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February 12, 1981

Mrs. Sonya Shashoua
New Jersey Department of Environmental Protection
Solid Waste Administration
32 East Hanover Street
Trenton, NJ 08625

Dear Mrs. Shashoua:

Per our recent conversation attached please find:

1. Copies of EPA Test Methods 106 and 107, for the determination of vinyl chloride monomer in air and residual monomer in slurry, wet cake and latex samples, respectively. As I indicated, these methods are selective to vinyl chloride, and were developed by EPA with regard to the NESHAPS Standard on Vinyl Chloride. The copies were taken from the EIC publication, but are available in 40CFR 61, Subpart F and the October 21, 1976 issue of the Federal Register.

2. A listing of the major raw materials used in the resin plant which could reach the landfill. Included are the materials for which analyses are run as part of Dr. Marwan Sadat's sludge quality assurance program.

Very truly yours,
TENNECO CHEMICALS, INC.

J. P. Sandstedt
Manager - Environmental Affairs

JPS:mm

cc: Mr. F. W. Kanzler - Burlington

P = Production of grade G_i resin represented by the sample, in kg

G_i = Grade of resin, e.g., G_1, G_2, and G_3.

n = Total number of grades of resin produced during the 24-hour period.

(vi) The owner or operator shall retain at the source and make available for inspection by the Administrator for a minimum of 2 years records of all data needed to furnish the information required by paragraph (c)(2)(v) of this section: The records are to contain the following information:

(A) The vinyl chloride content found in all the samples required in paragraphs (c)(2)(i) and (c)(2)(ii) of this section, identified by the resin type and grade and the time and date of the sample, and

(B) The corresponding quantity of polyvinyl chloride resin processed by the stripper(s), identified by the resin type and grade and the time and date it represents.

(3) The owner or operator shall include in the report a record of the emissions from each reactor opening for which an emission limit is prescribed in § 61.64(a)(2). Emissions are to be determined in accordance with § 61.67(g)(5), except that emissions for each reactor are to be determined. For a reactor that is also used as a stripper, the determination may be made immediately following the stripping operation.

§ 61.71 Recordkeeping.

(a) The owner or operator of any source to which this subpart applies shall retain the following information at the source and make it available for inspection by the Administrator for a minimum of two years:

(1) A record of the leaks detected by the vinyl chloride monitoring system, as required by § 61.65(b)(8), including the concentrations of vinyl chloride as measured, analyzed, and recorded by the vinyl chloride detector, the location of each measurement and the date and approximate time of each measurement.

(2) A record of the leaks detected during routine monitoring with the portable hydrocarbon detector and the action taken to repair the leaks, as required by § 61.65(b)(8), including a brief statement explaining the location and cause of each leak detected with the portable hydrocarbon detector, the date and time of the leak, and any action taken to eliminate that leak.

(3) A record of emissions measured in accordance with § 61.68.

(4) A daily operating record for each polyvinyl chloride reactor, including pressures and temperatures.

2. Appendix B is amended by adding Test Methods 106 and 107 as follows.

Method 106—Determination of Vinyl Chloride from Stationary Sources

Introduction

Performance of this method should not be attempted by persons unfamiliar with the operation of a gas chromatograph, nor by those who are unfamiliar with source sampling, as there are many details that are beyond the scope of this presentation. Care must be exercised to prevent exposure of sampling personnel to vinyl chloride, a carcinogen.

1. Principle and Applicability.

1.1 An integrated bag sample of stack gas containing vinyl chloride (chloroethene) is subjected to chromatographic analysis, using a flame ionization detector.

1.2 The method is applicable to the measurement of vinyl chloride in stack gases from ethylene dichloride, vinyl chloride and polyvinyl chloride manufacturing processes, except where the vinyl chloride is contained in particulate matter.

2. Range and Sensitivity.

The lower limit of detection will vary according to the chromatograph used. Values reported include 1×10^{-7} mg and 4×10^{-7} mg.

3 *Interferences.* Acetaldehyde, which can occur in some vinyl chloride sources, will interfere with the vinyl chloride peak from the Chromasorb 102[1] column. See sections 4.3.2 and 6.4. If resolution of the vinyl chloride peak is still not satisfactory for a particular sample, then chromatograph parameters can be further altered with prior approval of the Administrator. If alteration of the chromatograph parameters fails to resolve the vinyl chloride peak, then supplemental confirmation of the vinyl chloride peak through an absolute analytical technique, such as mass spectroscopy, must be performed.

4 Apparatus.

4.1 *Sampling* (Figure 106-1).

4.1.1 Probe—Stainless steel, Pyrex glass, or Teflon tubing according to stack temperature, each equipped with a glass wool plug to remove particulate matter.

4.1.2 Sample line—Teflon, 6.4 mm outside diameter, of sufficient length to connect probe to bag. A new unused piece is employed for each series of bag samples that constitutes an emission test.

4.1.3 Male (2) and female (2) stainless steel quick-connects, with ball checks (one pair without) located as shown in Figure 106-1.

4.1.4 Tedlar bags, 100 liter capacity—To contain sample. Teflon bags are not acceptable. Aluminized Mylar bags may be used, provided that the samples are analyzed within 24 hours of collection.

4.1.5 Rigid leakproof containers for 4.1.4, with covering to protect contents from sunlight.

4.1.6 Needle valve—To adjust sample flow rate.

4.1.7 Pump—Leak-free. Minimum capacity 2 liters per minute.

4.1.8 Charcoal tube—To prevent admission of vinyl chloride to atmosphere in vicinity of samplers.

4.1.9 Flow meter—For observing sample flow rate, capable of measuring a flow range from 0.10 to 1.00 liter per minute.

4.1.10 *Connecting tubing.* Teflon, 6.4 mm outside diameter, to assemble sample train (Figure 106-1).

4.1.11 Pitot tube—Type S (or equivalent), attached to the probe so that the sampling flow rate can be regulated proportional to the stack gas velocity.

4.2 Sample recovery.

4.2.1 Tubing—Teflon, 6.4 mm outside diameter, to connect bag to gas chromatograph sample loop. A new unused piece is employed for each series of bag samples that constitutes an emission test, and is to be discarded upon conclusion of analysis of those bags.

4.3 Analysis.

4.3.1 Gas chromatograph—With flame ionization detector, potentiometric strip chart recorder and 1.0 to 5.0 ml heated sampling loop in automatic sample valve.

4.3.2 *Chromatographic column.* Stainless steel, 2 m × 3.2 mm, containing 80/100 mesh Chromasorb 102. A secondary column of GE SF-96, 20 percent on 60/80 mesh AW Chromasorb P, stainless steel, 2 m × 3.2 mm or Porapak T, 80/100 mesh, stainless steel, 1 m × 3.2 mm is required if acetaldehyde is present. If used, a secondary column is placed after the Chromasorb 102 column. The combined columns should then be operated at 120° C.

