highest concentration (334 µg/L est.). The seven other BNA compounds found in the effluent were found in concentrations of 6.6 µg/L or lower. All VOAs and BNAs found in the effluent were found in concentrations below state water quality criteria (Table 5).

A complete list of parameters analyzed and analytical results is included in Appendix F. Tentatively identified compounds (TICs) are summarized in Appendix G. A number of TICs were found in the influent samples in concentrations up to 22,500 µg/L est. TICs were found in the effluent samples in concentrations up to 69 µg/L est.

Metals

Influent and effluent metals samples were inadvertently analyzed for total metals. Sludge and compost samples were appropriately analyzed as total metals. Of the eight priority pollutant metals detected in the WWTP influent sample, zinc was found in the highest concentration (147 µg/L). In the WWTP effluent sample, cadmium (0.17 µg/L), copper (18 µg/L), lead (3.0 µg/L), mercury (0.21 µg/L), nickel (12 µg/L), silver (1.6 µg/L), and zinc (37 µg/L) were found (Table 5).

Total metals results cannot be compared directly with state water quality criteria, which Ecology determines from total recoverable metals, but with adjustments, meaningful comparisons can be made. Total metals results show that cadmium and nickel in the effluent sample were lower than state water quality criteria.

Effluent concentrations of copper, lead, mercury, silver, and zinc were each higher than acute or chronic state water quality criteria by a factor of two or more. It should be noted, however, that the criteria do not apply directly to effluent. The following is a comparison of metals concentrations at the acute and chronic mixing zones, where state water quality criteria apply. According to Randy Knox of the Manchester Environmental Laboratory (1996), total metals results can be expected to be close to total recoverable metals. Even with a low estimate of total recoverable metals in effluent (obtained by multiplying total metals by 0.7 (Knox, 1996)), and applying dilution factors of 3.9:1 acute and 13.4:1 chronic, copper (3.23 mg/L) and silver (0.29 mg/L) violated state acute criteria at the edge of the acute mixing zone (Ecology, 1994a). Lead (0.157 µg/L) violated state chronic criteria at the edge of the chronic mixing zone. A relatively low receiving water hardness (12.6 mg/L) contributed to the copper, silver, and lead exceedances.

In September 1995, the diffuser was relocated to a more fully mixed portion of river and the single port was replaced with a four-port diffuser (Abbasi, 1996; Dannar, 1996). The above dilution factors were based on the earlier location and configuration. It can be expected that mixing zone calculations for the current diffuser will show greater dilution. The permittee should conduct a new mixing zone study to determine the potential for water quality criteria violations.

Data from this inspection can be compared with limited historical Ecology data as an indication of trends in metals contributions to the Monroe WWTP. The following table compares results of the composite effluent sample from the current inspection with effluent metals concentrations from a single grab sample taken in August 1993 (Glenn, 1994):

	August 1993* µg/L	March 1996** µg/L
Cadmium	0.36P	0.17
Copper	2.2P	18
Lead	1.0U	3.0
Silver	0.50U	1.6
Zinc	4U	147

* total recoverable metals
** total metals
U - The analyte was not detected at or above the reported result.
P - The analyte was detected above the instrument detection limit but below the established minimum quantitation limit.

A comparison between the 1993 and 1996 inspections does not show a decrease in effluent metals concentrations as would have been expected from the reduction of metals sources to the Monroe wastewater collection system. Effluent metals concentrations were generally higher during the 1996 inspection than during the 1993 inspection. Metals including copper (55.5 µg/L), lead (21.4 µg/L) and zinc (147 µg/L) were elevated in the WWTP influent, indicating sources that have not been identified (Table 5). Potential sources of priority pollutant metals, including Aero Pacific, should be investigated.

Sludge

The residual solids generated from sludge, screenings, grit, and scum are aerobically digested, then dewatered in a screw press.

The dried sludge sample contained 12.0% solids and 7.6% volatile solids. Total coliform count was 9,200,000/100g-wet (77,000,000/100g-dry). Fecal coliform count was also 77,000,000/100g-dry (Table 2.) This exceeds the 1,000/g-dry (100,000/100g-dry) maximum limit for Class A sewage sludge in accordance with EPA regulations (EPA, 1993). It should be noted that the sludge is composted, resulting in a lower fecal coliform count (see below).

Three VOA compounds were found in the sludge sample (Table 5). Toluene (80 mg/Kg-dry) was the VOA found in the highest concentration. Five BNA compounds were found in the sludge sample. The BNA compounds found in the highest concentration were 3B-Coprostanol (436,000 mg/Kg-dry), which is used as a tracer of domestic wastewater, and Phenol (5,540 mg/Kg-dry).

Eleven priority pollutant metals were detected in the sludge sample. Zinc was found in the highest concentration (878 mg/Kg-dry). All metals were found in concentrations below EPA sludge application limits and ceiling concentrations for land application of municipal sludge (Table 6).

A complete list of parameters analyzed and analytical results is included in Appendix F. A number of TICs were found in the sludge sample in concentrations up to 1,290,000 mg/Kg est. TICs are summarized in Appendix G.

Compost

After dewatering with a screw press at the WWTP, the sludge is composted at Monroe Consolidated. Wood shavings are added as a bulking agent. Monroe composts sludge by the static aerated pile method. The requirement for composting specified in 40 CFR Part 503 is to maintain a temperature of 55 °C for three days. Monroe reports that it adheres to this requirement (Dannar, 1996). The end product is given away to landscape contractors and interested citizens of the community.

The dried compost sample contained 29.0% solids and 22.4% volatile solids. The total coliform count was 1,300/100g-wet (4,480/100g-dry - Table 2). The fecal coliform count was 62/100g-dry, well within 1,000/g-dry (100,000/100g-dry) maximum limit for Class A sewage sludge in accordance with EPA regulations (EPA, 1993). Class A sewage sludge is suitable for use on agricultural lands without time restrictions to harvesting.

Eleven priority pollutant metals and molybdenum were detected in the compost sample (Table 5). Molybdenum was not analyzed for in the sludge sample. Zinc was found in the compost in the highest concentration (501 mg/Kg-dry). All metals were found in concentrations below EPA sludge application limits and ceiling concentrations for land application of municipal sludge (Table 6).

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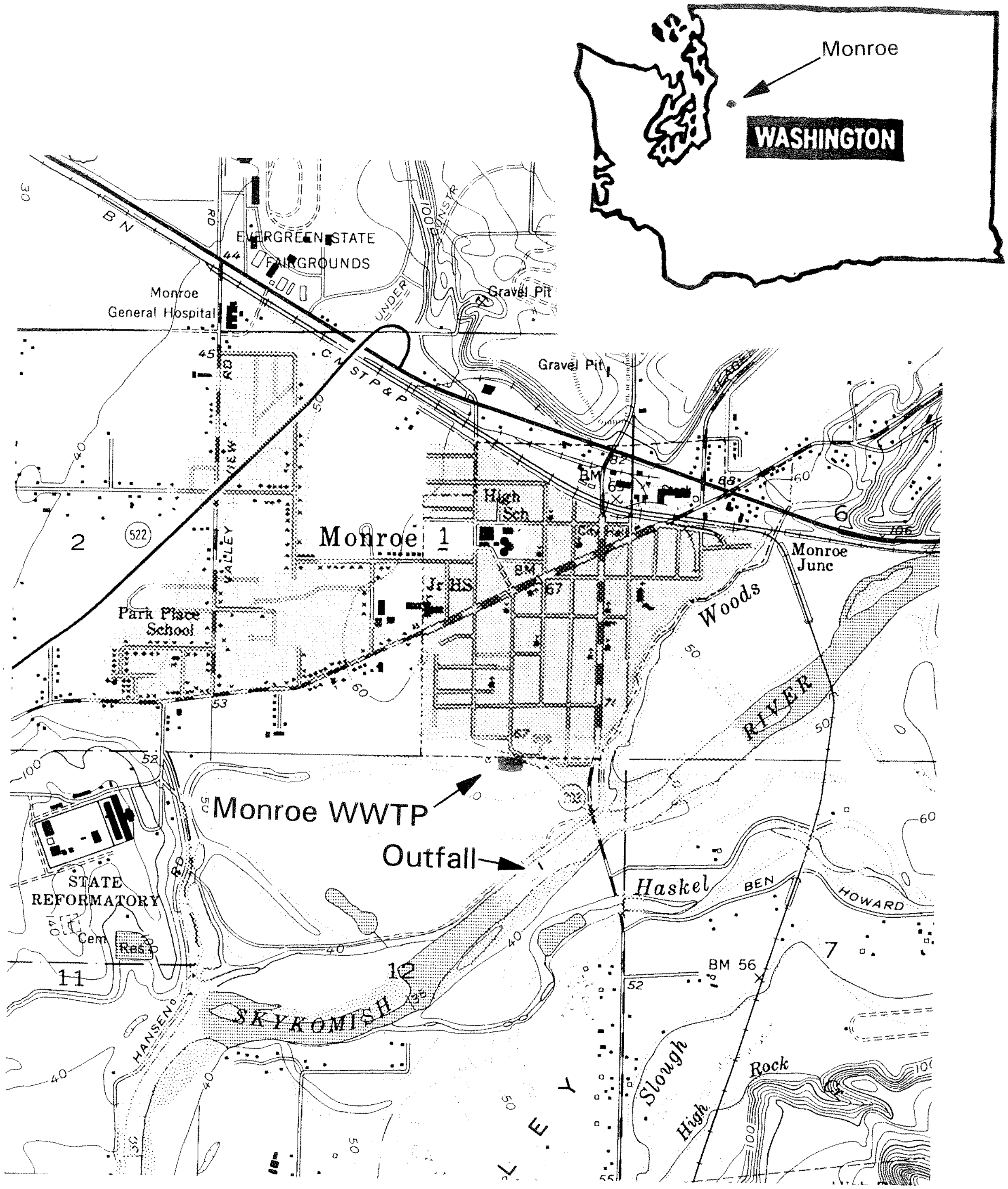

Figure 1 - Location Map - City of Monroe, March 1995.

