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SAMPLE PLAN FOR
POLYVINYL CHLORIDE
CONOCO CHEMICALS COMPANY
ABERDEEN, MISSISSIPPI

February 28, 1984

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1.0 INTRODUCTION

This sample plan describes all on-site and off-site activities related to sampling and analysis of residual streams of the polyvinyl chloride production unit at Conoco Chemicals Company's Aberdeen, Mississippi plant (hereafter called Conoco). This sample program is being carried out under the auspices of the Office of Solid Waste (OSW) of the Environmental Protection Agency (EPA) for the purpose of providing the technical background for hazardous waste listings under Part 261 of the Resource Conservation and Recovery Act (RCRA). The actual collection of samples within the facility may be performed by Conoco personnel with Radian personnel providing sample containers and all subsequent sample handling and preservation.

This document presents information on the planned sampling program. It is intended to serve as a guide to the field sampling crew, a guide to the analytical technicians, a documentation mechanism for EPA, and a source of procedural information for Conoco personnel.

The background material for this sampling plan can be found in the following documents:

- Engineering Analysis of Polyvinyl Chloride Production via suspension, emulsion, bulk, and solution polymerization processes submitted to EPA on 14 November 1983.
- RCRA Section 3007 Questionnaire for polyvinyl chloride received by EPA on 16 September 1983.

1.1 On-Site Activities

Table 1-1 is a summary of information on all the residual streams generated by polyvinyl chloride production process. Seven of the ten streams shown in Figure 1-1 have been selected for sampling. Personnel from Conoco may collect and transfer samples from the six residual streams to the on-site Radian sampling crew. Conoco will have the opportunity to split samples with EPA to enable independent analytical evaluation. All analytical protocols to be used by EPA will be made available to Conoco should they wish to conduct such a program. Sampling and analysis protocols to be used are summarized in Sections 3 and 4 of this document.

1.2 Sample Selection Rationale

Six residual streams have been selected for sampling and analysis. They are shown in Figure 1-1. The streams are being sampled to confirm or supplement information included in the response to the RCRA Section 3007 Questionnaire submitted by Conoco. The monomer vinyl chloride is listed as a hazardous constituent in Part 261 - Appendix VIII of RCRA, it is a known human carcinogen. Additionally, some plasticizers used in PVC, specifically the phthalates, are listed in Appendix VIII. Among the heat stabilizers used in PVC are barium, cadmium, and lead compounds. All these metals are EP Toxic and are listed in Appendix VIII.

Streams 7, 8, and 9 (incinerator wastewater, reclaim coarse resin, and reclaim wastewater) have not been selected for sampling. Stream 7 is not expected to contain measurable concentrations of hazardous constituents. Streams 8 and 9 are produced from the combination of streams 1, 2, 4, 6, and 7 in PVC Resin Reclaim System.

Table 1-1
SUMMARY OF RESIDUAL STREAMS FOR POLYVINYL CHLORIDE PRODUCTION PROCESS

Stream	Annual Quantity (metric tons/yr)	Expected Constituents and Concentration	Sample Type	Primary Analytical Methods
1. Spent Caustic	1,100	Water NaOH PVC Vinyl chloridet Plasticizers§ Heat Stabilizers§	grab/ composite	Purge and trap followed by GC/MS screen for volatile organics (Method 8240). GC/MS screen for extractable organics (Method 8270). pl. Inductively coupled plasma (Method 6010).
2. Rinse Water	380,000	Water Vinyl chloridet PVC Plasticizers§	grab/ composite	Purge and trap followed by GC/MS screen for volatile organics (Method 8240). GC/MS screen for extractable organics (Method 8270).
3. Strainer Coarse Resin	250	Water Vinyl chloridet PVC Heat Stabilizers§ Plasticizers§	grab/ composite	Purge and trap followed by GC/MS screen for volatile organics (Method 8240). GC/MS screen for extractable organics (Method 8270). EP Toxicity (Method 1310).
4. Dryer Wastewater	470,000	Water Vinyl chloridet PVC Plasticizers§	grab/ composite	Same as Stream 2
5. Process Cleanout Material	18	PVC Water Vinyl chloridet	grab	Purge and trap followed by GC/MS screen for volatile organics (Method 8240).

Concentration is unknown.

§ Indicates compound is listed as a hazardous constituent in Appendix VIII.

Plasticizers may include the phthalates (listed in Appendix VIII). Heat stabilizers may include barium, cadmium, and lead compounds (EP Toxic Metals).