4.3.3 Flow meters (2)—Rotameter type, 0 to 100 ml/min capacity, with flow control valves.

4.3.4 Gas regulators—For required gas cylinders.

4.3.5 Thermometer—Accurate to one degree centigrade, to measure temperature of heated sample loop at time of sample injection.

4.3.6 Barometer—Accurate to 5 mm Hg to measure atmospheric pressure around gas chromatograph during sample analysis.

4.3.7 Pump—Leak-free. Minimum capacity 100 ml/min.

4.4 Calibration.

4.4.1 Tubing—Teflon, 6.4 mm outside diameter, separate pieces marked for each calibration concentration.

4.4.2 Tedlar bags—Sixteen-inch square size, separate bag marked for each calibration concentration.

4.4.3 Syringe—0.5 ml, gas tight.

4.4.4 Syringe—50 ml, gas tight.

4.4.5 Flow meter—Rotameter type, 0 to 1000 ml/min range accurate to ±1%, to meter nitrogen in preparation of standard gas mixtures.

4.4.6 Stop watch—Of known accuracy, to time gas flow in preparation of standard gas mixtures.

5 Reagents. It is necessary that all reagents be of chromatographic grade.

5.1 Analysis.

5.1.1 Helium gas or nitrogen gas—Zero grade, for chromatographic carrier gas.

5.1.2 Hydrogen gas—Zero grade.

5.1.3 Oxygen gas, or Air, as required by the detector—Zero grade.

5.2 *Calibration.* Use one of the following options: either 5.2.1 and 5.2.2, or 5.2.3.

5.2.1 *Vinyl chloride, 99.9+ percent.* Pure vinyl chloride gas certified by the manufacturer to contain a minimum of 99.9 percent vinyl chloride for use in the preparation of standard gas mixtures in Section 7.1. If the gas manufacturer maintains a bulk cylinder supply of 99.9+ percent vinyl chloride, the certification analysis may have been performed on this supply rather than on each gas cylinder prepared from this bulk supply. The date of gas cylinder preparation and the certified analysis must have been affixed to the cylinder before shipment from the gas manufacturer to the buyer.

5.2.2 *Nitrogen gas.* Zero grade, for preparation of standard gas mixtures.

5.2.3 *Cylinder standards* (3). Gas mixture standards (50, 10, and 5 ppm vinyl chloride in nitrogen cylinders) for which the gas composition has been certified by the manufacturer. The manufacturer must have recommended a maximum shelf life for each cylinder so that the concentration does not change greater than ±5 percent from the certified value. The date of gas cylinder preparation, certified vinyl chloride concentration and recommended maximum shelf life must have been affixed to the cylinder before shipment from the gas manufacturer to the buyer. These gas mixture standards may be directly used to prepare a chromatograph calibration curve as described in section 7.3.

5.2.3.1 *Cylinder standards certification.* The concentration of vinyl chloride in nitrogen in each cylinder must have been certified by the manufacturer by a direct analysis of each cylinder using an analytical procedure that the manufacturer had calibrated on the day of cylinder analysis. The calibration of the analytical procedure shall, as a minimum, have utilized a three-point calibration curve.

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It is recommended that the manufacturer maintain two calibration standards and use these standards in the following way. (1) a high concentration standard (between 50 and 100 ppm) for preparation of a calibration curve by an appropriate dilution technique. (2) a low concentration standard (between 5 and 10 ppm)-for verification of the dilution technique used.

5.2.3.2 *Establishment and verification of calibration standards* The concentration of each calibration standard must have been established by the manufacturer using reliable procedures. Additionally, each calibration standard must have been verified by the manufacturer by one of the following procedures, and the agreement between the initially determined concentration value and the verification concentration value must be within ± 5 percent: (1) verification value determined by comparison with a calibrated vinyl chloride permeation tube, (2) verification value determined by comparison with a gas mixture prepared in accordance with the procedure described in section 7.1 and using 99.9+ percent vinyle chloride, or (3) verification value obtained by having the calibration standard analyzed by the National Bureau of Standards. All calibration standards must be renewed on a time interval consistent with the shelf life of the cylinder standards sold.

6 Procedure

6.1 Sampling. Assemble the sample train as in Figure 106-1. Perform a bag leak check according to Section 7.4. Observe that all connections between the bag and the probe are tight. Place the end of the probe at the centroid of the stack and start the pump with the needle valve adjusted to yield a flow of 0.5 lpm. After a period of time sufficient to purge the line several times has elapsed, connect the vacuum line to the bag and evacuate the bag until the rotameter indicates no flow. Then reposition the sample and vacuum lines and begin the actual sampling, keeping the rate proportional to the stack velocity. Direct the gas exiting the rotameter away from sampling personnel. At the end of the sample period, shut off the pump, disconnect the sample line from the bag, and disconnect the vacuum line from the bag container. Protect the bag container from sunlight.

6.2 Sample storage. Sample bags must be kept out of direct sunlight. When at all possible analysis is to be performed within 24 hours, but in no case in excess of 72 hours of sample collection.

6.4 Analysis. Set the column temperature to 100° C, the detector temperature to 150° C, and the sample loop temperature to 70° C. When optimum hydrogen and oxygen flow rates have been determined, verify and maintain these flow rates during all chromatograph operations. Using zero helium or nitrogen as the carrier gas, establish a flow rate in the range consistent with the manufacturer's requirements for satisfactory detector operation. A flow rate of approximately 40 ml/min should produce adequate separations. Observe the base line periodically and determine that the noise level has stabilized and that base line drift has ceased. Purge the sample loop for thirty seconds at the rate of 100 ml/min, then activate the sample valve. Record the injection time (the position of the pen on the chart at the time of sample injection), the sample number, the sample loop temperature, the column temperature, carrier gas flow rate, chart speed and the attenuator setting. Record the laboratory pressure. From the chart, select the peak having the retention time corresponding to vinyl chloride, as determined in Section 7.2. Measure the peak area, A_m, by use of H_m, and a disc integrator or a planimeter. Measure the peak height H_m. Record A_m and the retention time. Repeat the injection at least two times or until two consecutive vinyl chloride peaks do not vary in area more than 5%. The average value for these two areas will be used to compute the bag concentration.

Compare the ratio of H_m to A_m for the vinyl chloride sample with the same ratio for the standard peak which is closest in height. As a guideline if these ratios differ by more than 10%, the vinyl chloride peak may not be pure (possibly acetaldehyde is present) and the secondary column should be employed (see Section 4.3.2).

6.5 Measure the ambient temperature and barometric pressure near the bag. (Assume the relative humidity to be 100 percent.) From a water saturation vapor pressure table, determine the record and water vapor content of the bag.

