Information Request
Off Site Fly Ash
GP Fort Bragg Sawmill

Georgia-Pacific Corporation
Fort Bragg, California

December 2006

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an ARCADIS company

GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTH OF JANUARY, 1990

Monitoring and Reporting Order No. 86-3, Soil Amending Project.

Volume of Ash Deposited (@ Site		Cubic Yards Area A-South		Rainfall Totals inches
Week of 1 - 7		520	Yds^3	2.74
8 - 14		880		5.05
15 - 21		760		.51
22 - 28		320		.08
29 - 30		120		1.33
	Total	2,600	Yds^3	

The total number of treated acres to date = 63.0 acres

Precipitation

A total of 9.7 inches of rain was measured

Water Monitoring and Testing

Here are the pH levels:

	Pt.5	Pt. 6	Pt. 7	Pt. 8	Pt. 9
1-9-90	7.4	7.5	7.4	7.4	7.8
1-18-90	7.4	7.4	7.5	7.5	7.7

Deposition

All ash was stock piled.

GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTH OF February, 1990

Monitoring and Reporting Order No. 86-3, Soil Amending Project.

Volume of Ash Deposited (@ Site	Cubic Yards Area A-South	Rainfall Totals
Week of	Yds^3	inches
1 - 3	-0-	1.27
4 - 10	-0-	2.17
11 - 17	-0-	.96
18 - 24	100	.14
25 - 28	120	-0-
TOTAL =	220 yds^3	

The total number of treated acres to date = 63.0 acres

Precipitation

Four point five (4.5) inches of rain was measured for the month.

Here are the pH levels:

Pt.'s	5	6	7	8	9
2-1-90	7.5	7.4	7.5	7.9	7.4
2- -90	7.6	7.4	7.4	7.7	7.5

Deposition

Any ash received at the site was stockpiled in the 1989-90 winter area.

GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTH OF MARCH, 1990

Monitoring and Reporting Order No. 86-3, Soil Amending Project.

Volume of Ash Deposited @ Site		Cubic Yards Area A-South	Rainfall Totals
Week of	1 - 3	160 Yds^3	1.01 inches
	4 - 10	280	1.03
	11 - 17	340	1.21
	18 - 24	300	-
	25 - 31	280	-
	TOTAL =	1,360	3.25

The total number of treated acres to date = 63.0 acres

Precipitation

A total of 3.25 inches of rain fell during the month.

Water Monitoring and Testing

Here are the pH levels: For the week of 3-4-90.

	# 5	# 6	# 7	# 8	# 9
pH =	7.7	7.5	7.4	7.9	7.4

Deposition

All ash was stockpiled.

GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTH OF April, 1990

Monitoring and Reporting Order No. 86-3, Soil Amending Project.

Volume of Ash Deposited @ Site	Cubic Yards Area A-South	Rainfall Totals
		inches
Week of 1 - 7	280 Yds^3	
8 - 14	480	
15 - 21	280	
22 - 28	260	
29 - 30	80	
Total =	1,380 Yds^3	

The total number of treated acres to date = 63.0 acres

Precipitation

No rainfall during this month.

Water Monitoring and Testing

Here are the pH levels:

The ephemeral draws were dry.

Deposition

All ash was stockpiled.

GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTH OF MAY, 1990

Monitoring and Reporting Order No. 86-3, Soil Amending Project.

Volume of Ash Deposited @ Site		Cubic Yards Area A-South		Rainfall Totals	
Week of	1 - 5	380	Yds3	-0-	inches
	6 - 12	300		-0-	
	13 - 19	760		-0-	
	20 - 26	380		2.95	
	27 - 31	720		3.68	
	Total=	2,540	Yds^3	= 6.63	inches

The total number of treated acres to date = 63.0 acres

Precipitation

A total of 6.63 inches fell during the month.

Water Monitoring and Testing

Here are the pH levels:

Not taken.

Deposition

All ash was stockpiled.

GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTH OF JUNE, **1990**

Monitoring and Reporting Order No. 86-3, Soil Amending Project-

volume of Ash Deposited @ Site		Cubic Yards Area A-South		Rainfall Totals	
Week of	1 - 2	340	Yds^3	.31	inches
	3 - 9	**600**		.77	
	10 - 16	1,760			
	17 - 23	680			
	24 - 30	**260**			
	TOTAL	**3,640**	Yds^3	**1.08**	inches

The total number of treated acres to date = 63.0 acres

Precipitation

A total of **1.08** inches of rain fell in June.

Water Monitoring and Testing

Here are the pH levels:

N/A

Deposition

All ash was stockpiled.

F

State of California

Memorandum

To : Dr. Frank Palmer
State Water Resources Control Board

Date : January 2, 1990

From : Frank C. Reichmuth
California Regional Water Quality Control Board
North Coast Region - 1440 Guerneville Rod
Santa Rosa, California 95401

Subject: "TCDF Study on Fly Ash Soil and Related Environmental Vectors"

Enclosed is a copy of a report titled "TCDF Study on Fly Ash Soil and Related Environmental Vectors" as submitted by the Georgia-Pacific Corporation. This report was developed at the direction of the Regional Board and your technical review of the initial workplan. Please review the report and provide comments on whether you agree or disagree on its findings of no bioaccumulation of TCDF in plants or earthworms.

cc: Jesse Diaz, SWRCB

GP -
FT BRAGG
ASH

Georgia-Pacific

...tracompany memo

to	See Distribution	location	Various
from	Mr. Gerald W. Tice	location	GA030 - ATL - G16
subject	Fort Bragg Fly Ash Study	date	January 3, 1990

As indicated on the enclosed cover letter to Mr. Benjamin D. Kor of the California Regional Water Quality Control Board, I have enclosed pertinent sections of the report that we recently submitted to the state concerning fly ash disposal at our Fort Bragg mill.

For those of you that may not be familiar with this study, it was undertaken in 1988 in response to action by the state which threatened the continued practice of disposal of the fly ash generated at the mill by means of amending it into the soil. I consider this a major study which clearly shows no uptake of contaminants into the environment as was the concern of the state. Hopefully this study could be used at our other mills should the issue of dioxin and furan contamination from fly ash be raised.

Please let me know if there are any questions.

G. W. T.

GWT/pcw

Enclosure

Distribution: Messrs.
D. K. Mortensen
D. L. Glass
W. L. Duke
D. L. Mobley
C. T. Howlett, Jr.
A. T. Johnson
L. D. Ambrosini
R. L. Burns
P. M. Fetter
A. F. Hodges
K. C. Mayer
G. F. McCaig
L. P. E. Otwell
T. Treichelt
D. Whitman

ATTACHMENT 9

F

STATE OF CALIFORNIA — GEORGE DEUKMEJIAN, *Governor*

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA, CA 95403
(707) 676-2220

February 5, 1990

Mr. Kent Mayer
Georgia-Pacific Corporation
P. O. Box 1618
Eugene, OR 97440

Dear Mr. Mayer:

As you know, Waste Discharge Requirements Order No. 86-3 for the Georgia-Pacific Fort Bragg Soil Amendment expired on January 30, 1990. According to Section 13264 of the Water Code, no new waste discharges shall be initiated prior to (1) the issuance of waste discharge requirements, (2) the expiration of 120 days following receipt of a complete report of waste discharge, or (3) issuance of a waiver by the Regional Board. We have received and are evaluating your report of waste discharge. This is to notify you that any current discharge of waste is a violation of Section 13264 and may subject Georgia-Pacific to Administrative Civil Liability in an amount not to exceed $1,000 for each day in which the violation occurs, pursuant to Section 13265 of the Water Code.

The next Regional Board meeting is at 9:00 a.m. on February 22, 1990, at the Eureka City Council Chambers in Eureka, California. At that time the Board may consider adoption of new Waste Discharge Requirements. Please call Frank Reichmuth or Mark Neely of my staff if you have any questions.

Sincerely,

Benjamin D. Kor
Executive Officer

MKN:ba/gpashenf

cc: Don Whitman

STATE OF CALIFORNIA GEORGE DEUKMEJIAN, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA, CA 95403
(707)576-2220

February 9, 1990

NOTICE

PROPOSE?) WASTE DISCHARGE REQUIREMENTS

FOR

GEORGIA-PACIFIC CORPORATION
FORT BRAGG SOIL AMENDMENT

Mendocino County

Comments or recommendations you may have concerning the proposed Order should be submitted in writing to the Regional Board by February 19, 1990. Comments received after this date cannot be given full consideration.

Benjamin D. Kor
Executive Officer

Attachment

cc: SWRCB, Division of Water Quality, Attn: Archie Matthews
SWRCB, Office of the Chief Counsel, Attn: Bonnie Wolstoncroft
DFG, Yountville
Mendocino County Health Department, Attn: Gerald F. Davis
DOHS, EMB, Santa Rosa, Attn: District Representative
DWR, Central District, Sacramento, Attn: Rick Woodard
USDI, Fish and wildlife Service, Sacramento
Dept. Parks and Recreation, Sacramento, Attn: James M. Doyle
Mendocino County Planning Department, Ukiah, Attn: Ray Hall

California Regional Water Quality Control Board
North Coast Region

ORDER NO. 90-32
ID NO. 1B85030RMEN

PRELIMINARY

WASTE DISCHARGE REQUIREMENTS

For

GEORGIA-PACIFIC CORPORATION
FORT BRAGG SOIL AMENDMENT

Mendocino County

The California Regional Water Quality Control Board, North Coast Region (hereinafter Board) finds that:

1. On January 30, 1986, the Regional Board adopted Waste Discharge Requirements Order No. 86-3 for the use of woodwaste ash as a soil amendment. The permit had an expiration date of January 30, 1990.

2. Georgia-Pacific Corporation (hereinafter discharger) submitted a Report of Waste Discharge on September 28, 1989 to the Regional Board.

3. The Report of Waste Discharge describes use of woodwaste ash, a nonhazardous decomposable waste, as a soil amendment using applicable Best Management Practices pursuant to Section 2511(f) of Title 23, Chapter 3, Subchapter 15 of the California Administrative Code. The woodwaste is generated by the power plant operated at the Georgia-Pacific sawmill. The soil amendment site is located in Little Valley within Sections 14, 22, 23, 24, and 26 of T19N, R17W, MDB&M on 330 acres of pasture land along Little Valley Creek. There will be occasional stockpiling of ash during inclement weather on an additional eight acre parcel in Section 14, T19N, R17W MDB&M adjacent to the South Fork of Ten Mile Creek. Drainage controls and management practices for stockpiling the ash are designed to prevent a discharge of ash to surface streams.

4. Chemical analysis of the ash has found the presence of low levels of chlorodibenzofurans (CDF), which are suspected of being carcinogenic. Although the concentrations are considered nonhazardous by the Department of Health Services, the bioaccumulative nature of the compounds may lead to concentrations in plant, animal, or aquatic life which are hazardous. Georgia-Pacific Corporation undertook a study of the bioaccumulation potential of the CDF's at the site, for which a technical report was due on May 1, 1989. Following a request from Georgia-Pacific, this date was extended to September 1, 1989. The report was received by the Regional Board on December 26, 1989. Renewal of the permit was made contingent on the report finding the bioaccumulation potential to be negligible.

5. The Waste Discharge Requirements Order No. 90-32 provides for the interim stockpiling of ash until such time the bioaccumulation and hazard potential of the ash in assessed. The Regional Board will consider adoption of Waste Discharge Requirements, for soil amendment pending the findings of the bioaccumulation study. Order No. 90-32 also requires Georgia-Pacific Corporation to develop a feasibility study for the long term disposal of ash should the soil amending of ash is found to be inappropriate.

6. The Board adopted the Water Quality Control Plan for the North Coast Region on April 28, 1989. The plan was approved by the State Water Resources Control Board on November 15, 1988. It includes, by reference, the Water Quality Control Plan for Ocean Waters of California which was adopted by the State Water Resources Control Board on September 22, 1988. Both Plans include water quality objectives and receiving rater limitations. The basin plan contains a prohibition against new waste discharges to all coastal streams and natural drainageways that flow directly to the ocean.

7. The beneficial uses of Little Valley Creek, Pudding Creek, and Ten Mile Creek include:

   a. municipal and domestic water supply
   b. agricultural water supply
   c. potential industrial service water supply
   d. potential industrial process water supply
   e. groundwater recharge
   f. water contact recreation
   g. non-contact water recreation
   h. warm freshwater habitat
   i. cold freshwater habitat
   j. wildlife habitat
   k. fish migration
   l. fish *spawning*

8. The County of Mendocino has zoned this area as timber production and does not require a permit for a use of the land consistent with this *wning*. The Board has determined that compliance with this Order will mitigate any potential adverse water quality *impact.*

9. The Board has notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the proposed discharge and has provided them with an opportunity for a plblic meeting and an opportunity to submit their written views and recommendations.

10. The Board, in a plblic meeting, heard and considered all comments pertaining to the discharge.

THEREFORE, IT IS HEREBY ORDERED, that in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, the discharger shall comply with the following:

A. PROHIBITIONS:

1. There shall be no discharge of ash to surface streams at any time.

B. SPECIFICATIONS:

1. Runoff of ash to land not under the control of the discharger is prohibited.

2. The stockpiling of ash shall not cause a pollution or nuisance as defined in Section 13050 of the California Water Code.

3. No ash materials shall be deposited outside of the soil stockpiling areas shown on Attachment "A".

4. The ash stockpile area shall be protected from any washout or erosion of ash or covering materials and from inundation which could occur as a result of floods having a recurrence interval of 100 years.

5. Discharge of any waste not specifically regulated by this Order is prohibited.

C. PROVISIONS:

1. Availability

A copy of this Order and a copy of the facility spill contingency plan shall be maintained at the discharge facility and be available at all times to operating personnel.

2. Operation and Maintenance

The discharger must maintain in good working order and operate as efficiently as possible any facility or control system installed by the discharger to achieve compliance with the waste discharge requirements.

3. Change in Discharge

The discharger must promptly report to the Board any material change in the character, locations, or volume of the discharge.

4. Change in Ownership

In the event of any change in control or ownership or land or waste discharge facilities presently owned or controlled by the discharger, the discharger must notify the succeeding owner or operator of the existence of this Order by letter, a copy of which must be forwarded to this office.

5. Vested Rights

This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, nor protect the discharger from his liability under federal, State, or local laws, nor create a vested right for the discharger to continue the waste discharge.

6. Severability

Provisions of these waste discharge requirements are severable. If any provision of these requirements is found invalid, the remainder of these requirements shall not be affected.

7. Monitoring

The discharger must comply with the Contingency Planning and Notification Requirements Order No. 74-151, Monitoring and Reporting Program No. 90-32 and any modification to these documents as specified by the Executive Officer. Such documents are attached to this Order and incorporated herein. Chemical, bacteriological, and bioassay analyses must be conducted at a laboratory certified for such analyses by the State Department of Health Services. In the event a certified laboratory is not available to the discharger, analyses performed by a noncertified laboratory will be accepted.

8. Inspections

The discharger shall permit authorized staff of the Board:

a. entry upon premises in which an effluent source is located or in which any required records are kept;
b. access to copy any records required to be kept under terms and conditions of this Order;
c. inspection of monitoring equipment or records; and
d. sampling of any discharge.

9. Noncompliance

In the went the discharger is unable to comply with any of the conditions of this Order due to:

a. breakdown of waste treatment equipment;
b. accidents caused by human error or negligence; or
c. other causes such as acts of nature;

the discharger must notify the Executive Officer by telephone as soon as he or his agents have knowledge of the incident and confirm this notification in writing within two weeks of the telephone notification. The written notification shall include pertinent information explaining reasons for the noncompliance and shall indicate what steps are being taken to prevent the problem from recurring.

10. Revisions of Requirements

The Board will review this Order periodically and may revise requirements when necessary.

11. The discharger shall undertake a feasibility study evaluating alternative methods of ash disposal to be utilized should soil amending be deemed as inappropriate. This report shall be submitted to the Regional Board by _____

12. This Order expires on _____, 1990.

Certification

I, Benjamin D. Kor, Executive Officer, do hereby certify that the foregoing is a full, *true*, and correct copy of an Order adopted by the California Regional Water Quality Control Board, North Coast Region, on _____.

_____

Benjamin D. Kor
Executive Officer

(gpashwdr)

California Regional Water Quality Control Board
North Coast Region

MONITORING AND REPORTING PROGRAM NO. 90-32

FOR

GEORGIA-PACIFIC CORPORATION
FORT BRAGG SOIL AMENDMENT

Mendocino County

Monitoring

The discharger shall record the approximate volume of ash deposited at the site each month.

Stormwater Runoff Monitoring

Grab samples shall be taken periodically when streams are flowing from the points shown on the attached map. Samples shall be analyzed as follows:

Constituent	Units	Frequency
pH	pH units	Weekly
COD	mg/l	November, January, and March

Weekly rainfall totals shall also be recorded and reported.

Reporting

Monitoring reports shall be submitted monthly to the Board by the fifteenth of the month. Copies of signed laboratory sheets shall be submitted with any monthly summary report.

Ordered by _____
Benjamin D. Kor
Executive Officer

F

STATE OF CALIFORNIA GEORGE DEUKMEJIAN, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD-
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA, CA 95403
(707) 576-2220

CERTIFIED - Return Receipt Requested

February 9, 1990

Mr. Kent Mayer
Georgia Pacific Corporation
P.O. Box 1618
Eugene, OR 97440

Dear Mr. Mayer:

Enclosed you will find tentative Waste Discharge Requirements Order No. 90-32 for the Fort Bragg Ash Soil Amendment. The Regional Board will consider the tentative order at their February 22, 1990 Regional Board meeting in Eureka, California. Also enclosed are draft comments by Dr. Frank Palmer of the State Water Resources Control Board on the "TCDF Study on Fly Ash" report submitted by Georgia-Pacific Corporation. I will send you the final comments as soon as they are available.

Feel free to call if you have any questions. We look forward to seeing you at the meeting we have scheduled here at our office on February 20 to discuss the TCDF study.

Sincerely,

Frank C. Reichmuth
Senior Water Resource
Control Engineer

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.
Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For fees and check box(es) for additional services requested, see postmaster.
1. ☐ Show to whom delivered
3. Article Addressed to:
Mr. Kent May
Georgia-Paci
P.O. Box 161
Eugene. OR
5. Signature — Addressee
X
6. Signature — Agent
X
7. Date of Delivery

P 142 285 734
RECEIPT FOR CERTIFIED MAIL
Kent Mayer
Georgia-Pacific Corp.
P.O. Box 1618
Eugene, OR 97440
Postage
Certified Fee
Special Delivery Fee
Restricted Delivery Fee
Return Receipt Showing to Whom and Date Delivered
Return Receipt Showing to Whom, Date, and Address of Delivery
TOTAL Postage and Fees
Postmark or Date

PS Form 3800, June 1985

PS Form 3811, Mar. 1988 * U.S.G.P.O. 1988-212-865 DOMESTIC RETURN RECEIPT

California Regional Water Quality Control Board
North Coast Region

ORDER NO. 90-154
ID NO. 1B85030RMEN

WASTE DISCHARGE REQUIREMENTS

For

GEORGIA-PACIFIC CORPORATION
FORT BRAGG SOIL AMENDMENT

Mendocino County

The California Regional Water Quality Control Board, North Coast Region (hereinafter Board) finds that:

1. Georgia-Pacific Corporation (hereinafter discharger) submitted a request dated July 16, 1990 to resume the use of boiler ash as soil amendment on lands located adjacent to Little Valley Creek near Fort Bragg.

2. The Regional Board adopted Waste Discharge Requirements Order No. 90-32 for the stockpiling of woodwaste ash. The Order prohibited the soil amendment of ash pending further studies by discharger. The permit has an expiration date of July 1, 1991.

3. The request by the discharger describes the use of woodwaste ash, a nonhazardous decomposable waste, as a soil amendment using applicable Best Management Practices pursuant to Section 2511(f) of Title 23, Chapter 3, Subchapter 15 of the California Administrative Code. The woodwaste is generated by the power plant operated at the Georgia-Pacific sawmill. The soil amendment site is located in Little Valley within Sections 14, 22, 23, 24, and 26 of T19N, R17W, MDB&M on 330 acres of pasture land along Little Valley Creek. Drainage controls and management practices for stockpiling the ash are designed to prevent a discharge of ash to surface streams. These include:

   a. Retention of a minimum 50 foot buffer between incorporation activities and any watercourse, whether perennial, intermittent, or ephemeral.

   b. Ash should not be allowed to accumulate for more than a week during the summer period. It should be incorporated as soon as there is enough ash to feasibly incorporate with heavy equipment. Regional Board staff must be notified if a need arises to store the ash for longer periods.

   c. Amended areas must be seeded by October 1. Any delay must be reported to the Regional Board.

   d. Once an area has been incorporated and planted with grass seed, there shall be no passage of vehicles or equipment over the amended area.

4. The Waste Discharge Requirements Order No. 90-32 modified the previous Order No. 86-3 by not permitting the amending of the ash but allowing the interim stockpiling to proceed, pending a study by Georgia-Pacific on the hazard posed by bioaccumulation of low levels of chlorodibenzofurans (CDF) and chlorodibenzodioxins (CDD). 2,3,7,8-tetrachloro-p-dibenzodioxin is listed as being carcinogenic under the Safe Drinking Water and Toxic Enforcement k t of 1986. Although in 1986 the Department of Health Services, based on known concentrations of CDF's, considered the levels to be nonhazardous, the bioaccumulative nature of the compounds may lead to concentrations in plant, animal, or aquatic life which are hazardous. Resumption of amending under the permit was made contingent on a report finding the bioaccumulation potential to be negligible. The discharger submitted sampling data which found the ash to have a toxic equivalency factor (TEQ) of 3.83 and 3.02 parts per trillion (ppt), a TEQ for fish tissue of 0.10 and 0.03 ppt, and a TEQ for stream sediment ranging from 0.03 to 0.150 ppt. The TEQ method is a procedure for assessing the risks associated with exposures to complex mixtures of CDD's and CDF's, and relates their toxicity to the highly studied 2,3,7,8-tetrachlorodibenzodioxin (TCDD).

5. The Waste Discharge Requirements Order No. 90-32 provided for the interim stockpiling of ash until such time the bioaccumulation and hazard potential of the ash is assessed. On the basis of the data submitted, it appears likely that the bioaccumulation risk is small. Waste Discharge Requirements Order No. 90-154 allows resumption of amending until such time as the final bioaccumulation study on the aquatic resources of Little Valley Creek is submitted and analyzed.

6. Order No. 90-32 also required Georgia-Pacific Corporation to develop a feasibility study for the long term disposal of ash should the soil *d i n g* of ash is found to be inappropriate. The feasibility study indicated that lardfilling would be an alternative to soil amending.

7. The State Water Resources Control Board has requested the Department of Health Services to review the concentrations of CDDs and CDFs in the boiler ash and assess the risk to human health and environment. This Order can be modified or rescinded *pending* a finding of significant risk to human health or environment by the Department of Health Services.

8. The Board adopted the Water Quality Control Plan for the North Coast Region on April 28, 1989. The plan was approved by the State Water Resources Control Board on November 15, 1988. It includes, by reference, the Water Quality Control Plan for Ocean Waters of California which was adopted by the State Water Resources Control Board on September 22, 1988. Both Plans include water quality objectives and receiving water limitations. The basin plan contains a prohibition against new waste discharges to all coastal streams and natural drainageways that flow directly to the ocean.

9. The beneficial uses of Little Valley Creek and Pudding Creek include:

   a. municipal and domestic water supply
   b. agricultural water supply
   c. potential industrial service water supply
   d. potential industrial process water supply
   e. groundwater recharge
   f. water contact recreation
   g. non-contact water recreation
   h. warm freshwater habitat
   i. cold freshwater habitat
   j. wildlife habitat
   k. fish migration
   1. fish spawning

10. The County of Mendocino has zoned this area as timber production and does not require a permit for a use of the land consistent with this zoning. These waste discharge requirements constitute a minor modification to land and is exempt from CEQA under Section 15304 Title 14 CCR.

11. The Board has notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the proposed discharge and has provided them with an opportunity for a public meeting and an opportunity to submit their written views and recommendations.

12. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

THEREFORE, IT IS HEREBY ORDERED, that Waste Discharge Requirements Order No. 90-32 be rescinded, and in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, the discharger shall comply with the following:

A. PROHIBITIONS:

1. There shall be no discharge of ash to surface streams at any time.

B. SPECIFICATIONS:

1. Runoff of ash to land not under the control of the discharger is prohibited.

2. The stockpiling and amending of ash shall not cause a pollution or nuisance as defined in Section 13050 of the California Water Code.

3. No ash materials shall be deposited outside of the soil amendment areas shown on Attachment "A".

4. The soil amendment area shall be protected from any washout or erosion of ash or covering materials and from inundation which could occur as a result of floods having a recurrence interval of 100 years.

5. Annually, prior to the anticipated rainfall period, a cover crop shall be established in the soil amendment area to prevent erosion of the site.

6. During the rainy season, only the active area of ash placement shall be left exposed to rainfall. The active area shall not be excessively large for incorporation operations and vegetation establishment.

7. Discharge of any waste not specifically regulated by this *Order* is prohibited.

C. PROVISIONS:

1. Availability

A copy of this Order and a copy of the facility spill contingency plan shall be maintained at the discharge facility and be available at all times to operating personnel.

2. Operation and Maintenance

The discharger must maintain in good working order and operate as efficiently as possible any facility or control system installed by the discharger to achieve compliance with the waste discharge requirements.

3. Change in Discharge

The discharger must promptly report to the Board any material change in the character, locations, or volume of the discharge.

4. Change in Ownership

In the event of any change in control or ownership or land or waste discharge facilities presently owned or controlled by the discharger, the discharger must notify the succeeding owner or operator of the existence of this Order by letter, a copy of which must be forwarded to this office.

5. Vested Rights

This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, nor protect the discharger from his liability under federal, State, or local laws, nor create a vested right for the discharger to continue the waste discharge.

6. Severability

Provisions of these waste discharge requirements are severable. If any provision of these requirements is found invalid, the remainder of these requirements shall not be affected.

7. Monitoring

The discharger must comply with the Contingency Planning and Notification Requirements Order No. 74-151, Monitoring and Reporting Program No. 90-154 and *any* modification to these documents as specified by the Executive Officer. Such documents are attached to this Order and incorporated herein. Chemical, bacteriological, and bioassay analyses must be conducted at a laboratory certified for *such* analyses by the State Department of Health Services. In *the* event a certified laboratory is not available to the discharger, analyses performed by a noncertified laboratory will be accepted.

8. Inspections

The discharger shall permit authorized staff of the Board:

a. entry upon premises in which an effluent source is located or in which any required records are kept;
b. access to copy *any* records required to be kept under terms and conditions of this Order;
c. inspection of monitoring equipment or records; and
d. sampling of *any* discharge.

9. Noncompliance

In the event the discharger is unable to comply with any of the conditions of this Order due to:

a. breakdown of waste treatment equipment;
b. accidents caused by human error or negligence; or
c. other *causes* such as acts of nature;

the discharger must notify the Executive Officer by telephone as soon as he or his agents have knowledge of the incident and confirm this notification in writing within two weeks of the telephone notification. The written notification shall include pertinent information explaining reasons for the noncompliance and shall indicate what steps are being taken to prevent the problem from recurring.

10. Revisions of Requirements

The Board will review this *Order* periodically and may revise *requirements* when necessary.

11. Should the Department of Health Services find that the soil amendment of boiler ash to be a significant hazard to human health and environment, the Regional Board shall modify or rescind this Order.

12. The discharger shall undertake a study evaluating the potential bioaccumulation threat to the aquatic habitat of Little Valley Creek posed by the soil amending of the boiler ash. Quarterly, on the first day of September, December, March, and June the discharger shall submit a status report on the progress of the study, until such time as the threat to the beneficial uses of Little Valley Creek is defined to the satisfaction of the Executive Officer. The final report shall be submitted to the Board by July 1, 1991.

13. This Order expires on July 1, 1991.

Certification

I, Benjamin D. Kor, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, North Coast Region, on August 16, 1990.

ORIGINAL SIGNED BY

Benjamin D. Kor
Executive Officer

(gpashwdr)

California Regional Water Quality Control Board
North Coast Region

MONITORING AND REPORTING PROGRAM NO. 90-154

FOR

GEORGIA-PACIFIC CORPORATION
FORT BRAGG SOIL AMENDMENT

Mendocino County

Monitoring

The discharger *shall* record the approximate volume of ash deposited at the site *each* month.

Stormwater Runoff Monitoring

Grab samples shall be taken periodically when streams are flowing from the points shown on the attached map. Samples shall be analyzed as follows:

Constituent	Units	Frequency
pH	pH units	Weekly
COD	mg/l	November, January, and March

Weekly rainfall totals shall also be recorded and reported.

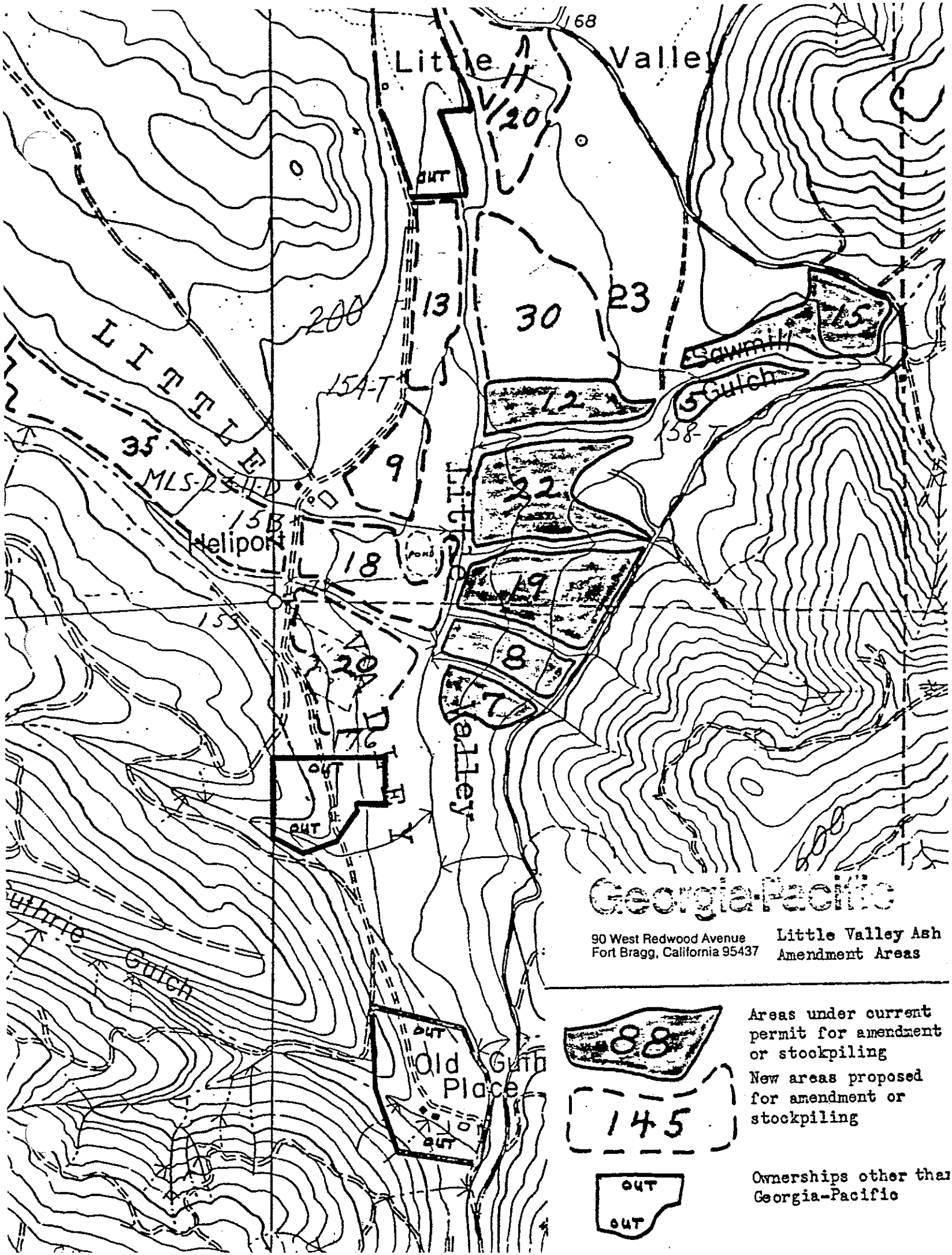
Reporting

Monitoring reports shall be submitted monthly to the Board by the fifteenth of the month. Copies of signed laboratory sheets shall be submitted with any monthly summary report.

Ordered by ORIGINAL SIGNED BY

Benjamin D. Kor
Executive Officer

August 16, 1990


68
Little Valley
V-20
OUT
0
200
13
30
23
15
Sawmill Gulch
12
15A-T
LITTLE
35
MLS-25-H
9
15B
Heliport
22
18
19
8
7
15
V-20
16
OUT
OUT
Weller
Guthrie Gulch
OUT
Old Place
OUT
Georgia-Pacific
90 West Redwood Avenue
Fort Bragg, California 95437
Little Valley Ash
Amendment Areas
88
145
OUT
OUT
Areas under current permit for amendment or stockpiling
New areas proposed for amendment or stockpiling
Ownerships other than Georgia-Pacific

California Regional Water Quality Control Board
North Coast Region

CONTINGENCY PLANNING AND NOTIFICATION REQUIREMENTS

FOR

ACCIDENTAL SPILLS AND DISCHARGES

ORDER NO. 74-151

The California Regional Water Quality Control Board, North Coast Region, finds that:

1. Section 13225 of the Porter-Cologne Water Quality Act requires the Regional Board to perform general duties to assure positive water quality control.

2. The Regional Board has been advised of situations in which preparations for. and response to accidental discharges and spills have been inadequate.

3. Persons discharging waste or conveying, supplying, storing, or managing wastes or hazardous materials have the primary responsibility for contingency planning, incident reporting and continuous and diligent action to abate the effects of such unintentional or accidental discharge.

THEREFORE, IT IS HEREBY ORDERED THAT:

I. All persons who discharge wastes or convey, supply, store, or otherwise manage wastes or other hazardous material shall:

A, Prepare and submit to this Regional Board, according to a time schedule prescribed by the Executive Officer, a contingency plan defining the following:

1. Potential locations and/or circumstances under which accidental discharge incidents might be expected to occur.

2. Possible water quality effects of accidental discharges,

3. The conceptual plan for cleanup and abatement of accidental discharge incidents, including:

a. The individual who will be in charge of cleanup and abatement activities on behalf of the discharger,

b. The equipment and manpower available to the discharger to implement the cleanup and abatement plans,

B. Immediately report to the Regional Board any accidental discharge incidents. Such notification shall be made by telephone as soon as the responsible person or his agent has knowledge of the incident.

C. Immediately begin diligent and continuous action to cleanup and abate the effects of any unintentional or accidental discharge. Such action shall include temporary measures to abate the discharge prior to completing permanent repairs to damaged facilities.

D. Confirm the telephone notification in writing within two weeks of the telephone notification. The written notification shall include: reasons for the discharge, duration and volume of the discharge, steps taken to correct the problem and steps being taken to prevent the problem from recurring.

II. Upon original receipt of phone report (I.B.), the Recutive Officer shall immediately notify all affected agencies and known users of waters affected by the unintentional or accidental discharge.

III. Provide updated information to the Regional Board in the event of change of staff. size of the facility. or change of operating procedures which will affect the previously established contingency plan.

IV. The Executive Officer or his employees shall maintain liaison with the discharger and other affected agencies and persons to provide assistance in cleanup and abatement activities.

V. The Executive Officer shall transmit copies of this Order to all persons whose discharges of waste handling activities are governed by Waste Discharge Requirements or an NDPES permit. Such transmittal shall include a current listing of telephone numbers of the Executive Officer and his key employees to facilitate compliance with Item I.B of this Order.

Ordered by _____
Benjamin D. Kor
Executive Officer

July 24, 1974
(Retyped February 15, 1990)

Your primary notification should be to the Regional Board office in Santa Rosa at (707) 576-2220. During off hours, you will be able to leave a recorded message at that number and, if you have a spill or discharge emergency, you will also be referred to the State Office of Emergency Services (OES) at (800) 852-7550. OES maintains a roster of key employees and will relay your notification to Regional Board staff.

North Coast Region

GENERAL MONITORING AND REPORTING PROVISIONS

February 3, 1971
(Retyped June 13, 1989)

GENERAL PROVISIONS FOR SAMPLING AND ANALYSIS

Unless otherwise noted, all sampling, sample preservation, and analyses shall be conducted in accordance with the current edition of "Standard Methods for the Examination of Water and Waste Water" or approved by the Executive Officer.

All analyses shall be performed in a Laboratory certified to perform such analyses by the California State Department of Health or a laboratory approved by the Executive Officer.

1 samples shall be representative of the waste discharge under the conditions of peak load.

GENERAL PROVISIONS FOR REPORTING

For every item where the requirements are not net, the discharger shall submit a statement of the actions undertaken or proposed which will bring the discharge in full compliance with requirements at the earliest time and submit a timetable for correction.

By January 30 of each year, the discharger shall submit an annual report to the Regional Board The report shall contain both tabular and graphical summaries of the monitoring data obtained during the previous year. In addition, the discharger shall discuss the compliance record and the corrective actions taken or planned which m y be needed to bring the discharge into full compliance with the waste discharge requirements.

The discharger shall file a written report within 90 days after the average dry weather flow for any : month that equals or exceeds 75 percent of the design capacity of the waste treatment or disposal facilities. The report shall ccntain a schedule for studies, design, and other steps needed to provide additional capacity or limit the flow below the design capacity prior to the time when the waste flow rate equals the capacity of the present units.

F

State of California

Memorandum

To : Regional Board Members

Date : February 9, 1990

Frank

Frank C. Reichmuth
Senior Water Resource Control Engineer
From : California Regional Water Quality Control Board
North Coast Region — 1440 Guerneville Road
Santa Rosa, California 95401

Subject: Waste Discharge Requirements for Georgia-Pacific Corporation, Application of Woodwaste Ash as Soil Amendment, Fort Bragg, Mendocino County

Enclosed you will find the staff report for Item No. 14 of the February agenda which is Georgia-Pacific Corporation's request for extension of Waste Discharge Requirements for soil amendment of ash near Fort Bragg. The current waste discharge requirements for this activity expired on January 30, 1990. The renewal of the waste discharge requirements are pending the findings of a bioaccumulation study which was submitted to staff on December 26, 1989. Both the Regional Board and State Board staff have a number of concerns about the study which have to be resolved with Georgia-Pacific Corporation before the safety of the soil amending can be assessed. At the time of this writing, we have not received the State Board's final review of the bioaccumulation study. We have scheduled a meeting between Regional Board staff. State Board staff and Georgia-Pacific Corporation for February 20, 1990 to discuss the findings of the bioaccumulation study.

The staff report contains tentative waste discharge requirements which provide for Georgia-Pacific to continue to stockpile ash for a period of time to be determined by the Board. The tentative Order does not provide for continued soil amending. The tentative Order also requires Georgia-Pacific to conduct a feasibility study for the long term disposal of ash in the event the soil amending of ash is found to be inappropriate. Both the staff report and tentative Order are subject to change as a result of our discussions with the State Board staff and Georgia-Pacific Corporation on February 20, 1990.

FCR:ba

Enclosures

State of California

Memorandum

To : Jesse Diaz
Division of Water Quality
SWRCB

Date : February 9, 1990

Ben Kor
Executive Officer

From : California Regional Water Quality Control Board
North Coast Region - 1440 Guerneville Road
Santa Rosa, California 95401

Subject: Classification of Fly Ash from Georgia-Pacific Corporation, Ft. Bragg, CA

The Regional Board is currently considering adoption of Waste Discharge Requirements for the continued use of fly ash as soil amendment by the Georgia-Pacific Corporation. We have been working closely with Frank Palmer of your staff on the review of dioxin and furan content of the ash. We request Palmer to attend a meeting with Georgia-Pacific Corporation on February 20, 1990 in Santa Rosa and possibly February 22, 1990 in Eureka at the Regional Board meeting.

Thank you for your support.

cc: Frank Palmer

State of California

Memorandum

To : Frank C. Reichmuth
California Regional Water Quality Control Board
North Coast Region
1440 Guerneville Road
Santa Rosa. CA 95403

Date : FEB 15 1990

Francis H. Palmer

Francis H. Palmer
Technical Support and Special Studies Unit
Division of Water Quality
From : STATE WATER RESOURCES CONTROL BOARD

Subject: COMMENTS ON A REPORT BY THE GEORGIA-PACIFIC CORPORATION DATED DECEMBER 1989: "TCDF STUDY ON FLY ASH AMENDED SOIL AND RELATED ENVIRONMENTAL VECTORS"

In your memorandum of January 2, 1990 to Jesse M. Diaz and me, you requested that I review the subject report. While the report has answered some of our earlier (pre-study) concerns (see memorandums of December 1, 1987: Frank Palmer to Bud Eagle [Attachment 1] and August 5, 1988: Frank Palmer to Frank Reichmuth [Attachment 2]), the report is incomplete and several concerns merit further discussion. The major finding of the study is the presence of 2,3,7,8-tetrachlorodibenzofuran (2,3,7,8-TCDF) in the fly ash amended-soil. During pre-study discussions between Georgia-Pacific Corporation and the Regional Board, there was considerable emphasis on the fact that only non-2,3,7,8-TCDFs had been detected in the fly ash. These non-2,3,7,8-TCDF isomers are considered to be less toxic, less bioaccumulative, and less environmentally persistent that 2,3,7,8-TCDF. This initial assessment of the situation and subsequent planning for the study described in the subject report were based on the assumption that there were no 2,3,7,8-chlorinated dibenzodioxin and dibenzofuran compounds present in the fly ash from the Fort Bragg sawmill.

I consider the detection of 2,3,7,8-TCDF in fly ash-amended soils to be an extremely important finding. It is unfortunate that earlier fly ash analysis did not detect 2,3,7,8-TCDF. Knowledge that this highly toxic compound was present in fly ash would have altered recommendations made to Georgia-Pacific on elements required for their study plan. For example, the first step would have been a more thorough characterization of the fly ash itself. Based on information released by Georgia-Pacific to date, it cannot be stated for certain if the source of the 2,3,7,8-TCDF is the fly ash, or if the 2,3,7,8-TCDF was already present in the soil. It is imperative to

quantify the concentration of 2,3,7,8-TCDF in the fly ash and to determine if any of the other 16 2,3,7,8-chlorinated dibenzodioxins (CDDs) and dibenzofurans (CDFs) are present. Without this analytical information, a hazard assessment of the fly ash itself cannot be performed.

I have several recommendations that, if followed, will serve to make the Georgia-Pacific report more complete. The two major recommendations are that (1) a high resolution isomer-specific analysis be performed on fly ash samples for all seventeen 2,3,7,8-CDDs and CDFs, and (2) analytical data for samples omitted from the report be included (fly ash samples LV109 and GP202 and root zone sample LV209). A general discussion and more detailed list of five recommendations is presented in the accompanying staff report (Attachment 3).

Attachments (3)

ATTACHMENT 3
WATER QUALITY
CONTROL BOARD
February 15, 1990 ITEM 1

FEB 16 '90

STAFF REPORT

REVIEW OF A STUDY BY GEORGIA-PACIFIC CORPORATION: 'TCDF STUDY ON FLY ASH AMENDED SOIL AND RELATED ENVIRONMENTAL VECTORS"

☐ BK ___ ☐ RK ___
☐ CJ ___ ☐ LR ___
☐ FR ___ ☐ BB ___
☐ RT ___ ☐ KD ___
☐ JH ___ ☐ JS ___
☐ SW ___ ☐ ___
☐ ___ ☐ REPLY
☐ ALL STAFF ☐ FILE

FRANCIS H. PALMER
DIVISION OF WATER QUALITY
STATE WATER RESOURCES CONTROL BOARD

RECOMMENDATIONS:

The following five recommendations for additional information and discussion are made. Each recommendation is discussed in more detail at the end of this staff report.

1. Analyze several fly ash samples for 2,3,7,8-substituted chlorinated dibenzodioxins (~~CDDs~~) ~~and~~ dibenzofurans rej o assess the toxicity of the fly ash.

   The report lacks high resolution gas chromatography/high resolution mass spectrometry analysis of all 17 toxic 2,3,7,8-chlorinated CDDs and CDFs. Analysis of other fly ashes has revealed a mixture of many different CDDs and CDFs to be present. The March 1989 Environmental Protection Agency Toxicity Equivalency Factor (TEF) procedure is recommended for evaluating mixtures of CDDs and CDFs.

2. Include data omitted from the report to provide more comprehensive assessment.

   Two samples of fly ash and one sample from the root zone of grass grown on ash-amended soil were analyzed, but the results were not reported. Data on TCDF concentrations in fly ash and in the root zone are very important components for assessing the study.

   The three phase study provides no data on concentrations of TCDF in the fly ash. Three fly ash samples were collected, and two samples were analyzed for TCDF. However, these results were not reported to the Regional Board. Because the 1989 report contains results that are two orders of magnitude lower in detection limits than previous 1987 analyses of fly ash samples, the 1989 fly ash data would be highly complementary to the report.

3. Provide more information and discussion on potential uptake of CDDs and CDFs by grass.

   The sampling and analysis presented in the report focused only on grass clippings. Uptake by roots was not discussed. A recent study in Seveso, Italy has indicated that many plants concentrate CDDs in roots

but do not translocate them to other plant parts. This finding could be particularly important because the root crops included potatoes, onions, and carrots.

4. Discuss potential movement of CDDs and CDFs to groundwater.

   One sample of ash-amended soil was positive for 2,3,7,8-TCDF, and this sample contained groundwater within the ash-amended zone. A conclusion of the subject report states that there is no leaching potential into the subsoil, yet the report has no discussion of groundwater being present in soil samples.

5. Discuss potential runoff of fly ash-amended soil to surface water.

   The report contains no discussion of possible erosion or dust migration of ash-amended soil before the cover crop is established. What happens to the recently disked soil in windy and rainy weather before the "thick grass thatch" has formed?

BACKGROUND:

The following description of the Georgia-Pacific Corporation's sawmill at Fort Bragg is summarized from introductory information provided in the Company's 1989 report. The sawmill produces lumber mainly from redwood and Douglas fir. Three large boilers produce steam for the mill operations with heat generated ""primarily"" by burning green sawdust and back from the sawmill. (Other secondary sources of fuel for these boilers are not mentioned in the report.) Ash produced in the boilers from burned waste wood is disposed of by utilization as a soil amendment at the Little Valley site. When local concern was expressed in 1987 over possible dioxin presence in the fly ash, Georgia-Pacific arranged for laboratory analysis of this material.

In September 1987, Georgia-Pacific submitted 12 fly ash samples to Enseco Laboratories for isomer-specific analysis of 2,3,7,8-chlorinated dibenzofurans as well as analysis of the total four through eight chlorine homologous series of dibenzofurans. The analyses were performed by low resolution GC/MS, and results of 3 of the 12 analyses were made available. The only chlorinated dibenzofuran reported was total tetrachlorodibenzofuran (TCDF) at concentrations of 0.14, 0.19, and 0.16 ng/g (nano grams per gram or parts per billion - ppb). 2,3,7,8-tetrachlorodibenzofuran (2,3,7,8-TCDF), the most toxic of the TCDFs, was not found at detection limits of 0.016, 0.022, and 0.018 ng/g. Both State Board comments and those of Georgia-Pacific and its consultants emphasized that 2,3,7,8-TCDF was not found in the fly ash. Because of the potential wide-spread use of fly ash as a soil amendment, the Regional Board requested a study be done to ensure that (1) TCDFs would not accumulate in terrestial or aquatic biota and (2) the method of fly ash disposal was environmentally sound.

In July 1988, Georgia-Pacific submitted a research proposal to examine three areas of concern to the Regional Board. The three elements consisted of (1) a cover crop study plan, (2) a dust sampling plan, and (3) a terrestial-aquatic animal exposure plan. At the Regional Board's request, Georgia-Pacific agreed to analyze for 2,3,7,8-TCDF in addition to total TCDF.

Georgia-Pacific released the subject report in December 1989. This Georgia-Pacific report contains information that 2,3,7,8-TCDF has been detected in soils amended with the fly ash. The presence of 2,3,7,8-TCDF in fly ash-amended soils is very significant because previous assessment and planning for the subject study assumed that there were no 2,3,7,8 CDD and CDF congeners present in the fly ash itself. It should be noted that this finding is not at odds with the earlier negative fly ash analyses because the analytical method used in 1989 is different from the 1987 method. The use of high resolution, more sensitive analysis in 1989 resulted in detection limits for 2,3,7,8-TCDF that were on the order of 0.1 to 0.5 pg/g (picograms per gram or parts per trillion), roughly two orders of magnitude lower than the September 1987 detection limits.

DISCUSSION OF DECEMBER 1989 REPORT

The Georgia-Pacific Corporation initiated a three phase study to examine TCDF concentrations in fly ash-amended plots of soils at its Little Valley site. The December 1989 report focuses discussion of the study's analytical results and conclusions on the three phases described below rather than being organized by the three elements proposed in the August 1988 research proposal. One element of the research proposal, the dust sampling plan, was not performed. Aquatic life was not sampled because Georgia-Pacific contended that no off-site migration of fly ash amended soil would occur. The three phases discussed in this staff report correspond to the three phases of the Georgia-Pacific December 1989 report. In addition to examining soil samples, earthworms and grass present at the amended plots were analyzed for TCDF. Additional samples were taken at other locations such as Shelter Cove and Mac Kerricher State Park. Not all samples collected were analyzed, and analytical results were not always included in the December 1989 report submitted to the Regional Board. Georgia-Pacific has archived a number of samples that were not analyzed. Appendix 1 summarizes sample locations and descriptions and is based on information provided by the sampling logs and laboratory reports appended to the subject report. Appendix 1 also indicates if the sample was analyzed for TCDF and if the analytical results were reported to the Regional Board.

Phase I: November 1988 Sampling Program (Table 1)

Phase I consisted of 20 samples, including field blanks, collected in November 1988. Georgia-Pacific reported the results of 16 analyses, deleting 4 samples as being outside the study's scope. All 16 reported were negative for total TCDF and 2,3,7,8-TCDF. The Enseco Laboratory report, dated January 30, 1989, contains the following statement: "Also, the Cl_4-Cl_8 analysis which you requested on your samples will be reported when that analysis is complete." However, these Cl_4-Cl_8 analysis results, which could provide useful information, were not included in the subject report.

Table 1 summarizes the sampling program and type of samples collected during Phase I of the study. Phase I consisted of collecting samples at experimental plots that were ash amended in 1986, 1987, and 1988, and samples from a control plot. According to the report, soils had been

TABLE 1: GEORGIA-PACIFIC CORPORATION'S STUDY OF ASH-AMENDED SOIL AT LITTLE VALLEY, PHASE I SAMPLING PROGRAM--NOVEMBER 1988

	Number of Samples(a)				
		Experimental Plots			
Media Sampled	Control Plots	1986	1987	1988	Other Samples
Grass clippings	2	0	0	2	
Earthworms	1	1	1	1	
Soil Samples					
Surface 1"	1(b)	0	0	0	
Ash-amended layer	0	0	0	0	
Below ash-amended	2	0	0	2	
Other locations					3(b)
Field blanks					4
Total Samples	6	1	1	5	7

(a) See Appendix 1 for description of individual samples

(b) analyzed but laboratory results deleted

amended within six months prior to sampling at the 1988 site. Ash had been added to the 1987 plot over a period of 6 to 18 months prior to sample collection and added four years before sampling at the 1986 test plot.

Grass clipping samples were compared between the 1988 experimental plot and the control plot. No TCDF was detected. The root zone was not sampled at the experimental site. Although a root zone sample was collected at the control site, the analytical results were not reported to the Regional Board. The unreported results of the Cl_4-Cl_8 analyses of grass clippings should be included in thereport.

A total of four earthworm samples was collected for the study, one from the control site and one from each of the three experimental sites. No TCDFs were detected in these organisms at detection levels ranging from 0.24 parts per trillion (ppt) to 0.37 ppt. According to the sampling log, earthworms from the control plot were small and were collected at one to two inch depth in black sandy loam. Earthworms from the experimental plots were not described in terms of size and collection depth in the sampling logs. The laboratory sample was 7.3 grams from the control site and approximately 10 grams from the three experimental plots. The report notes that a sample of 20 to 30 earthworms weighed from 10 to 15 grams. While it is encouraging that TCDF was not detected in these organisms, it is unfortunate that only one sample from each site was collected since it appears that only 20 to 30 organisms were sampled at each site. Earthworms were not collected in subsequent phases of the study. The unreported results of the Cl_4 - Cl_8 analyses of earthworms should be added to this portion of the report.

Several types of soil sample were collected during the course of the study. These can be categorize by the depth sampled: (1) the upper one inch and root zone, (2) a zone of roughly 24 inches to 28 inches deep representing the amended soil, and (3) a zone of roughly 26 inches to 30 inches deep, the depth beneath the ash-amended soil. The depth of the boundary between ash-amended soil and lower depth soil varied slightly from sample to sample. As indicated in Table 1, soil from the ash-amended zone was not sampled in Phase I. Only one comparison can be made of soils collected during Phase I, the control plot and the 1988 experimental plot for soils below the amended layer. No TCDF was detected, but the 1988 plot had been amended within a period of six months before sample collection. In other words, no detectable downward leaching of TCDF had occurred over a six month period, but the concentration of TCDF in the overlying amended soils was not characterized.

Phase II: March 1989 Sampling Program (Table 2)

Phase II of the study was conducted in March 1989. The samples collected are shown in Table 2 and consisted of grass clippings, soil, fly ash, and field blanks. During this phase, 12 samples were collected and 9 were submitted for laboratory analysis. Those samples not submitted for analysis were blanks consisting of distilled water, acetone, and hexane. The sampling log characterized the fly ash sample (LV 109) as an "ash sample off stock pile composite of 3 locations...." The results from the analysis of LV 109 were not submitted to the Regional Board because "Sample No. 109 was taken as a matter of general interest and was outside the scope of this

TABLE 2: GEORGIA-PACIFIC CORPORATION'S STUDY OF ASH-AMENDED SOIL AT LITTLE VALLEY, PHASE II SAMPLING PROGRAM--MARCH 1989

	Number of Samples[a]				
		Experimental Plots			
Media Sampled	Control Plots	1986	1987	1988	Other Samples
Grass clippings	2	0	0	2	
Soil samples					
Ash-amended layer	1	0	0	1	
Below ash-amended	1	0	0	1	
Fly ash composite					1(b)
Field blanks					3
Total Samples	4	0	0	4	4

(a) See Appendix 1 for description of individual samples

(b) analyzed but laboratory results deleted

study. Therefore, these results are not included in this report." Sample LV 109 results should be included because they will provide essential information for the study.

One sample (LV 108) taken during Phase II was positive for total TCDF (4.9 pg/g) and 2,3,7,8-TCDF (0.49 pg/g). This sample was characterized in the sampling log as "soil composite, 0 - 30 inches, mixed, split, quartered - GW @ 18 inch depth--". The subject report does not discuss encountering groundwater. Since an initial concern of the Regional Board was potential TCDF leaching into groundwater, this finding merits discussion in the report.

The other seven samples with reported results were negative for total TCDF and 2,3,7,8-TCDF. Four were taken from the control plot: two grass samples and two soil samples, one from 29 to 30 inch depth and a second from 0 to 29 inches. Four samples were taken from a plot treated with ash in 1988. Two grass samples and two soil samples. As in phase I, the only grass clipping samples analyzed were from the 1988 amended plot. No root zone samples were taken. The soil sample at 28½ to 30 inch depth was negative while the ash-amended soil (sample No. LV 108 discussed above) sampled from 0 to 28½ inch depth was positive. The latter sample result was the first time that 2,3,7,8-TCDF was detected by the study.

Phase III: July 1989 Sampling Program (Table 3)

Phase III samples were collected and analyzed in July 1989. Table 3 shows the type of samples collected. Of the 22 samples collected, 8 were submitted for analysis and results from 6 samples were transmitted to the Regional Board. Samples not analyzed were archived. The 22 samples consisted of the following: 2 fly ash, 1 baled hay, 6 grass clippings, 1 soil surface and root zone, 6 soil containing amended ash, and 6 soil beneath the depth that ash was amended. The grass clippings, ash-amended soil, and soil from beneath the amended soil samples were collected from the 1986, 1987, and 1988 ash-amended plots but not from the control plot. All six samples actually analyzed and reported to the Regional Board were collected from the 1988 ash-amended plot.

In Phase III, two grass clipping samples were analyzed from the 1988 plot. TCDF was not detected. In all three study phases, the only laboratory analyses performed were on samples from the control plot and the 1988 experimental ash-amended plots. In total, there were four control samples of grass clippings sampled and analyzed, and six samples from the 1988 plot analyzed. For completeness of the report, the archived samples from the 1986 and 1987 experimental plots should also be analyzed. However, future grass sampling efforts should focus on the root zones from all three amended plots (1986, 1987, and 1988) rather than grass clippings because of potential uptake by root crops.

The two samples containing ash-amended soil contained 2,3,7,8-TCDF at concentrations approximately three times greater than that detected in the Phase II positive sample. In this three-phase study, all three samples of fly ash-amended soils analyzed were found to contain 2,3,7,8-TCDF. Additionally, one of the two soil samples collected below the depth of

TABLE 3: GEORGIA-PACIFIC CORPORATION'S STUDY OF ASH-AMENDED SOIL AT LITTLE VALLEY. PHASE III SAMPLING PROGRAM--JULY 1989

	Number of Samples[a]				
		Experimental Plots			
Media Sampled	Control Plots	1986	1987	1988	Other Samples
Grass clippings	0	2(c)	2(c)	2	
Baled hay	0	0	0	1(c)	
Soil Samples					
Soil surface and root zone	0	0	0	1(b)	
Ash-amended layer	0	2(c)	2(c)	2	
Below ash-amended	0	2(c)	2(c)	2	
Boiler fly ash					1(b) and 1(c)
Total	0	6	6	8	2

(a) See Appendix 1 for description of individual samples
(b) analyzed but laboratory results deleted
(c) collected and archived but not analyzed

disking contained a very low concentration of total TCDF while the other sample was negative. The report attributes the presence of TCDF to small amounts of amended ash occurring in the layer below disking.

Two samples were analyzed but the results were not transmitted to the Regional Board. The data obtained from each would add valuable information to the Georgia-Pacific report. Sample No. GP-202 was a boiler-ash sample representing fly ash used for soil amendment. Sample No. LV-209 consisted of the grass root zone plus the upper inch of soil from the 1988 experimental plot. A 1985 study conducted at Seveso, Italy reported that plant roots will accumulate CDDs and CDFs even if these compounds are not translocated to other parts of the plant. (See State Board Report No. 88-SWQ, Chlorinated Dibenzo-dioxin and Dibenzofuran Contamination in California from Chlorophenol Wood Preservative Use, p. 2.21.) Studies at Seveso have also shown that root crops such as potatoes, onions, and carrots will concentrate 2,3,7,8-TCDD in edible root portions. (Fucchetti, S. et al. 1985. Assumption of 2,3,7,8-TCDD by some plant species. Presented before the Division of Environmental Chemistry, American Chemical Society, Miami, Florida, April 1985.)

Summary Comment on the Three Phases

The three phase study provides no data on concentrations of TCDF in the fly ash. Three fly ash samples were collected, and two samples were analyzed for TCDF. However, these results were not reported to the Regional Board. Because the 1989 report contains results that are two orders of magnitude lower in detection limits than previous 1987 analyses of fly ash samples, the 1989 fly ash data would be highly complementary to the report.

HAZARD ASSESSMENT:

There is a notable lack of federal or state guidance to measure the relative hazard posed by amending soil with CDD and CDF contaminated material. The State of Maine has suggested guidelines for amending soil with 2,3,7,8-CDD and 2,3,7,8-CDF contaminated sludge that could prove useful to the Regional Board. Maine's approach uses the U.S. Environmental Protection Agency's (EPA) method of calculating toxic equivalency to 2,3,7,8-TCDD (the TEF procedure) as a method for evaluating CDD and CDF mixtures. (The EPA TEF procedure is discussed later in Recommendation No. 2.) The maximum TEF for sludge (dry weight) used for soil amendment is 250 ppt. Sludges with less than 27 ppt TEF are exempt. The maximum allowable TEF equivalent in amended soil is 27 ppt dry weight. Maine requires strict site management where sludges contaminated by 2,3,7,8-CDD and 2,3,7,8-CDF are used to amend soils. A description of the State of Maine regulations was provided earlier by Georgia-Pacific Corporation and is included as Appendix 2 of this staff report. However, in order to apply this approach, high resolution, high sensitivity GC/MS analysis for all 2,3,7,8-CDDs and 2,3,7,8-CDFs should be performed on both fly ash and fly ash-amended soil samples in order to provide the necessary information for hazard evaluation.

RECOMMENDATIONS FOR ADDITIONAL INFORMATION AND DISCUSSION:

The following information and discussion should be added to a revised version of the subject report.

1. Analyze several fly ash samples for 2,3,7,8 substituted chlorinated dibenzodioxins (CDDs) and dibenzofurans (CDFs) to estimate total toxic equivalency of the fly ash.

   There is no explanation of why there has been no analysis of fly ash for chlorinated dibenzodioxins. I strongly recommend that several composite ash sample be examined by high resolution GC/MS for isomer-specific analysis of all seventeen 2,3,7,8-chlorinated dibenzodioxins and dibenzofurans. Since there is potential for wide-spread use of this fly ash as a soil amendment, the information provided by such an analysis is essential. It is possible that this or similar fly ashes may be used to amend soils where human food crops are raised. The data released by Georgia-Pacific in December 1989 indicate that 2,3,7,8-TCDF is present in fly ash-amended soil but not in the control plot soil. Previous analyses conducted in 1987 by low resolution GC/MS did not detect 2,3,7,8-TCDF in the Georgia-Pacific fly ash. This situation requires that results of the 1989 high resolution GC/MS analysis for fly ash samples (LV 109 and GP 202) be released to the Regional Board and included in the subject report.

   To assess the relative toxicity of CDDs and CDFs in the fly ash from the Fort Bragg sawmill, the Regional Board needs to know the total toxicity equivalency (TEF) to 2,3,7,8-TCDD of the fly ash. In March 1989, EPA updated its interim procedures for evaluating mixtures of CDDs and CDFs (the "TEF" procedure), based on an international TEF approach used by some other countries. Octachlorodibenzodioxin (OCDD) and octachlorodibenzofuran have been added to the TEF evaluation. A copy of the updated TEF table and related information is included as Appendix 3. As reported in State Board Report 88-5WQ, Chlorinated Dibenzo-p-dioxin and Dibenzofuran Contamination in California from chlorophenol Wood Preservation Use, (pages 3.4 and 3.5), OCDD, as well as a number of other CDDs and CDFs, has been detected in fly ash from the Midwest and East Coast.

2. Include data omitted from the report to provide more comprehensive assessment.

   According to the sample logs and laboratory reports, three important samples were submitted to Enseco for analysis but the results were not included in the December 1989 report. The report indicates that these results were deleted because they were "outside the scope of this study". These results should be included because they provide high resolution analysis of the fly ash samples as well as of a sample of the top one inch and root zone of the ash amended soil. By Georgia-Pacific identification number, these samples are LV109, GP202, and LV209.

   In the December 1989 report, analytical results are provided only for 2,3,7,8-TCDF and total TCDF. The Enseco Laboratory report for Phase I of the study states, "Also, the Cl_4-Cl_8 analysis which you requested on your samples will be reported when that analysis is complete." If available, the Cl_4-Cl_8 analyses should be included in the report.

3. Provide more information and discussion on potential uptake of CDDs and CDFs uptake by grass.

While is appears that TCDF is not accumulating in grass clippings from the 1988 experimental plot, there is no discussion of TCDF in the root zone. Examination of the data for sample LV209 (soil surface and root zone) would provide some of this information. Additionally, a sample from the root zone in the 1986 fly ash-amended plot should be collected and analyzed by high resolution GC, high resolution MS analysis to determine the potential for CDD and CDF root accumulation over a period of four years. The report should include a discussion of potential for incorporating CDDs and CDFs into root crops used for human consumption.

4. Discuss potential movement of CDDs and CDFs to impacts on groundwater.

The sampling log indicates that white taking sample LV108, the sampling crew encountered ground water at 18 inches depth. Since this sample was positive for total TCDF and 2,3,7,8-TCDF, a discussion of the potential for groundwater contamination should be included. The current report states in its conclusions (p.18) that "(S)oil samples taken at the 30" depth continue to indicate no potential for leaching or transport of TCDF to the subsoil or groundwater."

5. Discuss potential runoff of fly ash-amended soil to surface water.

The report makes a convincing argument that with the growth of the thick grass cover, there is little potential for spread of airborne dust. However, there is no discussion of dust dispersion during disking of ash into the soil and subsequent potential soil erosion before the grass cover has taken hold. Since an initial concern of the Regional Board was potential runoff of eroded soil and possible TCDF effects on water quality, the report should discuss this.

APPENDIX I:

SAMPLES COLLECTED FOR THE GEORGIA-PACIFIC CORPORATION'S THREE PHASE STUDY

APPENDIX 1: SAMPLES COLLECTED FOR THE GEORGIA-PACIFIC CORPORATION'S THREE PHASE STUDY (Based on Sampling Logs and Analytical Laboratory Reports)

A. PHASE I (November 1988): Analyzes performed: Total TCOF; 2,3,7,8-TCDF; Cl_4-Cl_8 CDFs:

Site and Sample Location	Field Sample Number	Laboratory Sample Number	Sample Description	Sample Analyzed	Result Reported to Regional Board	TCOF Detected
Shelter Cove SC-I	1	044527-0001-SA	Surface: mix of soil and char	Yes	No	?
Shelter Cove SC-2	2	044527-0002-SA	Surface: mix of soil and char	Yes	No	?
Little Valley Control Plot LVC-1	3	044527-0003-SA	Grass clippings	Yes	Yes	No
Little Valley Control Plot LVC-1	4	044527-0004-SA	Soil 1" depth Black, sandy loam	Yes	No	?
Little Valley Control Plot LVC-1	5	044527-0005-SA	Worms near surface (1" to 2" depth)	Yes	Yes	No
Little Valley Control Plot LVC-1	6	044527-0006-SA	Soil: 26" to 30" depth	Yes	Yes	No
Little Valley Control Plot LVC-2	7	044527-0007-SA	Grass clippings	Yes	Yes	No
Little Valley Control Plot LVC-2	8	044527-0008-SA	Soil: 27" to 30" depth	Yes	Yes	No
Little Valley 1988 Test Plot LVT-1	9	044527-0009-SA	Grass clippings	Yes	Yes	No

APPENDIX 1: (Continued)
A: PHASE I (Continued)

Site and Sample Location	Field Sample Number	Laboratory Sample Number	Sample Oescription	Sample Analyzed	Result Reported to Regional Board	TCOF Detected
Little Valley 1988 Test Plot LVT-2	10	044527-0010-SA	Grass clippings	Yes	Yes	No
Little Valley 1988 Test Plot LVT-1	11	044527-0011-SA	Soil: 27" to 31" depth yellowish brown clay with gray mottling/ stiff	Yes	Yes	No
Little Valley 1988 Test Plot LVT-1	12	044527-0012-SA	Soil: (depth not given) brown yellow brown clay, stiff very stiff	Yes	Yes	No
Little Valley 1987 Test Plot LVT-3	13	044527-0013-SA	worms	Yes	Yes	No
Little Valley 1988 Test Plot LVT-1	14	044527-0014-SA	worms	Yes	Yes	No
Little Valley 1986 Test Plot LVT-4	15	044527-0015-SA	worms	Yes	Yes	No
Blank	16	04527-0016-SA	Distilled rinse water	Yes	Yes	No
Blank	17	044527-0019-SA	acetone	Yes	Yes	No
Blank	18	044527-0020-SA	hexane	Yes	Yes	No
Field blank	19	044527-0017-SA	field wash soap	Yes	Yes	No
Mac Kerricher State Park LVC-2	20	044527-0018-SA	Ash Sample	Yes	No	?

APPENDIX 1: SAMPLES COLLECTED FOR THE GEORGIA-PACIFIC CORPORATION'S THREE PHASE STUDY (Based on Sampling Logs and Analytical Laboratory Reports)

B: PHASE II (March 1989): Analyzes performed: Total TCOF; 2,3,7,8-TCDF:

Site and Sample Location	Field Sample Number	Laboratory Sample Number	Sample Description	Sample Analyzed	Result Reported to Regional Board	TCOF Detected
Little Valley Control Plot LVC-101	101	046295-0001-SA	Grass clippings	Yes	Yes	No
Little Valley Control Plot LVC-102	102	046295-0002-SA	Grass clippings	Yes	Yes	No
Little Valley Control Plot LVC-103	103	046295-0003-SA	Soil: 29" to 30" depth	Yes	Yes	No
Little Valley Control Plot LVC-104	104	046295-0004-SA	Soil: 0" to 29" depth	Yes	Yes	No
Little Valley 1988 Plot NW LV-105	105	046295-0005-SA	Grass	Yes	Yes	No
Little Valley 1988 Plot NE LV-106	106	046295-0006-SA	Grass	Yes	Yes	No
Little Valley 1988 Plot LV-107	107	046295-0007-SA	Soil: 28½" to 30" depth	Yes	Yes	No
Little Valley 1988 Plot LV-108	108	046295-0008-SA	Soil: 0" to 30"	Yes	Yes	Yes

APPENDIX 1: (Continued)
B: PHASE II (Continued)

Site and Sample Location	Field Sample Number	Laboratory Sample Number	Sample Description	Sample Analyzed	Result Reported to Regional Board	TCDF Detected
Ash from stockpile LV-109	109	046295-0009-SA	Ash composited from 3 locations	Yes	No	?
Blank LV-110	110		Distilled water	No		
Blank LV-111	111		Acetone wash	No		
Blank LV-112	112		Hexane wash	No		

APPENDIX 1: SAMPLES COLLECTED FOR THE GEORGIA-PACIFIC CORPORATION'S THREE PHASE STUDY (Based on Sampling Logs and Analytical Laboratory Reports)

C: PHASE III (July 1989): Analyzes performed: Total TCDF; 2,3,7,8-TCDF:

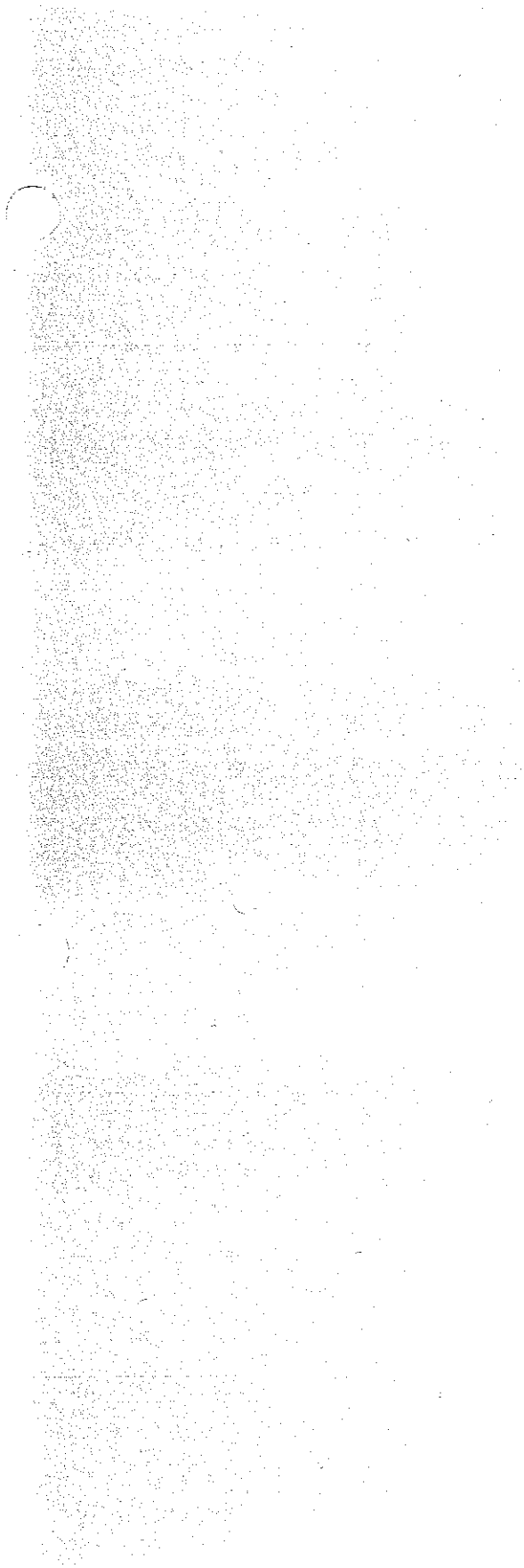
Site and Sample Location	Field Sample Number	Laboratory Sample Number	Sample Description	Sample Analyzed	Result Reported to Regional Board	TCOF Detected
Boiler Ash from in-feed conveyer	GP-201		Boiler ash used for soil amendment	No (Archived)		
Boiler ash from in-feed conveyer	GP-202	048360-0001-SA	Boiler ash used for soil amendment	Yes	No	?
Little Valley West 1988 Plot	LV-203	048360-0002-SA	Grass: composite of 6 sites	Yes	Yes	No
Little Valley West 1988 Plot	LV-204	048360-0003-SA	Soil composite of 6 sites, 0' to 30" depth	Yes	Yes	Yes
Little Valley West 1988 Plot	LV-205	048360-0004-SA	Soil composite of 6 sites, 30" to 32" depth	Yes	Yes	Yes
Little Valley East 1988 Plot	LV-206	048360-0005-SA	Grass composite *of* 6 sites	Yes	Yes	No
Little Valley East 1988 Plot	LV-207	048360-0006-SA	Soil/ash composite 0" to 30" depth	Yes	Yes	Yes
Little Valley East 1988 Plot	LV-208	048360-0007-SA	Soil-native 30" to 32" depth	Yes	Yes	No
Little Valley East and West 1988 Composite	LV-209	046295-0009-SA	Soi1-surface, upper root zone, 12 site composite	Yes	No	?

APPENDIX 1: (Continued)
C: PHASE III (Continued)

Site and Sample Location	Field Sample Number	Laboratory Sample Number	Sample Description	Sample Analyzed	Result Reported to Regional Board	TCDF Detected
Little Valley West 1987 Plot	LV-210		Grass clippings, 6 site composite	No (archived)		
Little Valley West 1987 Plot	LV-211		Soil-ash composite of 6 sites at 0" to 30"	No (archived)		
Little Valley West 1987 Plot	LV-212		Soil: 6 site composite at 30" to 32" depth	No (archived)		
Little Valley East 1987 Plot	LV-213		Grass: composite of 6 sites	No (archived)		
Little Valley East 1987 Plot	LV-214		Soil/ash, 0" to 30" depth, 6 site composite	No (archived)		
Little Valley East 1987 Plot	LV-215		Soil: 30" to 32" depth, 6 site composite	No (archived)		
Little Valley East 1986 Plot	LV-216		Grass: 6 site composite	No (archived)		
Little Valley East 1986 Plot	LV-217		Soil/ash: 0" to 30" composite of 6 sites	No (archived)		

APPENDIX 1: (Continued)
C: PHASE III (Continued)

Site and Sample Location	Field Sample Number	Laboratory Sample Number	Sample Description	Sample Analyzed	Result Reported to Regional Board	TCDF Detected
Little Valley East 1986 Plot	LV-218		Soil: 30" to 32" composite of 6 sites	No (archived)		
Little Valley West 1986 Plot	LV-219		Grass - 6 site composite	No (archived)		
Little Valley West 1986 Plot	LV-220		Soil/ash 0" to 30" 6 site composite	No (archived)		
Little Valley West 1986 Plot	LV-221		Soil: 30" to 32", composite of 6 sites	No (archived)		
Little Valley 1988 Site	LV-222		Baled hay composite	No (archived)		



NPS Copy

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, CA 94105

February 16, 1990

In Reply
Refer to: W-5-1

Dear Addressees:

Enclosed for your information are two items of interest regarding 2,3,7,8-TCDD: a draft tracking form which describes the 2,3,7,8-TCDD criteria being developed by states, and a memo from the Human Health Assessment Group on the critique of an alternative risk assessment for 2,3,7,8-TCDD.

Next week, I will send you an update of the tracking system, a litigation summary, list of pulp and paper mills being considered by EPA regions for addition/deletion to the June 1989 304(l) lists, and a package of information on technology, analytical methods, and bioaccumulation studies regarding 2,3,7,8-TCDD and 2,3,7,8-TCDF. While many of the latter materials are preliminary, they are being transmitted now to assist permit writers in the development of individual control strategies and revisions of permits required under Section 304(l) of the Clean Water Act. In addition, the Industrial Technology Division, with the help of Dan Bodien, Region X, is preparing a data summary on the availability of analytical methods and new technology and compliance techniques for dealing with dioxin discharges at U.S. bleached chemical pulp mills. This information should be available within the next two months.

If you have any questions, please contact me at (415) 705-2137.

Sincerely,

Madonna Narvaez

Madonna Narvaez
Regional Dioxin Contact

Enclosures

LIST OF ADDRESSEES

Archie Matthews
California State Water Resources Control Board
P.O. Box 100
Sacramento, California 95801

Frank Palmer
California State Water Resources Control Board
P.O. Box 100
Sacramento, California 95801

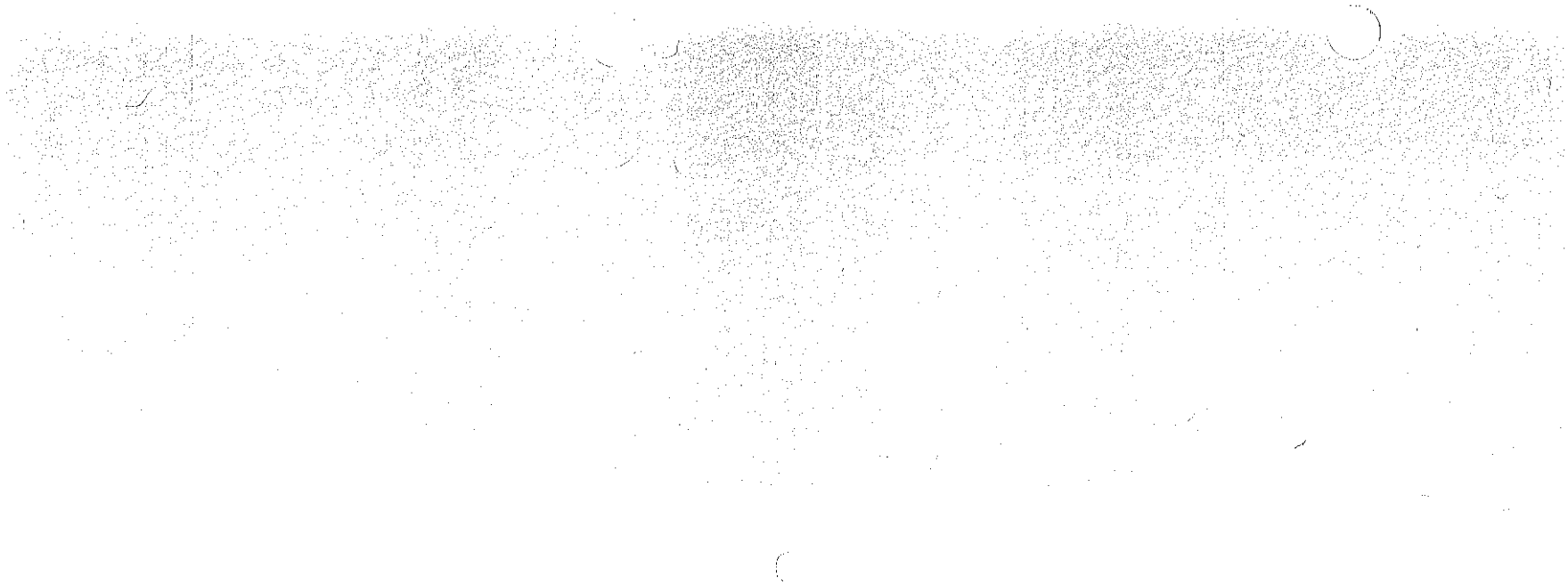
Michael Perrone
California State Water Resources Control Board
P.O. Box 100
Sacramento, California 95801

Bill Rodriguez ✓
North Coast Regional Water Quality
Control Board
1440 Guerneville Road
Santa Rosa, California 95403

Sterling Davis
Central Valley Regional Water Quality
Control Board
3443 Routier Road
Sacramento, California 95827-3098

Dennis Wilson
Central Valley Regional Water Quality
Control Board
415 Knollcrest Drive
Redding, California 96002

Bruce Mackler (W-6)



State of California
Regional Water Quality Control Board
North Coast Region

Mark K. Neely

EXECUTIVE OFFICER'S SUMMARY REPORT
9:00 a.m., February 22, 1990
Eureka City Council Chambers
531 K Street
Eureka, California

ITEM: 14

SUBJECT: Waste Discharge Requirements for Georgia-Pacific Corporation Application of Woodwaste Ash as Soil Amendment, Fort Bragg, Mendocino County

DISCUSSION: This item will be sent under separate cover.

State of California
Regional Water Quality Control Board
North Coast Region

Mark K. Neely

ADDENDUM TO ITEM NO. 14
9:00 a.m., February 22, 1990
Eureka City Council Chambers
531 K Street
Eureka, California

ITEM: 14

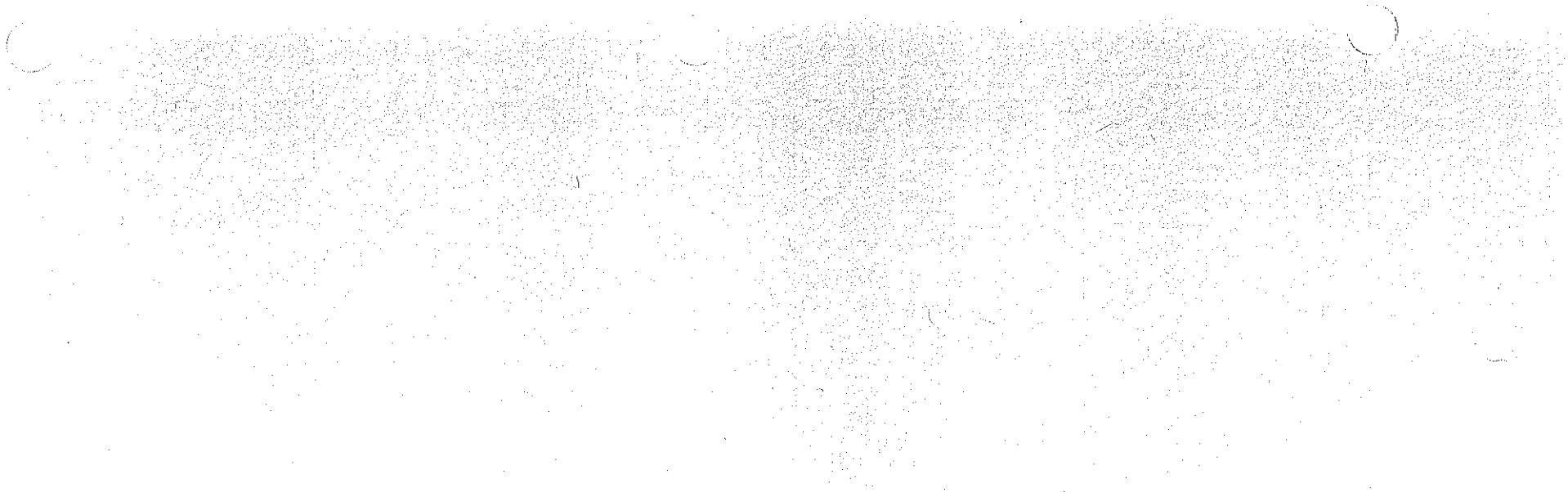
SUBJECT: Amendment to Tentative Waste Discharge Requirements Order No. 90-32 for Georgia-Pacific Corporation, Application of Woodwaste Ash as Soil Amendment, Fort Bragg, Mendocino County

DISCUSSION:

11. The discharger shall undertake a feasibility study evaluating alternative methods of ash disposal to be utilized should soil amending be deemed as inappropriate. This report shall be submitted to the Board by July 1, 1990.