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Table 1-1
SUMMARY OF RESIDUAL STREAMS FOR POLYVINYL CHLORIDE PRODUCTION PROCESS (CONT'D)

Stream	Annual Quantity (metric tons/yr)	Expected Constituents and Concentration	Sample Type	Primary Analytical Methods
6. Stripper Wastewater	19,000	Water Vinyl chloridet PVC	grab	Same as Stream 5
7. Incinerator Wastewater	95,000	Water HCl Chlorine	Not selected for sampling	
8. Reclaim Coarse Resin	83	Water Vinyl chloridet PVC	Not selected for sampling	
9. Reclaim Wastewater	1,700,000	Water Vinyl chloridet	Not selected for sampling	

* Concentration is unknown.

† Indicates compound is listed as a hazardous constituent in Appendix VIII.

§ Plasticizers may include the phthalates (listed in Appendix VIII). Heat stabilizers may include barium, cadmium, and lead compounds (EP Toxic Metals).

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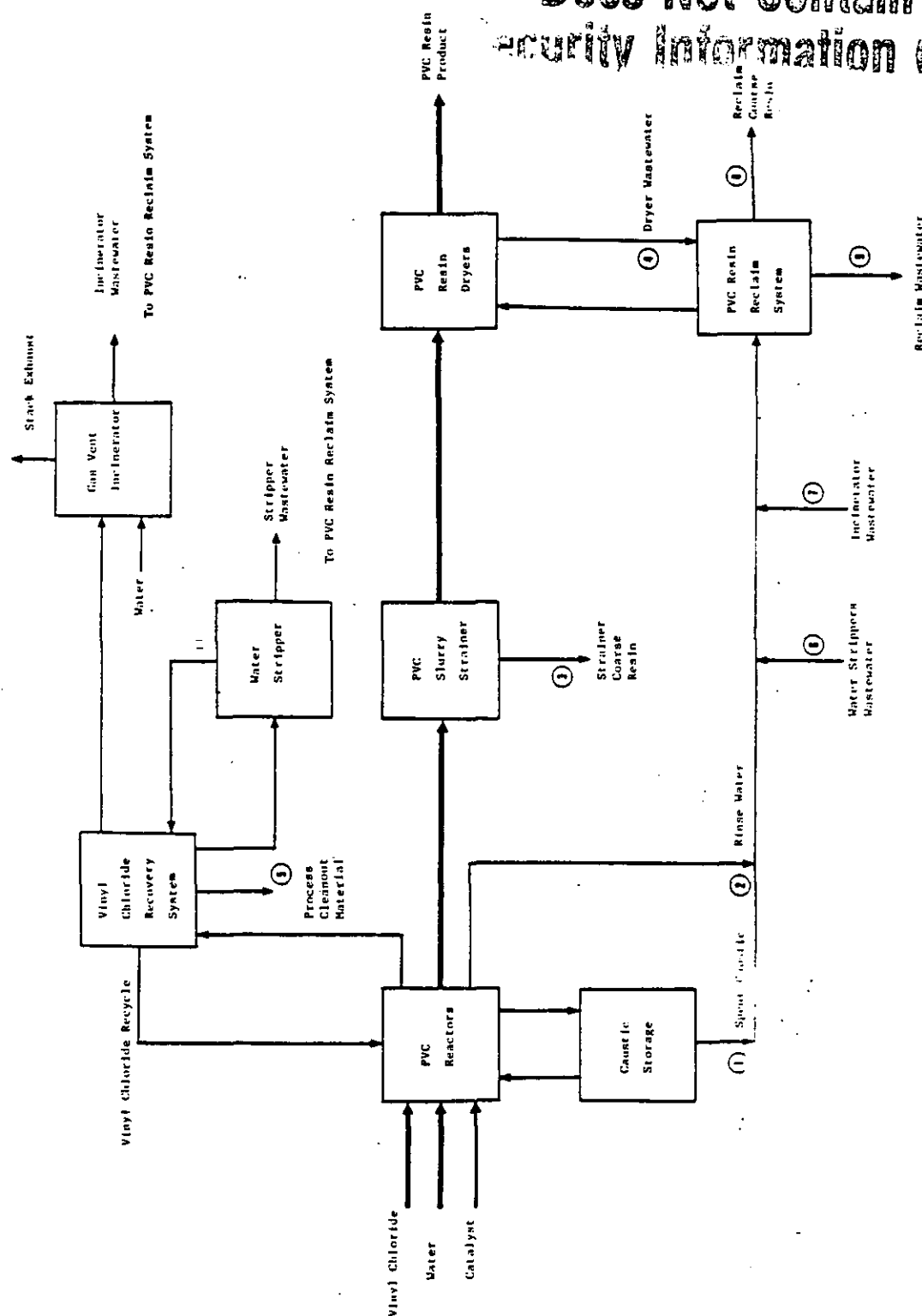


Figure 1-1

FLOW DIAGRAM FOR POLYVINYL CHLORIDE (PVC) PRODUCTION

2.0 LOGISTICS

Summarized below is the logistical information including representatives and telephone numbers of all the participants in the sampling effort at Conoco:

Facility Contact

Dave Mahler
Environmental Engineer
Conoco Chemicals Company
P. O. Box 91, Highway 25
Aberdeen, Mississippi 39730
(601) 369-8111

Radian Sampling Crew

Calvin Spencer
Project Director
Radian Corporation
7655 Old Springhouse Road
McLean, Virginia 22102
(703) 734-2600

Analytical Laboratory

Jerry Parr
Radian Corporation
8501 Mo-Pac Blvd.
P.O. Box 9948
Austin, Texas 78766
(512) 454-4797

EPA Personnel

Waste Characterization Program

Yvonne Garbe
Office of Solid Waste
U.S. EPA
401 M Street, S.W.
Washington, D.C. 20460
(202) 382-4779

Analytical Protocols

Jim Poppiti
Office of Solid Waste
U.S. EPA
401 M Street, S.W.
Washington, D.C. 20460
(202) 382-4779

Sample Shipment

Samples obtained during the one-day visit will be transported by Federal Express overnight to Radian's analytical laboratory in Austin, Texas. Chain of Custody forms (Appendix A) will be used to track handling procedures.

3.0 SAMPLING

3.1 Summary

Figure 1-1 is a generalized schematic block flow diagram of the polyvinyl chloride production facility. The schematics were provided by Conoco in their Section 3007 Questionnaire. Six residual streams will be sampled. Sample information is presented in Table 3-1.

3.2 Sampling Procedures

All samples may be taken by Conoco personnel. Sample containers will be provided by the Radian sampling crew. Radian will also provide glassware for Conoco's samples. Composite samples will be taken of streams 1 through 4. The method of compositing will be determined at the site in order to obtain the most representative sample possible. Possible composite methods include taking three samples approximately two hours apart, mixing them, and splitting the sample into two (2) 1 liter bottles

Table 3-1
SAMPLE INFORMATION

Sample	Phase	Analysis to be Performed	Collection Method	Sample Containers	On-Site Preservation
1. Spent Caustic	Aqueous	Organic Screening, pH, ICP	grab/composite	two 1 L. bottles two 40 mL VOA's two 1 L. bottles	4°C pH<2
2. Rinse Water	Aqueous	Organic Screening, pH	grab/composite	two 1 L. bottles two 40 mL VOA's	4°C
3. Strainer Coarse Resin	Aqueous Slurry	Organic Screening, EP Toxicity	grab/composite	two 1 L. bottles two 40 mL VOA's two 1 L. mason jars	4°C
4. Dryer Wastewater	Aqueous	Organic Screening	grab/composite	two 1 L. bottles two 40 mL VOA's	4°C
5. Process Cleanup Material	Aqueous Slurry	Organic Screening	grab	two 40 mL VOA's	4°C
6. Scrubber Wastewater	Aqueous	Organic Screening	grab	two 40 mL VOA's	4°C

or taking three samples at different locations of the stream, mixing them, and splitting the sample into two (2) 1 liter bottles. Grab samples will be taken from streams 1 through 6 and immediately split into two (2) 40 mL VOA's each.

The Radian crew will label all samples using standard labels (Appendix A). Sample seals will also be used (Appendix A). The sample numbers will be a Radian developed code.

The Radian crew will then package the samples in coolers for shipping. The coolers will be sent overnight by Federal Express to Radian's analytical laboratory.

3.3 Safety Procedures

Prior to sampling, the Radian crew will ask for a safety briefing from Conoco personnel. The purpose of this briefing is to become fully familiar with all of Conoco's safety procedures. In addition to the requirements made by Conoco, the Radian crew will be equipped with hard hats, safety glasses, and steel-toed shoes at all times while in the production facility.

4.0 ANALYSES OF SAMPLES

Samples obtained from Conoco's polyvinyl chloride will be analyzed to determine chemical characterizations as per toxic components listed in Part 261 - Appendix VIII of RCRA and other toxic constituents. Organic screening for characterization of organic components will be performed. Table 4-1 summarizes the analyses to be performed on the samples.

The results of the analyses will be transmitted to OSW for review and evaluation. Following OSW review of the results, any additional analyses to be conducted will be identified and performed.