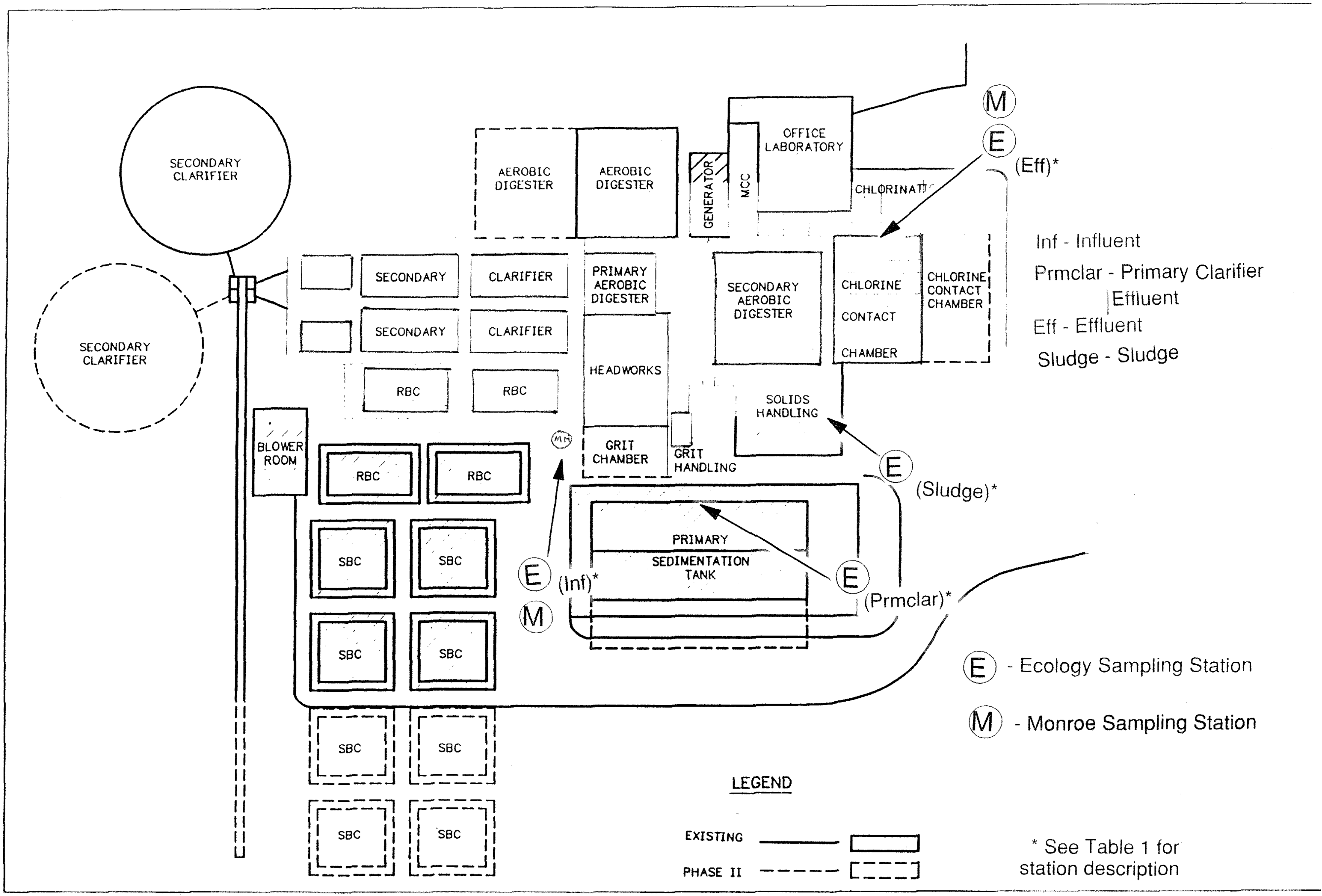

Figure 2 – Flow Schematic and Sampling Locations – Monroe, March 1966.

Table 1 - Sampling Station Descriptions - Monroe, March 1996.

Monroe

Ecology influent grab and composite samples (Inf-1,2; Inf-E)

Influent samples were taken from the influent wet well upstream of the inlets from which influent is pumped to the grit chamber. The compositor intake was positioned five feet below the surface. The wet well was well mixed. Despite the mixing, there was a thick layer of scum on the surface.

Monroe influent composite samples (Inf-M)

The compositor influent intake is positioned in the influent wet well just below the force main outlet.

Ecology primary clarifier grab and composite samples (Prmclar-1,2; Prmclar-E)

Samples were collected at the upstream end of the outflow channel. The compositor intake was located six inches below the surface.

Ecology effluent grab and composite samples (Eff-1,2; Eff-E)

Effluent samples were taken from the east chlorine contact chamber, just upstream of the V-notch outlet weir. The compositor intake was located one foot below the surface. VOA samples were taken from just downstream of the secondary clarifier launder weirs to obtain an unchlorinated sample.

Monroe effluent composite samples (Eff-M)

Two compositor intakes were permanently mounted, one in each of the two chlorine contact chambers, approximately one foot below the surface, just upstream of the V-notch outlet weirs. Flow from the two intakes is combined before reaching the composite sampler.

Ecology sludge sample (Sludge)

A grab sample of sludge was obtained directly from the screw press.

Ecology compost sample (Compost)

The composting facility is located at the Monroe Correction Facility. A grab sample of compost was obtained from the oldest compost pile, pile 5.

Monroe Correction Facility

Ecology sample of Monroe Correction Facility effluent (Reformty)

The compositor intake was placed just upstream of the Parshall flume. The intake was held two inches above the bottom of the channel.

Table 2 - General Chemistry Results - City of Monroe, March 1996.

Location:	Inf-1	Inf-2	Inf-E	Inf-M
Type:	grab	grab	comp	comp
Date:	3/12	3/12	3/12-13	3/12-13
Time:	1020	1500	1005	0925
Lab Log #:	118155	118156	118157	118158
GENERAL CHEMISTRY				
Conductivity (umhos/cm)	908	655	808	718
Sulfate (mg/L)				
Alkalinity (mg/L CaCO3)			152	151
Hardness (mg/L CaCO3)			45.8	41.3
TS (mg/L)			821	587
TNVS (mg/L)			403	325
TSS (mg/L)	333	282	236	187
TNVSS (mg/L)			45	36
% Solids				
% Volatile Solids				
OXYGEN DEMAND PARAMETERS				
BOD5 (mg/L)			241	147
COD (mg/L)			1,200	370
TOC (water mg/L)	118	130	134	75.2
TOC (soil -mg/Kg)				
NUTRIENTS				
NH3-N (mg/L)	21	21	20	15
NO2+NO3-N (mg/L)	0.193	0.149	0.169	1.87
Total-P (mg/L)	8.46	9.56	6.39	5.48
MISCELLANEOUS				
Oil and Grease (mg/L)				
F-Coliform MF (#/100mL)				
Fecal Coliform (soil - #/100g)				
Total Coliform (soil - #/100g)				
FIELD OBSERVATIONS				
Temperature (C)	13.3	14.6		
Temp-cooled (C)			3.2	9.3
pH	7.3	7.4	7.2	7.2
Conductivity (umhos/cm)	886	651	892	765
Chlorine (mg/L) Free				
Total				

E - Ecology sample
M - Monroe sample
grab - grab sample
comp - composite sample
grab-comp - grab-composite sample

Inf - Influent Sample
Eff - Effluent Sample
Sludge - Dewatered sludge sample
Compost - Composted sludge sample
Consl - Monroe Consolidated eff.
RcvWtr - Receiving water

J - estimated value

Table 2 - (cont'd) - City of Monroe, March 1996.

Location:	Prmclar-1	Prmclar-2	Prmclar-E	Eff-1	Eff-2	Eff-E	Eff-M
Type:	grab	grab	comp	grab	grab	comp	comp
Date:	3/12	3/12	3/12-13	3/12	3/12	3/12-13	3/12-13
Time:	0940	1410	1040	0955	1435	0935	0915
Lab Log #:	118160	118161	118159	118164	118165	118166	118167
GENERAL CHEMISTRY							
Conductivity (umhos/cm)			767	560	562	647	633
Sulfate (mg/L)	17.3	18.3					
Alkalinity (mg/L CaCO3)						170	152
Hardness (mg/L CaCO3)						40.1	40.6
TS (mg/L)						340	338
TNVS (mg/L)						253	253
TSS (mg/L)	44	97		18	17	12	10
TNVSS (mg/L)						<1	<1
% Solids							
% Volatile Solids							
OXYGEN DEMAND PARAMETERS							
BOD5 (mg/L)			196			32	26
COD (mg/L)						110	76
TOC (water mg/L)	57.9	90.0	75.3	23.4	23.1	23.8	21.2
TOC (soil -mg/Kg)							
NUTRIENTS							
NH3-N (mg/L)				19	21	22	18
NO2+NO3-N (mg/L)				0.218	0.217	0.216	2.56
Total-P (mg/L)				4.82	4.36	4.54	4.34
MISCELLANEOUS							
Oil and Grease (mg/L)	11J	17J					
F-Coliform MF (#/100mL)							
Fecal Coliform (soil - #/100g)							
Total Coliform (soil - #/100g)							
FIELD OBSERVATIONS							
Temperature (C)	11.1	13.5		13.0	13.7		
Temp-cooled (C)			2.1			3.2	9.4
pH	7.3	7.2	7.2	7.2	7.1	7.4	7.2
Conductivity (umhos/cm)	538	7.2	836	562	569	708	674
Chlorine (mg/L) Free					<0.1		
Total					<0.1		

Table 2 - (cont'd) - City of Monroe, March 1996.