12. Quarterly, on the first day of June, September, December, and March, the discharger shall submit a status report on the progress of determining the threat to water quality from the soil amending of ash. Each status report shall detail progress within the preceding quarter in completing any sampling or analysis of ash, aquatic organisms or other media as necessary, until such time as the threat to water quality is defined to the satisfaction of the Executive Officer.

13. This Order expires on July 1, 1991.



TIMBER ASSOCIATION
OF CALIFORNIA

February 26, 1990
File No. 548.2

Mr. Frank Reichmuth
North Coast RWQCB
1440 Guerneville Road
Santa Rosa, CA 95403

Dear Frank:

Thank you for discussing Georgia-Pacific's fly ash study with me over the telephone on Friday. As promised, I have enclosed the following documents:

- NCASI Technical Bulletin No. 525
- Letter of 6-8-87 From me to Sue Warner
- Letter of 6-18-87 from me to Sue Warner
- Letter of 7-2-87 from Sue Warner to me
- Letter of 10-22-87 from me to Sue Warner

After reviewing the correspondence, it is clear where the confusion has arisen concerning whether 2378-TCDF was detected in earlier samples. We did detect 2378-TCDF in the first round of sampling, so my recollection on this is correct. However, it was not detected in the more comprehensive second round. I assume that this is the data that the RWQCB has been using and that the earlier test data was not sent to Dr. Palmer. Thus, the earlier test was apparently disregarded in lieu of the latter analysis.

There appears to be some confusion on the issue of dioxins. Dr. Palmer has apparently indicated that he has seen no ash test data for dioxins and is concerned that such tests have not been done. Again, he apparently has not seen the first round of testing data where dioxins where tested for and not found. Also, you mentioned OCDDs in our telephone conversation. I must emphasize that OCDDs were not found in the testing done by G-P. The samples of alleged G-P ash taken by local environmentalists were not done under controlled conditions and Sue Warner indicated that they were not considered valid. Thus, OCDD contamination is not an issue.

As to risk assessment, the NCASI Bulletin outlines a possible methodology for a "quick-and-dirty" analysis of human health risk. I'm not sure that I'd depend entirely upon this, but I did take a quick look at the ash before leaving G-P using this methodology and worst case exposures were well below 5 picograms per day. A revised analysis would show even lower exposure using

1311 I STREET, SUITE 100, SACRAMENTO, C A 95814 • (916) 444-6592 • FAX: (916) 444-0170

the data available from the recent G-P tests and the most current toxic equivalency factors (I-TEFs/89).

We are increasingly convinced that there is no cause for concern with using fly ash for soil amending purposes and are anxious to have this issue resolved soon. To this end, we will continue to fully cooperate with the Board to ensure the all concerns are addressed. Feel free to call me with any other questions you may have.

Sincerely,

Steve

STEVEN PETRIN
Director
Environmental Affairs

cc: Kent Mayer

STATE OF CALIFORNIA GEORGE DEUKMEJIAN, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA, CA 95403
(707) 676-2220

February 26, 1990

Steve Petrin
Timber Association of California
1311 "I" Street, Suite 100
Sacramento, CA 95814

Dear Steve:

Enclosed are copies of 1) Georgia-Pacific Ash Study, 2) Frank Palmer's review, and 3) February Regional Board staff report as requested.

Very truly yours,

Frank C. Reichmuth
Senior Water Resource
Control Engineer

FCR:ba

Enclosures

STATE OF CALIFORNIA
GEORGE DEUKMEJIAN, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA, CA 95403
(707) 576-2220

February 27, 1990

Mr. Gerald Tice
Chief Environmental Engineer
Georgia-Pacific Corporation
P. O. Box 105603
Atlanta, GA 30348

Dear Mr. Tice:

Enclosed you will find a copy of the comments made by Dr. Frank Palmer of the State Water Resources Control Board on the "TCDF Study on Fly Ash Amended Soil" you submitted in December, 1989. As you can see, there are a number of unresolved issues that need to be addressed before the question of the safety of the ash amending is answered satisfactorily. We look forward to discussing them with you at the meeting tentatively scheduled for a day during the week of March 26, 1990, at our office.

If you have any questions, please call Mark Neely at this office.

Sincerely,

Frank C. Reichmuth
Senior Water Resource
Control Engineer

FCR:ba/frtice

Enclosure

cc: Don Whitman, Georgia-Pacific Corporation, Fort Bragg

STATE OF CALIFORNIA — GEORGE OEUKMEJIAN, *Governor*

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION

440 GUERNMUE ROAD
SANTA ROSA, CA 95403
(707) 676-2220

CERTIFIED - Return Receipt Requested

March 5, 1990

Mr. Kent Mayer
Georgia-Pacific Corporation
P. O. Box 1618
Eugene, OR 91440

Dear Mr. Mayer:

Enclosed is Waste Discharge Requirements Order No. 90-32 for the Fort Bragg Soil Amendment, as adopted by the Regional Board on February 22, 1990. Please note that the Permit will expire on July 1, 1991, and a Report of Waste Discharge for renewal is due before March 1, 1991. Renewal of the Permit will, of course, be contingent on the resolution of the question of bioaccumulation and threat to water quality. The first progress report as required by the Order will be due on June 1, 1990, and the feasibility study for alternative ash disposal measures will be due on July 1, 1990.

If you have any questions, please call Mark Neely at this office.

Sincerely,

Benjamin D. Kor
Executive Officer

MKN:ba/gpashtra

Enclosure

cc [illegible] Georgia Pacific Fort Bragg

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.
Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fee and check box(es) for additional service(s) requested.
1. ☐ Show to whom delivered, date, and address of delivery. (Extra charge)
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3. Article Addressed to:
Mr. Kent Mayer
Georgia-Pacific Corp.
P.O. Box 1618
Eugene, OR 97440
4. Article Number
P 539 862 464
5. Signature — Address
X
6. Signature — Agent
X
7. Date of Delivery
3/8/90
PS Form 3811, Mar. 1988 * U.S.G.P.O. 1988

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Postage	$
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Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
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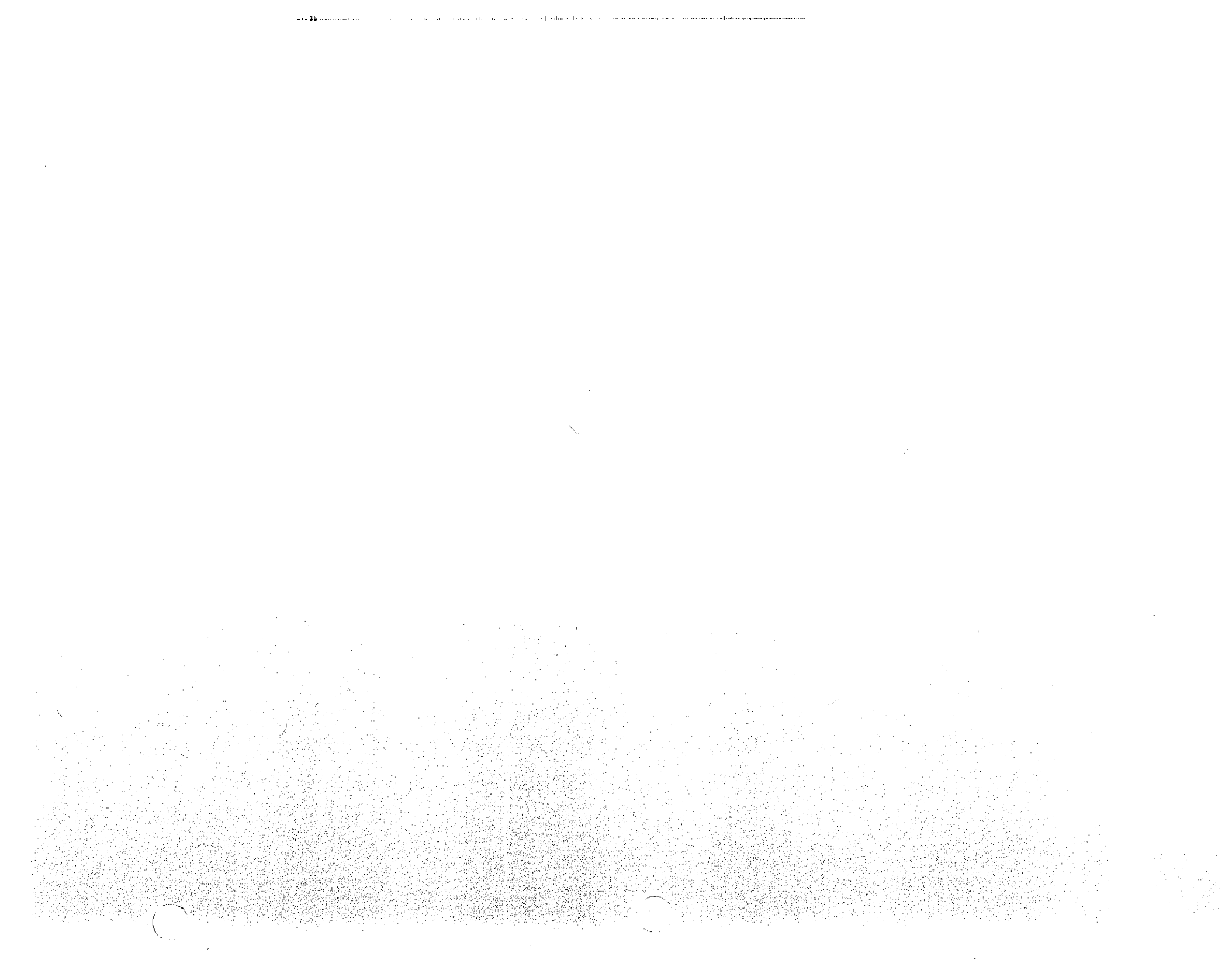

STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA, CA 95403
(707) 576-2220

GEORGE DEUKMEJIAN, *Governor*

WATER QUALITY CONTROL BOARD
REGION 1

MAR 27 '90

March 5, 1990

MAR 12 19

YOUNTVILLE

☐BK ___ ☐RK ___
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☐ ___ ☐REPLY
☐ALL STAFF ☐FILE

NOTICE OF ADOPTION

OF

WASTE DISCHARGE REQUIREMENTS

FOR

GEORGIA-PACIFIC CORPORATION
FORT BRAGG SOIL AMENDMENT

Mendocino County

Waste Discharge Requirements for the above named discharger were adopted by the California Regional Water Quality Control Board, North Coast Region, on February 22, 1990. The requirements were adopted with changes.

Benjamin D. Kor
Executive Officer

Attachment

cc: SWRCB, Division of Water Quality, Attn: Archie Matthews
SWRCB, Office of the Chief Counsel, Attn: Bonnie Wolstoncroft
DFG, Yountville
Mendocino County Health Department, Attn: Gerald F. Davis
DOHS, EMB, Santa Rosa, Attn: District Representative
DWR, Central District, Sacramento, Attn: Rick Woodard
USDI, Fish and Wildlife Service, Sacramento
Dept. Parks and Recreation, Sacramento, Attn: James M. Doyle
Mendocino County Planning Department, Ukiah, Attn: Ray Hall

The Department of Fish & Game concurs with your tentative order.

Regional Manager
Region

California Regional Water Quality Control Board
North Coast Region

ORDER NO. 90-32
ID NO. 1B85030RMEN

WASTE DISCHARGE REQUIREMENTS

For

GEORGIA-PACIFIC CORPORATION
FORT BRAGG SOIL AMENDMENT

Mendocino County

The California Regional Water Quality Control Board, North Coast Region (hereinafter Board) finds that:

1. On January 30, 1986, the Regional Board adopted Waste Discharge Requirements Order No. 86-3 for the use of woodwaste ash as a soil amendment. The permit had an expiration date of January 30, 1990.

2. Georgia-Pacific Corporation (hereinafter discharger) submitted a Report of Waste Discharge on September 28, 1989 to the Regional Board.

3. The Report of Waste Discharge describes use of woodwaste ash, a nonhazardous decomposable waste, as a soil amendment using applicable Best Management Practices pursuant to Section 2511(f) of Title 23, Chapter 3, Subchapter 15 of the California Administrative We . The woodwaste is generated by the power plant operated at the Georgia-Pacific sawmill. The soil amendment site is located in Little Valley within Sections 14, 22, 23, 24, and 26 of T19N, R17W, MDB&M on 330 acres of pasture land along Little Valley Creek. There will be occasional stockpiling of ash during inclement weather on an additional eight acre parcel in Section 14, T19N, R17W MDB&M adjacent to the South Fork of Ten Mile Creek. Drainage controls and management practices for stockpiling the ash are designed to prevent a discharge of ash to surface streams.

4. Chemical analysis of the ash has found the presence of low levels of chlorodibenzofurans (CDF), which are suspected of being carcinogenic. Although the concentrations are considered nonhazardous by the Department of Health Services, the bioaccumulative nature of the compounds may lead to concentrations in plant, animal, or aquatic life which are hazardous. Georgia-Pacific Corporation undertook a study of the bioaccumulation potential of the CDF's at the site, for which a technical report was due on May 1, 1989. Following a request from Georgia-Pacific, this date was extended to September 1, 1989. The report was received by the Regional Board on December 26, 1989. Renewal of the permit was made contingent on the report finding the bioaccumulation potential to be negligible.

5. The Waste Discharge Requirements Order No. 90-32 provides for the interim stockpiling of ash until such time the bioaccumulation and hazard potential of the ash in assessed. The Regional Board will consider adoption of Waste Discharge Requirements, for soil amendment pending the findings of the bioaccumulation study. Order No. 90-32 also requires Georgia-Pacific Corporation to develop a feasibility study for the long term disposal of ash should the soil amending of ash is found to be inappropriate.

6. The Board adopted the Water Quality Control Plan for the North Coast Region on April 28, 1989. The plan was approved by the State Water Resources Control Board on November 15, 1988. It includes, by reference, the Water Quality Control Plan for Ocean Waters of California which was adopted by the State Water Resources Control Board on September 22, 1988. Both Plans include water quality objectives and receiving water limitations. The basin plan contains a prohibition against new waste discharges to all coastal streams and natural drainageways that flow directly to the ocean.

7. The beneficial uses of Little Valley Creek, Pudding Creek, and Ten Mile Creek include:

   a. municipal and domestic water supply
   b. agricultural water supply
   c. potential industrial service water supply
   d. potential industrial process water supply
   e. groundwater recharge
   f. water contact recreation
   g. non-contact water recreation
   h. warm freshwater habitat
   i. cold freshwater habitat
   j. wildlife habitat
   k. fish migration
   l. fish spawning

8. The County of Mendocino has zoned this area as timber production and does not require a permit for a use of the land consistent with this zoning. The Board has determined that compliance with this Order will mitigate any potential adverse water quality impact.

9. The Board has notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the proposed discharge and has provided them with an opportunity for a public meeting and an opportunity to submit their written views and recommendations.

10. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

THEREFORE, IT IS HEREBY ORDERED, that in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, the discharger shall comply with the following:

A. PROHIBITIONS:

1. There shall be no discharge of ash to surface streams at any time.

B. SPECIFICATIONS:

1. Runoff of ash to land not under the control of the discharger is prohibited.

2. The stockpiling of ash shall not cause a pollution or nuisance as defined in Section 13050 of the California Water Code.

3. No ash materials shall be deposited outside of the soil stockpiling areas shown on Attachment "A".

4. The ash stockpile area shall be protected from any washout or erosion of ash or covering materials and from inundation which could occur as a result of floods having a recurrence interval of 100 years.

5. Discharge of any waste not specifically regulated by this Order is prohibited.

C. PROVISIONS:

1. Availability

A copy of this Order and a copy of the facility spill contingency plan shall be maintained at the discharge facility and be available at all times to operating personnel.

2. Operation and Maintenance

The discharger must maintain in good working order and operate as efficiently as possible any facility or control system installed by the discharger to achieve compliance with the waste discharge requirements.

3. Change in Discharge

The discharger must promptly report to the Board any material change in the character, locations, or volume of the discharge.

4. Change in Ownership

In the event of any change in control or ownership or land or waste discharge facilities presently owned or controlled by the discharger, the discharger must notify the succeeding owner or operator of the existence of this Order by letter, a copy of which must be forwarded to this office.

5. Vested Rights

This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, nor protect the discharger from his liability under federal, State, or local laws, nor create a vested right for the discharger to continue the waste discharge.

6. Severability

Provisions of these waste discharge requirements are severable. If any provision of these requirements is found invalid, the remainder of these requirements shall not be affected.

7. Monitoring

The discharger must comply with the Contingency Planning and Notification Requirements Order No. 74-151, Monitoring and Reporting Program No. 90-32 and any modification to these documents as specified by the Executive Officer. Such documents are attached to this Order and incorporated herein. Chemical, bacteriological, and bioassay analyses must be conducted at a laboratory certified for such analyses by the State Department of Health Services. In the event a certified laboratory is not available to the discharger, analyses performed by a noncertified laboratory will be accepted.

8. Inspections

The discharger shall permit authorized staff of the Board:

a. entry upon premises in which an effluent source is located or in which any required records are kept;
b. access to copy any records required to be kept under terms and conditions of this Order;
c. inspection of monitoring equipment or records; and
d. sampling of any discharge.

9. Noncompliance

In the event the discharger is unable to comply with any of the conditions of this Order due to:

a. breakdown of waste treatment equipment;
b. accidents caused by human error or negligence; or
c. other causes such as acts of nature;

the discharger must notify the Executive Officer by telephone as soon as he or his agents have knowledge of the incident and confirm this notification in writing within two weeks of the telephone notification. The written notification shall include pertinent information explaining reasons for the noncompliance and shall indicate what steps are being taken to prevent the problem from recurring.

10. Revisions of Requirements

    The Board will review this Order periodically and may revise requirements when necessary.

11. The discharger shall undertake a feasibility study evaluating alternative methods of ash disposal to be utilized should soil amending be deemed as inappropriate. This report shall be submitted to the Regional Board by _____

12. This Order expires on _____, 1990.

Certification

I, Benjamin D. Kor, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, North Coast Region, on _____.

_____
Benjamin D. Kor
Executive Officer

(gpashwdr)

California Regional Water Quality Control Board
North Coast Region

MONITORING AND REPORTING PROGRAM NO. 90-32

FOR

GEORGIA-PACIFIC CORPORATION
FORT BRAGG SOIL AMENDMENT

Mendocino County

Monitoring

The discharger shall record the approximate volume of ash deposited at the site each month.

Stormwater Runoff Monitoring

Grab samples shall be taken periodically when streams are flowing from the points shown on the attached map. Samples shall be analyzed as follows:

Constituent	Units	Frequency
pH	pH units	Weekly
COD	mg/l	November, January, and March

Weekly rainfall totals shall also be recorded and reported.

Reporting

Monitoring reports shall be submitted monthly to the Board by the fifteenth of the month. Copies of signed laboratory sheets shall be submitted with any monthly summary report.

Ordered by _____
Benjamin D. Kor
Executive Officer

State of California
Regional Water Quality Control Board
North Coast Region

Mark K. Neely

ADDENDUM TO ITEM NO. 14
9:00 a.m., February 22, 1990
Eureka City Council Chambers
531 K Street
Eureka, California

ITEM: 14

SUBJECT: Amendment to Tentative Waste Discharge Requirements Order No. 90-32 for Georgia-Pacific Corporation, Application of Woodwaste Ash as Soil Amendment, Fort Bragg, Mendocino County

DISCUSSION:

11. The discharger shall undertake a feasibility study evaluating alternative methods of ash disposal to be utilized should soil amending be deemed as inappropriate. This report shall be submitted to the Board by July 1, 1990.

12. Quarterly, on the first day of June, September, December, and March, the discharger shall submit a status report on the progress of determining the threat to water quality from the soil amending of ash. Each status report shall detail progress within the preceding quarter in completing any sampling or analysis of ash, aquatic organisms or other media as necessary, until such time as the threat to water quality is defined to the satisfaction of the Executive Officer.

13. This Order expires on July 1, 1991.

State of California
Regional Water Quality Control Board
North Coast Region

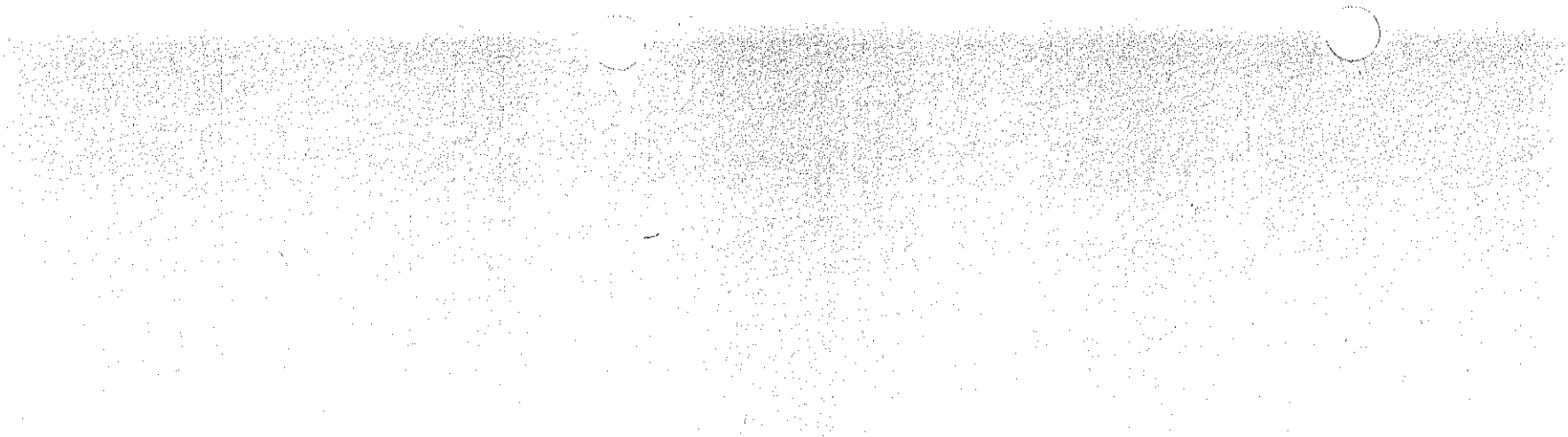
Mark K. Neely

EXECUTIVE OFFICER'S SUMMARY REPORT
9:00 a.m., February 22, 1990
Eureka City Council Chambers
531 K Street
Eureka, California

ITEM: 14

SUBJECT: Waste Discharge Requirements for Georgia-Pacific Corporation Application of Woodwaste Ash as Soil Amendment, Fort Bragg, Mendocino County

DISCUSSION: This item will be sent under separate cover.



Georgia-Pacific Corporation *Eastern Wood Products Manufacturing Division*
P.O. Box 105603
Atlanta, Georgia 30348
Telephone (404)521-4000
Teletype (810) 751-1000

March 13, 1990

Mr. Benjamin Kor
Executive Officer
California Regional Water Quality
Control Board
North Coast Region
1440 Guerneville Road
Santa Rosa, California 95403

RE: Fly Ash Study
Fort Bragg, California

Dear Mr. Kor,

As a follow-up to the Regional Water Quality Control Board meeting on February 22, 1990, we appreciate your willingness to allow us to continue to stockpile the fly ash from our Fort Bragg facility at the Little Valley site. However, it should be recognized that large-scale, longer term stockpiling of ash and the resulting need to "play catch-up" at some later date may give rise to other, as yet unforseen, concerns. As such, we are anxious to resume amending soil with the fly ash and we look forward to a resolution of our permit request.

We are in receipt of Dr. Frank Palmer's review on our December, 1989 report and would like to offer some preliminary comments. Dr. Palmer's observations fall primarily into two basic categories:

1) Comments and questions with regards to matters within the original agreed-upon scope of the current study and

2) Additional questions and concerns raised as a result of the findings of this study.

As you know, the Waste Discharge Requirements issued to Georgia-Pacific at Ft. Bragg calls for the soil amendment of fly ash developed at the Ft. Bragg mill on pasture land at the Little Valley site. These requirements are Specifically for this site and do not allow it's use at other lbcations nor do they envision it's use as a soil amendment for the cultivation of crops for human consumption. As such, the ash study plan was

gearedto address the concerns raised for the Little Valley site, namely:.

1) to determine if non-2,3,7,8-TCDFs were being bioaccumulated in cover crops (grass and clover) grown on soil amended with fly ash,

2) to determine if non-2,3,7,8-TCDFs were being bioaccumulated in terrestrial animals (earthworms) in contact with soil amended with fly ash and,

3) to determine if non-2,3,7,8-TCDFs in airborne dust from sites amended with fly ash could be transported off-site.

The study was later expanded to include 2,3,7,8-TCDF analyses's on all samples.

With respect to the first two of these, it was determined that there were no detectable levels of either 2,3,7,8-TCDF or total TCDF in cover crops and terrestrial animals. With regard to airborne dust, it was determined that it was a virtual impossibility for airborne dust to occur after the cover crop was established and therefore no analysis of dust was made.

As a result, we feel that the original objectives of the study have been met and urge the Regional Board to allow Georgia-Pacific to re-commence soil amending activity at the Little Valley site.

Additional Comments

Dr. Palmer has made several specific recommendations for additional information and discussion which we will comment on briefly below:

1. **Analyze several fly ash samples for 2,3,7,8-substitut chlorinated dibenzodioxins (CDDs) and dibenzofurans (CDFs) to assess the toxicity of the fly ash:**

   Dr. Palmer states that the major finding of the study is the presence of 2,3,7,8-TCDF in the amended soil. He states that the report lacks high resolution gas chromatography/high resolution mass spectrometry analysis of all 17 toxic 2,3,7,8-chlorinated CDDs and CDFs.

It is significant to note that the study confirmed that even with the presence of 2,3,7,8-TCDF in the amended soil, no uptake was found. However, because of the concern raised as a result of these high resolution analyses, Georgia-Pacific has obtained two composite samples from the ash stockpile at Little Valley and submitted them to Enseco Labs for analyses of all 17 2,3,7,8-chlorinated CDDs and CDFs. These results will be made available to the Regional Board when they are available.

2. Include data omitted from the report to provide more comprehensive assessment:

The ash study plan focused on analysis of amended soil, as well as the other objectives mentioned above, and did not call for ash analysis per se. However some ash samples were obtained during the study only because of general interest on our part. Since there was never any intent to withhold this information from the Regional Board we are enclosing the lab reports for LV109, GP202 and LV209.

Sample No. 4, taken during Phase I, was also taken as a matter of interest. This sample was from the control plot and taken at a one inch depth. The original analysis showed no detection of TCDFs, however, the analysis had a very low recovery. As indicated by Enseco Labs January 30, 1989 cover letter, this sample was re-extracted and a copy of this analysis is enclosed. This second analysis shows the presence of both total TCDF and 2,3,7,8-TCDF at this control plot location. We still have some questions as to the validity of this result since the ratio of 2,3,7,8 to total TCDF is clearly inconsistent with that found to be associated with our ash.

Sample No. 8, taken during Phase I, was obtained from the control plot and is a soil sample taken at 27" - 30" depth. This sample also had a very low recovery and was re-extracted by Enseco Labs. The results, which are enclosed, continue to show no detection although at a much lower detection level.

3. Provide more information and discussion on potential uptake of CDDs and CDFs by grass.

Dr. Palmer comments that the report focused only on grass clippings and that uptake by roots was not discussed. Again, the study protocol was only concerned with accumulation in the flora of the grass cover and not with the root zone. The obvious reason for this was because the flora would be available to be eaten by grazing animals. As far as the Little Valley project is concerned, no root crops will be grown and therefore we do not see the need to expand the study to address that issue. We want to say that sample No. LV209 was obtained in connection with the dust dispersion model had that part of the study been carried out. It was not obtained for root zone evaluation. In fact, this sample was obtained after the grass cover, including the roots, was removed and therefore was actually below the root zone.

4. Discuss potential movement of CDDs and CDFs to aroundwater.

Dr. Palmer states that the sampling log indicates that while taking sample LV108, groundwater was encountered at 18" depth and since this sample was positive for total TCDF and 2,3,7,8-TCDF, a discussion of the potential for groundwater contamination should be included.

This sample hole is the only sample hole in the entire study that encountered water. Sample LV107 was obtained from the bottom of the same sample hole and there was no indication of water at that depth. Heavy rains had occurred the day before the sampling and the ground in the area was wet. This may explain why water was encountered. If there was any movement downward it was not evident in sample LV107 which indicated no detection of total TCDF or 2,3,7,8-TCDF.

5. Discuss potential runoff of flv ash-amended soil to surface water.

Dr. Palmer states that the report contains no discussion of possible erosion or dust migration of ash-amended soil before the cover crop is established.

The Waste Discharge Requirements for the operation of the Little Valley soil amendment project requires that this activity utilize Best Management Practices approved by the state. As is the case with the application of all other agricultural minerals and fertilizers, proper procedures must be used to prevent wind or water-borne losses of material. As you know, a portion of the Little Valley project involves an on-going ash utilization study which is being conducted in cooperation with the U.C.-Davis Cooperative Extension Service. Should there be additional concerns for runoff of fly ash amended soil and wind blown dust during disking of the ash, Georgia-Pacific will work with U.C.-Davis to develop modifications to our BMP practices as may be needed.

As can be seen from the above discussion, most of Dr. Palmer's concerns represent an expansion of the original study scope and are raised as a result of the contents of the current report. We strongly feel that our December 1989 report has addressed the original objectives that were set forth in the agreed-upon study plan and has demonstrated that no clear threat to the environment exists at the Little Valley site. We recognize that the data generated by this study may have raised new concerns (and, indeed, future studies may raise additional concerns) for the Regional Board and Georgia-Pacific is willing to work with the Board to address legitimate concerns the Board may have. However we feel that the soil amending activity should be allowed to continue while any additional concerns are being addressed. We look forward to discussing these issues in more detail in our upcoming meeting.

Very truly yours,

Gerald W. Tice

GERALD W. TICE
CHIEF ENVIRONMENTAL ENGINEER
WOOD PRODUCTS MANUFACTURING DIVISION

GWT/pcw

Enclosure

cc: Messrs. K. C. Mayer
D. Whitman w/enclosure

Enseco

2,3,7,8-TCDF plus Total TCDF

HIGH RESOLUTION

Client Name: Georgia Pacific Co.
Client ID: 109 Ash
Lab ID: 046295-0009-SA Enseco ID: NA
Matrix: SOLID Sampled: Unknown Received: 22 MAR 89
Authorized: 22 MAR 89 Prepared: 05 APR 89

Sample Amount: 10.2 G
Percent Moisture: NA

Parameter	Result.	Units	Detection Limit
Furans			
Column Type: DB-225			
Analyzed: 14 APR 89			
2,3,7,8-TCDF	**1.4**	**pg/g**	--
Total TCDF	**6.8**	**pg/g**	--

	% Recovery
13C-2,3,7,8-TCDF	**63**

ND=Not Detected
NA=Not Applicable

Reported by: Mike Filigenzi Approved by: Bill Luksemburg

The cover letter is an integral part of **this report.**
Version 070187

Enseco

2,3,7,8-TCDF plus Total TCDF

HIGH RESOLUTION

Ash

Client Name: Georgia Pacific Corp.
Client ID: GP-202 Ash #2
Lab ID: 048360-0001-SA Enseco ID: 111791
Matrix: SOLID Sampled: 18 JUL 89 Received: 24 JUL 89
Authorized: 24 JUL 89 Prepared: 28 JUL 89

Sample Amount: 10.0 G
Percent Moisture: NA

Parameter	Result	Units	Detection Limit
Furans			
Column Type: DB-225			
Analyzed: 04 AUG 89			
2,3,7,8-TCDF	4.0	pg/g	--
Total TCDF	49	pg/g	--

	% Recovery
13C-2,3,7,8-TCDF	107

ND=Not Detected
NA=Not Applicable

Reported by: Mike Filigenzi Approved by: Bill Luksemburg

The cover letter is an integral part of this report.

Enseco

2,3,7,8-TCDF plus Total TCDF

HIGH RESOLUTION

Soil
(Composite "88" upper root = 0-3/4" Surface * (just under ground cover)

Client Name: Georgia Pacific Corp.
Client ID: LV-209 Soil
Lab ID: 048360-0008-SA Enseco ID: 111801
Matrix: SOLID Sampled: 18 JUL 89 Received: 24 JUL 89
Authorized: 24 JUL 89 Prepared: 28 JUL 89

Sample Amount: 10.4 G
Percent Moisture: NA

Parameter	Result	Units	Detection Limit
Furans			
Column Type: DB-225			
Analyzed: 04 AUG 89			
2,3,7,8-TCDF	5.3	pg/g	--
Total TCDF	66	pg/g	--

	% Recovery
13C-2,3,7,8-TCDF	82

ND=Not Detected
NA=Not Applicable

Reported by: Mike Filigenzi Approved by: Bill Luksemburg

The cover letter is an integral part of this report.
Version 070187

Enseco

2,3,7,8-TCDF PLUS TOTAL TCDF

HIGH RESOLUTION

Client Name: Georgia Pacific Corporation
Client ID: 4
Lab ID: 044527-0004-SA Enseco ID: NA
Matrix: SOLID Sampled: 15 NOV 88 Received: 18 NOV 88
Authorized: 18 NOV 88 Prepared: 02 FEB 89

Sample Amount: 2.1 G

Parameter	Result	Units	Detection Limit
Furans			
Column Type: OB-5			
Analyzed: 13 FEB 89			
Total TCDF	2.2	pg/g	--
2,3,7,8-TCDF	2.2	pg/g	--

	% Recovery
13C-TCDF	48

ND=Not Detected
NA=Not Applicable

Reported by: Martha Maier Approved by: Bill Luksemburg

The cover letter is an integral part of this report.
Version 070187

Enseco

2,3,7,8-TCDF PLUS TOTAL TCDF

HIGH RESOLUTION

Client Name: Georgia Pacific Corporation
Client ID: 8
Lab ID: 044527-0008-SA Enseco ID: NA
Matrix: SOLID Sampled: 15 NOV 88 Received: 18 NOV 88
Authorized: 18 NOV 88 Prepared: 02 FEB 89.

Sample Amount: 2.1 G

Parameter	Result	Units	Detection Limit
Furans			
Column Type: DB-5			
Analyzed: 13 FEB 89			
Total TCDF	ND	pg/g	0.41
2,3,7,8-TCDF	ND	pg/g	0.41

	% Recovery
13C-TCDF	67

ND=Not Detected
NA=Not Applicable

Reported by: 'Martha Maier Approved by: Bill Luksemburg

The cover letter is an integral part of this report.
Version 070187

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA, CA 95403
(707) 576-2220

CERTIFIED - Return Receipt Requested

March 28, 1990

Mr. Gerald Tice
Chief Environmental Engineer
Georgia-Pacific Corporation
P. O. Box 105603
Atlanta, GA 30348

Dear Mr. Tice:

We have received your preliminary comments on Dr. Frank Palmer's renew of your December, 1989 fly ash study. It appears that we are in agreement on a number of issues, but we still have a number of concerns that will need to be discussed.

We concur with the results of the soil sampling and earthworm sampling that you have completed. We also concur with your plan to analyze samples of the stockpiled ash for a complete scan of the seventeen toxic 2,3,7,8-chlorinated CDD's and CDF's. The results should be analyzed using the EPA protocol for developing toxic equivalent factors (TEF), titled "Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of Chlorinated Dibenzo-p-Dioxins and -Dibenzofurans (CDD's) and (CDF's) and 1989 Update", A copy of the title page is enclosed.

Our foremost concern with the ash amending has always been the possibility of ash containing TCDF's and TCDD's being deposited in the aquatic environment, specifically Little Valley Creek. As the primary mode of transport of ash is by wind dispersion, we originally agreed that an analysis of wind patterns in the area would be performed to determine transport off site before sampling of the stream environment. However, you stated that the possibility of wind transport of the ash is negligible due to the thick cover crop. This ignores the possibility of wind dispersal of ash during the months when it is stockpiled, the weeks between amending and establishment of the cover crop, and the days of the actual amending process. Regional Board staff have been present during amending activities in the past and can attest that it produces an appreciable amount of airborne dust and ash. Since the Regional Board's primary responsibility is to protect the beneficial uses of water, we believe the best course of action would be to sample Little Valley Creek for TCDF's and TCDD's. This would involve analysis of sediment samples, as well as possible additional analysis of aquatic animal tissue or insects. We can discuss this approach in greater detail during our April 12, 1990 meeting.

We will be requesting the Department of Health Services (DOHS) to review the available data for other environmental concerns. Historically, DOHS's review has not indicated any concern for the ash generated by Georgia-Pacific as a hazardous waste. We will be dealing directly with one of their staff toxicologists who has extensive knowledge of TCDD's and TCDF's.

We appreciate the inclusion of the "missing" soil sampling results in your letter. We would like to remind you that Waste Discharge Requirements Order No. 90-32 requires submission of a feasibility study of alternative ash disposal methods by July 1, 1990.

We look forward to meeting with you on April 12, 1990, here at our office. Please call if you have any questions before that time.

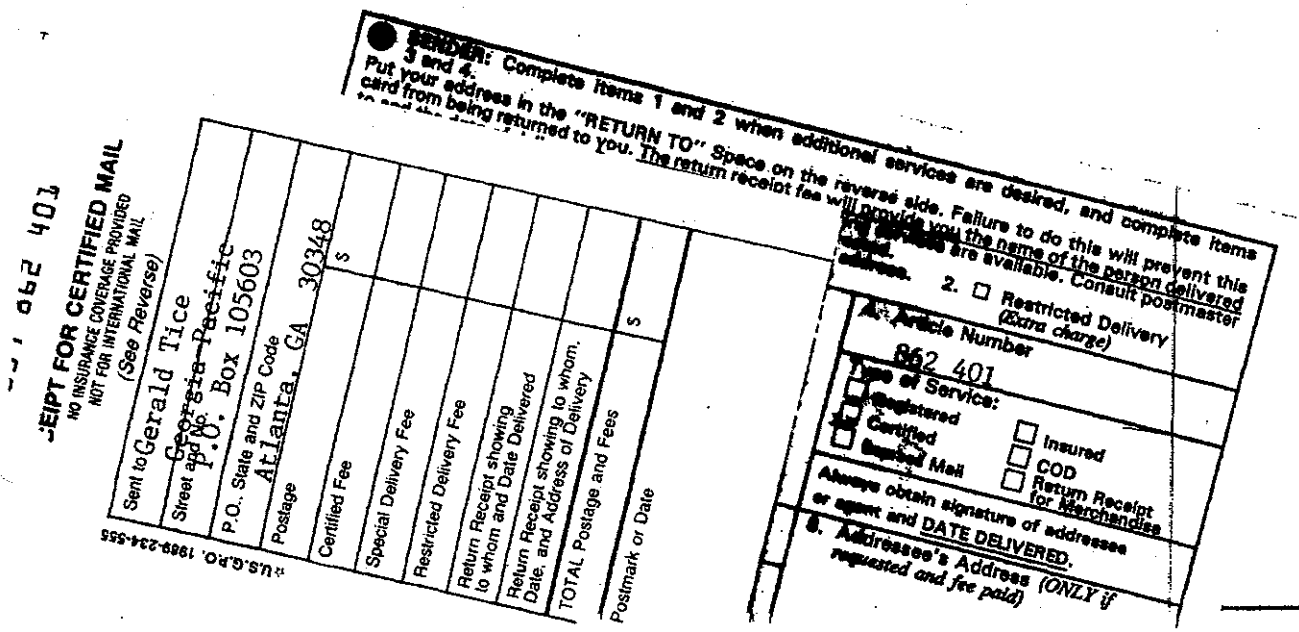
Sincerely,

Frank C. Reichmuth
Senior Water Resource
Control Engineer

MKN:ba/gpashltr

Enclosure

cc: Kent Mayer, Georgia-Pacific, Fort Bragg, California
Don Whitman, Georgia-Pacific, Eugene, Oregon
Frank Palmer, SWRCB



Georgia-Pacific Corporation *Eastern Wood Products*
Manufacturing Division
P.O. Box 105603
Atlanta, Georgia 30348
Telephone (404) 521-4000
Teletype (810) 751-1000

May 1, 1990

Mr. Frank C. Reichmuth
Senior Water Resources Control Engineer
California Regional Water Quality Control Board
North Coast Region
1440 Guerneville Road
Santa Rosa, CA 95403

RE: Fort Bragg Ash Amendment Project

Dear Mr. Reichmuth:

We just received the Ply ash sample results on the recent samples taken from the stockpiled ash at the Little Valley site. As you know, we had decided to delay our meeting with your office until these results were received rather than possibly schedule another meeting to discuss these results when they became available.

We plan to have a meeting with our staff here in Atlanta on May 8, 1990 to review these results as well as your letter of March 28, 1990. We will be contacting you later that week to set up a new meeting date. Also, it is our intention to comply with the July 1, 1990 date for submission of a feasibility study of alternative ash disposal methods.

Thank you for your continued cooperation.

Very truly yours,

Gerald W. Tice/pm

GERALD W. TICE
CHIEF ENVIRONMENTAL ENGINEER
WOOD PRODUCTS MANUFACTURING DIVISION

GWT/pm

cc: Messrs. K. C. Mayer - Georgia-Pacific, Eugene, OR
D. B. Whitman - Georgia-Pacific, Ft. Bragg, CA

Georgia-Pacific Corporation *Eastern Wood Products Manufacturing Division*
P.O. Box 105603
Atlanta, Georgia 30348
Telephone (404) 521-4000
Teletype (810) 751-1000

May 21, **1990**

Mr. Benjamin D. Kor
Executive Officer
California Regional Water
Quality Control Board
North coast Region
1440 Guerneville Road
Santa Rosa, **CA 95403**

RE: Conference Call on May **17, 1990**
Pertaining to Little Valley Ash Project
Georgia-Pacific, Ft. Bragg, CA.

Dear Mr. Kor:

This will confirm the details of the conference call we had on May **17, 1990** concerning the ash amendment project at our Little Valley site. Besides you and me, included in this conference call were members of your staff along with members of our Georgia-Pacific staff. Also included was Mr. Marty Lay of Selvage, Heber, Nelson and Associates, the sampling consultant we have used throughout this ash study project.

At the out-set of our conversation we expressed that Georgia-Pacific is extremely interested in resolving any outstanding issues that the North Coast Region staff has on this project which will allow our waste discharge permit to be modified so that soil amending activity can resume. As you know, we are continuing to stockpile at Little Valley and there is a real need to begin amending this year.

You indicated that before final approval could be given additional sampling relating to the Little Valley creek will have to be obtained. These would include sediment and aquatic animal or insect samples which would be analyzed for TCDF's and TCDD's. Also additional samples of the fly ash will be needed and should be analyzed for TCDF's and TCDD's. You and your staff stressed the need to develop a good sampling protocol, approved by your office, prior to actually performing the sampling. You also indicated that before final approval can be given you will request a review of the data generated by this project by the Department of Health Services.

Realizing that the time required to accomplish all of the above will probably delay final approval of this project beyond the **1990** amending season, it was suggested that Georgia-Pacific could go before the Board and make a request that the Board allow interim approval to amend during **1990.**

You felt that in order for this request to have a chance for approval that we should present the Board with as much data as possible in defense of our request.

Based on this approach it appears we should concentrate on the sampling and analysis that can be done with the fastest turn around. As you know, California Analytical Labs has agreed to give us 7-day results on up to six samples. Taking advantage of this, we decided to move ahead with the fly ash and sediment sampling while continuing to develop plans to conduct the aquatic sampling at a later time since this will require putting together a stream survey and sampling plan to be approved by your office.

With this approach in mind, Georgia-Pacific requests to be placed on the agenda to present our request to the North Coast Region Board at the Board's August 16, 1990 meeting in Santa Rosa, CA. We all agreed that, since the Board does not meet in July, this was the earliest practical board meeting that could be scheduled. As you suggested, some of the areas to be addressed before the Board would include that (a) the ash and sediment analyses have been completed (and hopefully the results will be favorable), (b) the aquatic studies are underway but require additional time (hence our request for interim approval to amend to take advantage of the 1990 season) and, (c) Georgia-Pacific has looked at other disposal alternatives including land disposal on other sites and (at the present) it appears that soil amending at Little Valley is still the most feasible option.

In order to have our presentation to your staff in a timely manner prior to the August 16th meeting, you indicated that you will need this by no later than July 26, 1990. Georgia-Pacific agrees to comply with this date.

In order to accomplish the soil sediment and fly ash sampling as soon as possible and at the same time insure that your staff is in agreement with the sampling protocol, it was agreed that we would meet at the Little Valley site to select sampling locations and review the sampling protocol. You also indicated that your staff may also want to split some samples with Georgia-Pacific while on site and we agreed to that. The date of May 30, 1990 seemed to be agreeable to everyone, therefore we settled on this date for the on-site meeting.

On May 30, 1990 we will also have our sampling consultant on-site who will come prepared to obtain, at a minimum, the fly ash samples. These samples will be obtained using the ASTM and/or EPA SW-846 pile sampling procedures as we discussed. (A copy of the ASTM procedures is being sent to you by our Dr. Jay Tice.)

Of course, your prior approval of this sampling method will be obtained before the samples are taken. We will confirm in writing the agreed upon procedures, either prior to this sampling date or shortly thereafter.

We would like to also obtain the sediment samples while we are on-site on May 30th if we can work out the methodology ahead of time and our consultant can come prepared to obtain the samples. I will be in touch with you in the next few days about this.

Concerning the aquatic sampling it was agreed that a qualified consultant will be needed for this work. We will attempt to have a qualified consultant on hand for our May 30, 1990 meeting so that this phase of the work can be discussed. You indicated that a sampling plan must be developed before any aquatic sampling can take place. This sampling plan will include, at a minimum, a survey of the stream area and aquatic habitat, number of organisms to be sampled and the lab procedures to be used. Once this plan is developed and approved the aquatic sampling can commence.

During our conversation you reminded us that Waste Discharge Requirements Order No. 90-32 requires submittal of *two* reports by Georgia-Pacific in the near future. First, a quarterly status report on the progress of the Little Valley ash study project is required by June 1, 1990. Secondly, a feasibility study of alternative ash disposal methods, including land disposal at another site, is required by July 1, 1990. I indicated to you that we intend to comply with both of these requirements.

I think this summarizes the main points of our conversation, however if you feel I have left out any important points or stated anything incorrectly, please let me know as soon as possible and I will be glad to amend the letter as necessary.

Thank you for your cooperation.

Sincerely,

Gerald W. Tice

GERALD W. TICE
CHIEF ENVIRONMENTAL ENGINEER
WOOD PRODUCTS MANUFACTURING DIVISION

GWT/pcw

cc: Messrs. D. Whitman
K. C. Mayer

cc: File: Ft. Bragg - Ash Study

G.P. Ash-
Georgia Pacific Ash

Georgia-Pacific Corporation
International Square
1875 Eye Street N.W.
Washington, D.C. 20006
Telephone (202) 659-3600

May 22, 1990

John Hannum
California Regional Quality Control Board
North Coast Region
1440 Guerneville Road
Santa Rosa, California 95403

5/25/90 RC

Dear John:

To assist you in our Ft. Bragg soil amendment project, enclosed find the documents you requested:

1. EPA Method 8290: "High Resolution Gas Chromatography/High-Resolution Mass Spectrometry Determination of Polychlorinated Dibenzo-p-Dioxins and Dibenzofurans."

2. ASTM Method D 75-87: "Standard Practice for Sampling Aggregates."

3. SW-846: "Test Methods for Evaluating Solid Waste; Volume II: Field Manual-Physical Chemical Methods, Chapter 9, Sampling Plan."

4. Letter from Enseco-Cal Laboratories detailing their modifications to Method 8290 to incorporate the salient points of NCASI Method 551.

In my opinion, the methodology detailed in Chapter 9 of SW-846 is very general in scope and does not specifically address our needs in sampling the ash pile. I believe that the ASTM method is much more relevant for our application.

California Analytical employs the modified EPA Method 8290 because it is a full congener method. NCASI Method 551 is only applicable for the 2,3,7,8-TCDD and TDCF.

Please let me know if I can be of further assistance and I look forward to seeing you next week.

Sincerely,

John J. Tice

John J. Tice, IV, Ph.D.
Manager, Government Affairs -
Science and Technology

Encl.

JJT/lmw

Georgia-Pacific

From The Desk Of GERALD W. TICE

5/29/90

Mr. Benjamin Kor:

Ben, this is a follow-up copy of the quarterly report for Ft. Bragg that was sent via overnite mail last week. Since that mailing could not be certified I am sending another copy certified just for the record. I sent the overnite letter so you could have this report in hand ASAP.

Gerald W. Tice

Georgia-Pacific Corporation *Eastern Wood Products Manufacturing Division*
P.O. Box 105603
Atlanta, Georgia 30348
Telephone (404) 521-4000
Telefax (810) 751-1000

May 25, 1990

Mr. Benjamin D. Kor
Executive Officer
California Regional Water Quality
Control Board
North Coast Region
1440 Guerneville Road
Santa Rosa, CA 95403

RE: June 1990 Quarterly Progress Report
Georgia-Pacific Corporation
Fort Bragg Soil Amendment Project

Dear Mr. Kor:

This quarterly progress report is submitted in compliance with Waste Discharge Requirements Order No. 90-32 for Georgia-Pacific's Fort Bragg soil amendment project. Since this is the first of the required quarterly reports for this project, this report will review the activity since the submittal of our TCDF Ash Study report on December 21, 1989.

After submittal of our December 1989 report, the North Coast Region staff responded on February 9, 1990 to Georgia-Pacific with draft comments on this report. This was later followed with final comments dated February 27, 1990. One of the main recommendations of these comments was for Georgia-Pacific to analyze fly ash samples for all 17 toxic 2,3,7,8 TCDD's and TCDF's. In an effort to comply with this recommendation Georgia-Pacific obtained fly ash samples from the ash stockpile at the Little Valley site during February 1990 and submitted them to California Analytical Labs with instructions to analyze for the requested parameters.

On March 13, 1990 Georgia-Pacific responded to the staff comments dated February 27, 1990. Our response essentially was that we felt that our December 1989 report had met the objectives of the staff-approved study plan that we had submitted in 1988 and that Georgia-Pacific should be allowed to re-commence soil amending activity at the Little Valley site. As you know, the objectives of that study were to determine if 2,3,7,8-TCDF's and non-2,3,7,8-TCDF's are being bioaccumulated in cover crops grown on soil amended with fly ash and in terrestrial animals (earthworms) in contact with soil amended with fly ash. Also it was to determine if these TCDF's that might be in airborne dust from areas amended with fly ash could be transported off-site. The study concluded there was no evidence of bioaccumulation in either cover crops or earthworms and that after the ash was

amended and a cover crop established there was no possibility that dust (ash) could become airborne and be transported off-site.

In brief, Georgia-Pacific's response to the specific items raised by staff comments were as follows:

1) As indicated above, we agreed to obtain additional fly ash samples for analysis and in fact did obtain these samples during February 1990. (More comment on this later.)

2) Staff requested a copy of some additional analyses that were performed during the December 1989 study and were referenced in that study but not included because they were outside the scope of the study. These samples consisted of some ash samples taken at the Ft. Bragg mill and at the Little Valley site and some additional soil samples taken at Little Valley. A copy of all of these analyses were provided to your office with our March 13, 1990 comments. The results of these samples did not alter the outcome or conclusions of the study.

3) Staff requested more information and discussion on potential uptake of CDD's and CDF's in the root zone of crops, stating that our report focused only on grass clippings and did not address uptake in the root zone. Our response was that since no root crops will be grown at the Little Valley site, this aspect was therefore outside the scope of the study.

4) Staff requested that we discuss potential movement of CDD's and CDF's to groundwater since one sample location that encountered water did show positive in the soil for 2,3,7,8-TCDF. Our response was that this was the only sample location that encountered water and it was felt this was caused by heavy rain in the area the day before the samples were taken. Also there was no evidence of downward movement of 2,3,7,8-TCDF since the sample taken below the positive sample in the same sampling hole did not show the presence of 2,3,7,8-TCDF.

5) Staff requested we discuss the potential runoff of fly ash-amended soil to surface water. The concern was for the possible erosion or dust migration of ash-amended soil before the cover crop is established. We responded by agreeing to modify our BMP plan as necessary to prevent wind or water-borne loss of this material;

In our March 13, 1990 response we further agreed to work with the Regional Board to address other legitimate concerns the board may have.

The Regional Board staff further responded to our March 13, 1990 comments in a letter to Georgia-Pacific dated March 28, 1990. The staff concurred with the results of the soil and earthworm sampling that had been completed and with our plan to analyze samples of the stockpiled ash (which in fact were obtained in February 1990). The staff was still concerned however, with the possible impact on Little Valley Creek of air borne dust and ash when the ash is stockpiled, during amending activities and the time until a cover crop is established. The staff therefore requested analysis of sediment samples from the creek as well as possible additional analysis of aquatic animal tissue or insects.

About at this point (late March 1990) it was decided that we would meet with the North Coast Region staff to review the requested additional stream sampling and the results of the fly ash samples that were obtained in February 1990. A meeting time of April 12, 1990 was established. At this point we had not received the results of the fly ash samples but it was expected they would be available by April 12, 1990. It was felt that having these results available would make for a more productive meeting. As it turned out, the sample results were not available by April 12, 1990 and Georgia-Pacific requested that the meeting be delayed until these results were received. The results were received by Georgia-Pacific late during the week of April 24, 1990, the date of the lab's transmittal letter for these analysis. This was more than 60 days from the time the samples were received by the lab, an excessively long laboratory processing time.

On May 8, 1990 members of Georgia-Pacific's staff met to review these results prior to meeting with the North Coast staff. At this point we were in the process of setting up a new meeting date with the North Coast staff and had tentatively established a meeting date of May 17, 1990.

As a result of Georgia-Pacific's staff meeting on May 8, 1990, however, it was discovered that the fly ash samples had been obtained using plastic bags instead of glass containers as required by proper sampling protocol. Because of this, these analyses were rendered invalid. It was therefore decided that new fly ash samples would have to be obtained, and that the planned meeting on May 17, 1990 would only be concerned with the sampling protocol for the fly ash sampling and aquatic work. Subsequently it was decided that in lieu of a face-to-face meeting on May 17, 1990 that a conference call would be conducted on that date to discuss the proposed sampling. As a result of this conference call it was agreed that Georgia-Pacific would

proceed with obtaining new fly ash samples and also proceed to develop plans to obtain the stream sediment and aquatic samples. It was also agreed that it would be most beneficial for Georgia-Pacific personnel and members of the North Coast Region staff to meet at the Ft. Bragg soil amending site (Little Valley) to review sampling locations and protocol before any further sampling and analysis work is conducted to insure that the Region staff will be in full agreement with the planned work. An on-site meeting date of May 30, 1990 has been set. Also t g his neet ng w be sampling l s by Pacific who will be ilabl t ticipate the discussions and obtain samples.

Although no new analytical data has been generated (except for the data provided with our March 13, 1990 comments), one can see that considerable activity has occurred on this project. We anticipate that we will receive a much faster lab processing time on the new fly ash samples (which will be obtained on May 30, 1990) based on a commitment we have received from the lab. This should enable us to have additional data during the next few weeks.

This chronology brings the review of this project to the end of May, 1990. Should there be any questions or if additional details are needed please let me know.

Very truly Yours,

GERALD W. TICE
CHIEF ENVIRONMENTAL ENGINEER
WOOD PRODUCTS MANUFACTURING DIVISION

GWT/pcw

cc: Messrs. A. T. Johnson
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D. Modi
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Reference: 88298.003

GEORGIA-PACIFIC CORPORATION
FORT BRAGG, CALIFORNIA

LITTLE VALLEY **STUDY**
ASH STOCKPILE SAMPLING

MAY 30, 1990

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INTRODUCTION

SHN was retained by Mr. Gerald Tice, Chief Environmental Engineer for Georgia-Pacific Corporation (GP), Atlanta, Georgia to act as an objective sampler in the sampling for the ash amendment plan. This sampling was to include the ash stockpile only.

SHN was expected to provide the equipment and personnel required to perform this sampling event at locations and depths determined by a two-dimensional random sampling strategy with depth variation. Additionally, SHN was expected to maintain a sampling log book, prepare chain-of-custody forms, and pack and ship retrieved samples to the designated testing laboratory and the designated archive depository.

SUMMARY

ENSECO-Cal Lab of West Sacramento, California was to be the designated testing laboratory and SHN - Eureka office was to be the recipient of archive samples. The basis for sampling operations was to retrieve and test samples for the constituents of polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofuran with isomer confirmation. ("cL4-cL8", plus isomers). The sampling operation and procedures were thus set up to the dioxin/furan parameters.

Sampling gear and containers were brought to the site by SHN decontaminated. Martin Lay (SHN), who is a registered Civil Engineer, and has conducted previous Little Valley sampling, was accompanied by Patrick Barsanti (SHN). Both have been OSHA 29 CFR 1910.120 certified.

Martin Lay and Patrick Barsanti met with members of Georgia Pacific Corporation (GP) and North Coast Regional Water Quality Control Board (NCRWQCB) to discuss sampling operations and procedures. On May 30th, sampling was performed after mutual consent between GP, SHN, and NCRWQCB on May 30th at the Little Valley ash stockpile site. Sampling gear was decontaminated before sampling side "B" and again before sampling side "A".

Collected samples were logged, sorted, and placed in iced coolers for transport by SHN to Eureka for subsequent shipment to the designated sample receiving locations. Mr. Lay completed the required chain-of-custody records, properly packaged the samples for U.P.S. shipment in iced coolers, and affixed security seals. Samples were sent May 31 to ENSECO.

As of this writing (June 20), completed chain-of-custody forms have not been received by this office, but verbal contact has been made with ENSECO and receipt of intact samples has been confirmed.

SPECIFIC OPERATIONAL PROCEDURE

Preparation

Field sampling gear and decontamination cleansers were inventoried by Mr. Lay and Mr. Barsanti at the SHN Eureka office. All sampling gear was liquinox washed, rinsed with distilled water and final rinsed with methanol in preparation for transport to the project site. Liquinox solution, methanol, hexane, and distilled water were packaged for on-site sample gear decontamination procedures: Liquinox solution for initial site change washing if required, distilled water for rinsing, methanol for intermediate wash and hexane for final wash followed by distilled water rinse. Glass sampling jars with teflon lined bakelite caps were laboratory prepared and shipped to SHN by ENSECO Cal-Lab in sampling coolers. NCRWQCB also had prepared sampling jars shipped to them by ENSECO for use in testing split samples retrieved by SHN.

SAMPLING METHODOLOGY

General

In estimating the original (pre-site visit) number of samples, the following equation was applied; (per ASTM E122-72):

$$n = (3\ V'_o/e)^2$$

n = sample size approximately = 25
V_o' = Coef. of variation = 25%
e = allowable sampling error = 15%

A pre-sampling meeting was held at the Ft. Bragg mill office with GP, NCRWQCB, and SHN personnel to discuss sampling methodology. Number of samples to be taken was set at 2, composited from some number of cores to be field determined.

The sampling locations and depths were established on the Little Valley ash stockpile site by SHN using a two dimensional simple random sampling strategy, per ASTM D 3665-87, with depth of samples dependent upon ash depth at the specific randomly selected lateral locations. Method and location were approved by GP and NCRWQCB.

Sample jar identification was kept using side "B" and side "A", reflecting the two major divisions of the ash stockpile random sampling methodology. The sample location, depth, and sample data was later put in the log book to allow referencing a specific lab number with a specific side and item by future project reviewers. Lab sample jar labels contained an identification number, date, time, and the required specific analysis. Jars were logged immediately following sampling by Mr. Lay.

Sampling Location Layout

The representatives of GP, SHN, and NCRWQCB met at the ash stockpile to field determine sampling location layout acceptable to all parties. A compromise was reached allowing for longitudinally dividing the ash pile into two sides with one composite sample to be taken from each side.

The ash stockpile was divided into two, approximately equal areas, side "B", and side "A". Six random sampling locations were calculated and designated in each of the "half" area units and sampling was completed in side "B" unit prior to moving and decontamination for sampling the side "A" unit. (Refer to Figure 1.)

Ash Sampling

Decontamination of equipment was conducted prior to sampling side "B" and prior to sampling side "A".

The stockpile was divided into two sides. Each side was then split into 6 smaller sections, with each section split into quarters, ("A1" - "A24" and "B1" - "B24").

Six sampling points per side, for a total of 12, were randomly (calculated) selected. (Random number generation per ASTM 3665-82 (reapproved 1987)).

The depth at which samples were to be taken was determined by analyzing available ash depth at a specific location and attempting to secure samples from a variety of depths overall.

Side "B" sampling points were staked. A hand auger was then used to advance a borehole within 12" of sample depth. A split spoon sampler was then driven into the ash 12" to 16" and was retrieved from the hole, supported horizontally, without any contact

between sampler and top layer of pile. The sample was extracted from the sampler by splitting the tube in half, and using a deconned spatula, the sample was put into a stainless steel mixing bowl. Six samples were extracted and put into the bowl from side "B". These six samples were than mixed and quartered (per ASTM C 702-87) on a stainless steel tray.

Two diagonally opposed quarters were returned to the stockpile and the remaining two quarters were evenly split and put into 16 oz. jars marked; LVB1, LVB1, and RB-LVB1.

The equipment was then deconned, and side "A" sample points were staked. Hand augering and collecting the side "A" samples were conducted similar to side "B".

Mixing and quartering was then completed. Two evenly split, diagonally opposed quarters were put into 16 oz. jars marked LVA1, LVA1 and RB-LVA1. The remaining quarters were put into plastic baggies for sieve analysis.

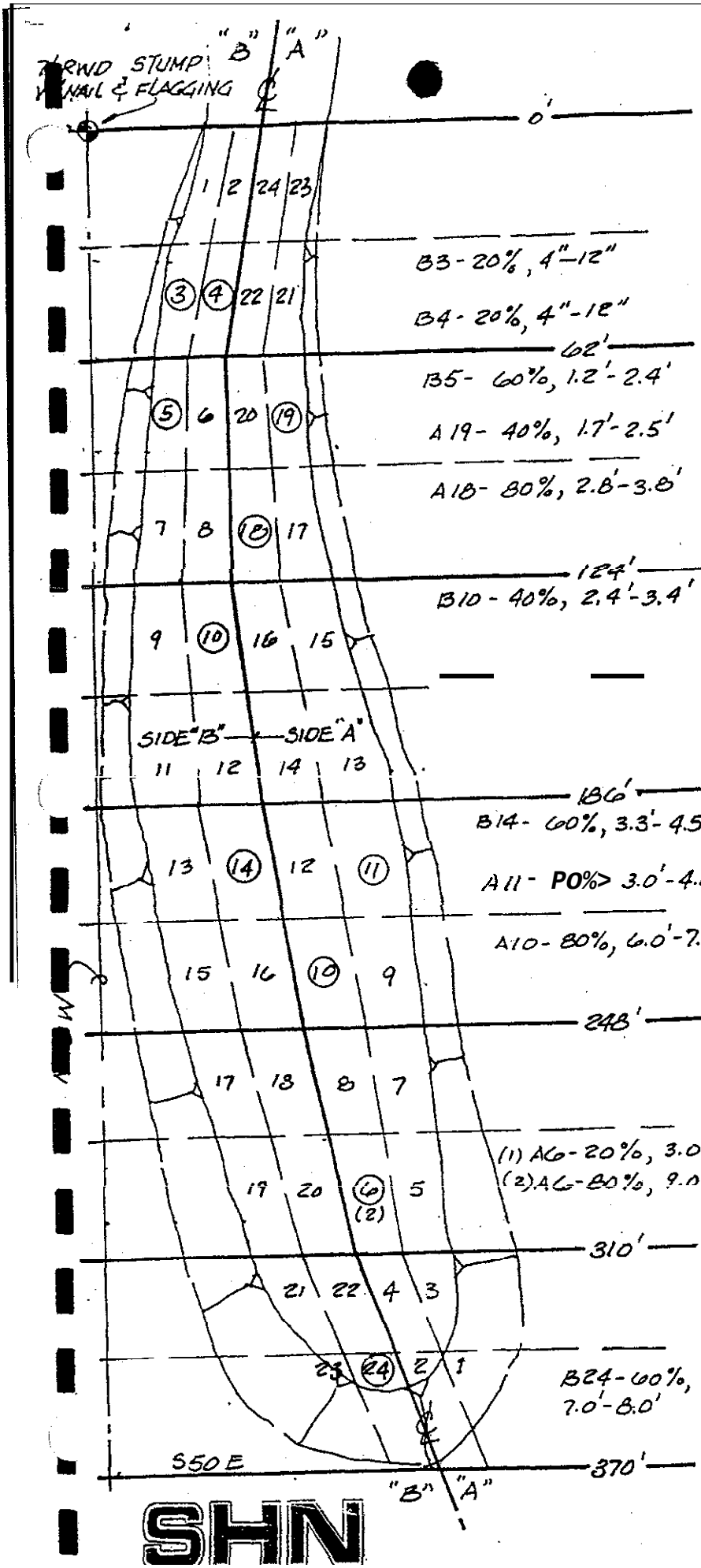
A second ash sample was retrieved from the ash pile for use in sieve analysis as a "typical" sample. The cut and quartered sieve sample was not analyzed but the ash pile sample was sieved for future use in estimating fine particle content.

CONCLUSIONS

Several observational comments are in order for concluding this summary report of the Little Valley Ash stockpile sampling program.

An approved random sampling program by SHN was followed and supervised by GP and the NCRWQCB.

Care was taken by all involved to maintain clean equipment and minimize risks for any potential sample cross contamination. Proper sample preparation and homogenization for analyses was left by the sampler to be performed at the laboratory under proper and controlled conditions. Turnaround time for transport to the testing laboratory by the sampler was conditioned by the remoteness of the area and the available transport carriers. All samples were kept in iced down covered coolers during transport from the field to the repackaging and shipping point in Eureka, California. The original field log book will be sent to Mr. Gerald Tice, Georgia-Pacific Corporation, Atlanta, Georgia, and chain-of-custody forms remain with the respective Cal-Lab and SHN archive personnel.



ALL LOCATIONS ARE APPROXIMATE

0 40 80 Feet

SCALE: 1" = 40'

EXPLANATION

(3) RANDOMLY SELECTED SAMPLING LOCATION

6 DESIGNATED QUADRANT OF SIDE AND SECTION

B3 - 20% , 4"-12"

- SAMPLE DEPTH
- SAMPLE (%) DEPTH
- QUADRANT LOCATION

SHN CONSULTING ENGINEERS AND GEOLOGISTS

Georgia Pacific Corporation
Fort Bragg, California
Little Valley Ash
Stockpile Sampling

PLAN

SHN 880298.003
May 30, 1990
Figure 1

APPENDIX 1

RANDOM SAMPLING CALCULATIONS

LITTLE VALLEY ASH STUDY
RANDOM SAMPLING CALCULATION

1. Method - ASTM D 3665-82(87)

2. Assumptions (Refer also to Figure 1)
   a. Six core samples to be taken for one composite test sample.
   b. Stockpile divided longitudinally and into six subsections each side of division.
   c. Each subsection split into quarters for a total of 24 quadrant areas each side.
   d. Random generation of six core locations to be calculated by ASTM D 3665-82, Table 1, for each side. Depth dependent upon ash depth and Engineer's decision.
   e. Sample taken from center of randomly selected quadrant

3. ASTM D 3665-82, Table 1 Results

Side B (core)	Random Number Generation			Random Number		Total Quad.		Sample Location (Fig. 1)
1	0.479	0.885	=	0.118	X	24	= 2.8 =	3
2	0.841	0.907	=	0.993	X	24	= 23.8 =	24
3	0.206	0.066	=	0.417	X	24	= 10.0 =	10
4	0.526	0.898	=	0.217	X	24	= 5.2 =	5
5	0.531	0.236	=	0.602	X	24	= 14.4 =	14
6	0.602	0.498	=	0.171	X	24	= 4.1 =	4

Random Number Generation Repeated for Site A

Side A (core)	Random Number		Total Quad.			Sample Location (Fig. 1)
1	0.255	X	24	= 6.1	=	6
2	0.757	X	24	= 18.1	=	18
3	0.771	X	24	= 18.5	=	19
4	0.438	X	24	= 10.5	=	11
5	0.253	X	24	= 6.0	=	6
6	0.427	X	24	= 10.2	=	10

PB88-120704

United States Environmental Protection Agency

Office of Air Quality Planning and Standards Research Triangle Park NC 27711

EPA-450/4-84-014h
September 1987

Air

EPA

National Dioxin Study Tier 4 — Combustion Sources

Engineering Analysis Report

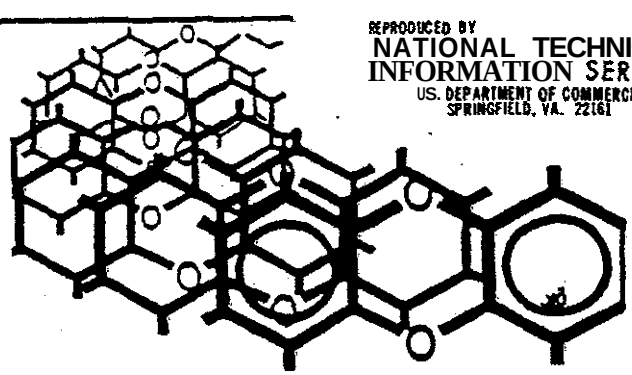


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TABLE 1-1. SUMMARY OF PCDD/PCDF STACK EMISSIONS BY SOURCE CATEGORY

Source Category	Number of Units Tested[a] Tier 4	Literature	Range of PCDD Emissions (as measured, ng/m^3)	Range of PCDF Emissions (as measured, ng/m^3)
1. Municipal Waste Incinerators				
European	0	8	71 - 48,997	37 - 9,831
U.S. and Canada	0	10	3.3 - 11,686	8.5 - 22,000
2. Boilers Cofiring Waste				
Commercial	0	3	1,400 - 17,000	170
Industrial	0	5	<0.002[b] - 76.4	<0.002 - 5.5
3. Secondary Copper Cupola Furnace	1	0	11,900	60,700
4. Wood Combustion				
PCP-Treated Wood	0	2	<17[c] - 1,520	<17[c] - 587
Salt-Laden Wood-Fired Boiler	1	0	195	83.2
5. Sewage Sludge Incinerators	3	2	ND[d] - 812	ND[d] - 1,374
6. Wire Reclamation Incinerator (wire and transformer feed)	1	0	704	866
7. Industrial Solid Waste Incinerator	1	0	625	2,390
8. Wire Reclamation Incinerator (wire-only feed)	1	0	173	305
9. Hospital Incinerators	0	4	15 - 69	25 - 156
10. Hazardous Waste Incinerators				
Rotary Kiln	0	2	7.7 - 8.6	11.2 - 19
11. Drum & Barrel Reclamation Incinerator	1	0	5	27
12. Carbon Regeneration Furnace				
without Afterburner	0	1	0.18	0.3
with Afterburner	1	1	1.6 - 3.7	0.05 - 3.3
13. Black Liquor Boiler	3	0	0.8 - 2.9	0.6 - 2.1
14. Cement Kilns	0	3	<1[e] - 1.35	<1[e] - 0.74
15. Lime Kilns	0	1	<0.34 - <2.0	---
16. Utility Boiler Co-firing Waste	0	1	<0.031 - <0.10	<0.31 - <0.10
17. Fossil Fuel Combustion				
Coal-Fired Utility	0	4	<0.10 - <0.70	<0.10 - <0.70
Pulverized Coal	0	1	<4.2 - <7.9[f]	<0.67 - <1.3[f]
Oil-Fired Utility	0	1	<4.2 - <7.9[f]	<0.67 - <1.3[f]
18. Incinerator Ship	0	1	<0.0009 - <0.086[g]	<0.3 - <3.0

"---" means data not reported.

[a] Analytical data for a noncatalytic woodstove tested under Tier 4 were not reported.

[b] Numbers preceded by "<" indicate detection limits.

[c] Detection limits reported in terms of ppb (by volume).

[d] ND = not detected. Detection limits not reported.

[e] Detection limits reported in terms of ng/ul of sample injected into GC-MS for analysis.

[f] 2378 TCDD/2378 TCDF scan only.

[g] Detection limits reported in terms of ng/ml injected into GC-MS for analysis.

sample. No detection limits were specified for the other homologues which were analyzed for by electron capture gas chromatqraphy.

3.2.3.5 Coal and Refuse-Derived Fuel Combustion. Analysis of flue gas emissions from a coal and RDF-fired facility located in Ames, Iowa, found less than detectable levels of TCDD, which was the only CDD homologue analyzed for.[115] The detection limit for TCDD was 5 ng/m^3 for vapor samples. This is a suspension-fired boiler that burns coal with 15 percent RDF. Small, uniform, 2-5 cm pieces of RDF are produced in a shredding and air classification process. The facility operates with a combustion temperature of approximately 1,200°C and produces 35 MW of electrical power from steam. The unit is reported to be operated at approximately 22 percent excess air and uses an ESP. Another study describing emissions testing at this facility reported that PCDD's and PCDF's were not detected in the flue gas.[196] The detection limit for PCDD and PCDF was 0.25 ng/m^3 for vapor samples.

3.2.4 Wood Combustion

Table 3-6 presents the emissions data for combustion units burning PCP-treated wood and firewood.

3.2.4.1 Residential Wood Combustion. Four. studies have been conducted on PCDD formation from the combustion of firewood.[54,62,165,167] Ash samples were collected from 24 woodstoves and two fireplaces. The woodstoves tested were located in rural areas in three different regions of the country. Presumably the wood being burned was untreated, that is, it had not been exposed to fungicides, herbicides, or wood presewatives. For the 24 woodstoves tested, PCDD concentrations in ash samples ranged from 0.007 ng/g to 210 ng/g, with a mean concentration of 23.4 ng/g. The penta-CDD homologue was not analyzed for.[54,165] The 2378-TCDD isomer was analyzed for in 17 samples. Two samples had non-detectable levels of 2378-TCDD with detection limits ranging from 0.0009 to 0.0014 ng/g. The other 15 samples had concentrations of 2378-TCDO varying from 0.001 to 0.20 ng/g with an average Concentration of 0.05 ng/g. The authors of one of the studies,[165] in which 18 woodstoves were tested, attributed some of the variability in the results to differences in woodstove design and sampling points. They also suggested

TABLE 3-6. SOURCE CATEGORY: WOOD COMBUSTION

Source Category	No. of Units Tested (Location)	Sample	PCDD/PCDF Emission Concentration and Ash Sample Content: 2378-TCDD Mean	2378-TCDD Range	PCDD Mean	PCDD Range	PCDF Mean	PCDF Range	References
Residential Woodburning									
• Woodstoves	24	Ash	0.05 ng/g (15)[b]	ND[a] - 0.20 ng/g (17)	23.4 ng/g[c] (24)	0.007 - 210 ng/g	-	-	54, 165, 167
• Fireplaces	2	Ash	1.0 ng/g (1)	-	23.3 ng/g[c] (2)	1.79 - 14.7 ng/g	-	-	62
• Oil and Wood Heater	1	Ash	0.8 ng/g	-	21.7 ng/g[c]	-	-	-	62
PCP-Treated Wood Combustion									
• Controlled Air Incinerator	1	Ash	-	-	ND[d]	-	ND[d]	-	220
		FG	-	-	ND[d]	-	ND[d]	-	220
• Incinerator	1	FG (Duct)	-	-	1520 ng/m^3	-	587 ng/m^3	-	233
• Fluidized Bed System	1	FA	-	-	324 ng/g	-	241 ng/g	-	179
• Pilot Scale Incineration	1	Stack	-	-	230,870 ng/g feed (2)	111,540 - 350,200 ng/g feed	-	-	6
• Pilot Scale Incineration									
• treated wood wool	1	Smoke gases	-	-	392,000 ng/g feed (1)	-	-	-	190
• treated birch leaves	2	Smoke gases	-	-	209,150 ng/g feed (2)	205,000 - 213,300 ng/g fad	-	-	190

- - means no data.
[a] Not Detected. Assumed to be zero for calculations.
[b] Number in parenthesis is number of samples.
[c] Penta-CDD homologue not analyzed far.
[d] TCDD/TCDF scan only.

that some of the variability could potentially be attributed to fuel contamination, although feed samples were not analyzed for PCDD content.

Ash samples from the chimneys of two fireplaces were analyzed for PCDD's.[62] One fireplace was 12 years old and one was 25 years old. The 25-year-old fireplace had total PCDD concentrations of 44.7 ng/g including 1 ng/g of 2378-TCDD. Ash samples from the 12-year-old fireplace contained 1.79 ng/g PCDD. No TCDD isomers were detected at a detection limit of 0.04 ng/g. The penta-CDD homologue was not analyzed for in either of these samples.

Ash samples scraped from the flue pipe of a residential heater combusting both oil and wood were analyzed for PCDD's. After burning only oil, the PCDD level in the ash was 0.280 ng/g. By comparison, after burning only wood, the PCDD level was 0.97 ng/g. After co-firing wood and oil, 21.7 ng/g PCDD were detected, including 0.8 ng/g of the 2378-TCDD isomer. The penta-CDD homologue was not analyzed for in any of these samples.

3.2.4.2 Jreated Wood Combustion. Chlorophenols are produced for use as wood preservatives, slimacides, bactericides, and as starting material for the chlorinated phenoxy acids 2,4-D and 2,4,5-T. Chlorophenols may either be contaminated with PCDD's and PCDF's, or PCDD's can be formed by the dimerization of chlorophenates during pyrolysis. The following section discusses the results of several studies where chlorophenols were combusted with wood or wood products.

Two studies concerned the combustion of pentachlorophenol (PCP)-treated military munition boxes.[220,233] At the Los Alamos National Laboratory in Los Alamos, New Mexico, PCP-treated wood was incinerated under a variety of test conditions in a controlled air incinerator.[220] The incinerator had modulated burners, steam injection capability, and enhanced mixing of secondary air with the primary chamber effluent. Ash samples were taken from the hot zone between the primary and secondary combustion chambers. Neither TCDD's nor TCDF's were detected at a detection limit of 17 ng/g.

At the Tooele Army Depot in Tooele, Utah, PCP-treated ammunition boxes and explosive-contaminated wastes were incinerated.[233] The incinerator was designed to decontaminate metal parts containing explosive residue. The

incinerator has an unfired afterburner (refractory lined duct) with a combustion residence time of 0.3 seconds. Four tests were performed while the incinerator was firing: I) no waste fuels, 2) wood freshly coated with PCP, 3) 40 percent by weight PCP-treated wood and 60 percent by weight contaminated waste (including wood, cloth, metal, and rubber). Results of the analysis of stack emissions for two baseline tests showed average PCDD emissions of 5.0 ng/m^3 and average PCDF emissions of 9.82 ng/m^3. The analysis of stack emissions for three tests conducted while the 40/60 mix was fired showed average PCDO emissions of 125 ng/m^3 and average PCDF emissions of 14.2 ng/m^3. Analysis of stack emissions for three tests while freshly coated wood was fired showed average PCDO emissions of 8,215 ng/m^3 and average PCDF emissions of 426 ng/m^3. When only ammunition boxes were incinerated, afterburner samples were taken. Analysis of afterburner samples showed PCDD emissions of 1,420 ng/m^3 and PCDF emfssions of 587 ng/m^3.

A pilot scale incinerator was used to burn wood chips which had been mixed with technical grade tri- and tetrachlorophenate.[6] At combustion temperatures of 500 to 800°C (932 to 1,472°F), the formation of PCDD's was demonstrated. At higher temperatures, the formation of PCDD's decreased. When wood chfps and trichlorophenate were burned, stack emissions of total PCDD's were 111,540 ng/g feed. Uhen tetrachlorophenate was burned with wood chips, stack emissions contained 350,200 ng/g feed. Addition of copper salts to the tetrachlorophenate formulation and increasing the residence time within the incinerator reduced the emission of PCDD's.

In another study, fly ash samples from a fluidized bed system burning PCP-treated wood, painted wood, and hypochlorite-treated paper were analyzed.[179] Total PCDD's and PCDF's detected in fly ash samples after burning painted wood were 177 ng/g and 217 ng/g, respectively. When PCP-treated wood was burned, PCDD levels in the fly ash were 324 ng/g and PCDF levels were 241 ng/g. When the hypochlorite-treated paper was burned, large amounts of chlorine were present but PCDD and PCDF levels were relatively low with 24 ng/g of PCOD detected and 12 ng/g PCDF detected. The addition of pentachlorophenol to these fuels did not increase PCDD or PCDF emissions.

In a pilot scale study, two chlorophenate formulations, Servarex and Kymmene KY-5, were sprayed over wood wool and birch leaves and combusted in an open fire.[190] These formulations are mixtures of 2,4,6 tri-, 2,3,4,6 tetra- and pentachlorophenate as sodium salts. PCDD's and PCDF's were detected in these two formulations at concentrations of 20 and 150 ppm, respectively. When Servarex and KY-5 were each burned separately, high levels of PCDD's were formed. When burned alone, the Servarex formed 21,600 ng/g of PCDD and the KY-5 formed 11,600 ng/g of PCDD. Each of these was then sprayed over birch leaves and wood wool and combusted in an open fire. One gram of chlorophenate was dissolved in 20 ml of water and sprayed over 30 grams of birch leaves or wood wool. Smoke gases were trapped in charcoal filters and analyzed. When birch leaves sprayed with Servarex were burned, 213,300 ng/g feed of PCDD's were formed. When wood wool and Servarex were burned, 392,000 ng/g feed of PCDD's were formed. When birch leaves and KY-5 were burned, 205,000 ng/g feed of PCDD's were formed. Purified chlorophenates were also burned with birch leaves. When 2,4,6 trichlorophenate and pentachlorophenate were burned with birch leaves, levels of PCDD's formed were 1,115,000 ng/g feed and 957,200 ng/g feed, respectively.

3.2.5 Boilers Co-firing Wastes

Table 3-7 represents the emissions data for boilers co-firing wastes. EPA's Hazardous Waste Engineering Research Laboratory (HWERL) (formerly Industrial Environmental Research Laboratory - Cincinnati (IERL)) conducted studies on industrial boilers co-firing waste products.[41] Four boilers co-firing chlorinated wastes such as creosote sludge, chlorinated solvents, and waste oil were tested. Stack emissions from three of the four boilers were tested for PCDD's at a detection limit of 1,000 ng/m^3 but none were detected. The fourth boiler was a steam generator firing waste wood contaminated with pentachlorophenol. Stack emissions of 2378-TCDD from this boiler ranged from t0.4 to <1.5 ng/m^3. Total PCDD stack emissions ranged from 74.6 to 76.4 ng/m^3 and averaged 75.5 ng/m^3.

A second study for EPA's HWERL tested waste fuels and stack gas emission samples from five industrial boiler test sites co-firing hazardous waste

reports.[40,41] The characteristics of the facility (Site ISW-A) tested are summarized in Table 4-6.

4.2.3.4 Wire Reclamation Incinerators. Three wire reclamation incinerators were pre-test surveyed, and one facility was chosen for testing (Site WRI-A). The facility chosen was judged to be a "high" potential site because the feed contained some PVC-coated wire and PCB-contaminated transfonner cores.

Pre-test facility characteristics are shown in Table 4-7. The typical wire incinerator is a batch-fed, natural gas-fired unit equipped with an afterburner for emissions control. The EPA's authority under Section 114 of the Clean Air Act was used to gain entrance to two of the pre-tested facilities in the wire reclamation source category.

4.2.3.5 Carbon Regeneration Furnaces. A single site was pre-test surveyed and eventually tested. This site was chosen because it was felt to be representative of other facilities in the source category. The facility was judged to have "average/high" potentfal for CDD emissions based on the heterogeneity of the Feed stream, and the potential for precursors to be present. A summary of the characteristics of the facility tested is given in Table 4-8.

4.2.3.6 Secondary Copper Blast Furnaces. Two blast furnaces were pre-tested, and one was chosen for testing. The facility chosen was estimated to have "high" potential for COO emissions due to the abundance of chlorinated plastics in the feed. The other facility processes tittle plastic-bearing copper scrap in its blast furnace and was judged to have "low" potential for CDD emission. Characteristics of the pre-tested facilities are given in Table 4-9.

4.2.3.7 Wood-Fired Boilers. Four wood-fired boilers were pre-tested. One site was chosen for testing. This facility was judged to have "high" potentfal for CDD emissions with respect to the rest of the source category because it fires wood which has been stored in salt water (i.e., salt-laden wood. The inorganic chlorine content in the feed to this unit is high. The other facilities pre-tested also reported using some salt-laden wood, but to a lesser degree than the site chosen for testing.