7 Calibration and Standards

7.1 *Preparation of vinyl chloride standard gas mixtures.* Evacuate a sixteen-inch square Tedlar bag that has passed a leak check (described in Section 7.4) and meter in 5 liters of nitrogen. While the bag is filling, use the 0.5 ml syringe to inject 250μl of 99.9+ percent vinyl chloride through the wall of the bag. Upon withdrawing the syringe needle, immediately cover the resulting hole with a piece of adhesive tape. The bag now contains a vinyl chloride concentration of 50 ppm. In a like manner use the other syringe to prepare gas mixtures having 10 and 5 ppm vinyl chloride concentrations. Place each bag on a smooth surface and alternately depress opposite sides of the bag 50 times to further mix the gases. These gas mixture standards may be used for 10 days from the date of preparation, after which time preparation of new gas mixtures is required. (CAUTION—Contamination may be a problem when a bag is reused if the new gas mixture standard contains a lower concentration than the previous gas mixture standard did.)

7.2 Determination of vinyl chloride retention time. This section can be performed simultaneously with Section 7.3. Establish chromatograph conditions identical with those in Section 6.3, above. Set attenuator to X 1 position. Flush the sampling loop with zero helium or nitrogen and activate the sample valve. Record the injection time, the sample loop temperature, the column temperature, the carrier gas flow rate, the chart speed and the attenuator setting. Record peaks and detector responses that occur in the absence of vinyl chloride. Maintain conditions. With the equipment plumbing arranged identically to Section 6.3, flush the sample loop for 30 seconds at the rate of 100 ml/min with one of the vinyl chloride calibration mixtures and activate the sample valve. Record the injection time. Select the peak that corresponds to vinyl chloride. Measure the distance on the chart from the injection time to the time at which the peak maximum occurs. This quantity, divided by the chart speed, is defined as the retention time. Record.

7.3 *Preparation of chromatograph calibration curve.* Make a gas chromatographic measurement of each gas mixture standard (described in section 5.2.2 or 7.1) using conditions identical with those listed in sections 6.3 and 6.4. Flush the sampling loop for 30 seconds at the rate of 100 ml/min with each standard gas mixture and activate the sample valve. Record C_c, the concentration of vinyl chloride injected, the attenuator setting, chart speed, peak area, sample loop temperature, column temperature, carrier gas flow rate, and retention time. Record the laboratory pressure. Calculate A_c, the peak area multiplied by the attenuator setting. Repeat until two injection areas are within 5 percent, then plot these points v C_c. When the other concentrations have been plotted, draw a smooth curve through the points. Perform calibration daily, or before and after each set of bag samples, whichever is more frequent.

7.4 Bag leak checks. While performance of this section is required subsequent to bag use, it is also advised that it be performed prior to bag use. After each use, make sure a bag did not develop leaks as follows. To leak check, connect a water manometer and pressurize the bag to 5–10 cm H_2O (2–4 in H_2O). Allow to stand for 10 minutes. Any displacement in the water manometer indicates a leak. Also check the rigid container for leaks in this manner.

(NOTE: An alternative leak check method is to pressurize the bag to 5–10 cm H_2O or 2–4 in. H_2O and allow to stand overnight. A deflated bag indicates a leak.) For each sample bag in its rigid container, place a rotameter in-line between the bag and the pump inlet. Evacuate the bag. Failure of the rotameter to register zero flow when the bag appears to be empty indicates a leak.

8. Calculations.

8.1 Determine the sample peak area as follows:

$$A_s = A_m A_f$$

Equation 106-1

Where:

A_s = The sample peak area.
A_m = The measured peak area.
A_f = The attenuation factor.

8.2 Vinyl chloride concentrations. From the calibration curve described in Section 7.3, above, select the value of C_c that corresponds to A_s, the sample peak area. Calculate C_s as follows:

$$C_s = \frac{C_c P_r T_s}{P_s T_r (1 - B_{ws})}$$

Equation 106-2

Where:

B_{ws} = The water vapor content of the bag sample, as analyzed.
C_s = The concentration of vinyl chloride in the bag sample in ppm.
C_c = The concentration of vinyl chloride indicated by the gas chromatograph, in ppm.
P_r = The reference pressure, the laboratory pressure recorded during calibration, mm Hg.
T_s = The sample loop temperature on the absolute scale at the time of analysis, °K.
P_s = The laboratory pressure at time of analysis, mm Hg.
T_r = The reference temperature, the sample loop temperature recorded during calibration, °K.

9. References.

1. Brown, D. W., Loy, E. W. and Stephenson, M. H. "Vinyl Chloride Monitoring Near the B. F. Goodrich Chemical Company in Louisville, Kentucky." Region IV, U.S. Environmental Protection Agency, Surveillance and Analysis Division, Athens, Georgia, June 24, 1974.

2. "Evaluation of A Collection and Analytical Procedure for Vinyl Chloride in Air," by G. D. Clayton and Associates, December 13, 1974. EPA Contract No. 68–02–1408, Task Order No. 2, EPA Report oN. 75–VCL–1.

3. "Standardization of Stationary Source Emission Method for Vinyl Chloride," by Midwest Research Institute, 1976. EPA Contract No. 68–02–1098, Task Order No. 7.

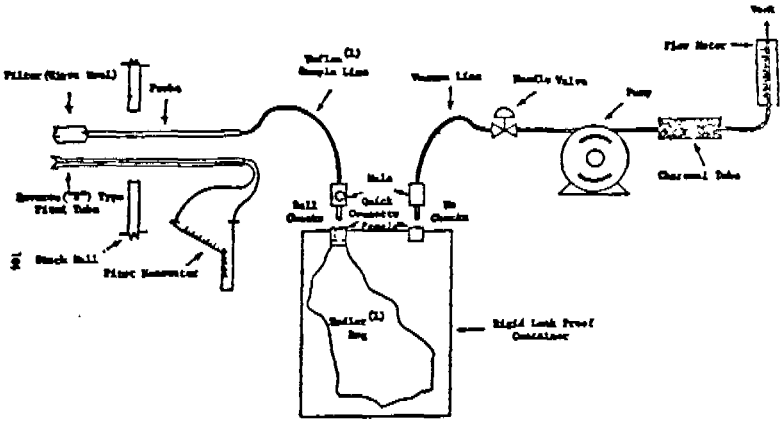

Figure 106-1. Integrated bag sampling train.

(1) Mention of trade names on specific products does not constitute endorsement by the Environmental Protection Agency.

METHOD 107—DETERMINATION OF VINYL CHLORIDE CONTENT OF INPROCESS WASTEWATER SAMPLES, AND VINYL CHLORIDE CONTENT OF POLYVINYL CHLORIDE RESIN, SLURRY, WET CAKE, AND LATEX SAMPLES

INTRODUCTION

Performance of this method should not be attempted by persons unfamiliar with the operation of a gas chromatograph, nor by those who are unfamiliar with sampling, as there are many details that are beyond the scope of this presentation. Care must be exercised to prevent exposure of sampling personnel to vinyl chloride, a carcinogen.

1. *Principle and Applicability.*

1.1 The basis for this method relates to the vapor equilibrium which is established between RVCM, PVC, resin, water, and air in a closed system. It has been demonstrated that the RVCM in a PVC resin will equilibrate in a closed vessel quite rapidly, provided that the temperature of the PVC resin is maintained above the glass transition temperature of that specific resin.