Location:	Eff-3	Eff-4	Sludge	Compost	Compst2	Consl	RcvWtr
Type:	grab	grab	grab	grab	grab	comp	grab
Date:	3/13	3/13	3/12	3/11	3/13	3/13	3/12
Time:	0845	1135	1100	1610	1345	1345	1240
Lab Log #:	118169	118170	118171	118172	118176	118173	118174
GENERAL CHEMISTRY							
Conductivity (umhos/cm)						626	
Sulfate (mg/L)							
Alkalinity (mg/L CaCO3)						244	
Hardness (mg/L CaCO3)							12.6
TS (mg/L)						382	
TNVS (mg/L)						234	
TSS (mg/L)	10	10				38	13
TNVSS (mg/L)						13	
% Solids			12.0	29.0			
% Volatile Solids			7.6	22.4			
OXYGEN DEMAND PARAMETERS							
BOD5 (mg/L)						73	
COD (mg/L)							
TOC (water mg/L)	21.2	20.0				30.5	
TOC (soil -mg/Kg)			410,000	320,000			
NUTRIENTS							
NH3-N (mg/L)						24	
NO2+NO3-N (mg/L)						0.596	
Total-P (mg/L)						5.42	
MISCELLANEOUS							
Oil and Grease (mg/L)							
F-Coliform MF (#/100mL)	1,500	1,200					
Fecal Coliform (soil - #/100g)			9,200,000		18U		
Total Coliform (soil - #/100g)			9,200,000		1,300		
FIELD OBSERVATIONS							
Temperature (C)	12.9	13.6					7.4
Temp-cooled (C)						3.2	
pH	7.1	7.1				7.8	7.1
Conductivity (umhos/cm)	898	868				658	34
Chlorine (mg/L) Free	0.2	0.2					
Total	0.2	0.2					

Table 3 - NPDES Permit Limits and Inspection Results - Monroe, March 1996.

Parameter	NPDES Limits: Monthly Average	NPDES Limits: Weekly Average	Inspection Results: Composite Samples	Inspection Results: Grab Samples
BOD5	30 mg/L 423 lbs/day 85% removal	45 mg/L 635 lbs/day	32 mg/L 280 lbs/day 87% removal	
TSS	30 mg/L 423 lbs/day 85% removal	45 mg/L 635 lbs/day	12 mg/L 105 lbs/day 95% removal	
Fecal Coliform	200/100 mL	400/100 mL		1500/100 mL 1200/100 mL
pH	6.0 to 9.0 (continuous)			7.2;7.1;7.1;7.1
Flow*	--	--	1.050 MGD	

* totalizer reading from 0800 on 03-12-96 to 0800 on 03-13-96.

Table 4 - Split Sample Results Comparison - Monroe, March 1996.

	Location:	Inf-E	Inf-M	Eff-E	Eff-M
	Type:	comp	comp	comp	comp
	Date:	3/12-13	3/12-13	3/12-13	3/12-13
	Time:	0800-0800	0800-0800	0800-0800	0800-0800
	Lab Log #:	118157	118158	118166	118167
	Sampled by:	Ecology	Monroe	Ecology	Monroe
Parameter	Analysis by:				
TSS (mg/L)					
	Ecology	236	187	12	10
	Monroe	282	188	18	14
BOD5 (mg/L)					
	Ecology	241	147	32	26
	Monroe	279	240	42	30
NH3-N (mg/L)					
	Ecology	20	15	22	18
	Monroe	22	16	23	19

Inf - influent sample
Eff - effluent sample

E - Ecology sample
M - Monroe sample
comp - composite sample

Table 5 - Comparison of Detected VOAs, BNAs, and Metals with Water Quality Criteria - Monroe, March 1996.

(Group)[1]	Location:	Inf-1	Inf-2	Eff-1	Eff-2	Sludge	EPA/Ecology Water Quality Criteria Summary	
	Type:	grab	grab	grab	grab	grab		
	Date:	3/12	3/12	3/12	3/12	3/13	Acute	Chronic
	Time:	1020	1500	0955	1435	1100	Fresh	Fresh
	Lab Log#:	18155	118156	118164	118165	118171		
	VOA Compounds	(ug/L)	(ug/L)	(ug/L)	(ug/L)	ug/Kg-dry	(ug/L)	(ug/L)
	Acetone	45	96	39 J				
	Carbon Disulfide		0.36 J					
b	cis-1,2-Dichloroethene		0.1 J				11,600 *(b)	
a	Chloroform	7	31	1.6	1.4		28,900 *	1,240 *
c	1,1,1-Trichloroethane	0.16 J					18,000 *(c)	
a	Bromodichloromethane	0.22 J	0.3 J				11,000 *(a)	
	Trichloroethene	0.14 J	0.11 J				45,000 *	21,900 *
	Tetrachloroethene	2.1	1.1	0.48 J	0.29 J	2.9 J	5,280 *	840 *
	Toluene	1.4	1.5	2.2	1.8	80	17,500 *	
g	Chlorobenzene		0.11 J				250 *(g)	50 *(g)
	Ethylbenzene	0.11 J	2.6				32,000 *	
	1,2,4-Trimethylbenzene	0.87 J	0.46 J					
	1,3,5-Trimethylbenzene	0.26 J	0.16 J					
	p-Isopropyltoluene	1.4	0.9 J					
h	1,4-Dichlorobenzene	1.7	4.2	1	0.86 J		1,120 *(h)	763 *(h)
h	1,2-Dichlorobenzene		0.26 J				1,120 *(h)	763 *(h)
n	Naphthalene	3.4 J	3.4				2,300 *	620 *
	o-Xylene	0.2 J	2.7					
	m&p-Xylene	0.45 J	9.6					
	n-Propylbenzene	0.1 J						

Inf - influent
Eff - effluent
Sludge - sludge

J - The analyte was positively identified. The associated numerical value is an estimate.
E - The concentration of the associated value exceeds the known calibration range.
Bold - detected analyte

a Total Halomethanes
b Total Dichloroethenes
c Total Trichloroethanes
g Total Chlorinated Benzenes (excluding Dichlorobenzenes)
h Total Dichlorobenzenes
i Total Phthalate Esters
n Total Polynuclear Aromatic Hydrocarbons

[1]NOTE: SOME INDIVIDUAL COMPOUND CRITERIA OR LOELS MAY NOT AGREE WITH GROUP CRITERIA OR LOELS. REFER TO APPROPRIATE EPA DOCUMENT ON AMBIENT WATER QUALITY CRITERIA FOR FULL DISCUSSION.

Table 5 - (cont'd) - Monroe, March 1996.

EPA/Ecology Water Quality

(Group)[1]		Location:	Inf-E	Eff-E	Sludge	Criteria Summary	
		Type:	comp	comp	grab		
		Date:	3/12-13	3/12-13	3/13	Acute	Chronic
		Time:	0800-0800	0800-0800	1100	Fresh	Fresh
		Lab Log#:	118157	118166	118171		
	BNA Compounds		(ug/L)	(ug/L)	(ug/Kg-dry)	(ug/L)	(ug/L)
	Benzoic Acid		111 E				
	Isophorone				828	117,000 *	
i	Diethyl Phthalate		4.2	0.26 J		940 *(i)	3 *(i)
i	Di-n-Butyl Phthalate		4.4			940 *(i)	3 *(i)
n	Naphthalene		1.3			2,300 *	620 *
	2-Methylnaphthalene		3.6				
	2-Methylphenol			0.11 J			
	Benzyl Alcohol		8	0.51	799 J		
	2,4-Dimethylphenol			0.28 J		2,120 *	
	4-Methylphenol		31	6.6			
h	1,4-Dichlorobenzene		2.6	0.52 J		1,120 *(h)	763 *(h)
	Phenol		4.4		5540	10,200 *	2,560 *
i	Bis(2-Ethylhexyl)Phthalate		25 J			940 *(i)	3 *(i)
n	Pyrene				262 J		
	3B-Coprostanol		334 E	36	436000		
	Caffeine		5.6	5.1			
	1-Methylnaphthalene		2.8				

Inf - influent
Eff - effluent
Sludge - sludge

J - The analyte was positively identified. The associated numerical value is an estimate.
E - The concentration of the associated value exceeds the known calibration range.
Bold - detected analyte

a Total Halomethanes
b Total Dichloroethenes
c Total Trichloroethanes
g Total Chlorinated Benzenes (excluding Dichlorobenzenes)
h Total Dichlorobenzenes
i Total Phthalate Esters
n Total Polynuclear Aromatic Hydrocarbons

[1]NOTE: SOME INDIVIDUAL COMPOUND CRITERIA OR LOELS MAY NOT AGREE WITH GROUP CRITERIA OR LOELS. REFER TO APPROPRIATE EPA DOCUMENT ON AMBIENT WATER QUALITY CRITERIA FOR FULL DISCUSSION.

Table 5 - (cont'd) - Monroe, March 1996.