TABLE 4-10. INFORMATION COLLECTED AT WOOD-FIRED BOILER SITES DURING PRE-TEST SURVEYS FOR TIER 4

Site Code	WFB-A	WFB-B	WFB-C	WFB-I
Test Site	X			
Estimated Dioxin Emissions Potential	High	High	High	High
Unit Design	Dutch oven	Dutch oven	Outch oven	Dutch oven
Feed Rate (lb/hr)	45,000	175,000	50,000	-
Control Device	Cyclone/ Baghouse	Multiclone/ Electrostatic gravel bed	Baghouse	-
Feed Material/ Precursor Information	Hagged-fuel, primarily salt-laden wood	Hogged-fuel, some salt-laden woad	Hogged-fuel, some salt-laden wood	Hogged-fuel, some salt-laden wood
Maximum Temp. in Boiler (^{o}F)	1800	2300-2600		

5.7 ASH SAMPLING DATA

Table 5-16 summarizes the PCDD/PCDF content of ash samples collected at the Tier 4 test sites. These data are discussed below for each source category, grouping.

Sewage Sludge Incinerators

For all three sewage sludge incinerators 2378-TCDD was not detected in the bottom ash. Total PCDD and total PCDF were not detected at Site SSI-A, and each were no more than 70 ppt at Sites SSI-8 and SSI-C. At Site SSI-C, filterable solids from the scrubber water and the filtrate were analyzed separately. Thefilterable solids did not contain detectable quantities of 2378-TCDD, but 0.7 ng/liter of total PCDD and 13 ng/liter of total PCDF were detacted. The filtrate contained much less PCDD/PCDF; 2×10^{-5} ng/liter of total PCDD and 3×10^{-4} ng/liter of total PCDF were detected.

Black Liauor Boilers

The ESP ash was sampled and analyzed only at Site BLB-C. At Site BLB-A, particulates were controlled with a wet bottom ESP; therefore ash samples could not be collected. At site BLB-B, particulates were controlled with a dry bottom ESP but there was no accessible ash sampling locatfon. The ESP ash at Site BLB-C did not contain detectable quantities of 2378-TCDD, but contained 20 ppt of total PCDD and 20 ppt of total PCDF.

Wood Combustion

The bottom ash and baghouse dust from Site WFB-A and the bottom ash from Site ISW-A were analyzed for PCDD/PCDF.

The baghouse dust from WFB-A contained 100 ppt of 2378-TCDD, 1.1×10^{6} ppt of total PCOD and 3.2×10^{5} ppt of total PCDF. The bottom ash from the primary chamber and secondary chamber of boiler WFB-A were analyzed separately. Furans were not detected in either bottom ash. However, 150 ppt of PCDD's were detected in the primary chamber bottom ash and 100 ppt of PCDD's were detected in the secondary chamber bottom ash.

For Site ISW-A, the bottom ash contained 140 ppt of 2378-TCOD, 1.4×10^{5} ppt of total PCOD and 7,400 ppt of total PCDF.

TABLE 5-16. SUMMARY OF ASH SAMPLE PCDD/PCDF DATA FOR THE TIER 4 TEST SITES

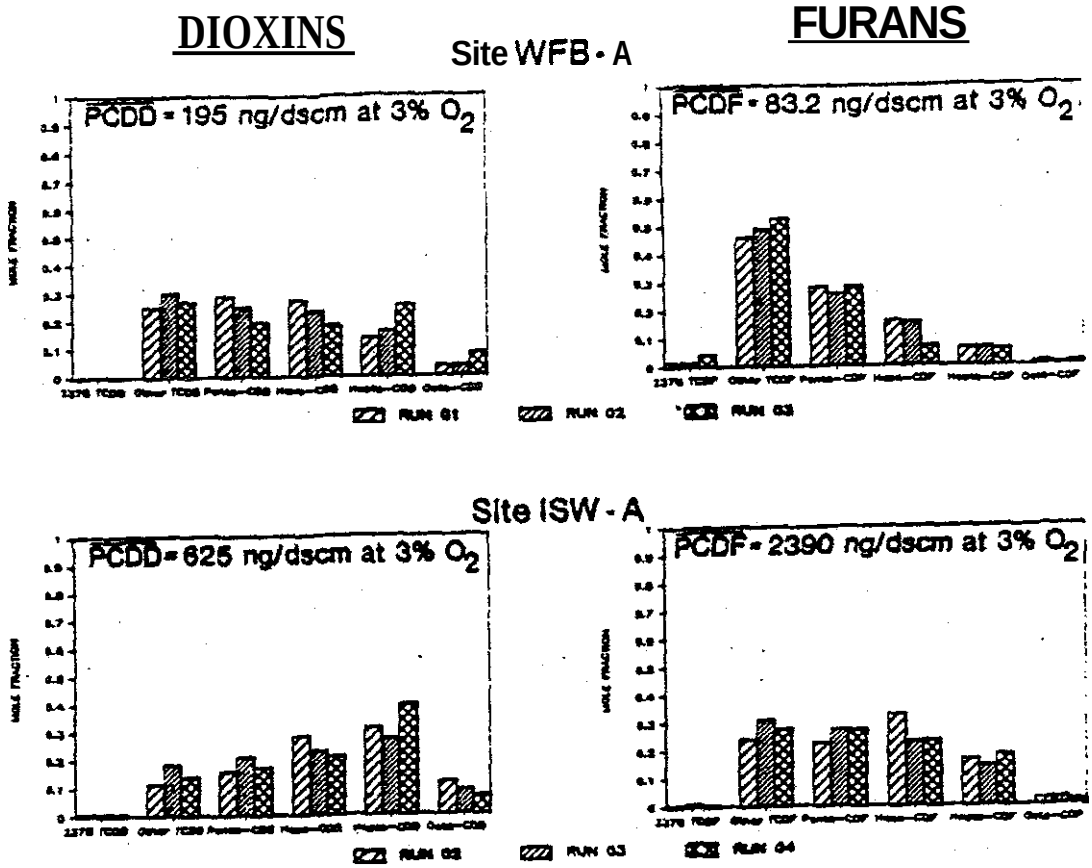
Source Category	Site	Ash Sample Type	PCDD/PCDF Content of Sample (ppt) 2378-TCDD	Total PCDD	Total PCDF
Sewage Sludge Incinerators	SSI-A	Bottom Ash	ND	ND	ND
	SSI-C	Bottom Ash	NO	20	70
		Scrubber water filterable solfds (ng/l)	NO	0.7	13
		Scrubber water filtrate (ppt)	ND	0.3	4.0
		(ng/l scrubber water)	NO	2×10^{-3}	3×10^{-4}
	SSI-8	Bottom Ash	ND	10	50
Black Liquor Boilers[a]	BLB-C	Dry bottom ESP Ash	ND	20	20
Wood Combustion	ISW-A	Bottom Ash	140	138,200	7,400
	WFB-A	Bottom Ash - Primary	NR	150	ND
		Bottom Ash - Secondary	NR	100	ND
		Baghouse Dust	100	1,143,600	315,600
Metals	WRI-A	Bottom Ash - Primary			
		Wire Only	20	240,000	730,000
		Wire & Transformer	ND	19,500	82,000
		Settling Chamber			
		Wire Only	20	521,000	2,610,300
		Wire 6 Transformer	6	231,000	657,600
	MET-A	Baghouse Dust	150	106,600	571,700
Miscellaneous	CRF-A	Baghouse Ash	ND	110	50

[a]At Site BLB-A, particulates were controlled with a wet bottom ESP; therefore, ash samples could not be collected. At Site BLB-B, the dry bottom ESP did not have an accessible ash sampling location.

For Site DBR-A, contamination prevented meaningful and valid results.

DBR = Drum and barrel incinerator
SSI = Sewage sludge incinerator
BLB = Black liquor boiler
ISW = Industrial solid waste Incinerator
WFB = Mood-fired boiler
WRI = Wire reclamation incinerator
CRF = Carbon regeneration furnace

WOOD COMBUSTION/OUTLET



Slte WS - A

Analytical Data were not Reported by Troika for MM5 Samples taken at Site WS - A due to Unacceptable Surrogate Recovery Results

Dioxin/Furan Homologue Distributions of Controlled Emissions from Wood Combustion Processes (Sites WFB - A, ISW - A, WS - A)

Figure 6 - 9.

TABLE 8-1. SUMMARY OF ASH SAMPLING SITES

Combustion Device Category	Radian Site Code	Sample Type Solid/Slurry	Sampling Organization[a]
Sewage Sludge Incinerator	SSI-A	Bottom Ash	Radian/Source Test
	SSI-B	Bottom Ash	Radian/Source Test
	SSI-C	Filterable Solids Filtrate Bottom Ash	Radian/Source Test
	SSI-D	Scrubber Water	Radian/Region V
	SSI-F	Filterable Solids Filtrate	Radian site survey
	SSI-G	Bottom Ash	Radian site survey
	SSI-H	Bottom Ash	Radian site survey
	SSI-I	Bottom Ash	Radian site survey
	SSI-J	Scrubber Solids	Radian site survey
Black Liquor Boiler	BCB-A	Economizer Ash	Radian site survey
	BCB-C	ESP Ash	Radian/Source Test
	BLB-D	ESP Ash	Radian site survey
	BLB-E	ESP Catch	Radian/Region V
	BLB-F	Economizer Ash	Radian site survey
	BLB-G	ESP Ash	CARB
Wire Reclamation Incinerator	WRX-A	Settling Chamber Ash Primary Chamber Ash	Radian/Source Test
	WRI-B	Baghouse Dust	Radian site survey
	WRI-C	Settling Chamber Ash	Radian site survey
	WRI-D	Fly Ash/afterburner	Radian/Region V
Secondary Copper Recovery	MET-A	Baghouse Ash	Radian/Source Test
	MET-B	Baghouse Dust	Radian site survey
Carbon Regeneration Furnace	CRF-B	Baghouse Dust	Radian/Source Test
	CRF-B	Filterable Solids Filtrate	Radian/Region III
	CRF-C	Afterburner Ash	Radian/Region III
Wood-fired Boiler	WFB-A	Baghouse Dust Bottom ash	Radian/Source Test
	WFB-B	Dust	EPA Region X
	WFB-C	Baghouse Dust	Radian site survey
	WFB-D	Scrubber Water	Radian/Region V
	WFB-E	Multiclone Ash	CARB
	WFB-F	Multiclone Ash	CARB
	WFB-G	Multiclone Ash	CARB
	WFB-H	Multiclone Ash	CARB
Drum and Barrel Reclamation Incinerator	DBI-A	Bottom Ash	Radian site survey
	DBR-A	Bottom Ash	Radian/Source Test
	DBI-C	Bottom Ash	Radian site survey
	DBI-D	Bottom Ash	EPA Region V
	DBI-E	Bottom Ash	Radian/Region V

(Continued)

TABLE 8-1. SUMMARY OF ASH SAMPLING SITES (Continued)

Combustion Device Category	Radian Site Code	Sample Type Solid/Slurry	Sampling Organization[a]
Hazardous Waste Incinerator	HWI-A	Bottom Ash	Radian/Region V
	HWI-B	Scrubber Water	Radian/Region V
	HWI-C	Scrubber Water	Radian/Region V
Hospital Waste Incinerator	WIH-A	Bottom Ash	Radian/Region V
	WIH-B	Fly Ash	Radian/Region V
	WIH-C	Bottom Ash	CEHTEC
	WIH-D	Primary Ash	MDEQE
Open Burn	OB-A	Flyash	OSDA
	OB-B	Ash	FDER
Sulfite Liquor Boiler	SLB-A	Filterable Solids	EPA Region X
	SLB-B	Filterable Solids	Radian/Region V
	SLB-C	Scrubber Water Solids/Filtrate Bottom ash	EPA Region V
Woodstove	WS-A	Bottom Ash	Radian
	WS-B	Bottom Ash	Radian
	WS-C	Bottom Ash	RTI-Radian/Source Test
Spreader Stoker Boiler	SSB-A	Multi-Clone Ash	EPA Region IV
	SSB-B	Multi-Clone Ash	Radian
	SSB-C	Bottom Ash Multi-clone ash	SOOHEC
Commercial Boiler	CB-A	Multi-Clone Ash	EPA Region IV
	CB-B	Fly Ash	Memphis & Shelby County Health Department
Utility Boiler	UB-A	Baghouse Dust	Radian
	UB-B	ESP Catch	Radian/Region V
	UB-D	Bottom Ash	Radian
Apartment House Incinerator	AHI-A	Bottom Ash	Hamilton county APCB
	AHI-B	Bottom Ash	CEHTEC
	AHI-C	Bottom Ash	CENTEC
	AHI-D	Bottom Ash	CENTEC
Charcoal Manufacturing	CM-A	Afterburner Ash/ Boiler Fly Ash	SODHEC
	CM-B	Bottom Ash	Region VII
Cement Kiln	CK-A	ESP Catch	Radian/Region V
	CK-B	ESP Catch	Radian/Region V

(Continued)

TABLE 8-3. COMBUSTION SOURCE CATEGORIES SAMPLED IN ASH PROGRAM
(August. 1985)

Source Category	Number of Ash Sites
Rank A	
Sewage Sludge Incinerators	9
Black Liquor Boilers	6
Rank B	
Industrial Incinerators	1
Carbon Regeneration (industrial)	3
Wire Reclamation	4
Wood Boilers (firing PCP treated or salt-laden wood)	8
Drum and Barrel	5
Secondary Copper Smelters	2
Rank C	
Hospital Waste Incinerators	4
Charcoal Manufacturing	2
Wood Staves	3
Small Spreader-Stoker Coal Boiler	3
Chlorinated Organic Waste Incinerators	3
Cement/Lime Kilns & Dryers Cofired w/Chlorinated Organic Wastes	3
Commercial Boilers Firing Fuels Contaminated with Chlorinated Organic Wastes	2
Open Burning	2
Apartment House Flue-fed Incinerators	3
Rank D	
Municipal Solid Waste (MSW) Incinerators	4
Industrial Boilers Cofiring Wastes (Utility Boilers)	3
Unranked	
Briquet Charcoal Grill	1
Sulfite Liquor Boilers	3
Residential Oil Burners Burning Waste Oil	1

Rank A - Large source categories (greater than 1 million tons of fuel and/or waste burned annually) with elevated dioxin precursor contamination or feed/fuel. These categories have a high potential to emit TCDD, and population exposure is expected to be relatively high compared to other source categories.

Rank B - Small source categories (less than 1 million tons of fuel and/or waste burned annually) or source categories with limited dioxin precursor contamination of feed/fuel. These categories have a high potential to emit TCOO, but population exposures are expected to be low.

Rank C - Source categories less likely to emit 2378-TCDD.

Rank D - Source categories which have been tested three or more times.

TABLE 8-10. SUMMARY OF ASH SAMPLING RESULTS (Continued)

Radian Site Code	Sample Type (Solid/Slurry)		Dioxin Isomer Concentration ng/g (ppb) 2,3,7,8 TCDD	Other TCDD	PCDD	HxCDD	HpCDD	OCDD	TOTAL PCDD	Furan Isomer Concentrations ng/g (ppb) 2,3,7,8 TCDF	Other TCDF	PCDF	HxCDF	HpCDF	OCDF	TOTAL PCDF
→ MFB-A	Baghouse Ash		1.00	228.00	266.20	339.70	306.80	55.50	1197.20	5.60	137.40	66.60	43.97	29.60	2.50	285.67
MFB-A	Bottom Ash	Primary chamber		[0.04]	[0.08]	[0.08]	[0.4]	0.02	0.02		[0.06]	[0.02]	[0.02]	[0.02]	[0.01]	0.00
MFB-A	Bottom Ash	Secondary Chamber	[0.01]	[0.03]	[0.08]	[0.11]	[0.1]	0.08	0.08	[0.01]	[0.04]	[0.02]	[0.03]	[0.02]	[0.02]	0.00
MFB-B	Baghouse Ash			50.70	96.40	41.50	15.80	1.80	206.20		10.40	9.00	2.60	0.50	[0.07]	22.50
MFB-C	Baghouse Ash		[0.01]	179.90	252.60	417.70	128.20	14.60	973.00	0.20	11.40	1.70	0.90	0.60	0.10	14.90
MFB-D	Scrubber Water	Analyzed by Dar	[0.17]	0.66		1.51	1.00	2.10	5.47	0.21						0.21
MFB-E	Multi-clone Ash		[0.01]	[0.02]	[0.08]	[0.01]	[0.02]	0.08	0.08	[0.08]	[0.06]	[0.08]	[0.01]	[0.001]	[0.006]	0.00
MFB-F	Multi-clone Ash		[0.02]	[0.04]	[0.04]	[0.05]	[0.05]	0.06	0.06		0.12	[0.04]	[0.08]	[0.04]	[0.02]	0.12
MFB-G	Multi-clone Ash		[0.02]	[0.08]	[0.02]	[0.02]	[0.08]	[0.05]	0.00	[0.02]	[0.04]	[0.06]	[0.02]	[0.04]	[0.009]	0.00
MFB-H	Multi-clone Ash		[0.2]	[0.05]	[0.05]	[0.05]	[0.04]	[0.05]	0.00	[0.1]	[0.20]	[0.06]	[0.07]	[0.02]	[0.01]	0.00
MDH-A	Bottom Ash		0.01	0.29	0.30	an	0.60	0.20	1.90	am	2.34	1.70	1.90	1.20	0.20	7.40
MDH-B	Fly Ash		0.04	3.36	0.90	0.50	0.10	am	4.98	0.20	3.80	0.60	0.30	[0.08]	[0.01]	4.90
MDH-C	Bottom Ash		[0.01]	[0.02]	um	0.08	am	[0.01]	0.05	[0.015]	0.08	[0.01]	0.02	0.02	[0.01]	0.07
MDH-D	Flyash		0.02	0.18	0.20	2.10	em	110.40	135.12	0.20	0.80	3.70	18.80	139.20	217.00	379.70
MDH-D	Primary Ash		0.01	0.10	0.10	0.40	1.50	1.90	4.01	0.05	1.15	2.40	3.70	6.70	3.50	17.50
MRI-A	Bottom ash	1 chamber/Runs 3,4,5	1.70	0.98	1.50	3.40	5.00	3.00	15.53	0.33	4.80	9.30	14.00	17.50	3.90	49.83
MRI-A	Bottom ash	2 chamber/Runs 1,2,6	1.00	3.70	1930	178.10	478.20	582.40	1262.70	48.00	115.20	486.20	1277.50	1868.80	1869.30	5645.00
MRI-A	Bottom ash	2 chamber/Runs 3,4,5	0.29	2.20	7.00	37.50	67.90	72.70	187.59	6.30	60.20	122.30	232.50	226.00	295.50	882.80
MRI-A	Bottom ash	1 chamber/Runs 1,2,6	0.20	8.30	19Y)	61.60	101.10	88.80	279.40	10.50	107.20	157.10	233.90	270.10	161.40	940.20
MRI-B	Baghouse Ash		[0.01]	0.10	0.30	1.30	1.90	1.0	5.00	[0.08]	0.20	0.40	0.90	2.10	1.20	4.80
MRI-C	Settling Chamber Ash		21.70	em	21.70	176.70	2340.00	500.10	3433.20	253.20	2202.10	4548.90	2914.30	6451.30	2728.10	19097.90
MRI-D	Fly Ash Before	Afterburner	[0.004]	0.09	[0.07]	0.10	0.20	am	0.46	[0.01]	0.30	0.3	0.2	0.2	0.04	0.30
MS-A	Bottom Ash		[0.01]	[0.08]	[0.02]	[0.08]	[0.08]	0.04	0.04	[0.02]	[0.05]	[0.02]	[0.02]	[0.04]	[0.01]	0.00
MS-B	Bottom Ash		[0.005]	[0.01]	[0.008]	[0.009]	[0.01]	[0.01]	0.00	[0.005]	[0.009]	[0.01]	[0.005]	[0.01]	[0.009]	0.00
MS-C	Bottom Ash		[0.005]	[0.01]	[0.01]	[0.01]	[0.006]	0.01	0.01	[0.005]	[0.01]	[0.01]	[0.01]	[0.003]	[0.002]	0.00

a Total = The sum of the tetra- thru octa- chlorinated homologues.
b Results in brackets are minimum detection limits for congeners that were not detected.
c Results reported by Dar under the Region V program included only the tetra, hexa, hepta, and octa-CDDs and 2378 TCDF. Results are reported on a solids basis.
d Results reported for this sample are in *nanograms*, not *ng/g*.

TABLE 8-12. COMPARISON OF TIER 4 ASH AND FLUE GAS DATA

Source Category	Site	Ash Sample Type	Average PCDD/PCDF Content			Flue Gas (ng/dscm @ 3% O_2)[a]		
			2378-TCDD	Total PCDD	Total PCDF	2378-TCDD	Total PCDD	Total PCDF
Sewage Sludge Incinerators	SSI-A	Bottom Ash	ND	ND	ND	0.05	19.6	34.5
	SSI-C	Bottom Ash	ND	20	70	0.1	52.7	446
		Scrubber water filterable solids (ng/l)	ND	0.7	13			
		Scrubber water filtrate (ppt) (ng/l scrubber water)	ND ND	0.3 2×10^{-5}	4.0 3×10^{-4}			
	SSI-B	Bottom Ash	ND	10	50	ND	1.6	27.6
Black Liquor[b] Boilers	BLB-C	ESP Ash	ND	20	20	ND	2.9	2.1
Wood Combustion	1%-A	Bottom Ash	140	138,200	7,400	4.5	625	2390
	WFB-A	Bottom Ash - Primary	NR	150	ND			
		Bottom Ash - Secondary	NR	100	ND			
		Baghouse Dust	100	1,143,600	315,600	0.3	195	83.2
Metals	WRI-A	Bottom Ash - Primary						
		Wire Only	20	240,000	730,000	0.1	173	305
		Wire & Transformer	ND	19,500	82,000	0.1	705	866
		Settling Chamber						
		Wire Only	20	521,000	2,610,300			
		Wire & Transformer	6	231,000	657,600			
	MET-A	Baghouse Dust	150	106,600	571,700	232	11,900	60,700
	DBR-A[c]	Bottom Ash	0.03	17	16	16	688	2,165
Miscellaneous	CRF-A	Baghouse Ash	ND	110	50	ND	3.7	3.3

[a] Flue gas concentration shown for outlet location.
[b] At Site All-A, particulates were controlled with rotbottom ESP's, therefore samples were not collected. At Site BLB-B, particulates were controlled with a dry bottom ESP, but the sampling location was inaccessible.
[c] For Site DBR-A, contamination prevented meaningful and valid results.

DBR = Drum and barrel incinerator
SSI = Sewage sludge incinerator
BLB = Black liquor boiler
ISW = Industrial solid waste incinerator
WFB = Wood-fired boiler
WRI = Wire reclamation incinerator
CRF = Carbon regeneration furnace

STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD

FACILITIES INSPECTION REPORT

SWRCB 001 (NEW 6-87)

ADDITIONAL INFORMATION SHOULD BE ATTACHED TO ORIGINAL

1. WDS NUMBER (Must be 11 digits)	2. NAME OF AGENCY RESPONSIBLE FOR DISCHARGE
1B85030RMEN	Georgia Pacific Corporation
3. DATE INSPECTION COMPLETED (Year Mo. Day)	4. NAME OF FACILITY
900530	G.P.- Ash Soil Amendment

5. INSPECTION TYPE (Check One)

A1 [X] "A" type compliance—Comprehensive inspection in which samples are taken.

B1 [ ] "B" type compliance—A routine nonsampling inspection.

02 [ ] Noncompliance follow-up—Inspection made to verify correction of a previously identified violation.

03 [ ] Enforcement follow-up—Inspection made to verify that conditions of an enforcement action are being met.

04 [ ] Complaint—Inspection made in response to a complaint.

05 [ ] Pre-requirement—Inspection made to gather information relative to preparing, modifying, or rescinding requirements.

06 [ ] Miscellaneous—Any inspection not mentioned above.

NPDES

6 INSPECTION BY [X] State [ ] State/EPA Joint

7. IS EPA INSPECTION REQUIRED? [ ] Yes [X] No

8. DID YOU TAKE A BIOASSAY SAMPLE? [ ] Yes [X] No

9. IF A BIOASSAY SAMPLE WAS TAKEN, WAS IT: [ ] Static [O] Flowthrough

10. INSPECTION COMMENTS SUMMARY-REQUIRED (100 Character Maximum)

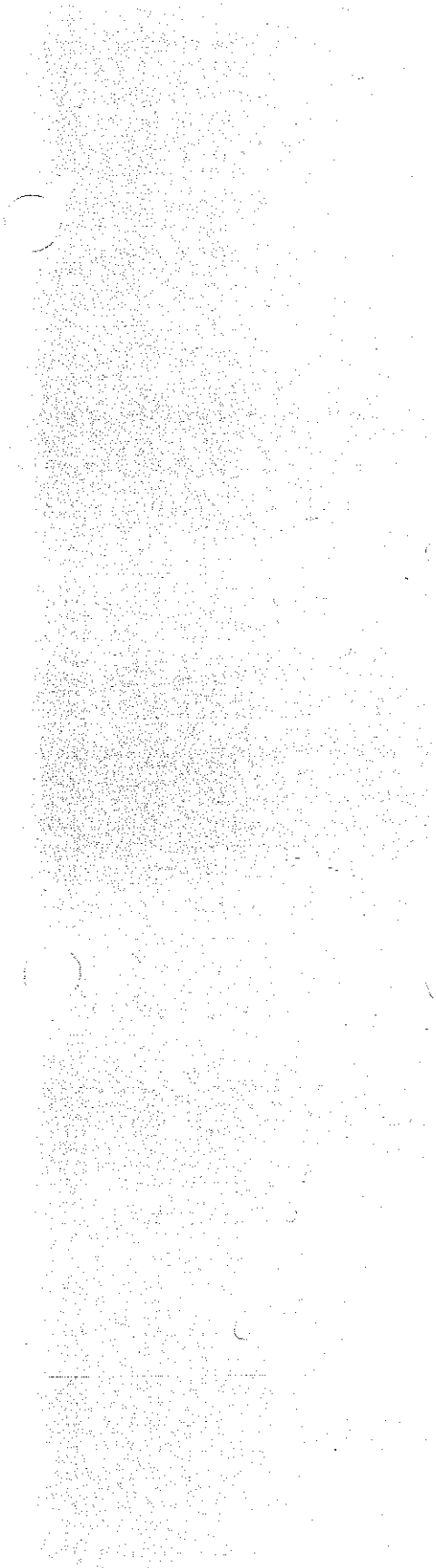
ASH PILE WAS SAMPLED FOR TCDD AND TCDF TETRA TO
CCTA DIOXINS AND FURANS ALSO PMA

11. WAS THERE A VIOLATION?

[ ] Yes (Complete violation form.) [X] No [ ] Pending (e.g., lab results)

12. INSPECTOR'S INITIALS → FCR

ADDITIONAL COMMENTS



Georgia-Pacific Corporation *Eastern Wood Products Manufacturing Division*
P.O. Box 105603
Atlanta, Georgia **30348**
Telephone (404) 521-4000
Teletype (810) **751-1000**

CONTROL BOARD
REGION 1

JUN 11 '90

June 6, 1990

Mr. Benjamin D. Kor
Executive Officer
California Regional Water Quality
Control Board
North Coast Region
1440 Guerneville Road
Santa Rosa, CA 95403

RE: Georgia-Pacific Corporation
Fort Bragg Ash Project

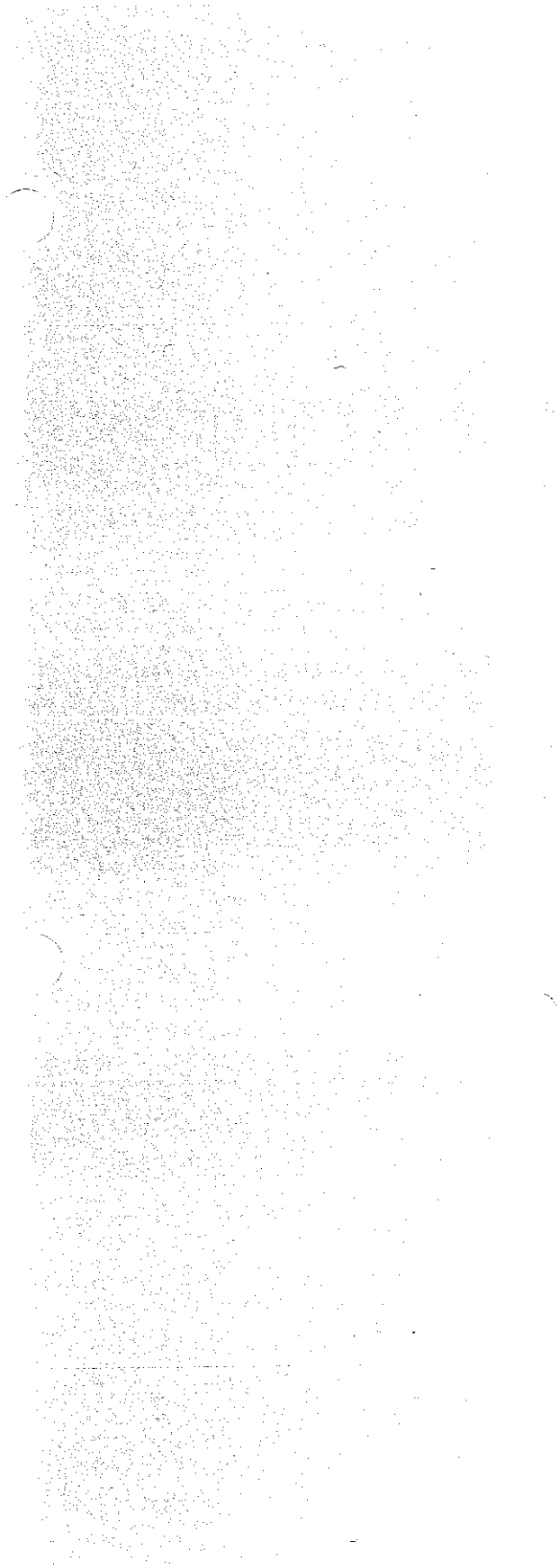
Dear Mr. Kor:

This is just to recap our meeting at the Little Valley ash amendment site in Ft. Bragg, CA with Messrs. Frank **Reichmuth** and John Hannum of your staff on May 30, 1990. Also present were other members of our Georgia-Pacific staff as well as representatives of our sampling consultants, SHN, Inc. and Karen Theiss and Associates.

A brief meeting was held at our Ft. Bragg mill office before going to the site. A suggested ASTM sampling procedure was presented by Mr. Marty Lay of SHN, Inc. and, after some discussion, it was decided that a final decision on the exact sampling method would have to be made on-site. After a brief discussion on the aquatic sampling it was also decided that on-site conditions would dictate how this would be approached. It was noted that because of the heavy rains in the area a stream survey assessment would probably be difficult, if not impossible.

After arriving at the Little Valley site a survey was made of the ash stockpile. It was noted that this pile was started in October 1989 and represented the entire mill production of fly ash since that time. Also some fly ash that had been previously stockpiled at the mill had also been added to the pile.

After measuring the size of the ash pile, it was decided (for sampling purposes) to "divide" the pile in half lengthwise and then further divide it into quadrants for locating sampling holes. These sampling holes were located using the ASTM random number tables. Samples were then obtained from various depths in each sampling hole. Samples collected from each half of the pile were composited to yield a sample that was submitted for analysis. Split samples were also obtained and given to Frank Reichmuth and John Hannum. One split sample from each composite was also retained for archive.



California Analytical Laboratory

Enseco
A CORNING Company

June 14, 1990

Lab ID: 053070

Jay Tice
Georgia Pacific Corp.
1875 Eye Street
Washington, DC 20006

Dear Dr. Tice:

Enclosed are the preliminary data sheets for the two ash samples from the Fort Bragg-Little Valley Project.

One concern we have is the low hepta and octa internal standard recoveries in sample LVA1. We are analyzing a re-extraction at this time, and hope to be able to report Improved recoveries in the final report.

It should be pointed out that the results reported are 2,3,7,8-isomer specific for the 2,3,7,8-TCDD and 2,3,7,8-TCDF only. The penta and hexa dioxin and furan values are maximum possible concentrations reported off the DB-5 column. The isomer specific values which will be reported off the SF-2331 column could be significantly lower.

If you have any questions, please give us a call.

Sincerely,

Michael J. Miille, Ph.D.
Division Director

ka

Enseco Incorporated
2544 Industrial Boulevard
West Sacramento, California 95691
916/372-1393 Fax: 916/372-7768

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific Corp.
Client ID: Method Blank
Lab ID: 053070-0001-MB Enseco ID: 150833
Matrix: SOLID Sampled: NA Received: NA
huthorfzed: 01 JUN 90 Prepared: 02 JUN 90 Analyzed: 07 JUN 90

sample Amount 2.00 G
Percent Mi sture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	0.35	
2,3,7,8-TCDF	ND	pg/g	0.12	
PeCDFs (total)	ND	pg/g	14	
1,2,3,7,8-PeCDF	ND	pg/g	14	
2,3,4,7,8-PeCDF	ND	pg/g	14	
HxCDFs (total)	ND	pg/g	1.1	
1,2,3,4,7,8-HxCDF	ND	pg/g	1.1	
1,2,3,6,7,8-HxCDF	ND	pg/g	1.1	
2,3,4,6,7,8-HxCDF	ND	pg/g	1.1	
1,2,3,7,8,9-HxCDF	ND	pg/g	1.1	
HpCDFs (total)	ND	pg/g	0.86	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	0.86	
1,2,3,4,7,8,9-HpCDF	NO	pg/g	0.86	
OCDF	ND			
Dioxins				
TCDDs (total)	ND	pg/g	1.0	
2,3,7,8-TCDD	ND	pg/g	0.64	
PeCDDs (total)	ND	pg/g	11	
1,2,3,7,8-PeCDD	ND	pg/g	11	
HxCDDs (total)	ND	pg/g	1.4	
1,2,3,4,7,8-HxCDD	ND	pg/g	1.4	
1,2,3,6,7,8-HxCDD	ND	pg/g	1.4	
1,2,3,7,8,9-HxCDD	ND	pg/g	1.4	
HpCDDs (total)	ND	pg/g	5.5	
1,2,3,4,6,7,8-HpCDD	ND	pg/g	5.5	
OCDD	ND	pg/g	7.0	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an inte ral part of this report.
Rev 238787

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific Corp.
Client ID: Method Blank
Lab ID: 053070-0001-MB Enseco ID: 150833
Matrix: SOLID Sampled: HA Received: NA
Authorized: 01 JUN 90 Prepared: 02 JUN 30 Analyzed: 07 JUN 90

Sample Amount 2.00 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	125
13C-2,3,7,8-TCDD	131
13C-1,2,3,7,8-PeCDD	77
13C-1,2,3,6,7,8-HxCDD	96
13C-1,2,3,4,6,7,8-HpCDD	90
13C-OCDD	73

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an integral part of this report.
Rev 230787

Enseco

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific Corp.
Client ID: LVAl-ash
Lab ID: 053070-0002-SA **Enseco ID:** 150834
Matrix: SOLID **Sampled:** 30 MAY 90 Recetved: 01 JUN 90
Authorized: 01 JUN 90 Prepared: 02 JUN 90 Analyzed: 07 JUN 90

Sample Amount 2.10 G
percent Moisture RA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	170	pg/g	--	
2,3,7,8-TCDF	8.2	pg/g	--	
PeCDFs (total)	100	pg/g	--	
1,2,3,7,8-PeCDF	11	pg/g	--	
2,3,4,7,8-PeCDF	13	pg/g	--	
HxCDFs (total)	13	pg/g	--	
1,2,3,4,7,8-HxCDF	1.7	pg/g	--	
1,2,3,6,7,8-HxCDF	1.5	pg/g	--	
2,3,4,6,7,8-HxCDF	1.7	pg/g	--	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.35	
HpCDFs (total)	ND	pg/g	4.0	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	4.0	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	4.0	
OCDF	ND	pg/g	5.6	
Dioxins				
TCDDs (total)	20	pg/g	--	
2,3,7,8-TCDD	1.9	pg/g	--	
PeCDDs (total)	ND	pg/g	18	
1,2,3,7,8-PeCDD	ND	pg/g	18	
HxCDDs (total)	8.8	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	1.3	
1,2,3,6,7,8-HxCDD	1.6	pg/g	--	
1,2,3,7,8,9-HxCDD	ND	pg/g	1.3	
HpCDDs (total)	18	pg/g	--	
1,2,3,4,6,7,8-HpCDD	9.2	pg/g	--	
OCDD	35	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

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Enseco
A Division of Corning Incorporated

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific Corp.
Client ID: LVA1-ash
Lab ID: 053070-0002-SA Enseco ID: 150834
Matrix: SOLID Sampled: 30 MAY 90 Received: 01 JUN 90
Authorized: 01 JUN 90 Prepared: 02 JUN 90 Analyzed: 07 JUN 90

Sample Amount 2.10 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	87
13C-2,3,7,8-TCDD	74
13C-1,2,3,7,8-PeCDD	29
13C-1,2,3,6,7,8-HxCDD	70
13C-1,2,3,4,6,7,8-HpCDD	47
13C-OCDD	19

ND = Not detected
NA = Not applicabfe

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an integral part of this report.
Rev 230787

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific Corp.
Client ID: LVB1-ash
Lab ID: 053070-0001-SA Enseco ID: 350832
Matrix: SOLID Sampled: 30 MAY 90 Received: 01 JUN 90
Authorized: 01 JUN 90 Prepared: 02 JUN 90 Analyzed: 07 JUN 90

Sample Amount 2.00 G
Percent Mofsture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	140	pg/g	--	
2,3,7,8-TCDF	8.2	pg/g	--	
PeCDFs (total)	46	pg/g	--	
1,2,3,7,8-PeCDF	11	pg/g	--	
2,3,4,7,8-PeCDF	6.7	pg/g	--	
HxCDFs (total)	88	pg/g	--	
1,2,3,4,7,8-HxCDF	2.2	pg/g	--	
1,2,3,6,7,8-HxCDF	1.2	pg/g	--	
2,3,4,6,7,8-HxCDF	1.2	pg/g	--	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.43	
HpCDFs (total)	8.6	pg/g	--	
1,2,3,4,6,7,8-HpCDF	2.7	pg/g	--	
1,2,3,4,7,8,9-HpCDF	1.4	pg/g	--	
OCDF	6.5	pg/g	--	
Dioxins				
TCDDs (total)	14	pg/g	--	
2,3,7,8-TCDD	2.5	pg/g	--	
PeCDDs (total)	ND	pg/g	7.7	
1,2,3,7,8-PeCDD	ND	pg/g	7.7	
HxCDDs (total)	8.0	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.55	
1,2,3,6,7,8-HxCDD	1.4	pg/g	--	
1,2,3,7,8,9-HxCDD	14	pg/g	--	
HpCDDs (total)	15	pg/g	--	
1,2,3,4,6,7,8-HpCDD	9.6	pg/g	--	
OCDD	30	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific Corp.
Client ID: LVBI-ash
Lab ID: 053070-0001-SA Enseco ID: 150832
Matrix: SOLID Sampled: 30 MAY 90 Received: 01 JUN 90
Authorized: 01 JUH 90 Prepared: 02 JUN 90 Analyzed: 07 SUN 90

Sample Amount 2.00 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	120
13C-2,3,7,8-TCDD	109
13C-1,2,3,7,8-PeCDD	76
13C-1,2,3,6,7,8-HxCDD	92
13C-1,2,3,4,6,7,8-HpCDD	90
13C-OCDD	71

ND = Not detected
NA = Not applicable

Reported By: Martha Haler Approved By: Mike Filigenzi

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Rev 230787

Georgia-Pacific Corporation Eastern Wood Products
Manufacturing Division
P O Box [illegible]03
[illegible], Georgia 30348
Telephone (404) 521-4000
Telex (810) 751-1000

FAX TRANSMITTAL

TO: Frank Reichmuth - Water Quality Control Board California Regional

LOCATION: Santa Rosa, CA

FAX NUMBER: 707-523-0135

FROM: Gerald Tice, Georgia-Pacific, Atlanta, GA

LOCATION: Atlanta, Ga. Environmental Ensineerina - 16th Floor

FAX NUMBER: 404/827-7022

TOTAL PAGES: 8 (Including Transmittal Sheet)

DATE: 10/15/90 TIME: 4:55

If you do not receive all of the pages listed above please call Pam at 404/521-5082.

Frank,

Here are the preliminary results on the ash samples. Since I promised to send the results today I wanted to get these to you even though it is preliminary. I will forward you the final results when they are available.

Gerald Tice

California Analytical Laboratory

Enseco
A CORNING Company

June 14, 1990

tab ID: 053070

Jay Tice
Georgia Pacific Corp.
1875 Eye Street
Washington, DC 20006

Dear Dr. Tice:

Enclosed are the preliminary data sheets for the two ash samples from the Fort Bragg-Little Valley Project.

One concern we have is the low hepta and octa internal standard recoveries in sample LVA1. We are analyzing a re-extraction at this time, and hope to be able to report improved recoveries in the final report.

It should be pointed out that the results reported are 2,3,7,8-isomer specific for the 2,3,7,8-TCDD and 2,3,7,8-TCDF only. The penta and hexa dioxin and furan values are maximum possible concentrations reported off the DB-5 column. The isomer specific values which will be reported off the SP-2331 column could be significantly lower.

If you have any questions, please give us a call.

Sincerely,

Michael J. Miille, Ph.D.
Division Director

ka

Enseco Incorporated
2544 Industrial Boulevard
West Sacramento, California 95691
916/372-1393 Fax: 916/372-7768

Enseco

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific Corp.
Client ID: Method Blank
Lab ID: 053070-0001-MB Enseco ID: 150833
Matrix: SOLID Sampled: NA Received: NA
Authorized: 01 JUN 90 Prepared; 02 JUN 90 Analyzed: 07 JUN 90

Sample Amount 2.00 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	0.35	
2,3,7,8-TCDF	ND	pg/g	0.12	
PeCDFs (total)	ND	pg/g	14	
1,2,3,7,8-PeCDF	ND	pg/g	14	
2,3,4,7,8-PeCDF	ND	pg/g	14	
HxCDFs (total)	ND	pg/g	1.1	
1,2,3,4,7,8-HxCDF	ND	pg/g	1.1	
1,2,3,6,7,8-HxCDF	ND	pg/g	1.1	
2,3,4,6,7,8-HxCDF	ND	pg/g	1.1	
1,2,3,7,8,9-HxCDF	ND	pg/g	1.1	
HpCDFs (total)	ND	pg/g	0.86	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	0.86	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.86	
OCDF	ND	pg/g	4.9	
Dioxins				
TCDDs (total)	ND	pg/g	1.0	
2,3,7,8-TCDD	ND	pg/g	0.64	
PeCDDs (total)	ND	pg/g	11	
1,2,3,7,8-PeCDD	ND	pg/g	11	
HxCDDs (total)	ND	pg/g	1.4	
1,2,3,4,7,8-HxCDD	ND	pg/g	1.4	
1,2,3,6,7,8-HxCDD	ND	pg/g	1.4	
1,2,3,7,8,9-HxCDD	ND	pg/g	1.4	
HpCDDs (total)	ND	pg/g	5.5	
1,2,3,4,6,7,8-HpCDD	ND	pg/g	5.5	
OCDD	ND	pg/g	7.0	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maler Approved By: Mike Filiganzi

The cover letter is an integral part of this report.

Enseco

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific Corp.
Client ID: Method Blank
Lab ID: 053070-0001-Ml **Enseco ID:** 150833
Matrix: SOLID **Sampled:** HA **Received:** NA
Authorized: 01 JUN 90 **Prepared:** 02 JUN 90 **Analyzed:** 07 JUN 90

Sample Amount 2.00 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	125
13C-2,3,7,8-TCDD	131
13C-1,2,3,7,8-PeCDD	77
13C-1,2,3,6,7,8-HxCDD	96
13C-1,2,3,4,6,7,8-HpCDD	90
13C-OCDD	73

ND = Not detected
NA = Not applicable

Reported By: Martha Maier **Approved By:** Mike Filigenzi

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Rev 230787

Enseco

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific Corp.
Client ID: LVA1-ash
Lab ID: 053070-0002-SA Enseco ID: 150834
Matrix: SOLID Sampled: 30 HAY 90 Recefved: 01 JUN 90
Authorized: 01 JUN 90 Prepared: 02 JUN 90 Analyzed: 07 JUN 90

Sample Amount 2.10 G
Percent Moisture NA

Parameter	Result	Unlts	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	170	pg/g	--	
2,3,7,8-TCDF	8.2	pg/g	--	
PeCDFs (total)	100	pg/g	--	
1,2,3,7,8-PeCDF	11	pg/g	--	
2,3,4,7,8-PeCDF	13	pg/g	--	
HxCDFs (total)	13	pg/g	--	
1,2,3,4,7,8-HxCDF	1.7	pg/g	--	
1,2,3,6,7,8-HxCDF	1.5	pg/g	--	
2,3,4,6,7,8-HxCDF	1.7	pg/g	--	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.35	
HpCDFs (total)	ND	pg/g	4.0	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	4.0	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	4.0	
OCDF	ND	pg/g	5.6	
Dioxins				
TCDDs (total)	20	pg/g	--	
2,3,7,8-TCDD	1.9	pg/g	--	
PeCDDs (total)	ND	pg/g	18	
1,2,3,7,8-PeCDD	ND	pg/g	18	
HxCDDs (total)	8.8	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	1.3	
1,2,3,6,7,8-HxCDD	1.6	pg/g	--	
1,2,3,7,8,9-HxCDD	ND	pg/g	1.3	
HpCDDs (total)	18	pg/g	--	
1,2,3,4,6,7,8-HpCDD	9.2	pg/g	--	
OCDD	35	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific Corp.
Client ID: LVA1-ash
Cab ID: 053070-0002-SA Enseco ID: 150834
Matrix: SOLID Sampled: 30 MAY 90 Received: 01 JUN 90
Authorfzed: 01 JUN 90 Prepared: 02 JUN 90 Analyzed: 07 JUN 90

Sample Amount 2.10 G
percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	87
13C-2,3,7,8-TCDD	74
13C-1,2,3,7,8-PeCDD	29
13C-1,2,3,6,7,8-HxCDD	70
13C-1,2,3,4,6,7,8-HpCDD	47
13C-OCDD	19

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an integral part of this report.
Rev 230787

Enseco

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific Corp.
Client ID: LVB1-ash
Lab ID: 055070-0001-SA Enseco ID: 150832
Matrix: SOLID Sampled: 30 MAY 90 Recefved: 01 JUN 90
Authorized: 01 JUN 90 Prepared: 02 JUN 90 Analyzed: 07 JUN 90

Sample hunt 2.00 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	140	pg/g	--	
2,3,7,8-TCDF	8.2	pg/g	--	
PeCDFs (total)	46	pg/g	--	
1,2,3,7,8-PeCDF	11	pg/g	--	
2,3,4,7,8-PeCDF	5.7	pg/g	--	
HxCDFs (total)	8.8	pg/g	--	
1,2,3,4,7,8-HxCDF	2.2	pg/g	--	
1,2,3,6,7,8-HxCDF	1.2	pg/g	--	
2,3,4,6,7,8-HxCDF	1.2	pg/g	--	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.43	
HpCDFs (total)	8.6	pg/g	--	
1,2,3,4,6,7,8-HpCDF	2.7	pg/g	--	
1,2,3,4,7,8,9-HpCDF	1.4	pg/g	--	
OCDF	6.5	pg/g	--	
Dioxins				
TCDDs (total)	14	pg/g	--	
2,3,7,8-TCDD	2.5	pg/g	--	
PeCDDs (total)	ND	pg/g	7.7	
1,2,3,7,8-PeCDD	ND	pg/g	7.7	
HxCDDs (total)	8.0	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.55	
1,2,3,6,7,8-HxCDD	1.4	pg/g	--	
1,2,3,7,8,9-HxCDD	1.4	pg/g	--	
HpCDDs (total)	15	pg/g	--	
1,2,3,4,6,7,8-HpCDD	9.6	pg/g	--	
OCDD	30	pg/g	--	

(continued on following page)

ND = Not detected.
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific Corp.
Client ID: LVB1-ash
Lab ID: 053070-0001-SA Enseco ID: 150832
Matrix: SOLID Sampled: 30 MAY 90 Received: 01 JUN 90
Authorized: 01 JUN 90 Prepared: 02 JUN 90 Analyzed: 07 JUN 90

Sample Amount 2.00 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	120
13C-2,3,7,8-TCDD	109
13C-1,2,3,7,8-PeCDD	76
13C-1,2,3,6,7,8-HxCDD	92
13C-1,2,3,4,6,7,8-HpCDD	90
13C-OCDD	71

ND = Not detected
NA = Not applicable

Reported By: Uartha Haler Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

SHN
CONSULTING ENGINEERS
& GEOLOGISTS

John R. Selvage, P.E.
K Jeff Nelson, P.E.
Gerald Jaramillo, P.E.
Roland S. Johnson, jr., C.E.G.

2630 Harrison Ave.
Eureka, CA 95501
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480 Hemsted Drive
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(916) 221-5424
FAX (916) 221-0135

Reference: 88298.003

GEORGIA-PACIFIC CORPORATION
FORT BRAGG, CALIFORNIA

LITTLE VALLEY CREEK
SEDIMENT SAMPLING

JUNE 25, 1990

TABLE OF CONTENTS

INTRODUCTION

SHN was retained by Mr. Gerald Tice, Chief Environmental Engineer for Georgia-Pacific Corporation (GP), Atlanta, Georgia, to act as an objective sampler in the sampling for the ash amendment plan. This sampling was to include the sediment sampling in Little Valley Creek only.

SHN was expected to provide the equipment and personnel required to perform this sampling event at field determined locations, upstream and downstream of boiler ash stockpile and amendment sites. Additionally, SHN was expected to maintain a sampling log book, prepare chain-of-custody forms, and pack and ship retrieved samples to the designated testing laboratory and the designated archive depository.

SUMMARY

ENSECO-Cal Lab of West Sacramento, California was to be the designated testing laboratory and SEN - Eureka office was to be the recipient of archive samples. The basis for sampling operations was to retrieve and test samples for the constituents of polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofuran with isomer confirmation. ("CL4-CL8", plus isomers). The sampling operation and procedures were thus set up to the dioxin/furan parameters.

Sampling gear and containers were brought to the site by SHN decontaminated. Martin Lay (SHN), who is a registered Civil Engineer, was accompanied by Patrick Barsanti (SHN). Both have been OSHA 29 CFR 1910.120 certified and have conducted previous Little Valley sampling.

Martin Lay and Patrick Barsanti met with members of GP and the North Coast Regional Water Quality Control Board (NCRWQCB) to discuss sampling operations and locations. On June 25th, sampling was performed at Little Valley Creek after mutual consent between GP, SHN, and NCRWQCB. Sampling gear was decontaminated before sampling upstream and again before sampling downstream.

Collected samples were logged, sorted, and placed in iced coolers for transport by SHN to Eureka for subsequent shipment to the designated sample receiving locations. Mr. Lay completed the required chain-of-custody records, properly packaged the samples for U.P.S. shipment in iced coolers, and affixed security seals. Samples were sent June 26 to ENSECO.

As of this writing (July 9), completed chain-of-custody forms have not been received by this office, but verbal contact has been made with ENSECO and receipt of intact samples has been confirmed.

SPECIFIC OPERATIONAL PROCEDURE

Preparation

Field sampling gear and decontamination cleansers were inventoried by Mr. Lay and Mr. Barsanti at the SHN Eureka office. All sampling gear was liquinox washed, rinsed with distilled water and final rinsed with methanol in preparation for transport to the project site. Liquinox solution, methanol, hexane, and distilled water were packaged for on-site sample gear decontamination procedures: liquinox solution for initial site change washing if required, distilled water for rinsing, methanol for intermediate wash and hexane for final wash followed by distilled water rinse. Glass sampling jars with teflon lined bakelite caps were laboratory prepared and shipped to SHN by ENSECO Cal-Lab in sampling coolers.

SAMPLING RATIONALE

The objective was to collect two upstream samples outside the potential ash amendment site and ash stockpile areas of influence, and two downstream samples immediately below the amended and stockpiled areas (see Figure 1).

Collection locations for representative sediment samples from Little Valley Creek were field determined based on stream characteristics.

After collection locations were agreed upon with all those present, we mobilized to the upstream site (LVSU). Sampling protocol was discussed and a check of the streambed indicated a root/vegetation mat overlying finer sediments and native sand. SHN suggested collection of both the root mass/fine sediments, as one sample and the lower sand sediments as a second sample. This method was agreeable to all and archive split samples were also to be collected. The equipment was then decontaminated as follows:

a. liquinox soap solution wash
b. thorough deionized water rinse
c. methanol wash
d. deionized water rinse
e. hexane wash

A split-spoon sampler (decontaminated) was driven into the sediment in Little Valley Creek. The sampler was then removed from the sediment, set down horizontally and supported off the soil to split the spoon and retrieve the sample. Contents of the spoon were divided into two classifications, the upper or root biomass/sediment was scraped into a decontaminated bowl using a decontaminated spatula; and the next lower, or sandy sediment was scraped into a second decontaminated bowl, using the decontaminated spatula. A minimum of six upstream samples, from varying locations, within 40± lineal feet were extracted using this method. The lower (sandy) samples were composited into one representative sample, and the upper (root biomass/sediment) samples were composited into another representative sample. The lower (sandy) samples were then mixed and quartered on a decontaminated stainless steel tray. Two diagonally opposing quarters of the mixed sample were carefully placed into a 16 oz. sample jar marked for testing, and the other two diagonally opposing quarters were carefully placed into another 16 oz. sample jar for archive. The upper (root biomass/sediment) samples were mixed and quartered, using decontaminated equipment and trays, and carefully put into 16 oz. jars similar to the lower samples. All sample jars were then put on ice in a cooler. SHN then decontaminated the equipment before mobilizing to the downstream site (LVSL).

Samples were collected at six downstream locations using the same method as the upstream sampling. These sample jars were then put on ice in a cooler with the other sample and transported back to SHN's Eureka office.

Sampling Location Lavout

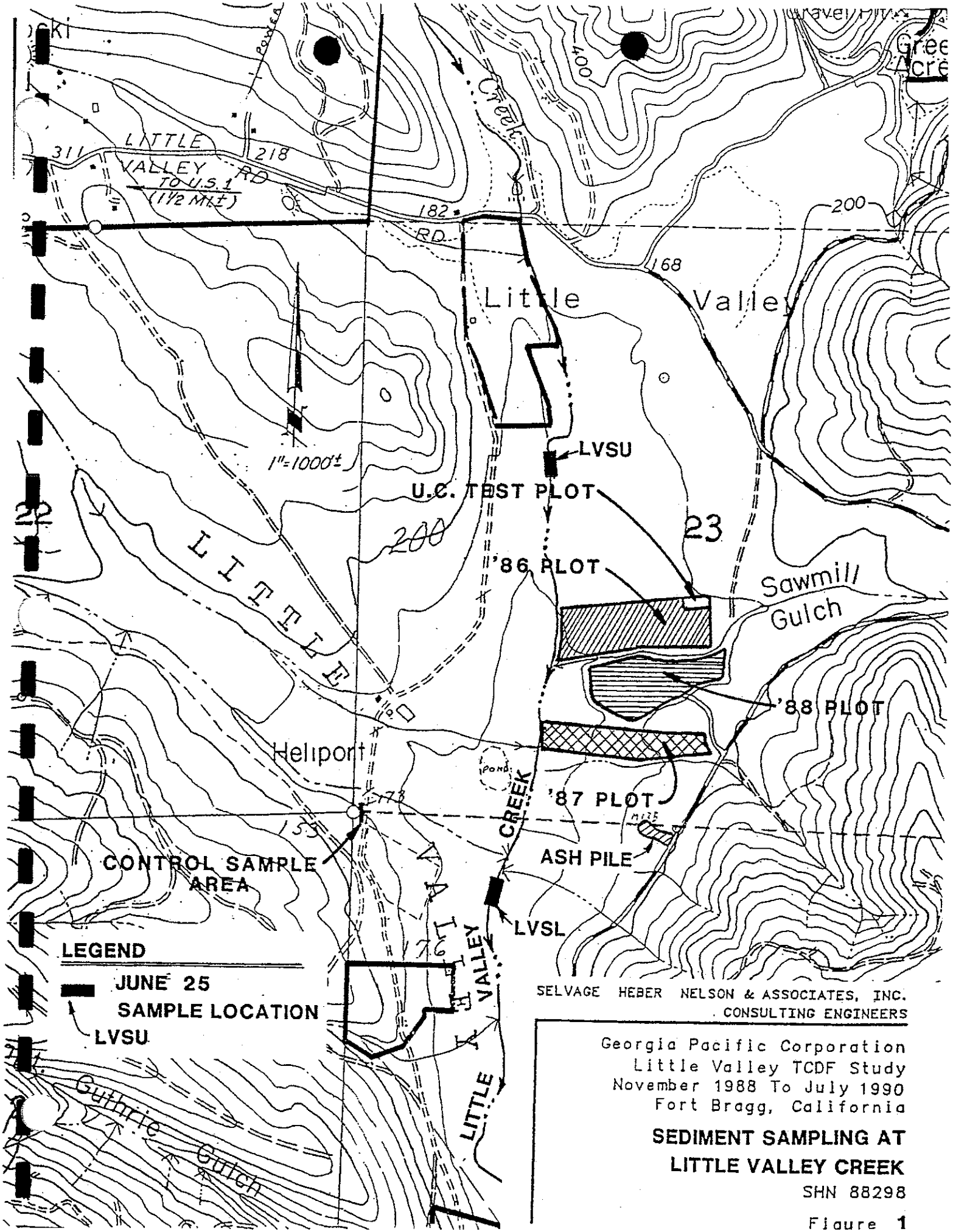
Representatives of GP, SHN, and NCRWQCB met at an upstream location on Little Valley Creek to determine the upstream sampling location and depth of samples. The location selected coincided with the aquatic sampling which was taking place at the same time (Karen Theiss & Associates). The location selected was far enough upstream to not be influenced by possible wind blown or surface runoff contamination from the amended or stockpiled areas. The downstream site was selected because it was immediately below the amended and stockpiled areas. The stream characteristics were also an important factor. Similar reaches of channel sections were sought with: 1) slight meander, 2) relatively the same type of overstory and understory, and 3) similar channel sections. The first two stream characteristics, slight meander and similar over/understory, were available at both the upstream and downstream locations. The third characteristic, similar channel sections, was more difficult to

realize. Two major tributaries to Little Valley Creek enter between the ash amending and stockpile areas (see Figure 1), thus altering the "downstream" channel area to a higher flow and less biomass (mat) development characterization. However, the two selected sampling locations provided were similar enough to allow both sediment and aquatic sampling to be conducted in the same stream reaches.

Sediment Sampling

A minimum of six sampling points, at each sampling location, was agreed upon. Each sample was taken 5 to 10 feet from the previous at random locations in the stream bed.

After decontaminating the equipment, the sampling proceeded at the upstream location (LVSU). The samples were taken, while moving upstream, using a split-spoon sampler and driving the tube 12 to 14 inches into the sediment. Each sample was extracted into two different bowls. The upper, or root biomass/sediment, and the lower, or sandy sediment. From the six samples, approximately 2 inches of upper and lower sediments were extracted each time and placed into the appropriate covered bowl. After seven samples were extracted, it was determined that large enough composites had been collected. The upper (root biomass/sediments) cornposited samples were then mixed and quartered (per ASTM C702-87); then the two diagonally opposing quarters were placed into one 16 oz., lab prepared jar, and the other two quarters were placed into another lab prepared jar. These samples were marked "LVSU-1". After decontaminating the mixing and quartering equipment, the lower (sandy sediment) was mixed and quartered and placed in two lab prepared jars similar to the upper sediments. These samples were marked "LVSU-2". The four jars were then placed on ice in a cooler. The equipment was then decontaminated before mobilizing to the downstream site (LVSL). Similar sampling, extraction, compositing mixing, and quartering procedures were then used. The upper (root biomass/sediment) representative sample was marked "LVSL-1", and the lower (sandy sediment) representative sample was marked "LVSL-2". The four jars were then placed on ice in the cooler. The eight sample jars were then transported back to SHN's Eureka office. The next day four of the jars were appropriately shipped to the testing laboratory. The other four split samples were kept at SHN's Eureka office for archive.



SELVAGE HEBER NELSON & ASSOCIATES, INC.
CONSULTING ENGINEERS

Georgia Pacific Corporation
Little Valley TCDF Study
November 1988 To July 1990
Fort Bragg, California

SEDIMENT SAMPLING AT LITTLE VALLEY CREEK

SHN 88298

Figure **1**

OFFICE NO. 1

INSPECTOR.

FACILITIES INSPECTION REPORT

SWRCB 003 (REV. 1-91)

PCA System Task No. | | | |

1B85030RMEN
WOS NUMBER

GEORGIA-PACIFIC CORPORATION
NAME OF AGENCY OR PARTY RESPONSIBLE FOR DISCHARGE

GP-ASH SOIL AMENDMENT
NAME OF FACILIM

NPOES NUMBER

91 (YY) 05 (MM) A1 (TYPE)
SCHEDULED INSPECTION DATA

~~STEVE PETRIN~~ ED WOJNSKI
ONSITE FACILITY CONTACT PERSON

91 . 06 . 18 (YYMM DD)
ACTUAL INSPECTION DATE

707 / 964 - 5651
FACILITY PHONE NO.

TITLE

__ inspection agency (State = S, State / EPA Joint = J)

N Is this a type "A1" or "B1" Compliance Inspection of an NPDES facility as required by the section 106 grant workplan? (Y/N) If so, send a copy of this report to EPA

INSPECTION TYPE (Check One)

A1 __ "A" type compliance -- Comprehensive inspection in which samples are taken. (EPA Type S).

B1 X "B" type compliance -- A routine nonsampling inspection. (EPA type C)

02 __ Noncompliance follow-up - Inspection made to veiny correction of a previously identified violation.

03 __ Enforcement follow-up -- Inspection made to verify that conditions of an enforcement action are being met

04 __ Complaint -- Inspection made in response to a complaint.

5 __ Pre-requirement-- Inspection made to gather info. relative to preparing, modifying, or rescinding requirements.

06 __ Miscellaneous -- Any inspection type n d mentioned above.

If this is an EPA inspection not mentioned above, please note type (e.g.--biomonitoring, performance audit diagnostic, etc.)

(Type)

N Were VIOLATIONS noted during this inspection? (Yes/No/Pending Sample Results)

N Was this a Quality Assurance-Based Inspection? (Y/N)

N Were bioassay samples taken? (N = No) If YES, then S = Static or F = Flowthrough.

INSPECTION SUMMARY (REQUIRED) (100 character limit)

ASH STOCKPILED, AWAITING AMENDMENT

INSPECTOR'S DATA:
INITIALS MKN SIGNATURE M R N DATE 6/24/91

For Internal Use: Reviewed by: (1) (2) (3)
Reg. WDS Coordinator

WDS Data Entry Date: - -

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
NORTH COAST REGION

Interoffice Memorandum

TO: 1) Frank Reichmuth 20 June 1991
2) File

FROM: Hark Neely

SUBJECT: Inspection of Georgia-Pacific Ft. Bragg Soil Amendment

On 18 June I completed a B level inspection of the subject facility. G-P is stockpiling ash at the northern portion of the permitted area (see attached map). It appears that they have just about enough to warrant amending. Although it was a calm day, a dust devil kicked up a small wispy funnel cloud of ash. However. there was no evidence of significant off-site migration of ash.

MNeely

FACILITIES [illegible]

SWRCB 001 (NEW 6-87)

ADDITIONAL INFORMATION SHOULD BE ATTACHED TO CO

1. WDS NUMBER (Must be 11 digits)	2. NAME OF AGENCY RESPONSIBLE FOR DISCHARGE
1B85030RMEN	GEURGIA - PACIFIC CORP
3. DATE INSPECTION COMPLETED (Year Mo Day) 90 11 26	4. NAME OF FACILITY ~~ASH DISPOSAL SITE~~ FT. BRAGG SOIL AMENDMENT

5. INSPECTION TYPE (Check One)

A1 ☐ "A" type compliance—Comprehensive inspection in which samples are taken.

B1 ☒ "B" type compliance—A routine nonsampling inspection.

02 ☐ Noncompliance follow-up—Inspection made to verify correction of a previously identified violation.

03 ☐ Enforcement follow-up—Inspection made to verify that conditions of an enforcement action are being met.

04 ☐ Complaint—Inspection made in response to a complaint.

05 ☐ Pre-requirement—Inspection made to gather information relative to preparing, modifying, or rescinding requirements.

06 ☐ Miscellaneous—Any inspection not mentioned above.

NPDES

6. INSPECTION BY	7. IS EPA INSPECTION REQUIRED?
☒ State ☐ State/EPA Joint	☐ Yes ☒ No
8. DID YOU TAKE A BIOASSAY SAMPLE?	**9. IF A BIOASSAY SAMPLE WAS TAKEN, WAS IT:**
☐ Yes ☒ No	☐ Static ☐ Flowthrough

10. INSPECTION COMMENTS SUMMARY-REQUIRED (100 Character Maximum)

NO APPARENT VIOLATIONS

11. WAS THERE A VIOLATION?

☐ Yes (Complete violation form.) ☒ No ☐ Pending (e.g., lab results)

12. INSPECTOR'S INITIALS → MKN

ADDITIONAL COMMENTS

SEE ATTACHED MEMO

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
NORTH COAST REGION

Interoffice Communication

TO: 1) Frank Reichmuth
2) File

7 January 1991

FROM: Mark Neely

SUBJECT: Compliance inspection of Georgia-Pacific Little Valley Ash Disposal site

While returning fran a prelogging inspection on Wages Creek, I detoured through Little Valley to observe the state of ash disposal. From across Little Valley Creek I could see the last amendment site under the previous permit. All the stockpiled ash had been incorporated and the land plowed. Grass was just beginning to sprout following the rain a few days previous. The new stockpile under the new permit was not visible, as I did not see all areas included.

STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD

FACILITIES INSPECTION REPORT

SWRCB 001 (NEW 6-87)

ADDITIONAL INFORMATION SHOULD BE ATTACHED TO ORIGINAL

1. WDS NUMBER (Must be 11 digits)	2. NAME OF AGENCY RESPONSIBLE FOR DISCHARGE
1B85030URMEN	Georgia Pacific Corporation
3. DATE INSPECTION COMPLETED (Year Mo. Day)	4. NAME OF FACILITY
900530	G.P.- Ash Soil Amendment

5. INSPECTION TYPE (Check One)

A1 [X] "A" type compliance—Comprehensive inspection in which samples are taken

B1 [ ] "B" type compliance—A routine nonsampling inspection.

02 [ ] Noncompliance follow-up—Inspection made to verify correction of a previously identified violation.

03 [ ] Enforcement follow-up—Inspection made to verify that conditions of an enforcement action are being met.

04 [ ] Complaint—Inspection made in response to a complaint.

05 [ ] Pre-requirement—Inspection made to gather information relative to preparing, modifying, or rescinding requirements.

06 [ ] Miscellaneous—Any inspection not mentioned above.

NPDES

6. INSPECTION BY	7. IS EPA INSPECTION REQUIRED?
[X] State [ ] State/EPA hint	[ ] Yes [X] No
8. DID YOU TAKE A BIOASSAY SAMPLE?	9. IF A BIOASSAY SAMPLE WAS TAKEN. WAS IT:
[ ] Yes [X] No	[ ] Static [ ] Flowthrough

10. INSPECTION COMMENTS SUMMARY–REQUIRED (100 Character Maximum)

ASH PILE WAS SAMPLED FOR TCDD AND TCDF TETRA TO
OCTA DIOXINS AND FURANS ALSO PMA

11. WAS THERE A VIOLATION?

[ ] Yes (Complete violation form) [X] No [ ] Pending (e.g. lab results)

12. INSPECTOR'S INITIALS → FCR

ADDITIONAL COMMENTS

STATE OF CALIFORNIA — STATE WATER RESOURCES CONTROL BOARD

FACILITIES INSPECTION REPORT

SWRCB 001 (NEW 6-87)

ADDITIONAL INFORMATION SHOULD BE ATTACHED TO ORIGINAL

1. WDS NUMBER (Must be 11 digits)	2. NAME OF AGENCY RESPONSIBLE FOR DISCHARGE
1 1 8 1 5 0 3 0 R N E N	GEORGIA - PACIFIC CORP.
3. DATE INSPECTION COMPLETED Year 90 Mo 06 Day 25	**4. NAME OF FACILITY** LITTLE VALLEY FT. BRAGG OIL AMENDMENT

5. INSPECTION TYPE (Check One)

A1 ☐ "A" type compliance—Comprehensive inspection in which samples are taken.

B1 ☒ "B" type compliance—A routine nonsampling inspection.

02 ☐ Noncompliance follow-up—Inspection made to verify correction of a previously identified violation.

03 ☐ Enforcement follow-up—Inspection made to verify that conditions of an enforcement action are being met.

04 ☐ Complaint—Inspection made in response to a complaint.

05 ☐ Pre-requirement—Inspection made to gather information relative to preparing, modifying, or rescinding requirements.

06 ☐ Miscellaneous—Any inspection not mentioned above.

NPDES

6. INSPECTION BY	7. IS EPA INSPECTION REQUIRED?
☒ State ☐ State/EPA Joint	☐ Yes ☒ No
8. DID YOU TAKE A BIOASSAY SAMPLE?	**9. IF A BIOASSAY SAMPLE WAS TAKEN, WAS IT:**
☐ Yes ☒ No	☐ Static ☐ Flowthrough

10. INSPECTION COMMENTS SUMMARY–REQUIRED (100 Character Maximum)

OBSERVED AQUATIC SAMPLING, INSPECTED POTENTIAL STOCKPILING/AMENDING AREAS

11. WAS THERE A VIOLATION?

☐ Yes (Complete violation form.) ☒ No ☐ Pending (e.g., lab results)

12. INSPECTOR'S INITIALS → MKN

ADDITIONAL COMMENTS

SEE ATTACHED MEMO

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
NORTH COAST REGION

Interoffice Communication

TO: 1) Frank Reichmuth 27 June 1990
2) John Hannum
3) File: G-P Ft. Bragg Soil Amendment

FROM: Mark Neely

SUBJECT: Compliance inspection of Georgia-Pacific Ft. Bragg Boiler Ash Soil Amendment

On 25 June 1990 I inspected the subject site, accompanied by Bill Winchester of our staff. The reason for the inspection at this time was two-fold; first, to inspect, along with the mill personnel, potential sites for stockpiling (and perhaps amending) of future ash production from the mill, and second, to allow us to observe the methods of aquatic sampling used by G-P's consultant, being performed under our enforcement.

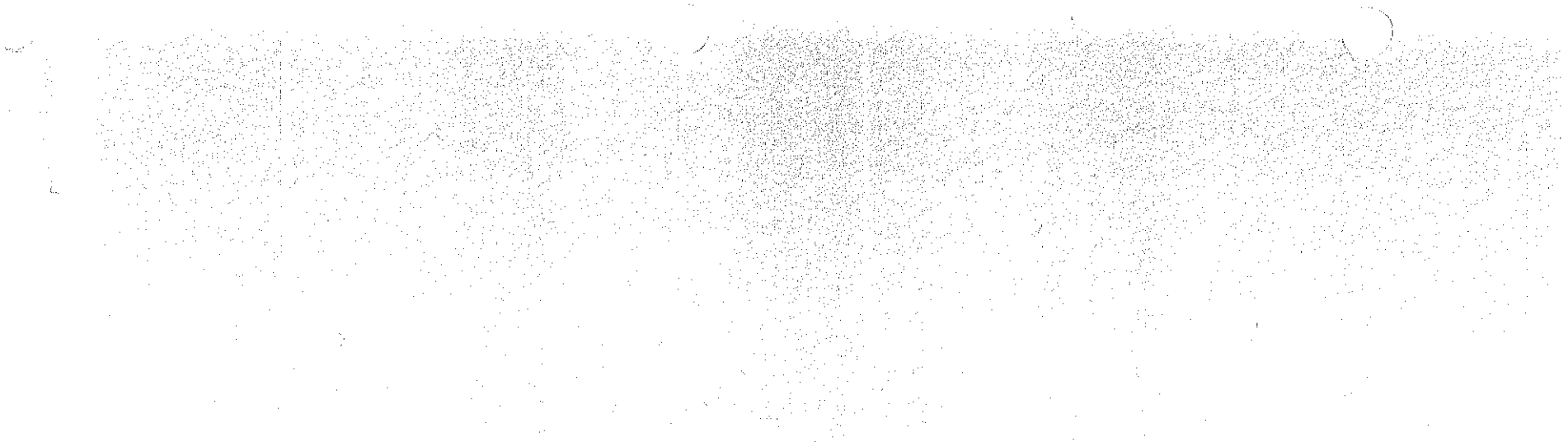
Insvection of potential stockpiling areas

I was accompanied by Dave Larkin and Jere Melo of G-P. They are running out of room to continue stockpiling of the ash from the mill boiler. The existing pile is already potentially too big a volume to amend in the approved areas, and new sites must be found. However, their permit does not encompass any areas that have not already been amended, and tir permit does not allow them to re-amend any areas. There were a number of suitable sites located on the western side of Little Valley Creek that would fit the criteria and limitations spelled out in the WDR's, but they would need to be amended into the permit. I suggested that they submit a written request, mapping out the areas to be included, and we could evaluate the proposal. They claimed that they had planned all along to re-amend areas following 5 to 10 years, but I knew nothing about that and stated my understanding of the blanket prohibition against such activities.

collection of aquatic samples

Bill Winchester and I observed the site selection and sampling protocol of the sampling for stream bottom sediments and aquatic organisms. Two sites were chosen along Little Valley Creek, one upstream and one downstream from the amended areas of the valley. Present were representatives from Selvage Heber Nelson, Tice and Associates, and G-P. We observed the sampling at the upstream (control) site. They were unable to locate any fish (stickleback was the preferred species), and requested our guidance. Basically what we told them was that the preferred alternatives for tissue analysis were 1) fish, 2) polliwogs, and 3) insects and or/freshwater mollusks. The last (unacceptable) alternative was no aquatic tissue samples at all. We later learned that they had found stickleback at a control point a little further downstream and also at the downstream samping point.

Another issue was the number of sediment samples. They proposed to take three split spoon samples at each site and composite them into two single samples. We expressed concern about the validity of only having two samples, but left the decision up to their professional judgement. Again, we have since learned that they apparently ended up with two discrete samples at each sample point. We left the site at approximately 1530.



SAMPLING LOG

FOR

GEORGIA-PACIFIC CORPORATION

FORT BRAGG, CALIFORNIA

LITTLE VALLEY CREEK

SEDIMENT SAMPLING

JUNE 25, 1990

PREPARED BY SHN
CONSULTING ENGINEERS & GEOLOGISTS

Patricia Barsanti
Assistant Engeneer

REGISTERED PROFESSIONAL ENGINEER
MARTIN E. LAU
No. 28031
3-31-94
CIVIL
STATE OF CALIFORNIA

TABLE OF CONTENTS

GENERAL INFORMATION

PURPOSE OF SAMPLING

CHARACTERIZATION OF SEDIMENTS LOCATED IN LITTLE VALLEY CREEK AT LITTLE VALLEY. BOILER ASH WAS BEING USED FOR SOIL AMENDMENT OPERATIONS, ADJACENT TO LITTLE VALLEY CREEK.

SAMPLES TO BE LABORATORY TESTED FOR;

1. Polychlorinated dibenzo-p-dioxin
2. Polychlorinated dibenzo furan w/ isomer confirmation (Cl4 - Cl8, + isomers)

PRODUCER OF WASTE

GEORGIA-PACIFIC CORPORATION
FORT BRAGG, CALIFORNIA SAWMILL

PROCESS OF PRODUCTION

ASH PRODUCED FROM HOGGED WOOD FUEL USED IN BOILER FOR LUMBER PRODUCTION ACTIVITIES.

TYPE OF WASTE

BOILER ASH; After transporting from mill, the ash is being used for soil amendment operations on site, since 1986, and also stockpiled in field area, 1990,

for potential future amendment
(see fig. 1.)

DECLARED WASTE COMPONENTS

PREVIOUSLY DECLARED NON-HAZARDOUS BY CALIF. D.O.H.S. (KENT MAYER - G.P.)
AWAITING CHARACTERIZATION

DATE OF SAMPLING

JUNE 25, 1990

LOCATION OF SAMPLING

LITTLE VALLEY; Sediment sampling in Little Valley Creek, upstream (LVSU) and downstream (LVSL) of soil amending and ash stockpile operations.

WEATHER

SUNNY and CLEAR THROUGHOUT SAMPLING OPERATIONS.

Temp 68-72 °F
Light breeze from North/Northwest

PERSONNEL ON SITE (6-25-90)

GERALD TICE	G.P. - Atlanta, GA.
LAWRENCE OTWELL	G.P. - Atlanta, GA.
TED DEER	G.P. - Fort Bragg, Ca.
BILL WINCHESTER, MARK NEELY	California Regional Water Quality Control Board - North Coast Region, Santa Rosa, CA.
MARTIN LAY, PATRICK BARSANTI	SHN Consulting Engineers and Geologists, Eureka, Ca.
VICKI FREY, TIM SALAMUNOVICH	KAREN THEISS and Associates, Mckinleyville, Ca.

SAMPLE LISTING SUMMARY (SHN)

DATE

6-25-90 Eight (8) field samples taken (SHN)
(4) 16oz. Jars, G.P.; to testing lab.
(4) 16oz. Jars, G.P. + SHN; to archive @ SHN

DISTRIBUTION OF SAMPLES (SHN)

6-26-90 LVSU-1, LVSU-2, LVSL-1, LVSL-2 > Test; Enseco-Cal Lab West Sacramento, Ca.

6-26-90 LVSU-1, LVSU-2, LVSL-1, LVSL-2 > Archive; SHN Eureka, Ca.

SAMPLING PROTOCOL

SAMPLING EQUIPMENT

1. Stainless steel mixing bowl and trays
2. Stainless steel splitting/Quartering spatulas
3. Steel split spoon Sampler w/ attachments
   1 3/8 in. ID x 14 in Long.
   a) Drill rod extensions w/ driving head. advanced with Fence Post driver.
   b) Spring and flapper retainers to hold sample in spoon upon retrieval of spoon.
4. Laboratory prepared sampling jars
   a) Glass, 16 oz., with Teflon lined bakelite Lids, screw type.
5. Decontamination Solutions (Decon.)
   a) Liquinox soap solution wash
   b) Deionized water rinse
   c) Methanol wash (analytical reagent, ACS spec. CH_3OH, cert. of lot F.W. 32.04, 99.9%)
   d) Hexane wash (glass distilled, HPLC., analysis 96.9% (GLC), water 0.03%)
6. Stainless wash/rinseate collection trays
7. Compass and flagging
8. Ice chest and packing for sample transport

SAMPLING METHODOLOGY

The objective was to collect two upstream samples outside the potential ash amendment and stockpile area influence, and two downstream samples, immediately below the amendment and stockpiled sites. (see fig. 1)

Collection locations for representative sediment samples, from Little Valley Creek, were field determined based on stream characteristics. Similar reaches of channel sections were sought with: 1) Similar channel sections (two major tributaries enter at/near ash area, downstream site), 2) slight meander, 3) relatively the same type of overstory and understory.

After collection locations were agreed upon, with all those present, we mobilized to the upstream site. Sampling protocol was discussed and a check of the streambed indicated a root/vegetation mat overlying finer sediments and native sand. SHN suggested collection of both the root mass / fine sediments as one sample and the lower sand sediments as a second sample. This method was agreeable to all, and archive split samples were also to be collected.

The equipment was then decontaminated as follows;

a) Liquinox soap solution wash
b) careful deionized water rinse.
c) methanol wash
d) Deionized water rinse

e) Hexane wash
f) Deionized water final rinse.

A split spoon sampler (decontaminated) was driven 12± inches into the sediment in Little Valley Creek. The sampler was then removed from the sediment, set down horizontally and supported off the soil to allow splitting the spoon and sample removal. Contents in the spoon were divided into two classifications, the upper or root biomass/ sediment (2± inches) was scraped into a decontaminated bowl with a deconned spatula, and the next lower (2± inches) or sandy sediments was scraped into a second deconned bowl w/ a deconned spatula. A minimum of six upstream cores, from varying locations within 40± lineal feet, were extracted using this method. The lower (sandy sediments) samples were composited into one representative sample and the upper (root biomass/ sediment) samples were composited into one representative sample. The lower (sandy sed.) sample was then mixed and quartered (per ASTM C702-87) on a stainless steel tray. Two diagonally opposing quarters, of the mixed composite, were then carefully placed into one 16 oz. lab prepared, jar and marked "LVSU-2" (for testing), and the other diagonally opposing quarters were placed into the second 16 oz. jar, also marked "LVSU-2 for archive. The upper (root biomass/sediment) samples were then mixed and quartered, using deconned

equipment and trays, and diagonally opposing quarters were carefully put into a lab prepared, 16 oz. jar marked "LVSU-1", with the other 2 diagonally opposing quarters put into the second jar, also marked "LVSU-1" for archive. These four JARS were then put on ice and set in a cooler.

SHN then decontaminated the equipment and mobilized to the downstream site. Sample cores were collected at six downstream locations using the same method as upstream sampling. The two lower (Sandy) composited samples were marked "LVSL-2" and the two upper (root biomass) composited samples were marked "LVSL-1". The four sample jars were then put on ice with the other four and transported back to SHN's Eureka office.

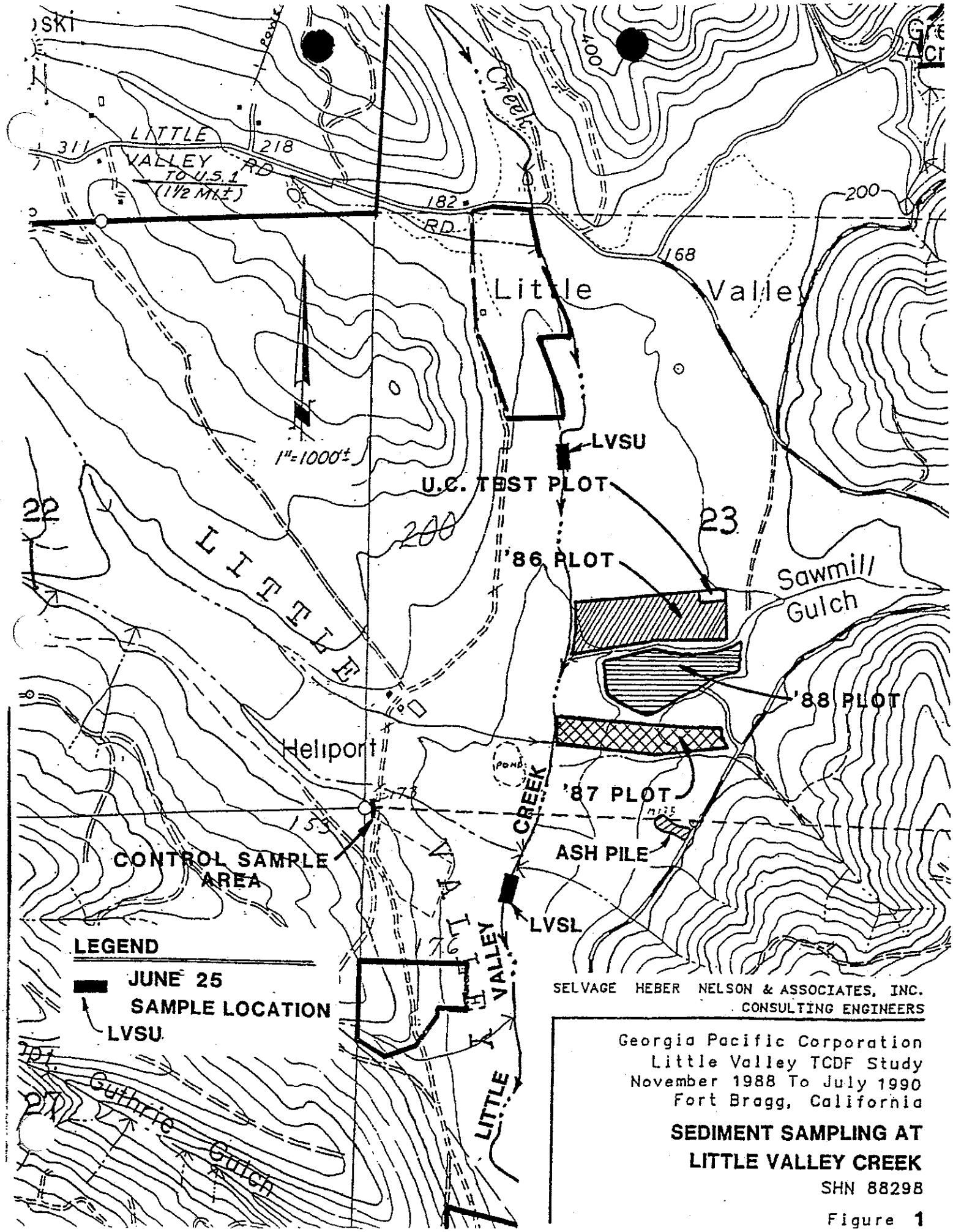
Field Sampling Data (6-25-90)

SAMPLE No. (label)	Time	Description	PRCD For
LVSU-1	1550	Upper 2", Root biomass/sediment	Test.
LVSU-2	1555	Lower 2", Sandy sediment	Test
LVSL-1	1920	Upper 2", Root biomass/sediment	Test
LVSL-2	1925	Lower 2", Sandy Sediment	Test
LVSU-1	1550	Upper 2", Root biomass/sediment	Archive
LVSU-2	1555	Lower 2", Sandy Sediment	Archive
LVSL-1	1920	Upper 2", Root biomass/sediment	Archive
LVSL-2	1925	Lower 2", Sandy Sediment	Archive

SAMPLE SHIPPING (SHN)

SAMPLE TRANSPORT AND SHIPPING

DATE	
6-25-90	SHN samples LVSU-1, LVSU-2, LVSL-1 and LVSL-2 were transported to Eureka, Ca. in iced cooler.
6-26-90	SHN samples LVSU-1, LVSU-2, LVSL-1 and LVSL-2 "Test" were cool iced packed in an ice cooler, and sent United Parcel Service (UPS) overnight delivery to ENSECO-CAL LAB, West Sacramento, Ca. ENSECO-CAL LABS cooler, 60 qt. Gott (white) Custody Seals #16461 & 16462, dated 6-26-90 UPS # 1532-2371-612
	SHN Samples LVSU-1, LVSU-2, LVSL-1 & LVSL-2 "Archive" here placed in 4°C ale. at SHN's, Eureka office.
6-27-90	Martin Lay takes custody of archive fish (Jar #6 & 7) and D.I. water blank (Jar #8) samples from Vicki Frey of Karen Theiss and Associates. Put into Archive freezer at 0°C
6-29-90	Martin Lay confirms Enseco-Cal Lab receipt of SHN's samples.



