

Appendix E

FISH TISSUE COLLECTION AND ANALYSIS

PLAN OF STUDY

Georgia-Pacific Corporation
Palatka Operations

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Fish Tissue Collection and Analysis Plan of Study

TABLE OF CONTENTS

SECTION

1.0	INTRODUCTION.....	3
2.0	SAMPLING LOCATION.....	3
3.0	FISH SPECIES SELECTION.....	3
4.0	SAMPLING METHOD.....	4
5.0	SAMPLING TIME.....	4
6.0	SAMPLE COLLECTION AND HANDLING.....	4
7.0	SAMPLE PROCESSING.....	5
8.0	SAMPLE ANALYSIS.....	5
9.0	REPORTS.....	5

TABLES

1.0	DIOXIN CONGENERS AND RELEVANT TOXICITY EQUIVALENCY FACTORS (TEF).....	3
2.0	PRIORITY FOR FRESHWATER FISH SPECIES COLLECTION.....	4

1.0 INTRODUCTION

This plan of study has been prepared pursuant to the National Pollutant Discharge Elimination System (NPDES) Permit Number FL0002763, that requires Georgia-Pacific Corporation to assess concentrations of 17 chloro-p-dibenzodioxins and furans (later referred to as dioxin in this report) in ambient fish and shellfish tissue in Rice Creek, Florida. These 17 congeners are listed in Table 1. In preparing this plan, Georgia-Pacific Corporation has relied on experience gained in the field in previous sampling efforts as well as the following guidance: EPA, Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories: Volume 1, Fish Sampling and Analysis, Third Edition. EPA 823-B-00-007, November 2000. The toxic equivalency factors (TEF) for these congeners represent the most recent toxicological information for this chemical. In-field modifications to the Plan of Study are permissible if they meet the intent of the study and are approved by the Florida Department of Environmental Protection.

Table 1. Dioxin Congeners and Relevant Toxicity Equivalency Factors (TEF)

<u>Congener</u>	<u>TEF</u>	<u>Congener</u>	<u>TEF</u>
2,3,7,8-TCDD	1.0	2,3,7,8-TCDF	0.10
1,2,3,7,8-PeCDD	1.0	1,2,3,7,8-PeCDF	0.05
		2,3,4,7,8-PeCDF	0.50
1,2,3,4,7,8-HxCDD	0.10	1,2,3,4,7,8-HxCDF	0.10
1,2,3,7,8,9-HxCDD	0.10	1,2,3,7,8,9-HxCDF	0.10
1,2,3,6,7,8-HxCDD	0.10	1,2,3,6,7,8-HxCDF	0.10
		2,3,4,6,7,8-HxCDF	0.10
1,2,3,4,6,7,8-HpCDD	0.01	1,2,3,4,6,7,8-HpCDF	0.01
		1,2,3,4,7,8,9-HpCDF	0.01
1,2,3,4,6,7,8,9-OcDD	0.0001	1,2,3,4,6,7,8,9-OcDF	0.0001

Source: EPA, Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories: Vol. 1, Fish Sampling and Analysis, Third Edition. EPA 823-B-00-007, November 2000.

2.0 SAMPLING LOCATION

The target sampling area is Rice Creek, Florida, as designated by permit condition. Two sampling locations have been selected: (1) on the upstream side of the railroad bridge; and (2) at the point closest to the mill's discharge that is still accessible by boat. Reference sample(s), uninfluenced by the Palatka mill effluent, may also be collected from one or several locations. These locations include St. Johns River near Lundy, Green Cove Springs, Deep Creek, Julington/Durbin Creek, and Trout Creek southeast of the Shands Bridge.

3.0 FISH SPECIES SELECTION

The EPA guidance document recommends the selection of one predator and one bottom-feeding finfish. It also suggests that all species sampled be representative of those caught for human consumption in the waterway.

The predator and bottom-feeding finfish targeted for sampling are in order of preference as listed in Table 2.