Location:	Inf-E	Eff-E	Trnsblk	Sludge	Compost	State Water Quality Criteria Summary	
Type:	comp	comp	grab	grab	grab	Acute	Chronic
Date:	3/12-13	3/12-13	3/12	3/13	3/11	Fresh	Fresh
Time:	0800-0800	0800-0800	0750	1100	1610		
Lab Log#:	118157	118166	118175	118171	118172		
	(ug/L)	(ug/L)	(ug/L)	(mg/Kg-dry)	(mg/Kg-dry)	(ug/L)	(ug/L)
Metals + +							
Antimony						9000 *	1600 *
Arsenic	1.7			5.05 J	2.3 J		
Pentavalent						850 *	48 *
Trivalent						360	190
Beryllium				0.25	0.12	130 *	5.3 *
Cadmium	0.71	0.17	0.56	3.0	3.13	0.33 +	0.19 +
Chromium							
Total				36.1	24.8		
Hexavalent						16	11
Trivalent						318.33 +	37.94 +
Copper	55.5	18		301	146	2.17 +	1.74 +
Lead	21.4	3.0		99.3	40.2	4.01 +	0.156 +
Mercury	0.42	0.21		3.38	1.18	2.4	0.012
Nickel	13	12		26.2	12.7	233.55 +	25.96 +
Selenium					1.7	20	5
Silver	3.4	1.6		3.66	3.0	0.06 +	0.12
Thallium						1,400 *	40 *
Zinc	147	37	6.2	878	501	18.03 +	16.33 +
Molybdenum					1.8		

[1]NOTE: SOME INDIVIDUAL COMPOUND CRITERIA OR LOELS MAY NOT AGREE WITH GROUP CRITERIA OR LOELS. REFER TO APPROPRIATE EPA DOCUMENT ON AMBIENT WATER QUALITY CRITERIA FOR FULL DISCUSSION.

U - The analyte was not detected at or above the reported result.
UJ - The analyte was not detected at or above the reported estimated result.
J - The analyte was positively identified. The associated numerical result is an estimate.
Analyte was found in the analytical method blank, indicating the sample may have been contaminated.

Inf - influent
Eff - effluent
Trnsblk - transfer blank
Sludge - sludge
Compost - compost

☐ - effluent concentration exceeds acute or chronic criteria.
* Insufficient data to develop criteria. Value presented is the LOEL - Lowest Observed Effect Level.
** pH dependent criteria (7.8 pH used).
\+ Hardness dependent criteria (12.6 mg/L used).
\+ + Metals are total .

Table 6 - Sludge and Compost Comparison of Metals Detected to EPA Criteria for Land Application -Monroe, March 1996.

Location:	Sludge	Compost	EPA Sludge Application Limits (monthly avg.)	EPA Ceiling Concentrations
Type:	grab	grab		
Date:	10/18	3/11		
Time:	1400	1610		
Lab Log #:	118171	118172		
	mg/Kg-dry	mg/Kg-dry	mg/Kg-dry	mg/Kg-dry
Metals (total)				
Antimony	3UJ	3UJ		
Arsenic	5.05J	2.3J	41	75
Beryllium	0.25	0.12		
Cadmium	3.0	3.13	39	85
Chromium	36.1	24.8	1200	3000
Copper	301	146	1500	4300
Lead	99.3	40.2	300	840
Mercury	3.38	1.18	17	57
Nickel	26.2	12.7	420	420
Selenium	3.20	1.7	36	100
Silver	3.66	3.0		
Thallium	0.3UJ	0.3UJ		
Zinc	878	501	2800	7500
Molybdenum		1.8		

Sludge - sludge sample
Compost - compost sample

grab - grab sample

U - The analyte was not detected at or above the reported result.
J - The analyte was positively identified. The associated numerical result is an estimate.

Appendices

Appendix A - Sampling Procedures - Monroe, March 1996.

Ecology Isco composite samplers were set up to collect equal volumes of sample every 30 minutes for 24 hours. The samples were then divided into subsamples for analysis. The compositors were iced to preserve samples.

The composite influent and effluent samplers operated by Monroe were set to collect time-proportionate sample volumes. The Monroe influent composite sampler was sampling every 15 minutes. The effluent composite sampler was sampling every hour.

Ecology influent and effluent composite samples and Monroe influent and effluent composite samples were split for both Ecology and Monroe laboratory analysis. Sampler configurations and locations are summarized in Figure 2 and Table 1.

Appendix B - Sampling Schedule - Monroe, March 1996.

Location:	Inf-1	Inf-2	Inf-E	Inf-M	
Type:	grab	grab	comp	comp	
Date:	3/12	3/12	3/12-13	3/12-13	
Time:	1020	1500	1005	0925	
Lab Log #:	118155	118156	118157	118158	
GENERAL CHEMISTRY					
Conductivity (umhos/cm)	E	E	E	E	
Sulfate (mg/L)					
Alkalinity (mg/L CaCO3)			E	E	
Hardness (mg/L CaCO3)			E	E	
TS (mg/L)			E	E	
TNVS (mg/L)			E	E	E - Ecology sample
TSS (mg/L)	E	E	EM	EM	M - Monroe sample
TNVSS (mg/L)			E	E	grab - grab sample
% Solids					comp - composite sample
% Volatile Solids					grab-comp - grab-composite sample
OXYGEN DEMAND PARAMETERS					
BOD5 (mg/L)			EM	EM	Inf - Influent Sample
COD (mg/L)			E	E	Eff - Effluent Sample
TOC (water mg/L)	E	E	E	E	Sludge - Dewatered sludge sample
TOC (soil - mg/Kg)					Compost - Composted sludge sample
NUTRIENTS					Consl - Monroe Consolidated eff.
NH3-N (mg/L)	E	E	EM	EM	RcvWtr - Receiving water
NO2+NO3-N (mg/L)	E	E	E	E	
Total-P (mg/L)	E	E	E	E	
MISCELLANEOUS					
Oil and Grease (mg/L)					
F-Coliform MF (#/100mL)					
Fecal Coliform (soil - #/100g)					
Total Coliform (soil - #/100g)					
FIELD OBSERVATIONS					
Temperature (C)	E	E			
Temp-cooled (C)			E	E	
pH	E	E	E	E	
Conductivity (umhos/cm)	E	E	E	E	
Chlorine (mg/L) Free					
Total					

Appendix B - (cont'd) - Monroe, March 1996.

Location	Prmclar-1	Prmclar-2	Prmclar-E	Eff-1	Eff-2	Eff-E	Eff-M
Type:	grab	grab	comp	grab	grab	comp	comp
Date:	3/12	3/12	3/12-13	3/12	3/12	3/12-13	3/12-13
Time:	0940	1410	1040	0955	1435	0935	0915
Lab Log #:	118160	118161	118159	118164	118165	118166	118167
GENERAL CHEMISTRY							
Conductivity (umhos/cm)			E	E	E	E	E
Sulfate (mg/L)	E	E					
Alkalinity (mg/L CaCO3)						E	E
Hardness (mg/L CaCO3)						E	E
TS (mg/L)						E	E
TNVS (mg/L)						E	E
TSS (mg/L)	E	E		E	E	EM	EM
TNVSS (mg/L)						E	E
% Solids							
% Volatile Solids							
OXYGEN DEMAND PARAMETERS							
BOD5 (mg/L)			E			EM	EM
COD (mg/L)						E	E
TOC (water mg/L)	E	E	E	E	E	E	E
TOC (soil - mg/Kg)							
NUTRIENTS							
NH3-N (mg/L)				E	E	EM	EM
NO2+NO3-N (mg/L)				E	E	E	E
Total-P (mg/L)				E	E	E	E
MISCELLANEOUS							
Oil and Grease (mg/L)	E	E					
F-Coliform MF (#/100mL)							
Fecal Coliform (soil - #/100g)							
Total Coliform (soil - #/100g)							
FIELD OBSERVATIONS							
Temperature (C)	E	E		E	E		
Temp-cooled (C)			E			E	E
pH	E	E	E	E	E	E	E
Conductivity (umhos/cm)	E	E	E	E	E	E	E
Chlorine (mg/ Free					E		
Total					E		

Appendix B - (cont'd) - Monroe, March 1996.

Location:	Eff-3	Eff-4	Sludge	Compost	Compst2	Consl	RcvWtr
Type:	grab	grab	grab	grab	grab	comp	grab
Date:	3/13	3/13	3/12	3/11	3/13	3/13	3/12
Time:	0845	1135	1100	1610	1345	1345	1240
Lab Log #:	118169	118170	118171	118172	118176	118173	118174
GENERAL CHEMISTRY							
Conductivity (umhos/cm)						E	
Sulfate (mg/L)							
Alkalinity (mg/L CaCO3)						E	
Hardness (mg/L CaCO3)							E
TS (mg/L)						E	
TNVS (mg/L)						E	
TSS (mg/L)	E	E				E	E
TNVSS (mg/L)						E	
% Solids			E	E			
% Volatile Solids			E	E			
OXYGEN DEMAND PARAMETERS							
BOD5 (mg/L)						E	
COD (mg/L)							
TOC (water mg/L)	E	E				E	
TOC (soil -mg/Kg)			E	E			
NUTRIENTS							
NH3-N (mg/L)						E	
NO2 + NO3-N (mg/L)						E	
Total-P (mg/L)						E	
MISCELLANEOUS							
Oil and Grease (mg/L)							
F-Coliform MF (#/100mL)	E	E					
Fecal Coliform (soil - #/100g)			E		E		
Total Coliform (soil - #/100g)			E		E		
FIELD OBSERVATIONS							
Temperature (C)	E	E					E
Temp-cooled (C)						E	
pH	E	E				E	E
Conductivity (umhos/cm)	E	E				E	E
Chlorine (mg/L) Free	E	E					
Total	E	E					

Appendix C - Ecology Analytical Methods - Monroe, March 1966.