Table 4-1

ANALYSES OF SAMPLES

Sample	Sample Phase	Compound or Constituents	Type of Analysis to be Performed	Test Method ¹
1. Spent Caustic	Aqueous	Organic compounds, Metals	GC/MS screen to identify organic compounds, pH, ICP	5030 * 8240 * 3520 8270 9040 * 1310 <i>out</i>
2. Rinse Water	Aqueous	Organic compounds	GC/MS screen to identify organic compounds, pH	5030 * 8240 * 3520 8270 9040
3. Strainer Coarse Resin	Aqueous Slurry	Organic compounds, 11 Toxic Metals	GC/MS screen to identify organic compounds, Ep Toxicity	5030 8240 3520 8270 1310 <i>out</i>
4. Dryer Wastewater	Aqueous	Organic compounds	GC/MS screen to identify organic compounds	5030 8240 3520 8270
5. Process Cleanout Wastewater	Aqueous Slurry	Organic compounds	GC/MS screen to identify organic compounds	5030 8240
6. Stripper Wastewater	Aqueous	Organic compounds	GC/MS screen to identify organic compounds	5030 8240

¹Test method refers to SU-846

4.1 Quality Assurance

The QA/QC measures to be taken are as follows:

- Duplicates will be taken for each sample to serve QA/QC functions as well as backup for further analysis.
- EPA protocols from Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846 will be used in all sampling and analysis activities (except where specifically documented otherwise).

5.0 DOCUMENTATION AND REPORTING

A field notebook will be used to record all observations during the sampling activities. The notes from the field notebook will be used as the basis for describing conditions during sampling as well as any deviation from the sample plan written here.

After all samples have been analyzed, a trip report will be written which will give the results of the analyses and all engineering aspects of sample collection. The objective will be to fully document what was done at the site. The report will be an addendum to the sampling trip reports.

APPENDIX A

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector _____ Date Sampled _____ Time _____ hrs.

Affiliation of Sampler _____

Address _____

number street city state zip

Telephone (____) _____ Company Contact _____

LABORATORY

<u>SAMPLE NUMBER</u>	<u>COLLECTOR'S SAMPLE NO.</u>	<u>TYPE OF SAMPLE*</u>	<u>FIELD INFORMATION**</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Analysis Requested _____

Special Handling and/or Storage _____

PART II: LABORATORY SECTION**

Received by _____ Title _____ Date _____

Analysis Required _____

* Indicate whether sample is soil, sludge, etc.

** Use back of page for additional information relative to sample location.

HAZARDOUS WASTE SAMPLE ANALYSIS REQUEST SHEET

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CHAIN OF CUSTODY RECORD

FIELD SAMPLE NO. _____

COMPANY SAMPLED/ADDRESS _____

SAMPLE POINT DESCRIPTION _____

STREAM CHARACTERISTICS:

TEMPERATURE _____ FLOW _____ PH _____

VISUAL OBSERVATIONS/COMMENTS _____

COLLECTOR'S NAME _____ DATE/TIME SAMPLED _____

AMOUNT OF SAMPLE COLLECTED _____

SAMPLE DESCRIPTION _____

STORE AT: ☐ AMBIENT ☐ 5°C ☐ -10°C ☐ OTHER _____☐ CAUTION - NO MORE SAMPLE AVAILABLE ☐ RETURN ALL PORTIONS ☐ RETURN UNUSED PORTION OF SAMPLE

OTHER INSTRUCTIONS - SPECIAL HANDLING - HAZARDS _____

☐ HAZARDOUS SAMPLE (SEE BELOW)☐ NON-HAZARDOUS SAMPLE☐ TOXIC☐ SKIN IRRITANT☐ FLAMMABLE (FP 40°C)☐ PYROPHORIC☐ LACHRYMATOR☐ SHOCK SENSITIVE☐ ACIDIC☐ BIOLOGICAL☐ CARCINOGENIC - SUSPECT☐ CAUSTIC☐ PEROXIDE☐ RADIOACTIVE☐ OTHER _____SAMPLE ALLOCATION / CHAIN OF POSSESSION:

ORGANIZATION NAME _____

RECEIVED BY _____ DATE RECEIVED _____

LAB SAMPLE NO. _____ COMMENTS _____

INCLUSIVE DATES OF POSSESSION _____

ORGANIZATION NAME _____

RECEIVED BY _____ DATE RECEIVED _____

LAB SAMPLE NO. _____ COMMENTS _____

INCLUSIVE DATES OF POSSESSION _____

ORGANIZATION NAME _____

RECEIVED BY _____ DATE RECEIVED _____

LAB SAMPLE NO. _____ COMMENTS _____

INCLUSIVE DATES OF POSSESSION _____

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Field Number _____

8501 Mo-Pac Blvd./P.O. Box 9948/Austin, Texas 78768-0948 (512) 454-4797

Sample Type: _____

Client: _____

Location: _____

Preservative: _____

Sampler: _____

Date: _____

Comment: _____

SAMPLE LABEL

ATTENTION:
BEFORE OPENING
NOTE IF BOTTLE WAS
TAMPERED WITH.

RADIAN
CORPORATION

8501 Mo-Pac Blvd. / P.O. Box 9948
Austin, Texas 78766 / (512)454-4797

SAMPLE# _____

ATTENTION:
BEFORE OPENING
NOTE IF BOTTLE WAS
TAMPERED WITH.

SAMPLE SEAL