SELVAGE HEBER NELSON & ASSOCIATES, INC.
CONSULTING ENGINEERS

Georgia Pacific Corporation
Little Valley TCDF Study
November 1988 To July 1990
Fort Bragg, California

SEDIMENT SAMPLING AT LITTLE VALLEY CREEK

SHN 88298

Figure **1**

SAMPLING LOG

FOR

GEORGIA - PACIFIC CORPORATION

FORT BRAGG, CALIFORNIA

LITTLE VALLEY

ASH STOCKPILE SAMPLING

MAY 30, 1990

PREPARED BY SHN

CONSULTING ENGINEERS & GEOLOGISTS

TABLE OF CONTENTS

General Information

Purpose of Sampling

Characterization of boiler ash stockpile located at Little Valley. Ash was being used for soil amendment operations. Samples to be laboratory tested for;

1. Polychlorinated dibenzo-p-dioxin
& 2. Polychlorinated dibenzo furan w/ isomer confirmation

(CL4-CL8 + isomers)

Producer of Waste

Georgia-Pacific Corporation
Fort Bragg, California Sawmill

Process of Production

Ash produced from hogged wood fuel used in boiler for lumber production activities.

Type of Waste

Boiler Ash; stockpiled in field area after transport from mill

Declared Waste Components

Previously Declared Non-Hazardous by Calif. D.O.H.S. (Kent Mayer - G.P.)
Awaiting characterization

DATE OF SAMPLING

MAY 30, 1990

LOCATION OF SAMPLING

Little Valley; ash stockpile

WEATHER

OVERCAST WITH CONTINUOUS LIGHT TO MODERATE RAINFALL, THROUGHOUT SAMPLING OPERATIONS

TEMP - 50-55° F

LIGHT BREEZE FROM SOUTH/SOUTHWEST

PERSONNEL ON SITE (5-30-90)

GERALD TICE	GP - Atlanta, GA.
KENT MAYER	GP - Eugene, OR.
LAWRENCE OTWELL	GP - Atlanta, GA.
JOHN TICE	GP - Washington D.C.
TIM TREICHELT	GP - Sacramento, CA.
FRANK REICHMUTH, JOHN HARRUM	California Regional Water Quality Control Board - North Coast
MARTIN LAY, PATRICK BARSANTI	SHN Consulting Engineers & Geologists - Eureka, CA.
KAREN THEISS, VICKI FREY	KAREN THEISS & Associates Mckinleyville, CA.

SAMPLE LISTING SUMMARY

DATE
5-30-90

Six (6) field samples taken

(2) 16oz jars, GP; to testing lab
(2) 16oz jars, GP-SHN; to archive @ SHN
(2) 16oz jars, NCRWQCB; to testing lab

DISTRIBUTION OF SAMPLES

-ING	5-31-90	LVA1 > TEST; LVB1 >	Enseco – Cal Lab West Sacramento, CA.
WEST	5-31-90	LVA1 > ARCHIVE; LVB1 >	SHN – Eureka, CA.
A.	6-1-90	RB – LVA1 > TEST; RB – LVB1 >	Enseco – Cal Lab

:C
CA.

ater
North Coast

ncers &
reka, CA.

sociates

SAMPLING PROTOCOL

SAMPLING EQUIPMENT

1. Stainless Steel mixing bowl and trays
2. Stainless steel splitting/quartering spatulas
3. Steel split spoon sampler w/attachments
   1 3/8 in. ID x 14 in. long
   a) drill rod extensions w/driving head - advanced w/fence post driver
   b) spring retainer to hold sample
4. 3 in. hand steel soil auger
5. Laboratory prepared sampling jars
   a) glass, 16 oz, w/ teflon lined bakelite lids, screw type
6. DECONTAMINATION SOLUTIONS (DECON)
   a) Liquinox soap solution wash
   b) Deionized water rinse
   c) Methanol wash (Analytical Reagent, ACS spec. CH_3OH, Cert. of lot F.W. 32.04, 99.9%)
   d) HEXANE WASH (Glass distilled, HPLC, analysis 96.9% (GLC), water 0.003%)
7. Stainless and plastic wash/rinseate collection (respectively) trays
8. Hand level, compass, 300 ft. cloth tape, 25 ft. stl. tape, wood stakes, wrenches (pipe/open)
9. Ice chest & packing for sample transport

SAMPLING METHODOLOGY

SAMPLING POINT LOCATION/NUMBER

Pre site calculation of a number of sampling points was conducted using ASTM E122-72 method for choice of sample size to represent a lot or process. Assuming the process was represented by the ash stockpile:

$$n = (3V_o'/e)^2$$

$$n = \left(\frac{3 \times 0.25}{0.15}\right) = 25$$

n = size of sample from infinite lot
3 = factor of probability (3 in 1000)
V_o' = coefficient of variation assumed @ 25%
e = allowable sampling error assumed @ 15%

This scenario was discussed at the pre work mill meeting and at the ash stockpile and was modified by mutual agreement between NCRWQCB and G-P personnel.

The agreed upon plan became and was conducted as follows:

Ash stockpile was divided longitudinally into two sides "A" + "B". The two sides were each divided into 6 approximately equal length sections, each section then split into quadrants (4 smaller sections).

Six sampling points were randomly calculated (ASTM D 3665-87) for each side using the 24 subsections as a basis for the random calculation. See attached figure of layout.

The depth at which samples were to be taken was determined by; 1) depth of ash at specific sample location and 2) by sampler selecting depth to get variety of "aged" ash samples over entire stockpile.

SIDE "B" sampling points were staked. All equipment was decontaminated after being transported to the site in a decontaminated state. Decon operation was used as follows:

a) Liquinox soap solution wash
b) careful deionized water rinse
c) methanol wash
d) deionized water rinse
e) Hexane wash
f) deionized water final rinse

A hand auger (deconned) was used to advance holes to desired depth — 12 inches. The split spoon sampler was then driven 14 inches ± to retrieve a sample from the appropriate depth. The sampler was removed from the hole, set down horizontally and supported off the ash pile to allow splitting the spoon (clear of contact w/ ash pile). Contents of the spoon were scraped into a stainless deconned mixing bowl with a deconned spatula. The process was repeated, without further decon, for the remaining 5 borehole locations on

side "B". Six (6) core samples were thus placed in the bowl and were then mixed, split, quartered, and sampled per ASTM C 702-87 while working on stainless steel trays. Two diagonally opposing quarters of the mixed sample were discarded to the ash pile and the remaining two quarters were carefully placed into the 16oz sample containers marked LV B1, LVB1, & RB-LVB1

All equipment was then decon'ed. SIDE "A" was staked to locate sample points, and the sampling procedure used on side "B" was repeated for side "A".

A separate bag of ash was collected from the stockpile for sieve analysis to determine "fine" content of the ash. SHN soils lab was to perform the sieve analysis.

FIELD SAMPLING DATA (5-30-90)

SAMPLE No. (Label)	TIME	DESCRIPTION	PREP FOR
LVB1-ASH	1620	Baker ash stockpile	TEST
LVA1-ASH	1830		TEST
LV B1-ASH	1620		ARCHIVE
LV A1-ASH	1830		ARCHIVE
RB-LV B1	1620		TEST
RB-LV A1	1830		TEST

SAMPLE SHIPPING
SAMPLE TRANSPORT & SHIPPING

5-30-90 SHN SAMPLES LVA1-ash & LVB1-ash were transported to Eureka, CA. in iced coolers.

5-31-90 SHN SAMPLES LVA1-ash & LVB1-ash "Test" were cool ice packed in ice cooler and sent United Parcel Service (UPS) overnight delivery TO ENSECO-CAL LAB, West SACRAMENTO CA.

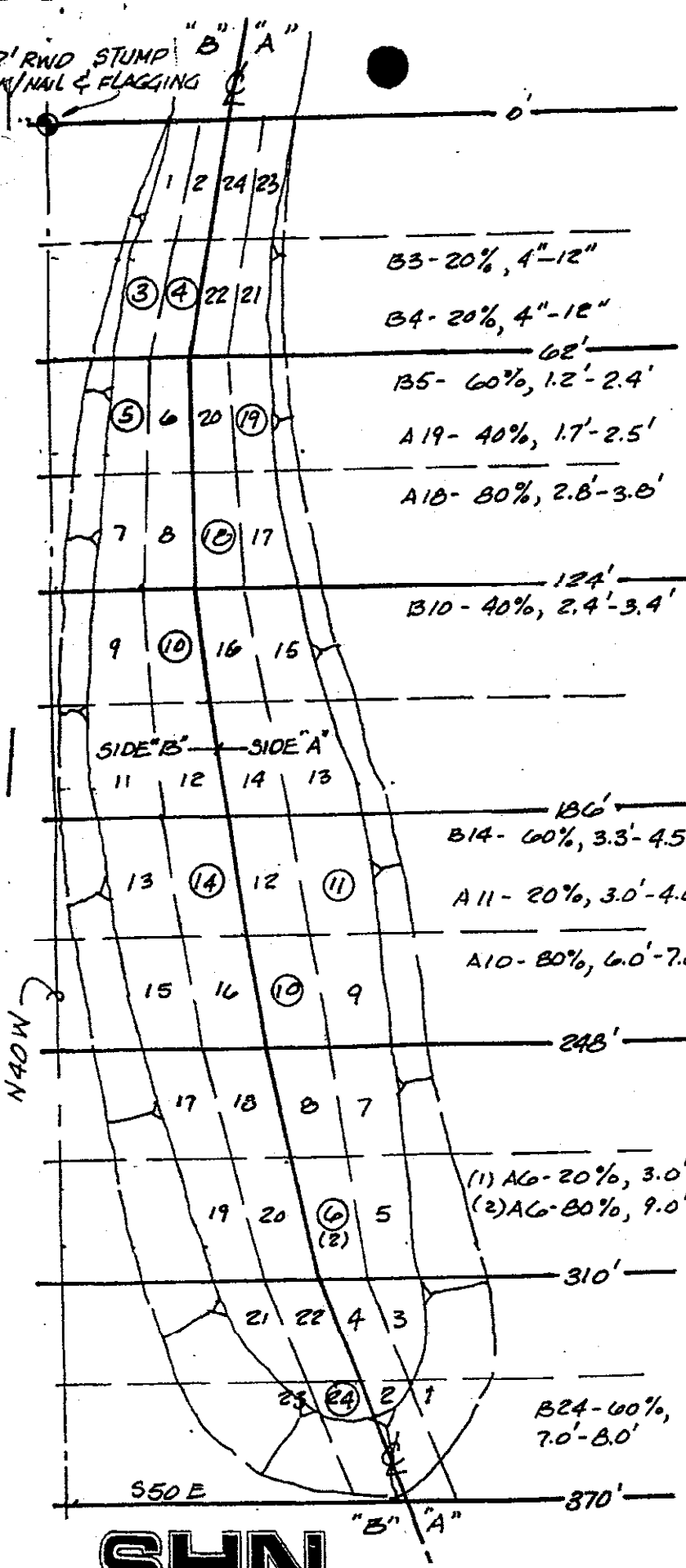
SHN cooler # 9
Custody Seals #15460 & #16459
UPS # 1532-2371-649

SHN SAMPLES LVA1-ash & LVB1-ash "archive" were placed in 4°C-cooler at SHN, Eureka, CA.

< Water Quality Board samples were taken by Frank Reichmuth & John Hannum >

6-1-90 Martin Lay confirms ENSECO receipt of SHN Samples

6-4-90 Martin Lay receives NCRWQCB memo from John Hannum relative to RWQCB send out of samples RB-LVA1 & RB-LVB1



ALL LOCATIONS ARE APPROXIMATE

0 40 80 Feet

SCALE: 1" = 40'

EXPLANATION

(3) RANDOMLY SELECTED SAMPLING LOCATION

6 DESIGNATED QUADRANT OF SIDE AND SECTION

B3 - 20% , 4"-12"

- SAMPLE DEPTH
- SAMPLE (%) DEPTH
- QUADRANT LOCATION

SHN CONSULTING ENGINEERS AND GEOLOGISTS

Georgia Pacific Corporation
Fort Bragg, California
Little Valley Ash Stockpile Sampling

PLAN

SHN 880298.003
May 30, 1990
figure 1

STATE OF CALIFORNIA — STATE WATER RESOURCES CONTROL BOARD

FACILITIES INSPECTION REPORT

SWRCB 001 (NEW 8-87)

F-

ADDITIONAL INFORMATION SHOULD BE ATTACHED TO ORIGINAL

1. WDS NUMBER (Must be 11 digits)	2. NAME OF AGENCY RESPONSIBLE FOR DISCHARGE
1 1 8 1 5 1 0 1 3 0 R M E N	GEORGIA - PACIFIC CORP.
3. DATE INSPECTION COMPLETED (Year Mo. Day)	**4. NAME OF FACILITY**
1 9 1 0 1 0 1 6 1 2 5	LITTLE VALLEY SOIL AMENDMENT

5. INSPECTION TYPE (Check One)

A1 ☐ "A" type compliance—Comprehensive inspection in which samples are taken.

B1 ☒ "B" type compliance—A routine nonsampling inspection.

02 ☐ Noncompliance follow-up—Inspection made to verify correction of a previously identified violation.

03 ☐ Enforcement follow-up—Inspection made to verify that conditions of an enforcement action are being met.

04 ☐ Complaint—Inspection made in response to a complaint.

05 ☐ Pre-requirement—Inspection made to gather information relative to preparing, modifying, or rescinding requirements.

06 ☐ Miscellaneous—Any inspection not mentioned above.

NPDES

6. INSPECTION BY	7. IS EPA INSPECTION REQUIRED?
☒ State ☐ State/EPA Joint	☐ Yes ☒ No
8. DID YOU TAKE A BIOASSAY SAMPLE?	**9. IF A BIOASSAY SAMPLE WAS TAKEN, WAS IT:**
☐ Yes ☒ No	☐ Static ☐ Flowthrough

10. INSPECTION COMMENTS SUMMARY–REQUIRED (100 Character Maximum)

OBSERVED AQUATIC SAMPLING, INSPECTED POTENTIAL STOCKPILING/AMENDING AREAS

11. WAS THERE A VIOLATION?

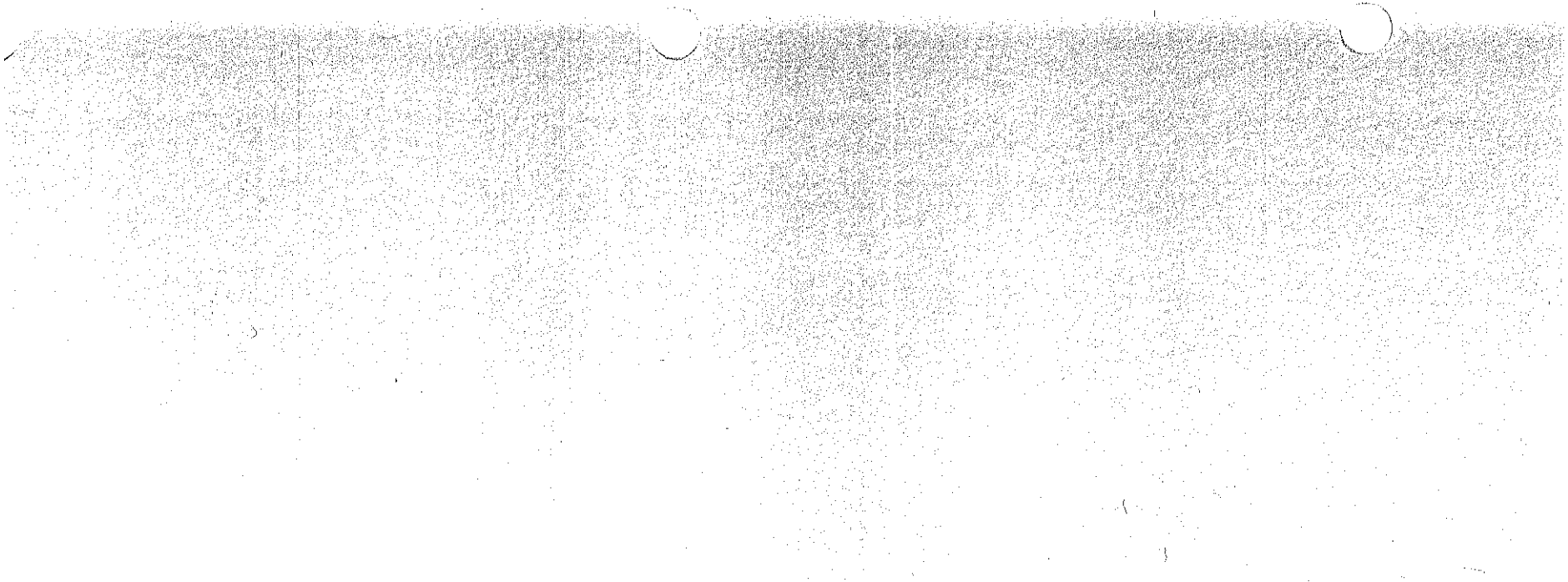
☐ Yes (Complete violation form.) ☒ No ☐ Pending (e.g., lab results)

12. INSPECTOR'S INITIALS → MKN

ADDITIONAL COMMENTS

SEE ATTACHED MEMO

87 8



ATTACHMENT 9

RECEIVED JUL 1990

Ash

California Analytical Laboratory

WATER QUALITY CONTROL BOARD REGION 1

JL 17 '90

☐BK ___ ☐RK ___
☐CJ ___ ☐LR ___
☐FR ___ ☐BB ___
☐RT ___ ☐KD ___
☐JH ___ ☐JS ___
☐SW ___ ☐ ___
q ___ ☐REPLY
☐ALL STAFF ☐FILE

Enseco
A CORNING company

June 25, 1990
Lab ID:053070

Jay Tice, Ph.D.
Georgia Pacific Corporation
1875 Eye Street
Washington, DC 20006

Dear Dr. Tice:

Enclosed is the report for the two ash samples for your G.P. Fort Bragg-Little Valley Project which were received at Enseco-Cal Lab on 1 June 1990.

The report consists of the following sections:

I Sample Description
II Analysis Request
III Quality Control Report
IV Analysis Results

If you have any questions, please feel free to call.

Sincerely,

Michael J. Miille, Ph.D.
Division Director

td

Enseco Incorporated
2544 Industrial Boulevard
West Sacramento, California 75671
916/372-1393 Fax: 916/372-7768

Enseco
A CORNING Company

I Sample Description

See the attached Sample Description Information.

The samples were received under chain-of-custody.

II Analysis Reauest

The following analytical test was requested.

Lab ID	Analysis Description
053070-1, 2	C14 thru Cl_8 plus Substituted Isomers

III Quality Control

A. Project Specific QC. No project specific QC (i .e., spikes and/or duplicates) was requested.

B. Method Blank Results. A method blank is a laboratory-generated sample which assesses the degree to which laboratory operations and procedures cause false-positive analytical results for your samples.

No target parameters were detected in the method blank associated with your samples at or above the detection limits noted on the data sheet in the Analytical Result Section.

IV Analysis Results

Test methods for all analyses except chlorinated dioxins and furans, may include minor modifications of published EPA Methods such as reporting limits or parameter lists. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e., no correction is made for moisture content, unless the method requires or the client requests that such correction be made.

For pulp and paper industry samples, test methods for chlorinated dioxin/furan analyses will follow NCASI Technical Bulletin 551 unless otherwise noted. Pulp and sludge samples are air dried and prepared per this method. All results for these analyses, including detection limits, are reported on a dry weight basis.

Detection limits are reported on a sample specific basis. All results are recovery corrected per the isotope dilution technique.

Results are on the attached data sheets.

Enseco
A CORNING Company

SAMPLE DESCRIPTION INFORMATION
for
Georgia Pacific Corp.

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
053070-0001-SA	LVB1-ash	SOLID	30 MAY 90	16:20	01 JUN 90
053070-0001-MB	Method Blank	SOLID			01 JUN 90
053070-0002-SA	LVA1-ash	SOLID	30 MAY 90	18:30	01 JUN 90

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific Corp.
Client ID: Method Blank
Lab ID: 053070-0001-MB Enseco ID: 150833
Matrix: SOLID Sampled: NA Received: NA
Authorized: 01 JUN 90 Prepared: 02 JUN 90 Analyzed: 07 JUN 90

Sample Amount 2.00 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	~~0.35~~	
2,3,7,8-TCDF	ND	pg/g	0.12	
PeCDFs (total)	ND	pg/g	~~14~~	
1,2,3,7,8-PeCDF	ND	pg/g	14	
2,3,4,7,8-PeCDF	ND	pg/g	14	
HxCDFs (total)	ND	pg/g	~~1.1~~	
1,2,3,4,7,8-HxCDF	ND	pg/g	1.1	
1,2,3,6,7,8-HxCDF	ND	pg/g	1.1	
2,3,4,6,7,8-HxCDF	ND	pg/g	1.1	
1,2,3,7,8,9-HxCDF	ND	pg/g	1.1	
HpCDFs (total)	ND	pg/g	~~0.86~~	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	0.86	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.86	
OCDF	ND	pg/g	4.9	
Dioxins				
TCDDs (total)	ND	pg/g	1.0	
2,3,7,8-TCDD	ND	pg/g	0.64	
PeCDDs (total)	ND	pg/g	11	
1,2,3,7,8-PeCDD	ND	pg/g	11	
HxCDDs (total)	ND	pg/g	1.4	
1,2,3,4,7,8-HxCDD	ND	pg/g	1.4	
1,2,3,6,7,8-HxCDD	ND	pg/g	1.4	
1,2,3,7,8,9-HxCDD	ND	pg/g	1.4	
HpCDDs (total)	ND	pg/g	5.5	
1,2,3,4,6,7,8-HpCDD	ND	pg/g	5.5	
OCDD	ND	pg/g	7.0	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an integral part of this report.
Rev 230787

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific Corp.
Client ID: Method Blank
Lab ID: 053070-0001-M8 Enseco ID: 150833
Matrix: SOLID Sampled: NA Received: NA
Authorized: 01 JUN 90 Prepared: 02 JUN 90 Analyzed: 07 JUN 90

Sample Amount 2.00 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	125
13C-2,3,7,8-TCDD	131
13C-1,2,3,7,8-PeCDD	77
13C-1,2,3,6,7,8-HxCDD	96
13C-1,2,3,4,6,7,8-HpCDD	90
13C-OCDD	73

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific Corp.
Client ID: LVAl-ash
Lab ID: 053070-0002-SA Enseco ID: 150834
Matrix: SOLID Sampled: 30 HAY 90 Received: 01 JUN 90
Authorized: 01 JUN 90 Prepared: 02 JUN 90 Analyzed: 07 JUN 90

Sample Amount 2.10 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	170	pg/g	--	
2,3,7,8-TCDF	8.2	pg/g	--	
PeCDFs (total)	100	pg/g	--	
1,2,3,7,8-PeCDF	ND	pg/g	11	
2,3,4,7,8-PeCDF	ND	pg/g	13	
HxCDFs (total)	13	pg/g	--	
1,2,3,4,7,8-HxCDF	ND	pg/g	1.7	
1,2,3,6,7,8-HxCDF	1.5	pg/g	--	
2,3,4,6,7,8-HxCDF	ND	pg/g	1.7	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.35	
HpCDFs (total)	ND	pg/g	4.0	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	4.0	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	4.0	
OCDF	ND	pg/g	5.6	
Dioxins				
TCDDs (total)	20	pg/g	--	
2,3,7,8-TCDD	1.9	pg/g	--	
PeCDDs (total)	ND	pg/g	18	
1,2,3,7,8-PeCDD	ND	pg/g	18	
HxCDDs (total)	8.8	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	1.3	
1,2,3,6,7,8-HxCDD	1.6	pg/g	--	
1,2,3,7,8,9-HxCDD	ND	pg/g	1.3	
HpCDDs (total)	18	pg/g	--	
1,2,3,4,6,7,8-HpCDD	9.2	pg/g	--	
OCDD	35	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an integral part of this report.
Rev 230787

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific Corp.
Client ID: LVAl-ash
Lab ID: 053070-0002-SA
Matrix: SOLID
Authorized: 01 JUN 90

Enseco ID: 150834
Sampled: 30 MAY 90
Prepared: 02 JUN 90

Received: 01 JUN 90
Analyzed: 07 JUN 90

Sample Amount 2.10 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	87
13C-2,3,7,8-TCDD	74
13C-1,2,3,7,8-PeCDD	29
13C-1,2,3,6,7,8-HxCDD	70
13C-1,2,3,4,6,7,8-HpCDD	47
13C-OCDD	19

ND = Not detected
NA = Not applicable

Reported By: Martha Maier

Approved By: Mike Filigenzi

The cover letter is an inte ral part of this report.
Rev 238787

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific Corp.
Client ID: LVB1-ash
Lab ID: 053070-0001-SA
Matrix: SOLID
Authorized: 01 JUN 90

Enseco ID: 150832
Sampled: 30 MAY 90
Prepared: 02 JUN 90

Received: 01 JUN 90
Analyzed: 07 JUN 90

Sample Amount 2.00 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	140	pg/g	--	
2,3,7,8-TCDF	8.2	pg/g	--	
PeCDFs (total)	46	pg/g	--	
1,2,3,7,8-PeCDF	ND	pg/g	11	
2,3,4,7,8-PeCDF	ND	pg/g	6.7	
HxCDFs (total)	8.8	pg/g	--	
1,2,3,4,7,8-HxCDF	2.2	pg/g	--	
1,2,3,6,7,8-HxCDF	1.2	pg/g	--	
2,3,4,6,7,8-HxCDF	ND	pg/g	1.2	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.43	
HpCDFs (total)	8.6	pg/g	--	
1,2,3,4,6,7,8-HpCDF	2.7	pg/g	--	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	1.4	
OCDF	6.5	pg/g	--	
Dioxins				
TCDDs (total)	14	pg/g	--	
2,3,7,8-TCDD	2.5	pg/g	--	
PeCDDs (total)	ND	pg/g	7.7	
1,2,3,7,8-PeCDD	ND	pg/g	7.7	
HxCDDs (total)	8.0	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.55	
1,2,3,6,7,8-HxCDD	ND	pg/g	1.4	
1,2,3,7,8,9-HxCDD	ND	pg/g	1.4	
HpCDDs (total)	15	pg/g	--	
1,2,3,4,6,7,8-HpCDD	9.6	pg/g	--	
OCDD	30	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier

Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific Corp.
Client ID: LVB1-ash
Lab ID: 053070-0001-SA Enseco ID: 150832
Matrix: SOLID Sampled: 30 MAY 90 Received: 01 JUN 90
Authorized: 01 JUN 90 Prepared: 02 JUN 90 Analyzed: 07 JUN 90

Sample Amount 2.00 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	120
13C-2,3,7,8-TCDD	109
13C-1,2,3,7,8-PeCDD	76
13C-1,2,3,6,7,8-HxCDD	92
13C-1,2,3,4,6,7,8-HpCDD	90
13C-OCDD	71

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco

Page 1 of 1

CHAIN-OF-CUSTODY RECORD

SAMPLER: (Signature) Martin E. Fay
Phone (202) 444-0427
Date Shipped 5/31/90 Carrier UPS
Airbill No 532 2371 649 Cooler No SHW #9

SHIP **TO:**
Enseco-Cal Lab
2544 Industrial Blvd.
West Sacramento, CA 95691
(916) 372-1393
ATTENTION: Ms. KATHY GILL

ATTN

SEND RESULTS TO:
Client Name: GEORGIA-PACIFIC CORPORATION
~~Company~~ Dr. John Tice
Address 1875 Eye St. N.W. #775
Washington, D.C. 20006
Phone (202) 659-3600

PROJECT NAME G.P. Ft. Bragg - Little Valley PROJECT NO. _____ P.O. NO. _____

Relinquished by: (Signature)	Received by: (Signature)	Date	Time
Martin E. Fay			
Relinquished by: (Signature)	Received by: (Signature)	Date	Time
Relinquished by: [Signature]	Received at lab by: (Signature)	Date	Time
	Nimal Mobasla	6/1/90	0920
Relinquished from lab by: (Signature)	Received by: (Signature)	Date	Time

ANALYSIS REQUEST

Sample ID Number	Sample Description	Date/Time Sampled	Analysis Requested	Sample Condition Upon Receipt
	LVA1 - ash	5/30/90 1620	CL 4 - CL 8 + Isomers	good
		5/30/90 1830	"	4

Special Instructions/Comments:
Verify "Analysis Requested" with Dr. J. Tice
7 day guaranteed turnaround: Mike Milly to J. Tice

NOTE: UNUSED PORTIONS OF NON-AQUEOUS SAMPLES WILL BE RETURNED TO CLIENT

Expected Analytical T.A.T's: ____ Immediate Attention (200% surcharge) X RUSH (50-100% surcharge) ____ Standard

Cal Lab ID Number: *(for lab use only)*

Client Retains White Copy Only

(Revised 1/87)

Georgia-Pacific Corporation *Eastern Wood Products Manufacturing Division*
P.O. Box 105603
Atlanta, Georgia 30348
Telephone (404) 521-4000
Teletype (810) 751-1000

June 28, 1990

Mr. Benjamin D. Kor
Executive officer
California Regional Water Quality
Control Board
North Coast Region
1440 Guerneville Road
Santa Rosa, CA 95403

CERTIFIED MAIL
NO. P317694311

RE: Alternative Disposal Methods Report
Georgia-Pacific corporation
Fort Bragg, CA

Dear Mr. Kor:

As required by Waste Discharge Requirements Order No. 90-32, we are enclosing our Alternative Feasibility Study which addresses various methods for disposal on use of the ash generated at Georgia-Pacific's sawmill located in Fort Bragg, CA. These alternative methods, of course, are in lieu of the present method of soil amending.

This report was prepared, with our review by Mr. Dave Modi of our Washington, DC government affairs office.

It is certainly our desire that the Board can agree that the practice of soil amending is the most beneficial ash and will grant our request to re-commence this activity.

Please let me know if there are any questions or if further information is needed.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
REGION 1
JUL 6 '90

Very truly yours,

GERALD W. TICE
CHIEF ENVIRONMENTAL ENGINEER
WOOD PRODUCTS MANUFACTURING DIVISION

GWT/pcw

Enclosure

cc: Messrs. K. C. Mayer
D. Whitman

☐ BK ___ ☐ RK ___
☐ CJ ___ ☐ LR ___
☒ FR ___ ☐ BB ___
☐ RT ___ ☐ KD ___
mi ___ ☐ JS ___
☐ SW ___ ☐ MK
☐ ___ ☐ REPLY
☐ ALL STAFF ☐ FILE

ALTERNATIVE FEASIBILITY STUDY

This is submitted pursuant to the Waste Discharge Requirements Order 90-32 for Georgia-Pacific's soil amendment project at its Fort Bragg mill. Order 90-32 requires that Georgia-Pacific submit a study on alternatives to soil amending. We have done a preliminary analysis on four different options: (1) landfilling on our own site; (2) landfilling at a county or municipal landfill; (3) stop generating ash altogether; and (4) using the ash as a hydromulch on Georgia-Pacific timber lands.

1. Landfilling on Our Own Site

The Georgia-Pacific Fort Bragg mill owns and operates a landfill near the mill. It is a class III landfill and is permitted to receive "non-hazardous solid woodwaste consisting of saw dust, wood chips woodwaste, bark, bark and soil." It is not permitted to receive ash. The landfill permits specify that the fill is prohibited from accepting waste for which it is not approved. Therefore, to deposit ash at the site, we would need to obtain new landfill permits.

The fly ash in question has heretofore been determined by the Department of Health Services to be non-hazardous. In its current classification, therefore, the ash is eligible for disposal in a Class III landfill.

Requirements for permitting Class III landfills can be found in Section 2533 under Article 2 of Subchapter 15. The most important consideration seems to be to prevent "impairment of beneficial uses of surface water or of groundwater beneath or adjacent to the landfill." The landfill must be sited so as to achieve this goal. Section 2530(c) of Article 3 stipulates that any new landfill be sited at least 5 feet above the highest anticipated elevation of underlying ground water. In some situations it may be necessary to construct an elevated area with berms to achieve this separation. Sites whose geologic setting does not ensure isolation of landfill leachate from groundwater must install a single clay liner (at least one foot thick) with a maximum permeability. These sites must also install a leachate collection and removal system (LCRS).

We have not attempted to site a landfill for purposes of this report, nor have we done the engineering and other work necessary to determine if our current landfill site would be suitable as an ash fill. Such work could take up to twelve months to complete, assuming an appropriate site could be located, and cost $60,000-80,000 for the required geological and hydrological characterizations. However, we can make some generalizations about a potential site based on known geology and hydrology.

If we were to site the fill closer to the coast, we would likely encounter the geologic formation known as "marine terrace." Marine terrace is characterized by generally higher water tables and sandy soil. If we were to site our fill over marine terrace we may need to install a composite liner (one foot clay), a synthetic liner and the LCRS.

If we were to site the fill further inland, we could encounter the Franciscan geologic formations. Franciscan formations generally have lower water tables and less sandy soils than do marine terrace areas. Depending on how permeable the formation may be, we may not need to install the liners and the LCRS for an ash landfill located over this formation.

If we had to construct and permit a new landfill for the ash, we would plan for that fill to have a useful life of twenty (20) years. With that in mind, we estimate that we would need to construct a landfill area of between 7 and 24 acres, based on current rates of ash generation (1,400 cubic yards per month). The smaller figure, 7 acres, assumes a single, 40 ft. deep, canyon-like fill area located over a Franciscan formation. The larger figure assumes 42 separate but adjacent disposal cells, each 10 ft. deep, 50 ft. wide and 500 ft. long, located over either marine terrace or Franciscan formation. With this type of cell landfill the actual land area required to site the landfill

will be about 48 acres when the space occupied by earth dividers between cells and buffer areas around the landfill are allowed for.

We estimate that the cost of construction of a new landfill, with the liners and the LCRS would be approximately $65,000 an acre, with additional costs of $5,000-10,000 per acre for permitting, engineering and reporting. For a 7 acre site, total costs would run between $490,000 and $525,000. A 24 acre site would cost between $1.68 and $1.8 million. These figures do not include the costs of elevating the site if elevation is required nor do they include the $60,000 - $80,000 for the geological and hydrological characterizations mentioned above.

Construction and permitting of a class III landfill without the clay liners and without the LCRS (highly unlikely in our opinion) would be about $20,000 per acre. For a 7 acre site, total costs would be about $140,000; a 24 acre site would cost $480,000.

We understand that the Board is undergoing a review of fly ash and may designate it as a "designated waste." If the ash is classified as a "designated waste" rather than a "nonhazardous solid waste", then disposal must be to a Class II waste management unit, and not a Class III unit. The requirements for a Class II unit are generally more stringent than those for a

Class III unit. The clay liner and the LCRS would both probably be required, at a minimum. Siting criteria are more stringent for class 11 facilities than for Class III facilities. Costs of construction of a Class II facility would be at least $65,000 per acre and would likely be more.

Maintenance costs for a landfill, either Class II or III, would be substantial. Background and downgradient monitoring of both surface and groundwater would be required. Unsaturated zone monitoring may also be required. We estimate the cost of installation of a groundwater monitoring system to be between $20,000 and $40,000.

Once a landfill has been sited, we estimate that the minimum time required to gain the necessary regulatory approval for a new landfill would be 12 months, and that construction time would take about 12 months after that. Thus, something in excess of at least two years would elapse before any ash could be deposited.

2. Landfilling At a County or Municipal Landfill

A second option is to take the ash waste to a municipal landfill. This is an option employed by other sawmills in the Region.

We have written a letter to the municipal landfill in Willits asking for permission to dispose of our waste there, but have

not received a response as of this date. We estimate that disposal would cost between $20 and $25 per yard at most public landfills. We generate 1,400 yards of ash a month, so disposal costs would be between $28,000 and $35,000 a month, or $336,000-420,000 per year. Of course, any public landfill which accepts our ash will have to comply with the same regulations that Georgia-Pacific would to landfill on its own land. Mendocino County landfills are not equipped with disposal cell base liners or leachate collection and recovery systems. For this reason, Mendocino County landfills may not be interested in accepting our ash.

According to State estimates, there is in 1990 about 700,000 tons of landfill capacity remaining in Mendocino county. This figure is expected to drop to less than 500,000 tons in 1996. About 34,000 tons per year are currently disposed of in Mendocino County landfills, and this is expected to rise to about 37,000 tons in 1996. Our 1,400 yards/month of ash corresponds to 16,800 yards/year, or about 11,000 tons/year (assuming an ash density of about 1,400 pounds per cubic yard). If this waste were deposited in a county landfill it, would represent about a 33% increase in the total waste landfilled in the County over 1990 levels (by weight).

A factor that may make landfilling in a municipal landfill (and for that matter in our own landfill) even less attractive relates to a technical problem at the mill's boiler. Currently we re-inject the ash into the boiler after the first burning. The ash has sufficient fuel value after the first burning to justify this re-injection. However, the re-injected ash has a lot of sand mixed in with it. The sand is very abrasive on the boiler tubes. We have experienced many more boiler tube failures since we began re-injecting the ash. If we continue to find abnormal wear on the tubes, we may have to modify our re-injection program. This could substantially increase the volume of ash to be disposed. (We would not expect this to be a problem for soil amending. If the volume of ash to be amended were to increase, we would continue to follow sound best management practices (BMP) for soil amending and would simply increase the number of acres amended.)

3. Stop Generating the Ash Altogether

If we were to stop burning bark in the boiler, we Would stop generating the ash altogether.

The boilers burn some fuel oil as well as wood waste. However, oil is burned only during start ups and shut downs, when the wood waste is too wet to get a good burn, or when wood waste may be unavailable. Fuel oil represents about 1% of the total fuel for the mill. Switching to 100% fuel oil would be extremely expensive. A truck load of oil (6,400 Gal.) costs about $3,940.

we estimate we would need about 165 loads a month (from the current 2 a month) to provide 100% of our energy needs, costing about $650,000 a month, or about $7.8 million a year. In addition, the boilers are not capable of burning fuel oil only. To convert them would require such a major revision that we would probably need to build a new power plant. At any rate, we would have the problem of disposing of the woodwaste that is now burned in the boiler since this woodwaste is generated from the mill operation. We estimate that there would be about 22 million cubic feet of woodwaste per year, requiring a landfill over 1,600 acres in size for disposal. Increasing the burning of fuel oil would also dramatically increase the emissions of sulfur dioxide from the power plant. Finally, by burning the woodwaste, we are consuming a potential waste product. It would not make energy or environmental sense to switch to an alternative fuel. For these reasons, we do not believe that this is a very viable option.

4. Using the Ash as Hydromulch on Georgia-Pacific Owned Timber Lands

Within 30 miles of the Fort Bragg mill, Georgia-Pacific owns over a hundred thousand acres of timber land. Much of this timber is harvested and new seedlings planted. Since the ash is non-hazardous and has good nutrient value, it would make an excellent mulch for the new seedlings. It could also be used as a mulch along the roadways on Georgia-Pacific timber lands.

According to a Resource Conservation Service Feasibility study in Maine, a ton of ash has nutrient and fertilizer value of over $17.00. And according to the mid-March 1990 issue of Farm Journal, a program of distributing ash to farmers in Alabama has met with widespread acceptance by farmers and environmentalists. For farmers, ash sweetens acidic soil at a lower cost than lime.

For environmentalists, the program returns natural products to the land and saves on valuable landfill space. Using the ash as mulch would return to the environmental nutrients in the same concentration as when they were removed. It would enhance mineral cycling, and would increase soil stabilization, thereby enhancing revegetation and reducing the impact of rainfall on the harvested areas. We expect that more seedlings would survive with an ash mulch covering.

Currently we are not using mulch either along the roadways or on harvested areas. Hence, we do not have a data base upon which to specifically measure performance, and we do not view this option as a near-term solution. We recognize additional study would be necessary before we could begin hydromulching, but theoretically we believe it has merit.

The fly ash in question is generated by the burning of redwood and douglas fir bark and sawdust in the power plant at the Georgia-Pacific sawmill in Fort Bragg. There is nothing added to this woodwaste. The ash is no different from ash generated by forest fires or generated in thousands of wood burning stoves and fireplaces throughout the State.

It seems that we can narrow the options for ash disposal into two simple ones: we can landfill it, or we can use it for something beneficial. With precious landfill space dwindling, and with the current national emphasis on beneficial re-use of waste material, it seems highly preferable that the fly ash be used for something beneficial. A goal of the "California Integrated Waste Management Act of 1989" is to encourage beneficial re-use of potential waste products rather than disposal.

We have identified two beneficial re-use options; soil amending, for which we are currently seeking approval, and hydromulching, discussed earlier in this report. Our preference is soil amending. Soil amending is a beneficial use; it sweetens the amended soil, and it returns nutrients to the land, thereby increasing biomass yield on amended plots.

California Regional Water Quality Control Board
North Coast Region

ORDER NO. 90-154
ID NO. 1B85030RMEN

WASTE DISCHARGE REQUIREMENTS

For

GEORGIA-PACIFIC CORPORATION
FORT BRAGG SOIL AMENDMENT

Mendocino County

The California Regional Water Quality Control Board, North Coast Region (hereinafter Board) finds that:

1. Georgia-Pacific Corporation (hereinafter discharger) submitted a request dated July 16, 1990 to resume the use of boiler ash as soil amendment on lands located adjacent to Little Valley Creek near Fort Bragg.

2. The Regional Board adopted Waste Discharge Requirements Order No. 90-32 for the stockpiling of woodwaste ash. The Order prohibited the soil amendment of ash pending further studies by discharger. The permit has an expiration date of July 1, 1991.

3. The request by the discharger describes the use of woodwaste ash, a nonhazardous decomposable waste, as a soil amendment using applicable Best Management Practices pursuant to Section 2511(f) of Title 23, Chapter 3, Subchapter 15 of the California Administrative Code. The woodwaste is generated by the power plant operated at the Georgia-Pacific sawmill. The soil amendment site is located in Little Valley within Sections 14, 22, 23, 24, and 26 of T19N, R17W, MDB&M on 330 acres of pasture land along Little Valley Creek. Drainage controls and management practices for stockpiling the ash are designed to prevent a discharge of ash to surface streams. These include:

   a. Retention of a minimum 50 foot buffer between incorporation activities and any watercourse, whether perennial, intermittent, or ephemeral.

   b. Ash should not be allowed to accumulate for more than a week during the summer period. It should be incorporated as soon as there is enough ash to feasibly incorporate with heavy equipment. Regional Board staff must be notified if a need arises to store the ash for longer periods.

   c. Amended areas must be seeded by October 1. Any delay must be reported to the Regional Board.

   d. Once an area has been incorporated and planted with grass seed, there shall be no passage of vehicles or equipment over the amended area.

4. The Waste Discharge Requirements Order No. 90-32 modified the previous Order No. 86-3 by not permitting the amending of the ash but allowing the interim stockpiling to proceed, pending a study by Georgia-Pacific on the hazard posed by bioaccumulation of low levels of chlorodibenzofurans (CDF) and chlorodibenzodioxins (CDD). 2,3,7,8-tetrachloro-p-dibenzodioxin is listed as *being* carcinogenic under the Safe Drinking Water and Toxic Enforcement Act of 1986. Although in 1986 the Department of Health Services, based on known concentrations of CDF's, considered the levels to be nonhazardous, the bioaccumulative nature of the compounds may lead to concentrations in plant, animal, or aquatic life which are hazardous. Resumption of amending under the permit was made contingent on a report finding the bioaccumulation potential to be negligible. The discharger submitted sampling data which found the ash to have a toxic equivalency factor (TEQ) of 3.83 and 3.02 parts per trillion (ppt), a TEQ for fish tissue of 0.10 and 0.03 ppt, and a TEQ for stream sediment ranging from 0.03 to 0.150 ppt. The TEQ method is a procedure for assessing the risks associated with exposures to complex mixtures of CDD's and CDF's, and relates their toxicity to the highly studied 2,3,7,8-tetrachlorodibenzodioxin (TCDD).

5. The Waste Discharge Requirements Order No. 90-32 provided for the interim stockpiling of ash until such time the bioaccumulation and hazard potential of the ash is assessed. On the basis of the data submitted, it appears likely that the bioaccumulation risk is small. Waste Discharge Requirements Order No. 90-154 allows resumption of amending until such time as the final bioaccumulation study on the aquatic resources of Little Valley Creek is submitted and analyzed.

6. Order No. 90-32 also required Georgia-Pacific Corporation to develop a feasibility study for the long term disposal of ash should the soil amending of ash is found to be inappropriate. The feasibility study indicated that landfilling would be an alternative to soil amending.

7. The State Water Resources Control Board has requested the Department of Health Services to review the concentrations of CDDs and CDFs in the boiler ash and assess the risk to human health and environment. This Order can be modified or rescinded *pending* a finding of significant risk to human health or environment by the Department of Health Services.

8. The Board adopted the Water Quality Control Plan for the North Coast Region on April 28, 1989. The plan was approved by the State Water Resources Control Board on November 15, 1988. It includes, by reference, the Water Quality Control Plan for Ocean Waters of California which was adopted by the State Water Resources Control Board on September 22, 1988. Both Plans include water quality objectives and receiving water limitations. The basin plan contains a prohibition against new waste discharges to all coastal streams and natural drainageways that flow directly to the ocean.

9. The beneficial uses of Little Valley Creek and Pudding Creek include:

   a. municipal and domestic water supply
   b. agricultural water supply
   c. potential industrial service water supply
   d. potential industrial process water supply
   e. groundwater recharge
   f. water contact recreation
   g. non-contact water recreation
   h. warm freshwater habitat
   i. cold freshwater habitat
   j. wildlife habitat
   k. fish migration
   1. fish spawning

10. The County of Mendocino has zoned this area as timber production and does not require a permit for a use of the land consistent with this zoning. These waste discharge requirements constitute a minor modification to Land and is exempt from CEQA under Section 15304 Title 14 CCR.

11. The Board has notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the proposed discharge and has provided them with an opportunity for a public meeting and an opportunity to submit their written views and recommendations.

12. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

THEREFORE, IT IS HEREBY ORDERED, that Waste Discharge Requirements Order No. 90-32 be rescinded, and in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, the discharger shall comply with the following:

A. PROHIBITIONS:

1. There shall he no discharge of ash to surface streams at any time.

B. SPECIFICATIONS:

1. Runoff of ash to land not under the control of the discharger is prohibited.

2. The stockpiling and amending of ash shall not cause a pollution or nuisance as defined in Section 13050 of the California Water Code.

3. No ash materials shall be deposited outside of the soil amendment areas shown on Attachment "A".

4. The soil amendment area shall be protected from any washout or erosion of ash or covering materials and from inundation which could occur as a result of floods having a recurrence interval of 100 years.

5. Annually, prior to the anticipated rainfall period, a cover crop shall be established in the soil amendment area to prevent erosion of the site.

6. During the rainy season, only the active area of ash placement shall be left exposed to rainfall. The active area shall not be excessively Large for incorporation operations and vegetation establishment.

7. Discharge of any waste not specifically regulated by this Order is prohibited.

C. PROVISIONS:

1. Availability

A copy of this Order and a copy of the facility spill contingency plan shall be maintained at the discharge facility and be available at all times to operating personnel.

2. Operation and Maintenance

The discharger must maintain in good working order and operate as efficiently as possible any facility or control system installed by the discharger to achieve compliance with the waste discharge requirements.

3. Change in Discharge

The discharger must promptly report to the Board any material change in the character, locations, or volume of the discharge.

4. Change in Ownership

In the event of any change in control or ownership or land or waste discharge facilities presently owned or controlled by the discharger, the discharger must notify the succeeding owner or operator of the existence of this Order by letter, a copy of which must be forwarded to this office.

5. Vested Rights

This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, nor protect the discharger from his liability under federal, State, or local laws, nor create a vested right for the discharger to continue the waste discharge.

6. Severability

Provisions of these waste discharge requirements are severable. If any provision of these requirements is found invalid, the remainder of these requirements shall not be affected.

7. Monitoring

The discharger must comply with the Contingency Planning and Notification Requirements Order No. 74-151, Monitoring and Reporting Program No. 90-154 and any modification to these documents as specified by the Executive Officer. Such documents are attached to this Order and incorporated herein. Chemical, bacteriological, and bioassay analyses must be conducted at a laboratory certified for such analyses by the State Department of Health Services. In the event a certified laboratory is not available to the discharger, analyses performed by a noncertified laboratory will be accepted.

8. Inspections

The discharger shall permit authorized staff of the Board:

a. entry upon premises in which an effluent source is located or in which any required records are kept;
b, access to copy any records required to be kept under terms and conditions of this Order;
c. inspection of monitoring equipment or records; and
d. sampling of any discharge.

9. Noncompliance

In the event the discharger is unable to comply with any of the conditions of this Order due to:

a. breakdown of waste treatment equipment;
b. accidents caused by human error or negligence; or
c. other causes such as acts of nature;

the discharger must notify the Executive Officer by telephone as soon as he or his agents have knowledge of the incident and confirm this notificatim in writing within two weeks of the telephone notification. The written notificatim shall include pertinent information explaining reasons for the noncompliance and shall indicate what steps are being taken to prevent the problem from recurring.

10. Revisions of Requirements

The Board will review this Order periodically and may revise requirements when necessary.

11. Should the Department of Health Services find that the soil amendment of boiler ash to be a significant hazard to human health and environment, the Regional Board shall modify or rescind this Order.

12. The discharger shall undertake a study evaluating the potential bioaccumulation threat to the aquatic habitat of Little Valley Creek posed by the soil amending of the boiler ash. Quarterly, on the first day of September, December, March, and June the discharger shall submit a status report on the progress of the study, until such time as the threat to the beneficial uses of Little Valley Creek is defined to the satisfaction of the Executive Officer. The final report shall be submitted to the Board by July 1, 1991.

13, This Order expires on July 1, 1991.

Certification

I, Benjamin D. Kor, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, North Coast Region, on August 16, 1990.

ORIGINAL SIGNED BY

Benjamin D. Kor
Executive Officer

(gpashwdr)

California Regional Water Quality Control Board
North Coast Region

MONITORING AND REPORTING PROGRAM NO. 90-154

FOR

GEORGIA-PACIFIC CORPORATION
FORT BRAGG SOIL AMENDMENT

Mendocino County

Monitoring

The discharger shall record the approximate volume of ash deposited at the site each month.

Stormwater Runoff Monitoring

Grab samples shall be taken periodically when streams are flowing from the points shown on the attached map. Samples shall be analyzed as follows:

Constituent	Units	Frequency
pH	pH units	Weekly
COD	mg/l	November, January, and March

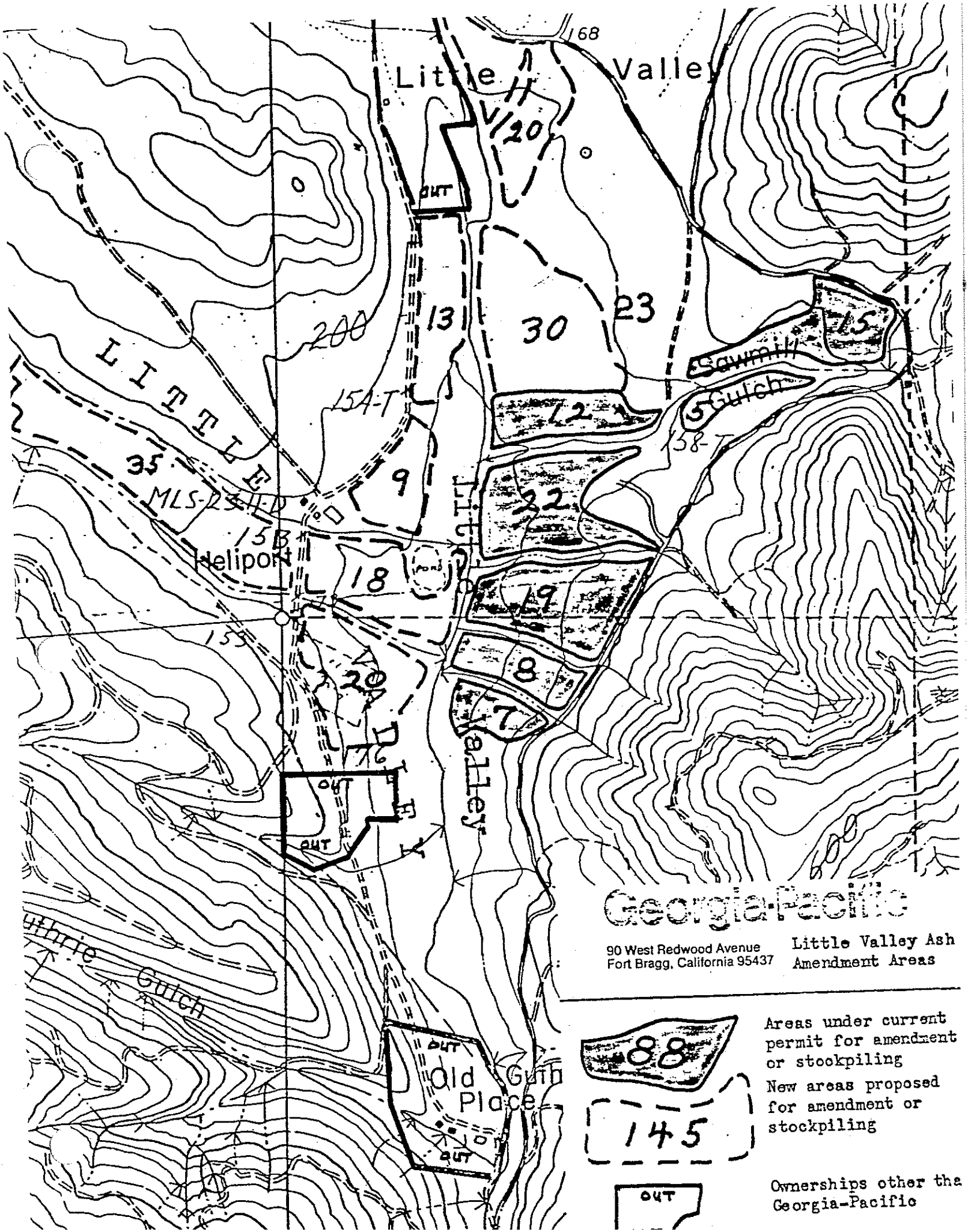
Weekly rainfall totals shall also be recorded and reported.

Reporting

Monitoring reports shall be submitted monthly to the Board by the fifteenth of the month. Copies of signed laboratory sheets shall be submitted with any monthly summary report.

Ordered by ORIGINAL SIGNED BY
Benjamin D. Kor
Executive Officer

August 16, 1990


Little Valley
LITTLE
Heliport
Little Valley
Walley
Gulch
Old Place
Gulch
OUT
68
200
600
0
13
30
23
15
12
9
22
19
18
8
7
35
15A-T
15B
15
20
26
15B-T
15A-T
MLS-23-LD
Georgia-Pacific
90 West Redwood Avenue
Fort Bragg, California 95437
Little Valley Ash
Amendment Areas
88
145
Areas under current permit for amendment or stockpiling
New areas proposed for amendment or stockpiling
OUT
Ownerships other tha
Georgia-Pacific

California Regional Water Quality Control Board
North Coast Region

CONTINGENCY PLANNING AND NOTIFICATION REQUIREMENTS

FOR

ACCIDENTAL SPILLS AND DISCHARGES

ORDER NO. 74-151

The California Regional Water Quality Control Board, North Coast Region, finds that:

1. Section 13225 of the Porter-Cologne Water Quality Act requires the Regional Board to perform general duties to assure positive water quality control.

2. The Regional Board has been advised of situations in which preparations for, and response to accidental discharges and spills have been inadequate.

3. Persons discharging waste or conveying, supplying, storing, or managing wastes or hazardous materials have the primary responsibility for contingency planning, incident reporting and continuous and diligent action to abate the effects of such unintentional or accidental discharge.

THEREFORE, IT IS HEREBY ORDERED THAT:

I. All persons who discharge wastes or convey, supply, store, or otherwise manage wastes or other hazardous material shall:

A. Prepare and submit to this Regional Board, according to a time schedule prescribed by the Executive Officer, a contingency plan defining the following:

1. Potential locations and/or circumstances under which accidental discharge incidents might be expected to occur,

2. Possible water quality effects of accidental discharges.

3. The conceptual plan for cleanup and abatement of accidental discharge incidents, including:

a. The individual who will be in charge of cleanup and abatement activities on behalf of the discharger.

b. The equipment and manpower available to the discharger to implement the cleanup and abatement plans.

B. Immediately report to the Regional Board any accidental discharge incidents. Such notification shall be made by telephone as soon as the responsible person or his agent has knowledge of the incident.

C. Immediately begin diligent and continuous action to cleanup and abate the effects of any unintentional or accidental discharge. Such action shall include temporary measures to abate the discharge prior to completing permanent repairs to damaged facilities.

D. Confirm the telephone notification in writing within two weeks of the telephone notification. The written notification shall include: reasons for the discharge, duration and volume of the discharge, steps taken to correct the problem and steps *being* taken to prevent the problem from recurring.

II. Upon original receipt of phone report (I.B.), the Executive Officer shall immediately notify all affected agencies and known users of waters affected by the unintentional or accidental discharge.

III. Provide updated information to the Regional Board in the went of change of staff, size of the facility, or change of operating procedures which will affect the previously established contingency plan.

IV. The Executive Officer or his employees shall maintain liaison with the discharger and other affected agencies and persons to provide assistance in cleanup and abatement activities.

V. The Executive Officer shall transmit copies of this Order to all persons whose discharges of waste handling activities are governed by Waste Discharge Requirements or an NDPES permit. Such transmittal shall include a current listing of telephone numbers of the Executive Officer and his key employees to facilitate compliance with Item I.B of this Order.

Ordered by _____
Benjamin D. Kor
Executive Officer

July 24, 1974
(Retyped February 15, 1990)

Your primary notification should be to the Regional Board office in Santa Rosa at (707) 576-2220. During off hours, you will be able to leave a recorded message at that number *and,* if you have a spill or discharge emergency, you will also be referred to the State Office of Emergency Services (OES) at (800) 852-7550. OES maintains a roster of key employees and will relay your notification to Regional Board staff.

North Coast Region

GENERAL MONITORING AND REPORTING PROVISIONS

February 3, 1971
(Retyped June 13, 1989)

GENERAL PROVISIONS FOR SAMPLING AND ANALYSIS

Unless otherwise noted, all sampling, sample preservation, and analyses shall be conducted in accordance with the current edition of "Standard Methods for the Examination of Water and Waste Water[a] or approved by the Executive Officer.

1 analyses Shall be performed in a Laboratory certified to perform such analyses by the California State Department of Health or a laboratory approved by the Executive Officer.

All samples shall be representative of the waste discharge under the conditions of peak load.

GENERAL PROVISIONS FOR REPORTING

For every item where the requirements are not met, the discharger shall submit a statement of the actions undertaken or proposed which will bring the discharge in full compliance with requirements at the earliest time and submit a timetable for correction.

By January 30 of each year, the discharger shall submit an annual report to the Regional Board 'The report shall contain both tabular and graphical summaries of the monitoring data obtained during the previous year. In addition, the discharger shall discuss the compliance record and the corrective actions taken or planned which may be needed to bring the discharge into full compliance with the waste discharge requirements.

The discharger shall file a written report within 90 days after the average dry weather flow for any month that equals or exceeds 75 percent of the design capacity of the waste treatment or disposal facilities. The report shall contain a schedule for studies, design, and other steps needed to provide additional capacity or limit the flow below the design capacity prior to the time when the waste flow rate equals the capacity of the present units.

ATTACHMENT 9

California Analytical Laboratory

Fish

Enseco
A CORNING Company

July 5, 1990
Lab ID: **053468**

Gerald Tice
Georgia Pacific
133 Peachtree Street **NE**
Atlanta, GA **30348**

Dear Mr. Tice:

Enclosed is the report for the two fish samples for your Little Valley Project which were received at Enseco-Cal Lab on 27 June 1990.

The report consists of the following sections:

I Sample Description
II Analysis Request
III Quality Control Report
IV Analysis Results

If you have any questions, please feel free to call.

Sincerely,

Michael J. Miille, Ph.D.
Division Director

td

Enseco Incorporated
2544 Industrial Boulevard
West Sacramento, California 95691
916/372-1393 FAX 916/372-7768

Enseco
A CORNING Company

I Sample Description

See the attached Sample Description Information.

The samples were received under chain-of-custody.

II Analysis Request

The following analytical test was requested.

Lab ID	Analysis Description
053468-1, 2	C14 thru Cl8 Dioxins/Furans plus 2,3,7,8, Substituted Isomers

III Quality Control

A. project Specific QC. No project specific QC (i.e., spikes and/or duplicates) was requested.

B. Method Blank Results. A method blank is a laboratory-generated sample which assesses the degree to which laboratory operations and procedures cause false-positive analytical results for your samples.

No target parameters were detected in the method blank associated with your samples at or above the detection limits noted on the data sheet in the Analytical Result Section.

IV Analysis Results

Test methods for all analyses except chlorinated dioxins and furans, may include minor modifications of published EPA Methods such as reporting limits or parameter lists. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e., no correction is made for moisture content, unless the method requires or the client requests that such correction be made.

For pulp and paper industry samples, test methods for chlorinated dioxin/furan analyses will follow NCASI Technical Bulletin 551 unless otherwise noted. Pulp and sludge samples are air dried and prepared per this method. All results for these analyses, including detection limits, are reported on a dry weight basis.

Detection limits are reported on a sample specific basis. All results are recovery corrected per the isotope dilution technique.

Results are on the attached data sheets.

Enseco
A CORNING Company

SAMPLE DESCRIPTION INFORMATION
for
Georgia Pacific

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
053468-0001-SA	JAR #4	TISSUE	25 JUN 90	17:12	27 JUN 90
053468-0001-MB	Method Blank	TISSUE			27 JUN 90
053468-0002-SA	JAR #5	TISSUE	25 JUN 90	19:00	27 JUN 90

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: Method Blank
Lab ID: 053468-0001-M8
Matrix: TISSUE
Authorized: 27 JUN 90

Enseco ID: 153769
Sampled: NA
prepared: 27 JUN 90

Received: NA
Analyzed: 02 JUL 90

Sample Amount 10.0 G
percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	0.096	
2,3,7,8-TCDF	ND	pg/g	0.096	
PeCDFs (total)	ND	pg/g	0.16	
1,2,3,7,8-PeCDF	ND	pg/g	0.16	
2,3,4,7,8-PeCDF	ND	pg/g	0.16	
HxCDFs (total)	ND	pg/g	0.11	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.11	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.11	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.11	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.11	
HpCDFs (total)	ND	pg/g	0.27	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	0.27	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.27	
OCDF	ND	pg/g	1.2	
Dioxins				
TCDDs (total)	ND	pg/g	0.18	
2,3,7,8-TCDD	ND	pg/g	0.18	
PeCDDs (total)	NO	pg/g	0.23	
1,2,3,7,8-PeCDD	ND	pg/g	0.23	
HxCDDs (total)	ND	pg/g	0.34	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.34	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.34	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.34	
HpCDDs (total)	NO	pg/g	1.1	
1,2,3,4,6,7,8-HpCDD	ND	pg/g	1.1	
OCDD	ND	pg/g	12	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier

Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: Method Blank
Lab ID: 053468-0001-MB
Matrix: TISSUE
Authorized: 27 JUN 90

Enseco ID: 153769
Sampled: NA
Prepared: 27 JUN 90

Received: NA
Analyzed: 02 JUL 90

Sample Amount 10.0 G
percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	94
13C-2,3,7,8-TCDD	90
13C-1,2,3,7,8-PeCDD	87
13C-1,2,3,6,7,8-HxCDD	83
13C-1,2,3,4,6,7,8-HpCDD	58
13C-OCDD	20

ND = Not detected
NA = Not applicable

Reported By: Martha Maier

Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: JAR #4
Lab ID: 053468-0001-SA
Matrix: TISSUE
Authorized: 27 JUN 90

Enseco ID: 153767
Sampled: 25 JUN 90
prepared: 27 JUN 90

Received: 27 JUN 90
Analyzed: 02 JUL 90

Sample Amount 10.0 G
percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	0.13	
2,3,7,8-TCDF	ND	pg/g	0.13	
PeCDFs (total)	ND	pg/g	0.13	
1,2,3,7,8-PeCDF	ND	pg/g	0.13	
2,3,4,7,8-PeCDF	ND	pg/g	0.13	
HxCDFs (total)	ND	pg/g	0.14	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.14	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.14	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.14	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.14	
HpCDFs (total)	ND	pg/g	0.62	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	0.62	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.62	
OCDF	ND	pg/g	1.7	
Dioxins				
TCDDs (total)	ND	pg/g	0.31	
2,3,7,8-TCDD	ND	pg/g	0.31	
PeCDDs (total)	ND	pg/g	0.24	
1,2,3,7,8-PeCDD	ND	pg/g	0.24	
HxCDDs (total)	ND	pg/g	0.30	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.30	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.30	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.30	
HpCDDs (total)	3.3	pg/g	--	
1,2,3,4,6,7,8-HpCDD	2.3	pg/g	--	
OCDD	71	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier

Approved By: Mike Filigenzi

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: JAR #4
Lab ID: 053468-0001-SA
Matrix: TISSUE
Authorized: 27 JUN 90

Enseco ID: 153767
Sampled: 25 JUN 90
Prepared: 27 JUN 90

Received: 27 JUN 90
Analyzed: 02 JUL 90

Sample Amount 10.0 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	113
13C-2,3,7,8-TCDD	107
13C-1,2,3,7,8-PeCDD	116
13C-1,2,3,6,7,8-HxCDD	101
13C-1,2,3,4,6,7,8-HpCDD	57
13C-OCDD	16

ND = Not detected
NA = Not applicable

Reported By: Martha Maier

Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: JAR #5
Lab ID: 053468-0002-SA Enseco ID: 153768
Matrix: TISSUE Sampled: 25 JUN 90 Received: 27 JUN 90
Authorized: 27 JUN 90 Prepared: 27 JUN 90 Analyzed: 02 JUL 90

Sample Amount 10.2 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	0.13	
2,3,7,8-TCDF	ND	pg/g	0.13	
PeCDFs (total)	ND	pg/g	0.10	
1,2,3,7,8-PeCDF	ND	pg/g	0.10	
2,3,4,7,8-PeCDF	ND	pg/g	0.10	
HxCDFs (total)	ND	pg/g	0.12	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.12	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.12	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.12	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.12	
HpCDFs (total)	ND	pg/g	0.32	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	0.32	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.32	
OCDF	ND	pg/g	1.1	
Dioxins				
TCDDs (total)	ND	pg/g	0.23	
2,3,7,8-TCDD	ND	pg/g	0.23	
PeCDDs (total)	ND	pg/g	0.23	
1,2,3,7,8-PeCDD	ND	pg/g	0.23	
HxCDDs (total)	ND	pg/g	0.29	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.29	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.29	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.29	
HpCDDs (total)	2.4	pg/g	--	
1,2,3,4,6,7,8-HpCDD	1.6	pg/g	--	
OCDD	15	pg/g		

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an integral part of this report.
Rev 230787

Enseco

Page 1 of 1

CHAIN-OF-CUSTODY RECORD

SAMPLER: (Signature) Vicki Frey
Phone (707) 677-3621
Date Shipped 26 JUNE 1990
Airbill No. 7391473036
Carrier FEDERAL EXPRESS
Cooler No. —

SHIP TO:
Enseco-Cal Lab
2544 Industrial Blvd.
West Sacramento, CA 95691
(916) 372-1393
ATTENTION: Mike Mille

SEND RESULTS TO:
Client Name Gerald W. Tice
Company Georgia-Pacific Corp
Address P.O. Box 105603
Atlanta, Ga. 30348
Phone (404) 521-5084

PROJECT NAME Little Valley PROJECT NO. — P.O. NO. —

Relinquished by: (Signature)	Received by: (Signature)	Date	Time
Jorrie Bott			
Relinquished by: [Signature]	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Received at lab by: (Signature) Robert Bonaly	Date 6-27-90	Time
Relinquished from lab by: [Signature]	Received by: (Signature)	Date	Time

ANALYSIS REQUEST

Sample ID Number	Sample Description	Date/Time Sampled	Analysis Requested	Sample Condition Upon Receipt
JV-#4	Little Valley Creek Control *	6/25/90	Full GRF/CDD Scan	Good
JV-#5	Little Valley Creek Test *	"	" " " "	"
		"	* * *	

Special Instructions/Comments:
* Stickle Backs

NOTE: UNUSED PORTIONS OF NON-AQUEOUS SAMPLES WILL BE RETURNED TO CLIENT

Expected Analytical T.A.T's: X Immediate Attention (200% surcharge) R U S H (50-100% surcharge) ____ Standard

Cal Lab ID Number: *(for lab use only)*

Client Retains White Copy Only

(Revised 1/87)

Karen Theiss and Associates
Biological and Environmental Consultants

P.O. Box 3005 • McKinleyville, CA 95521 • (707) 839-0681

July 10, 1990

Mr. Gerald W. Tice
Georgia-Pacific Corporation
133 Peachtree Street N.E.
Atlanta, GA 30303

RE: Aquatic Sampling Program
Soil Amendment Project
Ft. Bragg. CA
#90-054

Dear Gerald:

Enclosed is a report of the field methodology employed by Vicki Frey and Tim Salamunovich for selection of an appropriate organism for the aquatic bioaccumulation study on Little Valley Creek near Fort Bragg, CA. It includes a description of the requisite criteria for the selection of a suitable test organism. the different techniques employed in collection of the chosen organism (Threespine Stickleback - *Gasterosteus aculeatus*), a map delineating the collection sites and specific data with regard to each sample collected.

I have finally found a source for General Liability Insurance at a reasonable rate, and will have them send you a copy of the Certificate of Insurance as soon as possible. The fee for the insurance will be about $250.

Should you have any questions or comments about the enclosed report, please give me a call. I will be in most of this week, but will be out of town from July 14 through July 22.

Sincerely,

KAREN THEISS AND ASSOCIATES

Karen C. Theiss
Principal

Encl.

Karen Theiss and Associates
Biological and Environmental Consultants

P.O. Box *3005* • McKinleyville, *CA 95521* • (707) *839-0681*

TCDF BIOACCUMULATION STUDY

LITTLE VALLEY CREEK, MENDOCINO COUNTY

GEORGIA-PACIFIC CORPORATION

On June 25, 1990 Vicki Frey, aquatic biologist, and Tim Salamunovich, fisheries biologist, with Karen Theiss and Associates, sampled Little Valley Creek, near Fort Bragg, CA, for a suitable aquatic organism to be tested for bioaccumulation of the full dioxin/furan series. The selection of a suitable organism for a bioaccumulation study is dependent upon certain prerequisites. In order to be representative of the study area, the organism should be sedentary or non-migratory. It should be abundant throughout the study area and of reasonable size to give adequate tissue for analysis. It should be sufficiently long-lived to allow bioaccumulation and allow the sampling of more than one year class if desired. Also, the organism should live in close contact with the bottom sediments and feed on sedentary infauna and small epifauna which would enhance the chances of bioaccumulation.

The Threespine Stickleback (*Gasterosteus aculeatus*) fits most of the above prerequisites, making it a suitable organism for this study. The stickleback is a quiet water fish living among vegetation at stream edges and in weedy pools and backwaters. It preys on bottom organisms and epifauna living on vegetation. Stickleback are frequently important as prey items for both salmonid fish and birds. Stickleback may live for 2-3 years. although many complete their life cycle in one year.

A reconnaissance survey resulted in the selection of a control site directly above the amended plots and a test site directly below the amended plots (see attached map). Prior to sampling at all sites, a decontamination procedure was performed on a metal sampling bucket used for holding captured organisms. This procedure consisted of a soapy water wash (Liquinox), deionized water (DI) rinse, methanol rinse, DI rinse, hexane rinse, and a final DI rinse.

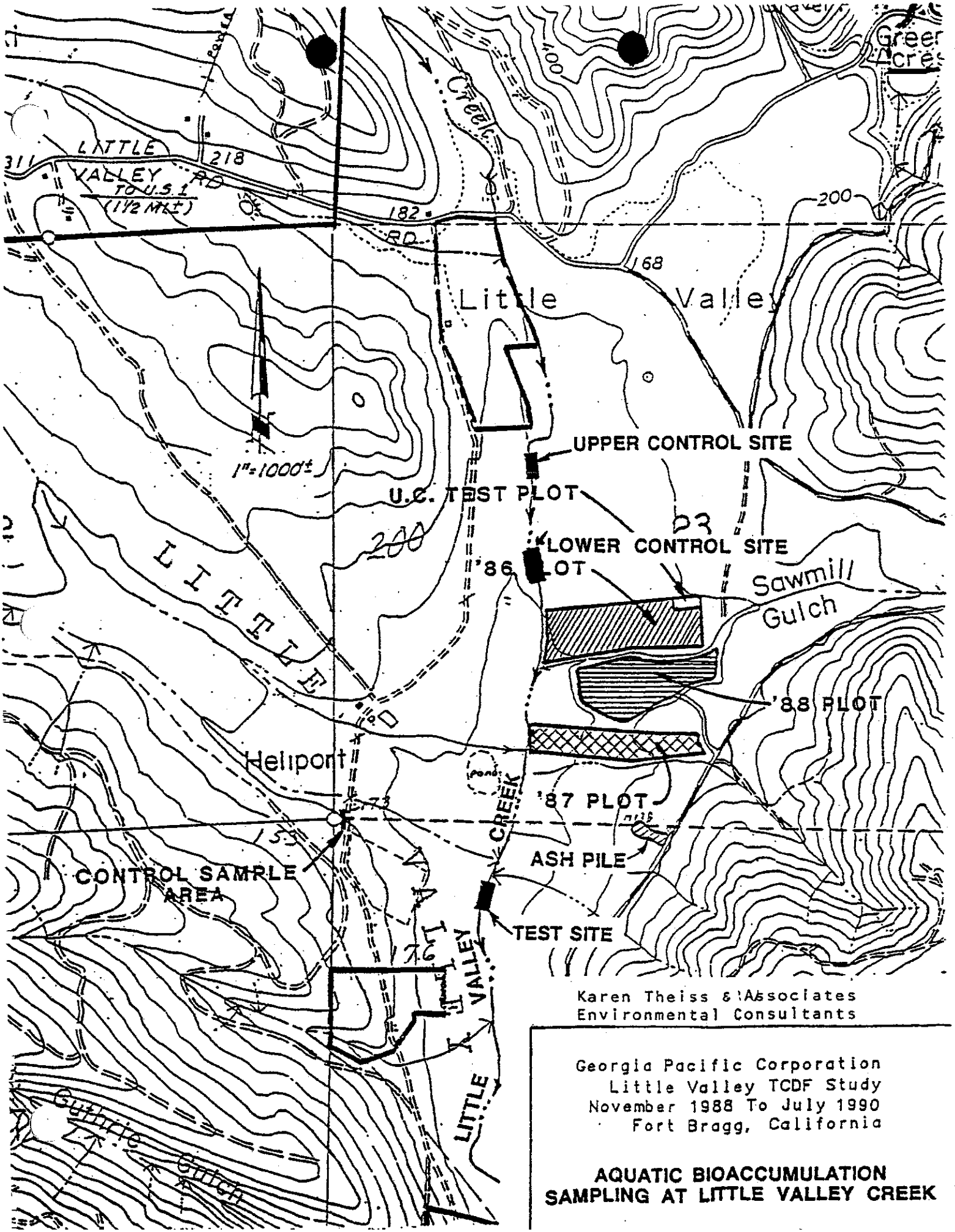
Sampling commenced at the control site using two Smith-Root Model 11A BAckpack Electroshockers. Approximately 100 yards of stream bed were shocked, but no fish were captured. Visibility of the water was very poor due to a heavy sediment load caused by a muddy bottom and cattle crossings in the vicinity. Some areas of the stream had 4-5 foot deep pools with a muddy bottom making it difficult to see and capture stunned organisms. Shallow reaches of the stream had heavy vegetative cover which also created difficulties.

The sampling method at the control site was then changed to use of a small pole seine and had-held dip nets. This technique proved more successful with the following organisms being captured: numerous tadpoles, two Mosquitofish (*Gambusia affinis*), three adult Threespine Stickleback (*Gasterosteus aculeatus*), one Black Bullhead (*Ictalurus melas*), numerous gammarid amphipods, small bivalves, small aquatic beetles and insect larvae. In order to capture enough stickleback for the sample, seining was continued further downstream where there was more emergent vegetation in the streambed. This proved successful and enough stickleback were captured for a test sample and an archive sample. Stickleback were hand-picked off the seine using clean latex surgical gloves and placed into a decontaminated metal bucket filled with distilled water. When enough fish had been collected, they were rinsed again with DI and placed into clean glass jars provided by Enseco-Cal Laboratory in Sacramento, CA.

At the test site, sampling began after decontamination of the sampling bucket. Sampling methods were the same as those used at the control site with the pole seine and dip nets. The stream bed at the test site had more emergent vegetation and the water was clearer than at the control site. Sampling occurred in two open pools, approximately 100 feet apart. Seining yielded numerous stickleback per seine haul with young-of-the-year fry being very abundant. No other species were captured.

A test sample and an archive sample were collected at each site. All samples contained several fish in order to ensure adequate quantities of tissue. The control site sample had a biomass of 35 grams and included 30 reproductively mature stickleback ranging from 50-70 mm in length. The control site archive sample had 25 grams of fish tissue and was comprised of 50 immature stickleback (15-25 mm). The test site sample for analysis had a biomass of 45 grams and a total of 31 mature stickleback (50-70 mm). The test site archive sample had 15 grams of tissue and 27 individuals (25-35mm).

All samples were placed on ice for transport to Eureka where they were immediately frozen. The following day the test samples were shipped on dry ice via Federal Express to Enseco-Cal Laboratory, Sacramento, CA for analysis. The archive samples were transferred to Selvage, Heber, Nelson and Associates in Eureka for storage in their freezer.



Karen Theiss & Associates
Environmental Consultants

Georgia Pacific Corporation
Little Valley TCDF Study
November 1988 To July 1990
Fort Bragg, California

AQUATIC BIOACCUMULATION SAMPLING AT LITTLE VALLEY CREEK

STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
'ORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA, CA 95403
(707)576-2220

PETE WILSON, *Governor*

June 10, 1991

Mr. Gerald Tice
Chief Environmental Engineer
Georgia-Pacific Corporation
P.O. Box 105603
Atlanta, GA 30348

Dear Mr. Tice:

Enclosed is a copy of the draft Regional Board Order No. 91-93, revised Waste Discharge Requirements for the Georgia-Pacific Fort Bragg Soil Amendment. This Order will be considered by the Regional Board during its regular meeting on June 27, 1991, at the Eureka City Council Chambers. We would appreciate it if you could send us any comments you may have as soon as possible.

Please call if you have any questions.

Sincerely

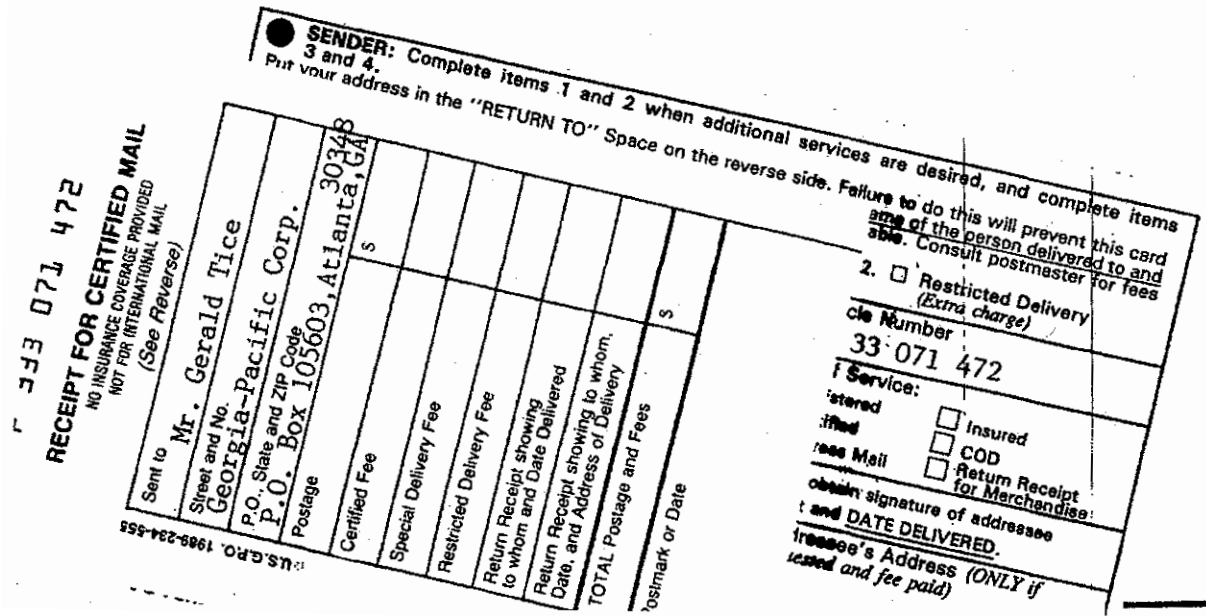
Mark K. Neely
Associate Engineering Geologist

MKN:tam/gpastrns

Enclosure

Certified-Return Receipt Requested

cc: Don Whitman, Georgia-Pacific Corporation, 90 W. Redwood Avenue, Fort Bragg, CA 95437



ATE OF CALIFORNIA

EGIONAL WATER QUALITY CONTROL BOARD
RTMENT OF HEALTH SERVICES
WASTE MANAGEMENT BOARD
ITMENT OF FORESTRY

APPLICATION FOR FACILITY PERMIT/WASTE DISCHARGE

This form is to be used for filing a/an: (check all appropriate)

1. [X] **REPORT OF WASTE DISCHARGE** (pursuant to Division 7 of the State Water Code)
2. [ ] **APPLICATION FOR A HAZARDOUS WASTE FACILITY PERMIT** (pursuant m Health and Safety Coda Section 25200)
3. [ ] **APPLICATION FOR A SOLID WASTE FACILITIES PERMIT** (pursuant to Government Code Section 66796.301
4. [ ] **APPLICATION FOR A RUBBISH DUMP PERMIT** (pursuant to Public Resources Code Sections 43714375 and 4438)

FOR OFFICE USE ONLY

Form 200 Rec'd _____
Fee (RWQCB) _____ (SWMB) _____
Letter to Discharger _____
Report Rec'd _____
Effective Date _____
CDF Notified _____
DOHS No. _____
SWMB No. _____

I. FACILITY

A. NAME OF FACILITY: Georgia-Pacific Corporation — TELEPHONE #: (707) 964-5651
ADDRESS: 90 West Redwood Ave.. Fort Bragg, CA — ZIP CODE: 95437

B. NAME OF LEGAL OWNER OF FACILITY: Georgia-Pacific Corporatibn — TELEPHONE #: (404) 521-5084
ADDRESS: 133 Peachtree St., N.E., Atlanta, GA — ZIP CODE: 30303

C. NAME OF BUSINESS OPERATING FACILITY: Same as A above — TELEPHONE #: ( )
ADDRESS: _____ ZIP CODE: _____

D. TYPE OF BUSINESS OPERATING FACILITY
[ ] Sole Proprietorship [ ] Partnership [ ] Corporation [ ] Government Agency

a. NAME OF OWNER(S) OF BUSINESS OPERATING FACILITY: Same as B above — TELEPHONE #: ( )
ADDRESS: _____ ZIP COD.