Table 2. Priority for Freshwater Fish Species Collection

<u>Predator</u>	<u>Bottom-Feeders</u>
Bluegill (<i>Lepomis macrochirus</i>)	Brown bullhead (aka speckled catfish) (<i>Ictalurus nebulosus</i>)
Redbreast sunfish (<i>Lepomis auritus</i>)	White catfish (<i>Ictalurus catus</i>)
Redear sunfish (<i>Lepomis microlophus</i>)	

Shellfish are not taken for human consumption from Rice Creek, based on knowledge from government and University of Florida scientists; and, as such, will not be included in the collection effort.

4.0 SAMPLING METHOD

Fish must be collected at each site by one or a combination of the following methods: electrofishing, trawling, seining, hook and line, trot-line, or gillnet. Apparatus for electrofishing will be capable of producing a low pulse rate (15 or 20 pps) to collect catfish. Scale fish are susceptible to typical pulse rates of 60-120 pps, whereas catfish are particularly vulnerable to pulsed DC current below 30 pps. If high conductivity is relevant in any location, a GPP 9.0-type electrofishing rig will be used.

If the quest for 12 fish initially has low yields, then a collection time of two 3-hour periods in a one day timeframe will be considered the maximum time to demonstrate diligence in that sampling effort. If this effort exhausts the possibility of collecting 12 fish of each species, Georgia-Pacific Corporation will consult with DEP to document those efforts.

5.0 SAMPLING TIME

The target time period for collection is mid June to mid July. The lipid content of many species (which represents an important reservoir for dioxin) is generally highest at this time.

6.0 SAMPLE COLLECTION AND HANDLING

Twelve oldest fish of the same size **and species**, that will allow a composite sample of 200 grams, will be collected from predator and bottom-feeding finfish for analysis. Full documentation of fish species, length, weight, morphological abnormalities if observed, and GPS location will be included in the field log and included in the final report.

After collection, all fish will be individually weighed and measured. Measured fish length will be the maximum length as determined from the tip of the caudal fin (tail) to the anterior-most part of the fish. This information will be logged on a field collection record, and each fish will be inventoried on a Chain-of-Custody record with a unique sample identification, collection

location including GPS, and collection date. Collection and Chain-of Custody records will be included with the final report.

All fish composites will contain the same number of fish to allow numerically unbiased data comparisons, where possible. Fish for the composites will be collected from the same area of the water body and represent the oldest (largest) subpopulation of a single species. The collected oldest fish should be approximately the same size and length. The results will be used to determine and verify previous results and assess the magnitude of tissue contamination. One composite sample for each target species at all collection areas will be analyzed. A replicate composite may be collected; however, this replicate is not required by DEP or DOH. Archived composites will be maintained at the analytical laboratory for back-up analysis until such time as Georgia-Pacific Corporation determines they are no longer needed.

Clean sampling methodologies are paramount to the collection process to insure that no contamination of samples occurs during collection, transport, and processing of the samples. All surfaces used to weigh fish will be covered with new aluminum foil (shiny side out). Sample nets will be pre-cleaned and kept near the front of the boat away from the motor and any exhaust gases. Fish will be collected and wrapped whole in pre-cleaned aluminum foil (shiny side out), then butcher wrapping paper in an envelope format to prevent leakage, sealed in a waterproof plastic bag, placed on ice in pre-cleaned coolers, bound using duct or strapping tape, and shipped via overnight courier service using appropriate Chain-of-Custody forms.

7.0 SAMPLE PROCESSING

Analytical samples will consist of a composite of edible tissue (fillets). Fish will have scales removed prior to filleting and fish without scales (catfish) will be skinned prior to filleting. After filleting, individual fish fillets will be homogenized into uniform subsamples. Approximately equal portions from each individual subsample will be used to make up the composite sample. The composite sample will then be homogenized to form a uniform composite sample of which twenty-five grams will be solvent extracted for analysis.

8.0 SAMPLE ANALYSIS

The samples will be analyzed for dioxin and lipid content. Dioxin analyses will be performed using EPA method 1613B. Results will be reported as wet weight in parts per trillion (ppt).

9.0 REPORTS

The final report will include copies of all sample handling and processing data sheets including field data sheets, Chain-of-Custody receipts, and laboratory processing sheets. Moreover, it will include information of results of all analytical quality assurance results including analysis of duplicates, standard reference materials, matrix spike samples, and laboratory blanks. Any deviations from laboratory data quality objectives will be indicated.