Laboratory Analysis	Method Used for Ecology Analysis	Laboratory Performing Analysis
Conductivity	EPA, Revised 1983: 120.1	Manchester Laboratory
Sulfate	EPA Revised 1983: 330.0	Manchester Laboratory
Alkalinity	EPA, Revised 1983: 310.1	Manchester Laboratory
Hardness	EPA, Revised 1983: 130.2	Manchester Laboratory
TS	EPA, Revised 1983: 160.3	Manchester Laboratory
TNVS	EPA, Revised 1983: 160.3	Manchester Laboratory
TSS	EPA, Revised 1983: 160.2	Manchester Laboratory
TNVSS	EPA, Revised 1983: 160.2	Manchester Laboratory
% Solids	APHA, 1989: 2540G.	Manchester Laboratory
% Volatile Solids	EPA, Revised 1983: 160.4	Manchester Laboratory
BOD5	EPA, Revised 1983: 405.1	Manchester Laboratory
COD	EPA, Revised 1983: 410.1	Sound Analytical
TOC (water)	EPA, Revised 1983: 415.1	Manchester Laboratory
TOC (soil/sed)	EPA, Revised 1983: 415.1	Sound Analytical
NH3-N	EPA, Revised 1983: 350.1	Manchester Laboratory
NO2+NO3-N	EPA, Revised 1983: 353.2	Manchester Laboratory
NO2-N	EPA, Revised 1983: 353.2	Manchester Laboratory
Total-P	EPA, Revised 1983: 365.3	Manchester Laboratory
F-Coliform MF	APHA, 1989: 9222D.	Manchester Laboratory
F-Coliform (soil/sed)	APHA, 1989: 9221A.	Manchester Laboratory
T-Coliform (soil/sed)	APHA, 1989: 9221A.	Manchester Laboratory
VOC (water)	EPA, 1986: 8260	Manchester Laboratory
VOC (soil/sed)	EPA, 1986: 8240	Manchester Laboratory
BNAs (water)	EPA, 1986: 8270	Manchester Laboratory
BNAs (soil/sed)	EPA, 1986: 8270	Manchester Laboratory
PP Metals (water)	EPA, Revised 1983: 200-299	Manchester Laboratory
PP Metals (soil/sed)	EPA, Revised 1983: 200-299	Manchester Laboratory

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Appendix D - Quality Assurance/Quality Control (QA/QC) - Monroe, March 1996.

SAMPLING QA/QC

Ecology quality assurance procedures for sampling included cleaning of the sampling equipment for priority pollutant analyses prior to the inspection to prevent sample contamination (Appendix E). Chain-of-custody procedures were followed to assure the security of the samples (Ecology, 1994c).

LABORATORY QA/QC

General Chemistry Analysis

All general chemistry analyses were performed within the method holding times. Method blanks associated with TOC and COD show that the process is free from contamination. All initial and continuing calibration verification standards were within the relevant EPA control limits. A correlation of 0.995 or greater was met as stated in the CLP calibration requirements. All procedural blanks were within acceptable limits. All spike recoveries and laboratory control samples were within acceptance windows.

All oil and grease samples were qualified with a "J" indicating an estimated result. The extraction process produced emulsions that were difficult to break. This reduced extraction efficiency could produce underestimated results.

Temperatures of Ecology composite samples were at or below the 4°C criterion. Monroe samples had been left out of the refrigerator prior to Ecology splitting and were warmer than the criterion, at 9.3°C for Inf-M and 9.4°C for Eff-M. All samples were chilled immediately after splitting.

Priority Pollutant Organics Analysis

VOAs

Low levels of certain target VOA compounds were detected in the laboratory blanks. The five times rule was applied. Surrogate recoveries were within acceptable limits for the water analysis. Some surrogates were low for solids analysis and data have been qualified accordingly. The samples were analyzed within the recommended holding time. Matrix spikes were within recommended limits for percent recovery and relative percent deviations.

BNAs

All sample and extraction holding times were within the recommended limits. Low levels of some target compounds were detected in the laboratory blanks. The EPA five times rule was applied. All surrogate recoveries were within acceptable limits. In water samples, matrix spike recoveries were low for aniline, 1,2-, 1,3- and 1,4-dichlorobenzene, hexachloroethane, hexachlorobutadiene, hexachlorocyclopentadiene and 4-chloroaniline. All of the results for these compounds in the matrix spike source sample were given the "J" qualifier. In solids samples, matrix spike recoveries were low for aniline, hexachloroethane, 3 and 4-nitroanilines and 4-chloroaniline. The "J" qualifier, indicating an estimate, was added to the results for these compounds. Two compounds, 4-nitrophenol and hexachlorocyclopentadiene were not recovered and the data was rejected, "REJ".

Metals Analysis

Data quality for this project is generally good with the exception that spike recoveries are low for arsenic and thallium by GFAA and for antimony by ICP. Recovery of antimony in the LCS sample is also low. No other significant quality assurance issues are noted with the data.

All analyses were conducted within recommended holding times. All initial and continuing calibration verification standards were within the relevant CLP control limits. AA calibration gave a correlation coefficient of 0.995 or greater, also meeting CLP requirements.

All procedural blanks were acceptable. All spike recoveries except those for arsenic and thallium by GFAA and antimony by ICP are within CLP acceptance limits. Arsenic, thallium and antimony levels in the samples are qualified J as estimated due to the observed low spike recoveries. Zinc and mercury spike levels were reported NC, as not calculated, due to the sample level being greater than 4 times the spike level. Precision data are acceptable. Laboratory control sample (LCS) analyses for all elements except antimony are within the windows established for each parameter. Antimony data is flagged J as estimated due to low recoveries in the spiked samples and the LCS sample.

LABORATORY AUDIT

The Monroe laboratory was accredited on January 19, 1995. The accreditation expires on January 18, 1997.

Appendix E - Priority Pollutant Cleaning Procedures - Monroe, March 1996.

PRIORITY POLLUTANT SAMPLING EQUIPMENT CLEANING PROCEDURES

1. Wash with laboratory detergent
2. Rinse several times with tap water
3. Rinse with 10% HNO_3 solution
4. Rinse three (3) times with distilled/deionized water
5. Rinse with high purity acetone
6. Rinse with high purity hexane
7. Rinse with high purity acetone
8. Allow to dry and seal with aluminum foil

Appendix F - VOA, BNA Scan and Metals Results - Monroe, March 1996.

(Group)[1]	Location:	Inf-1	Inf-2	Eff-1	Eff-2	Sludge
	Type:	grab	grab	grab	grab	grab
	Date:	3/12	3/12	3/12	3/12	3/13
	Time:	1020	1500	0955	1435	1100
	Lab Log#:	18155	118156	118164	118165	118171
	VOA Compounds	(ug/L)	(ug/L)	(ug/L)	(ug/L)	ug/Kg-dry
a	Chloromethane	1 U	1 U	1 U	1 U	14 UJ
a	Dichlorodifluoromethane	1 U	1 U	1 U	1 U	14 UJ
a	Bromomethane	1 U	1 U	1 U	1 U	14 UJ
	Vinyl Chloride	1 U	1 U	1 U	1 U	14 UJ
	Chloroethane	1 U	1 U	1 U	1 U	14 UJ
a	Trichlorofluoromethane	1 U	1 U	1 U	1 U	14 UJ
a	Methylene Chloride	0.75 UJ	1.2 UJ	0.59 UJ	0.52 UJ	29 UJ
	Acetone	**45**	**96**	**39 J**	17 UJ	160 UJ
	Carbon Disulfide	2 U	**0.36 J**	2 U	2 U	26 UJ
b	1,1-Dichloroethene	1 U	1 U	1 U	1 U	14 UJ
	1,1-Dichloroethane	1 U	1 U	1 U	1 U	14 UJ
b	trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	14 UJ
b	cis-1,2-Dichloroethene	1 U	**0.1 J**	1 U	1 U	14 UJ
d	2,2-Dichloropropane	1 U	1 U	1 U	1 U	14 UJ
a	Bromochloromethane	1 U	1 U	1 U	1 U	14 UJ
a	Chloroform	**7**	**31**	**1.6**	**1.4**	14 UJ
	1,2-Dichloroethane	1 U	1 U	1 U	1 U	14 UJ
	2-Butanone (MEK)	2 U	2 U	2 U	2 U	35 UJ
c	1,1,1-Trichloroethane	**0.16 J**	1 U	1 U	1 U	14 U
a	Carbon Tetrachloride	1 U	1 U	1 U	1 U	14 UJ
e	1,1-Dichloropropene	1 U	1 U	1 U	1 U	14 U
a	Bromodichloromethane	**0.22 J**	**0.3 J**	1 U	1 U	14 UJ
d	1,2-Dichloropropane	1 U	1 U	1 U	1 U	14 U
a	Dibromomethane	1 U	1 U	1 U	1 U	14 U
e	trans-1,3-Dichloropropene	0.94 U	0.94 U	0.94 U	0.94 U	13 UJ
	Trichloroethene	**0.14 J**	**0.11 J**	1 U	1 U	14 U
a	Dibromochloromethane	1 U	1 U	1 U	1 U	14 UJ
	1,2-Dibromoethane (EDB)	1 U	1 U	1 U	1 U	14 UJ
c	1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	14 U
d	1,3-Dichloropropane	1 U	1 U	1 U	1 U	14 U
	Benzene	1 U	1 U	1 U	1 U	14 U
e	cis-1,3-Dichloropropene	1.1 U	1.1 U	1.1 U	1.1 U	REJ
a	Bromoform	2 U	2 U	2 U	2 U	14 UJ
	2-Hexanone	2 U	2 U	2 U	2 U	56 UJ
	4-Methyl-2-Pentanone (MIBK)	2 U	2 U	2 U	2 U	56 UJ
	Tetrachloroethene	**2.1**	**1.1**	**0.48 J**	**0.29 J**	**2.9 J**
f	1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	14 UJ
f	1,1,1,2-Tetrachloroethane	1 U	1 U	1 U	1 U	14 UJ
	Toluene	**1.4**	**1.5**	**2.2**	**1.8**	**80**
g	Chlorobenzene	1 U	**0.11 J**	1 U	1 U	2.3 UJ
	Ethylbenzene	**0.11 J**	**2.6**	1 U	1 U	14 U
	Styrene (Ethenylbenzene)	1 U	1 U	1 U	1 U	14 UJ

U - The analyte was not detected at or above the reported result

J - The analyte was positively identified. The associated numerical result is an estimate.