It. REASON FOR FILING

A. [ ] New discharge or facility
B. [Y] Existing discharge or facility
C. Increase in quantity of discharge
D. [ ] Change in character of discharge
E. [ ] Change in place or method of disposal
F. [ ] Change in design or operation
G. [ ] Change in business operating facility
H. [ ] Enlargement of existing facility
I. [ ] Other (explain below)

III. TYPE OF OPERATION

HECK ALL APPROPRIATE:

A. [ ] Transfer station
B. [ ] Solid waste disposal rite
C. [ ] Hazardous waste disposal site
D. [ ] Sewage treatment
E. [ ] Industry (on-site disposal facility)
F. [ ] Industry (discharge to sewer)
G. [ ] Woodwaste site
H. [X] Other (explain below)

This is an ash amending site for increased pasture yield

IV. TYPE OF WASTE

HECK ALL APPROPRIATE:

A. [ ] Sewage, sewage sludge, and/or septic tank pumpings
B. [ ] Industrial wastes
C. [ ] Municipal solid wastes
D. [ ] Hazardous wastes
E. [ ] Agricultural wastes
F. [ ] Animal wastes
G. [X] Forest product wastes (Boiler Ash)
H. [ ] Construction/demolition wastes
I. [ ] Inert materials
J. [ ] Dead animals
K. [ ] Tires
L. [ ] Other (explain below)

V. SITE DESIGN CAPACITY

A. PRESENT POPULATION OR CAPACITY: 233 Acres (currently planned for
B. DESIGN POPULATION OR ULTIMATE CAPACITY: 300 Acres
C. LIFE EXPECTANCY (YEARS): 5 to 8 years

VI. QUANTITY OF WASTES

	MAXIMUM		
A. PRESENT OR PROPOSED DAILY FLOW (IN MGD):	N/A	N/A	N/A

C. SOLID WASTE DISPOSAL RATE (IN TONS OR CUBIC YARDS):	DAILY QUANTITY	TOTAL IN PLACE QUANTITY	D. AREA IN WHICH SOIL WILL BE DISTURBED (IN ACRES)	TOTAL SITE AREA
	60 cu.yds./day	128,000 cu.yds.	23 Acres/hr.	300 Max.

VII. LOCATION OF POINT OF DISPOSAL OR OPERATION

(DESIGN AND ATTACH MAP, SKETCH, OR LOCATION ON U.S.G.S. QUADRANGLE MAP, 7.5 OR 15 MINUTE SERIES.)
LIST DISTANCES OR BEARING AND DISTANCE FROM SECTION CORNER OR QUARTER CORNER, SECTION, TOWNSHIP, RANGE, BASE AND MERIDIAN:

See Attached Maps

VIII. SOURCE OF WATER SUPPLY (CHECK ALL APPROPRIATE)

A. ☐ MUNICIPAL OR UTILITY SERVICE: N/A

NAME OF WATER PURVEYOR

ADDRESS OF PURVEYOR

B. ☐ INDIVIDUAL (Wells) N/A

C. ☐ SURFACE SUPPLY: N/A

NAME OF STREAM, LAKE, SPRING, ETC. (IF NAMED)

TYPE OF WATER RIGHTS ☐ Riparian ☐ Appropriation

WATER RIGHTS PERMIT OR LICENSE #

IX. ENVIRONMENTAL IMPACT REPORT (EIR)

Has an EIR been prepared for this project? If "Yes", please enclose a copy.	☐ Yes	☐ No
If "No", will an EIR be prepared?	☐ Yes	☒ No
Will a negative declaration be prepared?	☐ Yes	☒ No

Note: Extensive environmental impact study has been conducted on this site and is on file with the North Coast Regional office.

If "Yes", please answer the following:

WHO WILL PREPARE THE NEGATIVE DECLARATION? APPROX. DATE OF COMPLETION

CERTIFICATION

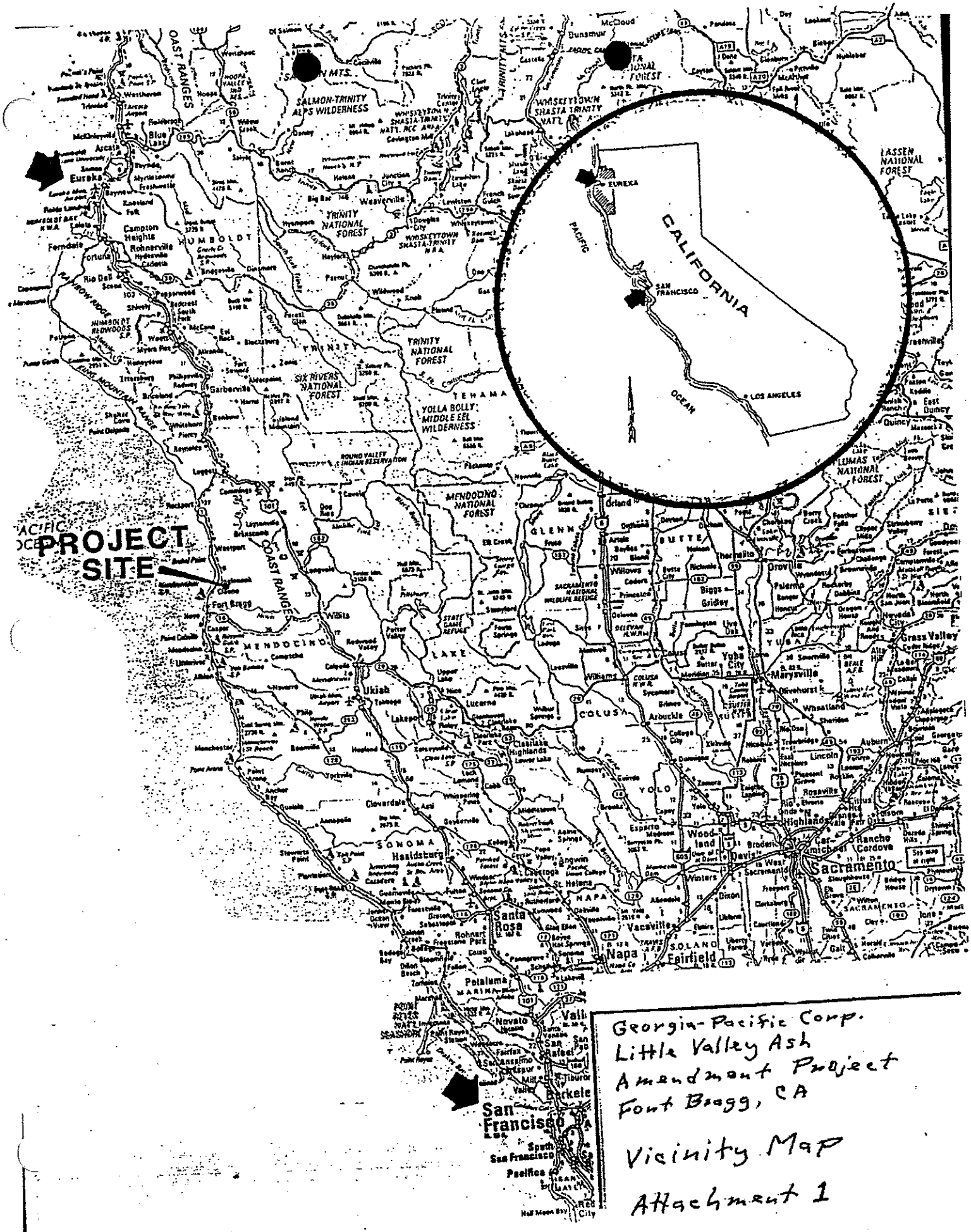
I hereby certify under penalty of perjury that the information provided in this application and in any attachment is true and accurate to the best of my knowledge.

SIGNATURE OF OWNER OF FACILITY		SIGNATURE OF OPERATOR OF FACILITY	
Gerald W. Tice		Donald B. Whitman	
PRINTED OR TYPED NAME		PRINTED OR TYPED NAME	
Gerald W. Tice		Donald B. Whitman	
TITLE	DATE	TITLE	DATE
Senior Manager-Environmental Engineering-Building Products	2-26-91	Plant Manager	

LIST TITLES OF ANY ATTACHMENTS:

Attachment I - Vicinity Map
Attachment 2 - Little Valley Ash Amendment Aregs

You will be notified of the correctness of filing fee and submittal of any additional information deemed necessary to complete your Report of Waste Discharge pursuant to Division 7, Ssction 13250 of the State Water Code. or to complete your permit application pursuant to Government Code Suction 66796 30 and Health and Safety Code Section 25200.



Georgia-Pacific Corp.
Little Valley Ash
Amendment Project
Fort Bragg, CA

Vicinity Map

Attachment 1

STATE OF CALIFORNIA — GEORGE DEUKMEJIAN, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA, CA 95403
(707) 578-2220

July 10, 1990

Mr. Ed Wojinski
Georgia-Pacific Corporation
90 West Redwood Avenue
Fort Bragg, CA 95437

Dear Mr. Wojinski:

We have received from Winzler & Kelly a rough set of plans for construction of a stormwater diversion system to route stormwater runoff from the area north of the power plant through a separate outfall to the Pacific Ocean. It is our understanding from telephone conversations with Mr. Kelly that installed pumping capacity has a ten year return period storm design to lift all remaining runoff from the vicinity of the power plant to the log pond for settling and skimming prior to discharge. We recommend modification of the proposed plans to include the equivalent of *one* inch screens on all inlets to the stormwater diversion system. We feel this modification will be necessary to prevent *discharge* of woody debris from the new outfall. We intend to require installation of some recording device to detect discharge at the remaining emergency overflow structure to the Pacific Ocean near the pumps. We *urge* you to proceed with implementation of these plans.

Please call me if you have any questions.

Your civil servant,

Albert L. Wellman
Associate Water Resource Control Engineer

ALW:ba/wojinski

cc: Bob Kelly
Don Whitman
Kent Mayer

INTRODUCTION

Due to Cleanup and Abatement Order No. 89-159, Georgia-Paafic Corporation, Fort Bragg, is required to submit a technical report that defines methods to separate stormwater from the process wastewater and to prevent future discharges of wastewater and woody debris to the Paafic Ocean.

FIELD WORK AND SITE DESCRIPTION

A site visit was conducted to verify drainage basins and to verify mill operations. figure 1 indicated the various drainage basins identified.

Mill waste from the debarker and scrubber towers flow by gravity to the debarker pond and scrubber basin. Overflow water from both the debarker pond and scrubber basin makes its way to a settling pond. The backwash water from the water treatment plant flows directly to this settling pond. Boiler blow down water flows to a separate pond to the south east.
Flows from the settling pond and separate flows from the blow down pond are connected to a stilling basin. Two pumps pump from this stilling basin to an upper, aerated lagoon via an 8-inch/10-inch discharge main approximately 3000 feet to the south.

These flows from the aerated lagoon run by gravity to a second pond then flow back north via a ditch to the large mill pond where it discharges over a spillway to the Pacific Ocean. Refer to Figure 2, Site Map for the wastewater routing.

Only one pump at a time is operated, although, if necessary, the second pump could be turned on. Refer to the attached pump curve and system head curve Figure 3. Gauges on the suction and discharge were monitored during normal pumping operations. From this data it is estimated that the pump generally is pumping at 1140 gpm.

An emergency pump station is set up to pump from the blow down pond directly to the mill pond via a 6-inch discharge main This pump station consisting of two pumps is used only when the main pump station is down or during storm events when storm runoff coupled with the wastewater exceeds the capacity of the primary pump station.

It is anticipated that the proposed work to separate the storm drainage flows will negate the need for this pump station except if both primary pumps were to fail.

RECOMMENDATIONS

Figure 4 shows recommended drainage improvements to intercept storm runoff before it reaches the debarker pond and scrubber basin and overloads the pump station. (Appendix A includes the backup hydraulic calculations.) This plan sheet is somewhat schematic. The existing storm drainage and waste system is quite complicated and it will take significant field site work during construction to verify existing pipeline locations and flowlines. The existing storm drainage system can be tom out and abandoned, but care will be needed so as not to disrupt the wastewater system.

Basically, runoff from storm drainage areas 1 and 2 will be picked up by the proposed new storm drainage network. The runoff from drainage area I is collected in a proposed earth channel. This channel flows to a DI that is detailed in figure 7. The cross-section of the proposed earth channel is shown in Figure 8. It is recommended that this channel be rock lined (6") to prevent scouring, due to the steepness of the side slopes. The north slope would be seeded above channel.

The runoff from drainage area 2 flows to a proposed underground storm drainage network, which generally parallels the existing storm drainage system in this area. It is recommended that large grating sizes be used on these proposed drop inlets, so as to keep maintenance cleaning to a minimum. This system, which picks up flows from area 2, joins the storm drainage flows from area 1 at a new, proposed storm drain manhole. From this manhole, the flows run through an underground storm drainage network (proposed) to a new ocean outfall. Sections of the existing storm drainage network are tied into this last piece of proposed storm drainage system, thereby picking up storm runoff which is currently flowing into the process waste system. At the ocean outfall, a debris rack will need to be installed to prevent clogging in the lime due to backwash at high tides.

The majority of area 3 will flow to the existing drop inlet and ocean outfall. However, there is concern that leachate from the mill and hog fuel piles will be carried with this runoff. In order to prevent direct discharge to the ocean during normal rainfall events, it is proposed that the existing drop inlet be modified with a weir and sump pump. This modification can take one of two different forms. (Refer to figures 5 and 6.) This sump pump will be capable of pumping 500 gpm to the blow down pond where it will be pumped to the aerated lagoons. Referring to Figure 5, large storm events will top the weir allowing direct discharge via the 18-inch outfall to the ocean. However, it is anticipated that during these larger storm events, the dilution of any leachate by normal runoff will be significant, reducing most potential contamination. Referring to Figure 6, any storm event would necessitate maintenance of the drop inlet. It will be necessary to skim material from the top of the inlet. This modification to the inlet would keep sawdust from getting out through the storm drainage system, if property maintained.

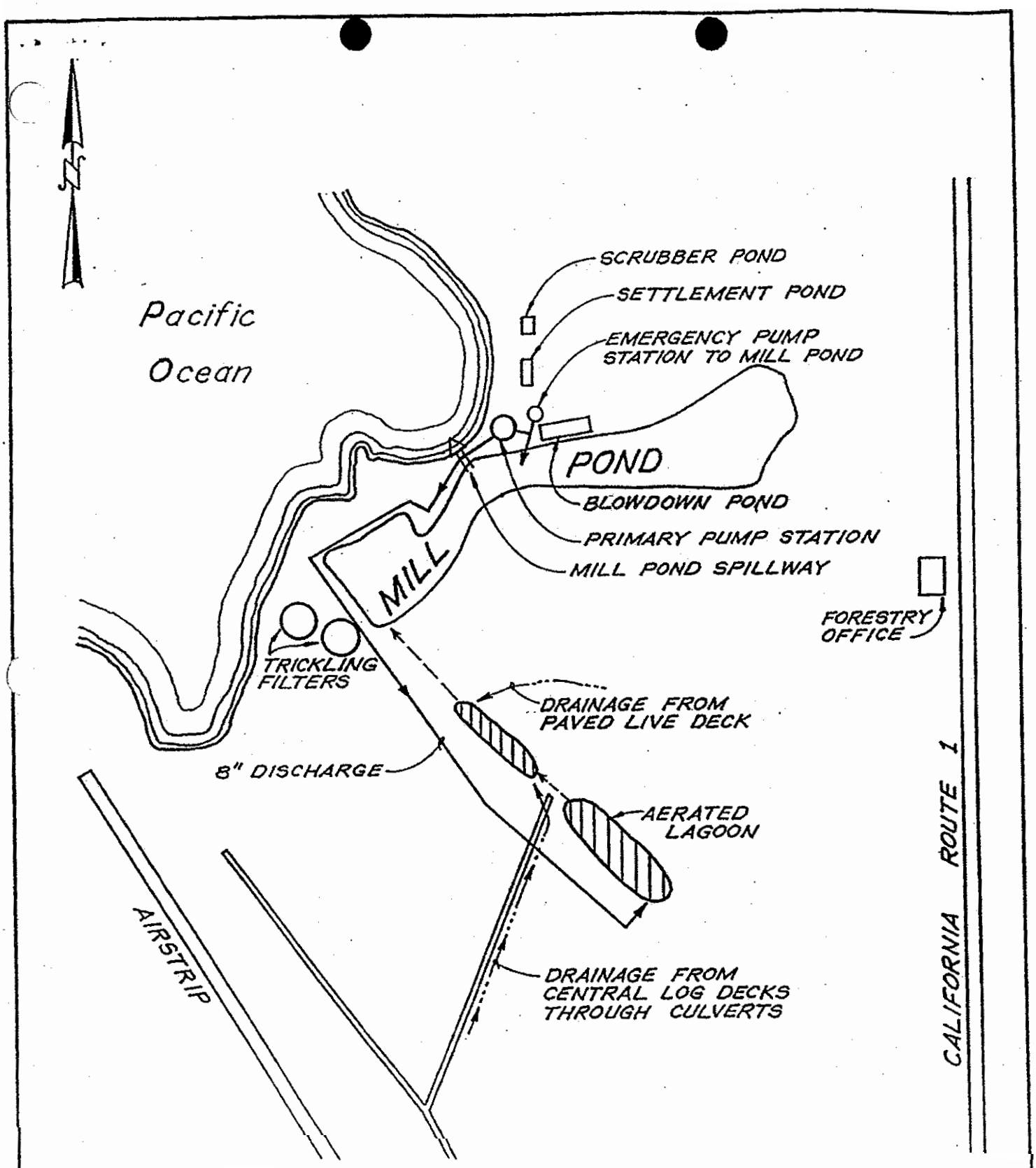
The existing outfall and the proposed new storm drain network is sized to handle a 10-year storm event. Sizing is based on using RCP or similar smooth surface piping. If CMP is used, it will need to be upsized accordingly.

Waste flows from the mill are roughly estimated at just over 1000 gpm. During non-runoff conditions, the primary pump station, with a single pump operating, is capable of handling this waste discharge. As was stated above, the pump capacity is estimated at 1140 gpm. Thus, there is some additional capacity available. ~100 gpm

It is anticipated that not all storm water flow can be kept out of the waste process system. In particular, an area at the south end of the mill is difficult to collect in a storm drain system. Most runoff from this relatively small area eventually finds its way to the blow down pond where it is pumped to the aerated lagoons.

The proposed corrections should separate the majority of storm water flows from waste discharge flows. It is possible that there still exists some minor cross connection areas besides the area mentioned above. Once the corrections are in place, dose monitoring during storm events should indicate if infiltration is still a concern, or if the existing pump station can handle any increased flows.

LIST OF FIGURES



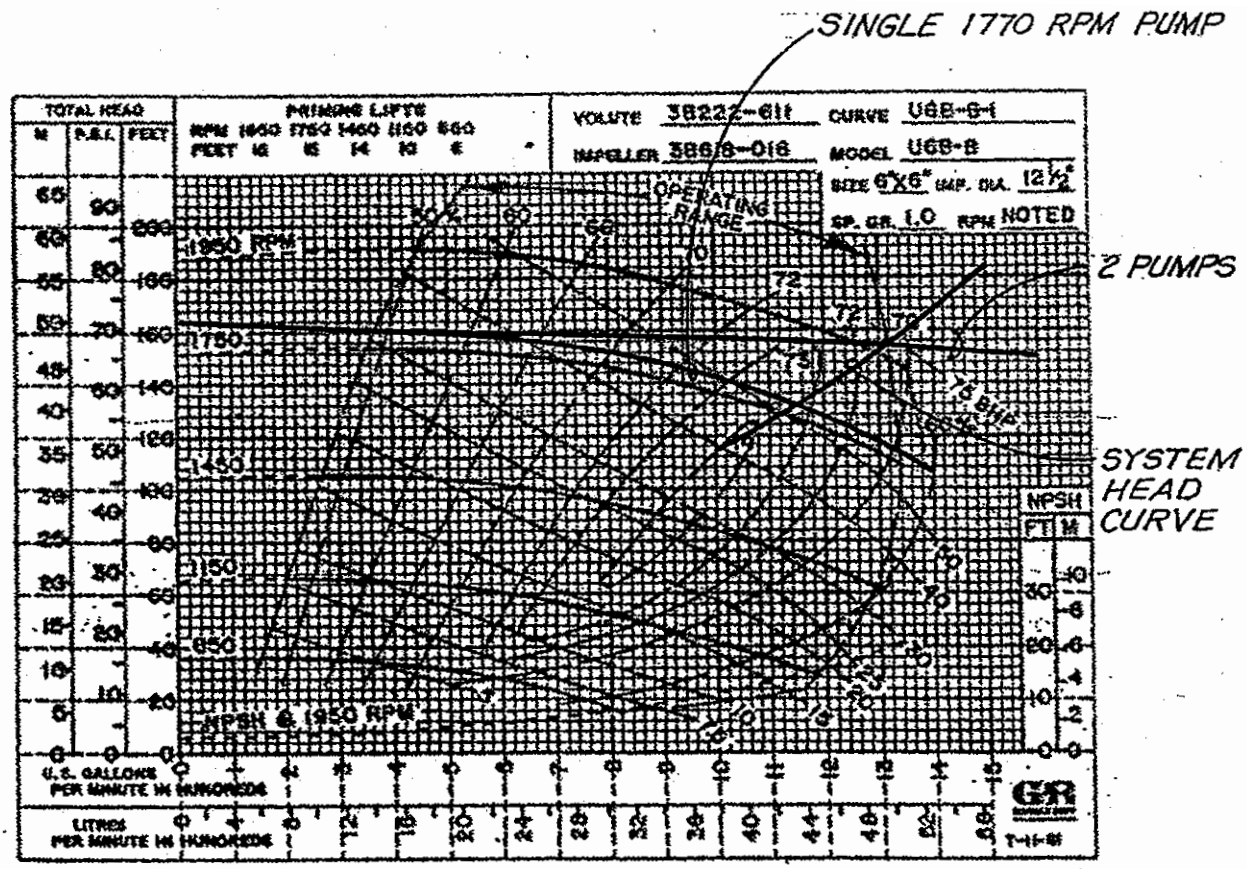
SITE MAP

EXISTING WASTEWATER PUMPING

N.T.S.

FIGURE 2

MAINTENANCE AND REPAIR OF THE WEARING PART'S OF M E PUMP WILL MAINTAIN PEAK OPERATING PERFORMANCE.



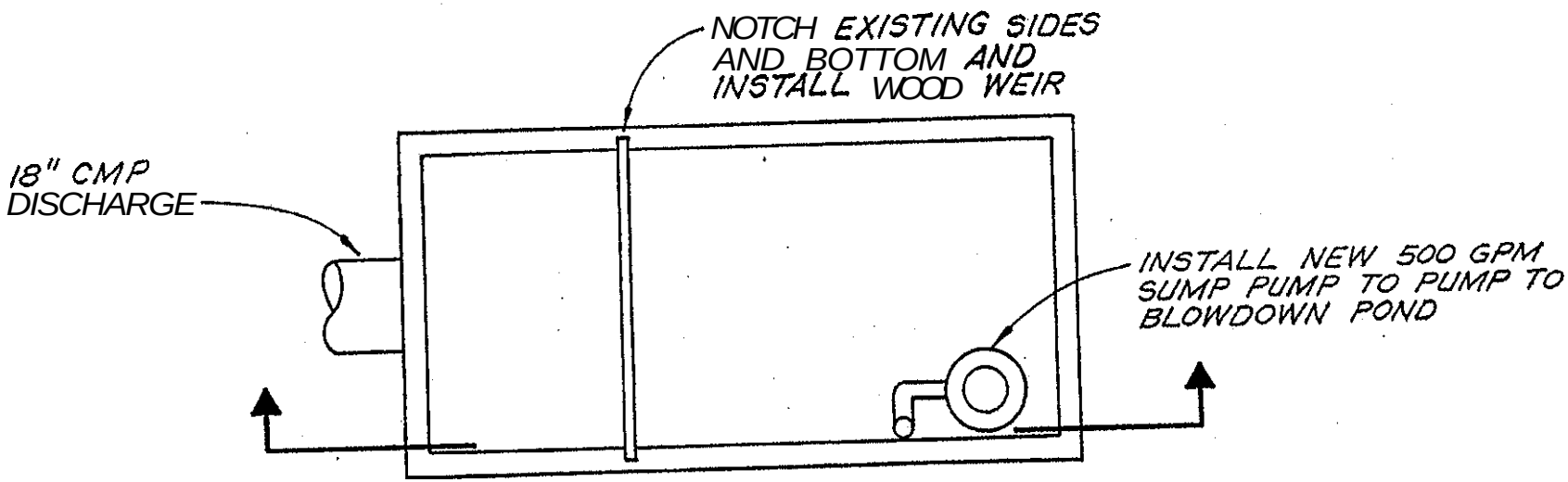
*STANDARD PERFORMANCE FOR PUMP MODEL U6B60-B

*Based on 70°F clear water at sea level with minimum suction lift. Since pump installations are seldom identical, your performance may be different due to such factors as viscosity, specific gravity, elevation, temperature, and impeller trim.

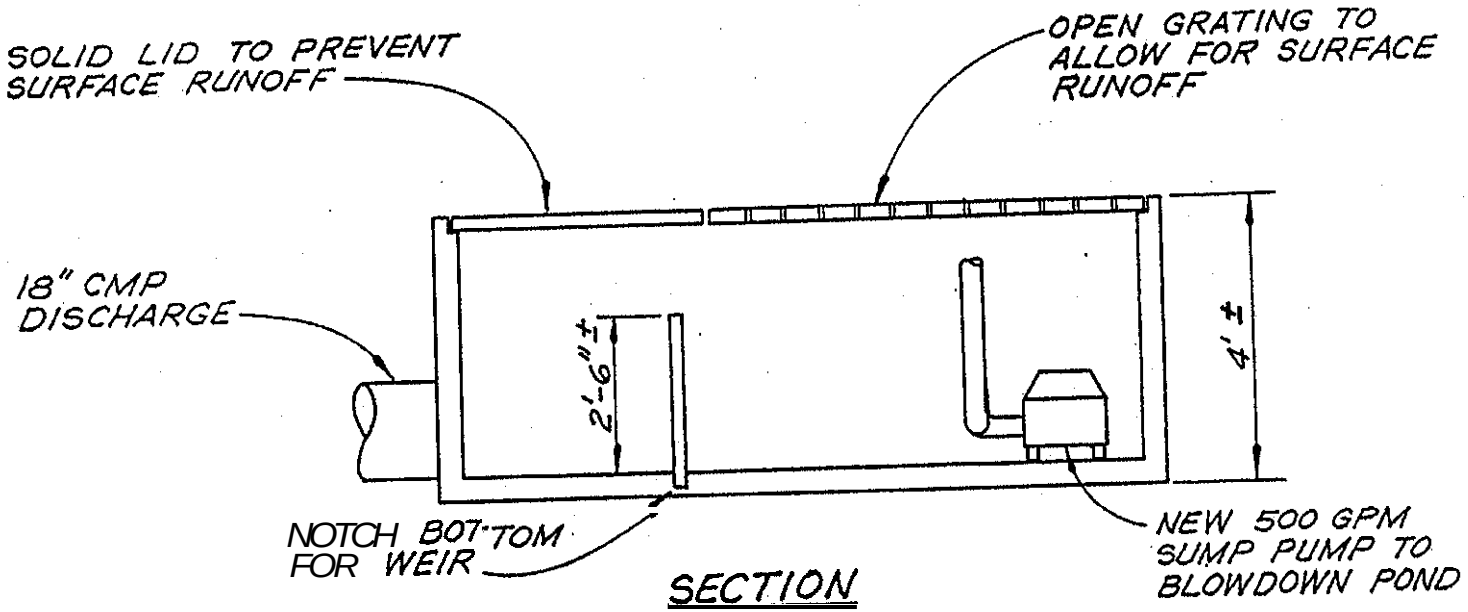
SYSTEM HEAD CURVE / PUMP CURVE

N.T.S.

FIGURE 3



PLAN

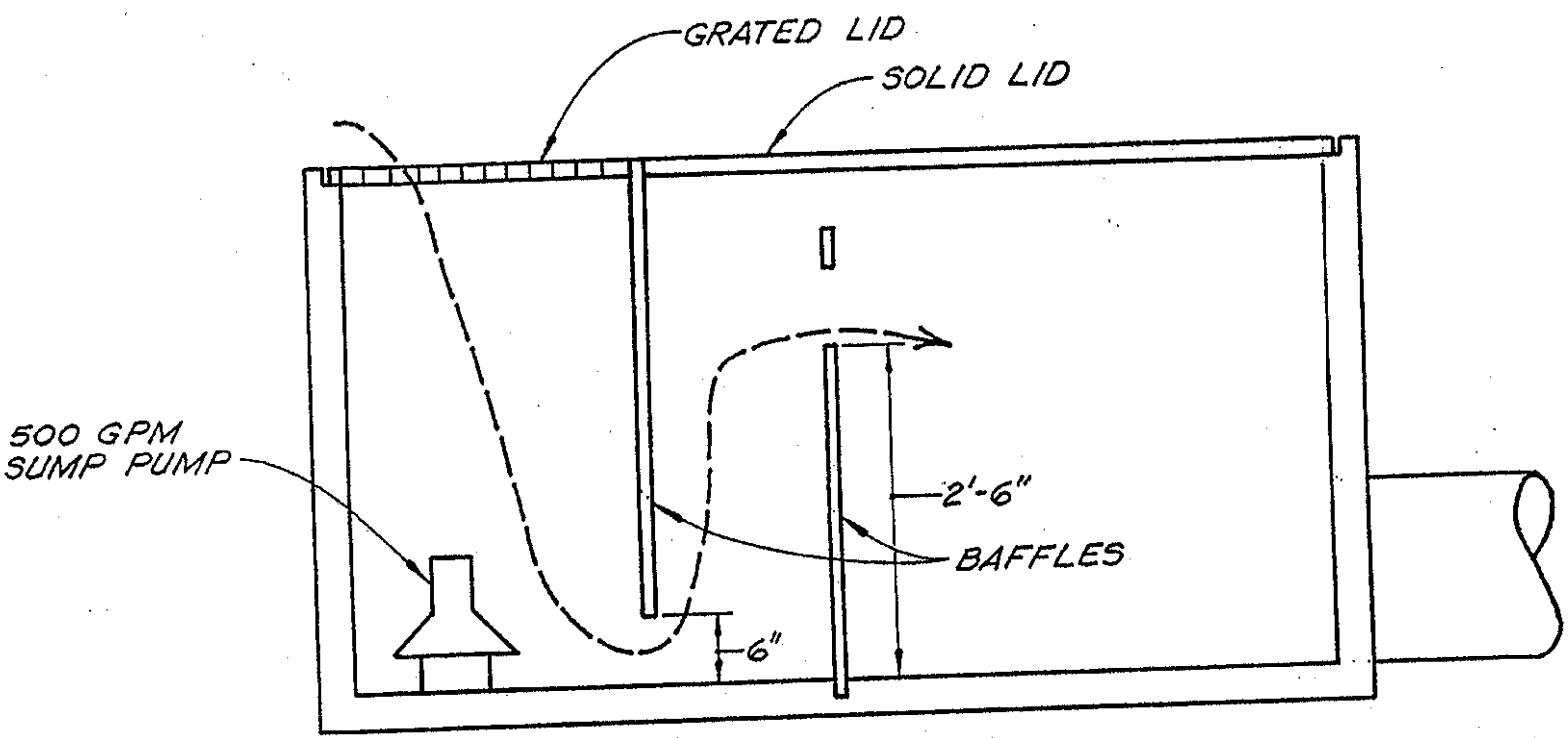


SECTION

MODIFICATIONS TO EXISTING D.I.

N.T.S.

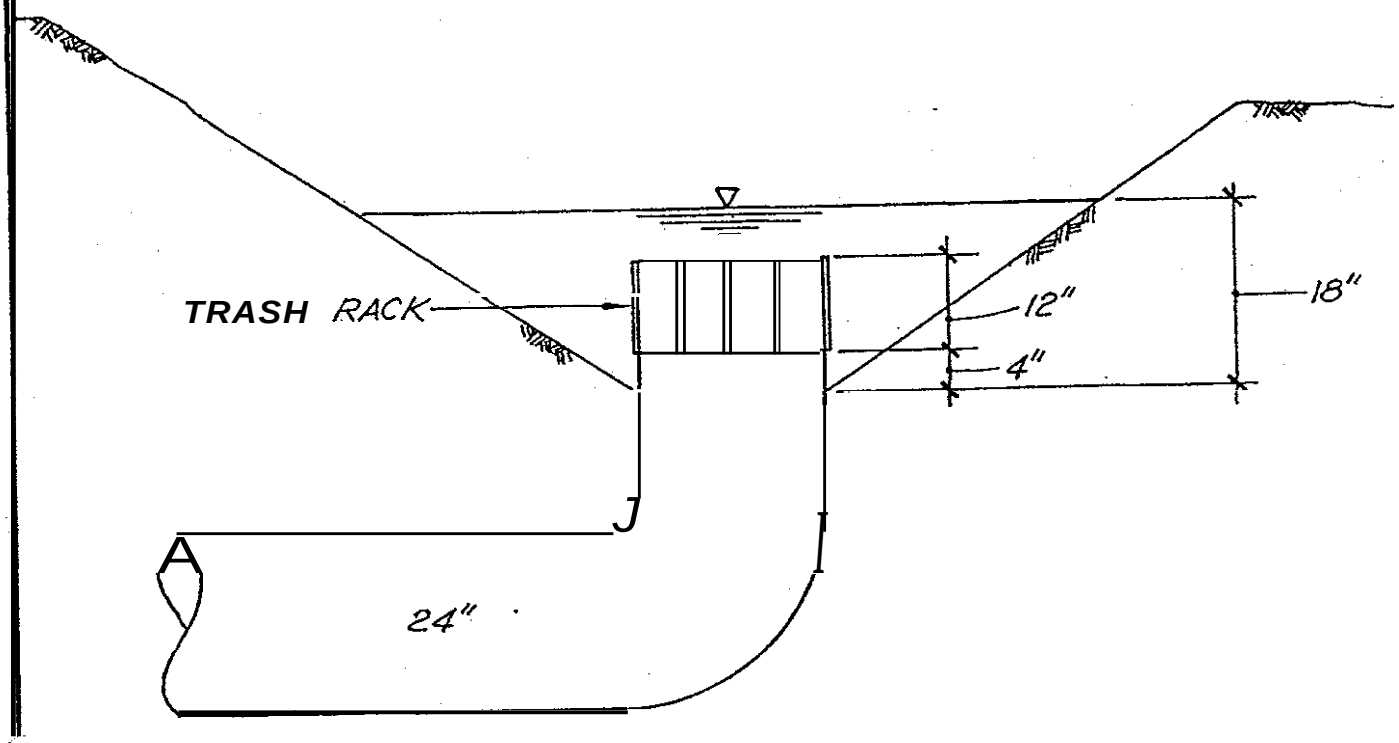
FIGURE 5

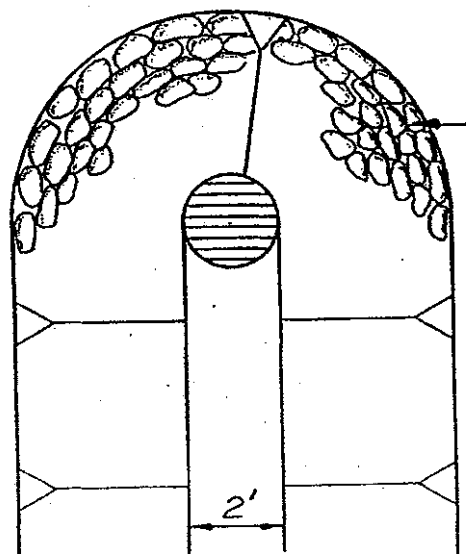


ALTERNATE MODIFICATIONS TO EXISTING D.I.

N.T.S.

FIGURE 6



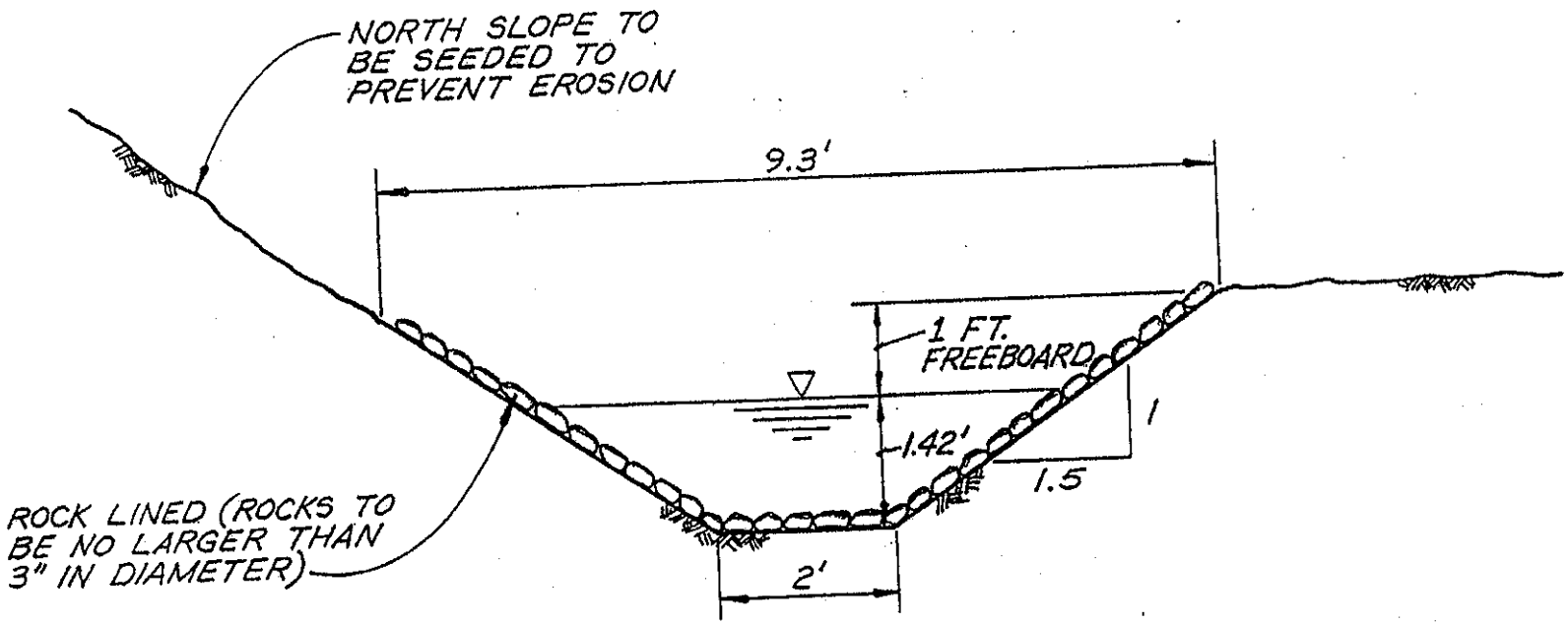


PLAN

D.I. AT END OF EARTH CHANNEL

N.T.S.

FIGURE 7



TYPICAL CHANNEL CROSS SECTION

N.T.S.

FIGURE 8

APPENDIX A

Page

BY: LE
DATE: 3/23/90
FILE: GEOP

ENGINEER'S COST ESTIMATE
GEORGIA - PACIFIC AT FORT BRAGG

NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL PRICE
1	12" RCP	LF	25	45	1125
2	15" RCP	LF	150	50	7500
3	18" RCP	LF	140	55	7700
4	24"RCP	LF	300	65	19500
5	36" RCP	LF	440	80	35200
6	CHANNEL EXCAVATION	CY	160	20	3200
7	ROCK SLOPE PROTECTION AT CHANNEL	CY	57	25	1425
8	DI AT CHANNEL	LS	1	1500	1500
9	DI	EA	4	1700	6800
10	SDMH	EA	5	2000	10000
11	MODIFY EXIST. DI @ SUMP	LS	1	1600	1600
12	SUMP PUMP	LS	1	4000	4000
13	SEEDING AT CHANNEL	LS	1	1000	1000
14	MOBILIZATION	LS	1	2000	2000
				TOTAL	102550

BY: LE
DATE: 4/26/90
FILE: GEOPALT

LTERNA ENGINEE :OST MATE **
GEORGI · PACIFI AT FORT GG

NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL PRICE
1	12" RCP	LF	25	45	1125
2	15" RCP	LF	150	50	7500
3	18" RCP	LF	140	55	7700
4	24"RCP	LF	105	65	6825
5	36" RCP	LF	390	80	31200
6	CHANNEL EXCAVATION	CY	283	20	5660
7	ROCK SLOPE PROTECTION AT CHANNEL	CY	100	25	2500
8	DI AT CHANNEL	LS	1	1500	1500
9	DI	EA	4	1700	6800
10	SDMH	EA	5	2000	10000
11	MODIFY EXIST. DI @ SUMP	LS	1	1600	1600
12	SUMP PUMP	LS	1	4000	4000
13	SEEDING AT CHANNEL	LS	1	1200	1200
14	MOBILIZATION	LS	1	2000	2000
				TOTAL	89610

** ALTERNATE ENGINEER'S ESTIMATE ELIMINATES A WRTION OF THE UNDERGROUND PIPELINE AND REPLACES IT WITH A OPEN CHANNEL AS SHOWN ON FIGURE 4

WINZLER & KELLY:
CONSULTING ENGINEERS

RATIONAL METHOD DRAINAGE STUDY

By: Liz E. Date 2/3/90 Subject Georgia - Pacific Sheet No. 2 of 3

Chkd. By _____ Date _____ Storm Freq. 10 % 10 yr. slope = 2% Job. No. _____

Point of Conc.	Area	EL / Distance	Slope	V	Time of Conc. (in minutes) Travel Time	Time of Conc. (in minutes) Total Time	I	Assume 1.0 K	C	ΔA / A Total	KΔAC	ΣKΔAC	CiA=Q Q	Design	Remarks
A2	2					Initial 17	1.75	1.0	0.9	19.44	17.50	17.50	30.62	D = 24"	n = 0.013
														S = 1% D = 27"	S = 0.005 D = 33
A1	1					Initial 17	1.75	1.0	0.9	20.03	18.03	18.03	31.55	D = 24"	n = 0.013
														S = 1% D = 27"	S = 0.005 D = 33"
A3	1,2,3				6	23	1.50	1.0	0.9	7.62 / 47.09	6.86	24.36	63.57	D = 33"	n = 0.013
														S = 1% D = 36"	S = 0.005 D = 42"
A4	1 & 2					17	1.75	1.0	0.9	39.47	35.52	35.52	62.17	D = 33"	n = 0.013
														S = 1% D = 36"	S = 0.005 D = 42"
A3	3-1					Initial 6.0	1.52	1.0	0.9	6.00	5.40	5.40	8.21	D = 18"	n = 0.013
														S = 1% D = 18"	S = 0.005 D = 21"

2

STATE WATER RESOURCES CONTROL BOARD		Date: 7-6-91
From: T. Palmer	Division/Region: DSA	Phone: (8) 492-8400

TO

☐ Executive Office	☐ Division of Water Rights	☐ Div. of Administration Services	☐ Pers. and Training Office
☐ Affirmative Action Office	☐	☐ Pers. and Admin. Services Branch	☐ Contracts Office
☐ Program Control	☐ Division of Loans, Tanks & Land Disposal	☐ Data Management Office	☐ Fiscal and Program Eval. Branch
☐ Labor Relations Office	☐	☐ Systems and Management Analysis	☐ Accounting Office
☐ Office of Legislative and Public Affairs	☐ Division of Water Quality	☐ Business Services Office	☐ Budget Office
☐ Office of Chief Counsel	☐	☐ Reproduction and Mail Unit	☐ Program Analysis Office

ACTION

☐ Appropriate Action	☐ Signature	☐ Review and Return	☒ Information
☐ Approval	☐ Reply – Copy to Me	☐ ? Per Your Request	☐ File

COMMENTS

I have a call in to Dave Siegal (DHS) to see if he had a chance to review the Georgia Pacific flyash material. Attached are DHS's comments re Antioch pulp mill and sludge used as soil amendment

U.S. POSTAL SERVICE

☐ EPA Region 9	San Francisco	☐ Water Quality Control Institute (San Marcos)	

REGIONAL WATER QUALITY CONTROL BOARD

☒ 1 – Santa Rosa Frank Reichmuth	☐ 5 – Sacramento	☐ 6 – Victorville
☐ 2 – Oakland	☐ 5 – Fresno	☐ 7 – Palm Desert
☐ 3 – San Luis Obispo	☐ 5 – Redding	☐ 8 – Riverside
☐ 4 – Los Angeles	☐ 6 – South Lake Tahoe	☐ 9 – San Diego
☐	☐	☐

FOR0023

Karen Theiss and Associates
Biological and Environmental Consultants

P.O. *Box 3005* • McKinleyville, CA 95521 • (707) 839-0681

July 10, 1990

Mr. Gerald W. Tice
Georgia-Pacific Corporation
133 Peachtree Street N.E.
Atlanta, GA 30303

RE: Aquatic Sampling Program
Soil Amendment Project
Ft. Bragg, CA
#90-054

Dear Gerald:

Enclosed is a report of the field methodology employed by Vicki Frey and Tim Salamunovich for selection of an appropriate organism for the aquatic bioaccumulation study on Little Valley Creek near Fort Bragg, CA. It includes a description of the requisite criteria for the selection of a suitable test organism. the different techniques employed in collection of the chosen organism (Threespine Stickleback - *Gasterosteus aculeatus*), a map delineating the collection sites and specific data with regard to each sample collected.

I have finally found a source for General Liability Insurance at a reasonable rate, and will have them send you a copy of the Certificate of Insurance as soon as possible. The fee for the insurance will be about $250.

Should you have any questions or comments about the enclosed report, please give me a call. I will be in most of this week, but will be out of town from July 14 through July 22.

Sincerely,

KAREN THEISS AND ASSOCIATES

Karen C. Theiss
Principal

Encl.

Karen Theiss and Associates
Biological and Environmental Consultants

P.O. Box 3005 • McKinleyville, CA 95521 • (707) 839-0681

TCDF BIOACCUMULATION STUDY

LITTLE VALLEY CREEK, MENDOCINO COUNTY

GEORGIA-PACIFIC CORPORATION

On June 25, 1990 Vicki Frey, aquatic biologist, and Tim Salamunovich, fisheries biologist, with Karen Theiss and Associates, sampled Little Valley Creek, near Fort Bragg, CA, for a suitable aquatic organism to be tested for bioaccumulation of the full dioxin/furan series. The selection of a suitable organism for a bioaccumulation study is dependent upon certain prerequisites. In order to be representative of the study area, the organism should be sedentary or non-migratory. It should be abundant throughout the study area and of reasonable size to give adequate tissue for analysis. It should be sufficiently long-lived to allow bioaccumulation and allow the sampling of more than one, year class if desired. Also, the organism should live in close contact with the bottom sediments and feed on sedentary infauna and small epifauna which would enhance the chances of bioaccumulation.

The Threespine Stickleback (*Gasterosteus aculeatus*) fits most of the above prerequisites, making it a suitable organism for this study. The stickleback is a quiet water fish living among vegetation at stream edges and in weedy pools and backwaters. It preys on bottom organisms and epifauna living on vegetation. Stickleback are frequently important as prey items for both salmonid fish and birds. Stickleback may live for 2-3 years, although many complete their life cycle in one year.

A reconnaissance survey resulted in the selection of a control site directly above the amended plots and a test site directly below the amended plots (see attached map). Prior to sampling at all sites, a decontamination procedure was performed on a metal sampling bucket used for holding captured organisms. This procedure consisted of a soapy water wash (Liquinox), deionized water (DI) rinse, methanol rinse, DI rinse, hexane rinse, and a final DI rinse.

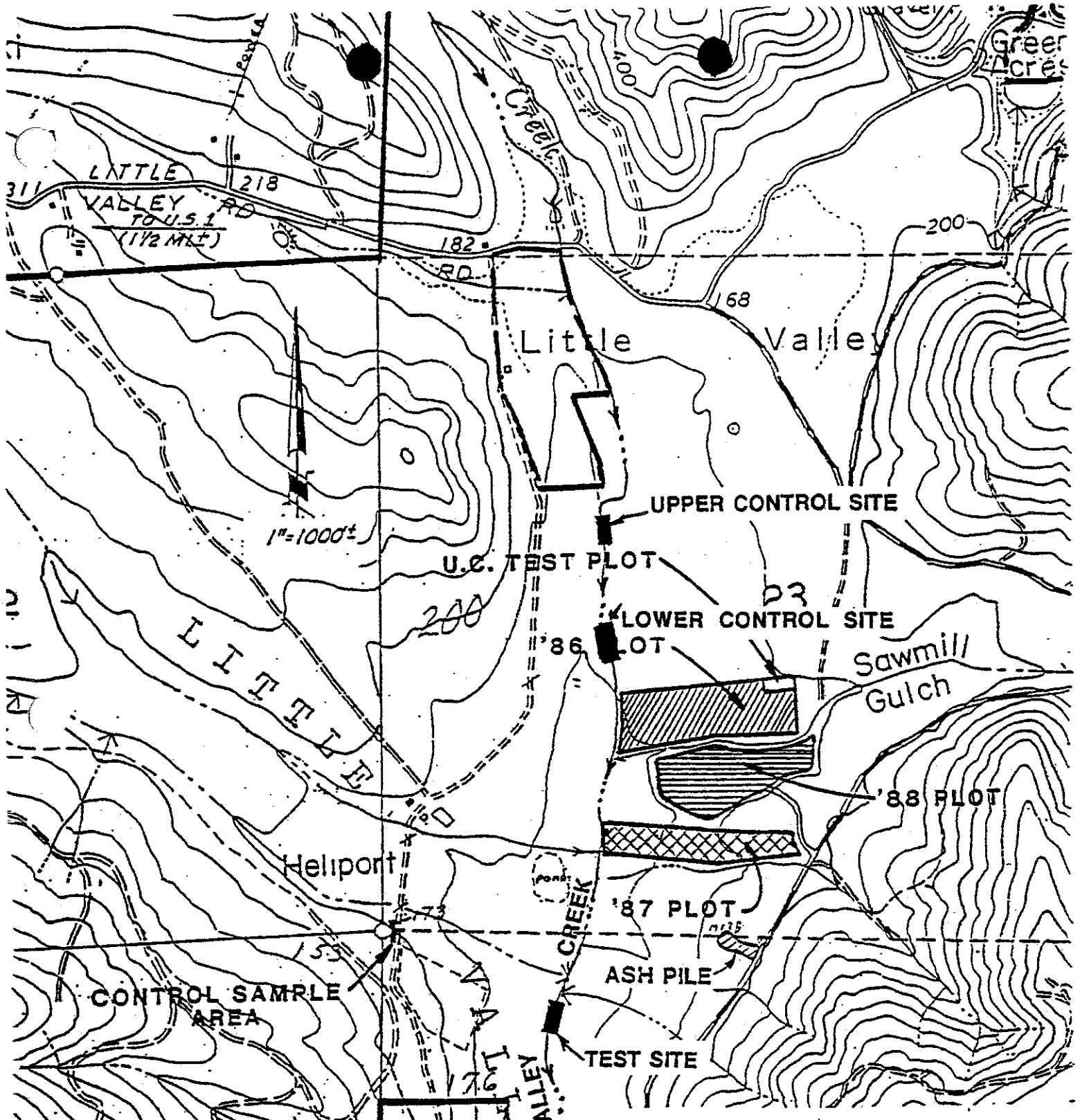
Sampling commenced at the control site using two Smith-Root Model 11A BAckpack Electroshockers. Approximately 100 yards of stream bed were shocked, but no fish were captured. Visibility of the water was very poor due to a heavy sediment load caused by a muddy bottom and cattle crossings in the vicinity. Some areas of the stream had 4-5 foot deep pools with a muddy bottom making it difficult to see and capture stunned organisms. Shallow reaches of the stream had heavy vegetative cover which also created difficulties.

The sampling method at the control site was then changed to use of a small pole seine and had-held dip nets. This technique proved more successful with the following organisms being captured: numerous tadpoles, two Mosquitofish (*Gambusia affinis*), three adult Threespine Stickleback (*Gasterosteus aculeatus*), one Black Bullhead (*Ictalurus melas*), numerous gammarid amphipods, small bivalves, small aquatic beetles and insect larvae. In order to capture enough stickleback for the sample, seining was continued further downstream where there was more emergent vegetation in the streambed. This proved successful and enough stickleback were captured for a test sample and an archive sample. Stickleback were hand-picked off the seine using clean latex surgical gloves and placed into a decontaminated metal bucket filled with distilled water. When enough fish had been collected, they were rinsed again with DI and placed into clean glass jars provided by Enseco-Cal Laboratory in Sacramento, CA.

At the test site, sampling began after decontamination of the sampling bucket. Sampling methods were the same as those used at the control site with the pole seine and dip nets. The stream bed at the test site had more emergent vegetation and the water was clearer than at the control site. Sampling occurred in two open pools, approximately 100 feet apart. Seining yielded numerous stickleback per seine haul with young-of-the-year fry being very abundant. No other species were captured.

A test sample and an archive sample were collected at each site. All samples contained several fish in order to ensure adequate quantities of tissue. The control site sample had a biomass of 35 grams and included 30 reproductively mature stickleback ranging from 50-70 mm in length. The control site archive sample had 25 grams of fish tissue and was comprised of 50 immature stickleback (15-25 mm). The test site sample for analysis had a biomass of 45 grams and a total of 31 mature stickleback (50-70 mm). The test site archive sample had 15 grams of tissue and 27 individuals (25-35mm).

All samples were placed on ice for transport to Eureka where they were immediately frozen. The following day the test samples were shipped on dry ice via Federal Express to Enseco-Cal Laboratory, Sacramento, CA for analysis. The archive samples were transferred to Selvage, Heber, Nelson and Associates in Eureka for storage in their freezer.



Karen Theiss & Associates
Environmental Consultants

Georgia Pacific Corporation
Little Valley TCDF Study
November 1988 To July 1990
Fort Bragg, California

AQUATIC BIOACCUMULATION SAMPLING AT LITTLE VALLEY CREEK

STATE OF CALIFORNIA — PETE WILSON, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA, CA 95403
(707) 576-2220

June 10, 1991

Mr. Gerald Tice
Chief Environmental Engineer
Georgia-Pacific Corporation
P.O. Box 105603
Atlanta, GA 30348

Dear Mr. Tice:

Enclosed is a copy of the draft Regional Board Order No. 91-93, revised Waste Discharge Requirements for the Georgia-Pacific Fort Bragg Soil Amendment. This Order will be considered by the Regional Board during its regular meeting on June 27, 1991, at the Eureka City Council Chambers. We would appreciate it if you could send us any comments you may have as soon as possible.

Please call if you have any questions.

Sincerely

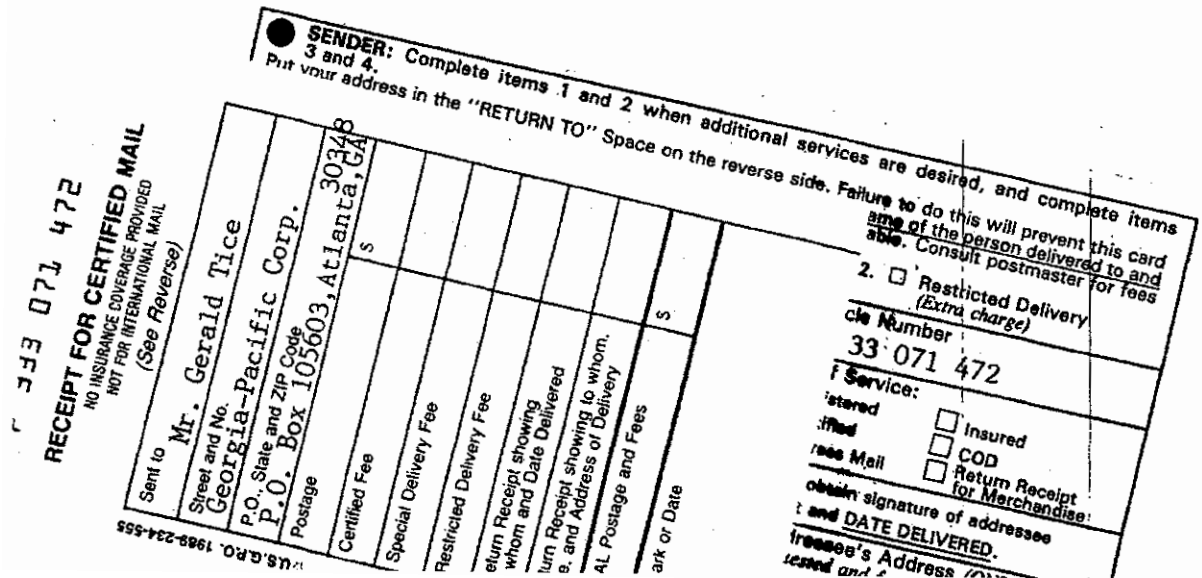
Mark K. Neely
Associate Engineering Geologist

MKN:tam/gpastrns

Enclosure

Certified-Return Receipt Requested

cc: Don Whitman, Georgia-Pacific Corporation, 90 W. Redwood Avenue, Fort Bragg, CA 95437



ATE OF CALIFORNIA
EGIONAL WATER QUALITY CONTROL BOARD
PARTMENT OF HEALTH SERVICES
WASTE MANAGEMENT BOARD
TMENT OF FORESTRY

APPLICATION FOR FACILITY PERMIT/WASTE DISCHARGE

This form is to be used for filing a/an: (check all appropriate)

1. [X] **REPORT OF WASTE DISCHARGE** (pursuant to Division 7 of the State Water Code)
2. [ ] **APPLICATION FOR A HAZARDOUS WASTE FACILITY PERMIT** (pursuant to Health and Safety Code Section 25200)
3. [ ] **APPLICATION FOR A SOLID WASTE FACILITIES PERMIT** (pursuant to Government Code Section 66796.30)
4. [ ] **APPLICATION FOR A RUBBISH DUMP PERMIT** (pursuant W Public Resources Code Sections 4371–4375 and 44381

FOR OFFICE USE ONLY
Form 200 Rec'd
Fee (RWQCB) (SWMB)
Letter to Discharger
Report Rec'd
Effective Date
CDF Notified
DOHS No.
SWMB No.

I. FACILITY

A. NAME OF FACILITY: Georgia-Pacific Corporation — TELEPHONE #: (707) 964-5651
ADDRESS: 90 West Redwood Ave., Fort Braea, CA — ZIP CODE: 95437

B. NAME OF LEGAL OWNER OF FACILITY: Georgia-Pacific Corporation — TELEPHONE #: (404) 521-5084
ADDRESS: 133 Peachtree St., N.E., Atlanta, GA — ZIP CODE: 30303

C. NAME OF BUSINESS OPERATING FACILITY: Same as A above — TELEPHONE #: ( )
ADDRESS: — ZIP CODE:

D. OF BUSINESS OPERATING FACILITY
[ ] Sole Proprietorship [ ] Partnership [X] Corporation [ ] Government Agency

E. NAME OF OWNER(S) OF BUSINESS OPERATING FACILITY: Same as B above — TELEPHONE #: ( )
ADDRESS WHERE LEGAL NOTICE MAY BE SERVED: — ZIP CODE:

II. REASON FOR FILING

CHECK ALL APPROPRIATE:

A. [ ] New discharge or facility
B. [X] Existing discharge or facility
C. [ ] Increase in quantity of discharge
D. [ ] Change in character of discharge
E. [ ] Change in place or method of disposal
F. [ ] Change in design or operation
G. [ ] Change in business operating facility
H. [ ] Enlargement of existing facility
I. [ ] Other (explain below)

III. TYPE OF OPERATION

CHECK ALL APPROPRIATE:

A. [ ] Transfer station
B. [ ] Solid waste disposal site
C. [ ] Hazardous waste disposal rite
D. [ ] Sewage treatment
E. [ ] Industry (on-site disposal facility)
F. [ ] Industry (discharge to sewer)
G. [ ] Woodwaste site
H. [X] Other (explain below)

This is an ash amending site for increased pasture yield

IV. TYPE OF WASTE

CHECK ALL APPROPRIATE:

A. [ ] Sewage, sewage sludge, and/or septic tank pumpings
B. [ ] Industrial wastes
C. [ ] Municipal solid wastes
D. [ ] Hazardous wastes
E. [ ] Agricultural wastes
F. [ ] Animal wastes
G. [X] Forest product wastes (Boiler Ash)
H. [ ] Construction/demolition wastes
I. [ ] Inert materials
J. [ ] Dead animals
K. [ ] Tires
L. [ ] Other (explain below)

V. SITE DESIGN CAPACITY

A. PRESENT POPULATION OR CAPACITY: 233 Acres (currently planned for use)
B. DESIGN POPULATION OR ULTIMATE CAPACITY: 300 Acres
C. LIFE EXPECTANCY (YEARS): 5 to 8 years

VI. QUANTITY OF WASTES

A. PRESENT OR PROPOSED DAILY FLOW (IN MGD):	AVERAGE	B. DESIGN FLOW (IN MGD)
N/A	N/A	N/A

C. SOLID WASTE DISPOSAL (IN TONS OR CUBIC YARDS):	DAILY QUANTITY	TOTAL IN PLACE QUANTITY	D. AREA IN WHICH SOIL WILL BE DISTURBED (IN ACRES)	TOTAL SITE AREA
	60 cu.yds./day	128,000 cu.yds.	23 Acres/hr.	300 Acres Max.

VII. LOCATION OF POINT OF DISPOSAL OR OPERATION

(DESIGN AND ATTACH MAP, SKETCH, OR LOCATION ON U.S.G.S. QUADRANGLE MAP, 7.5 OR 15 MINUTE SERIES.)
LIST DISTANCES OR BEARING AND DISTANCE FROM SECTION CORNER OR QUARTER CORNER, SECTION, TOWNSHIP, RANGE, BASE AND MERIDIAN:

See Attached Maps

VIII. SOURCE OF WATER SUPPLY (CHECK ALL APPROPRIATE)

A. ☐ MUNICIPAL OR UTILITY SERVICE: N/A

NAME OF WATER PURVEYOR

ADDRESS OF PURVEYOR

B. ☐ INDIVIDUAL (Wells) N/A

C. ☐ SURFACE SUPPLY: N/A

NAME OF STREAM, LAKE, SPRING, ETC. (IF NAMED)

TYPE OF WATER RIGHTS: ☐ Riparian ☐ Appropriation

WATER RIGHTS PERMIT OR LICENSE #

IX. ENVIRONMENTAL IMPACT REPORT (EIR)

Has an EIR been prepared for this project? If "Yes", please enclose a copy.	☐ Yes	☒ No
If "No": will an EIR be prepared?	☐ Yes	☒ No
Will a negative declaration be prepared?	☐ Yes	☒ No

Note: Extensive environmental impact study has been conducted on this site and is on file with the North Coast Regional office.

If "Yes", please answer the following:

WHO WILL PREPARE THE NEGATIVE DECLARATION?	APPROX. DATE OF COMPLETION

CERTIFICATION

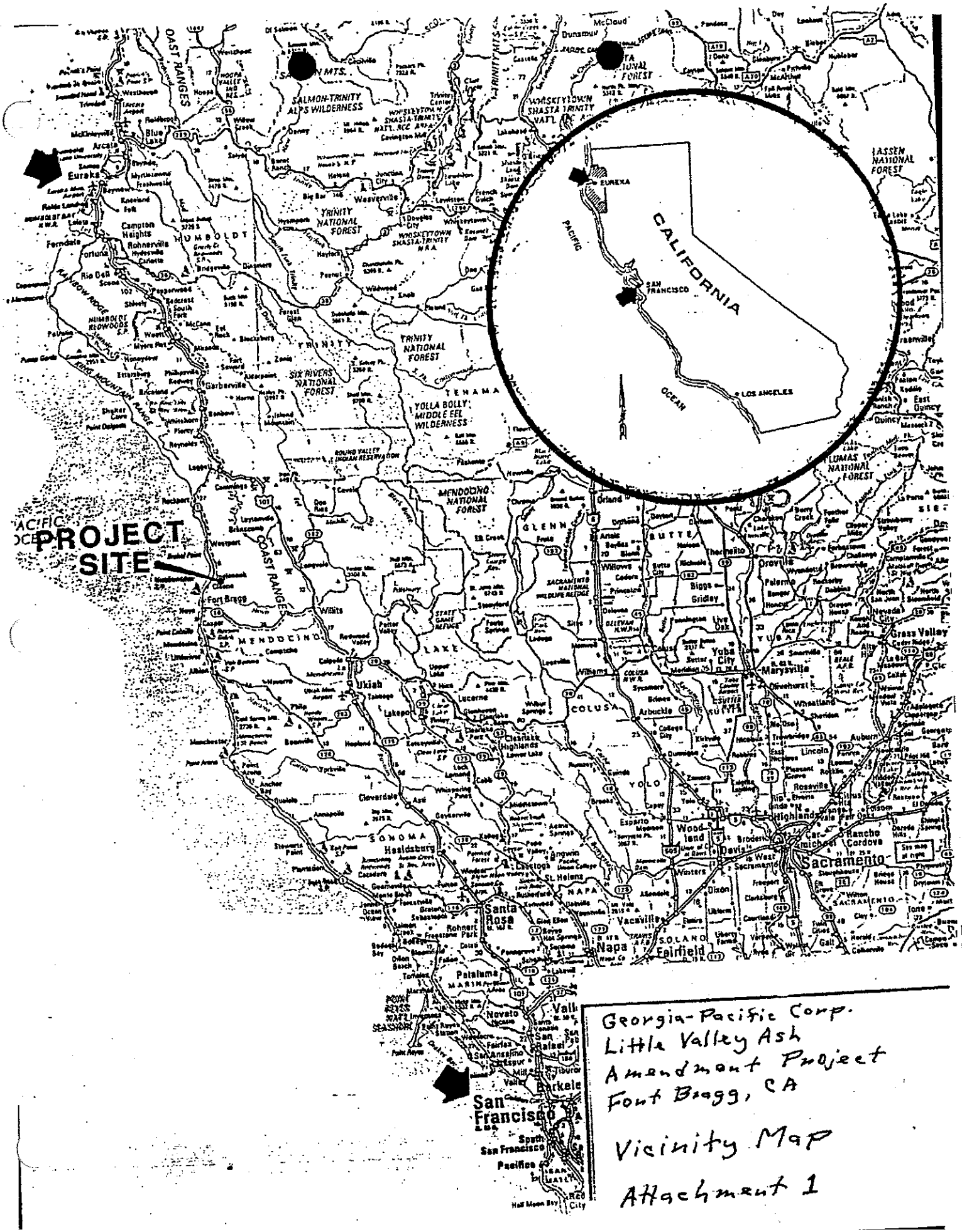
I hereby certify under penalty of perjury thot the information provided in this application and in any attachments is true and accurate to the best of my knowledge.

SIGNATURE OF OWNER OF FACILITY		SIGNATURE OF OPERATOR OF FACILITY	
Gerald W. Tice		Donald B. Whitman	
PRINTED OR TYPED NAME		PRINTED OR TYPED NAME	
Gerald W. Tice		Donald B. Whitman	
TITLE: Senior Manager-Environmental Engineering-Building Products	DATE: 2-26-91	TITLE: Plant Manager	DATE

LIST TITLES OF ANY ATTACHMENTS:

Attachment 1 - Vicinity Map
Attachment 2 - Little Valley Ash Amendment Areas

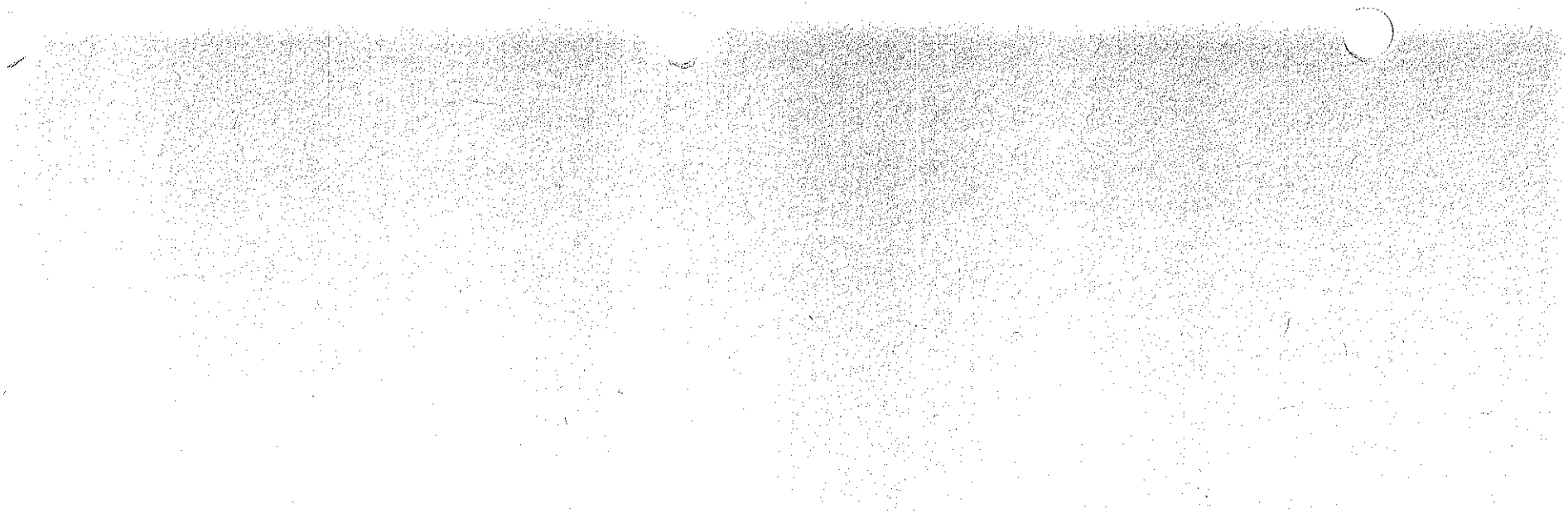
You will be notified of the correctness of filing f a and submittal of any additional information deemed necessary to complete your Report of Wate Discharge pursuant to Division 7, Section 13250 of the Ststs Water Code, or to complete your permit application pursuant to Government Code



Georgia-Pacific Corp.
Little Valley Ash
Amendment Project
Fort Bragg, CA

Vicinity Map

Attachment 1



STATE OF CALIFORNIA
GEORGE DEUKMEJIAN, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD-
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA. CA 95403
(707) 576-2220

July 10, 1990

Dave Siegel
Department of Health Services
714 P Street, Room 499
Sacramento, CA 95814

Dear Dave:

I am sending along the final lab results of the dioxin and furan analysis for the boiler ash from Georgia-Pacific sawmill in Fort Bragg. Also included are the lab *results* of fish tissue analysis from samples collected from an adjacent *creek.* You will remember that Frank Palmer suggested that I keep you current on developments of the ash disposal question. Please call me to discuss any thoughts you may have on these results. Thanks again for any light you *can* shed on this.

Sincerely,

Mark K. Neely
Associate Engineering Geologist

MKN:ba/siegel

cc: Dr. Frank Palmer, SWRCB, Division of Water Quality

File G.P. Ash Mendo Co.

Georgia-Pacific Corporation *Eastern Wood Products Manufacturing Division*
P.O.Box 105603
Atlanta, Georgia 30348
Telephone (404) 921-4000
Teletype (810) 751-100

FAX TRANSMITTAL

TO: Frank Reichmuth

LOCATION: CA Water Control Board

FAX NUMBER: 707/523-0135

FROM: Gerald W. Tice

MCATION: Atlanta, Ga. Environmental Engineering - 16th Floor

FAX NUMBER: 404/827-7022

TOTAL PAGES: 12 **(Including Transmittal Sheet)**

DATE: 7/10/90 **TIME:** 8.30 AM

If you do not receive all of the pages listed above please call Pam at 404/521-5082.

Frank,

Here is the final analysis on the stickle backs. Jar #4 is the controi (upstream) and Jar 65 is at the test site (downstream). Note that downstream numbers are somewhat lower than upstream, I will send the sediment results in the next day or so.

Gerald Tice

COPIES SENT TO FRANK PALMER, LWQ
+ DAVE SIEGEL, DOHS

Enseco
A CORNING Company

July 5, 1990
Lab ID: 053468

Gerald Tice
Georgia Pacific
133 Peachtree Street NE
Atlanta, GA 30348

Dear Mr. Tice:

Enclosed is the report for the two fish samples for your Little Valley Project whfch were received at Enseco-Cal Lab on 27 June 1990.

The report consists of the following sections:

I Sample Description
II Analysis Request
III Quality Control Report
IV Analysis Results

If you have any questions, please feel free to call.

Sincerely,

Michael J. Miille, Ph.D.
Division Director

td

Enseco Incorporated
2544 Industrial Boulevard
West Sacramento, California 95691
916/372-1393 Fax: 916/372-7768

Enseco
A CORNING COMPANY

I Sample Description

See the attached Sample Description Information.

The samples were received under chain-of-custody.

II Analysis Request

The following analytical test was requested.

Lab ID	Analysis Description
053468-1, 2	C14 thru Cl8 Dioxins/Furans plus 2,3,7,8, Substituted Isomers

III Quality Control

A. Project Specific QC. No project specific QC (i.e., spikes and/or duplicates) was requested.

B. Method Blank Results. A method blank is a laboratory-generated sample which assesses the degree to which laboratory operations and procedures cause false-positive analytical results for your samples.

No target parameters were detected in the method blank associated with your samples at or above the detection limits noted on the data sheet in the Analytical Result Section.

IV Analysis Results

Test methods for all analyses except chlorinated dioxins and furans, may include minor modifications of published EPA Methods such as reporting limits or parameter lists. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e., no correction is made for moisture content, unless the method requires or the client requests that such correction be made.

For pulp and paper industry samples, test methods for chlorinated dioxin/furan analyses will follow NCASI Technical Bulletin 551 unless otherwise noted. Pulp and sludge samples are air dried and prepared per this method. All results for these analyses, including detection limits, are reported on a dry weight basis.

Detection limits are reported on a sample specific basis. All results are recovery corrected per the isotope dilution technique.

Results are on the attached data sheets;

Enseco
A CORNING Company

SAMPLE DESCRIPTION INFORMATION
for
Georgia Pacific

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
053468-0001-SA	JAR #4	TISSUE	25 JUN 90	17:12	27 JUN 90
053468-0001-MB	Method Blank	TISSUE			27 JUN 90
053468-0002-SA	JAR #5	TISSUE	25 JUN 90	19:00	27 JUN 90

Enseco

A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: Method Blank
Lab ID: 053468-0001-MB Enseco ID: 153769
Matrix: TISSUE Sampled: NA Received: NA
Authorized: 27 JUN 90 Prepared: 27 JUN 90 Analyzed: 02 JUL 90

Sample Amount 10.0 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	0.096	
2,3,7,8-TCDF	ND	pg/g	0.096	
PeCDFs (total)	ND	pg/g	0.16	
1,2,3,7,8-PeCDF	ND	pg/g	0.16	
2,3,4,7,8-PeCDF	ND	pg/g	0.16	
HxCDFs (total)	ND	pg/g	0.11	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.11	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.11	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.11	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.11	
HpCDFs (total)	ND	pg/g	0.27	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	0.27	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.27	
OCDF	ND	pg/g	1.2	
Dioxins				
TCDDs (total)	ND	pg/g	0.18	
2,3,7,8-TCDD	ND	pg/g	0.18	
PeCDDs (total)	ND	pg/g	0.23	
1,2,3,7,8-PeCDD	ND	pg/g	0.23	
HxCDDs (total)	ND	pg/g	0.34	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.34	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.34	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.34	
HpCDDs (total)	ND	pg/g	1.1	
1,2,3,4,6,7,8-HpCDD	ND	pg/g	1.1	
OCDD	ND	pg/g	12	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: Method Blank
Lab ID: 053468-0001-MB **Enseco ID:** 153769
Matrix: TISSUE **Sampled:** NA **Received:** NA
Authorized: 27 JUN 90 **Prepared:** 27 JUN 90 **Analyzed:** 02 JUL 90

Sample Amount 10.0 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	94
13C-2,3,7,8-TCDD	90
13C-1,2,3,7,8-PeCDD	87
13C-1,2,3,6,7,8-HxCDD	83
13C-1,2,3,4,6,7,8-HpCDD	58
13C-OCDD	20

NO = Not detected
NA = Not applicable

Reported By: Martha Maier **Approved By:** Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: JAR #4
Lab ID: 053468-0001-SA
Enseco ID: 153767
Matrix: TISSUE
Sampled: 25 JUN 90
Received: 27 JUN 90
Authorized: 27 JUN 90
Prepared: 27 JUN 90
Analyzed: 02 JUL 90

Sample Amount 10.0 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	0.13	
2,3,7,8-TCDF	ND	pg/g	0.13	
PeCDFs (total)	ND	pg/g	0.13	
1,2,3,7,8-PeCDF	ND	pg/g	0.13	
2,3,4,7,8-PeCDF	ND	pg/g	0.13	
HxCDFs (total)	ND	pg/g	0.14	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.14	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.14	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.14	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.14	
HpCDFs (total)	ND	pg/g	0.62	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	0.62	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.62	
OCDF	ND	pg/g	1.7	
Dioxins				
TCDDs (total)	ND	pg/g	0.31	
2,3,7,8-TCDD	ND	pg/g	0.31	
PeCDDs (total)	ND	pg/g	0.24	
1,2,3,7,8-PeCDD	ND	pg/g	0.24	
HxCDDs (total)	ND	pg/g	0.30	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.30	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.30	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.30	
HpCDDs (total)	3.3	pg/g	--	
1,2,3,4,6,7,8-HpCDD	2.3	pg/g	--	
OCDD	71	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier
Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A CORNING COMPANY

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: JAR $4
Lab ID: 053468-0001-SA
Matrix: TISSUE
Authorized: 27 JUN 90

Enseco ID: 153767
Sampled: 25 JUN 90
Prepared: 27 JUN 90

Received: 27 JUN 90
Analyzed: 02 JUL 90

Sample Amount 10.0 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	113
13C-2,3,7,8-TCDD	107
13C-1,2,3,7,8-PeCDD	116
13C-1,2,3,6,7,8-HxCDD	101
13C-1,2,3,4,6,7,8-HpCDD	57
13C-OCDD	16

ND = Not detected
NA = Not applicable

Reported By: Martha Maier

Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: JAR #5
Lab ID: 053468-0002-SA Enseco ID: 153768
Matrix: TISSUE Sampled: 25 JUN 90 Received: 27 JUN 90
Authorized: 27 JUN 90 Prepared: 27 JUN 90 Analyzed: 02 JUL 90

Sample Amount 10.2 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	0.13	
2,3,7,8-TCDF	ND	pg/g	0.13	
PeCDFs (total)	ND	pg/g	0.10	
1,2,3,7,8-PeCDF	ND	pg/g	0.10	
2,3,4,7,8-PeCDF	ND	pg/g	0.10	
HxCDFs (total)	ND	pg/g	0.12	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.12	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.12	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.12	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.12	
HpCDFs (total)	ND	pg/g	0.32	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	0.32	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.32	
OCDF	ND	pg/g	1.1	
Dioxins				
TCDDs (total)	ND	pg/g	0.23	
2,3,7,8-TCDD	ND	pg/g	0.23	
PeCDDs (total)	ND	pg/g	0.23	
1,2,3,7,8-PeCDD	ND	pg/g	0.23	
HxCDDs (total)	ND	pg/g	0.29	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.29	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.29	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.29	
HpCDDs (total)	2.4	pg/g	--	
1,2,3,4,6,7,8-HpCDD	1.6	pg/g	--	
OCDD	15	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an integral part of this report.
Rev 230787

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: JAR #5
Lab ID: 053468-0002-SA Enseco ID: 153768
Matrix: TISSUE Sampled: 25 JUN 90 Received: 27 JUN 90
Authorized: 27 JUN 90 Prepared: 27 JUN 90 Analyzed: 02 JUL 90

Sample Amount 10.2 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	104
13C-2,3,7,8-TCDD	100
13C-1,2,3,7,8-PeCDD	104
13C-1,2,3,6,7,8-HxCDD	99
13C-1,2,3,4,6,7,8-HpCDD	56
13C-OCDD	22

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco

Page 1 of 1

CHAIN-OF-CUSTODY RECORD

SAMPLER: (Signature) Vicki Frey
Phone (707) 677-3621
Date Shipped 26 JUNE 1990
Airbill No. 7391473036
Carrier FEDERAL EXPRESS
Cooler No. —

SHIP TO:
Enseco-Cal Lab
2544 Industrial Blvd.
West Sacramento, CA 95691
(916) 372-1393
ATTENTION Mike Mille

SEND RESULTS TO:
Client Name Gerald W. Tice
Company Georgia-Pacific Corp
Address P.O. Box 105603
Atlanta, Ga. 30348
Phone (404) 521-5084

PROJECT NAME Little Valley
PROJECT NO. —
P.O. NO. —

Relinquished by: (Signature)	Received by: (Signature)	Date	Time
Jorrie Bott			
Relinquished by: (Signature)	Received by: (Signature)	Date	Time
Relinquished by. (Signature)	Received at lab by: (Signature)	Date	Time
	Robert Bonaly	6-27-90	1020
Relinquished from lab by: (Signature)	Received by: (Signature)	Date	Time

ANALYSIS REQUEST

Sample ID Number	Sample Description	Date/Time Sampled	Analysis Requested	Sample Condition Upon Receipt
Jar #4	Little Valley Creek Control *	6/25/90	Full CNF/CND Scan	Good
Jar #5	Little Valley Creek Test *	"	"	"
		"	"	
			*	

Special Instructions/Comments:
* Stickle Backs

NOTE: UNUSED PORTIONS OF NON-AQUEOUS SAMPLES WILL BE RETURNED TO CLIENT

Expected Analytical T.A.T's
X Immediate Attention (200% surcharge)
RUSH (50-100% surcharge)
— Standard

Gal Lab ID Number: (for lab use only)

Client Retains White Copy Only

(Revised 1/87)

Enseco, Inc. - Cal Lab Analytical
2544 Industrial Bvd.
West Sacramento, California 95691
(916) 372-1393

Date Received : 27 JUN 90 10:20

Mr. Gerald Tice
Georgia Pacific -
133 Peachtree St. NE
Atlanta, Georgia
30348

(404) 521-5084

Project ID,
EPA Case, RMA Lot : GEPGA01 TISSUE/ISODXNFUR
Little Valley 6/27/90
P.O. Number
Delivered By
Storage Location : F3
Logged in by : RBONALY

Two frozen samples of whole fishes (Stickle Backs) received under COC in good condition. Delivered by Federal Express.

Sample ID	Enseco ID	Client's label info	Date/Time Samp.	Containers
053468-0001-SA	153767	JAR #4	25 JUN 90 17:12	1-500CGJ
053468-0001-MB	153769	Method Blank		
053468-0002-SA	153768	JAR 15	25 JUN 90 19:00	1-500CGJ

Samples not destroyed in testing are retained a maximum of thirty (30) days unless otherwise requested.