1.2 This procedure is suitable for determining the vinyl choride monomer (VCM) content of inprocess wastewater samples, and the residual vinyl chloride monomer (RVCM) content of polyvinyl chloride (PVC) resins, wet cake, slurry, and latex samples. It cannot be used for polymer in fused forms, such as sheet or cubes. If a resolution of the vinyl chloride peak is not satisfactory for a particular sample, then chromatograph parameters may be altered provided that the precision and reproducibility of the analysis of vinyl chloride cylinder standards are not impaired. If there is reason to believe that some other hydrocarbon with an identical retention time is present in the sample, then supplemental confirmation of the vinyl chloride peak through an absolute analytical technique, such as mass spectroscopy, should be performed.

2. Range and Sensitivity.

The lower limit of detection of vinyl chloride will vary according to the chromatograph used. Values reported include 1×10^{-4} mg and 4×10^{-7} mg. With proper calibration, the upper limit may be extended as needed.

3. Precision and Reproducibility.

An interlaboratory comparison between seven laboratories of three resin samples, each split into three parts, yielded a standard deviation of 2.63% for a sample with a mean of 2.09 ppm, 4.16% for a sample with a mean of 1.66 ppm, and 5.29% for a sample with a mean of 62.66 ppm.

4. Safety.

Do not release vinyl chloride to the laboratory atmosphere during preparation of standards. Venting or purging with VCM/air mixtures must be held to a minimum. When they are required, the vapor must be routed to outside air. Vinyl chloride, even at low ppm levels, must never be vented inside the laboratory. After vials have been analyzed, the pressure within the vial must be vented prior to removal from the instrument turntable. Vials must be vented into an activated charcoal tube using a hypodermic needle to prevent release of vinyl chloride into the laboratory atmosphere. The charcoal must be replaced prior to vinyl chloride breakthrough.

5. Apparatus.

5.1 Sampling.

5.1.1 Bottles—60 ml (2 oz), with waxed lined screw on tops, for PVC samples.

5.1.2 Vials—50 ml Hypo-vials,[1] sealed with Teflon faced Tuf-Bond discs for water samples.

5.1.3 Electrical tape—or equivalent, to prevent loosening of bottle tops.

5.2 Sample recovery.

5.2.1 Vials—With seals and caps, Perkin-Elmer Corporation No. 105-0118, or equivalent.

5.2.2 Analytical balance—Capable of weighing to ±0.001 gram.

5.2.3 Syringe, 100 ml—Precision Series "A" No. 010025, or equivalent.

5.2.4 Vial Sealer, Perkin-Elmer No. 105-0106 or equivalent.

5.3 Analysis.

5.3.1 Gas chromatograph—Perkin-Elmer Corporation Model F-40 head-space analyzer, No. 104-0001, or equivalent.

5.3.2 *Chromatographic column.* Stainless steel, 2 m × 3.2 mm, containing 0.4 percent Carbowax 1500 on Carbopak A, Perkin-Elmer Corporation No. 105-0133, or equivalent. Carbopak C can be used in place of Carbopak A. If methenol and/or acetaldehyde is present in the sample, a pair of Poropak Q columns in series (1 m × 3.2 mm followed by 2 m × 3.2 mm) with provision for backflush of the first column has been shown to provide adequate separation of vinyl chloride.

5.3.3 Thermometer—0 to 100° C, accurate to ±0.1° C, Perkin-Elmer No. 105-0102 or equivalent.

5.3.4 Sample tray thermostat system—Perkin-Elmer No. 105-0103, or equivalent.

5.3.5 *Septa*—Sandwich type, for automatic dosing, 13 mm, Perkin-Elmer No. 105-1008, or equivalent.

5.3.6 Integrator - recorder — Hewlett - Packard Model 3330A, or equivalent.

5.3.7 Filter drier assembly (8)- Perkin-Elmer No. 2230117, or equivalent.

5.3.8 Soap film flowmeter—Hewlett Packard No. 0101-0113, or equivalent.

5.4 Calibration.

5.4.1 Regulators—for required gas cylinders.

6. Reagents

6.1 Analysis.

6.1.1 Hydrogen gas—zero grade

6.1.2 Nitrogen gas—zero grade

6.1.3 Air—zero grade.

6.2 *Calibration.*

6.2.1 *Cylinder standards* (4). Gas mixture standards (50, 500, 2,000, and 4,000 ppm vinyl chloride in nitrogen cylinders) *for which* the gas composition has been certified by the manufacturer. Lower concentration standards should be obtained if lower concentrations of vinyl chloride samples are expected, as the intent is to bracket the sample concentrations with standards. The manufacturer must have recommended a maximum shelf life for each cylinder so that the concentration does not change greater than ± 5 percent from the certified value. The date of gas cylinder preparation, certified vinyl chloride concentration and recommended maximum shelf life must have been affixed to the cylinder before shipment from the manufacturer to the buyer.

6.2.1.1 *Cylinder standards certification.* The concentration of vinyl chloride in nitrogen in each cylinder must have been certified by the manufacturer by a direct analysis of each cylinder using an analytical procedure that the manufacturer had calibrated on the day of cylinder analysis. The calibration of the analytical procedure shall, as a minimum, have utilized a three-point calibration curve. It is recommended that the manufacturer maintain two calibration standards and use these standards in the following way: (1) a high concentration standard (between 4,000 and 8,000 ppm) for preparation of a calibration curve by an appropriate dilution technique; (2) a low concentration standard (between 50 and 500 ppm) for verification of the dilution technique used.

6.2.1.2 *Establishment and verification of calibration standards.* The concentration of each calibration standard must have been established by the manufacturer using reliable procedures. Additionally, each calibration standard must have been verified by the manufacturer by one of the following procedures, and the agreement between the initially determined concentration value and the verification concentration value must be within ±5 percent: (1) verification value determined by comparison with a gas mixture standard generated in a similar manner to the procedure described in section 7.1 of Method 106 for preparing gas mixture standards using 99.9+ percent vinyl chloride, or (2) verification value obtained by having the calibration standard analyzed by the National Bureau of Standards. All calibration standards must be renewed on a time interval consistent with the shelf life of the cylinder standards sold.

7. Procedure.

7.1 *Sampling.*

7.1.1 PVC sampling—Allow the resin or slurry to flow from a tap on the tank or silo until the tap line has been well purged. Extend a 60 ml sample bottle under the tap, fill, and immediately tightly cap the bottle. Wrap

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electrical tape around the cap and bottle to prevent the top from loosening. Place an identifying label on each bottle, and record the date, time, and sample location both on the bottles and in a log book.

7.1.2 Water sampling—Prior to use, the 50 ml vials (without the discs) must be capped with aluminum foil and muffled at 400°C for at least one hour to destroy or remove any organic matter that could interfere with analysis. At the sampling location fill the vials bubble-free, to overflowing so that a convex meniscus forms at the top. The excess water is displaced as the sealing disc is carefully placed, Teflon side down, on the opening of the vial. Place the aluminum seal over the disc and the neck of the vial and crimp into place. Affix an identifying label on the bottle, and record the date, time, and sample location both on the vials and in a log book. All samples must be kept refrigerated until analyzed.