UJ - The analyte was not detected at or above the reported estimated result.

REJ - The data are unusable for all purposes.

Inf - influent

Eff - effluent

Sludge - sludge

Appendix F - (cont'd) - Monroe, March 1996.

	Location:	Inf-1	Inf-2	Eff-1	Eff-2	Sludge
	Type:	grab	grab	grab	grab	grab
	Date:	3/12	3/12	3/12	3/12	3/13
	Time:	1020	1500	0955	1435	###
	Lab Log#:	118155	118156	118164	118165	###
	VOA Compounds (cont'd)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	ug/Kg-dry
(Group)[1]						
	Bromobenzene	1 U	1 U	1 U	1 U	14 U
	1,2,3-Trichloropropane	1 U	1 U	1 U	1 U	14 UJ
	2-Chlorotoluene	1 U	1 U	1 U	1 U	14 U
	4-Chlorotoluene	1 U	1 U	1 U	1 U	14 U
	1,2,4-Trimethylbenzene	**0.87 J**	**0.46 J**	1 U	1 U	14 U
	tert-Butylbenzene	1 U	1 U	1 U	1 U	14 U
	1,3,5-Trimethylbenzene	**0.26 J**	**0.16 J**	1 U	1 U	14 U
	sec-Butylbenzene	1 U	1 U	1 U	1 U	14 U
	p-Isopropyltoluene	**1.4**	**0.9 J**	1 U	1 U	14 U
	1,2-Dibromo-3-Chloropropane (D	5 U	5 U	5 U	5 U	28 UJ
g	1,2,3-Trichlorobenzene	1 U	1 U	1 U	1 U	28 UJ
	Isopropylbenzene	1 U	1 U	1 U	1 U	14 U
h	1,4-Dichlorobenzene	**1.7**	**4.2**	**1**	**0.86 J**	**21 J**
h	1,2-Dichlorobenzene	1 U	**0.26 J**	1 U	1 U	3.2 UJ
g	1,2,4-Trichlorobenzene	1 U	1 U	1 U	1 U	28 UJ
n	Naphthalene	**3.4 J**	**3.4**	1 U	1 U	70 U
	Hexachlorobutadiene	1 U	1 U	1 U	1 U	28 UJ
	o-Xylene	**0.2 J**	**2.7**	1 U	1 U	14 U
h	1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	28 U
	m&p-Xylene	**0.45 J**	**9.6**	2 U	2 U	28 U
	1,1-Dichloropropanone	2 U	2 U	2 U	2 U	REJ
	1-Chlorobutane	1 U	1 U	1 U	1 U	14 UJ
	2-Methyoxy-2-Methylpropane	1 U	1 U	1 U	1 U	14 UJ
	Acrylonitrile	2 U	2 U	2 U	2 U	28 UJ
	Allyl Chloride	1 U	1 U	1 U	1 U	14 UJ
	Chloroacetonitrile	1 U	1 U	1 U	1 U	14 U
	Ethyl Ether	1 U	1 U	1 U	1 U	14 UJ
	Ethylmethacrylate	1 U	1 U	1 U	1 U	REJ
	Hexachloroethane	1 U	1 U	1 U	1 U	14 UJ
	Methyl Iodide	1 U	1 U	1 U	1 U	14 UJ
	Methyacrilonitrile	1 U	1 U	1 U	1 U	14 UJ
	Methyl acrylate	5 U	5 U	5 U	5 U	REJ
	Methyl Methacrylate	1 U	1 U	1 U	1 U	14 UJ
	n-Butylbenzene	1 U	1 U	1 U	1 U	28 U
	n-Propylbenzene	**0.1 J**	1 U	1 U	1 U	14 U
	Nitrobenzene	REJ	REJ	REJ	REJ	REJ
	Pentachloroethane	1 U	1 U	1 U	1 U	14 UJ
	Propane, 2-Nitro-	1 U	1 U	1 U	1 U	28 UJ
	Propionitrile	NAF	NAF	NAF	NAF	NAF
	Tetrahydrofuran	2 U	2 U	2 U	2 U	70 UJ
	Trans-1,4-Dichloro-2-butene	1 U	1 U	1 U	1 U	REJ
	1,1,2 Trichlorotrifluoroethane	1 U		1 U	1 U	14 UJ

U - The analyte was not detected at or above the reported result

J - The analyte was positively identified. The associated numerical result is an estimate.

UJ - The analyte was not detected at or above the reported estimated result.

REJ - The data are unusable for all purposes.

NAF - t analyzed for.

Appendix F - (cont'd) - Monroe, March 1996.

(Group)[1]		Inf-E		Eff-E		Sludge	
	Location:	Inf-E		Eff-E		Sludge	
	Type:	comp		comp		grab	
	Date:	3/12-13		3/12-13		3/13	
	Time:	0800-0800		0800-0800		1100	
	Lab Log#:	118157		118166		118171	
	BNA Compounds	(ug/L)		(ug/L)		(ug/Kg-dry)	
n	Benzo(a)Pyrene	0.68	UJ	0.4	U	1270	U
l	2,4-Dinitrophenol	14	UJ	8	UJ	12700	U
n	Dibenzo(a,h)Anthracene	0.68	UJ	0.4	U	3170	U
n	Benzo(a)Anthracene	0.68	UJ	0.4	U	635	U
	4-Chloro-3-Methylphenol	0.68	U	0.4	U	1270	U
	Aniline	0.68	U	0.4	UJ	635	UJ
	Benzoic Acid	111	E	16	UJ	10800	UJ
	Hexachloroethane	0.68	U	0.4	UJ	635	UJ
	Hexachlorocyclopentadiene	6.8	U	4	UJ	31700	U
	Isophorone	0.68	U	0.4	U	**828**	
n	Acenaphthene	0.68	U	0.4	U	635	U
i	Diethyl Phthalate	**4.2**		**0.26**	**J**	635	U
i	Di-n-Butyl Phthalate	4.4		0.4	U	1270	U
n	Phenanthrene	1.4	U	0.8	U	635	U
i	Butylbenzyl Phthalate	6.8	UJ	4	U	1750	UJ
k	N-Nitrosodiphenylamine	0.68	U	0.4	U	1270	U
n	Fluorene	0.68	U	0.4	U	635	U
	Carbazole	0.68	U	0.4	U	635	U
	Hexachlorobutadiene	0.68	U	0.4	UJ	635	U
	Pentachlorophenol	6.8	U	4	U	3170	U
	2,4,6-Trichlorophenol	0.68	U	0.4	U	635	U
	2-Nitroaniline	14	U	8	U	1270	U
l	2-Nitrophenol	6.8	U	4	U	3170	U
n	Naphthalene	**1.3**		0.4	U	635	U
	2-Methylnaphthalene	3.6		0.4	U	635	U
m	2-Chloronaphthalene	0.68	U	0.4	U	635	U
	3,3'-Dichlorobenzidine	6.8	UJ	4	U	1270	U
	Benzidine	6.8	U	4	U	6350	U
	2-Methylphenol	0.68	U	**0.11**	**J**	635	U
h	1,2-Dichlorobenzene	0.68	U	0.4	UJ	635	U
	2,4,5-Trichlorophenol	0.68	U	0.4	U	635	U
	Nitrobenzene	0.68	U	0.4	U	1270	U
	3-Nitroaniline	6.8	U	4	U	1270	U
	4-Nitroaniline	6.8	U	4	U	1270	UJ
l	4-Nitrophenol	3.4	U	2	U	63500	U
	Benzyl Alcohol	**8**		**0.51**		**799**	**J**
p	4-Bromophenyl Phenylether	0.68	U	0.4	U	635	U
	2,4-Dimethylphenol	0.68	U	0.28	J	1270	U
	4-Methylphenol	31		6.6		635	U
h	1,4-Dichlorobenzene	**2.6**		**0.52**	**J**	635	U
	4-Chloroaniline	0.68	U	0.4	UJ	635	UJ
	Phenol	**4.4**		0.4	U	**5540**	

j U - The analyte was not detected at or above the reported result

j J - The analyte was positively identified. The associated numerical result is an estimate.

i UJ - The analyte was not detected at or above the reported estimated result.

Appendix F - (cont'd) - Monroe, March 1996.

(Group)'	Location:	Inf-E		Eff-E		Sludge	
	Type:	comp		comp		grab	
	Date:	3/12-13		3/12-13		3/13	
	Time:	0800-0800		0800-0800		1100	
	Lab Log#:	118157		118166		118171	
	BNA Compounds (cont'd)	(ug/L)		(ug/L)		(ug/Kg-dry)	
	Pyridine	1.4	U	0.8	U	1270	U
	Bis(2-Chloroethyl)Ether	0.68	U	0.4	U	635	U
	Bis(2-Chloroethoxy)Methane	0.68	U	0.4	U	635	U
	Bis(2-Ethylhexyl)Phthalate	**25**	**J**	4	UJ	32800	UJ
i	Di-n-Octyl Phthalate	6.8	UJ	4	U	3170	U
g	Hexachlorobenzene	0.68	U	0.4	U	635	U
n	Anthracene	0.68	U	0.4	U	635	U
g	1,2,4-Trichlorobenzene	0.68	U	0.4	U	635	U
	2,4-Dichlorophenol	0.68	U	0.4	U	1270	U
o	2,4-Dinitrotoluene	14	U	8	U	3170	U
n	Pyrene	0.68	UJ	0.4	U	**262**	**J**
i	Dimethyl Phthalate	0.68	U	0.4	U	635	U
	Dibenzofuran	0.68	U	0.4	U	635	U
n	Benzo(g,h,i)Perylene	0.68	UJ	0.4	U	635	U
n	Indeno(1,2,3-cd)Pyrene	0.68	UJ	0.4	U	3170	U
n	Benzo(b)Fluoranthene	0.68	UJ	0.4	U	635	U
n	Fluoranthene	0.68	U	0.4	U	635	U
n	Benzo(k)Fluoranthene	0.68	UJ	0.4	U	635	U
n	Acenaphthylene	0.68	U	0.4	U	635	U
n	Chrysene	0.68	UJ	0.4	U	635	U
l	4,6-Dinitro-2-Methylphenol	6.8	U	4	U	6350	U
h	1,3-Dichlorobenzene	0.68	U	0.4	UJ	635	U
o	2,6-Dinitrotoluene	14	U	8	U	3170	U
k	N-Nitroso-di-n-Propylamine	0.68	U	0.4	U	635	U
p	4-Chlorophenyl Phenylether	0.68	U	0.4	U	635	U
	2-Chlorophenol	0.68	U	0.4	U	635	U
j	Bis(2-Chloroisopropyl)Ether	0.68	U	0.4	U	635	U
	Retene	0.68	UJ	0.4	U	1270	U
	3B-Coprostanol	**334**	**E**	**36**		**436000**	
	Caffeine	**5.6**		**5.1**		1270	U
	Hydrazine, 1,2-Diphenyl-	0.68	U	0.4	U	635	U
	N-Nitrosodimethylamine	3.4	U	2	U	3170	U
	1-Methylnaphthalene	**2.8**		0.4	U	635	U