Client Manager: Kathy Gill

ATTACHMENT 9

Sediment

California Analytical Laboratory

Enseco
A CORNING Company

July 11, 1990
Lab ID: 053465

Gerald Tice
Georgia Pacific Corporation
133 Peachtree St. NE
Atlanta. GA 30348

Dear Mr. Tice:

Enclosed is the report for the four soil samples for your G.P. - Little Valley Project, which were received at Enseco-Cal Lab on 27 June 1990.

The report consists of the following sections:

I Sample Description
II Analysis Request
III Quality Control Report
IV Analysis Results

If you have any questions, please feel free to call.

Sincerely,

Michael J. Miille, Ph.D.
Division Director

ka

cc: Jay Tice - Washington, DC

Enseco Incorporated
2544 Industrial Boulevard
West Sacramento. California 93691
916/372-1393 Fax: 916/371-8420

Enseco
A CORNING Company

SAMPLE DESCRIPTION INFORMATION
for
Georgia Pacific

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
053465-0001-SA	LVSU-1	SOIL	25 JUN 90	15:50	27 JUN 90
053465-0001-MB	Method Blank	SOIL			27 JUN 90
053465-0002-SA	LVSU-2	SOIL	25 JUN 90	15:55	27 JUN 90
053465-0003-SA	LVSL-1	SOIL	25 JUN 90	19:20	27 JUN 90
053465-0004-SA	LVSL-2	SOIL	25 JUN 90	19:25	27 JUN 90

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS

ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: Method Blank
Lab ID: 053465-0001-MB Enseco ID: 153739
Matrix: SOIL Sampled: NA Received: NA
Authorized: 27 JUN 90 Prepared: 27 JUN 90 Analyzed: 02 JUL 90

Sample Amount 10.00 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	0.068	
2,3,7,8-TCDF	ND	pg/g	0.068	
PeCDFs (total)	ND	pg/g	0.33	
1,2,3,7,8-PeCDF	ND	pg/g	0.33	
2,3,4,7,8-PeCDF	ND	pg/g	0.33	
HxCDFs (total)	ND	pg/g	0.27	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.27	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.27	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.27	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.27	
HpCDFs (total)	ND	pg/g	0.23	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	0.23	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.23	
OCDF	ND	pg/g	0.54	
Dioxins				
TCDDs (total)	ND	pg/g	0.24	
2,3,7,8-TCDD	ND	pg/g	0.13	
PeCDDs (total)	ND	pg/g	0.15	
1,2,3,7,8-PeCDD	ND	pg/g	0.15	
HxCDDs (total)	ND	pg/g	0.57	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.57	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.57	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.57	
HpCDDs (total)	ND	pg/g	1.1	
1,2,3,4,6,7,8-HpCDD	ND	pg/g	1.1	
OCDD	ND	pg/g	4.8	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an integral part of this report.
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Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: Method Blank
Lab ID: 053465-0001-MB Enseco ID: 153739
Matrix: SOIL Sampled: NA Received: NA
Authorized: 27 JUN 90 Prepared: 27 JUN 90 Analyzed: 02 JUL 90

Sample Amount 10.00 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	113
13C-2,3,7,8-TCDD	105
13C-1,2,3,7,8-PeCDD	97
13C-1,2,3,6,7,8-HxCDD	124
13C-1,2,3,4,6,7,8-HpCDD	101
13C-OCDD	72

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

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Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: LVSU-1
Lab ID: 053465-0001-SA Enseco ID: 153735 Received: 27 JUN 90
Matrix: SOIL Sampled: 25 JUN 90
Authorized: 27 JUN 90 Prepared: 27 JUN 90 Analyzed: 02 JUL 90

Sample Amount 10.00 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	0.96	pg/g	--	
2,3,7,8-TCDF	ND	pg/g	0.16	
PeCDFs (total)	ND	pg/g	0.33	
1,2,3,7,8-PeCDF	ND	pg/g	0.33	
2,3,4,7,8-PeCDF	ND	pg/g	0.33	
HxCDFs (total)	2.7	pg/g	--	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.15	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.15	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.15	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.15	
HpCDFs (total)	6.2	pg/g	--	
1,2,3,4,6,7,8-HpCDF	2.0	pg/g	--	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.90	
OCDF	5.3	pg/g	--	
Dioxins				
TCDDs (total)	ND	pg/g	0.42	
2,3,7,8-TCDD	ND	pg/g	0.42	
PeCDDs (total)	ND	pg/g	0.47	
1,2,3,7,8-PeCDD	ND	pg/g	0.47	
HxCDDs (total)	3.6	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.21	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.65	
1,2,3,7,8,9-HxCDD	ND	pg/g	1.0	
HpCDDs (total)	14	pg/g	--	
1,2,3,4,6,7,8-HpCDD	7.8	pg/g	--	
OCDD	43	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: LVSU-1
Lab ID: 053465-0001-SA
Matrix: SOIL
Authorized: 27 JUN 90

Enseco ID: 153735
Sampled: 25 JUN 90
Prepared: 27 JUN 90

Received: 27 JUN 90
Analyzed: 02 JUL 90

Sample Amount 10.00 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	74
13C-2,3,7,8-TCDD	68
13C-1,2,3,7,8-PeCDD	60
13C-1,2,3,6,7,8-HxCDD	95
13C-1,2,3,4,6,7,8-HpCDD	56
13C-OCDD	30

ND = Not detected
NA = Not applicable

Reported By: Martha Maier

Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: LVSU-2
Lab ID: 053465-0002-SA Enseco ID: 153736
Matrix: SOIL Sampled: 25 JUN 90 Received: 27 JUN 90
Authorized: 27 JUN 90 Prepared: 27 JUN 90 Analyzed: 02 JUL 90

Sample Amount 10.00 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (**total**)	0.49	pg/g	--	
2,3,7,8-TCDF	ND	pg/g	0.14	
PeCDFs (total)	ND	pg/g	0.14	
1,2,3,7,8-PeCDF	ND	pg/g	0.14	
2,3,4,7,8-PeCDF	ND	pg/g	0.14	
HxCDFs (total)	1.3	pg/g	--	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.10	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.10	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.10	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.10	
HpCDFs (total)	2.8	pg/g	--	
1,2,3,4,6,7,8-HpCDF	0.90	pg/g	--	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.11	
OCDF	2.4	pg/g	--	
Dioxins				
TCDDs (**total**)	0.54	pg/g	--	
2,3,7,8-TCDD	ND	pg/g	0.33	
PeCDDs (total	ND	pg/g	0.19	
1,2,3,7,8-PeC D	ND	pg/g	0.19	
HxCDDs (total)	1.8	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.059	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.61	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.56	
HpCDDs (total)	6.5	pg/g	--	
1,2,3,4,6,7,8-HpCDD	3.9	pg/g	--	
OCDD	22	pg/g	--	

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ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

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Rev 238787

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: LVSU-2
Lab ID: 053465-0002-SA Enseco ID: 153736
Matrix: SOIL Sampled: 25 JUN 90 Received: 27 JUN 90
Authorized: 27 JUN 90 Prepared: 27 JUN 90 Analyzed: 02 JUL 90

Sample Amount 10.00 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	111
13C-2,3,7,8-TCDD	107
13C-1,2,3,7,8-PeCDD	95
13C-1,2,3,6,7,8-HxCDD	120
13C-1,2,3,4,6,7,8-HpCDD	103
13C-OCDD	85

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an integral part of this report.
Rev 230787

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: LVSL-I
Lab ID: 053465-0003-SA Enseco ID: 153737
Matrix: SOIL Sampled: 25 JUN 90 Received: 27 JUN 90
Authorized: 27 JUN 90 Prepared: 27 JUN 90 Analyzed: 02 JUL 90

Sample Amount 10.00 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	1.0	pg/g	--	
2,3,7,8-TCDF	ND	pg/g	0.10	
PeCDFs (total)	0.15	pg/g	--	
1,2,3,7,8-PeCDF	ND	pg/g	0.20	
2,3,4,7,8-PeCDF	ND	pg/g	0.20	
HxCDFs (total)	1.1	pg/g	--	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.13	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.15	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.15	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.15	
HpCDFs (total)	2.6	pg/g	--	
1,2,3,4,6,7,8-HpCDF	0.91	pg/g	--	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.12	
OCDF	1.9	pg/g	--	
Dioxins				
TCDDs (total)	ND	pg/g	0.21	
2,3,7,8-TCDD	ND	pg/g	0.16	
PeCDDs (total)	ND	pg/g	0.20	
1,2,3,7,8-PeCDD	ND	pg/g	0.20	
HxCDDs (total)	0.73	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.33	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.42	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.65	
HpCDDs (total)	6.1	pg/g	--	
1,2,3,4,6,7,8-HpCDD	3.7	pg/g	--	
OCDD	18	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: LVSL-1
Lab ID: 053465-0003-SA Enseco ID: 153737
Matrix: SOIL Sampled: 25 JUN 90 Received: 27 JUN 90
Authorized: 27 JUN 90 Prepared: 27 JUN 90 Analyzed: 02 JUL 90

Sample Amount 10.00 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	91
13C-2,3,7,8-TCDD	104
13C-1,2,3,7,8-PeCDD	121
13C-1,2,3,6,7,8-HxCDD	113
13C-1,2,3,4,6,7,8-HpCDD	97
13C-OCDD	77

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: LVSL-2
Lab ID: 053465-0004-SA Enseco ID: 153738
Matrix: SOIL Sampled: 25 JUN 90 Received: 27 JUN 90
Authorized: 27 JUN 90 Prepared: 27 JUN 90 Analyzed: 02 JUL 90

Sample Amount 10.00 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	0.43	pg/g	--	
2,3,7,8-TCDF	ND	pg/g	0.14	
PeCDFs (total)	ND	pg/g	0.20	
1,2,3,7,8-PeCDF	ND	pg/g	0.20	
2,3,4,7,8-PeCDF	ND	pg/g	0.20	
HxCDFs (total)	0.72	pg/g	--	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.12	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.17	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.17	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.19	
HpCDFs (total)	0.73	pg/g	--	
1,2,3,4,6,7,8-HpCDF	0.73	pg/g	--	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.21	
OCDF	2.2	pg/g	--	
Dioxins				
TCDDs (total)	ND	pg/g	0.20	
2,3,7,8-TCDD	ND	pg/g	0.17	
PeCDDs (total)	ND	pg/g	0.35	
1,2,3,7,8-PeCDD	ND	pg/g	0.35	
HxCDDs (total)	ND	pg/g	0.69	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.23	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.19	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.69	
HpCDDs (total)	4.7	pg/g	--	
1,2,3,4,6,7,8-HpCDD	3.2	pg/g	--	
OCDD	16	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: LVSL-2
Lab ID: 053465-0004-SA Enseco ID: 153738
Matrix: SOIL Sampled: 25 JUN 90 Received: 27 JUN 90
Authorized: 27 JUN 90 Prepared: 27 JUN 90 Analyzed: 02 JUL 90

Sample Amount 10.00 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	94
13C-2,3,7,8-TCDD	92
13C-1,2,3,7,8-PeCDD	86
13C-1,2,3,6,7,8-HxCDD	105
13C-1,2,3,4,6,7,8-HpCDD	78
13C-OCDD	48

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco

Page 1 of 1

CHAIN-OF-CUSTODY RECORD

SAMPLER: (Signature) Martin E. Ivy
Phone (707) 4446 0427

Date Shipped 6/26/90
Airbill No 1532 2371 612

Carrier United Parcel Service
Cooler No. CAL-LAB (Colt-Gott)

SHIP TO:
Enseco-Cal Lab
2544 Industrial Blvd.
West Sacramento, CA 95691
(916) 372-1393
ATTENTION Kathy Gill

SEND RESULTS TO:
Client Name MR. GERALD TICE
Company GEORGIA-PACIFIC CORPORATION
Address 133 Peachtree St N.E. (30303)
Atlanta, GA. 30348
Phone (404) 521-5084

PROJECT NAME G.P. - Little Valley PROJECT NO. _____ P.O. NO. _____

Relinquished by: (Signature)	Received by: (Signature)	Date	Time
Martin E. Ivy			
Relinquished by: (Signature)	Received by: (Signature)	Date	Time
Relinquished by. (Signature)	Received at lab by: (Signature)	Date	Time
	Wdeas Diedell	6-27-90	0900
Relinquished from lab by: (Signature)	Received by: (Signature)	Date	Time

ANALYSIS REQUEST

Sample ID Number	Sample Description	Date/Time Sampled	Analysts Requested	Sample Condition Upon Receipt
	LVSU-1 sediment	6/25/90 1550	CL4-CL8 + Homers	
	LVSU-2	1555		
	LVSL-1	1920		
	LVSL-2	1925		

Special Instructions/Comments:

7 day guaranteed turnaround: Mike Melly to J. Tice

NOTE: UNUSED PORTIONS OF NON-AQUEOUS SAMPLES **WILL** BE RETURNED TO CLIENT

Expected Analytical T.A.T's: ____ Immediate Attention (200% surcharge) X RUSH (50-100% surcharge) ____ Standard

Cal Lab ID Number: *(for lab use only)* #2542

Client Retains White Copy Only

(Revised 1/87)

Enseco
■ CORNING Company

I Sample Description

See the attached Sample Description Information.

The samples were received under chain-of-custody.

II Analysis Request

The following analytical test was requested.

Lab ID	Analysis Description
053465-0001 through 4	Cl_4-Cl_8 Dioxins/Furans plus 2,3,7,8-Substituted Isomers

III Quality Control

A. Project Specific QC. No project specific QC (i.e., spikes and/or duplicates) was requested.

B. Method Blank Results. A method blank is a laboratory-generated sample which assesses the degree to which laboratory operations and procedures cause false-positive analytical results for your samples.

No target parameters were detected in the method blank associated with your samples at or above the detection limits noted on the data sheet in the Analytical Result Section.

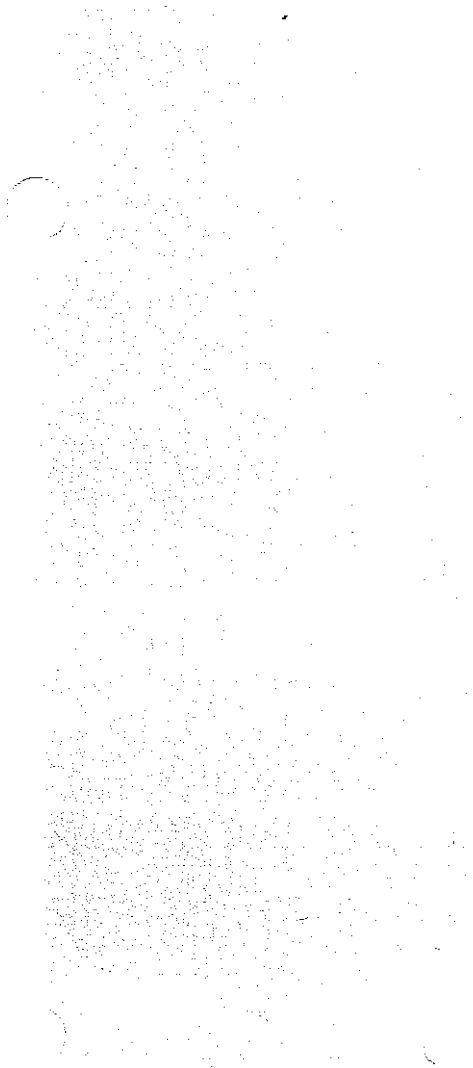
IV Analysis Results

Test methods for all analyses except chlorinated dioxins and furans, may include minor modifications of published EPA Methods such as reporting limits or parameter lists. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e., no correction is made for moisture content, unless the method requires or the client requests that such correction be made.

For pulp and paper industry samples, test methods for chlorinated dioxin/furan analyses will follow NCASI Technical Bulletin 551 unless otherwise noted. Pulp and sludge samples are air dried and prepared per this method. All results for these analyses, including detection limits, are reported on a dry weight basis.

Detection limits are reported on a sample specific basis. All results are recovery corrected per the isotope dilution technique.

Results are on the attached data sheets.



Georgia-Pacific

Intracompany memo

to	Distribution	location	Various
from	J. J. Tice, IV	location	Washington, D.C.
subject	Ft. Bragg Data Relative to the 104 Mill Study	date	July 12. 1990

To put our Ft. Bragg samples in perspective relative to the 104 Mill Study results, I've calculated toxicity equivalents (TEQ) for all of the corresponding data with results as follows:

Ft. Braee Samples

			Part Per Trillion TEQ*	
Sample	Description		A111 Congener	2.3.7.8 Only
LVA1	Ash	7-90	3.2	2.7 Average
LVB1	Ash	7-90	3.8	3.3 3.0
LVSU-1	Sediment, upstream. Top 2"	7-90	0.15	ND
LVSU-2	Sediment, upstream. Next 2"	7-90	0.07	ND
LVSL-1	Sediment, downstream, Top 2"	7-90	0.06	ND
LVSL-2	Sediment, downstream, Next 2"	7-90	0.09	ND
Jar #4	Fish, upstream	7-90	0.09	ND
Jar #5	Fish, downstream	7-90	0.03	ND

104 Hill Study

	Parts Per Trillion TEQ* 2.3.7.8 Only		
Sample	Minimum	Median	Maximum
Pulp - Hardwood	ND	5.5	85
Pulp - Softwood	ND	9.7	195
Pulp - Sulfite	ND	0.2	90
Sludge - All Kraft	ND	45.6	700

Assuming that the 104 Kill data is distributed linearly over the concentration ranges shown, the following comparisons can be made:

1. The ash TEQ of 3.0 ppt is significantly lower than the respective medians for hardwood and softwood pulp and sludge.

2. The ash TEQ is comparable to:

pulp - hardwood:	less than 23rd percentile
pulp - softwood:	less than 16th percentile
sludge - all kraft:	less than 4th percentile

These comparisons clearly demonstrate that our ash is innocuous and that the very low concentrations of PCDD and PCDF are not uptaken by the aquatic environment. The TEQ of our ash is similar to that of a high grade of paper.

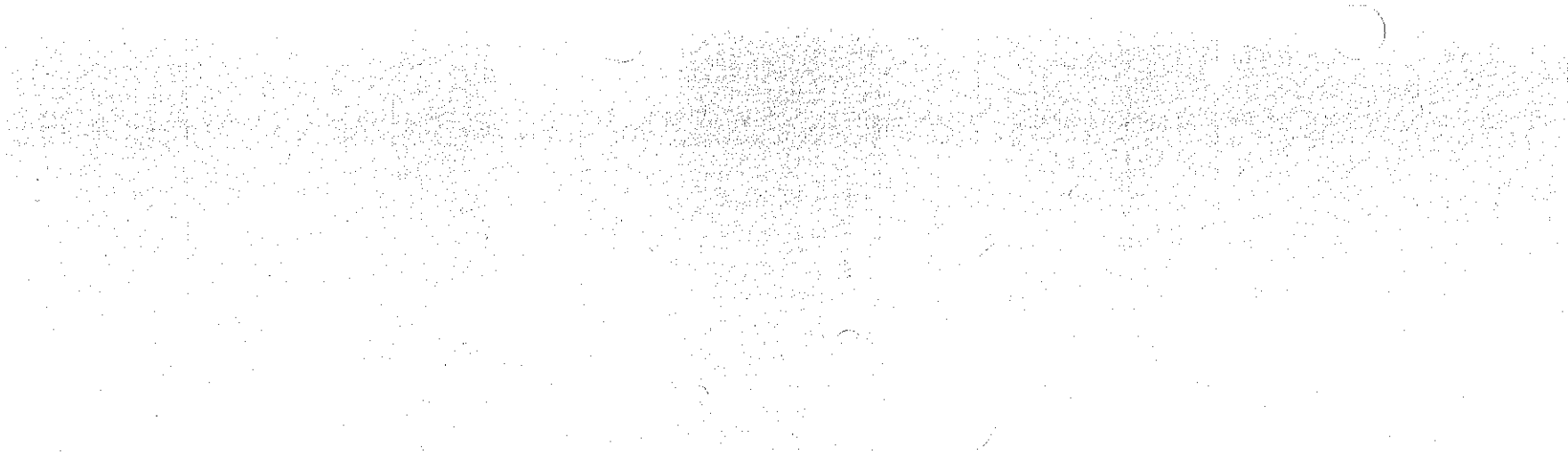
J. J. Tice, IV

JJT/lmw

Distribution

S. Friess - Arlington, VA(Drill, Friess, Hays, Loomis & Shaffer, Inc.)
K. Mayer - Eugene. OR
D. Modi - Washington. D.C.
L. Otwell - Atlanta, GA (GA030 G-16)
G. Tice - Atlanta, GA (GA030 G-16)
T. Treichelt - Sacramento, CA

cc: C. T. Howlett, Jr. - Washington, D.C.
Maggie Dean - Washington, D.C.



Georgia-Pacific Corporation 133 Peachtree Street, N.E. (30303)
P.O. Box 105605
Atlanta, Georgia 30348-5605
Telephone (404) 121-4000

July 16, 1990

Mr. Benjamin D. Kor
Executive Officer
California Regional Water Quality
Control Board
North Coast Region
1440 Guerneville Road
Santa Rosa, CA 95403

RE:
Georgia-Pacific Corporation
Fort Bragg, CA

Dear Mr. Kor:

As a result of our conference call on May 17, 1990 with you and your staff, it was agreed that Georgia-Pacific would proceed to obtain new ash samples and proceed to obtain stream sediment and aquatic tissue samples from Little Valley Creek.

The purpose of this letter is to report that all of the sampling work agreed to on May 17, 1990 has been completed and all analytical results have been received. A copy of this material is enclosed for your review. The purpose of this letter is also to request renewal or reissuance of the Waste Discharge Permit issued to Georgia-Pacific at Fort Bragg, CA. for soil amending at the Little Valley site. This request is based on the results of the recently completed test work as well as the previous test work conducted by Georgia-Pacific.

The recent ash sampling work was conducted on May 30, 1990 and the aquatic sampling was conducted on June 25, 1990. This work is summarized in the following presentation.

<u>May 30, 1990 Sampling Event</u>

Prior to this date Georgia-Pacific contracted with SHN Consulting Engineers and Geologists of Eureka, CA to conduct the ash sampling and stream sediment sampling. Georgia-Pacific also contracted with Karen Theiss and Associates of McKinleyville, CA. to perform the aquatic survey and sampling. After arranging with these consultants and members of the NCRWQCB it was confirmed that all sampling would be conducted (or commenced) on May 30, 1990. Accordingly, members of the NCRWQCB, members of Georgia-Pacific staff and the consultants met at the Fort Bragg site on that date to conduct the sampling.

Ash Sampling

It was agreed that all ash sampling would be conducted on the Little Valley ash stockpile since this stockpile represented the entire production of ash for more than a year from the Ft. Bragg mill. Georgia-Pacific proposed that to insure that representative ash samples were obtained, statistically accurate sampling procedures should be used as provided by EPA-SW846 and ASTM sampling methods. After some discussion of these sampling methods, a survey was made of the ash stockpile. Based on recommendations by our consultant, SHN, it was decided to obtain two (2) composite samples from the pile with one sample being obtained from one half of the pile and one from the other half of the pile. Each of these composite samples were made up of samples taken from six (6) randomly located sample spots. Also each sample was obtained from varying depths throughout the pile. A full description of the ash sampling procedures is contained in the enclosed report provided by SHN. Also enclosed is a copy of SHN's ash sampling log. All ash sampling was completed during the May 30, 1990 sampling event.

Steam Sediment and Aquatic Samwling

During the May 30, 1990 sampling event, a survey of the Little Valley Creek was made by our consultant Karen Theiss and Associates. Because of recent heavy rains in the area it was discovered that stream flow was very high and made any sampling effort impossible. For this reason, the stream sampling work had to be postponed until stream conditions returned to normal. A new stream sampling date was later scheduled for June 25, 1990.

June 25. 1990 Sampling Event

On June 25, 1990 representatives of Karen Theiss and Associates, SHN, Georgia-Pacific and the NCRWQCB re-visited the Little Valley site to survey and conduct aquatic and stream sediment sampling in the Little Valley creek.

After an initial inspection of the stream, control and test sampling locations were selected and agreed upon by all parties, including the NCRWQCB representatives. The control site was located upstream of the amended plots and ash stockpile area and the test site was located immediately downstream of these areas.

Stream Sediment Sampling

Within each of the two sampling locations, a composite sediment sample was obtained. This sample was subsequently divided into two samples with the top approximately 2" of root biomass constituting one sample and the next lower approximately 2" of soil sediment constituting the other sample.

A full description of the sediment sampling procedures is contained in the enclosed report provided by SHN. Also enclosed is a copy of SHN's sediment sampling log.

Aquatic Samwling

As indicated above, the aquatic sampling was conducted by representatives of Karen Theiss and Associates. Samples were obtained from the control and test sites. An inventory of the aquatic environment was made and sufficient quantities of the most appropriate aquatic animals were collected as test specimens. A full description of the aquatic sampling procedures is enclosed in the enclosed report provided by Karen Theiss and Associates.

Sampling Results

A review of the ash data shows low level quantities of several furan and dioxin congeners. A calculated TEQ for this data shows an average of 3.5 ppt (full congener). As such, the level of concern for the toxicity of the ash itself is quite low. (See J.J. Tice, IV memo, attached, which compares the 2,3,7,8 (only) TEQ for the ash to the 104 Mill Study. The Ft. Bragg ash TEQ is similar to that of a high grade of paper.)

Low levels of furan and dioxin congeners were found in both the upstream and downstream sediment samples. A calculated TEQ for the upstream samples were 0.15 and 0.07 ppt and the downstream samples were 0.06 and 0.09 ppt. This indicates no evidence of release of ash related furans/dioxins to the aquatic environment.

A review of the aquatic tissue samples show a calculated TEQ of 0.09 and 0.03 ppt, respectively, for upstream and downstream samples. As such, there is no evidence of bioaccumulation in the aquatic environment proximate to the ash amended sites.

A risk based analysis of this recent data, coupled with our previous studies of bioaccumulation in cover crops and terrestrial animals (earthworms), would suggest that the level of risk posed by our soil amending activities at Little Valley is quite low. Considering the beneficial effect of these activities, resulting in dramatically increased yields in cover crop production (as documented by U.C.-Davis studies), and the negative implications of our recently submitted alternative disposal methods report, it would seem prudent to permit resumption of soil amending activities at Little Valley.

Based on these conclusions, Georgia-Pacific requests that our Little Valley soil amending permit be either renewed or a new permit be issued, whichever is preferable to the NCRWQCB.

As you know, Mr. Mark Neely of your staff recently visited the Little Valley site and met with Georgia-Pacific personnel for the purpose of reviewing additional amending areas that Georgia-Pacific proposes to utilize as amending sites at the Little Valley location. It is our understanding that the areas reviewed by Mr. Neely were approved by him for use as amending plots. These areas are shown on the enclosed map, which shows the areas currently approved as well as those for which we are requesting formal approval to use. The total additional area we are requesting approval for is 145 acres. Georgia-Pacific requests that these additional areas be included in our soil amending permit.

As we discussed with you on July 12, 1990, we request your review of the enclosed material and your guidance in our making formal petition to the NCRWQCB for approval to resume soil amending activity at the Little Valley site.

Please call if there are any questions about this material.

Very truly yours,

Gerald W. Tice

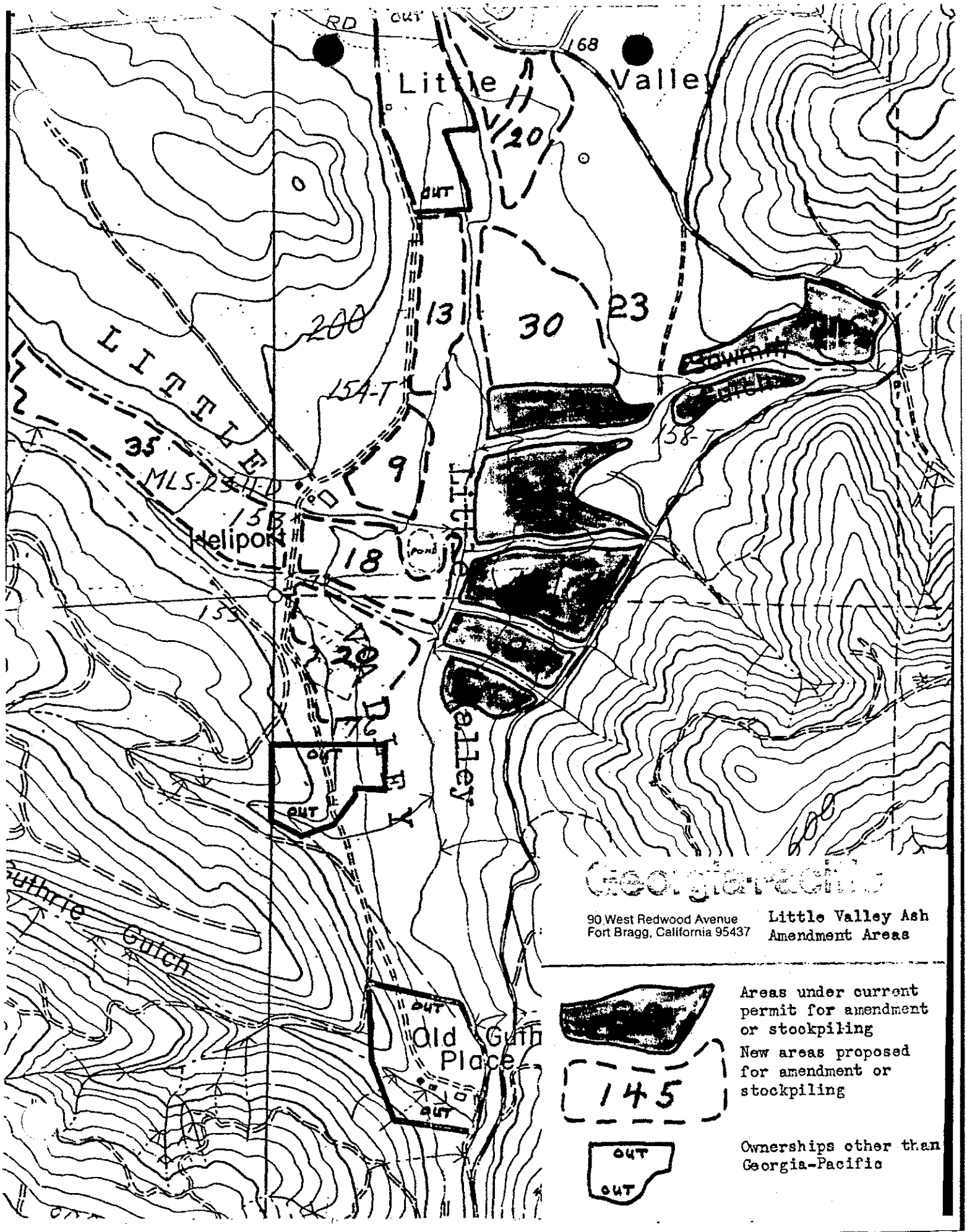
GERALD W. TICE
CHIEF ENVIRONMENTAL ENGINEER
WOOD PRODUCTS MANUFACTURING DIVISION

GWT/pcw

Enclosures: Ash Analysis-Enseco
Sediment Analysis-Enseco
Aquatic(Fish)Analysis-Enseco
Ash Sampling Procedure Report-SHN
Ash Stockpile Sampling Log-SHN
Sediment Sampling Procedures-SHN
Sediment Sampling Log-SHN
Aquatic Sampling Report-Karen Theiss & Assoc.
Dr. J. J. Tice, IV Memo
Map-Proposed Soil Amending Areas @ Little Valley

cc: Messrs. T. Deer W/Enclosures
K. C. Mayer W/Enclosures
D. Whitman W/Enclosures

bcc: Messrs. D. K. Mortensen
D. L. Glass
W. L. Duke
D. L. Mobley
L. D. Ambrosini
A. T. Johnson
P. M. Fetter
G. F. McCaig W/Enclosures
D. Modi
L. P. E. Otwell
J. Tice W/Enclosures
T. Treichelt W/Enclosures


RD
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Little Valley
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OUT
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Guthrie Gulch
OUT
Old Guth
Place
OUT
600
90 West Redwood Avenue
Fort Bragg, California 95437
Little Valley Ash
Amendment Areas
Areas under current permit for amendment or stockpiling
New areas proposed for amendment or stockpiling
145
OUT
OUT
Ownerships other than Georgia-Pacific

STATE OF CALIFORNIA GEORGE DEUKMEJIAN, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA, CA 95403
(707) 576-2220

July 17, 1990

Mr. Dave Siegel
Department of Health Services
714 P Street, Room 499
Sacramento, CA 95814

Dear Dave:

I am sending along the preliminary lab results of the dioxin and furan analysis of the stream sediments from Little Valley Creek, which flows adjacent to the amendment sites for the boiler ash from the Georgia-Pacific sawmill in Ft. Bragg. I will call you soon to discuss any thoughts you may have on these results. Thanks again for your assistance and opinions.

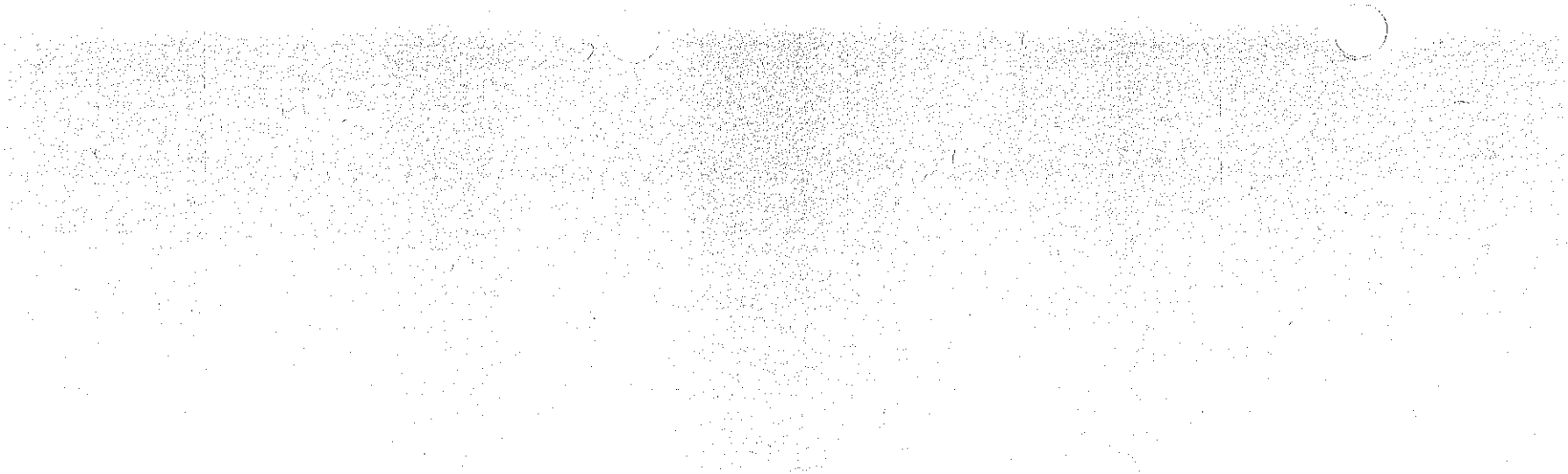
Sincerely,

Mark K. Neely
Associate Engineering Geologist

MKN:ba/siegel

Enclosure

cc: Frank Palmer, SWRCB, Division of Water Quality



Georgia-Pacific Corporation
90 West Redwood Avenue
Fort Bragg, California 95437-3471
Telephone (707) 964-5651

July 19, 1990

Mr. Hark Neeley
North Coast Regional
Water Quality Control Board
1440 Guerneville Road
Santa Rosa, CA 95401

Dear Mark:

Enclosed please find a copy of the map we have prepared, estimating the areas available for wood ash amendment in Little Valley. If you have any questions, please contact me or some of the other company folks who you have been working with on this project.

Sincerely,

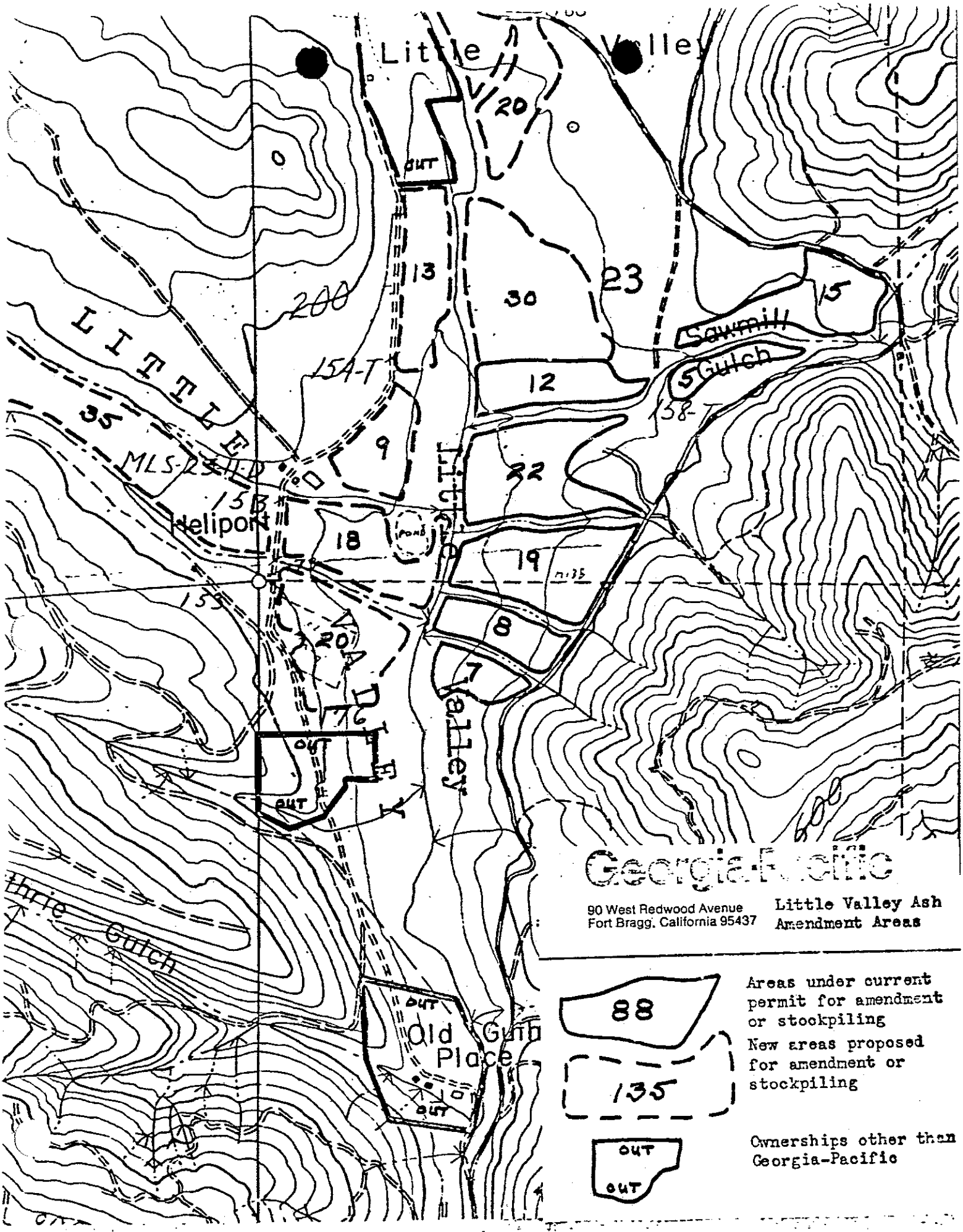
Jere Melo

Jere Melo
Chief Forester

JH: dh

Enc.

cc: K. Mayer, Eugene, OR
G. Tice, Atlanta, GA
T. Deer, Fort Bragg, CA
D. Larkin, Fort Bragg, CA


Little Valley
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30
23
15
Sawmill Gulch
LITTLE
15A-T
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58-T
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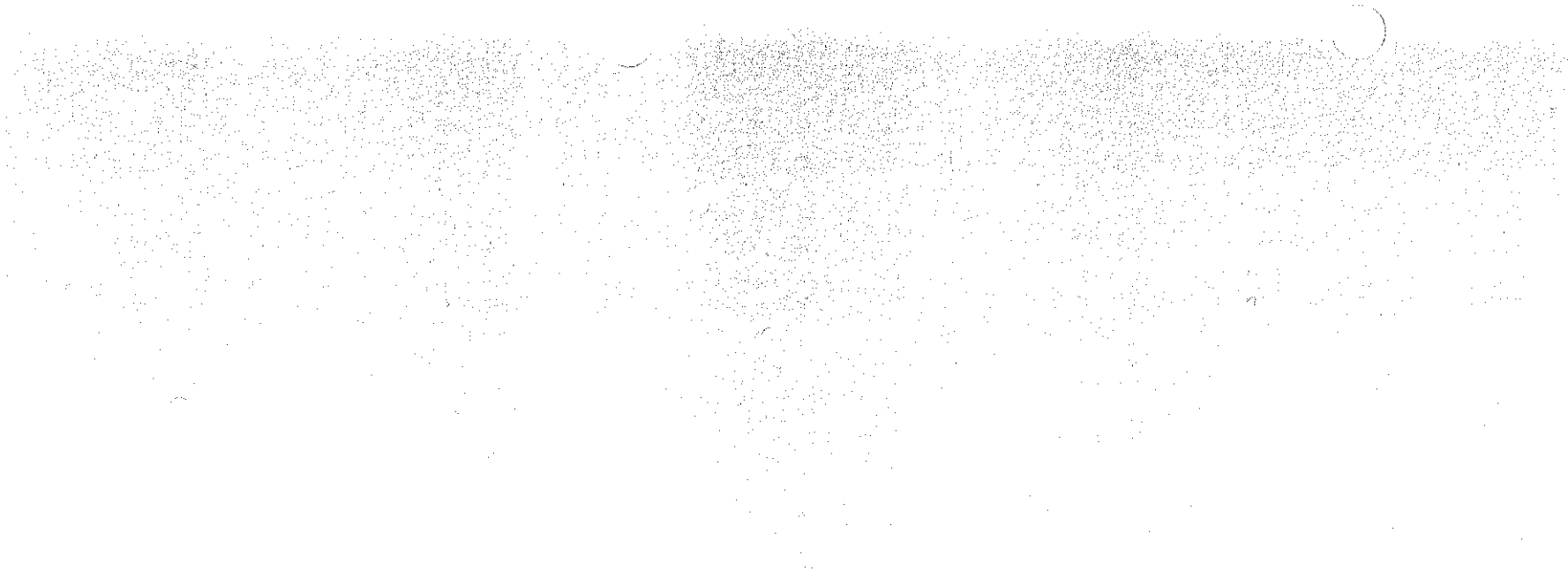
MLS-2
9
32
15B
Heliport
18
19
n135
15
8
7
20
Valley
76
OUT
OUT
Three Gulch
OUT
Old Gulch Place
OUT
Georgia-Pacific
90 West Redwood Avenue
Fort Bragg, California 95437
Little Valley Ash
Amendment Areas
88
Areas under current permit for amendment or stockpiling
135
New areas proposed for amendment or stockpiling
OUT
OUT
Ownerships other than Georgia-Pacific



TIMBER ASSOCIATION
OF CALIFORNIA

July 25, 1990
File No. 548.

Mr. Benjamin Kor
Executive Officer
North Coast Regional Water
Quality control Board
1440 Guerneville Road
Santa Rosa, CA 95403

RE: BMPs for Aaricultural Use of Wood Ash

Dear Ben:

On behalf of our membership, I'd like to thank you for your continuing efforts to keep us appraised of the Board's activities related to regulation of dioxins and furans. We are particularly thankful for your outreach efforts and stated intent to only proceed with full cooperation and input from the impacted industries.

As you know, we have been holding discussion amongst our members to determine how we might best help the Board in "getting the ball rolling" on this issue. We had originally received the impression that quick action was needed, particularly as it pertains to regulation of wood ash use and disposal. While there is still some need for timely action, it has become clear through our discussions over the past two months that the current regulatory and scientific climate on dioxins will necessitate a much longer, more careful process.

Nonetheless, we have felt for some time that the development of BMPs for the agricultural use of wood ash is something that is needed now. This would be a good first step towards regulating these materials in a manner that would reduce or prevent public nuisances or threats. You confirmed this opinion in our May 7 telephone conversation.

To that end, we will soon be organizing a select committee of ash generators and involved extension personnel to develop such BMPs. As the concerns of the regional water boards are a primary force behind the need for these BMPs, your staff's input would also be most appreciated. If you or your staff have concerns or issues that they specifically feel should be addressed in the BMPs, please send any comments to this effect and we will ensure that your concerns are addressed.

1311 I STREET, SUITE 100, SACRAMENTO, CA 95814 • (916) 444-6592 • FAX: (916)444-0170

By using our own experience and incorporating your concerns, we hope to produce a product that will meet both the needs of industry and the regulatory community. Thus, your help on this will not only be most appreciated, but will be of benefit to all parties.

Sincerely,

Steve

STEVEN PETRIN
Director
Environmental Affairs

G.P. Ash-Men F.

STATE OF CALIFORNIA — GEORGE DEUKMEJIAN, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA, CA 95403
(707) 576-2220

July 31, 1990

Mr. Gerald Tice
Chief Environmental Engineer
Georgia-Pacific Corporation
P. O. Box 105603
Atlanta, GA 30348

Dear Mr. Tice:

Enclosed is a copy of the tentative Regional Board Order No. 90-154, revised Waste Discharge Requirements for the Georgia-Pacific Fort Bragg Soil Amendment. This Order will be considered by the Regional Board during its regular meeting on August 16, 1990, at the State Building, 50 D Street, Room 410, in Santa Rosa.

Please call if you have any questions.

Sincerely,

Mark K. Neely
Associate Engineering Geologist

MKN:ba/gpastrns

Enclosure

CERTIFIED - Return Receipt Requested

cc: Kent Mayer, Georgia-Pacific Corporation, Eugene, Oregon
ifornia

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.
Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fee and check box(es) for additional service(s) re
1. ☐ Show to whom delivered, date, and (Extra Charge)

3. Article Addressed to:
Gerald Tice
Georgia-Pacific Corporation
P.O. Box 105603
Atlanta, GA 30348

5. Signature — Addressee
X

6. Signature — Agent
X

7. Date of Delivery

PS Form 3811, Apr. 1989 *U.S.G.P.O.

P 442 188 482

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL

Sent to	Gerald Tice (See Reverse) Georgia-Pacific Corp.
Street and No.	P.O. Box 105603
P.O., State and ZIP Code	Atlanta, GA 30348
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date	

PS Form 3800, June 1985 U.S.G.P.O. 1989-234-555

STATE OF CALIFORNIA
GEORGE DEUKMEJIAN, *Governor*

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA, CA 95403
(707) 576-2220

July 31, 1990

NOTICE

PROPOSED WASTE DISCHARGE REQUIREMENTS

FOR

GEORGIA-PACIFIC CORPORATION
FORT BRAGG SOIL AMENDMENT

Mendocino County

Comments or recommendations you may have concerning the proposed Order should be submitted in writing to the Regional Board by August 13, 1990. Comments received after this date cannot be given full consideration.

Benjamin D. Kor
Executive Officer

Attachment

cc: SWRCB, Division of Water Quality, Attn: Archie Matthews
SWRCB, Office of the Chief Counsel, Attn: Bonnie Wolstoncroft
DFG, Sacramento
DFG, Yountville
Mendocino County Health Department, Attn: Gerald F. Davis
DOHS, EMB, Santa Rosa, Attn: District Representative
DWR, Central District, Sacramento, Attn: Rick Woodard
USDI, Fish and Wildlife Service, Sacramento
Mendocino County Planning Department, Ukiah, Attn: Ray Hall

California Regional Water Quality Control Board
North Coast Region

ORDER NO. 90-154
ID NO. 1B85030RMEN

PRELIMINARY

WASTE DISCHARGE REQUIREMENTS

For

GEORGIA-PACIFIC CORPORATION
FORT BRAGG SOIL AMENDMENT

Mendocino County

The California Regional Water Quality Control Board, North Coast Region (hereinafter Board) finds that:

1. Georgia-Pacific Corporation (hereinafter discharger) submitted a request dated July 16, 1990 to resume the use of boiler ash as soil amendment on lands located adjacent to Little Valley Creek near Fort Bragg.

2. The Regional Board adopted Waste Discharge Requirements Order No. 90-32 for the stockpiling of woodwaste ash. The Order prohibited the soil amendment of ash pending further studies by discharger. The permit has an expiration date of July 1, 1991.

3. The request by the discharger describes the use of woodwaste ash, a nonhazardous decomposable waste, as a soil amendment using applicable Best Management Practices pursuant to Section 2511(f) of Title 23, Chapter 3, Subchapter 15 of the California Administrative Code. The woodwaste is generated by the power plant operated at the Georgia-Pacific sawmill. The soil amendment site is located in Little Valley within Sections 14, 22, 23, 24, and 26 of T19N, R17W, MDB&M on 330 acres of pasture land along Little Valley Creek. Drainage controls and management practices for stockpiling the ash are designed to prevent a discharge of ash to surface streams. These include:

   a. Retention of a minimum 50 foot buffer between incorporation activities and any watercourse, whether perennial, intermittent, or ephemeral.

   b. Ash should not be allowed to accumulate for more than a week during the summer period. It should be incorporated as soon as there is enough ash to feasibly incorporate with heavy equipment. Regional Board staff must be notified if a need arises to store the ash for longer periods.

   c. Amended areas must be seeded by October 1. Any delay must be reported to the Regional Board.

   d. Once an area has been incorporated and planted with grass seed, there shall be no passage of vehicles or equipment over the amended area.

4. The Waste Discharge Requirements Order No. 90-32 modified the previous Order No. 86-3 by not permitting the amending of the ash but allowing the interim stockpiling to proceed, pending a study by Georgia-Pacific on the hazard posed by bioaccumulation of low levels of chlorodibenzofurans (CDF) and chlorodibenzodioxins (CDD). 2,3,7,8-tetrachloro-p-dibenzodioxin is listed as being carcinogenic under the Safe Drinking Water and Toxic Enforcement Act of 1986. Although in 1986 the Department of Health Services, based on known concentrations of CDF's, considered the levels to be nonhazardous, the bioaccumulative nature of the compounds may lead to concentrations in plant, animal, or aquatic life which are hazardous. Resumption of amending under the permit was made contingent on a report finding the bioaccumulation potential to be negligible. The discharger submitted sampling data which found the ash to have a toxic equivalency factor (TEQ) of 3.83 and 3.02 parts per trillion (ppt), a TEQ for fish tissue of 0.10 and 0.03 ppt, and a TEQ for stream sediment ranging from 0.03 to 0.150 ppt. The TEQ method is a procedure for assessing the risks associated with exposures to complex mixtures of CDD's and CDF's, and relates their toxicity to the highly studied 2,3,7,8-tetrachlorodibenzodioxin (TCDD).

5. The Waste Discharge Requirements Order No. 90-32 provided for the interim stockpiling of ash until such time the bioaccumulation and hazard potential of the ash is assessed. On the basis of the data submitted, it appears likely that the bioaccumulation risk is small. Waste Discharge Requirements Order No. 90-154 allows resumption of emending until such time as the final bioaccumulation study on the aquatic resources of Little Valley Creek is submitted and analyzed.

6. Order No. 90-32 also required Georgia-Pacific Corporation to develop a feasibility study for the long term disposal of ash should the soil amending of ash is found to be inappropriate. The feasibility study indicated that landfilling would be an alternative to soil amending.

7. The State Water Resources Control Board has requested the Department of Health Services to review the concentrations of CDDs and CDFs in the boiler ash and assess the risk to human health and environment. This Order can be modified or rescinded pending a finding of significant risk to human health or environment by the Department of Health Services.

8. The Board adopted the Water Quality Control Plan for the North Coast Region on April 28, 1989. The plan was approved by the State Water Resources Control Board on November 15, 1988. It includes, by reference, the Water Quality Control Plan far Ocean Waters of California which was adopted by the State Water Resources Control Board on September 22, 1988. Both Plans include water quality objectives and receiving water limitations. The basin plan contains a prohibition against new waste discharges to all coastal streams and natural drainageways that flow directly to the ocean.

9. The beneficial uses of Little Valley Creek and Pudding Creek include:

   a. municipal and domestic water supply
   b. agricultural water supply
   c. potential industrial service water supply
   d. potential industrial process water supply
   e. groundwater recharge
   f. water contact recreation
   g. non-contact water recreation
   h. warm freshwater habitat
   i. cold freshwater habitat
   j. wildlife habitat
   k. fish migration
   1. fish spawning

10. The County of Mendocino has zoned this area as timber production and does not require a permit for a use of the land consistent with this zoning. These waste discharge requirements constitute a minor modification to land and is exempt from CEQA under Section 15304 Title 14 CCR.

11. The Board has notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the proposed discharge and has provided them with an opportunity for a public meeting and an opportunity to submit their written views and recommendations.

12. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

THEREFORE, IT IS HEREBY ORDERED, that Waste Discharge Requirements Order No. 90-32 be rescinded, and in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, the discharger shall comply with the following:

A. PROHIBITIONS:

1. There shall be no discharge of ash to surface streams at any time.

B. SPECIFICATIONS:

1. Runoff of ash to land not under the control of the discharger is prohibited.

2. The stockpiling and amending of ash shall not cause a pollution or nuisance as defined in Section 13050 of the California Water Code.

3. No ash materials shall be deposited outside of the soil amendment areas shown on Attachment "A".

4. The soil amendment area shall be protected from any washout or erosion of ash or covering materials and from inundation which could occur as a result of floods having a recurrence interval of 100 years.

5. Annually, prior to the anticipated rainfall period, a cover crop shell be established in the soil amendment area to prevent erosion of the site.

6. During the rainy season, only the active area of ash placement shall be left exposed to rainfall. The active area shall not be excessively large for incorporation operations and vegetation establishment.

7. Discharge of any waste not specifically regulated by this Order is prohibited.

C. PROVISIONS:

1. Availability

A copy of this Order and a copy of the facility spill contingency plan shall be maintained at the discharge facility and be available at all times to operating personnel.

2. Operation and Maintenance

The discharger must maintain in good working order and operate as efficiently as possible any facility or control system installed by the discharger to achieve compliance with the waste discharge requirements.

3. Change in Discharge

The discharger must promptly report to the Board any material change in the character, locations, or volume of the discharge.

4. Change in Ownership

In the event of any change in control or ownership or land or waste discharge facilities presently owned or controlled by the discharger, the discharger must notify the succeeding owner or operator of the existence of this Order by letter, a copy of which must be forwarded to this office.

5. Vested Rights

This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, nor protect the discharger from his liability under federal, State, or local laws, nor create a vested right for the discharger to continue the waste discharge.

6. Severability

Provisions of these waste discharge requirements are severable. If any provision of these requirements is found invalid, the remainder of these requirements shall not be affected.

7. Monitoring

The discharger must comply with the Contingency Planning and Notification Requirements Order No. 74-151, Monitoring and Reporting Program No. 90-154 and any modification to these documents as specified by the Executive Officer. Such documents are attached to this Order and incorporated herein. Chemical, bacteriological, and bioassay analyses must be conducted at a laboratory certified for such analyses by the State Department of Health Services. In the event a certified laboratory is not available to the discharger, analyses performed by a noncertified laboratory will be accepted.

8. Inspections

The discharger shall permit authorized staff of the Board:

a. entry upon premises in which an effluent source is located or in which any required records are kept;
b. access to copy any records required to be kept under terms and conditions of this Order;
c. inspection of monitoring equipment or records; and
d. sampling of any discharge.

9. Noncompliance

In the event the discharger is unable to comply with any of the conditions of this Order due to:

a. breakdown of waste treatment equipment;
b. accidents caused by human error or negligence; or
c. other causes such as acts of nature;

the discharger must notify the Executive Officer by telephone as soon as he or his *agents* have knowledge of the incident and confirm this notification in writing within two weeks of the telephone notification. The written notification shall include pertinent information explaining reasons for the noncompliance and shall indicate what steps are being taken to prevent the problem from recurring.

10. Revisions of Requirements

The Board will review this Order periodically and may revise requirements when necessary.

11. Should the Department of Health Services find that the soil amendment of boiler ash to be a significant hazard to human health and environment, the Regional Board shall modify or rescind this Order.

12. The discharger shall undertake a study evaluating the potential bioaccumulation threat to the aquatic habitat of Little Valley Creek posed by the soil amending of the boiler ash. Quarterly, on the first day of September, December, March, and June the discharger shall submit a status report on the progress of the study, until such time as the threat to the beneficial uses of Little Valley Creek is defined to the satisfaction of the Executive Officer. The final report shall be submitted to the Board by July 1, 1991.

13. This Order expires on July 1, 1991.

Certification

I, Benjamin D. Kor, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, North Coast Region, on August 16, 1990.

_____

Benjamin D. Kor
Executive Officer

(gpashwdr)

California Regional Water Quality Control Board
North Coast Region

MONITORING AND REPORTING PROGRAM NO. 90-154

FOR

GEORGIA-PACIFIC CORPORATION
FORT BRAGG SOIL AMENDMENT

Mendocino County

Monitoring

The discharger shall record the approximate volume of ash deposited at the site each month.

Stormwater Runoff Monitoring

Grab samples shall be taken periodically when stream are flowing from the points shown on the attached map. Samples shall be analyzed as follows:

Constituent	Units	Frequency
pH	pH units	Weekly
COD	mg/l	November, January, and March

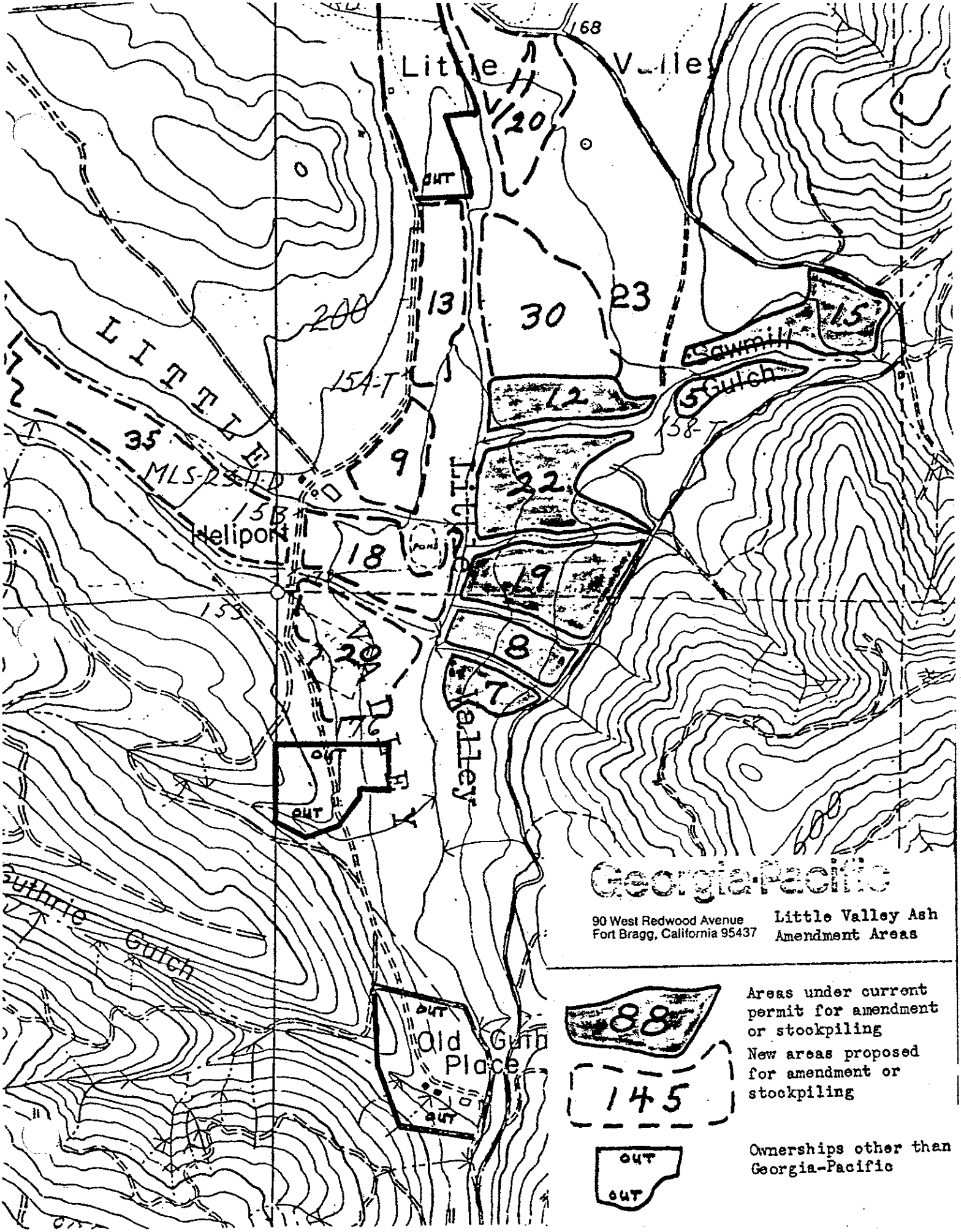
Weekly rainfall totals shall also be recorded and reported.

Reporting

Monitoring reports shall be submitted monthly to the Board by the fifteenth of the month. Copies of signed laboratory sheets shall be submitted with any monthly summary report.

Ordered by _____
Benjamin D. Kor
Executive Officer

August 16, 1990


Little Valley
168
OUT
0
200
13
30
23
15
Sawmill Gulch
12
22
19
8
7
LITTLE
35
MLS-RSH-D
15B
Heliport
18
15A-T
9
15
20
Kelley
OUT
OUT
Bubbie Gulch
OUT
Old Gulch Place
OUT
Georgia-Pacific
90 West Redwood Avenue
Fort Bragg, California 95437
Little Valley Ash
Amendment Areas
88
Areas under current permit for amendment or stockpiling
145
New areas proposed for amendment or stockpiling
OUT
OUT
Ownerships other than Georgia-Pacific

California Regional Water Quality Control Board
North Coast Region

CONTINGENCY PLANNING AND NOTIFICATION REQUIREMENTS

FOR

ACCIDENTAL SPILLS AND DISCHARGES

ORDER NO. 741151

The California Regional Water Quality Control Board. North Coast Region, finds that:

1. Section 13225 of the Porter-Cologne Water Quality Act requires the Regional Board to perform general duties to assure positive water quality control.

2. The Regional Board has been advised of situations in which preparations for, and response to accidental discharges and spills have been inadequate.

3. Persons discharging waste or conveying, supplying, storing, or managing wastes or hazardous materials have the primary responsibility for contingency planning. incident reporting and continuous and diligent action to abate the effects of such unintentional or accidental discharge.

THEREFORE, IT IS HEREBY ORDERED THAT:

I. All persons who discharge wastes or convey, supply. store, or otherwise manage wastes or other hazardous material shall:

A. Prepare and submit to this Regional Board, according to a time schedule prescribed by the Executive Officer. a contingency plan defining the following:

1. Potential locations and/or circumstances under which accidental discharge incidents might be expected to occur,

2 Possible water quality effects of accidental discharges.

3. The conceptual,plan for cleanup and abatement of accidental discharge incidents, including:

a. The individual who will be in charge of cleanup and abatement activities on behalf of the discharger.

b. The equipment and manpower available to the discharger to implement the cleanup and abatement plans,

B. Immediately report to the Regional Board any accidental discharge incidents. Such notification shall be made by telephone as soon as the responsible person or his agent has knowledge of the incident.

C. Immediately begin diligent and continuous action to cleanup and abate the effects of any unintentional or accidental discharge. Such action shall include temporary measures to abate the discharge prior to completing permanent repairs to damaged facilities.

D. Confirm the telephone notification in writing within two weeks of the telephone notification. The mitten notification shall include: reasons for the discharge, duration and volume of the discharge, steps taken to correct the problem and steps being taken to prevent the problem from recurring.

II. Upon original receipt of phone report (I.B.), the Executive Officer shall immediately notify all affected agencies and known users of waters affected by the unintentional or accidental discharge.

III. Provide updated information to the Regional Board in the went of change of staff, size of the facility, or change of operating procedures which will affect the previously established contingency plan.

IV. The Executive Officer or his employees shall maintain liaison with the discharger and other affected agencies and persons to provide assistance in cleanup and abatement activities.

V. The Executive Officer shall transmit copies of this Order to all persons whose discharges of waste handling activities are governed by Waste Discharge Requirements or an NDPES permit. Such transmittal shall include a current listing of telephone numbers of the Executive Officer and his key employees to facilitate compliance with Item I.B of this Order.

Ordered by

Benjamin D. Kor
Executive Officer

July 24. 1974
(Retyped February 15, 1990)

Your primary notification should be to the Regional Board office in Santa Rosa at (707) 576-2220. During off hours, you will be able to leave a recorded message at that number and, if you have a spill or discharge emergency, you will also be referred to the State Office of Emergency Services (OES) at (800) 852-7550. OES maintains a roster of key employees and will relay your notification to Regional Board staff.

California Regional Water Quality Control Board
North Coast Region

GENERAL MONITORING AND REPORTING PROVISIONS

February 3, 1971
(Retyped June 13, 1989)

GENERAL PROVISIONS FOR SAMPLING AND ANALYSIS

Unless otherwise noted, all sampling, sample preservation, and analyses shall be conducted in accordance with the current edition of "Standard Methods for the Examination of Water and Waste Water" or approved by the Executive Officer.

All analyses shall be performed in a laboratory certified to perform such analyses by the California State Department of Health or a laboratory approved by the Executive Officer.

All samples shall be representative of the waste discharge under the conditions of peak load.

GENERAL PROVISIONS FOR REPORTING

For every item where the requirements are not met, the discharger shall submit a statement of the actions undertaken or proposed which will bring the discharge in full compliance with requirements at the earliest time and submit a timetable for correction.

By January 30 of each year, the discharger shall submit an annual report to the Regional Board. The report shall contain both tabular and graphical summaries of the monitoring data obtained during the previous year. In addition, the discharger shall discuss the compliance record and the corrective actions taken or planned which may be needed to bring the discharge into full compliance with the waste discharge requirement..

The discharger shall file a written report within 90 days after the average dry weather flow for any month that equals or exceeds 75 percent of the design capacity of the waste treatment or disposal facilities. The report shall contain a schedule for studies, design, and other steps needed to provide additional capacity or limit the flow below the design capacity prior to the time when the waste flow rate equals the capacity of the present units.

G.P. Sawmill - Ft. Bragg

STATE OF CALIFORNIA — GEORGE DEUKMEJIAN, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION

1440 GUERNEVILLE ROAD
SANTA ROSA. CA 95403
(707)576-2220

August 9, 1990

Ed Wojinski
Georgia-Pacific Corporation
90 West Redwood Avenue
Fort Bragg, CA 95437

Dear Mr. Wojinski:

I have enclosed a copy of the report of my inspection on July 31st. It is my understanding from discussion during that inspection that you will be submitting for our review a revised technical report in conformance with Section 1.a. of Cleanup and Abatement Order No. 89-156. I have enclosed a copy of the Order for your information. Please notice the revised technical report will require the signature of a registered professional civil engineer. If Mr. Rothe is not registered, it will be necessary to retain a registered engineer to review and sign his work. The revised report should include a time schedule for implementation in accordance with Section 1.b. of Cleanup and Abatement Order No. 89-156. Please provide us with a written request for extension of time in accordance with Section 2 of Cleanup and Abatement Order No. 89-156 if you cannot deliver the revised report by 1 September 1990. You may call Mark Neely if you have any questions.

Sincerely,

Albert L. Wellman
Associate Water Resource Control Engineer

ALW:ba/wojinski

Enclosure

CERTIFIED - Return Receipt Requested

cc: Don Whitman, Georgia-Pacific Corporation, Fort Bragg, California
Kent Mayer, Georgia-Pacific Corporation, Eugene, Oregon

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.

Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following and check box(es) for additional service(s) requested.

1. ☐ Show to whom delivered, date, and address *(Extra charge)*

3. Article Addressed to:
Ed Wojinski
Georgia-Pacific Corp.
90 West Redwood Avenue
Fort Bragg, CA 95437

5. Signature — Addressee
X

6. Signature — Agent
X D. Long

7. Date of Delivery
8/10/90.

PS Form 3811, Apr. 1989 *U.S.G.P.O. 19

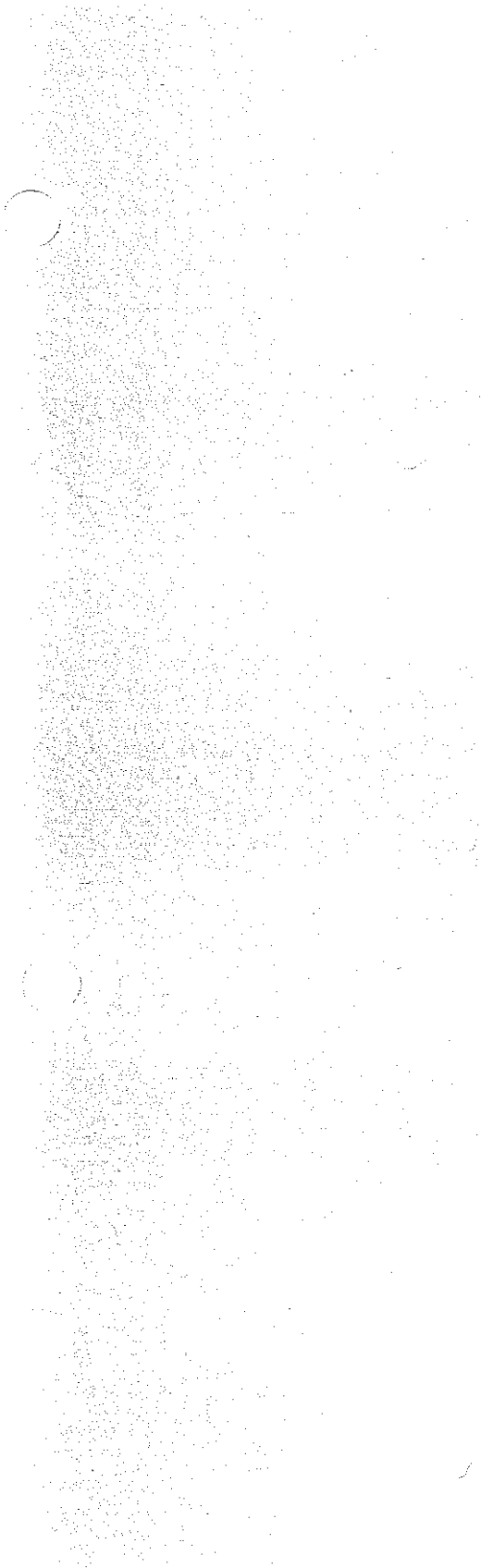
P 442 188 484

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

Sent to	Ed Wojinski Georgia-Pacific Corp.
Street and No.	90 West Redwood Ave.
P.O., State and ZIP Code	Fort Bragg, CA 95437
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Data Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date	

PS Form 3800, June 85

*U.S.G.P.O. 1989-234-555



Soil Admendm

Georgia-Pacific Corporation
P.O. Box 1618
Eugene, Oregon 97440
(503) 689-1221

K-10-30-90 90154

August 14, 1990

Mark Neely
California Regional Board
Quality Control Board
1440 Guerneville Road
Santa Rosa, CA 95403

Dear Mr. Neely:

Here is the *July*, 1990 Monitoring and Reporting Program report, as per Order No. 86-3 for Georgia-Pacific Corporation at Fort Bragg, California (Little Valley).

If you have any questions, please call me.

Sincerely,

Kent C. Mayer
Environmental Engineer

KCM: jap

Enclosures

STATE OF CALIFORNIA
GEORGE DEUKMEJIAN, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA, CA 95403
(707)576-2220

August 22, 1990

NOTICE OF ADOPTION

OF

WASTE DISCHARGE REQUIREMENTS

FOR

GEORGIA-PACIFIC CORPORATION
FORT BRAGG SOIL AHEHDHEHT

Aendocino County

Waste Discharge Requirements for the above naned discharger were adopted by the California Regional Water Quality Control Board, North Coast Region on August 16, 1990. The Order was adopted as originally proposed.

Benjamin D. Kor
Executive Officer

cc: SWRCB, Division of Water Quality, Attn: Archie Matthews
SWRCB, Office of the Chief Counsel, Attn: Bonnie Wolstoncroft
DFG, Sacramento
DFG, Yountville
Rendocino County Health Department, Attnr Gerald F. Davis
MHS, EHB, Santa Rosa, Attn: District Representative
DWR, Central District, Sacranento, Attn: Rick Woodard
USDI, Fish and Wildlife Service, Sacramento
Rendocino County Planning Department, Ukiah, Attn: Ray Hall

STATE OF CALIFORNIA
GEORGE DEUKMEJIAN, *Governor*

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA, CA 95403
(707) 576-2220

August 22, 1990

Gerald Tics
Chief Environmental Engineer
Georgia-Pacific Corporation
P. O. Box 105603
Atlanta, GA 30348

Dear Mr. Tice:

Enclosed is a copy of Waste Discharge Requirements Order No. 90-154 for the Fort Bragg Soil Raendaent, as adopted by the Regional Board on August 16, 1990. Please note that the Permit will expire on July 1, 1991. Renewal of the Permit will, of course, be contingent on the ultimate resolution of the bioaccumulation question.

If you have any questions, please call Mark Neely at this office.

Sincerely,

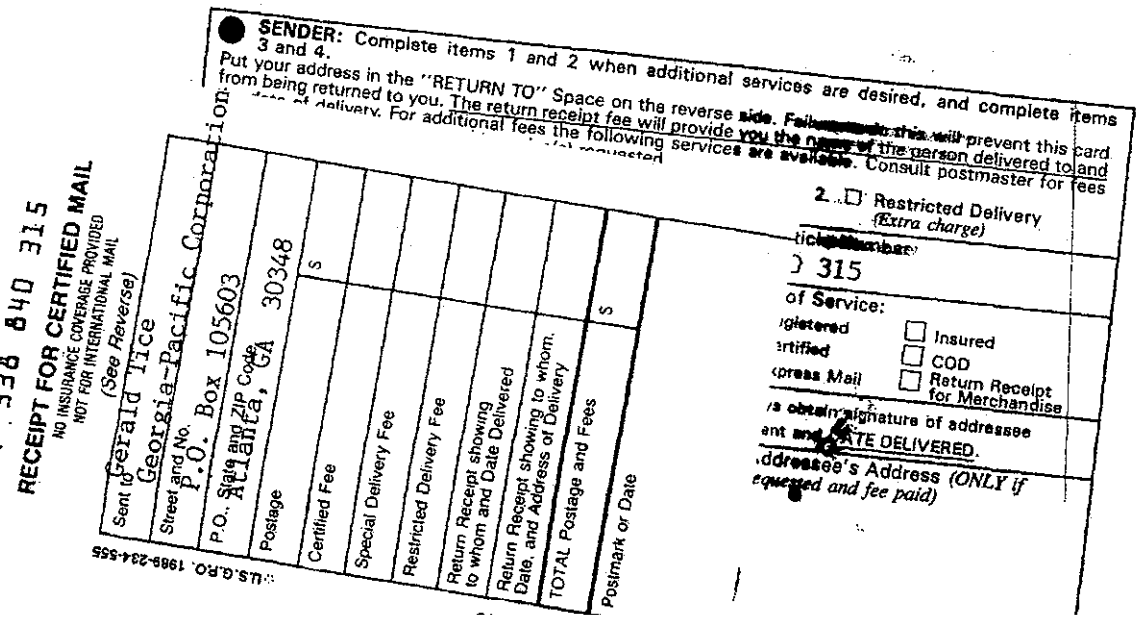
Benjamin D Kor
Executive Officer

MKN:ba/gpashcvr

Enclosure

CERTIFIED - Return Receipt Requested

cc: Kent Mayer, Georgia-Pacific Corporation, Eugene. Oregon
Don Wh[illegible] Georgia-Pacific Corporation, Fort Bragg, California



G.P. Fort Bragg Samill

Georgia-Pacific Corporation
P.O. Box 1618
Eugene, Oregon 97440
(503) 689-1221

August 29, 1990

Albert L. Wellman
State of California
California Regional Water
Quality Control Board
1440 Guerneville Road
Santa Rosa, CA 95401

Dear Mr. Wellman:

As a follow-up to our conversation of this same date, I am submitting this report in regards to the detection of residual chlorine in our outfall discharge.

On July 10, 1990 we detected 50 ug/l of residual chlorine in our discharge. On August 15, 1990, we found 80 ug/l. We then shut-off our chlorine-treatment system on August 17, 1990. Following that, on August 21, 1990 we detected 200 ug/l.

Since we have never detected residual chlorine before in our discharge, and our on-site chlorine checks found nothing unusual in the cooling-tower effluent, we contacted Mr. Steinhardt with the City of Fort Bragg. We were informed that the city had charged some newly-installed water lines with 50 ppm of chlorinated water in July. Apparently, this is common practice in new systems. We believe this is the reason for the residual chlorine levels detected.

If you have any questions, please call me.

Sincerely,

Kent C. Mayer
Environmental Engineer

KCM:jap

cc: Richard Acker
Don Whitman

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
NORTH COAST REGION

Interoffice Communication

29 August 1990

FROM: Albert Wellman

TO: 1) Mark Neely MKN

2) Frank Reichmuth FR

3) File

SUBJECT: Georgia-Pacific Fort Bragg Sawmill

I received a telephone call from Kent Meyer this morning. He said they had been investigating an unexplained increase in the chlorine residual at the discharge from subject facility. He said it was first detected in the semi-annual monitoring. The company commenced additional testing following that time. Their only known source of chlorine addition was a gaseous chlorine addition to the cooling tower to arrest slime growth in the tower. They tried a trial cutback on the quantity of chlorine added to the tower, but the chlorine residual in the discharge continued to rise. They investigated and reportedly found the City of Fort Bragg had been flushing some newly installed piping in mid-July. The high-chlorine water used for flushing and disinfecting the new piping was reportedly discharged into a channel which drains to the mill log pond. Mr. Meyer said the chlorine residual has only once come up to the maximum level allowed by the mill's NPDES Permit.

I asked Mr. Meyer to prepare a written report of the circumstances including their additional analytical results and references upon which they based their assessment of the City's involvement. He said he would get the report mailed by September 7th.

Georgia-Pacific Corporation 133 Peachtree Street, N.E. (30303)
P.O. Box 105605
Atlanta, Georgia 30348-5605
Telephone (404) 521-4000

August 30, 1990

Mr. Benjamin D. Kor
Executive Officer
California Regional Water Quality
Control Board
North Coast Region
1440 Guerneville Road
Santa Rosa, CA 95403

CERTIFIED MAIL
NO. 317694481

RE: September 1990 Quarterly Progress Report
Georgia-Pacific Corporation
Fort Bragg Soil Amendment Project

Dear Mr. Kor:

This quarterly progress report is submitted in compliance with Waste Discharge Requirements Order No. 90-154 for Georgia-Pacific's Fort Bragg soil amendment project.

Our June 1990 quarterly report concluded with a planned meeting at our Fort Bragg facility scheduled for May 30, 1990. The purpose of this meeting was to discuss with members of the North coast Regional staff, Georgia-Pacific personnel and sampling consultants retained by Georgia-Pacific the planned ash and aquatic sampling programs at the Little Valley site and to actually obtain ash and aquatic samples. The ash samples were obtained during this on-site visit however, the aquatic sampling could not be accomplished because of heavy rains in the area. Therefore a subsequent visit was made on June 25, 1990 during which the aquatic samples were obtained. Details of both of these sampling events are discussed in our correspondence to you dated June 6, 1990 and July 16, 1990. This correspondence also includes the analytical results of this sampling. Briefly, these results show very low level quantities of several furan and dioxin congeners in the ash and showed no evidence of uptake in the stream sediment and aquatic tissue samples. Our correspondence indicates that "a risk based analysis of this recent data, coupled with our previous studies of bioaccumulation in cover crops and terrestrial animals (earthworms), would suggest that the level of risk posed by our soil amending activities at Little Valley is quite low." Based on the results of these studies the North Coast Regional Board on August 16, 1990 issued Order No. 90-154 which allowed soil amending activity to resume at the Little Valley site through July 1, 1991.

This order also requires that additional study be undertaken to further evaluate the potential bioaccumulation threat to the aquatic habitat of the Little Valley creek posed by the soil amending of the ash. Georgia-Pacific intends to comply with this requirement and will submit a proposed sampling plan to the North Coast staff for their review and approval.

Order No. 90-32 required that Georgia-Pacific submit an Alternative Feasibility Report to address various methods for disposal or use of the ash generated at its Fort Bragg sawmill. These methods would be in lieu of soil amending. This report was submitted to the North Coast staff as required on June 28, 1990. The report concluded that, although soil amending of the ash is the preferred method of disposal, landfilling was probably the only other disposal option available assuming a landfill could be sited and permitted.

This concludes the activity on this project through August, 1990. Should there be any questions or if additional details are needed please let me know.

Very truly yours,

Gerald W. Tice

GERALD W. TICE
CHIEF ENVIRONMENTAL ENGINEER
WOOD PRODUCTS MANUFACTURING DIVISION

GWT/pcw
Enclosure

cc: Mr. A. T. Johnson
Mr. K. C. Mayer
Mr. D. Modi
Mr. J. Tice
Mr. T. Treichelt
Mr. D. Whitman
Mr. T. Deer
Mr. G. F. McCaig

cc: File - Ft. Bragg - Ash Study

pace®
INCORPORATED
THE ASSURANCE OF QUALITY

September 7, 1990

Mr. Robert Klamt
R.W.Q.C.B., North Coast Region
1440 Guerneville Rd.
Santa Rosa, CA 95403

RE: PACE Project No. 400601.506
F. Reichmuth, #1

G-P FT. BRAGG
SOIL AMENDMENT

Dear Mr. Klamt:

Enclosed is the report of laboratory analyses for the two solid samples received June 01, 1990.

The report consists of the following sections:

I Sample Description
II Analysis Request
III Quality Control Report
IV Analysis Results

As you are aware, we subcontracted your samples to Enseco for analytical results. Unfortunately Enseco was unable to meet the turnaround time as promised. We apologize for any inconvenience this may have caused you, and assure you that we are taking steps to prevent this from occurring again.

Sincerely,

Carol Posthuma

Carol Posthuma
Project Manager

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 4158852873

I Sample Description

See the attached Sample Description Information.

The samples were received under chain-of-custody.

II Analysis Request

The following analytical tests were requested.

Lab ID	Analysis Description
053126-0001,2	Polynuclear Aromatic Hydrocarbons, HPLC Cl_4 = Cl_8 Dioxins/Furans plus 2,3,7,8-Substituted Isomers

III Quality Control

A. Project Specific QC. No project specific QC (i.e., spikes and/or duplicates) was requested.

B. **Method Blank Results.** A method blank is a laboratory-generated sample which assesses the degree to which laboratory operations and procedures cause false-positive analytical results for your samples.

No target parameters were detected in the method blanks associated with your samples at or above the detection limits noted on the Method Blank Report and data sheet in the Analysis Results Section.

C. Laboratory Control Samples - The LCS Proaram

Duplicate Control Samples. A DCS is a well-characterized matrix (blank water, sand or celite) which is spiked with certain target parameters and analyzed at approximately 10% of the sample load in order to establish method-specific control limits. The DCS results associated with your samples are on the attached Duplicate Control Sample Report.

Accuracy is measured by Percent Recovery as in:

$$\% \text{ recovery} = \frac{[\text{measured concentration})}{(\text{actual concentration})} \times 100$$

Precision is measured using duplicate tests by Relative Percent Difference (RPD) as in:

$$RPD = \frac{(\% \text{ recovery test } 1 - \% \text{ recovery test } 2)}{(\% \text{ recovery test } 1 + \% \text{ recovery test } 2)/2} \times 100$$

Control limits for accuracy (percent recovery) are based on the average, historical percent recovery +/-3 standard deviation units. Control limits for precision (relative percent difference) range from 0 (identical duplicate DCS results) to the average, historical relative percent difference + 3 standard deviation units. In cases where there is not enough historical data, EPA limits or advisory limits are set, with the approval of the Quality Assurance department.

IV Analysis Results

Test methods for all analyses except chlorinated dioxins and furans, may include minor modifications of published EPA Methods such as reporting limits or parameter lists. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e., no correction is made for moisture content, unless the method requires or the client requests that such correction be made.