7.2 *Sample recovery.* Samples must be run within 24 hours.

7.2.1 Resin samples—The weight of the resin used must be between 0.1 and 4.5 grams. An exact weight must be obtained (±0.001 gram) for each sample. In the case of suspension resins a volumetric cup can be prepared which will hold the required amount of sample. The sample bottle is opened, and the cup volume of resin is added to the tared sample vial (including septum and aluminum cap). The vial is immediately sealed and the exact sample weight is then obtained. Report this value on the data sheet as it is required for calculation of RVCM. In the case of relatively dry resin samples (water content <0.3 weight %), 100 μl of distilled water must be injected into the vial after sealing and weighing, using a 100 μl syringe. In the case of dispersion resins, the cup cannot be used. The sample is instead weighed approximately in an aluminum dish, transferred to the tared vial and weighed accurately in the vial. The sample is then placed in the Perkin-Elmer head space analyzer (or equivalent) and conditioned for one hour at 90°C.

NOTE: Some aluminum vial caps have a center section which must be removed prior to placing into sample tray. If not removed, serious damage to the injection needle will occur.

7.2.2 Suspension resin slurry and wet cake samples—Slurry must be filtered using a small Buchner funnel with vacuum to yield wet cake. The filtering process must be continued only as long as a steady stream of water is exiting from the funnel. Excessive filtration time could result in some loss of VCM. The wet cake sample (0.10 to 4.5 grams) is added to a tared vial (including septum and aluminum cap) and immediately sealed. Sample weight is then determined to 3 decimal places. The sample is then placed in the Perkin-Elmer head space analyzer (or equivalent) and conditioned for one hour at 90°C. A sample of wet cake is used to determine TS (total solids). This is required for calculating the RVCM.

7.2.3 Dispersion resin slurry samples—This material should not be filtered. Sample must be thoroughly mixed. Using a tared vial (including septum and aluminum cap) add approximately 8 drops (0.25 to 0.35 grams) of slurry or latex using a medicine dropper. This should be done immediately after mixing. Seal the vial as soon as possible. Determine sample weight accurate to 0.001 grams. Total sample weight must not exceed 0.50 grams. Condition the vial for one hour at 90°C in the analyzer. Determine the TS on the slurry sample (Section 7.3.6).

7.2.4 Inprocess wastewater samples—Using a tared vial (including septum and aluminum cap) quickly add approximately 1 cc of water using a medicine dropper. Seal the vial as soon as possible. Determine sample weight accurate to 0.001 gram. Condition the vial for two hours at 90°C in the analyzer.

7.3 Analysis.

7.3.1 Preparation of gas chromatograph—Install the chromatographic column and condition overnight at 150°C. Do not connect the exit end of the column to the detector while conditioning.

7.3.1.1 Flow rate adjustments—Adjust flow rates as follows:

a. Nitrogen carrier gas—Set regulator on cylinder to read 50 psig. Set regulator on chromatograph to 1.3 kg/cm^2. Normal flows at this pressure should be 25 to 40 cc/minute. Check with bubble flow meter.

b. Burner air supply—Set regulator on cylinder to read 50 psig. Set regulator on chromatograph to supply air to burner at a rate between 250 and 300 cc/minute. Check with bubble flowmeter.

3. Hydrogen supply—Set regulator on cylinder to read 30 psig. Set regulator on chromatograph to supply approximately 35±5 cc/minute. Optimize hydrogen flow to yield the most sensitive detector response without extinguishing the flame. Check flow with bubble meter and record this flow.

7.3.1.2 Temperature adjustments—Set temperatures as follows:

a. Oven (chromatographic column), 50° C.

b. Dosing line, 140° C.

c. Injection block, 140° C.

d. Sample chamber, water temperature, 90° C±1.0° C.

7.3.1.3 Ignition of flame ionization detector—Ignite the detector according to the manufacturer's instructions.

7.3.1.4 Amplifier balance—Balance the amplifier according to the manufacturer's instructions.

7.3.2 Programming the chromatograph—Program the chromatograph as follows:

a. *I—Dosing time*—The normal setting is 2 seconds.

b. A—Analysis time—The normal setting is 8 minutes. Certain types of samples contain high boiling materials which can cause interference with the vinyl chloride peak on subsequent analyses. In these cases the analysis time must be adjusted to eliminate the interference. An automated backflush system can also be used to solve this problem.

c. B—Flushing—The normal setting is 0.2 minutes.

d. *W—Stabilization time.* The normal setting is 0.2 minutes.

e. X—Number of analyses per sample—The normal setting is 1.

7.3.3 Preparation of sample turntable—Before placing any sample into turntable, be certain that the center section of the aluminum cap has been removed. The numbered sample bottles should be placed in the corresponding numbered positions in the turntable. Insert samples in the following order:

Positions 1 & 2—Old 2000 ppm standards for conditioning. These are necessary only after the analyzer has not been used for 24 hours or longer.

Position 3—50 ppm standard, freshly prepared.

Position 4—500 ppm standard, freshly prepared.

Position 5—2000 ppm standard, freshly prepared.

Position 6—4000 ppm standard, freshly prepared.

Position 7—Sample No. 7 (This is the first sample of the day, but is given as 7 to be consistent with the turntable and the integrator printout.)

After all samples have been positioned, insert the second set of 50, 500, 2000, and 4000 ppm standards. Samples, including standards must be conditioned in the bath of 90° C for 1 hour (not to exceed 5 hours).

7.3.4 Start chromatograph program—When all samples, including standards, have been conditioned at 90° C for 1 hour, start the analysis program according to the manufacturers' instructions. These instructions must be carefully followed when starting and stopping program to prevent damage to the dosing assembly.

7.3.5 *Determination of total solids (TS).*

For wet cake slurry, resin solution, and PVC latex samples, determine TS for each sample by accurately weighing approximately 3 to 4 grams of sample in an aluminum pan before and after placing in a draft oven (*105 to 110° C*). Samples must be dried to constant weight. After first weighing return the pan to the oven for a short period of time and then reweigh to verify complete dryness. TS is then calculated as the final sample weight divided by initial sample weight.

8. Calibration.

Calibration is to be performed each eight-hour period when the instrument is used. Each day, prior to running samples, the column should be conditioned by running two of the previous days 2000 ppm standards.

8.1 Preparation of Standards.

Calibration standards are prepared by filling the vials with the vinyl chloride/nitrogen standards, rapidly seating the septum and sealing with the aluminum cap. Use a stainless steel line from the cylinder to the vial. Do not use rubber or tygon tubing. The sample line from the cylinder must be purged (into hood) for several minutes prior to filling vials. After purging, reduce the flow rate to approximately 500–1000 cc/min. Place end of tubing into vial (near bottom) and after one minute slowly remove tubing. Place septum in vial as soon as possible to minimize mixing air with sample. After the standard vials are sealed, inject 100 μl of distilled water.