U - The analyte was not detected at or above the reported result

J - The analyte was positively identified. The associated numerical result is an estimate.

UJ - The analyte was not detected at or above the reported estimated result.

E- The concentration of the associated value exceeded the known calibration range.

Appendix F - (cont'd) - Monroe, March 1996.

Location:	Inf-E	Eff-E	Trnsblk	Sludge	Compost
Type:	comp	comp	grab	grab	grab
Date:	3/12-13	3/12-13	3/12	3/13	3/11
Time:	0800-0800	0800-0800	0750	1100	1610
Lab Log#:	118157	118166	118175	118171	118172
	(ug/L)	(ug/L)	(ug/L)	(mg/Kg-dry)	(mg/Kg-dry)
Metals + +					
Antimony	30 U	30 U	30 U	3 UJ	3 UJ
Arsenic	**1.7**	1.5 U	1.5 U	**5.05 J**	**2.3 J**
Pentavalent					
Trivalent					
Beryllium	2 U	2 U	2 U	**0.25**	**0.12**
Cadmium	**0.71**	**0.17**	**0.56**	**3.0**	**3.13**
Chromium					
Total	5 U	5 U	5 U	**36.1**	**24.8**
Hexavalent					
Trivalent					
Copper	**55.5**	**18**	5 U	**301**	**146**
Lead	**21.4**	**3.0**	1.0 U	**99.3**	**40.2**
Mercury	**0.42**	**0.21**	0.05 U	**3.38**	**1.18**
Nickel	**13**	**12**	10 U	**26.2**	**12.7**
Selenium	1.5 U	1.5 U	1.5 U	3.20	**1.7**
Silver	**3.4**	**1.6**	0.5 U	**3.66**	**3.0**
Thallium	1.5 U	1.5 U	1.5 U	0.3 UJ	0.3 UJ
Zinc	**147**	**37**	**6.2**	**878**	**501**
Molybdenum					**1.8**

'NOTE: SOME INDIVIDUAL COMPOUND CRITERIA OR LOELS MAY NOT AGREE WITH GROUP CRITERIA OR LOELS. REFER TO APPROPRIATE EPA DOCUMENT ON AMBIENT WATER QUALITY CRITERIA FOR FULL DISCUSSION.

U - The analyte was not detected at or above the reported result.
UJ - The analyte was not detected at or above the reported estimated result.
J - The analyte was positively identified. The associated numerical result is an estimate.
Analyte was found in the analytical method blank, indicating the sample may have been contaminated.
Bold - detected analyte

Inf - influent
Eff - effluent
Trnsblk - transfer blank
Sludge - sludge
Compost - compost

* Insufficient data to develop criteria. Value presented is the LOEL - Lowest Observed Effect Level.
** pH dependent criteria (7.8 pH used).
\+ Hardness dependent criteria (12.6 mg/L used).
\+ + Metals are total .

E - Ecology sample

Appendix G - VOA and BNA Scan Tentatively Identified Compounds (TICs)- Monroe, March 1996.

TIC data are presented on the laboratory report sheets that follow. Fractions are identified as volatile organic analysis (VOAs) or Base/Neutral/Acids (BNAs). Locations corresponding to the Lab Log # (called Sample: on the laboratory reporting sheet and data qualifiers are summarized on this page.

Location:	Inf-1	Inf-2	Inf-E
Type:	grab	grab	comp
Date:	3/12	3/12	3/12-13
Time:	1020	1500	1005
Lab Log #:	118155	118156	118157

Location:	Eff-1	Eff-2	Eff-E	Sludge
Type:	grab	grab	comp	grab
Date:	3/12	3/12	3/12-13	3/12
Time:	0955	1435	0935	1100
Lab Log #:	118164	118165	118166	118171

Inf- influent sample

Eff - effluent sample

Sludge - sludge sample

grab - grab sample

comp - composite sample

E - Ecology sample

NJ - There is evidence that the analyte is present. The associated numerical result is an estimate.

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Volatile Organic Analysis + top 10 TIC's CLP

Project Name: Monroe Class II
LIMS Project ID: 1185-96

Sample: **96118155**
Field ID: INF-1
Project Officer: S. Golding

Date Received: 03/14/96
Date Analyzed: 03/21/96

Method: SW8260
Matrix: Water
Units: ug/L

Tentatively Identified Compounds

CAS Number	Analyte Description	Result	Qualifier
*3008001	*Unknown 01*	2.2	NJ
620144	*Benzene, 1-Ethyl-3-Methyl-*	.46	NJ
*3005001	*Unknown Hydrocarbon 01*	.46	NJ
*3008002	*Unknown 02*	1.3	NJ
*3005002	*Unknown Hydrocarbon 02*	.38	NJ
*3008003	*Unknown 03*	2.1	NJ
*3005003	*Unknown Hydrocarbon 03*	.55	NJ
*3005004	*Unknown Hydrocarbon 04*	1.1	NJ
527844	*Benzene, 1-Methyl-2-(1-Methylethyl)-*	.28	NJ
*3008004	*Unknown 04*	.4	NJ
*3005005	*Unknown Hydrocarbon 05*	.3	NJ
*3002401	*Unknown Aromatic HC 01*	.49	NJ
119642	*Naphthalene, 1,2,3,4-Tetrahydro-*	.6	NJ

Authorized By: ______________ Release Date: 4/15/96

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Volatile Organic Analysis + top 10 TIC's CLP

Project Name: Monroe Class II **LIMS Project ID:** 1185-96

Sample: 96118156 **Date Received:** 03/14/96 **Method:** SW8260
Field ID: INF-2 **Matrix:** Water
Project Officer: S. Golding **Date Analyzed:** 03/21/96 **Units:** ug/L

Tentatively Identified Compounds

CAS Number	Analyte Description	Result	Qualifier
624920	*Disulfide, Dimethyl*	.27	NJ
*3008001	*Unknown 01*	.3	NJ
620144	*Benzene, 1-Ethyl-3-Methyl-*	.39	NJ
*3005001	*Unknown Hydrocarbon 01*	.88	NJ
*3005002	*Unknown Hydrocarbon 02*	.33	NJ
*3008002	*Unknown 02*	.33	NJ
*3005003	*Unknown Hydrocarbon 03*	.47	NJ
*3008003	*Unknown 03*	.52	NJ
*3005004	*Unknown Hydrocarbon 04*	1.3	NJ
554610	*Bicyclo[4.1.0]Hept-2-Ene, 3,7,7-Trimethyl-*	.43	NJ
*3002401	*Unknown Aromatic HC 01*	.42	NJ
*3005005	*Unknown Hydrocarbon 05*	.51	NJ
119642	*Naphthalene, 1,2,3,4-Tetrahydro-*	.14	NJ

Authorized By: [signature] Release Date: 4/15/96

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Volatile Organic Analysis + top 10 TIC's CLP

Project Name: Monroe Class II **LIMS Project ID:** 1185-96

Sample: **96118164** **Date Received:** 03/14/96 **Method:** SW8260
Field ID: EFF-1 **Matrix:** Water
Project Officer: S. Golding **Date Analyzed:** 03/21/96 **Units:** ug/L

Tentatively Identified Compounds

CAS Number	Analyte Description	Result	Qualifier
*3005001	*Unknown Hydrocarbon 01*	.6	NJ

Authorized By: _______________ Release Date: 4/15/96 Page: 3

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Department of Ecology

Analysis Report for

Volatile Organic Analysis + top 10 TIC's CLP

Project Name: Monroe Class II **LIMS Project ID:** 1185-96

Sample: 96118165 **Date Received:** 03/14/96 **Method:** SW8260
Field ID: EFF-2 **Matrix:** Water
Project Officer: S. Golding **Date Analyzed:** 03/21/96 **Units:** ug/L

Tentatively Identified Compounds

CAS Number	Analyte Description	Result	Qualifier
75183	*Methane, Thiobis*	1	NJ
624920	*Disulfide, Dimethyl*	.24	NJ
*3005001	*Unknown Hydrocarbon 01*	.42	NJ

Authorized By: [signature] Release Date: 4/15/96

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Analysis Report for

Base/Neutral/Acids

Project Name: Monroe Class II **LIMS Project ID:** 1185-96

Sample: 96118157 (Dilution - DIL1) **Date Received:** 03/14/96 **Method:** SW8270
Field ID: INF-E **Date Prepared:** 03/17/96 **Matrix:** Water
Project Officer: S. Golding **Date Analyzed:** 03/29/96 **Units:** ug/L