For pulp and paper industry samples, test methods for chlorinated dioxin/furan analyses will follow NCASI Technical Bulletin 551 unless otherwise noted. Pulp and sludge samples are air dried and prepared per this method. All results for these analyses, including detection limits, are reported on a dry weight basis.

Detection limits are reported on a sample specific basis. All results are recovery corrected per the isotope dilution technique.

Results are on the attached data sheets.

Enseco
A CORNING Company

SAMPLE DESCRIPTION INFORMATION
for
Pace Laboratories, Inc.

Lab ID	Client ID	Matrix	Sampled Date	Sampled *Time*	Received Date
053126-0001-SA	76143	SOLID	30 MAY 90	18:30	05 JUN 90
053126-0001-MB	Method Blank	SOLID			05 JUN 90
053126-0002-SA	76144	SOLID	30 MAY 90	16:30	05 JUN 90

Enseco
A CORNING Company

QC LOT ASSIGNMENT REPORT
HPLC Analysis Area

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
053126-0001-SA	SOIL	PAH-HPLC-S	06 JUN 90-A	06 JUN 90-A
053126-0002-SA	SOIL	PAH-HPLC-S	06 JUN 90-A	06 JUN 90-A

Enseco
A CORNING Company

METHOD BLANK REPORT
HPLC Analysis Area

Analyte	Result	Units	Reporting Limit
Test: 8310-HPLC-S			
Matrix: SOLID			
QC Lot: 06 JUN 90-A QC Run: 06 JUN 90-A			
Naphthalene	ND	ug/kg	400
Acenaphthylene	ND	ug/kg	400
Acenaphthene	ND	ug/kg	400
Fluorene	ND	ug/kg	40
Phenanthrene	ND	ug/kg	120
Anthracene	ND	ug/kg	140
Fluoranthene	ND	ug/kg	40
Pyrene	ND	ug/kg	60
Benzo(a)anthracene	ND	ug/kg	16
Chrysene	ND	ug/kg	40
Benzo(b)fluoranthene	ND	ug/kg	4.0
Benzo(k)fluoranthene	ND	ug/kg	4.0
Benzo(a)pyrene	ND	ug/kg	10
Dibenz(a,h)anthracene	ND	ug/kg	40
Benzo(g,h,i)perylene	ND	ug/kg	16
Indeno(1,2,3-cd)pyrene	ND	ug/kg	40

Enseco
A CORNING Company

DUPLICATE CONTROL SAMPLE REPORT
HPLC Analysis Area

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision (RPD) Limit
Category: PAH-HPLC-S								
Matrix: SOIL								
QC Lot: 06 JUN 90-A								
Concentration Units: ug/kg								
Naphthalene	1000	706	627	666	67	58- 88	12	23
Fluorene	200	130	106	118	59	59- 91	20*	19
Pyrene	200	151	127	139	70	52- 98	17	21
Benzo(a)pyrene	100	78.1	70.0	74.0	74	33-111	11	18
Indeno(1,2,3-cd)pyrene	100	77.7	72.3	75.0	75	63- 94	7.2	18

* = RPD outside QC Limits

Calculations are performed before rounding to avoid round-off errors in calculated results.

Enseco
A CORNING Company

Polynuclear Aromatic Hydrocarbons, HPLC

Method 8310

Client Name: Pace Laboratories, Inc.
Client ID: 76143
Lab ID: 053126-0001-SA Enseco ID: 151241
Matrix: SOLID Sampled: 30 MAY 90 Received: 05 JUN 90
Authorized: 05 JUN 90 Prepared: 06 JUN 90 Analyzed: 08 JUN 90

Parameter	Result	Wet wt. Units	Reporting Limit	
Naphthalene	ND	ug/kg	400	
Acenaphthylene	ND	ug/kg	400	
Acenaphthene	ND	ug/kg	400	
Fluorene	ND	ug/kg	40	
Phenanthrene	ND	ug/kg	120	
Anthracene	ND	ug/kg	140	
Fluoranthene	ND	ug/kg	40	
Pyrene	ND	ug/kg	60	
Benzo(a)anthracene	ND	ug/kg	16	
Chrysene	ND	ug/kg	600	G
Benzo(b)fluoranthene	ND	ug/kg	4.0	
Benzo(k)fluoranthene	ND	ug/kg	4.0	
Benzo(a)pyrene	ND	ug/kg	10	
Dibenz(a,h)anthracene	ND	ug/kg	40	
Benzo(g,h,i)perylene	ND	ug/kg	16	
Indeno(1,2,3-cd)pyrene	ND	ug/kg	40	

Note G : Reporting Limit raised due to matrix interference.

ND = Not detected
NA = Not applicable

Reported By: Claire Hanamoto Approved By: Marcia Reed

The cover letter is an integral part of this report.

Enseco
A CORNING Company

Polynuclear Aromatic Hydrocarbons, HPLC
Method 8310

Client Name: Pace Laboratories, Inc.
Client ID: 76144
Lab ID: 053126-0002-SA Enseco ID: 151243
Matrix: SOLID Sampled: 30 MAY 90 Received: 05 JUN 90
Authorized: 05 JUN 90 Prepared: 06 JUN 90 Analyzed: 08 JUN 90

Parameter	Result	Wet wt. Units	Reporting Limit	
Naphthalene	ND	ug/kg	400	
Acenaphthylene	ND	ug/kg	400	
Acenaphthene	ND	ug/kg	400	
Fluorene	ND	ug/kg	40	
Phenanthrene	ND	ug/kg	120	
Anthracene	ND	ug/kg	140	
Fluoranthene	ND	ug/kg	40	
Pyrene	ND	ug/kg	60	
Benzo(a)anthracene	ND	ug/kg	16	
Chrysene	ND	ug/kg	300	G
Benzo(b)fluoranthene	ND	ug/kg	4.0	
Benzo(k)fluoranthene	ND	ug/kg	4.0	
Benzo(a)pyrene	ND	ug/kg	10	
Dibenz(a,h)anthracene	ND	ug/kg	40	
Benzo(g,h,i)perylene	ND	ug/kg	16	
Indeno(1,2,3-cd)pyrene	ND	ug/kg	40	

Note G : Reporting Limit raised due to matrix interference.

ND = Not detected
NA = Not applicable

Reported By: Claire Hanamoto Approved By: Marcia Reed

The cover letter is an integral part of this report.

Enseco
A CORNING Company

GENERAL INORGANICS

(Soil/Solid)

Client Name: Pace Laboratories. Inc.
Client ID: 76143
Lab ID: 053126-0001-SA Enseco ID: 151241
Matrix: SOLID Sampled: 30 MAY 90 Received: 05 JUN 90
Authorized: 05 JUN 90 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Percent Water	55	%	0.10	CLP Method	NA	06 JUN 90

ND = Not detected
NA = Not applicable

Reported By: Willie Harmon Approved By: Willie Harmon

The cover letter is an integral part of this report.
Rev 230787

Enseco
A CORNING Company

GENERAL INORGANICS

(Soil/Solid)

Client Name: Pace Laboratories, Inc.
Client ID: 76144
Lab ID: 053126-0002-SA Enseco ID: 151243
Matrix: SOLID Sampled: 30 MAY 90 Received: 05 JUN 90
Authorized: 05 JUN 90 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Percent Water	53	%	0.10	CLP Method	NA	06 JUN 90

ND = Not detected
NA = Not applicable

Reported By: Willie Harmon Approved By: Willie Harmon

The cover letter is an integral part of this report.

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 1613

Client Name: Pace Laboratories, Inc.
Client ID: Method Blank
Lab ID: 053126-0001-MB Enseco ID: 151323
Matrix: SOLID Sampled: NA Received: NA
Authorized: 05 JUN 90 Prepared: 18 JUN 90 Analyzed: 11 AUG 90

Sample Amount 2.0 G
percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	0.26	
2,3,7,8-TCDF	ND	pg/g	0.20	
PeCDFs (total)	ND	pg/g	1.8	
1,2,3,7,8-PeCDF	ND	pg/g	0.36	
2,3,4,7,8-PeCDF	ND	pg/g	0.39	
HxCDFs (total)	ND	pg/g	1.6	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.29	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.30	
2,3,4,6,7,8-HxCDF	ND	pg/g	1.0	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.30	
HpCDFs (total)	ND	pg/g	1.2	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	1.2	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.37	
OCDF	ND	pg/g	1.7	
Dioxins				
TCDDs (total)	ND	pg/g	2.1	
2,3,7,8-TCDD	ND	pg/g	0.43	
PeCDDs (total)	ND	pg/g	1.7	
1,2,3,7,8-PeCDD	ND	pg/g	0.94	
HxCDDs (total)	ND	pg/g	3.0	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.57	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.46	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.63	
HpCDDs (total)	ND	pg/g	1.4	
1,2,3,4,6,7,8-HpCDD	ND	pg/g	1.4	
OCDD	ND	pg/g	12	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 1613

Client Name: Pace Laboratories, Inc.
Client ID: Method Blank
Lab ID: 053126-0001-MB
Matrix: SOLID
Authorized: 05 JUN 90
Enseco ID: 151323
Sampled: NA
Prepared: 18 JUN 90
Received: NA
Analyzed: 11 AUG 90

Sample Amount 2.0 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	95
13C-1,2,3,7,8-PeCDF	51
13C-2,3,4,7,8-PeCDF	49
13C-1,2,3,4,7,8-HxCDF	50
13C-1,2,3,6,7,8-HxCDF	56
13C-1,2,3,7,8,9-HxCDF	70
13C-1,2,3,4,6,7,8-HpCDF	57
13C-1,2,3,4,7,8,9-HpCDF	95
13C-2,3,7,8-TCDD	85
37Cl-2,3,7,8-TCDD	70
13C-1,2,3,7,8-PeCDD	57
13C-1,2,3,6,7,8-HxCDD	96
13C-1,2,3,4,7,8-HxCDD	85
13C-1,2,3,4,6,7,8-HpCDD	64
13C-OCDD	45

ND = Not detected
NA = Not applicable

Reported By: Martha Maier
Approved By: Mike Filigenzi

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Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 1613

Client Name: Pace Laboratories, Inc.
Client ID: 76143
Lab ID: 053126-0001-SA
Enseco ID: 151241
Matrix: SOLID
Sampled: 30 MAY 90
Received: 05 JUN 90
Authorized: 05 JUN 90
Prepared: 18 JUN 90
Analyzed: 11 AUG 90

Sample Amount 2.2 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	76	pg/g	--	
2,3,7,8-TCDF	9.0	pg/g	--	
PeCDFs (total)	9.5	pg/g	--	
1,2,3,7,8-PeCDF	2.7	pg/g	--	
2,3,4,7,8-PeCDF	3.3	pg/g	--	
HxCDFs (total)	ND	pg/g	3.5	
1,2,3,4,7,8-HxCDF	ND	pg/g	1.2	
1,2,3,6,7,8-HxCDF	ND	pg/g	1.2	
2,3,4,6,7,8-HxCDF	ND	pg/g	1.4	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.77	
HpCDFs (total)	ND	pg/g	2.4	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	2.4	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	1.6	
OCDF	ND	pg/g	3.9	
Dioxins				
TCDDs (total)	6.6	pg/g	--	
2,3,7,8-TCDD	0.97	pg/g	--	
PeCDDs (total)	ND	pg/g	3.3	
1,2,3,7,8-PeCDD	ND	pg/g	2.9	
HxCDDs (total)	ND	pg/g	3.4	
1,2,3,4,7,8-HxCDD	ND	pg/g	1.1	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.90	
1,2,3,7,8,9-HxCDD	ND	pg/g	1.4	
HpCDDs (total)	ND	pg/g	8.5	
1,2,3,4,6,7,8-HpCDD	ND	pg/g	4.6	
OCDD	24	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier
Approved By: Mike Filigenzi

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 1613

Client Name: Pace Laboratories, Inc.
Client ID: 76143
Lab ID: 053126-0001-SA Enseco ID: 151241
Matrix: SOLID Sampled: 30 MAY 90 Received: 05 JUN 90
Authorized: 05 JUN 90 Prepared: 18 JUN 90 Analyzed: 11 AUG 90

Sample Amount 2.2 G
percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	98
13C-1,2,3,7,8-PeCDF	37
13C-2,3,4,7,8-PeCDF	34
13C-1,2,3,4,7,8-HxCDF	41
13C-1,2,3,6,7,8-HxCDF	50
13C-1,2,3,7,8,9-HxCDF	78
13C-1,2,3,4,6,7,8-HpCDF	30
13C-1,2,3,4,7,8,9-HpCDF	76
13C-2,3,7,8-TCDD	96
37Cl-2,3,7,8-TCDD	78
13C-1,2,3,7,8-PeCDD	36
13C-1,2,3,6,7,8-HxCDD	103
13C-1,2,3,4,7,8-HxCDD	100
13C-1,2,3,4,6,7,8-HpCDD	30
13C-OCDD	38

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Hike Filigenzi

The cover letter is an integral part of this report.

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 1613

Client Name: Pace Laboratories, Inc.
Client ID: 76144
Lab ID: 053126-0002-SA Enseco ID: 151243
Matrix: SOLID Sampled: 30 MAY 90 Received: 05 JUN 90
Authorized: 05 JUN 90 Prepared: 18 JUN 90 Analyzed: 11 AUG 90

Sample Amount 1.8 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	110	pg/g	--	
2,3,7,8-TCDF	14	pg/g	--	
PeCDFs (total)	30	pg/g	--	
1,2,3,7,8-PeCDF	4.0	pg/g	--	
2,3,4,7,8-PeCDF	6.9	pg/g	--	
HxCDFs (total)	120	pg/g	--	
1,2,3,4,7,8-HxCDF	ND	pg/g	12	
1,2,3,6,7,8-HxCDF	ND	pg/g	12	
2,3,4,6,7,8-HxCDF	ND	pg/g	3.0	
1,2,3,7,8,9-HxCDF	ND	pg/g	10	
HpCDFs (total)	74	pg/g	--	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	26	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	5.1	
OCDF	ND	pg/g	15	
Dioxins				
TCDDs (total)	4.2	pg/g	--	
2,3,7,8-TCDD	ND	pg/g	2.7	
PeCDDs (total)	ND	pg/g	14	
1,2,3,7,8-PeCDD	ND	pg/g	14	
HxCDDs (total)	31	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	9.9	
1,2,3,6,7,8-HxCDD	31	pg/g	--	
1,2,3,7,8,9-HxCDD	ND	pg/g	12	
HpCDDs (total)	180	pg/g	--	
1,2,3,4,6,7,8-HpCDD	98	pg/g	--	
OCDD	150	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

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Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 1613

Client Name: Pace Laboratories, Inc.
Client ID: 76144
Lab ID: 053126-0002-SA
Matrix: SOLID
Authorized: 05 JUN 90

Enseco ID: 151243
Sampled: 30 MAY 90
Prepared: 18 JUN 90

Received: 05 JUN 90
Analyzed: 11 AUG 90

Sample Amount 1.8 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	84
13C-1,2,3,7,8-PeCDF	29
13C-2,3,4,7,8-PeCDF	25
13C-1,2,3,4,7,8-HxCDF	35
13C-1,2,3,6,7,8-HxCDF	41
13C-1,2,3,7,8,9-HxCDF	72
13C-1,2,3,4,6,7,8-HpCDF	24
13C-1,2,3,4,7,8,9-HpCDF	79
13C-2,3,7,8-TCDD	82
37Cl-2,3,7,8-TCDD	82
13C-1,2,3,7,8-PeCDD	27
13C-1,2,3,6,7,8-HxCDD	100
13C-1,2,3,4,7,8-HxCDD	97
13C-1,2,3,4,6,7,8-HpCDD	24
13C-OCDD	44

ND = Not detected
NA = Not applicable

Reported By: Martha Maier

Approved By: Hike Filigenzi

The cover letter is an integral part of this report.

Revised July 1989

LABORATORY SUBMITTAL

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
NORTH COAST REGION

1440 **Guerneville** Road, **Santa** Rosa, CA 95403

LAB: **PACE LABORATORIES**
415-883-6100

DATE: 6/1/90

SAMPLER: FCR #1
Frank Reichmuth

PRIORITY: X ROUTINE **(10 DAYS** VERBAL; 15 DAYS **WRITTEN)**

___ **URGENT** (ASAP)

TASK CHARGE

___ **105-91 COMPLIANCE/ENFORCEMENT INSPEC**

___ 105-93 RUSSIAN RIVER **MONITORING**

___ 165-04 **205J LAGUNA** STUDY

___ 126-03 YELL **INVESTIGATIOON**

SAMPLE IDENTIFICATION	ANALYSES DESIRED	PCA No.	ESTIMATED COST
76143 RB-LVA1 (1/2, 2/2)	TCDD, TCDF Method 1613A	121-04	
	% moisture		
	Polynuclear aromatic hydrocarbons (PNA) EPA Method 8310		
76144 RB-LVB1 (1/2, 2/2)	Same as above	121-04	
	See attached Supplemental Lab Transmittal Memo		

date samp 5/30

SAMPLE RECEIVED BY : Donald Dobanski Pace Inc 6/1/90 1612

INVOICE: _____ DATED: _____ **AMOUNT:** _____ TOTAL ESTIMATED COST: _____

4 Donald Dobanski Pace Inc. 6/1/90 1712

rec'd step Mat90 PACE 6/1/90 1712

4000601-5

ATTACHMENT 9

Sediment

California Analytical Laboratory

Enseco
A CORNING Company

July 11, 1990
Lab ID: 053465

Gerald Tice
Georgia Pacific Corporation
133 Peachtree St. NE
Atlanta. GA 30348

Dear Mr. Tice:

Enclosed is the report for the four soil samples for your G.P. - Little Valley Project, which were received at Enseco-Cal Lab on 27 June 1990.

The report consists of the following sections:

I Sample Description
II Analysis Request
III Quality Control Report
IV Analysis Results

If you have any questions, please feel free to call.

Sincerely,

Michael J. Miille, Ph.D.
Division Director

ka

cc: Jay Tice - Washington, DC

Enseco Incorporated
2544 Industrial Boulevard
West Sacramento, California 95691
916/372-1393 Fax: 916/371-8420

Enseco
A CORNING Company

SAMPLE DESCRIPTION INFORMATION
for
Georgia Pacific

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
053465-0001-SA	LVSU-1	SOIL	25 JUN 90	15:50	27 JUN 90
053465-0001-MB	Method Blank	SOIL			27 JUN 90
053465-0002-SA	LVSU-2	SOIL	25 JUN 90	15:55	27 JUN 90
053465-0003-SA	LVSL-1	SOIL	25 JUN 90	19:20	27 JUN 90
053465-0004-SA	LVSL-2	SOIL	25 JUN 90	19:25	27 JUN 90

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: Method Blank
Lab ID: 053465-0001-MB
Matrix: SOIL
Authorized: 27 JUN 90

Enseco ID: 153739
Sampled: NA
Prepared: 27 JUN 90

Received: NA
Analyzed: 02 JUL 90

Sample Amount 10.00 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	0.068	
2,3,7,8-TCDF	ND	pg/g	0.068	
PeCDFs (total)	ND	pg/g	0.33	
1,2,3,7,8-PeCDF	ND	pg/g	0.33	
2,3,4,7,8-PeCDF	ND	pg/g	0.33	
HxCDFs (total)	ND	pg/g	0.27	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.27	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.27	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.27	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.27	
HpCDFs (total)	ND	pg/g	0.23	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	0.23	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.23	
OCDF	ND	pg/g	0.54	
Dioxins				
TCDDs (total)	ND	pg/g	0.24	
2,3,7,8-TCDD	ND	pg/g	0.13	
PeCDDs (total)	ND	pg/g	0.15	
1,2,3,7,8-PeCDD	ND	pg/g	0.15	
HxCDDs (total)	ND	pg/g	0.57	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.57	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.57	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.57	
HpCDDs (total)	ND	pg/g	1.1	
1,2,3,4,6,7,8-HpCDD	ND	pg/g	1.1	
OCDD	ND	pg/g	4.8	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier

Approved By: Mike Filigenzi

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: Method Blank
Lab ID: 053465-0001-MB
Matrix: SOIL
Authorized: 27 JUN 90

Enseco ID: 153739
Sampled: NA
Prepared: 27 JUN 90

Received: NA
Analyzed: 02 JUL 90

Sample Amount 10.00 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	113
13C-2,3,7,8-TCDD	105
13C-1,2,3,7,8-PeCDD	97
13C-1,2,3,6,7,8-HxCDD	124
13C-1,2,3,4,6,7,8-HpCDD	101
13C-OCDD	72

ND = Not detected
NA = Not applicable

Reported By: Martha Maier

Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: LVSU-1
Lab ID: 053465-0001-SA Enseco ID: 153735
Matrix: SOIL Sampled: 25 JUN 90 Received: 27 JUN 90
Authorized: 27 JUN 90 Prepared: 27 JUN 90 Analyzed: 02 JUL 90

Sample Amount 10.00 G
percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	0.96	pg/g	--	
2,3,7,8-TCDF	ND	pg/g	0.16	
PeCDFs (total)	ND	pg/g	0.33	
1,2,3,7,8-PeCDF	ND	pg/g	0.33	
2,3,4,7,8-PeCDF	ND	pg/g	0.33	
HxCDFs (total)	2.7	pg/g	--	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.15	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.15	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.15	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.15	
HpCDFs (total)	6.2	pg/g	--	
1,2,3,4,6,7,8-HpCDF	2.0	pg/g	--	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.90	
OCDF	5.3	pg/g	--	
Dioxins				
TCDDs (total)	ND	pg/g	0.42	
2,3,7,8-TCDD	ND	pg/g	0.42	
PeCDDs (total)	ND	pg/g	0.47	
1,2,3,7,8-PeCDD	ND	pg/g	0.47	
HxCDDs (total)	3.6	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.21	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.65	
1,2,3,7,8,9-HxCDD	ND	pg/g	1.0	
HpCDDs (total)	14	pg/g	--	
1,2,3,4,6,7,8-HpCDD	7.8	pg/g	--	
OCDD	43	pg/g	--	

(continued on following page)

NO = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

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Enseco
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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: LVSU-1
Lab ID: 053465-0001-SA
Matrix: SOIL
Authorized: 27 JUN 90

Enseco ID: 153735
Sampled: 25 JUN 90
prepared: 27 JUN 90

Received: 27 JUN 90
Analyzed: 02 JUL 90

Sample Amount 10.00 G
percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	74
13C-2,3,7,8-TCDD	68
13C-1,2,3,7,8-PeCDD	60
13C-1,2,3,6,7,8-HxCDD	95
13C-1,2,3,4,6,7,8-HpCDD	56
13C-OCDD	30

ND = Not detected
NA = Not applicable

Reported By: Martha Maier

Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: LVSU-2
Lab ID: 053465-0002-SA
Matrix: SOIL
Authorized: 27 JUN 90

Enseco ID: 153736
Sampled: 25 JUN 90
Prepared: 27 JUN 90

Received: 27 JUN 90
Analyzed: 02 JUL 90

Sample Amount 10.00 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	0.49	pg/g	--	
2,3,7,8-TCDF	ND	pg/g	0.14	
PeCDFs (total)	ND	pg/g	0.14	
1,2,3,7,8-PeCDF	ND	pg/g	0.14	
2,3,4,7,8-PeCDF	ND	pg/g	0.14	
HxCDFs (total)	1.3	pg/g	--	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.10	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.10	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.10	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.10	
HpCDFs (total)	2.8	pg/g	--	
1,2,3,4,6,7,8-HpCDF	0.90	pg/g	--	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.11	
OCDF	2.4	pg/g	--	
Dioxins				
TCDDs (total)	0.54	pg/g	--	
2,3,7,8-TCDD	ND	pg/g	0.33	
PeCDDs (total)	ND	pg/g	0.19	
1,2,3,7,8-PeCDD	ND	pg/g	0.19	
HxCDDs (total)	1.8	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.059	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.61	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.56	
HpCDDs (total)	6.5	pg/g	--	
1,2,3,4,6,7,8-HpCDD	3.9	pg/g	--	
OCDD	22	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier

Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: LVSU-2
Lab ID: 053465-0002-SA
Matrix: SOIL
Authorized: 27 JUN 90

Enseco ID: 153736
Sampled: 25 JUN 90
Prepared: 27 JUN 90

Received: 27 JUN 90
Analyzed: 02 JUL 90

Sample Amount 10.00 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	111
13C-2,3,7,8-TCDD	107
13C-1,2,3,7,8-PeCDD	95
13C-1,2,3,6,7,8-HxCDD	120
13C-1,2,3,4,6,7,8-HpCDD	103
13C-OCDD	85

ND = Not detected
NA = Not applicable

Reported By: Martha Maier

Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: LVSL-I
Lab ID: 053465-0003-SA Enseco ID: 153737
Matrix: SOIL Sampled: 25 JUN 90 Received: 27 JUN 90
Authorized: 27 JUN 90 Prepared: 27 JUN 90 Analyzed: 02 JUL 90

Sample Amount 10.00 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	1.0	pg/g	--	
2,3,7,8-TCDF	ND	pg/g	0.10	
PeCDFs (total)	0.15	pg/g	--	
1,2,3,7,8-PeCDF	ND	pg/g	0.20	
2,3,4,7,8-PeCDF	ND	pg/g	0.20	
HxCDFs (total)	1.1	pg/g	--	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.13	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.15	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.15	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.15	
HpCDFs (total)	2.6	pg/g	--	
1,2,3,4,6,7,8-HpCDF	0.91	pg/g	--	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.12	
OCDF	1.9	pg/g	--	
Dioxins				
TCDDs (total)	ND	pg/g	0.21	
2,3,7,8-TCDD	ND	pg/g	0.16	
PeCDDs (total)	ND	pg/g	0.20	
1,2,3,7,8-PeCDD	ND	pg/g	0.20	
HxCDDs (total)	0.73	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.33	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.42	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.65	
HpCDDs (total)	6.1	pg/g	--	
1,2,3,4,6,7,8-HpCDD	3.7	pg/g	--	
OCDO	18	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: LVSL-1
Lab ID: 053465-0003-SA
Matrix: SOIL
Authorized: 27 JUN 90

Enseco ID: 153737
Sampled: 25 JUN 90
Prepared: 27 JUN 90

Received: 27 JUN 90
Analyzed: 02 JUL 90

Sample Amount 10.00 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	91
13C-2,3,7,8-TCDD	104
13C-1,2,3,7,8-PeCDD	121
13C-1,2,3,6,7,8-HxCDD	113
13C-1,2,3,4,6,7,8-HpCDD	97
13C-OCDD	77

ND = Not detected
NA = Not applicable

Reported By: Martha Maier

Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: LVSL-2
Lab ID: 053465-0004-SA
Matrix: SOIL
Authorized: 27 JUN 90

Enseco ID: 153738
Sampled: 25 JUN 90
prepared: 27 JUN 90

Received: 27 JUN 90
Analyzed: 02 JUL 90

Sample Amount 10.00 G
percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	0.43	pg/g	--	
2,3,7,8-TCDF	ND	pg/g	0.14	
PeCDFs (total)	ND	pg/g	0.20	
1,2,3,7,8-PeCDF	ND	pg/g	0.20	
2,3,4,7,8-PeCDF	ND	pg/g	0.20	
HxCDFs (total)	0.72	pg/g	--	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.12	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.17	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.17	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.19	
HpCDFs (total)	0.73	pg/g	--	
1,2,3,4,6,7,8-HpCDF	0.73	pg/g	--	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.21	
OCDF	2.2	pg/g	--	
Dioxins				
TCDDs (total)	ND	pg/g	0.20	
2,3,7,8-TCDD	ND	pg/g	0.17	
PeCDDs (total	ND	pg/g	0.35	
1,2,3,7,8-PeC D	ND	pg/g	0.35	
HxCDDs (total)	ND	pg/g	0.69	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.23	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.19	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.69	
HpCDDs (total)	4.7	pg/g	--	
1,2,3,4,6,7,8-HpCDD	3.2	pg/g	--	
OCDD	16	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Martha Maier

Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A CORNING Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
HIGH RESOLUTION

Client Name: Georgia Pacific
Client ID: LVSL-2
Lab ID: 053465-0004-SA Enseco ID: 153738
Matrix: SOIL Sampled: 25 JUN 90 Received: 27 JUN 90
Authorized: 27 JUN 90 Prepared: 27 JUN 90 Analyzed: 02 JUL 90

Sample Amount 10.00 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	94
13C-2,3,7,8-TCDD	92
13C-1,2,3,7,8-PeCDD	86
13C-1,2,3,6,7,8-HxCDD	105
13C-1,2,3,4,6,7,8-HpCDD	78
13C-OCDD	48

ND = Not detected
NA = Not applicable

Reported By: Martha Maier Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco

CHAIN-OF-CUSTODY RECORD

SAMPLER: (Signature) Martin E. Hay
Phone (707) 446-0427
Date Shipped 6/26/90
Airbill No 1532 2371 612
Carrier United Parcel Service
Cooler No. CAL-LAB (Cooler Cont)

SHIP TO:
Enseco-Cal Lab
2544 Industrial Blvd.
West Sacramento, CA 95691
(916) 372-1393
ATTENTION KATHY Gibbs

SEND RESULTS TO:
Client Name MR. GERALD TICE
Company GEORGIA PACIFIC CORPORATION
Address 133 Peachtree St. N.E. (30303)
Atlanta, GA. 30348
Phone (404) 521-5084

PROJECT NAME G.P. - L = ALLIED PROJECT NO. _____ P.O. NO. _____

Relinquished by: (Signature)	Received by (Signature)	Date	Time
Martin E. Hay			
Relinquished by: (Signature)	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Received at lab by: (Signature)	Date	Time
	Deborah Bischoff	6-27-90	0900
Relinquished from lab by: (Signature)	Received by: (Signature)	Date	Time

ANALYSIS REQUEST

Sample ID Number	Sample Description	Date/Time Sampled	Analysis Requested	Sample Condition Upon Receipt
	LVSU-1 solvent	6/25/90 1550	CL 4 - CL 8 + Uoners	
	LVSU-2	1555		
	LVSL-1	1920		
	LVSL-2	1925		

Special Instructions/Comments:

7 day guaranteed turnaround: Mike Melly to J. Tice

NOTE: UNUSED PORTIONS OF NON-AQUEOUS SAMPLES WILL BE RETURNED TO CLIENT

Expected Analytical T.A.T's: ____ Immediate Attention (200% surcharge) X RUSH (50-100% surcharge) ____ Standard

Cal Lab ID Number: *(for lab use only)* #2542

Client Retains White Copy Only

(Revised 1/87)

Enseco
A CORNING Company

I Sample Descriotion

See the attached Sample Description Information.

The samples were received under chain-of-custody.

II Analysis Reauest

The following analytical test was requested.

Lab ID	Analysis Descriotion
053465-0001 through 4	Cl_4-Cl_8 Dioxins/Furans plus 2,3,7,8-Substituted Isomers

III Oualitv Control

A. Project Specific QC. No project specific QC (i.e., spikes and/or duplicates) was requested.

B. Method Blank Results. A method blank is a laboratory-generated sample which assesses the degree to which laboratory operations and procedures cause false-positive analytical results for your samples.

No target parameters were detected in the method blank associated with your samples at or above the detection limits noted on the data sheet in the Analytical Result Section.

IV Analysis Results

Test methods for all analyses except chlorinated dioxins and furans, may include minor modifications of published EPA Methods such as reporting limits or parameter lists. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e., no correction is made for moisture content, unless the method requires or the client requests that such correction be made.

For pulp and paper industry samples, test methods for chlorinated dioxin/furan analyses will follow NCASI Technical Bulletin 551 unless otherwise noted. Pulp and sludge samples are air dried and prepared per this method. All results for these analyses, including detection limits, are reported on a dry weight basis.

Detection limits are reported on a sample specific basis. All results are recovery corrected per the isotope dilution technique.

Results are on the attached data sheets.

Georgia-Pacific Corporation
P.O. Box 1618
Eugene, Oregon 97440
(503) 689-1221

Mon.

SEP 17 '90

K-9-15-90

September 13, 1990

Mark Neely
California Regional Board
Quality Control Board
1440 Guerneville Road
Santa Rosa, CA 95403

Dear Mr. Neely:

Here is the August, ~~1990~~ Monitoring and Reporting Program report, as per order no. 90-154 for Georgia-Pacific Corporation at Fort Bragg, ~~California (Little~~ Valley).

If you have any questions, please call me.

Sincerely,

Kent C. Mayer
Environmental Engineer

KCM: jap

Enclosures

GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTH OF AUGUST, 1990

Monitoring and Reporting Order No. 86-3, Soil Amending Project.

Volume of Ash Deposited @ Site		Cubic Yards Area A-South		Rainfall Totals	
Week of 1 - 5		260	Yds^3	-0-	inches
6 - 12		620			
13 - 19		320			
20 - 26		260			
27 - 31		250			
	Total	1,700	Yds^3		

The total number of treated acres to date = 63 acres

Precipitation

NA

Water Monitoring and Testing

Here are the pH levels:

NA

Deposition

All ash for the month of August was stockpiled.

Georgia-Pacific Corporation
P.O. Box 1618
Eugene, Oregon 97440
(503) 689-1221

September 21, 1990

Albert L. Wellman
State of California
California Regional Water
Quality Control Board
1440 Guerneville Road
Santa Rosa, CA 95401

Dear Mr. Wellman:

Regarding my letter of August 29, 1990, we are back to non-detect levels of residual chlorine in our outfall discharge.

Based on our monitoring history, we do not normally find any residual chlorine in our pond or cooling tower effluent. In July, after the City of Fort Bragg installed and flushed some new piping with chlorinated water, we detected trace levels of residual chlorine. The chlorinated water appears to have run its course and our discharge is free of this material. The time-line below confirms our results:

Date	Result
Start	Non-detect
July 10	50 ug/l
August 15	80 ug/l
(August 17 = shut off chlorinators at cooling towers)	
August 21	200 ug/l
September 4	100 ug/l
September 11	50 ug/l
September 18	Non-detect

At this time, we believe our outfall discharge is back to normal. If you have any questions or comments please do not hesitate to call me.

Sincerely,

Kent C. Mayer

Kent C. Mayer
Environmental Engineer

cc: Richard Acker
Don Whitman

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
NORTH COAST REGION

Interoffice Communication

29 August 1990

FROM: Albert Wellman

TO: 1) Mark Neely MKN

2) Frank Reichmuth FR

3) File

SUBJECT: Georgia-Pacific Fort Bragg Sawmill

I received a telephone call from Kent Meyer this morning. He said they had been investigating an unexplained increase in the chlorine residual at the discharge from subject facility. He said it was first detected in the semi-annual monitoring. ~~the~~ company commenced additional testing following that time. Their only known source of chlorine addition was a gaseous chlorine addition to the cooling tower to arrest slime growth in the tower. They tried a trial cutback on the quantity of chlorine added to the tower, but the chlorine residual in the discharge continued to rise. They investigated and reportedly found the City of Fort Bragg had been flushing some newly installed piping in mid-July. The high-chlorine water used for flushing and disinfecting the new piping was reportedly discharged into a channel which drains to the Mill Pond. Mr. Meyer said the chlorine residual had only once come up to the maximum level allowed by the Mill's NPDES Permit.

I asked Mr. Meyer to prepare a written report of the circumstances including their additional analytical results and references upon which they based their assessment of the City's involvement. He said he would get the report mailed by September 7th.

G.P. Ash Soil Amendment
(Georgia Pacific)

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
NORTH COAST REGION

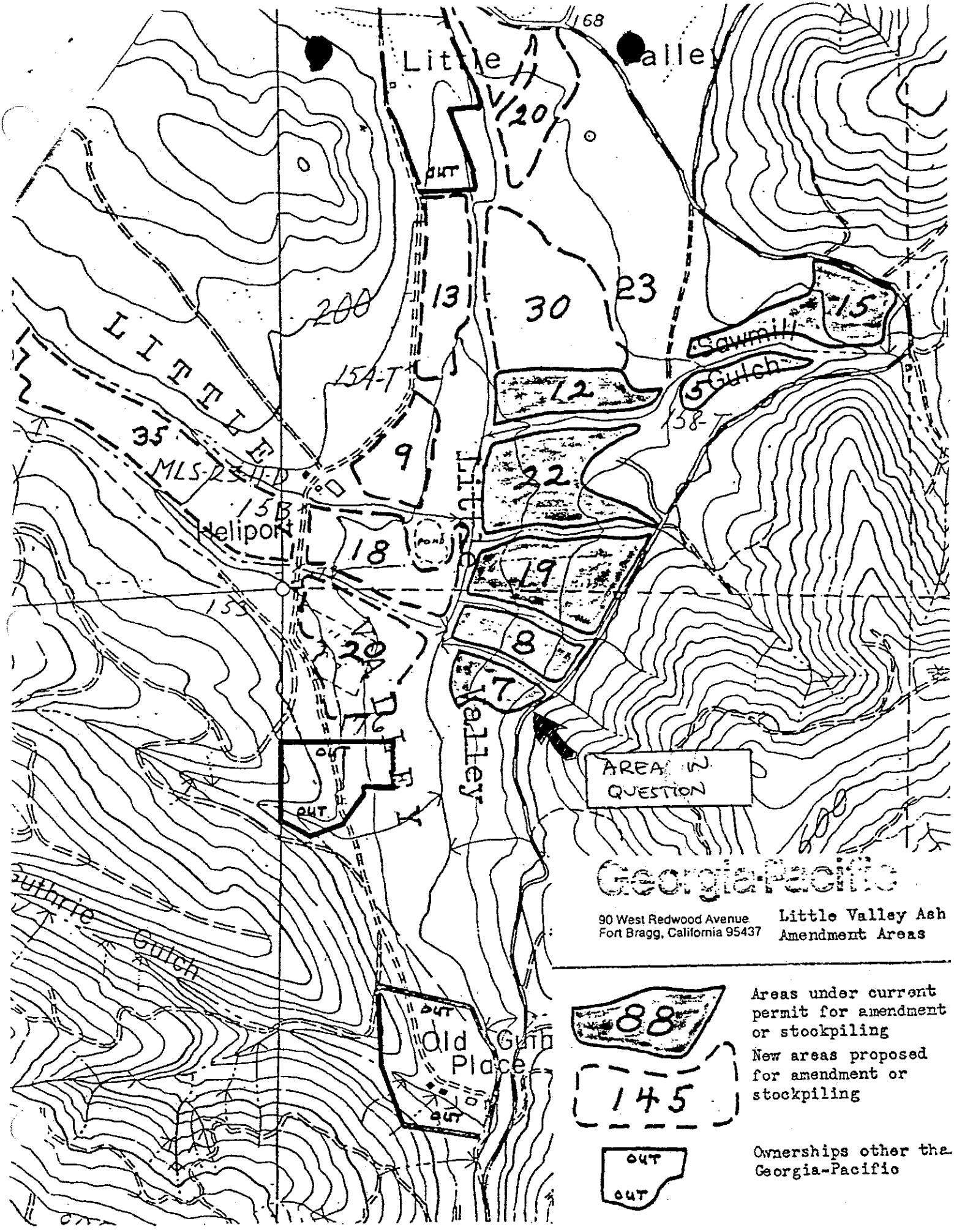
Interoffice Communication

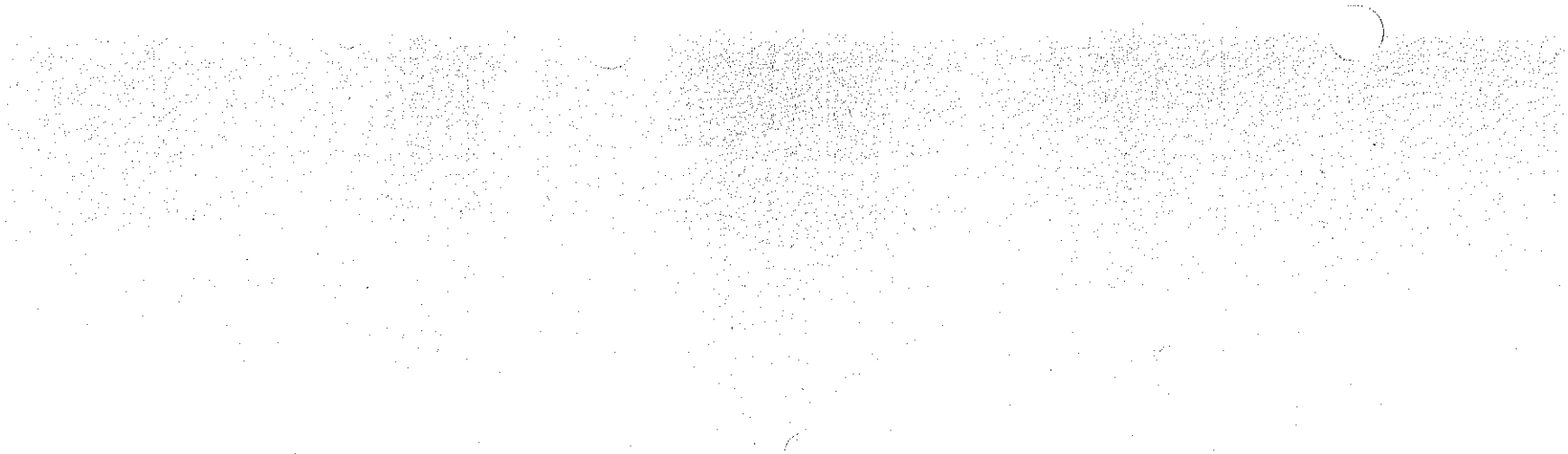
TO: 1) Frank Reichmuth FR OK 24 September 1990
2) File: Mendocino Co.

FROM: Mark Neely MN

SUBJECT: Telephone call from Jere Melo, Georgia-Pacific, re: ash incorporation

I returned Jere Melo's call today, and he wanted to request an extension past the October 1 deadline for incorporation of ash at the Little Valley site. The large amount of ash which has accumulated at the site due to the prohibition of amending this year has made it impossible for them to finish incorporating it by the cutoff date. They have spread the stockpiled ash 6-8" deep across the entire area remaining in the area covered under their expired permit and it has been plowed (but not disced) in. The volume of ash remaining unincorporated is being loaded onto trucks and transported to the areas allowed for incorporation under their revised permit. Following removal of the ash, the area now covered by the stockpiled ash can be amended and seeded and then the southeast sector of the valley will be finished. He anticipates finishing the incorporation by October 5 to 8, and seeding directly afterward. I told him that would be acceptable, weather permitting. However, if significant rainfall comes the work would be shut down for the season, and that he should keep an eye on the weather report. He will call me when the seeding is done.


Little Valley
68
V/20
OUT
0
13
30
23
200
15
Sawmill Gulch
12
154-T
158-T
LITTLE
35
MLS-25-LD
9
22
15B
Heliport
18
19
8
7
Kelley
20
16
AREA IN QUESTION
Guthrie Gulch
Old Place
OUT
88
145
OUT
OUT
Georgia-Pacific
90 West Redwood Avenue
Fort Bragg, California 95437
Little Valley Ash Amendment Areas
Areas under current permit for amendment or stockpiling
New areas proposed for amendment or stockpiling
Ownerships other tha Georgia-Pacific



Georgia-Pacific Corporation
P.O. Box 1618
Eugene, Oregon 97440
(503) 689-1221

OCT 15 '90

October 12, 1990

Mark Neely
California Regional Board
Quality Control Board
1440 Guerneville Road
Santa Rosa, CA 95403

Dear Mr. Neely:

Here is the ~~September, 1990~~ Monitoring and Reporting Program report, as per Order No. 90-154 for Georgia-Pacific Corporation at Fort Bragg, California (~~Little~~ Valley). Ash Site

If you have any questions, please call me.

Sincerely,

Kent C. Mayer
Environmental Engineer

KCM: jp

Enclosure

GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTH OF September, 1990

Monitoring and Reporting Order No. 86-3, Soil Amending Project.

volume of Ash Deposited (@ Site		Cubic Yards Area A-South		Rainfall Totals
Week of 1	- 8	660	Yds^3	-0- inches
9	- 15	520		
16	- 22	520		
23	- 30	640		
	TOTAL	2,340	Yds^3	

The total number of treated acres to date = 82 acres

Precipitation

None measureable.

Water Monitoring and Testing

Here are the pH levels:

NA

Deposition

Soil amending was performed in September. All ash generated during the month was amended, along with the 1989-1990 winter-stockpile material, requiring a total of 19 acres.

MEMORANDUM

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD - CENTRAL VALLEY REGION

415 Knollcrest Drive
Redding, CA 96002

Phone: (916) 224-4845
ATSS Phone: 8-441-4845

TO: Kenneth D. Landau
Senior Engineer

FROM: Dennis C. Wilson
SR L&W Use Analyst

DATE: 24 October 1990

SIGHATURE: Dennis C. Wilson

SUBJECT: REVIEW OF RISK ASSESSMENT REPORT, GAYLORD CONTAINER CORPORATION, ANTIOCH

The approach used by Envirologic Data(ED) in the risk assessment for Gaylord Container was basically the same as they used for Simpson Paper Company in Anderson. During the initial meetings with Simpson and ED we made it clear that, while we were not opposed to a risk assessment approach, it was not being required by the Regional Board or other agencies and it would not be considered a substitute for control strategies to reduce the formation and discharge rate of dioxins and furans. We also expressed concern with the risk assessment that had been prepared for the mills on the coast which presented a "best case" scenario that received criticism from the agencies.

In reviewing the risk assessment for Gaylord it appears that a "best case" approach was used by ED when compared with the EPA cancer risk estimates for the consumption of fish containing dioxin residues that was prepared by Tetra Tech, Inc. My concern with the risk assessment approach is that you can change the outcome depending on the assumptions you use. As one example, ED based their conclusions on bioaccumulation from uptake of sediments and ingested food while EPA assumed that all contaminants in water column were 100% bioavailable to fish (simple dilution) or they only used dissolved contaminants in the water column (Exams II), ED does not support the TEQ approach and only based their conclusions on dioxin while EPA used the TEQ approach to include furans. ED also made other assumptions, such as cooking losses, which do no seem to be accepted by the scientific community. ED concluded that there was a minimal risk and no discharge prohibition was needed. EPA concluded the risk to be significant and is requesting the state to'consider a health advisory for fish consumption in the Antioch area. However, the report prepared by Tetra Tech does not include adequate data far the Antioch site to support the EPA request. If the DHS method of calculating TEQ is used the risks are even greater.

To assess the risk from eating contaminated fish, you can use modeling and bioconcentration factors to determine risk or you can measure the concentration in the fish itself. The same is true for the other pathways of concern. ED believes that,"the modeled concentrations of dioxin in fish provide an accurate description of the conditions likely to exist in the San Joaquin River and are more representative of currently reduced levelsof dioxin in the effluent"(page 80). They also did not feel the fish samples collected by EPA as part of the Bioaccumulation Study were statiscally significant or representative of actual conditions. In reviewing the risk assessment for the Simpson Mill at Anderson the primary comment from the agencies was that sampling of the final receptor would be the best approach to determine not only existing conditions but to monitor reductions in fish tissue concentrations as effluent levels are decreased.

Simpson conducted a comprehensive fish sampling program in the Sacramento River which I think they originally felt would help lift the health advisory issued by DHS. The data that was obtained confirmed the concentrations found by the EPA Bioaccumulation Study. The sampling also confirmed that the primary source of the dioxins and furans was the paper mill. The Regional Board also conducted a sampling program using Sacramento Suckers. Simpson turned their efforts to reducing the amount of dioxins and furans in their effluent. The attached table shows the reductions that have been obtained by Simpson at the Anderson Mill. The risk assessment using the modeling approach has been pushed into the background. Part of the reason for this was that none of the agencies involved felt the risk assessment would be useful without sampling of the final receptors. Simpson is currently sampling quarterly to determine how fast the reductions will result in reduced concentrations in the fish tissue. One of the best indicators appears to be rainbow trout eggs which are high in lipids. Initial samples *(1988)* had high concentrations in the eggs while more recent samples have shown reductions.

The results from sampling of fish and sediments in the Sacramento River have also pointed out that we really do not know the exposure routes for all species. The data showed that the concentration of dioxin in rainbow trout and sacramento sucker was the highest immediately below the outfall (Balls Ferry). However, the peak concentration of furans in the sacramento sucker was further downstream (see attached graphs). The concentration of dioxin in the sucker remained fairly constant all the way to Knights Landing (KL). Dioxin and furan were not detected in the sediments immediately below the discharge where the highest dioxin levels occurred in the trout and sucker. The higher furan concentrations in the suckers further downstream may be associated with sediment deposition since dioxin and furan was detected in the sediments from Lake Red Bluff 30+ miles below the mill. This seems to support the EPA contention that dioxin and furan absorbed to suspended sediments pose a greater risk in areas further downstream where the sediments are finally deposited. In my opinion, in the area immediately below the discharge, the simple dilution method which includes dissolved and particulate matter is the assumption that is more appropriate.

However, I don't think we know enough about the exposure routes or the bioconcentration factors associated with water column concentrations, suspended particles, bed sediments, or the food chain, to know which assumptions shouid really be used for the purposes of risk assessments. We also don't know enough about the depuration rate in fish to determine how long the risks will remain after dioxin discharges are reduced. The actual concentrations measured in fish would show what was in the tissue regardless of how it got there and continuous sampling will determine how long it will remain.

The same comments above apply to the other pathways such as the sludge use as a soil amendment. If there are concerns with consumption of crops, the concentrations in the plants would provide the best assessment of risks.

The sludge from the Simpson facility is currently being taken to a new landfill, which opened in September 1990. The landfill has a composite clay-synthetic liner and a leachate collection and removal system. The old landfill received sludge from the mill since 1970. Monitoring information from the old site indicated the dioxins and furans in the sludge did not migrate into the vadose zone; however, furans were detected in the leachate.

wastewater from the mill has also been used for irrigation at the Simpson ranch. Monitoring data from wells at the ranch site, which has shallow ground water, indicated no migration of dioxins or furans to ground water. Simpson has sampled alfalfa at the ranch for dioxin and furan for the past two years. Initial sampling did not detect dioxin (0.29 ppt DL) but did detect furans up to 6 ppt. More recent sampling has not detected furans (0.24 ppt DL), which may reflect the decrease in furans in the effluent.

In conclusion, the risk assessment for Gaylord Container provides conclusions, based on a selected set of assumptions which appear to present a "best case" for industry.

DCW:tch

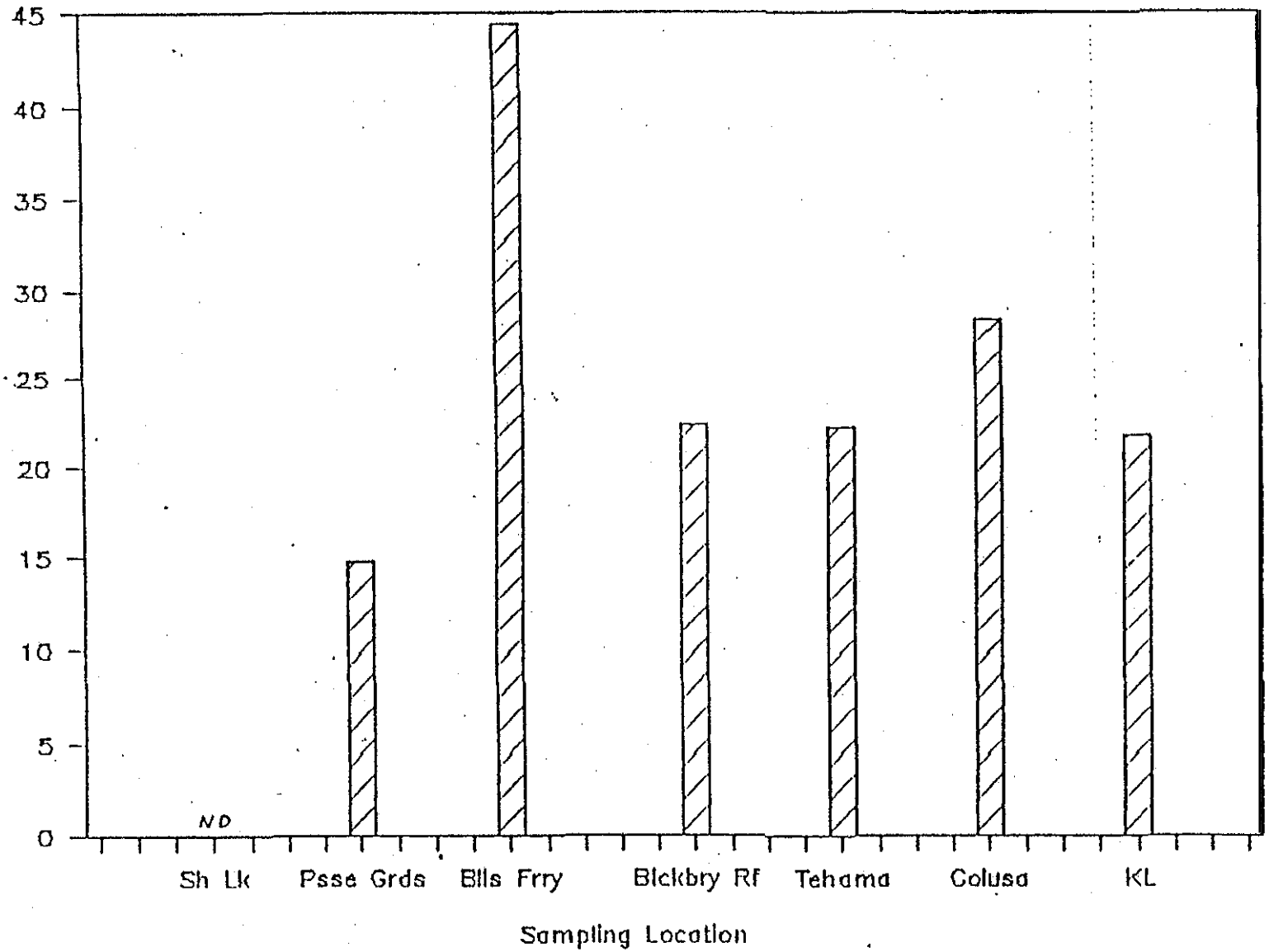
Attachments

cc: Frank Palmer, Division of Water Quality, State Water Resources Control Board, Sacramento

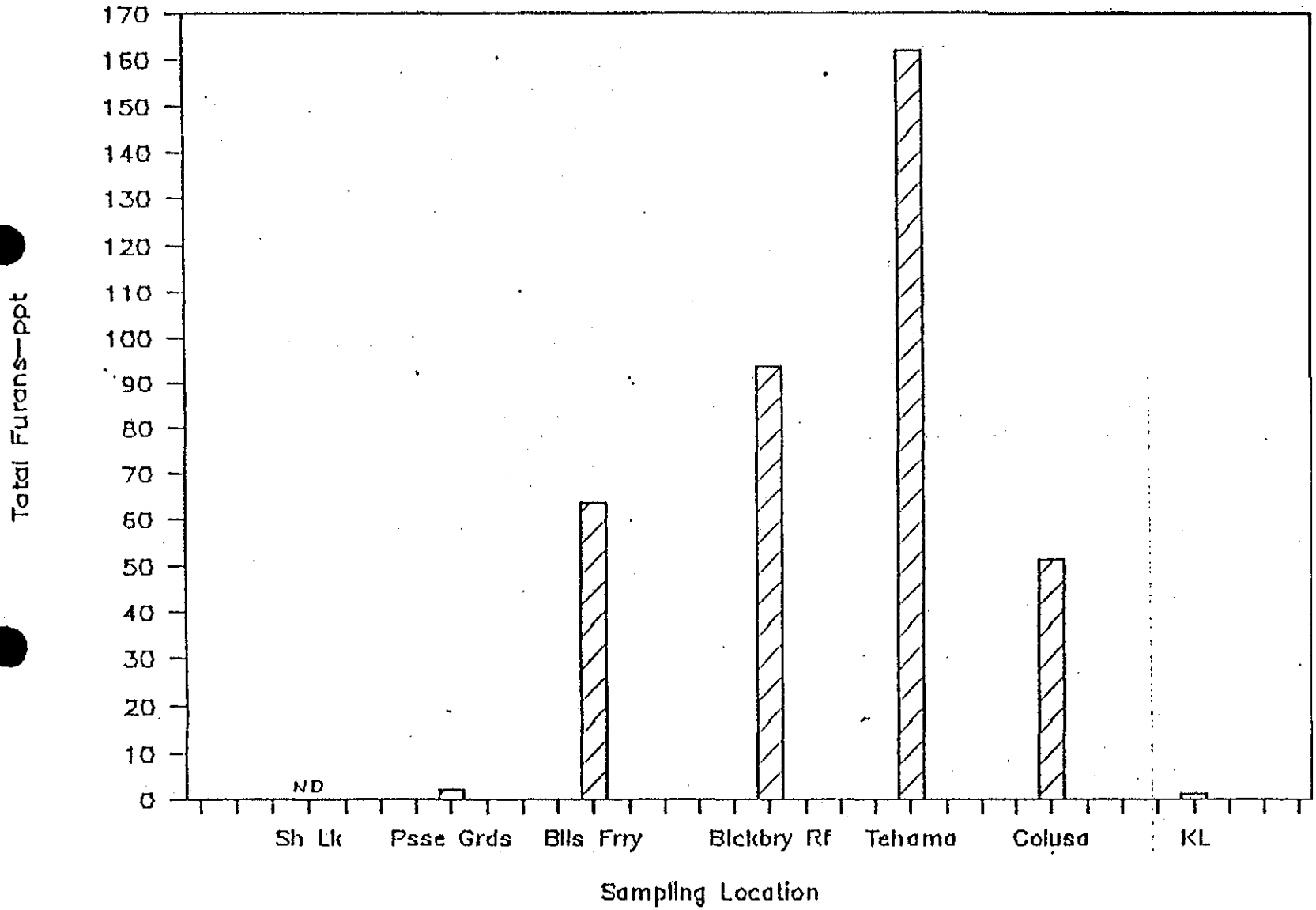
SUMMARY OF 2,3,7,8-TCDD AND 2,3,7,8-TCDF CONCENTRATIONS
DETECTED IN SIMPSON'S (ANDERSON PLANT) DISCHARGE TO SACRAMENTO RIVER

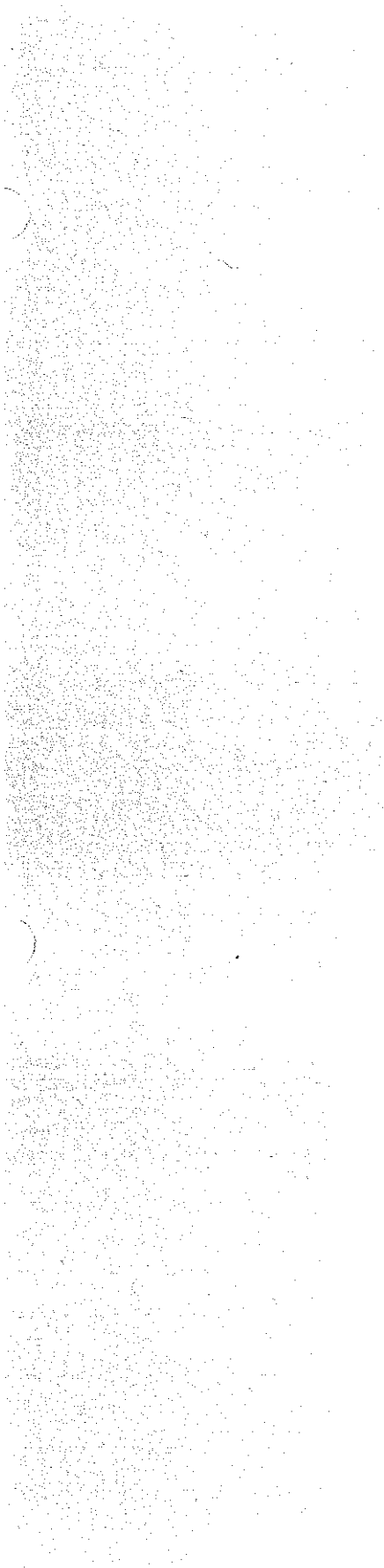
Date	Concentration (pg/l) 2,3,7,8-TCDD	2,3,7,8-TCDF
June 1988	250	8400
July 1988	LOO	2300
November 1988	130	3400
January 1989	120	2450
March 1989	20	480
May 1989	29	92
August 1989	16	32
October 1989	14	51
November 1989	24	81
December 1989	21	33
March 1990	6.4	23
May 1990	14	13
July 1990	21	20

Sacramento Suckers—Total Dioxins



Sacramento Suckers—Total Furans





Georgia-Pacific Corporation
P.O. Box 1618
Eugene, Oregon 97440
(503) 689-1221

November 8, 1990

Mr. Mark Neely
California Regional Board
Quality Control Board
1440 Guerneville Road
Santa Rosa, CA 95403

Dear Mr. Neely:

Here is the October, 1990 Monitoring and Reporting Program report, as per Order No. 90-154 for Georgia-Pacific Corporation at Fort Bragg, California (Little Valley).

If you have any questions, please call me.

Sincerely,

Kent C. Nayer

Kent C. Nayer
Environmental Engineer

KCM:cdc
Enclosure

GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTH OF OCTOBER

Monitoring and Reporting Order No. 86-3, Soil Amending Project.

Volume of Ash Deposited @ Site	Cubic Yards Area A-South	Rainfall Totals
		inches
Week of 1-6	520 Yds^3	Ø
7-13	460	Ø
14-20	420	.49
21-27	460	Ø
28-31	200	1.20
Total =	2,060 yds^3	1.69

The total number of treated acres to date = 83.7 acres

Precipitation

A total of 1.69 inches fell during two days - see above.

Water Monitoring and Testing

Here are the pH levels:

The ephemeral draws were dry.

Deposition

All ash generated was amended in the month of October.

Ash stockpiling for the 1990-91 winter season began on November 1st, in the new North area.

State of California

Department of Health Services

Memorandum

To : Kenneth D. Landau
Senior Engineer
California Regional Water
Quality Control Board
Central Valley Region
3443 Routier Road. Suite A
Sacramento, CA 95827-3098

Date : November 14, 1990

Subject: Dioxin Risks

From : Health Hazard Assessment Division
714 P Street, Room 460
Sacramento, CA 95814
8/454-7572

In response to your request. my staff has reviewed the document entitled "Risks Associated with Potential Exposure to Dioxin Through Activities Associated with the Manufacture of Bleached Pulp at Gaylord Container Corporation, Antioch. CA" by Envirologic Data.

This document is well-written in parts, scholarly in some, describing in great detail the scientific debates concerning a number of issues about 2,3,7,8-tetrachloro-dibenzodioxin (TCDD), such as its designation as an initiator versus a promoter, systems for determining toxicity equivalents for isomers of TCDD and 2,3,7,8-dibenzofuran (TCDF), and the reasons behind the choice of some specific risk assessment assumptions.

Not all risk assessment assumptions, hovever, are presented in the same detail, the derivation of values for a particular risk assessment are scattered throughout many sections, and we have serious disagreements encompassing four broad areas of assumptions. Specifically, we are concerned about: (1) the primary starting assumptions on TGDD concentrations in the water. fish, sludge, and mother's milk, (2) the makeup of the composite scenarios. (3) the justification for the use of some risk assessment assumptions to describe "average exposure" and "maximum plausible exposure" in the Antioch area, and (4) the insufficient description of engineering processes and models which underlie assumptions upon which risk estimates are made for situations such as dilution of effluent in the San Joaquin River, handling of sludge, sludge concentration in soil amendment products, and particulate concentrations on-site and off-site due to preparing sludge.

When we examined the assumptions and methods of concern for their influence on the risk estimates calculated in the document, we found that they produced estimates of risk from dioxin exposure that were thousands of times lower than risk estimates based on assumptions and methods recommended by the Department of Health Services' (DHS) staff. The basis for our concerns are detailed below.

Primary Starting Assumptions on TCDD Concentration

The risk assessments for every scenario in the document--drinking water. fish, sludge, and human breast milk--are based on only two or possibly three unvalidated data points. These are two effluent samples which are reported to contain 7.1 and 11.0 ppq TCDD, and possibly one sludge sample with a TCDD concentration of 35 ppt. However, the citation is "from the RWQCB quarterly effluent monitoring program from the east mill; written communication from the legal firm of Landels, Ripley and Diamond, 1990". No analysis report was reproduced to supply necessary information such as the location, time, and date the sample vas taken, activities at the site that day, the analysis method and detection limit, and the presence or absence of other isomers of polychlorinated dibenzo(p)dioxins or dibenzofurans, and other quality assurance/quality control (QA/QC) information such as precision, sensitivity, background, etc. Documentation that an average of 9 ppq in effluent and 35 ppt in sludge are valid is critical to the risk estimates in this document, since they are all based on mathematical models using these average concentrations. In the risk assessment, it is stated that dioxin minimization processes have been implemented at the east mill since the EPA 104 Mill Study reported that a sample of effluent from the Antioch Mill conrained 49 ppq TCDD. The implication is that this is an engineering alteration. so there should be data available on anticipated and realized concentrations at various steps in the process which minimize dioxin. A change in reporting procedures or sample preparation could be "dioxin minimization procedures". so this has to be clarified.

In the document there is a nice discussion of Toxicity Equivalent Factors (TEFs) or Toxicity Equivalents (TEQs). It is stated that "Envirologic Data supports the use of TEFs in assessing the toxicity of mixtures of dioxin compounds" (p.60) and 'supports the North Atlantic Treaty Organization (NATO) TEF ranking scheme in risk assessments on dioxin" (p.62). It is further indicated that if other isomers were present, as is likely, "they would be assumed to be 2,3,7,8-substituted (more toxic) by the EPA and NATO methodologies" and the risk estimates would be higher (p.62). However. later in the document it is stated that "the risk estimation would quantify the potential risk from exposure to dioxin and would not quantitatively address other chlorinared dioxin or furan isomers in' the final risk calculations". This indicates that if other isomers were detected and quantified, only the TCDD concentration was used to determine risks. The final method used appears contrary to the authors' own preference. The document also fails to provide the data needed to determine if other isomers are present and whether these other isomers would significantly influence the estimated risk. The presence of other isomers would increase the dioxin TEFs or TEQs by the NATO (International), EPA, or California system, and, thus, these risk estimates based only on 9 ppq TCDD would be underestimates of the actual risk. Attached to this memorandum (Attachment A) is a comparison of the risks estimated by Envirologic Data using the TCDD concentration they cite with risks estimated from EPA data obtained from the Antioch Hill area using TEFs computed by the NATO system, which Envirologic Data stated they favored.

A concentration of 400 ppq dioxin in fish is assumed, based on a series of modeled assumptions, and it was stated that "the results of sampling analysis conducted on fish samples taken during the National Bioaccumulation Study [would] not be used for quantification in this assessment". The document indicates that preliminary modeling using an effluent concentration of 49 ppq indicated that the steady-state concentration in white catfish would be 2.3 ppt (p.79). Since "the EPA National Bioaccumulation Study revealed that the concentration in a Sacramento sucker sampled at Antioch was 3.47 ppt, well within the same order of magnitude of the predicted concentration of 2.3 ppt for white catfish" (p.79), a concentration of 3.47 ppt is more appropriate for these risk estimates than a reported concentration without valid QA/QC. Furthermore, the bioconcentration factor from Envirologic Data's model appears to be 44, which is well below the current EPA assumption of 5.000. A new EPA document, which is currently in draft stage undergoing review, reports that new empirical data indicates that bioconcentration factors may range up to 150,000. The Envirologic Data document suggests that a bioaccumulation index (BI) based on TCDD per gram of carbon in fish and sediments would be appropriate, but an assumption of 5% carbon in sludge' in the San Joaquin river is unsupported by any sampling data. As stated above, use of 3.47 ppt TCDD and the NATO (International) system for estimating toxicity equivalents, which Envirologic Data states that they favor, led EPA to calculate a risk estimate of 4×10^{-4} excess lifetime risk using a fish consumption of 23 g/day, the State of California estimate for recreational fishermen (Attachment B). This contrasts with Envirologic Data's risks of 7.7×10^{-8} for "average exposure" and 1.0×10^{-6} for "maximum plausible[a] exposure (Appendix 2, p.198)

The TCDD concentration in sludge is assumed to be 35 ppt and the citation is "from the RWQCB quarterly effluent monitoring program from the east mill; written communication from the legal firm of Landels, Ripley and Diamond, 1990". However, "the concentration of TCDD detected in sludge from the east mill measured during the EPA/Paper Industry Cooperative Dioxin Study was 101 ppt (Kirkland and Allis, 1989)". according to the documenr (p.100). Envirologic Data notes that "this is a single datum point: therefore, some uncertainty in this number exists", but it is unclear whether the reference to uncertainty is related to the EPA value of 101 ppt or to the 35 ppt value about which it is stated "the reduced number reflects dioxin minimization measures which have been implemented". There is uncertainty as to the origin of the 35 ppt TCDD concentration in sludge--whether it was the result of an actual analysis or based on the percentage of water containing TCDD in the sludge, organic carbon content, dioxin partition coefficient for carbon. and porosity. Fugacity considerations, or the "high affinity of dioxin for organic material" (p.94-95) indicate that TCDD and isomers will readily partition from water onto organic particulates in a dynamic system, so a greater concentration of dioxin may be bound to the sludge than the physical parameters from a static sysrem predict. Thus, the amount of TCDD predicted to be in the sludge may be an underestimate even if dioxin minimization procedures have reduced the TCDD content of the effluent. Also the *same* concerns discussed above about the lack of inclusion of other TCDD and TCDF isomers will lead to a further underestimate.

The "high affinity of dioxin for organic material" is discussed as a reason that dioxin from the sludge will not leach into subsurface soils and groundwater either at the production facility or at sites where these soil amendment products are used (p.94-95). More engineering data need to be supplied in regard to this aspect.

Multipathway Scenarios

The document models the risk for several individual composite scenarios, but the combined risks are based on summing "average risks" (see later paragraphs) from various types of exposure to a single medium (water or sludge) containing TCDD, rather than on human activities where exposure may be to several media (water and sludge) containing TCDD. One composite risk scenario combines incidental soil ingestion by a child, dermal contact with sludge by a worker at the plant, and vegetable ingestion from sludge used in gardens by a homeowner. Another composite risk scenario combines fish ingestion by an adult who water skis occasionally and for whom a portion of his/her drinking water is treated water from the San Joaquin River containing effluent TCDD. However, no multipathway scenario is presented for a consumer of products from both water and sludge, and none for a worker who is also a consumer. This would be an individual who works at the mill. drinks the treated water, eats locally caught fish, and ingests incidental soil, as well as encounters dermal soil contacc from gardening with the sludge product. Nor was a multipathway scenario presented for a child nursing, playing in the garden and ingesting soil as well as having dermal contacc, and eating fish.

The individual composite scenarios are for "average exposure" to one media. and there are no composites for the scenario termed "maximum plausible exposure" or lifetime exposure. Since the "maximum plausible exposure" is assumed plausible, it should also be used to determine individual composites and multipathway risks. The difference between "average exposure" and "maximum plausible exposure" for certain factors in the risk assessment assumptions can cause a significant increase in the risk. Examples include a 3-fold difference in length of exposure. 9 vs 30 years of residence in the Antioch area. and a 4-fold difference in fish consumption, one small meal per month versus one small meal per week.

The document models the risk for a nursing infant and assumes that no further significant dioxin exposure from the Antioch Mill occurs throughout the rest of life. It seems more likely that the child will play in the garden and ingest soil as a 7- to 8-month old infant and later a toddler, eat fish from late infancy through childhood into adulthood, help his/her parents with the vegetable garden and have dermal exposure to soil, soil ingestion, and eat home-grown vegetables, etc. The 9-year residence, 30-year residence, or lifetime risk from combining these activities may be easily several orders of magnitude higher.

The "average exposure" and "maximum possible exposure" risk estimate for dermal exposure to sludge in soil amendment products use different body surface areas to account for the addition of gloves to gardening attire of long pants and short sleeves for an "average exposure" and different amounts

of soil amendment product adherence/cm of body surface areas to account for the addition of clay to the silty sand in the "average exposure". The "average exposure" and "maximum plausible exposure" scenarios already include a difference of 26 vs 52 days gardening days per year and different residence times of 9 and 30 years. The different garden attire and soil composition seem unrealistic for the Antioch area.

The document does not include estimates of exposure and risk for consumption of products from dairy cattle or livestock used for food. The site appears to be near an area in which some land is still utilized for cattle grazing.

The document does not measure or estimate risks from off-site exposure to dioxin vapors or particulates containing dioxin although Envirologic Data indicates that "volatilization from soil may be the most significant environmental loss mechanism for compounds that are highly insoluble in water and characterized by low vapor pressures" and "due to the potential for dioxin to volatilize from stored sludge at the production site, dioxin concentrations in air must be estimated" (p. 103). The document further states that "82,500 cy^3 of sludge material is stored on-site at the production site...in five piles each measuring 100 feet by 300 feec with a depth of 15 feet,... with a total exposed area of 210,000 ft^2" (p. 107). "The average dioxin flux from the surface is reported to be 6.2 $pg/m^2/day$ and the average wind speed is 10.2 mph" (p. 111).

Risk Estimate Equation Assumptions

The assumptions used in the risk estimates, even those based on the EPA Exposure Factors Handbook (EPA. July 1989), tend to give numbers that are lower in the numerator and larger in the denominator than assumptions that the DHS scientists consider to be health protective for lifetime exposure. Assumptions originated by Envirologic Data also tend to have lower values than ones that DHS scientists would derive. Furthermore, those derived by DHS scientists may better represent the situation in the Antioch area. Specific examples are given in the paragraphs that follow. When substitute secondary assumptions are made (length of residence, age of mother when nursing began, diet of children, amount of fish eaten, gardening attire, clay content of soil, etc.), but the same primary starting assumptions of 9 ppq TCDD in effluent, 400 ppb TCDD in fish, and 35 ppc TCDD in sludge, composite risk estimates give total risks which are more than an order of magnitude higher than those presented in this document. With different primary starting assumptions (an effluent concentration of TCDD of 49 ppq, inclusion of TEFs, use of actual TCDD concentrations in fish) and different secondary assumptions. the total risk estimates may even be greater than four orders of magnitude higher. Examples of assumptions will be discussed in the paragraphs that follow.

The terms "average exposure" and "maximum plausible exposure" do not always reflect the assumptions in the risk assessment scenarios. DHS scientists regard many of the assumptions in the "average exposure* scenario to reflect "low to average exposure" and the assumptions in the "maximum plausible exposure" scenario to reflect "greater than low to average exposure". For example, garden attire for "average exposure" was long pants, short sleeves,

and garden gloves, while for "maximum plausible exposure" only the gloves were discarded. DHS scientists recommend that the title of the exposure scenarios and the assumptions better reflect the likely exposures in the Antioch area.

The risk estimates assume only nine years of residence in a locale for an average risk and 30 years for the maximum plausible risk. This is based on national census data collected in 1983. The increased cost of real estate in California has made it most likely that individuals stay in the same home in California, or "trade up' but stay within the same general geographic area. California is also experiencing net growth, and predictions are that this will continue, and this plant site is in a rapidly growing area of California where real estate is appreciating. Data published on numbers of homeowners with a property tax rate determined by Proposition 13, passed in 1976, indicate that about two-thirds of homeowners have stayed in their original home for greater than 14 years. A risk estimate based on realistic residence time in the Antioch area is preferable.

The risk estimates assume a 75-year lifetime, which may be justified by new actuarial tables, but which does not allow comparison with risk estimates using the standard 70-year lifetime. The use of the standard 70-year lifetime is preferable.

The risk estimates for a nursing child indicate that Envirologic Data will assume total maternal exposure via composite pathways (p.129). The document states that the maternal doses are 0.513 pg/kg/day for background. 0.5148 pg/kg/day for background plus effluent and 0.5152 pg/kg/day for background plus consumer soil amendment exposures (p.136). Background was assumed to be 5 ppt in fat at steady state and this was used to model the TCDD fat content of a 20-year old nursing mother (p.136), from literature references of 3 - 10 ppt (p.36). DHS scientists were unable to verify Envirologic Data's assumption of the maternal doses from composite scenarios from the data in the document. The risk estimates also assume that the woman in question is only 20 years old when she starts nursing. However, even national EPA estimates assume that women don't start nursing until age 25, and many, if not most, women have children later in life and therefore have a greater body burden of dioxin, which would increase the dose given to the infant. DHS scientists' risk estimates were 70% greater than those presented in this document, using the mother's daily dose from Envirologic Data but substituting age 25, 4% milkfat, and 90% partitioning of TCDD into fat. In addition, if the nursing child's lifetime is averaged over a 70-year period, instead of 75 years, the estimated risk would be even greater than that indicated above.

The risk estimates for TCDD exposure from nursing assumes that a child nurses for only eight months, and consumes only the amount of milk that a three-month old infant would consume. The California Department of Health Services recommends one year for nursing so an average exposure should be one year. Since many infants nurse for up to three years, three years should be used for a "maximum plausible exposure". Also an infant's milk intake increases from three - six months even though solid food begins to be introduced into the diet. It does not stay at the three-month level,

because the infant is rapidly growing and requires more nourishment for both maintenance of an ever increasing body weight and rapid growth. Furthermore, DHS scientists utilize a human milk fat content of 4%, rather than 3%, which alone increases the exposure estimate by 25%. Also, by eight months of age, infants are likely to be eating fish, nursing, and putting garden soil into their mouths.

These risk estimates are incremental risks which do not include background, or exposure to background sources of dioxin, but it is not so stated in the document. The only risk estimate that includes background is in the nursing scenario. Although Envirologic Data concludes from this risk estimate that the risk from nursing is derived almost entirely from background, DHS scientists do not agree with the assumptions on which this conclusion is based.

Complete Description and Validation of Models

The document provided insufficient information and documentation in several areas for my staff to evaluate Envirologic Data's conclusions. These areas include the dilution of effluent in the San Joaquin River, the dilution of sludge in the soil amendment product, the airborne particulate concentration on-site and thus rhe occupational exposure due to manipulation of sludge, off-site particulate migration, and the possibility of on-site soil and groundwater contamination. Environmental sampling data, complete descriptions of models used, and engineering aspects of processes also need to be presented.

Conclusion

In conclusion, this risk estimate appears to greatly underestimare the incremental risk from valid analyses of dioxin in effluent discharges from the east mill. The points discussed above could raise just the estimates of risk from average multipathway exposure by four or greater orders of magnitude, or 10,000 times greater or more, and the maximum exposure multipathway scenario would demonstrate even greater risk estimates. Furthermore, DHS scientists question the assumptions about "average exposure" and "maximum plausible exposure" for the demographics of the Antioch area, and feel that if the term "maximum plausible exposure" is to be used, it should truly reflect some upper bound exposure. The multipathway risk estimates for "maximum plausible exposure" may model a large segment of the Antioch population better than the 'average exposure" assumptions.

I therefore recommend that this document be returned for extensive revision, documentation of assumptions, and sampling, addressing specifically the concerns outlined above. The sampling data in the revised document should be submitted with appropriate QA/QC. I further strongly recommend that the risk assessment assumptions for individual scenarios be tabulated on a page, discussed on adjacent pages, and cross-referenced, in contrast to being located in different sections throughout the document (note page references

to TCDD volatilization from sludge and TCDD concentration in mother's milk. for example). Locating the basis and derivation of risk assessment values for the various scenarios required more person-hours than ought to be necessary.

Thank you for the opportunity to comment on this document. If you have any questions, please call Susan Knadle, Ph.D., DABT, Staff Toxicologist. Hazardous Waste Toxicology Section, or David Siegel, Ph.D, DABT, Chief, Hazardous Waste Toxicology Section. at (916) 324-2829.

Steven A. Book, Ph.D.
Chief

Attachments

ATTACHMENT A

COMPARATIVE RISK ESTIMATES USING EPA DATA AND NATO TEFS AND TCDD CONCENTRATIONS FROM ENVIROLOGIC DATA

	EPA Data Using TEFs(a)			Envirologic Data(a)	
Exposure Route	Average	Maximum	Lifetime	Average	Maximum
Fish Ingestion	6.0E-05	2.0E-04	4.0E-04	7.7E-08	1.0E-06
Gardening Vegetable Ingestion	4.7E-09	1.0E-07		6.9E-10	1.7E-08
soil Ingestion (Adult)	2.7E-07	2.1E-06	5.2E-06	4.9E-10	6.5E-09
River Water Ingestion	1.3E-07				
Water Skiing	5.7E-09	3.2E-08	4.7E-08	4.4E-10	2.1E-09
Soil Ingestion (Child)	2.0E-10	1.0E-09		1.5E-11	8.1E-11
Nursing Child (Bkg + Effluent)	6.0E-07	6.3E-05		9.2E-08	9.2E-07
	3.4E-06			2.0E-06	

a) The NATO TEFs and dioxin concentrations from Envirologic Data in fish, sludge, and effluent were used to estimate the risks by the given exposure routes. All the risk assessment assumptions are those presented by Envirologic Data. If the risk assessment assumptions favored by DHS scientists were included in the tabulation of EPA Data using TEFs, the risks would be at least 10 times greater.

PRIMARY STARTING ASSUMPTIONS on TCDD CONCENTRATIONS

Media	EPA Data	NATO TEFs	Envirologic Data
Fish	3.47 ppt	8.28 ppt	0.4 ppt
Sludge	101 ppt	241 ppt	35 ppt
Effluent	49 ppt	117 ppt	9 ppt

a) TEF= Toxicity Equivalent Factors (NATO System) TEFs in sludge and effluent are assumed to be proportional to the TEFs in fish. EPA Data is used to derive the NATO TEFs.

b) ppt= parts per trillion

Cancer **Risk Estimates** for the Consumptlon of **Fish** Contalnlng **Dioxin** Resldues Antioch/Bay Delta

• Data from NDS PHASE II: Bioaccumulative Pollutant Study (1988)

Sacramento Sucker
Whole Body - One Fish
Concentration 2,3,7,8-TODD: 3.47 ppt calculated I-TEQ: 8.28 ppt

Fish Consumption (150 g/meal)	**5** year	9 year	**20** year	**30** year	**Lifetime**
			RISK		
one meal per year	**6 E-7**	**1 E-6**	**2 E-6**	**3 E-6**	**1 E-5**
one meal per month •	6 **E-6**	**1 E-5**	**3 E-5**	**4 E-5**	**1 E-4**
23 g/day**	**3 E-5**	**6 E-5**	**1 E-4**	**2 E-4**	**4 E-4**
140 **g/day*****	**2 E-4**	**3 E-4**	**7 E-4**	**1 E-3**	**3 E-3**

Squawfish
Partial Fillet - One Fish
Concentration 2,3,7,8-TODD: 0.8 ppt calculated I-TEQ: 1.5 ppt

Fish Consumption (150 g/meal)					
one meal per year	5 **E-8**	2 **E-7**	**2 E-7**	**6 E-7**	**1 E-6**
one **meal** per month •	**6 E.7**	**2 E-6**	**3 E-6**	**7 E-6**	**2 E-5**
23 g/day**	**3 E-6**	**1 E-5**	**1 E-5**	**3 E-5**	**8 E-5**
140 g/day***	**3 E-5**	**6 E-5**	**1 E-4**	**2 E-4**	**5 E-4**

• **EPA estimate of** average daily **fish** consumptlon (used lor **establishing** Water Quality Standards)
** State of Callfornla **fish** consumpllon estimate for recreational fishermen
*** EPA **estimate** of **95th** percentile dally **fish** consurnptlon
**** **Note that** 6 *E-7* = *6* X 10-7
***** Risk **estimates** presented here are rounded lo the nearest whole number value
See attached page **detalling the** assumptlons underlying lhese **risk estimates**

ATTACHMENT B

FACILITIES [illegible]

SWRCB 001 (NEW 8-87)

ADDITIONAL INFORMATION SHOULD BE ATTACHED TO CO

1. WDS NUMBER (Must be 11 digits)	2. NAME OF AGENCY RESPONSIBLE FOR DISCHARGE
1 1 B 6 5 0 3 0 R M E N	GEORGIA - PACIFIC CORP
3. DATE INSPECTION COMPLETED Year 90 Mo 11 Day 26	**4. NAME OF FACILITY** ~~ASH DISPOSAL SITE~~ FT. BRAGG SOIL AMENDMENT

5. INSPECTION TYPE (Check One)

A1 ☐ "A" type compliance—Comprehensive inspection in which samples are taken.

B1 ☒ "B" type compliance—A routine nonsampling inspection.

02 ☐ Noncompliance follow-up—Inspection made to verify correction of a previously identified violation.