8.2 Preparation of chromatograph calibration curve.

Prepare two 50 ppm, two 500 ppm, two 2000 ppm, and two 4000 ppm standard samples. Run the calibration samples in exactly the same manner as regular samples. Plot A_r, the integrator area counts for each standard sample vs C_r, the concentration of vinyl chloride in each standard sample. Draw a line of best fit through the points.

9. Calculations.

9.1 Response factor.

From the calibration curve described in Section 8.2, above, select the value of C_r that corresponds to A_r for each sample. Compute the response factor, R_f, for each sample, as follows:

$$R_f = \frac{A_r}{C_r} \quad \text{Equation 107-1}$$

9.2 Residual vinyl chloride monomer concentration, or vinyl chloride monomer concentration.

Calculate C_{rvc} as follows:

$$C_{rvc} = \frac{A_s P_a}{R_f T_1}\left(\frac{M_v V_g}{m_f R} + K T_2\right)$$

Equation 107-2

where:

C_{rvc} = Concentration of vinyl chloride in the sample, in ppm.

P_a = Laboratory atmosphere pressure, mm Hg.

T_1 = Room temperature, °K.

M_v = Molecular weight of VCM (62.5).

V_g = Volume of vapor phase (vial volume less sample volume).

m_f = Weight of sample, grams.

R = Gas constant [62,360 (cc-mm-mole-degrees Kelvin)]

K = Henry's Law constant. For VCM in PVC at 90° C, $K = 6.52 \times 10^{-4} = K_p$. For VCM in 1 cc (approximate) wastewater sample at 90° C, $K = 5.0 \times 10^{-4} = K_w$.

$$C_{vc} = \frac{A_s}{K_f}\left(4.197 \times 10^{-3} + 3.0 \times 10^{-4} + \frac{5.988 \times 10^{-2}}{m_t}\right)$$ Equation 107-3

The following general equation can be used for any sample which contains VCM, PVC and water.

$$C_{vc} = \frac{A_s P_a}{R_f T_1} \times \left[\frac{M_f V_f}{R m_t} + K_w (TS) T_2 - K_w (1 - TS) T_2\right]$$ Equation 107-4

where,

TS = Total solids.

Note: K_w must be determined for samples with a vapor volume to liquid volume ratio other than 22.5 to 1. This ratio can be obtained by adjusting the sample weight through giving consideration to the total solids and density of the PVC.

Results calculated using Equation 107-4 represent concentration based on the total sample. To obtain results based on dry PVC content, divide by TS.

For a 1-cc wastewater sample (that is, 22.5 to 1 vapor volume to liquid volume ratio) K_w is 3.0×10^{-4}. Thus, Equation 107-4 can be simplified to the following:

$$C_{vc} = \frac{A_s}{K_f}\left[\frac{5.988 \times 10^{-2}}{m_t} + (2.066 \times 10^{-3})\right]$$ Equation 107-5

(Secs. 112 and 301(a) of the Clean Air Act, 42 U.S.C. 1857c-7 and 1857g(a).)

T_2 = Equilibration temperature, °K.

If the following conditions are met, Equation 107-2 can be simplified as follows:

1. $T_1 = 22°$ C (295° K)
2. $T_2 = 90°$ C (363° K)
3. $P_a = 750$ mm Hg.
4. $V_f = V_v - \frac{m_t}{1.4} = 23.5 - \frac{m_t}{1.4}$

where

V_v = Vial volume, cc (23.5).

5. Sample contains less than 0.5 percent water.

10. References.

1. Residual Vinyl Chloride Monomer Content of Polyvinyl Chloride Resins and Wet Cake Samples, B. F. Goodrich Chemical Co. Standard Test Procedure No. 1005-T. B. F. Goodrich Technical Center, Avon Lake, Ohio, January 30, 1975.

2. Berens, A. R., "The Solubility of Vinyl Chloride in Polyvinyl Chloride," ACS-Division of Polymer Chemistry, Polymer Preprints *15* (2): 197, 1974.

3. Berens, A. R., "The Diffusion of Vinyl Chloride in Polyvinyl Chloride," ACS-Division of Polymer Chemistry, Polymer Preprints *15* (2): 203, 1974.

4. Berens, A. R., L. B. Crider, C. J. Tomanek and J. M. Whitney, Analysis for Vinyl Chloride in PVC Powders by Head-Space Gas Chromatography," to be published.

[FR Doc.77-15828 Filed 6-6-77;8:45 am]

TENNECO CHEMICALS, INC.

BURLINGTON, NEW JERSEY

MAJOR RAW MATERIALS

methanol
tridecanol
vinyl chloride
vinyl acetate
trichloroethylene
ammonia
food grade gelatin
liquid caustic
liquid chloride
ferric sulfate
lime
sulfuric acid

MATERIALS REPORTED ON SLUDGE QUALITY REPORT

phenol
toluene
trichloroethylene
mercury
thiostop-N
methylene chloride
tetrachloroethylene
di(2-ethylhexyl) phthalate

DATE

To

25752 phenol
105553 toluene
1216 methylene chloride
7439976 mercury
12541 benzo(a)pyrene
75092 methylene chloride
127184 tetrachloroethylene
11517 ~~27~~ DIELDRIN

From the office of: J. P. SANDSTEDT

B

LIST OF TOXIC SUBSTANCES
FROM APPENDICES B-1, B-2, B-3

		USED		DISPOSAL METHOD	
CAS NO'S	QTY'S	PROCESS	ANAL LAB	TREATMENT [illegible]	OFF-SITE [illegible]
1. 7440350	<.5Lbs/yr.		X		X
2. 7440382	<.5Lbs/yr.		X		X
3. 71432	[illegible]		X		X
4. 7440439	<.5Lbs/yr.		X		X
5. 56235	25Lbs/yr.		X		X
6. 67663	25Lbs/yr.		X		X
7. 7440473	<.5Lbs/yr.		X		X
8. 7440508	<.5Lbs/yr.		X		X
9. 57125	<.5Lbs/yr.		X		X
10. 75343	<.5Lbs/yr.		X		X
11. 75092	36Lbs/yr.		X		X
12. 117817	2460 Lbs/yr.		X		X
13. 85687	93Lbs/yr.		X		X
14. 122394	<.5Lbs/yr.		X		X
15. 7439921	<.5Lbs/yr.		X		X
7439921	15Lbs/yr.	X		X	
16. 7439976	<.5Lbs/yr.		X		X
17. 7440020	<.5Lbs/yr.		X		X
7440020	1800Lbs/yr.	X		X	
18. 108952	<.5Lbs/yr.		X		X
19. 7440224	<.5Lbs/yr.		X		X
20. 127184	2067Lbs/yr.		X		X
127184	18 gal/yr.	X		X	