Tentatively Identified Compounds

CAS Number	Analyte Description	Result	Qualifier
464175	*Bicyclo[2.2.1]Hept-2-Ene, 1,7,7-Trimethyl-*	85	NJ
112345	*Ethanol, 2-(2-Butoxyethoxy)-*	73	NJ
98555	*3-Cyclohexene-1-Methanol, .Alpha.,.Alpha.4-Trimethyl-*	73	NJ
124174	*Ethanol, 2-(2-Butoxyethoxy)-, Acetate*	345	NJ
334485	*Decanoic Acid*	83	NJ
*3008001	*Unknown 01*	98	NJ
143077	*Decanoic Acid, Di-*	314	NJ
*3008002	*Unknown 02*	91	NJ
544638	*Decanoic Acid, Tetra-*	1200	NJ
5746587	*Tetradecanoic Acid, 12-Methyl-, (S)-*	147	NJ
2091294	*9-Hexadecenoic Acid*	1150	NJ
57103	*Hexadecanoic Acid*	6360	NJ
*3008003	*Unknown 03*	112	NJ
506127	*Heptadecanoic Acid*	124	NJ
*3008004	*Unknown 04*	22500	NJ
112801	*Oleic Acid*	11100	NJ
57114	*Octadecanoic Acid*	4090	NJ
506309	*Arachidic Acid, Ethyl Ester*	252	NJ
*3008005	*Unknown 05*	118	NJ
*3008006	*Unknown 06*	113	NJ
*3008007	*Unknown 07*	127	NJ

Authorized By: O. Kleste Release Date: 4/19/96

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Monroe Class II — **LIMS Project ID:** 1185-96

Sample: 96118166 — **Date Received:** 03/14/96 — **Method:** SW8270
Field ID: EFF-E — **Date Prepared:** 03/17/96 — **Matrix:** Water
Project Officer: S. Golding — **Date Analyzed:** 03/29/96 — **Units:** ug/L

Tentatively Identified Compounds

CAS Number	Analyte Description	Result	Qualifier
20324327	*2-Propanol, 1-(2-Methoxy-1-Methylethoxy)-*	7.6	NJ
10143325	*2-Propanol, 1-(2-ethoxyprop*	5.1	NJ
112345	*Ethanol, 2-(2-Butoxyethoxy)-*	5.7	NJ
*3008001	*Unknown 01*	5.8	NJ
*300802	*Unknown 02*	26	NJ
124174	*Ethanol, 2-(2-Butoxyethoxy)-, Acetate*	258	NJ
*3008003	*Unknown 03*	5.2	NJ
*3008004	*Unknown 04*	7.7	NJ
*3008005	*Unknown 05*	16	NJ
*3008006	*Unknown 06*	5.8	NJ
*3008007	*Unknown 07*	4.9	NJ
25154523	*Phenol, Nonyl-*	12	NJ
*3008008	*Unknown 08*	8.9	NJ
*3008009	*Unknown 09*	6.4	NJ
2091294	*9-Hexadecenoic Acid*	20	NJ
*3008010	*Unknown 10*	5.4	NJ
112801	*Oleic Acid*	33	NJ
57114	*Octadecanoic Acid*	69	NJ
*3008011	*Unknown 11*	8.2	NJ
*3008012	*Unknown 12*	12	NJ
57885	*Cholesterol*	24	NJ

Authorized By: D. Hunter (signature) Release Date: 4/19/96

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Volatile Organic Analysis + top 10 TIC's CLP

Project Name: Monroe Class II

LIMS Project ID: 1185-96

Sample: 96118171
Field ID: SLUDGE
Project Officer: S. Golding

Date Received: 03/14/96
Date Analyzed: 03/20/96

Method: SW8260
Matrix: Semi-Solid/Sludge
Units: ug/Kg Dry Wt.

Tentatively Identified Compounds

CAS Number	Analyte Description	Result	Qualifier
74931	*Methyl Mercaptan*	1560	NJ
110543	*Hexane(Dot)*	10	NJ
624920	*Disulfide, Dimethyl*	3060	NJ
61142798	*1-Decene, 8-Methyl-*	16	NJ
24524570	*Bicyclo[3.1.0]Hexane, 6-Isopropylidene-1-Methyl-*	91	NJ
*3005001	*Unknown Hydrocarbon 01*	53	NJ
6975980	*Decane, 2-methyl*	76	NJ
17302373	*Decane, 2,2-Dimethyl-*	43	NJ
17312742	*Decane, 5-Ethyl-5-Methyl-*	77	NJ
1186534	*Pentane, 2,2,3,4-Tetramethyl-*	57	NJ
1120214	*Undecane*	79	NJ
*3005002	*Unknown Hydrocarbon 02*	34	NJ
62108263	*Decane, 2,6,8-Trimethyl-*	152	NJ
629594	*Tetradecane*	34	NJ
74645980	*Dodecane, 2,7,10-Trimethyl-*	70	NJ
13151343	*Decane, 3-Methyl*	36	NJ

Authorized By: [signature] Release Date: 4/15/96

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Monroe Class II　　**LIMS Project ID:** 1185-96

Sample: 96118171
Field ID: SLUDGE
Project Officer: S. Golding

Date Received: 03/14/96
Date Prepared: 03/20/96
Date Analyzed: 04/05/96

Method: SW8270
Matrix: Semi-Solid/Sludge
Units: ug/Kg Dry Wt.

Tentatively Identified Compounds

CAS Number	Analyte Description	Result	Qualifier
*3008001	*Unknown 01*	38800	NJ
*3008002	*Unknown 02*	38700	NJ
25154523	*Phenol, Nonyl-*	56000	NJ
544638	*Decanoic Acid, Tetra-*	106000	NJ
1002842	*Decanoic Acid, Penta-*	223000	NJ
5746587	*Tetradecanoic Acid, 12-Methyl-, (S)-*	90700	NJ
*3008003	*Unknown 03*	94700	NJ
1120258	*9-Hexadecenoic Acid, Methyl Ester, (Z)-*	17100	NJ
5129602	*Pentadecanoic Acid, 14-Methyl-, Methyl Ester*	52000	NJ
*3008004	*Unknown 04*	52900	NJ
2091294	*9-Hexadecenoic Acid*	549000	NJ
57103	*Hexadecanoic Acid*	1090000	NJ
506127	*Heptadecanoic Acid*	52000	NJ
*3008005	*Unknown 05*	85900	NJ
*3008006	*Unknown 06*	69300	NJ
*3008007	*Unknown 07*	56200	NJ
112801	*Oleic Acid*	406000	NJ
57114	*Octadecanoic Acid*	164000	NJ
23470000	*Hexadecanoic acid, 2-hydroxy-1-(hydroxym*	16100	NJ
6006015	*3,7,11-Tridecatrienenitrile, 4,8,12-Trimethyl-*	63700	NJ
59029	*Vitamin E*	30800	NJ
57885	*Cholesterol*	71800	NJ
80977	*Cholestanol (Van)*	33500	NJ
*3008008	*Unknown 08*	39100	NJ

Authorized By: D. Norton　　Release Date: 4/15/96　　

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Base/Neutral/Acids

Project Name: Monroe Class II **LIMS Project ID:** 1185-96

Sample: **96118171 (Dilution - DIL1)**
Field ID: SLUDGE
Project Officer: S. Golding

Date Received: 03/14/96
Date Prepared: 03/20/96
Date Analyzed: 04/05/96

Method: SW8270
Matrix: Semi-Solid/Sludge
Units: ug/Kg Dry Wt.

Tentatively Identified Compounds

CAS Number	Analyte Description	Result	Qualifier
104405	*Phenol, 4-Nonyl-*	24600	NJ
544638	*Decanoic Acid, Tetra-*	107000	NJ
1002842	*Decanoic Acid, Penta-*	144000	NJ
5746587	*Tetradecanoic Acid, 12-Methyl-, (S)-*	55800	NJ
*3008001	*Unknown 01*	133000	NJ
112390	*Decanoic Acid, Methyl Ester Hexa-*	66300	NJ
2091294	*9-Hexadecenoic Acid*	512000	NJ
57103	*Hexadecanoic Acid*	1290000	NJ
*3008002	*Unknown 02*	65100	NJ
*3008003	*Unknown 03*	97400	NJ
57114	*Octadecanoic Acid*	211000	NJ
*3008004	*Unknown 04*	36600	NJ
6006015	*3,7,11-Tridecatrienenitrile, 4,8,12-Trimethyl-*	265000	NJ
*3005001	*Unknown Hydrocarbon 01*	41700	NJ
59029	*Vitamin E*	56000	NJ
57885	*Cholesterol*	233000	NJ
516950	*Epicholestanol*	42500	NJ
*3008005	*Unknown 05*	49000	NJ
83476	*Gamma-Sitosterol*	132000	NJ

Authorized By: D. Norton Release Date: 4/15/96

Appendix H - Glossary of Terms - Monroe, March 1996

BOD_5 - five day biochemical oxygen demand
BNA - base-neutral acid extractables (semivolatile organics)
comp - composite sample
est. - estimated concentration
E - Department of Ecology
Eff - effluent
EPA - United States Environmental Protection Agency
F-coli - fecal coliform bacteria
g - gram
grab - grab sample
Inf - influent
MF - membrane filter
mg - milligram
mg/L - milligram per liter
M - Monroe
NPDES - National Pollutant Discharge Elimination System
D.O. - dissolved oxygen
pH - $-\log_{10}$ (hydrogen ion concentration)
QA - quality assurance
QC - quality control
TIC - tentatively identified compound
TNVS - total nonvolatile solids
TNVSS - total nonvolatile suspended solids
TOC - total organic carbon
TS - total solids
TSS - total suspended solids
μg - microgram
VOA - volatile organic analysis