LIST OF TOXIC SUBSTANCES
FROM APPENDICES B-1, B-2, B-3

CAS NOS	QTY'S	USED		DISPOSAL METHOD	
21. [illegible]	[illegible]/yr.		X		X
22. 79005	<.5Lbs/yr.		X		X
79005	[illegible]/yr.	X		X	
23. 79016	12Lbs/yr.		X		X
24. 7440666	<.5Lbs/yr.		X		X
25. 7440473	<.5Lbs/yr.		X		X
7440473	500Lbs/yr.	X		X	
26. 128041	12Lbs/yr.		X		X

C

SELECTED LIST OF TOXIC SUBSTANCES AND THE PROCEEDURES FOR TESTING

CAS NO	NAME	PROCEDURE FOR TESTING
7439976	Mercury (total)	Standard Methods, 303A Flameless atomic absorption
1336363	PCB's	EPA Method 608 - gas chromatography, solvent extraction (methylene chloride) followed by analysis with Flame ionization detector.
108883	Toluene	EPA Method 602- gas chromatograph with Purge and Trap device and Flame ionization detector.
79016	Trichloroethylene	EPA Method 601- gas chromatograph with purge and trap device and Hall or Electron Capture Detector.
128041	Sodium dimethyl dithiocarbamate	No EPA method has been published for the analysis of this compound. We have requested information on the specific procedures required but have not yet received it.

*NOTE: The above EPA Methods for GC analysis were published in the Federal Register on December 3, 1979. (Vol. 44, No. 233)

APPENDIX B-1

HEAVY METALS AND TOXIC ORGANIC COMPOUNDS

Contamination Indicators

Heavy Metals	ppm	Toxic Organic Compounds	ppm
Arsenic (total)	10	Aldrin	0.10
		Chlordane	0.10
Cadmium (total)	16	Dieldrin	0.10
Chromium (total)	890	Endrin	0.10
Copper (total)	850	Heptachlor	0.10
Lead (total)	500	Heptachlor epoxide	0.10
Mercury (total)	5	Lindane	0.10
Nickel (total)	82	Methoxychlor	0.25
Zinc (total)	1,740	p,p' - TDE (DDD)	0.25
		Mirex	0.25
		p,p' - DDT	0.25
		p,p' - DDE	0.25
		Toxaphene	1.0
		Polychlorinated biphenyls (PCB's)	0.50

*dry-weight basis

E

TESTING PROCEDURES
FOR
WASTE WATER SAMPLES
APPENDIX A-4

Sludge Quality Assurance Regulations using the following procedures:

COD- EPA Method 451.3 in "Methods for Chemical Analysis of water and wastes" EPA, March 1979. (attached)

Oil & Grease- Standard Methods, 14 ed Method 502D (attached)

pH- pH meter (electrode)

Total Solids- Standard Methods, 14 ed. Method 208A determination of total residue in solid & semi solid samples (attached)

APPENDIX B-2

TOXIC POLLUTANTS

	CAS No.	
lbs/year		
	83329	acenaphthene
	208968	acenaphthylene
	107028	acrolein
	79061	X acrylamide
	107131	acrylonitrile
	309002	aldrin
	1321115	aminobenzoic acid
	61825	amitrole
	71410	amyl alcohols
	62533	aniline
	142041	aniline hydrochloride
	100663	anisole
	120127	anthracene
<1/2	— 7440360	antimony (total)
<1/2	— 7440382	arsenic (total)
	2465272	auramine
	56553	1,2 - benzanthracene
<1	— 71432	benzene L
	92875	benzidine
	205992	3,4 - benzofluoranthene
	207089	11,12 - benzofluoranthene
	191242	1,12 - benzoperylene
	50328	3,4 - benzopyrene (benzo (a)pyrene)
	98077	benzotrichloride
	100469	benzylamine
	7440417	beryllium (total)
	319846	alpha BHC
	319857	beta BHC
	58899	gamma BHC (Lindane)
	319868	delta BHC
	111911	bis (2 - chloroethoxy) methane
	111444	bis (2 - chloroethyl) ether
	39638329	bis (2 - chloroisopropyl) ether
	75252	bromoform (tribromomethane)
	101553	4 - bromophenyl phenyl ether
<1/2	— 7440439	cadmium (total)
25	56235	carbon tetrachloride (tetrachloromethane) L
	57749	chlordane (technical mixture and metabolites)
	95512	2 - chloroaniline
	108429	3 - chloroaniline
	106478	4 - chloroaniline
	— 108907	chlorobenzene L
	124481	chlorodibromomethane
	110753	2 - chloroethyl vinyl ether (mixed)
25	67663	chloroform (trichloromethane) L
	91587	2 - chloronaphthalene

* Chemical Abstracts Service Number

APPENDIX B-2 (continued)

	CAS No.	
	88733	2-chloronitrobenzene
	100005	4 - chloronitrobenzene
	25167800	2 - chlorophenol
	7005723	4 - chlorophenyl phenyl ether
	126998	chloroprene
1/2	7440473	chromium (total)
	218019	chrysene
	532821	chrysolidine
1/2	7440508	copper (total)
	98828	cumene
1/2	57125	cyanide (total)
	72548	p,p' - DDD (p,p' - TDE)
	72559	p,p' - DDE (p,p' - DDX)
	50293	p,p' - DDT
	53703	1,2:5,6 - dibenzanthracene
	608275	2,3 - dichloroaniline
	554007	2,4 - dichloroaniline
	95829	2,5 - dichloroaniline
	95761	3,4 - dichloroaniline
	626437	3,5 - dichloroaniline
	95501	1,2 - dichlorobenzene
	541731	1,3 - dichlorobenzene
	106467	1,4 - dichlorobenzene
	91941	3,3' - dichlorobenzidine
	75274	dichlorobromomethane
1/2	75343	1,1 - dichloroethane
1/2	107062	1,2 - dichloroethane
	156592	1,2 - dichloroethylene (trans)
36	75092	dichloromethane (methylene chloride) L
	120832	2,4 - dichlorophenol
	78875	1,2 - dichloropropane
	542756	1,3 - dichloropropene
	60571	dieldrin
	84662	diethyl phthalate
460	117817	di (2 - ethylhexyl) phthalate L
93	85687	butyl benzyl phthalate L
	131113	dimethyl phthalate
	84742	di - n - butyl phthalate
	117840	di - n - octyl phthalate
	119904	3,3' - dimethoxybenzidine
	121697	dimethylaniline
	119937	3,3' - dimethylbenzidine
	57147	1,1 - dimethylhydrazine
	105679	2,4 - dimethylphenol
	534521	4,6 - dinitro - o - cresol
	51285	2,4 - dinitrophenol
	121142	2,4 - dinitrotoluene

APPENDIX B-2 (continued)

CAS No.	
606202	2,6 - dinitrotoluene
123911	1,4 - dioxane (1,4 - diethylene dioxide)
122394	diphenylamine
122667	1,2 - diphenylhydrazine
959988	endosulfan - I
33213659	endosulfan - II
1031078	endosulfan sulfate
72208	endrin
7421934	endrin aldehyde
53494705	endrin ketone
100414	ethylbenzene
106934	ethylene dibromide
151564	ethyleneimine (Aziridine)
206440	fluoranthene
86737	fluorene
76448	heptachlor
1024573	heptachlor epoxide
118741	hexachlorobenzene
87683	hexachlorobutadiene
77474	hexachlorocyclopentadiene
67721	hexachloroethane
302012	hydrazine
193395	indeno (1,2,3-C,D) pyrene
78591	isophorone
7439921	lead (total)
7439976	mercury (total)
101144	4,4' - methylene bis (2-chloraniline)
101779	4,4' - methylene dianiline
108101	methylisobutyl ketone
91203	naphthalene
134327	alpha naphthylamine
91598	beta naphthylamine
7440020	nickel (total)
98953	nitrobenzene
88755	2 - nitrophenol
100027	4 - nitrophenol
1321126	nitrotoluene
100618	N - methylaniline
62759	N - nitrosodimethylamine
621647	N - nitrosodi - n - propylamine
86306	N - nitrosodiphenylamine
59507	parachlorometacresol
	PCB - 1016 (Aroclor 1016)
	PCB - 1221 (Aroclor 1221)
11097691	PCB - 1232 (Aroclor 1232)
	PCB - 1242 (Aroclor 1242)
	PCB - 1248 (Aroclor 1248)
	PCB - 1254 (Aroclor 1254)
	PCB - 1260 (Aroclor 1260)

APPENDIX B-2 (continued)

CAS No.	
87865	pentachlorophenol
85018	phenanthrene
108952	phenol
95545	1,2 - phenylenediamine
108452	1,3 - phenylenediamine
106503	1,4 - phenylenediamine
129000	pyrene
7782492	selenium (total)
7440224	silver (total)
842079	sudan I (solvent yellow 14)
1746016	2,3,7,8 - tetrachlorodibenzo-p-dioxin (TCDD)
79345	1,1,2,2 - tetrachloroethane
127184	tetrachloroethylene
7440280	thallium (total)
62566	thiourea
108883	toluene
104154	toluene sulfonic acids
26915128	toluidines
8001352	toxaphene
120821	1,2,4 - trichlorobenzene
71556	1,1,1 - trichloroethane
79005	1,1,2 - trichloroethane
79016	trichloroethylene
88062	2,4,6 - trichlorophenol
1300716	xylenols
1300738	xylidines
7440666	zinc (total)

APPENDIX B-3

POLLUTANTS THAT ARE INHIBITORY TO BIOLOGICAL TREATMENT PROCESSES

CAS No.	
	INORGANIC POLLUTANTS
14213979	Borate (Boron)
-7440473	Chromium
7439965	Manganese
7440622	Vanadium
	ORGANIC POLLUTANTS
107186	Allyl alcohol
57067	Allyl isothiocyanate
141435	2-Aminoethanol (mono ethanolamine)
538283	Benzyl thiuronium chloride
4170303	Crotonaldehyde
97234	Dichlorophen
591355	3,5 - dichlorophenol
138896	Dimethylparanitrosoaniline
86566	N,N-dimethyl-1-naphthylamine
593851	Guanidine carbonate
124094	Hexamethylenediamine
148243	8 - hydroxyquinoline
556616	Methyl isothiocyanate
867447	Methyl thiuronium sulphate
107197	Propargyl alcohol
83341	Skatole
-128041	Sodium dimethyl dithiocarbamate
137428	Sodium methyl dithiocarbamate
137268	Tetramethyl thiuram disulphide
97745	Tetramethyl thiuram monosulphide
79196	Thiosemicarbazide

475358-475364:Y:A:

APPENDIX B-2

TOXIC POLLUTANTS

CAS No.	
83329	acenaphthene
208963	acenaphthylene
107028	acrolein
79061	acrylamide
107131	acrylonitrile
309002	aldrin
1332214	asbestos
61825	amitrole
7664417	ammonia
62533	aniline
142041	aniline hydrochloride
100663	anisole
120127	anthracene
7440360	antimony (total)
7440382	arsenic (total)
2465272	auramine
56553	1,2 - benzanthracene
71432	benzene
92875	benzidine
205992	3,4 - benzofluoranthene
207089	11,12 - benzofluoranthene
191242	1,12 - benzoperylene
50328	3,4 - benzopyrene (benzo (a)pyrene)
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100469	benzylamine
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319857	beta BHC
58899	gamma BHC (Lindane)
319868	delta BHC
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111444	bis (2 - chloroethyl) ether
39638329	bis (2 - chloroisopropyl) ether
75252	bromoform (tribromomethane)
101553	4 - bromophenyl phenyl ether
7440439	cadmium (total)
56235	carbon tetrachloride (tetrachloromethane)
57749	chlordane (technical mixture and metabolites)
95512	2 - chloroaniline
108429	3 - chloroaniline
106478	4 - chloroaniline
108907	chlorobenzene
124461	chlorodibromomethane
110753	2 - chloroethyl vinyl ether (mixed)
67663	chloroform (trichloromethane)
91587	2 - chloronaphthalene

* Chemical Abstracts Service Number

RAW MATERIALS LIST

...ess Related

...AC, Celvatol 2090
Methocel, 15 cps 65 hg
Methocel, 50 cps 65 hg
Tributyl Phosphate
Lauroyl Peroxide
Sodium Bicarbonate
Ionol
40% DMW-80
Avirol POL-1-S
Ninol 1281
Colloids 581-B
AF-60
Trisodium Phosphate
Sodium Carbonate
Tween 20
Tridecanol
Vinyl Chloride
Vinyl Acetate
Trichloroethylene
TAIC
Epoxol 9-5
Sodium Bisulfite
Lu...rsol 223M
Ammonium Persulfate
Anhydrous Ammonia
Methocel, 100 cps 90 hg
Hormel Gelatin Blend
Colloids 991
Sodium Acetate
Aqueous Ammonia
Phenol (10% in MeOH)
Shell Sol 71

20 % Caustic Of

Operating Supplies

Glycerine
Nitrogen
Thiostop N
Air, breathing

Boiler House & Effluent Plant

Phosphoric Acid 75%
Aqueous Ammonia 28%
Degreaser 701
#6 Fuel Oil 0.3% sulfur max.
#4 Fuel Oil
Muriatic Acid (128 lbs/13 gal)
Caustic Liquid
Liquid Chlorine
Ferric Sulfate
Calcium Hypochlorite, granular (65-70%)
Hydrated Lime, low mg
Solar Salt (rock)
Sink Floc AZ-6
Sulfuric Acid 66°
Octafilm
#2 Fuel Oil
Polyfloc 1120
Defoamer 300-66
Liqui-Treat CL-2247
Betz Slimicide C-30
Betz Fuel-Solv FS-20
Betz Fuel-Solv FS-534
Pulverized Quick Lime
Corrogen
Ferrous Sulfate
Arco Chem RW-877

Miscellaneous

Ethylene Glycol
Methanol
Acetone
Solvesso 100
THF
Calcium Chloride
Sand
Perchloroethylene

R.A. Lojewski
4/12/79