03 ☐ Enforcement follow-up—Inspection made to verify that conditions of an enforcement action are being met.

04 ☐ Complaint—Inspection made in response to a complaint.

05 ☐ Pre-requirement—Inspection made to gather information relative to preparing, modifying, or rescinding requirements.

06 ☐ Miscellaneous—Any inspection not mentioned above.

NPDES

6. INSPECTION BY	7. IS EPA INSPECTION REQUIRED?
☒ State ☐ State/EPA Joint	☐ Yes ☒ No
8. DID YOU TAKE A BIOASSAY SAMPLE?	**9. IF A BIOASSAY SAMPLE WAS TAKEN, WAS IT:**
☐ Yes ☒ No	☐ Static ☐ Flowthrough

10. INSPECTION COMMENTS SUMMARY-REQUIRED (100 Character Maximum)

NO APPARENT VIOLATIONS

11. WAS THERE A VIOLATION?

☐ Yes (Complete violation form) ☒ No ☐ Pending (e.g. lab results)

12. INSPECTOR'S INITIALS → MKN

ADDITIONAL COMMWS

SEE ATTACHED MEMO

Georgia-Pacific Corporation
Wood Products
Manufacturing Division
PO. Box 105603
Atlanta, Georgia 30348
Telephone (404) 521-4000

November 30, 1990

Mr. Benjamin D. Kor
Executive Officer
California Regional Water Quality
Control Board
North Coast Region
1440 Guerneville Road
Santa Rosa, CA 95403

CERTIFIED MAIL
NO. 317694339

RE: December 1990 Quarterly Progress Report
Georgia-Pacific Corporation
Fort Bragg Soil Amendment Project

Dear Mr. Kor:

This quarterly progress report is submitted in compliance with Waste Discharge Requirements Order No. 90-154 for Georgia-Pacific's Fort Bragg soil amendment project.

Since our September 1990 quarterly report, we are pleased to report that all the stockpiled ash that had accumulated at the Little Valley site has been spread and amended into the soil. Some of the ash had to be amended in one of the newly approved amending areas since there was more ash than could be accommodated in the area adjacent to the pile. Its my understanding that our resource management people, who are responsible for the amendment project, have done an excellent job in spreading and incorporating the ash into the soil.

As you know, Order No. 90-154 requires that additional studies be undertaken to further evaluate the potential bioaccumulation threat to the aquatic habitat of the Little Valley creek posed by the soil amending of the ash. We are currently working with our consultant, Karen Theiss and Associates, to develop a proposed sampling plan to accomplish the additional sampling. We anticipate this sampling will be done in late January or early February 1991 after flow in the Little Valley creek has reached its peak. It will also be necessary to complete the sampling about that time in order to have the analytical work accomplished in time to submit a report to your office prior to the expiration of Order No. 90-154 in July 1, 1991. I want to point out, however, that as of today there has been virtually no rainfall at Fort Bragg and Little Valley creek is reported to be dry. As you know, this area would normally be well into the rainy season by now. Any proposed sampling plan will be contingent on adequate flow and the presence of appropriate aquatic animals.

Our plan is to submit the proposed sampling plan by no later than December 21, 1990. Please let me know if there are any questions or if further information is needed.

Very truly yours,

GERALD W. TICE
CHIEF ENVIRONMENTAL ENGINEER
WOOD PRODUCTS MANUFACTURING DIVISION

GWT/bp

CC: Mr. C. T. Howlett, Jr.
Mr. A. T. Johnson
Mr. K. C. Mayer
Mr. D. Modi
Mr. J. J. Tice
Mr. T. Treichelt
Mr. D. B. Whitman
Mr. T. E. Deer, Jr.

File G.P. Ash Soil Adm
Mendocino Co.

SITE-SPECIFIC BIOCONCENTRATION FACTORS (BCFs) FOR 2,3,7,8-TCDD AND 2,3,7,8-TCDF ON SACRAMENTO RIVER

Sample	TCDF/TCDD Ratio	2,3,7,8-TCDF Concentration (ppt)	BCF 1/	2,3,7,8-TCDD Concentration (ppt)	BCF 1/
EPA-87 Sucker (wb)	9.7	61.4	9,300	6.35	25,000
EPA-87 Trout (fillet)	8.8	99.7	15,000	11.3	45,000
SPC-88					
Below outfall					
Tmut	7.3	160	24,000	22	88,000
Suckers	11.7	14	2,100	12	48,000
Crayfish	19.7	77	12,000	3.9	16,000
Keswick Dam					
Tmut	3.0	3.0	--	1.0	--
SPC-89 Trout					
Balls Ferry					
flllet (3 sample $\bar{x}$)	3.4	48	7,300	14	56,000
whole body	1.8	34	5,200	19	76,000
eggs	2.7	410	62,000	150	600,000
Red Bluff (fillet)	1.9	21	3,200	11	44,000
Tehama Park (fillet)	3.1	25	3,800	8.1	32,000
SPC-89 Squawfish	9.3	52	7,900	5.6	22,000
Red Bluff (fillet)					
RWQCB-89 Suckers					
Shasta Lake	--	ND	--	ND	--
Redding	--	0.9	--	ND	--
Balls Ferry	9.4	44	6,700	4.7	19,000
Blackberry Riffle	12.5	66	10,000	5.3	21,000
Tehama	13.6	110	17,000	8.1	32,000
Colusa	12.6	34	5,200	2.7	10,800
Knights Landing	2.1	4	600	1.9	7,600
RWQCB-89 Trout					
McCloud River	0.3	1.1	--	3.4	--
Balls Ferry	2.4	130	20,000	54	216,000

Notes:

1/ BCF Concentration in tissue divided by estimated concentration in the river.

Estimated river concentration was determined as follows:

Effluent concentration (average of samples from 6/88 - 1/89): 2,3,7,8-TCDF - 3.600 pg/l; 2,3,7,8-TCDD - 137 pg/l.

Effluent Flow 11.8 MGD = 18.3 cfs
Average River Water Flow 10,000 cfs

Estimated river concentration: 2,3,7,8-TCDF: $\frac{(3,600)(18.3)}{10,000} = 66$ pg/l

2,3,7,8-TCDD: $\frac{(137)(18.3)}{10,000} = 0.25$ pg/l

G.P. Ash Soil Amendment
(Georgia Pacific)

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
NORTH COAST REGION

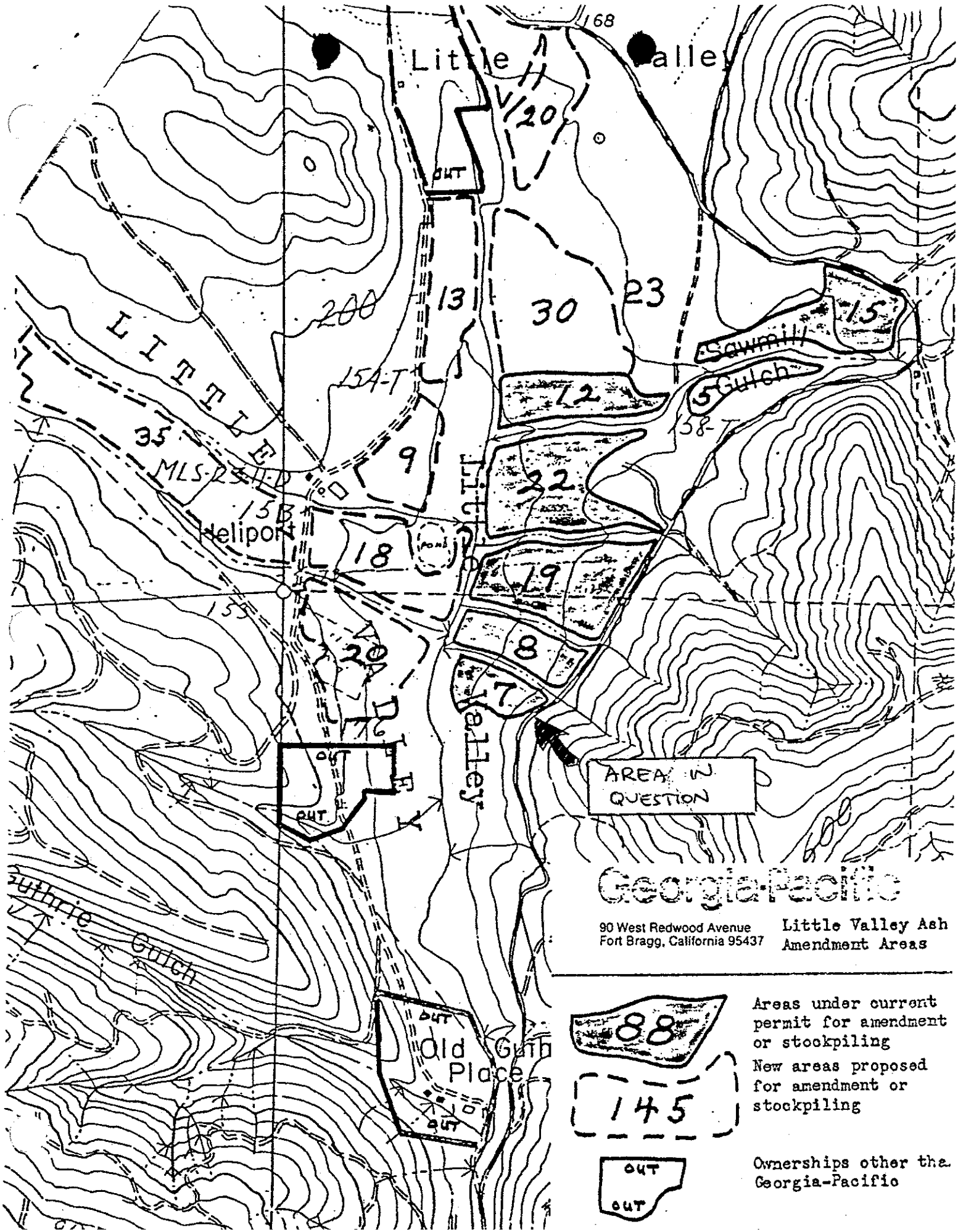
Interoffice Communication

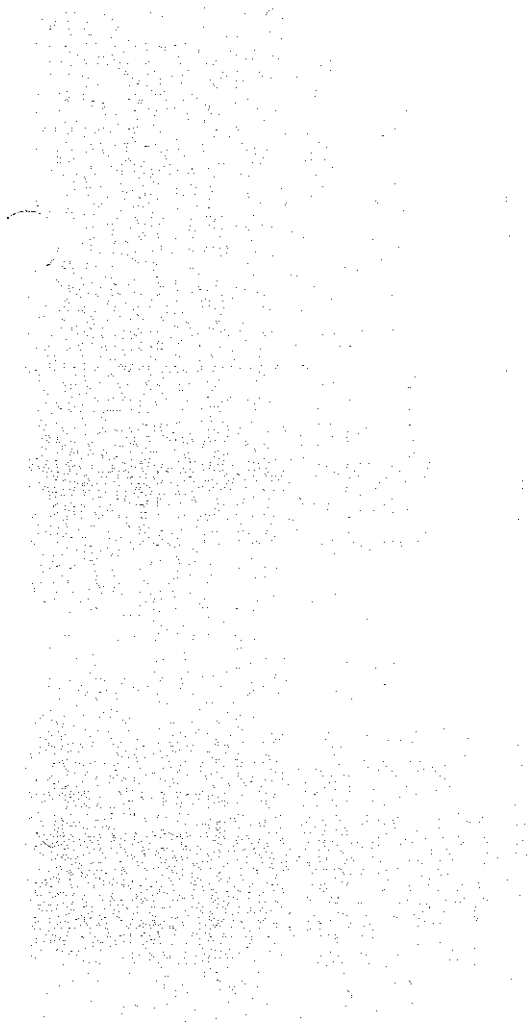
TO: 1) Frank Reichmuth FR DK 24 September 1990
2) File: Mendpcino Co.

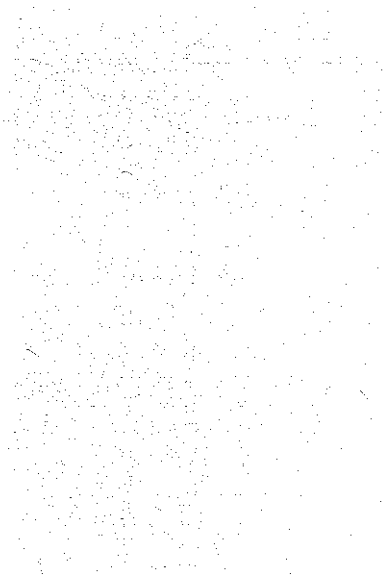
FROM: Mark Neely MKN

SUBJECT: Telephone call from Jere Melo, Georgia-Pacific, re: ash incorporation

I returned Jere Melo's call today, and he wanted to request an extension past the October 1 deadline for incorporation of ash at the Little Valley site. The large amount of ash which has accumulated at the site due to the prohibition of amending this year has made it impossible for them to finish incorporating it by the cutoff date. They have spread the stockpiled ash 6-8" deep across the entire area remaining in the area covered under their expired permit and it has been plowed (but not disced) in. The volume of ash remaining unincorporated is being loaded onto trucks and transported to the areas allowed for incorporation under their revised permit. Following removal of the ash, the area now covered by the stockpiled ash can be amended and seeded and then the southeast sector of the valley will be finished. He anticipates finishing the incorporation by October 5 to 8, and seeding directly afterward. I told him that would be acceptable, weather permitting. However, if significant rainfall comes the work would be shut down for the season, and that he should keep an eye on the weather report. He will call me when the seeding is done.


Little Valley
168
OUT
20
0
13
30
23
200
LITTLE
15A-T
12
Sawmill Gulch
15
58-T
35
MLS-2
9
15B
Heliport
22
18
19
8
7
Kelley
AREA IN QUESTION
20
16
OUT
OUT
Guthrie Gulch
Old Gulch Place
OUT
OUT
600
Georgia-Pacific
90 West Redwood Avenue
Fort Bragg, California 95437
Little Valley Ash Amendment Areas
88
145
OUT
OUT
Areas under current permit for amendment or stockpiling
New areas proposed for amendment or stockpiling
Ownerships other tha Georgia-Pacific





GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTH OF DECEMBER

Monitoring and Reporting Order No. 90-154, Soil Amending Project.

Week of	Ash Deposited North Area yds^3	Rainfall Details
1-2	0 Yds	inches
3-9	400	.92
10-16	280	
17-23	300	
24-30	140	
	1,120 Yds	.92 inches

The total number of treated acres to date = 83.7 acres

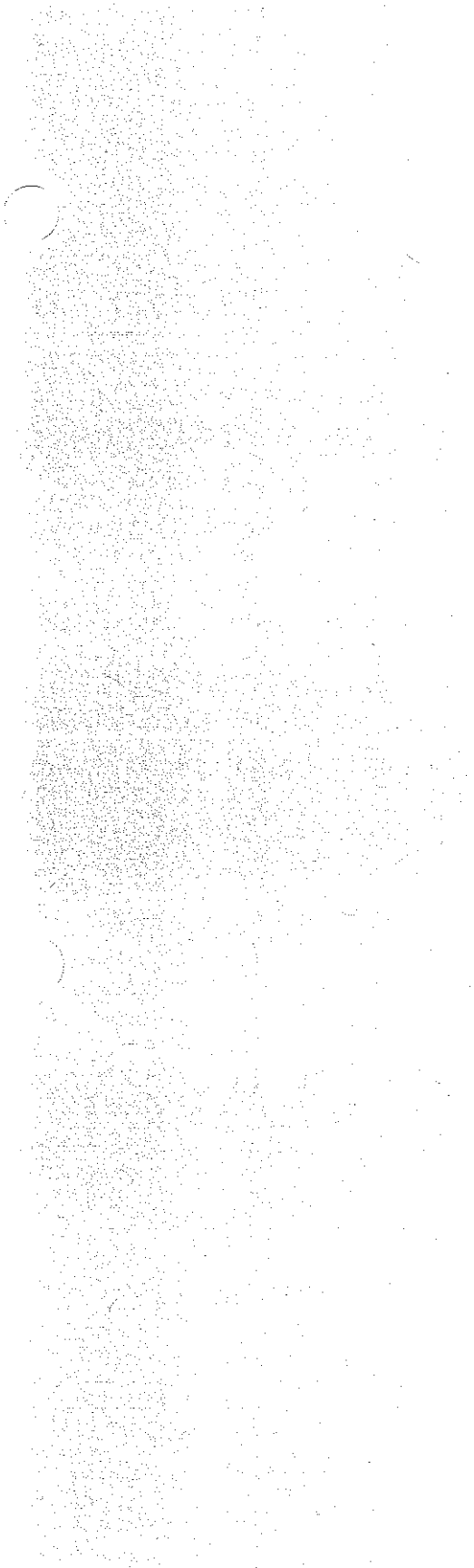
Water Monitoring and Testing

pH levels:

N/A

Desposition

All ash was deposited in the North area for the month of December, 1990.



Georgia-Pacific Corporation

P.O. Box 1618
Eugene, Oregon 97440
(503) 689-1221

December 6, 1990

Mr. Mark Neely
California Regional Board
Quality Control Board
1440 Guerneville Road
Santa Rosa, CA 95403

Dear Mr. Neely:

Here is the November 1990 Monitoring and Reporting Program report, as per Order No. 90-154 for Georgia-Pacific Corporation at Fort Bragg (Little Valley), California.

If you have any questions, please contact me.

Sincerely,

Kent C. Mayer

Kent C. Mayer
Environmental Engineer
Western Wood Products

KCM:cdc
Enclosure

GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTH OF NOVEMBER 1990

Monitoring and Reporting Order No. 90-154, Soil Amending Project.

Week of	Ash Deposited North Area		Rainfall Details	
		Yds^3		
1-4	300		0	inches
5-11	460		.04	
12-18	360		.12	
19-25	320		.05	
26-30	340		.40	
Total =	1,780	Yds^3		

The total number of treated acres to date = 83.7 acres.

Water Monitoring and Testing

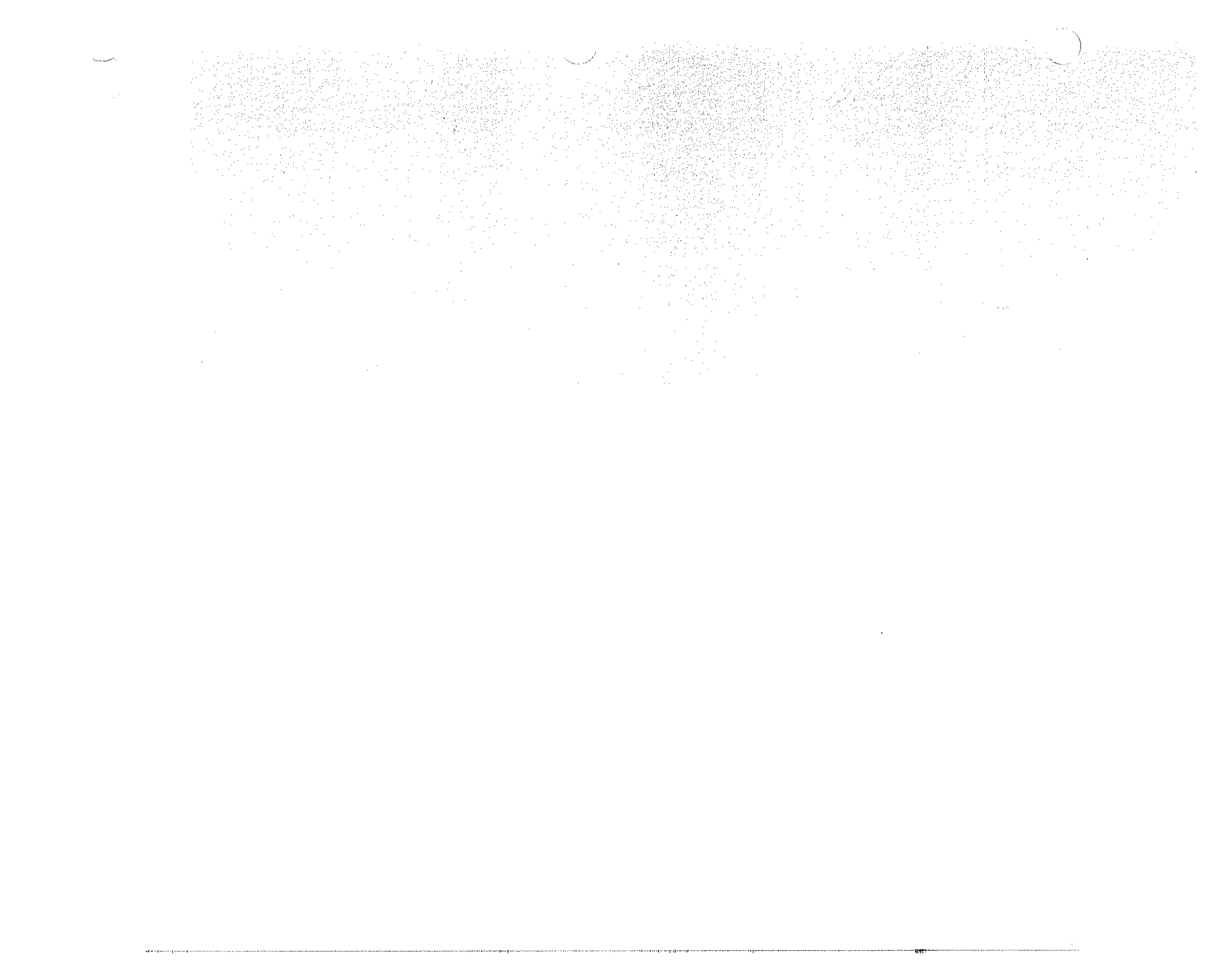
pH levels:

N/A - The ephemeral draws were dry.

No C.O.D. measurements were possible due to the dry conditions.

Desposition

All ash generated during the month was stockpiled in the new North aea.



Georgia-Wcific Corporation *Wood Products*
Manufacturing Division
P.O. Box 105603
Atlanta, Georgia30348
Telephone (404) 521-4000

WATER QUALITY
CONTROL BOARD
REGION 1

December 20, 1990

DEC 21 '90

Mr. Benjamin D. Kor
Executive Officer
California Regional Water Quality
Control Board
North Coast Region
1440 Guerneville Road
Santa Rosa, CA 95403

RE: Georgia-Pacific Corporation
Ash Amending Project
Fort Bragg, CA

6-?SOIL AMENDMENT

Dear Mr. Kor:

Enclosed for your review is a copy of the sampling protocol for Phase II of the aquatic bioaccumulation study to be conducted at the Little Valley ash amendment site near Georgia-Pacific's Fort Bragg, CA mill.

This sampling protocol has been prepared for us by Karen Theiss and Associates, the same consultant who performed the Phase I aquatic sampling in June 1990. You will note that it is proposed to conduct the aquatic sampling in late winter/early spring 1991. This is of course assuming that rainfall conditions are approaching somewhat normal levels for that time of the year. As you know, this area has been experiencing very dry conditions and only recently has it received any rainfall. As of today, however, the upper end of the Little Valley creek is reported to still be dry. We may have to modify the proposed sampling effort if these conditions persist.

In addition to aquatic sampling, additional sediment sampling in the immediate vicinity of the aquatic plant sampling is also proposed, which will, of course, include upstream and downstream sampling. SHN, the consultant who conducted the previous sediment sampling, will also obtain these samples. The same sampling protocol used by SHN for the previous sediment sampling will again be followed.

Please let me know if you have any questions or if further details are needed. We will certainly let you know in advance of the actual sampling dates at the Little Valley site.

Very truly yours,

Gerald W. Tice

GERALD W. TICE
CHIEF ENVIRONMENTAL ENGINEER
WOOD PRODUCTS MANUFACTURING DIVISION

GWT/pcw
Enclosure

cc: Mr. C. T. Howlett, Jr.
Mr. A. T. Johnson
Mr. K. C. Mayer
Mr. D. B. Whitman
Mr. T. E. Deer, Jr.
Mr. L. P. E. Otwell
Mr. J. Tice
Mr. D. Modi

File - Ft. Bragg - Ash Study

PROTOCOL FOR AQUATIC BIOACCUMULATION STUDY
LITTLE VALLEY CREEK, FORT BRAGG
GEORGIA-PACIFIC CORPORATION

PHASE II

I. PROJECT DESCRIPTION

Georgia-Pacific Corporation of Ft. Bragg, California, must investigate the extent of aquatic bioaccumulation of dioxins and furans in the vicinity of its ash stockpile/amendment area in Little Valley Creek.

11. BACKGROUND

A preliminary investigation into bioaccumulation of dioxins and furans by aquatic organisms in Little Valley Creek was conducted in June 1990 by Karen Theiss and Associates. This study resulted in the collection and analysis of Threespine Stickleback (*Gasterosteus aculeatus*) from above and below the ash amendment sites. Test results from both sites were low, approximating background levels (pers. comm., Frank Reichmuth, North Coast Regional Water Quality Control Board). The results seem to indicate that the Threespine Stickleback in the immediate vicinity of the test plots are not bioaccumulating dioxins or furans from the amendment site.

As part of the permit issued by the North Coast Regional Water Quality Control Board (NRWQCB), Georgia-Pacific is required to expand the aquatic bioaccumulation study to include additional Stickleback analysis and collection and analysis of an appropriate aquatic plant species. Since issuance of its permit in August 1990, Georgia-Pacific has stockpiled ash upstream of the June 1990 control sampling locations.

III. FOALS AND OBJECTIVES

The preliminary investigation resulted in the selection of a suitable fish species for analysis, and the procurement of preliminary data on the presence of dioxins and furans. The goal of the present study is to amplify on the previous investigation in order to achieve a better understanding of the extent of aquatic bioaccumulation in Little Valley Creek. The specific objectives will be as follow:

- collect and analyze Threespine Stickleback from quiescent pools above and below the stockpile/amendment sites;

- determine an appropriate aquatic plant test species;

- collect and analyze the vegetative test species from the same sampling locations as the Threespine Stickleback.

IV. METHODOLOGY

A. Target Species

Stream sampling in June 1990 revealed that the Threespine Stickleback was likely the only appropriate target species present in sufficient numbers for collection and analysis. This species was collected in the June 1990 sampling program, and will be collected again during the upcoming sampling period.

The target plant species should be a emergent aquatic perennial rooted in the floor or lower slopes of the channel. A plant with fibrous roots rather than a tap root system is preferred for the target species. Fibrous roots, being mare shallow, could be expected to have more exposure to sediments than would a tap root and may thus have a greater potential for bioaccumulation.

8. Samole Timing

It is proposed to collect the target species during the late winter/early spring of 1991. Assuming that rainfall approaches somewhat "normal" levels, there should be sufficient numbers of Stickleback available for collection. This is also the period of active vegetative growth and nutrient uptake.

C. Sample Locations

The control sites sampled in June 1990 were located upstream of the stockpile/amendment sites in order to reflect background levels of potential contaminants. These sites are downstream of the area put into operation under the permit extension granted in August 1990. Field review during spring 1990 did not reveal the presence of potential control sample sites upstream of the new stockpile site. Further field reconnaissance will be conducted for an appropriate control site upstream of all operations. If such a site is not found, the control sites used in June 1990 will again be sampled in order to provide control data for the older sites.

Downstream sample site(s) will be located in area(s) of quiescent pools with ample vegetation. Such conditions allow deposition and accumulation of stream-borne sediments. The downstream site sampled in June 1990 yielded sufficient numbers of

Stickleback for analysis and should yield sufficient plant material. If this site does not support the appropriate conditions during the sampling period (e.g., due to lack of rainfall), larger pool(s) downstream will be investigated. The downstream sampling location(s) will be as close to the amendment sites as possible in order to minimize interference by off-site factors.

D. Sample Collection

Sampling for Threespine Stickleback will be by use of a small pole seine and had-held dip nets. Stickleback will be hand-picked off the seine using clean latex surgical gloves and placed into a decontaminated metal bucket filled with distilled water (DI). When enough fish are collected, they will be rinsed again with DI and placed into clean glass jars provided by Enseco-Cal Laboratory in Sacramento, CA.

Collection of plant material will be by auguring and/or digging in the stream bed. Clean latex surgical gloves will be used to handle all plant material. The root system will be gently rinsed in-stream to remove the bulk of soil material. The root system will be separated from the shoot system, using a decontaminated knife, and will be placed into a decontaminated metal bucket filled with DI until sufficient sample is collected. The plant material will be rinsed again with DI and placed into clean glass jars provided by the laboratory.

A test sample and an archive sample will be collected at each site. All samples will be frozen and then shipped on dry ice via Federal Express to Enseco-Cal Laboratory, Sacramento, CA for analysis. The archive samples will be transferred to SHN, Associates in Eureka for storage in their freezer.

V. REPORT

A summary report will be prepared following sample collection, to include the following elements:

- location of sampling locations on a map;
- discussion of sampling locations and techniques;
- discussion of'selected target species;
- recommendations, if appropriate.

Georgia-Pacific Corporation
P.O. Box 1618
Eugene, Oregon 97440
(503) 689-1221

January 4, 1991

Mr. Mark Neely
California Regional Board
Quality Control Board
1440 Guerneville Road
Santa Rosa, CA 95403

Dear Mr. Neely:

Here is the December 1990 Monitoring and Reporting Program report, as per Order No. 90-154 for Georgia-Pacific Corporation at Fort Bragg (Little Valley), California.

If you have any questions, please contact me.

Sincerely,

Kent C. Mayer
Environmental. Engineer

KCM:cdc
Enclosure

GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTH OF JANUARY

Monitoring and Reporting Order No. 90-154, Soil Amending Project.

Week of	Ash Deposited North Area		Rainfall Details	
		Yds^3		inches
1-6	**140**			
7-13	160			
14-20	**260**		**1.65**	
21-27	180			
28-31	**240**			
	980	Yds^3	**1.65**	inches

The total number of treated acres to date = **83.7** acres

Water Monitorinn and Testing

pH levels: N/A

Desuosition

All ash was desposited in the North area for the month of January **1991.**

GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTE OF FEBRUARY

Monitoring and Reporting Order No. 90-154, Soil Amending Project:

Week of:	Ash Deposited North Area		Rainfall Details	
1-3	100	Yds^3	2.5	inches
4-10	360		.7	
11-18	540			
18-24	320			
25-28	280		.3	
	1600	Yds^3	3.5	inches

The total number os treated acres to date = 83.7 acres

WATER MONITORING AND TESTING

pH levels: N/A

Desposition

All ash was deposited in the North area for the month of February, 1991.

GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTH OF MARCH, 1991

Monitoring and Report Order No. 90-154, Soil Amending Project:

Week Of	Ash Deposited North Area	Rainfall Details
1 - 3	20 Yds^3	inches
4 - 8	180	3.55
11 - 15	200	2.4
18 - 22	220	1.8
25 - 29	360 / 980 Yds^3	9.5 inches

The total number of treated acres to date: 83.8 acres.

WATER MONITORING AND TESTING

pH Levels: 7.47 Average for month.

DESPOSITION

All ash was deposited in the North area for the month of March, 1991.

GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTH OF APRIL, 1991

Monitoring and Report Order No. 90-154, Soil Amending Project:

Week Of	Ash Deposited North Area		Rainfall Details	
1 - 6	160	Yds^3	.90	Inches
8 - 13	140		Θ	
14 - 20	160		Θ	
21 - 27	380		.75	
28 - 30	160		0	
	1000	Yds^3	1.65	Inches

The total number of treated acres to date: 83.8 acres

WATER MONITORING AND TESTING

Epemeral draws were dry during the month of April - no Ph taken.

DEPOSITION

All ash was deposited in the north area for the month of April, 1991.

GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTE OF MAY, 1991

Monitoring and Report Order No. 90-154, Soil Amending Project:

Week Of	Ash Deposited North Area	Rainfall Details
1 - 4	180 yds^3	.50 Inches
6 - 11	320	.30
13 - 18	280	.85
20 - 25	220	.00
27 - 31	300	.60
	1300 yds^3	2.25 inches

The total number of treated acres is 83.8 acres.

WATER MONITORING AND TESTING

Epemeral draws were dry during the month of May. No pH taken

DEPOSITION

All ash was deposited in the north area for the month of May, 1991.

GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTH OF JUNE, 1991

Monitoring and Report Order NO. 90-154, Soil Amending Project:

Week Of	Ash Deposited North Area	Rainfall Details
3 – 8	420 yds^3	0 Inches
10 – 15	400	0
17 – 22	480	0
24 – 29	320	.60
	1620 yds^3	.60 Inches

The total number of treated acres is 83.8 acres

WATER MONITORING AND TESTING

Epemeral draws were dry during the month June. No. ph taken.

DEPOSITION

All ash was deposited in the north area for the month of June, 1991.

GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTH OF SEPTEMBER, 1991

Monitoring and Reporting Order No. **90-154,** Soil Amending Project.

Week of	Ash Deposited North Area		Rainfall Details
		yd^3	
1 - 7	**340**	Yds	inches
8 - 14	**180**		Insufficient rainfall.
15 - 21	**360**		
22 - 28	**300**		
29 - 30	80		
		yd^3	
	1260	Yds	

The total number of treated acres to date = **86.02** acres

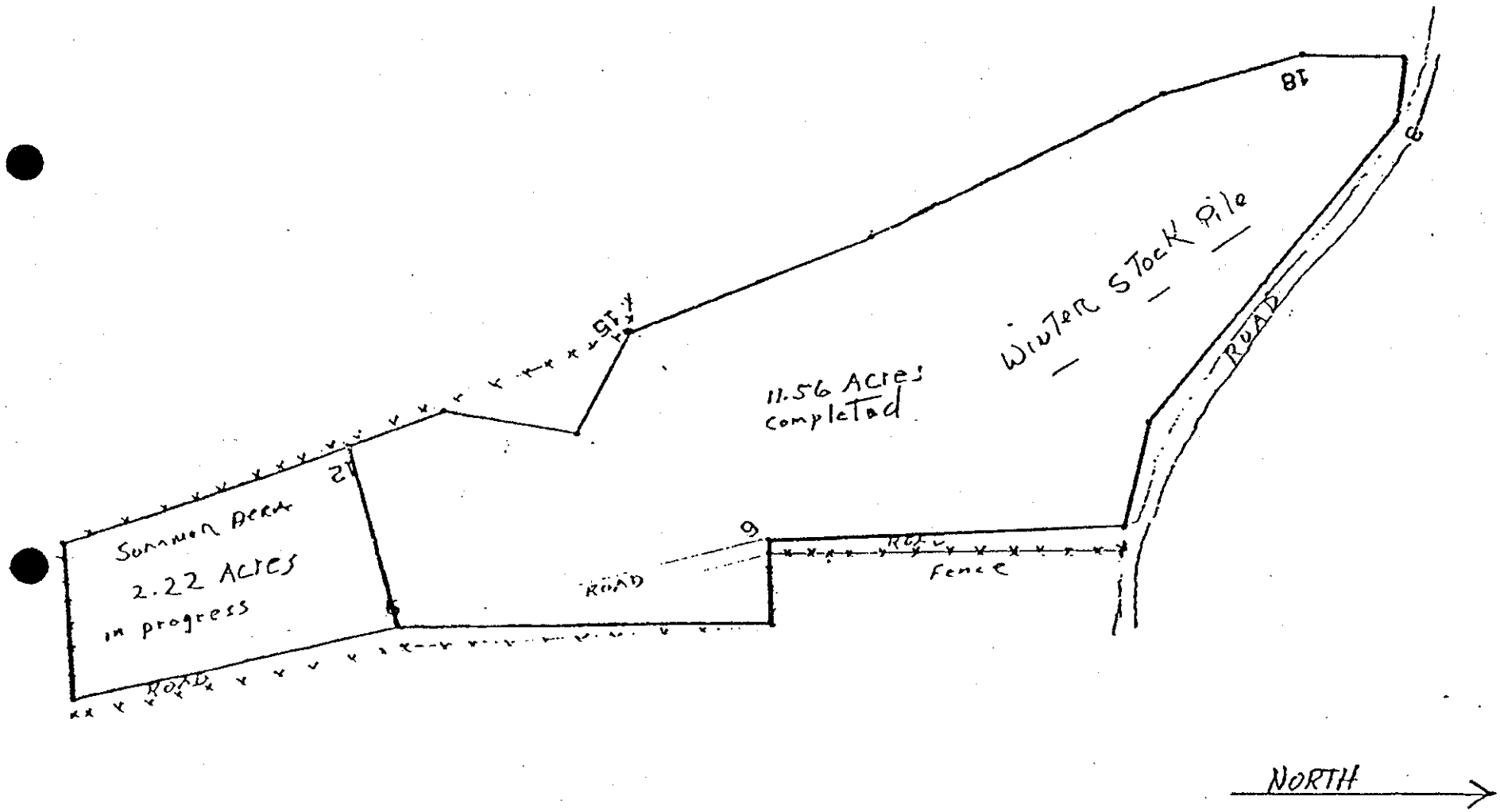
Water Monitoring and Testing

Epemeral draws were dry during month of September. No pH taken.

Desposition

All ash was deposited in the north area for the month of September, 1991.

NORTH LITTLE VALLEY ASH DISPOSAL (S261917D)
FT/IN = 200



STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA. CA 95403
(707)576-2220

PETE WILSON. Governor

February 8, 1991

Mr. Gerald Tice
Chief Environmental Engineer
Georgia-Pacific Corporation
P. O. Box 105603
Atlanta, GA 30348

Dear Mr. Tice:

We have received your proposal for the second round of sampling of aquatic biota in Little Valley Creek. It appears satisfactory, with a few clarifications needed. First, you need to specify that there will be isomer-specific analysis for ply-chlorinated dioxins and furans using EPA Method 1613 Revision A. Second, it is unclear which portion of the aquatic plants will be analyzed: we believe the root portion is the most important. With these clarifications, the plans for sampling can proceed. Of course, this is dependent on sufficient rainfall to cause adequate runoff in the creek.

Because the present Waste Discharge Requirements expire in July, it will be necessary for you to submit a new Report of Waste Discharge (ROWD) as soon as possible (the form is enclosed). The ROWD should specify what locations are planned for amending and the approximate length of time in each, and should list the best management practices you will utilize to prevent transport of ash to the waters of the State.

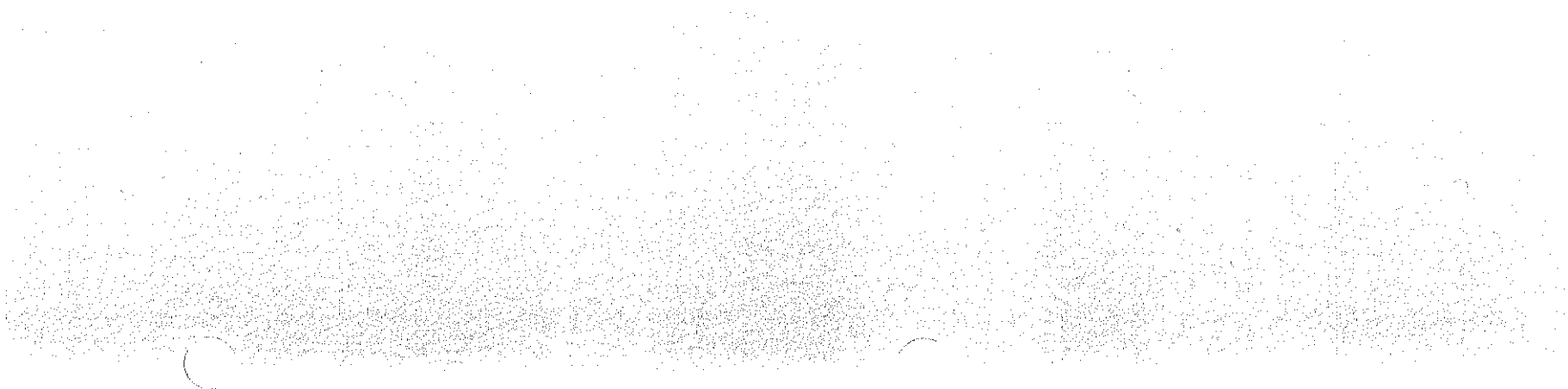
As there is M Regional Board meeting in July 1991, the Board will consider the permit at their June 1991 meeting in Eureka. Please call if you have any questions.

Sincerely.

Mark K. Neely
Associate Engineering
Geologist

MKN:tc:gpashltr

Enclosure



Georgia-Pacific Corporation
Wood Products
Manufacturing Division
P.O. Box 105603
Atlanta, Georgia 30348
Telephone (404) 521-4000

February 14, 1991

Mr. Mark K. Neely
Associate Engineering Geologist
California Regional Water Quality Control Board
North Coast Region
1440 Guerneville Road
Santa Rosa, CA 95403

RE: Georgia-pacific Corporation
Ash Amendment Project
Fort Bragg, CA

Dear Mr. Neely:

In response to your letter dated February 8, 1991, we clarify our proposal for the second round of aquatic sampling in Little Valley Creek as follows:

- All samples obtained as outlined in our proposal will be analyzed for full congener, isomer-specific PCDD and PCDF using EPA Method 1613 Revision A.

- We are proposing to sample and analyze the root portion of the aquatic plants in the creek. Specifically, the fibrous roots rather than the tap root system is what we will be sampling since the fibrous roots could be expected to have more exposure to sediments and thus have greater potential for bioaccumulation.

As I discussed with you yesterday we are planning to conduct the proposed sampling on March 5 and 6, 1991 and I would like to confirm these dates at this time. Of course, you or any members of your staff are always welcome to be present.

Sincerely,

Gerald W. Tice

GERALD W. TICE
SENIOR MANAGER - ENVIRONMENTAL ENGINEERING
BUILDING PRODUCTS MANUFACTURING DIVISION

GWT/pcw

cc: Mr. D. Whitman
Mr. M. E. Lay, P.E. - SHN, Eureka, CA
Ms. K. C. Theiss - Karen Theiss and Assoc., McKinleyville, CA

File - Fort Bragg - Ash Project

State of California

Memorandum

F/U G.P. F+B soil amendment

WATER QUALITY CONTROL BOARD REGION I

JUN 1 '91

To : F. Wayne Pierson
Senior Water Resource
Control Engineer
Central Valley Regional Water Quality
Control Board

Date : February 21, 1991

☐BK ☐RK
☐CJ ☐LR
☐FB
☐RT ☐KD
☐JH ☐JS
☐SW ☐MKW
☐ ☐REPLY
☐ALL STAFF ☐

Francis H. Palmer

From : Francis H. Palmer, D. Env.
Environmental Specialist
Division of Standards and Assessment
STATE WATER RESOURCES CONTROL BOARD

Subject: COMMENTS ON RISK ASSESSMENT PERFORMED FOR GAYLORD CONTAINER CORPORATION BY ENVIROLOGIC DATA (ED)

This memorandum conveys my comments on the ED risk assessment report which was assigned to me in January 1991 for review. I have had the opportunity to read comments submitted by Dennis Wilson of your Redding Office (memo dated September 5, 1990) and by Dr. Stephen Book of the Department of Health Services Health Hazard Assessment Division (memo dated November 14, 1990). For reference, the September 5, 1990 and November 14, 1990 comments are attached.

General Comment

The Executive Summary of the ED report based its risk assessment conclusions on the Proposition 65 de minimus (no significant) risk level of 1 in 100,000. ED concluded that risks posed by release of Gaylord's effluent into the San Joaquin River are not significant and that consumer risks from using Gaylord's sludge as a soil amendment product are insignificant. As noted both by Dr. Book and Mr. Wilson, ED reached this conclusion by using assumptions that resulted in calculation of estimated risk levels several orders of magnitude less than that predicted by risk assessment approaches used by the Department of Health Services (DHS) and the Environmental Protection Agency (EPA). For a number of ED risk assessment scenarios, assumptions used by the regulatory agencies do result in estimates of significant risk under Proposition 65.

Comments on Specific Scenarios

1. Potential Exposure to Dioxin from the Use of River Water as a Source of Drinking Water

More importantly, from a regulatory point of view, the use of ED assumptions reduce the estimate of risk for this exposure scenario from significant to insignificant. As Dennis Wilson suggested in his comments, far from presenting a conservative estimate of risk, the ED report used a set of assumptions that result in a "best case" for industry.

3. Exposure Assessment for the Utilization of Sludge as a Soil Amendment Product

A number of questions arise from the scenario based on exposure to sludge used as a soil amendment. The first concerns the concentration of dioxins in sludge. The February 1989 Gaylord sludge sample report'ed by the EPA/industry 104 mill study contained 101 pg/g of 2,3,7,8-TCDD and 1,570 pg/g of 2,3,7,8-TCDF, a NATO TEF of 258 ppt. The February 1990 sludge sample used by ED was 35 ppt 2,3,7,8-TCDD and 180 ppt 2,3,7,8-TCDF, a NATO TEF of 53 ppt. As in the effluent exposure scenarios, despite the ED report's discussion of the TEF approach, ED omitted the 2,3,7,8-TCDF concentration in preparing sludge exposure scenarios. Based on the more frequent effluent monitoring data, more sludge information is needed: the lowest concentration detected is not necessarily the most representative concentration.

A second question arises over the estimate of CDDs and CDFs present in soil amendment products. As Dr. Book's comments noted, the ED approach tends to use numbers for risk estimate assumptions that are lower in the numerator and higher in the denominator of the risk equation than risk assumptions used by DHS and EPA. This approach considerably lowers the estimated risk of exposure to Gaylord's effluent and sludge. For example, ED extrapolates the concentration of dioxin in soil from that in sludge using four factors: soil density, sludge density, sludge to soil amendment product ratio, and product to final soil ratio. These result in a sludge concentration of 35 pg/g being reduced to 5 pg/g in soil. While this estimate may be defensible, it would be preferable to conduct a site-specific study that measures the concentration of dioxins in the soil amendment product and the amended soil.

Information on uptake of CDDs and CDFs by food crops is scanty and contradictory. It appears likely that there is little or no translocation of these compounds from plant roots to aerial portions; volatilization from soil is a more likely source of low concentrations of CDDs and CDFs measured in plant leaves and fruits. However, the picture is less clear for root crops such as beets, carrots, onions, potatoes, and radishes grown in northern California home gardens. ED assumed that roots and tubers would take up dioxins to a level representing five percent of the estimated soil concentration. ED then multiplied additional factors(the home grown coefficient LC and the harvest time factor ET) to represent the portion of vegetables that were home grown. By ED calculations, home grown vegetables represented 20 percent of total vegetable consumption in the maximum plausible scenario and 12.5 percent in the average scenario.

Some studies have shown soil to root crop concentrations of pproximately unity. A true health-conservative, maximum plausible exposure scenario for the temperate Antioch climatic zone might assume a 1:1 root uptake exposure of crops in a home garden that provides all of family's basic vegetable supply. The latter estimated maximum plausible exposure would exceed ED's by a factor of 100. Again, rather than resorting to estimates, a site-specific study of dioxin concentration in root crops grown in Gaylord sludge-amended soil would be invaluable. Samples would be taken to characterize dioxin concentrations in sludge, soil amendment products, amended soils, and root crops grown in those soils.

Conclusions

Despite frequent references to the fact that its "conservative" approach probably overestimates risk, the ED report appears to do the opposite. This underestimation is performed through five general sets of manipulations:

1. Mathematical models are used as estimates in lieu of environmental data. The most obvious example is estimating dioxin concentrations in fish exposed to Gaylord's effluent that are eight to ten times less than concentrations actually measured in fish sampled near the outfall.

2. While noting the value of accounting for all toxic CDDs and CDFs present in Gaylord's effluent, the ED risk assessment is based solely on 2,3,7,8-TCDD.

3. When multiple values are available from monitoring data, the lowest concentrations are used in preference to data from the EPA/industry 104 mill study because of dioxin reductions achieved by Gaylord. However, in the example of Gaylord effluent, the concentration used by ED is lower than that determined by subsequent monthly monitoring.

4. In assessing risk, the ED report uses a number of assumptions that are not considered health conservative by either OHS or EPA. Examples are the use of a "cooking factor" that reduces estimated exposure to dioxin in fish by 50 percent and a "diet fraction" that reduces estimated exposure of recreational fisherman by 75 percent.

5. In using "predictive' models to estimate dioxin concentrations, a number of factors are introduced in the models that serve to reduce estimated exposure. Dr. Book noted that this tendency used factors to decrease the numerator and increase the denominator of the exposure equations.

I recommend that the ED risk assessment submitted by Gaylord Container be considered a draft version. The final version should incorporate comments made on the report and emphasize a site-specific approach to the Antioch area. Erroneous assumptions about river flow and extent of exposure should be corrected as these result in overly optimistic scenarios that minimize estimated risk. Whenever possible, environmental data should be substituted for models that incorporate numerous assumptions and factors that reduce the estimated risk.

Reference

Herbold, B. and P.B. Moyle. September 1989. The Ecology of the Sacramento-San Joaquin Delta: A Community Profile Biological Report 85(7.22), National Wetlands Research Center, Fish and Wildlife Service, U.S. Department of the Interior, Washington, D.C. 20240

Attachments

cc: (both with attachments)
Dennis Wilson
California Regional Water Quality
Control Board, Central Valley Region
Redding Office
415 Knollcrest Drive
Redding, CA 96002

David Siegel, Chief
Hazardous Waste Toxicology Section
Health Hazard Assessment Division
Department of Health Services
714 "P" Street
Sacramento, CA 95814

bcc: (all with attachments)
Edward Anton
Gerald Bowes
Michael Perrone
Richard Sapuder

FHPALMER:bjhard
bhard250/SASECTION/fp2
2/19/91

a. Effluent dilution in the San Joaquin River was predicted on the assumption of zero net flow past Gaylord Container's outfall (p. 69 of ED report) due to water diversion by the State and Central Valley Water Projects. However, this scenario incorrectly assumes that the exposed population will be limited to those deriving drinking water "downstream" of the outfall (ED report, p. 81).

ED states that no exposure would occur to upstream populations supplied by the Contra Costa Canal. In fact, flow of the San Joaquin River is reversed during certain times of the year so that water from Antioch reaches the canal's intake at Rock Slough. In addition to the Contra Costa Canal, water sources receiving these reversed flows may include the South Bay Aqueduct, the California Aqueduct, and the Delta-Mendota Canal (Herbold and Moyle, 1989).

Not only does the description of the exposed population in this scenario need revision, but also derivation of the dioxin concentration in drinking water used by the city of Antioch should be redone. The existing draft uses a dioxin dilution factor of 0.4 based on a ratio of 1 part river water to 2.5 parts Contra Costa Canal water (ED report, page 82) and assumes no dioxin present in the canal.

b. The report has a good discussion of toxicity equivalency factors (TEFs) but fails to use the TEF approach in performing the risk assessment. The NATO TEF approach assigns potency values of 1.0 to 2,3,7,8-TCDD and 0.1 to 2,3,7,8-TCDF. DHS uses the NATO TEF for risk assessment purposes, and the State Board has proposed using the NATO TEF as part of the water quality objective for dioxin (Draft Water Quality Control Plan for Inland Waters of California, November 1990). The ED report should use the NATO TEF, and thus include both 2,3,7,8-TCDD and 2,3,7,8-TCDF, in its risk assessment scenarios.

The ED report states that dioxin concentrations in effluents from Gaylord's east mill have decreased substantially since a concentration of 49 pg/l 2,3,7,8-TCDD was measured in the EPA/industry 104 mill study. ED used a concentration of 9 pg/l based on 1989 effluent monitoring. In monthly samples taken between January and October 1990, the average concentrations of seven samples above the detection level were 18.3 pg/l for 2,3,7,8-TCDD and 42.6 pg/l for 2,3,7,8-TCDF, a NATO TEF of 22.6 pg/l.

If the ED report is revised, the dioxin concentration for Gaylord's should be reported either as 23 pg/l, or a concentration that includes more recent monitoring information. The revised concentration then be used to calculate the risk from ingestion of drinking water and from other effluent based scenarios.

c. Finally, ED (page 83) uses two fluid ingestion rates: 1.4 l/day for average exposure and 2.0 l/day for "maximum plausible exposure." Typically, 2 l/day is used for risk assessments, including those performed for Proposition 65 (the stated purpose of the ED assessment, ED report p. vii).

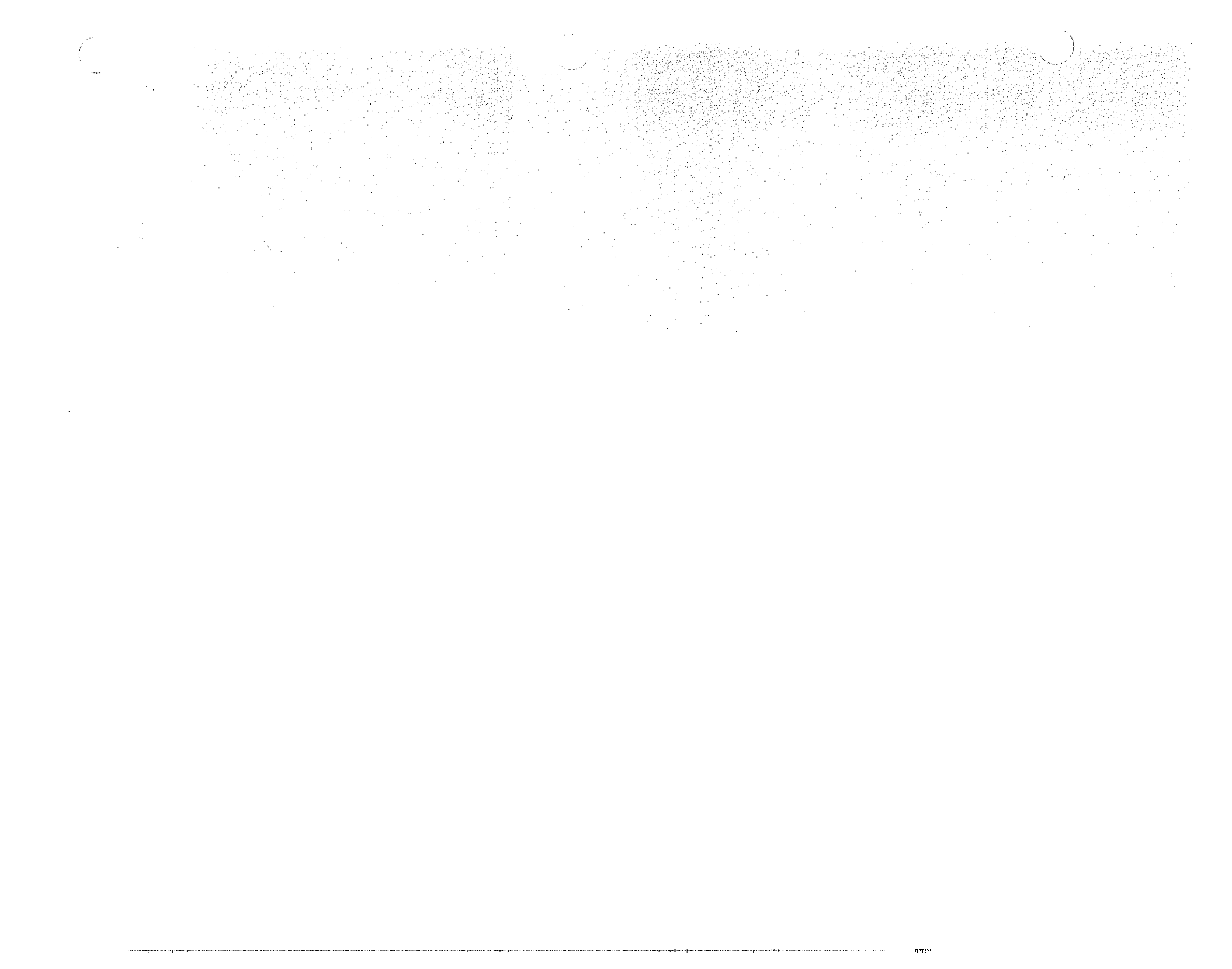
2. Potential Exposure to Dioxin from Ingestion of Fish Caught in the San Joaquin River

There are a number of assumptions used by ED in this scenario that are not health conservative. The first assumption is the estimate of dioxin concentration in white catfish near the Gaylord outfall. In justifying the use of models for predictive risk assessments, the ED report (p. 11) states that exposures, and hence risks, will be overestimated. "The exposed population would actually experience exposure less than conservatively modeled." Then, when environmental data are available, they will replace the model's estimates. "The use of the sampling program data will result in more accurate and less conservative, yet still protective, estimates of risk" (p. 12).

The opposite effect occurred when ED used a modeled estimate instead of available environmental data. At the time that the ED report was prepared, the only available dioxin body burden data on fish from the outfall vicinity were from the National Bioaccumulation Study. This admittedly limited sampling reported a NATO TEF of 1.4 pg/g (2,3,7,8-TCDD of 0.8 pg/g) in a squawfish fillet and 7.7 pg/g (2,3,7,8-TCDD of 3.5 pg/g) in a whole body sample of Sacramento sucker. The ED report (p. 87) calculated that whole body catfish, the fish chosen to model exposure of recreational fisherman, would contain 0.4 pg/g dioxin body burden and 0.1 pg/g in fillets. The observed concentrations exceed the modeled concentrations by a factor of 8, an occurrence that directly contradicts the ED justification for a "conservatively modeled" estimate.

The estimated catfish body burden of dioxin is based on an effluent concentration of 9 pg/l. As discussed above in the comment on the scenario fcr water ingestion, effluent monitoring data from 1990 report concentrations at least twice this level.

In its calculations, ED uses a number of factors that decrease the estimate of dioxin exposure from fish ingestion. These include a "cooking factor" of 0.5, an approach that has been criticized by both EPA and DHS; a "diet fraction" of 0.25 of total fish consumption for average exposure; and an exposure duration of nine years instead of the usual 70 years. As the DHS comments noted, factors and assumptions used in the ED model reduce the calculated risk to recreational fisherman by a factor of over 5,000 for "average exposure" and 400 for "maximum plausible" exposure, compared to EPA's calculations based on an environmental sample (the Sacramento sucker).



Georgia-Pacific Corporation
P.O. Box 1618
Eugene, Oregon 97440
(503) 689-1221

Certified Mail #P 714-760-460

February 26, 1991

Mr. Benjamin D. Kor
Executive Officer
California Regional Water Quality
Control Board
North Coast Region
1440 Guerneville Road
Santa Rosa, CA 95403

Re: March 1991 Quarterly Progress Report
Georgia-Pacific Corporation
Fort Bragg Soil Amendment Project

Dear Mr. Kor:

This quarterly progress report is submitted in compliance with Waste Discharge Requirements Order No. 90-154 for Georgia-Pacific's Fort Bragg soil amendment project.

Since our December 1990 quarterly report, we have filed with your office on December 20, 1990, our sampling plan for additional sampling to further evaluate the potential bioaccumulation threat to the aquatic habitat of the Little Valley Creek posed by the soil amending of the ash. Your office indicated the sampling plan appeared satisfactory by letter dated February 8, 1991, with the request for clarification regarding the dioxin and furan test method to be used and clarification that aquatic plant roots samples would be obtained. Clarification on these points was provided to your office by our letter dated February 14, 1991.

During this reporting quarter we have also notified your office that March 5 and 6, 1991 is the scheduled field sampling dates at the Little Valley site for the planned aquatic sampling.

Please let me know if there are any questions or if further information is needed.

Very truly yours,

Gerald W. Tice

Gerald W. Tice
Senior Manager
Environmental Engineering
Building Products

GWT: cdc

cc: Messrs. C. T. Howlett, Jr.
D. T. Modi
J. J. Tice
T. N. Treichelt
D. B. Whitman
T. E. Deer, Jr.

Georgia-Pacific Corporation
P.O. Box 1618
Eugene, Oregon 97440
(503) 689-1221

February 26, 1991

Mr. Mark Neely
Associate Engineering Geologist
California Regional Water Quality
Control Board
1440 Ouerneville Road
Santa Rosa, CA 95403

Re: Georgia-Pacific Corporation
Little Valley Ash Amendment Project
Report of Waste Discharge

Dear Mr. Neely:

Attached is a completed report of waste discharge application form for the continuation of the Little Valley soil amendment site waste discharge requirements.

The fee is calculated at the minimum for a former Class II-2 site, which is $2,000, based on 8,000 tons per year, therefore, our check for this amount is enclosed.

The enclosed Little Valley map (attachment 2) shows the areas that we plan to amend as well as those areas that have been amended. We have indicated the specific areas we will be amending next. At the current rate ash is being generated and amended we will use about 23 acres per year. In the areas designated for amending it will require about 2-1/2 to 3 years to complete.

We will continue to use the best management practices as we have in the past. Specifically, these consist of maintaining a 50 ft. setback from stream areas and refraining from amending activities on high wind days.

Please let me know if you have any questions or need further information.

Very truly yours,

Gerald W. Tice

Gerald W. Tice
Senior Manager
Environmental Engineering
Building Products

GWT:cdc
Attachments

cc: Messrs. D. B. Whitman
T. E. Deer, Jr.
T. N. Treichelt

CHECK NO.	VENDOR NO.
903698	8752

Georgia-Pacific
WESTERN WOOD PRODUCTS MANUFACTURING DIVISION
PORTLAND, OREGON

No. 903698

OW 7333-1 (2-8

WATER QUALITY
CONTROL BOARD
REGION 1
MAR 4 91

DATE	VENDOR INVOICE NUMBER	INVOICE AMOUNT	DISCOUNT	AMOUNT PAID
		Little Valley Ash Amendment Project Report of Waste Discharge Fee		2,000.00*

☐ BK ____ ☐ RK ____
☐ CJ ____ ☐ LR ____
☐ FR ____ ☐ BB ____
☐ RT ____ ☐ KD ____
☐ JH ____ ☐ JS ____
☐ SW ____ ☐ ____
☐ ____ ☐ REPLY
☐ ALL STAFF ☐ FILE

SAMPLING LOG

FOR

GEORGIA - PACIFIC CORPORATION

FORT BRAGG, CALIFORNIA

LITTLE VALLEY CREEK

SEDIMENT SAMPLING
SECOND ROUND

APRIL 16 & 17, 1991

SHN CONSULTING ENGINEERS & GEOLOGISTS

SHN JOB 88298.005

TABLE OF CONTENTS

General Information

Purpose of Sampling

Characterization of sediments located in Little Valley Creek, at Little Valley. Boiler ash from G.P. sawmill being used as soil amendment on land adjacent to Little Valley Creek.

Sediment samples to be analyzed for:

1. Polychlorinated dibenzo-p-dioxin
2. Polychlorinated dibenzo furan w/ isomer confirmation (Cl 4 – Cl 8, + isomers)

Producer of Waste

Georgia-Pacific Corporation
Fort Bragg, California – Sawmill

Process of Production

Ash produced from hogged wood fuel used in boiler for lumber production operations.

TYPE OF WASTE

BOILER ASH; TRANSPORTED FROM SAW-MILL TO STOCKPILE/AMENDMENT OPERATIONS. (SEE FIG. 1)

DECLARED WASTE COMPONENTS

AWAITING CHARACTERIZATION — PREVIOUSLY DECLARED NON-HAZARDOUS BY CALIF. D.O.H.S. (TO KENT MAYER - G.P.)

DATE OF SAMPLING

APRIL 16 and 17, 1991

LOCATION OF SAMPLING

MENDOCINO COUNTY COASTAL VALLEY. LITTLE VALLEY, LITTLE VALLEY CREEK BOTTOM SEDIMENTS.

WEATHER

GENERALLY SUNNY AND CLEAR AFTER EARLY MORNING FOG. LIGHT BREEZE TO LIGHT WIND FROM NORTHWEST INCREASING AFTERNOON. TEMP 60° - 70° F ±.

Personnel on Site

Gerald Tice, Laurence Otwell → G.P., Atlanta, GA.
Martin Lay, Patrick Barsanti → SHN, Eureka, CA.
Karen Theiss, (4/16 only) Tim Salamunovich → Karen Theiss & Associates, McKinleyville, CA.

Sample Summary (Sediment)

Twelve (12) field samples (SHN)

(6) 16oz. jars, G.P.'s, to test @ Enseco
(6) 16oz. jars, SHN Archive for G.P. @ SHN

Distribution of Samples

Collected	Sample	
4-16-91	LVSL5	a) Test set to Enseco · Cal Lab West Sacramento, CA
	LVSL6	
4-17-91	LVSU3	
	LVSU4	b) Archive set to SHN Consult. Engr. & Geol. Eureka, CA.
	LVSC5	

4

SAMPLING PROTOCOL

SAMPLING EQUIPMENT

1. STAINLESS STEEL MIXING BOWL (1) & TRAYS (2)
2. STAINLESS STEEL SPLITTING/QUARTERING SPATULAS, TROWELS (4)
3. STEEL SPLIT SPOON SAMPLER w/ATTACHMENTS 1 3/8 in. ID X 14 in. Long
   a) DRILL ROD EXTENSIONS w/DRIVING HEAD
   b) SPRING & FLAPPER SAMPLE RETAINERS
   c) "FENCE POST" DRIVER
4. LABORATORY PREPARED SAMPLING JARS
   a) 16 oz., GLASS, TEFLON LINED BAKELITE SCREW CAP
   b) REC'D BY SHN (4-1-91) FROM ENSECO (2-26-91) INTACT, CUSTODY SEAL NO. 07097 (LUCERO)
5. DECONTAMINATION SOLUTIONS (DECON)
   a) "LIQUINOX" SOAP SOLUTION DETERGENT
   b) DEIONIZED WATER RINSE
   c) METHANOL WASH (ANALYTICAL REAGENT, ACS SPEC. CH_3OH, CERT. OF LOT F.W. 32.04, 99.9%)
   d) HEXANE WASH (GLASS DISTILLED, HPLC, ANALYSIS 96.9% (GLC), WATER 0.003%)
6. STAINLESS STEEL WASH/RINSEATE TRAYS
7. INSULATED ICE CHEST & PACKING FOR SAMPLE TRASPORT

SAMPLING METHODOLOGY

COLLECT SEDIMENT SAMPLES FROM LOCATIONS

1. DOWNSTREAM OF ASH STOCKPILE/AMMENDMENT OPERATIONS AT 1990 LOCATION (LVSL)
2. "UPSTREAM" AREA OF 1990 SAMPLING AT LOCATION WHERE FISH COLLECTED (LVSU)
3. CONTROL LOCATION, OUT OF POTENTIAL IMPACT BY 1991 ASH STOCKPILE, FOR COMPARISON TO OTHERS (LVSC)

COLLECTION LOCATIONS FOR REPRESENTATIVE SEDIMENT SAMPLES WERE FIELD DETERMINED BASED UPON STREAM CHARACTERISTICS AND OBSERVED CONDITIONS. SIMILAR REACHES OF CHANNEL SOUGHT WITH 1) SIMILAR CHANNEL SECTIONS (NOTE THAT TWO MAJOR TRIBUTARIES ENTER AT/NEAR ASH AREA, DOWNSTREAM SITE), 2) SLIGHT LOW WATER CHANNEL MEANDER, 3) RELATIVELY SAME OVERSTORY & UNDERSTORY.

AFTER COLLECTION LOCATIONS LVSL & LVSU AGREED UPON, AND FISH COLLECTED AT LVSU, CREWS MOBILIZED TO DOWNSTREAM (LVSL) LOCATION FOR FISH, ACQUATIC, AND SEDIMENT SAMPLING. AS DURING 1990 SAMPLING, SEDIMENT SAMPLES AT A SPECIFIC LOCATION WERE TO BE

COLLECTED BY TAKING A ROOT/SEDIMENT SAMPLE AND A LOWER ADJACENT SEDIMENT SAMPLE FROM THE SAME SAMPLE CORE AND PLACING EACH IN A SEPARATE TRAY.

SAMPLING EQUIPMENT WAS THEN DECONTAMINATED (DECONNED) AS FOLLOWS;

1) LIQUINOX SOAP SOLUTION WASH/SCRUB
2) FULL DEIONIZED WATER RINSE
3) METHANOL WASH
4) DEIONIZED WATER RINSE
5) HEXANE WASH/RINSE

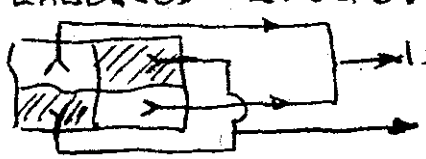
SEDIMENT SAMPLING THEN PROCEEDED, USING THE DECONNED SPLIT SPOON SAMPLER, AS FOLLOWS;

1) SEVEN (7) LOCATIONS IN A STREAM REACH (LVSL) OF 40± TO 60± LINEAL FEET WERE ANTICIPATED FOR SUFFICIENT SAMPLE QUANTITY COMPOSITION.
2) THE TOP TWO (2) INCHES OF ROOT/SEDIMENT FROM EACH RETRIEVED CORE WERE TO BE PUT IN ONE TRAY AND THE NEXT LOWER TWO (2) INCHES WERE TO BE PUT IN A SEPARATE TRAY, USING A DECONNED SPATULA
3) SEDIMENT REMAINING IN THE SAMPLER

WAS DISCARDED AND THE NEXT CORE AREA MOVED TO FOR SAMPLING.

4) UPON COLLECTION OF 7 "TOP" AND 7 "BOTTOM" CORES SAMPLES WERE TAKEN TO THE STAGING AREA FOR PREPARATION/BOTTLING.

5). THE 7 "TOP" 2 inch ± CORE PLUGS WERE MIXED, SPLIT, AND QUARTERED* WITH A DECONNED MIXING SPATULA. DIAGONAL () QUARTERS OF THE SPLIT WERE PUT EACH INTO A JAR LABELLED LVSL5 FOR "TEST" AND A SECOND JAR LABELLED LVSL5 FOR "ARCHIVE." THE "BOTTOM" 2 inches ± OF COMPOSITE WERE MIXED AND QUARTERED SIMILARILY USING A FRESH DECONNED SPATULA AND PLACED INTO TWO JARS LABELLED LVSL6. (*PER ASTM C702-67)



SAMPLER THEN PLACED IN ICED COOLER

6) ALL EQUIPMENT WAS DECONNED FOR MOBILIZATION TO LVSU WHILE SAMPLES WERE LOGGED ONTO CHAIN-OF-CUSTODY FORMS.

WORK FOR APRIL 16, 1991 CEASED AND GEAR WAS SECURED, SAMPLES TAKEN TO MOTEL FOR SECURITY.

THE SAMPLING OPERATION THEN MOBILIZED TO UPSTREAM LOCATION "LVSU" FOR COLLECTION OF SAMPLES LVSU3 (UPPER 2in.±) AND LVSU4 (LOWER 2in.±) AS PREVIOUSLY DESCRIBED, ON APRIL 17, 1991. SAMPLES WERE COLLECTED AT LVSU IN THE AREA FISH WERE COLLECTED ON APRIL 16. COLLECTED LVSU SEDIMENT SAMPLES WERE LOGGED ONTO CHAIN-OF-CUSTODY FORM AND PLACED INTO ICED COOLER WITH PREVIOUS DAY SAMPLES. EQUIPMENT WAS DECONNED.

SHN & KT&A THEN MOBILIZED TO THE NORTHERN AREA OF THE VALLEY TO LOCATE A "CONTROL" SAMPLING LOCATION (LVSC) OUT OF PROBABLE IMPACT DUE TO 1991 ASH STOCKPILE OPERATIONS. G.P, SHN, & KT&A STAFF HAD SURVEYED THIS AREA ON 4/16; FOUND INSUFFICIENT FISH IN A REACH(ES) OF SIMILAR SIZE TO LVSL & LVSU. G.P. DECIDED TO PROCEED WITH AQUATIC VEGETATION AND SEDIMENT SAMPLING TO AVOID/MINIMIZE POTENTIAL CONJECTURE AS TO THE VALIDITY OF LVSU SAMPLES (RELATIVE TO 1991 ASH STOCKPILE LOCATION UPSTREAM OF LVSU). LVSC WAS SELECTED BY SHN AND KT&A STAFF FOR ITS SIMILAR CHANNEL AND VEGETATIVE CHARACTERISTICS (RELATIVE TO LVSL & LVSU), AS WELL

AS ITS PROXIMITY FOR NOT BEING IMPACTED BY THE 1991 ASH STOCKPILE OPERATION. LVSC WAS THEN SAMPLED IN THE SAME MANNER AS LVSL AND LVSU. THE UPPER (TOP) TWO INCH ± COMPOSITE WAS LABELLED LVSC 7, AND THE BOTTOM TWO INCH ± COMPOSITE WAS LABELLED LVSC 8. SAMPLES WERE LOGGED ONTO CHAIN-OF-CUSTODY FORM, REPACKED SECURELY WITH THE OTHER SAMPLES (FOR TRANSPORT TO EUREKA) IN THE ICED COOLER, AND SET IN THE VEHICLE. EQUIPMENT WAS CLEANED. PHOTOS OF THE AREAS WERE COMPLETED AND DEMOBILIZATION WAS CONDUCTED.

FIELD SAMPLING DATA SUMMARY

SAMPLE	DATE	TIME	DESCRIPTION	PKGD FOR
LVSL 5	4/16/91	1400	TOP 2"±, ROOT/SED	1-TEST/1-ARCH
LVSL 6	4/16/91	1400	NEXT 2"±, SEDIMENT	1-TEST/1-ARCH
LVSU 3	4/17/91	1115	TOP 2"±, ROOT/SED	1-TEST/1-ARCH
LVSU 4	4/17/91	1115	NEXT 2"±, SEDIMENT	1-TEST/1-ARCH
LVSC 7	4/17/91	1420	TOP 2"±, ROOT/SED	1-TEST/1-ARCH
LVSC 8	4/17/91	1420	NEXT 2"±, SEDIMENT	1-TEST/1-ARCH
			TOTAL	6 T / 6 A

10

SAMPLE TRANSPORT AND SHIPPING (SHN)

DATE	
4-17-91	SHN SAMPLES LVSU3, LVSU4, LVSL5, LVSL6, LVSC7 AND LVSC8 (12 TOTAL) TRANSPORTED IN ICED COOLER UNDER CHAIN-OF-CUSTODY TO SHN OFFICE IN EUREKA, CA.
4-18-91	SHN SAMPLES WERE DIVIDED INTO TEST AND ARCHIVE LOTS. 1 EACH FROM LVSU3, LVSU4, LVSL5, LVSL6, LVSC7, AND LVSC8 AS FOLLOWS:

a) "TEST" PACKED IN ICED COOLER AND SENT UNITED PARCEL SERVICE (UPS) OVERNIGHT DELIVERY TO ENSECO, CAL-LAB, WEST SACRAMENTO, CA, UNDER CHAIN-OF-CUSTODY.

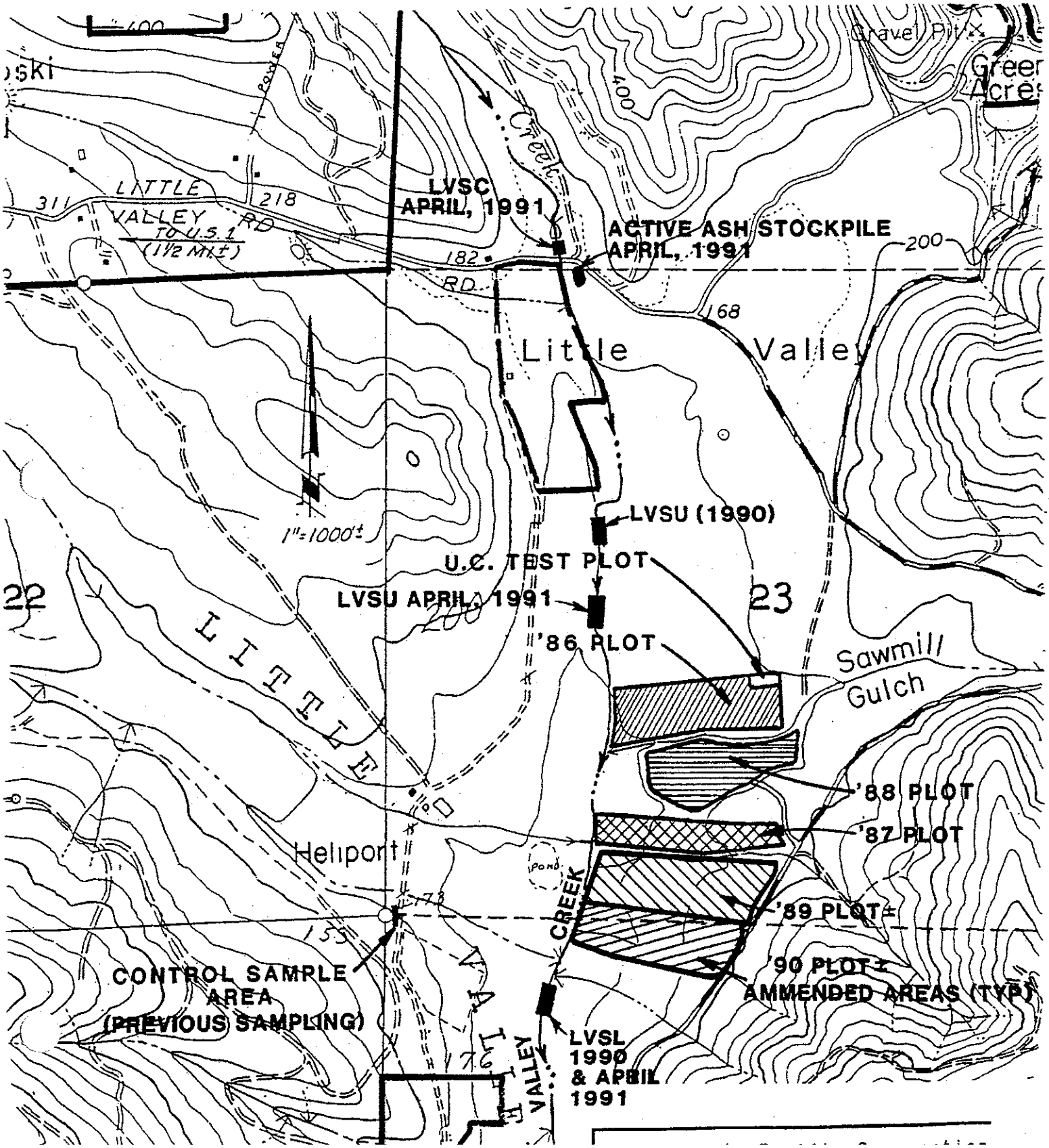
ENSECO - COOLER; COLEMAN 48 QT.
ENSECO CUSTODY SEAL # 07095, PLACED BY M. LAY (SHN), DATED 4-18-91
UPS SHIPPING # 1750 9014 965

b) "ARCHIVE" SAMPLES PLACED IN SHN COOLER AT 4°C — UNDER CHAIN-OF-CUSTODY

4-19-91 MARTIN LAY CONFIRMS ENSECO RECEIPT OF SHN SAMPLES (TELEPHONE)

4-25-91 MARTIN LAY RECEIVES COPY OF SIGNED CHAIN-OF-CUSTODY FROM ENSECO INDICATING TEST SAMPLES RECEIVED INTACT, AND INCLUDED WAS ENSECO LOG IN SHEET 057878.

END LOG 4-16 & 17, 1991
WRITTEN TEXT


LVSC
APRIL, 1991
ACTIVE ASH STOCKPILE
APRIL, 1991
LVSU (1990)
U.C. TEST PLOT
LVSU APRIL, 1991
'86 PLOT
'88 PLOT
'87 PLOT
'89 PLOT±
'90 PLOT±
AMMENDED AREAS (TYP)
CONTROL SAMPLE
AREA
(PREVIOUS SAMPLING)
LVSL
1990
& APRIL
1991
LITTLE VALLEY RD TO U.S. 1 (1½ MI±)
Little Valley
Sawmill Gulch
Heliport
LITTLE VALLEY CREEK
Gravel Pits
1"=1000'±

CONSULTING ENGINEERS
& GEOLOGISTS

Reference: 88298.005

LITTLE VALLEY CREEK
SECOND ROUND
SEDIMENT SAMPLING
APIUL 16 & 17,1991

PREPARED FOR:

GEORGIA PACIFIC CORPORATION
FORT BRAGG, CALIFORNIA

APRIL 1991

TABLE OF CONTENTS

LITTLE VALLEY CREEK
SECOND ROUND
SEDIMENT SAMPLING
APRIL 16 & 17, 1991

EXECUTIVE SUMMARY

ENSECO-Cal Lab of West Sacramento, California was to be the designated testing laboratory and SHN's Eureka office was to be the recipient of archive samples. The basis for sampling operations was to retrieve and test samples for the constituents of polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofuran with isomer confirmation. ("CL4-CL8," plus isomers). The sampling operation and procedures were thus set up to the dioxin/furan parameters.

Sampling gear and containers were brought to the site by SHN and decontaminated. Martin Lay (SHN), who is a registered Civil Engineer, was accompanied by Patrick Barsanti (SHN). Both have been OSHA 29 CFR 1910.120 certified and have conducted previous Little Valley sampling.

Mr. Lay and Mr. Barsanti met with GP personnel and members of the aquatic sampling team, Karen Theiss and Associates (KT&A), to discuss sampling operations and locations. On April 16 and 17, sampling was performed at Little Valley Creek after mutual consent between GP, SHN, and KT&A. Sampling gear was decontaminated before sampling upstream (LVSU), again before sampling downstream (LVSL), and before sampling at the control location (LVSC).

Collected samples were logged, sorted, and placed in iced coolers for transport by SHN to Eureka for subsequent shipment to the designated sample receiving locations. Mr. Lay completed the required chain-of-custody records, properly packaged the samples for UPS shipment in iced coolers, and affixed security seals. Samples were sent to ENSECO on April 18, 1991.

As of this writing (May 13), completed chain-of-custody forms have been received by this office, verbal contact has been made with ENSECO, and ENSECO receipt of intact samples has been confirmed.

LITTLE VALLEY CREEK
SECOND ROUND
SEDIMENT SAMPLING
APRIL 16 & 17, 1991

INTRODUCTION

SHN was retained by Mr. Gerald Tice, Chief Environmental Engineer for Georgia Pacific Corporation (GP), Atlanta, Georgia, to act as an objective sampler in the sampling for the ash amendment plan. This sampling was to include the follow up (second round) sediment sampling in Little Valley Creek only. Previous sediment sampling was conducted by SHN on June 25, 1990.

SHN was expected to provide the equipment and personnel required to perform this sampling event at field determined locations, upstream and downstream of boiler ash stockpile and amendment sites. Additionally, SHN was expected to maintain a sampling log book, prepare chain-of-custody forms, and pack and ship retrieved samples to the designated testing laboratory and the designated archive depository.

SPECIFIC OPERATIONAL PROCEDURE

Preparation

Field sampling gear and decontamination cleansers were inventoried by Mr. Lay and Mr. Barsanti at the SHN Eureka office. All sampling gear was liquinox washed, rinsed with distilled water, and final rinsed with methanol in preparation for transport to the project site. Liquinox solution, methanol, hexane, and distilled water were packaged for on site sample gear decontamination procedures. Glass sampling jars with teflon lined bakelite caps were laboratory prepared and shipped to SHN by ENSECO Cal-Lab in sampling coolers.

Sampling Rationale and Methodology

The objective was to collect two control samples outside the potential ash amendment site and ash stockpile areas of influence; two downstream samples immediately below the amended and stockpiled areas; and two samples in the area previously sampled (June 1990), referred to as the upstream location (See Figure 1). Ash stockpile operations were moved for the 1991 season to a location north of previous operations so a new sediment control location (LVSC) was selected by SHN, KT&A, and GP staff.

Collection locations for representative sediment samples from Little Valley Creek were field determined based on stream characteristics.

Collection locations were agreed upon and fish were collected at LVSU (to verify availability). Sampling of the downstream site (LVSL) was conducted on April 16, 1991. Sampling protocol was discussed and a check of the streambed indicated a root/vegetation mat overlying finer sediments and native sand. Collection of both the root mass/fine sediments, as one sample, and the lower sand sediments, as a second sample, was conducted as was previously done in June 1990. Archive split samples were also collected. The equipment was then decontaminated as follows:

a. liquinox soap solution wash
b. thorough deionized water rinse
c. methanol wash
d. deionized water rinse
e. hexane wash

A split-spoon sampler (decontaminated) was driven 12 to 14 inches into the sediment in Little Valley Creek. The sampler was then removed from the sediment, set down horizontally and supported off the soil to split the spoon and retrieve the sample. Contents of the spoon were divided into two classifications, the upper or root biomass/sediment was scraped into a decontaminated bowl using a decontaminated spatula; and the lower, sandy sediment was scraped into a second decontaminated bowl, using the decontaminated spatula. A minimum of seven upstream samples, from varying locations, within 40 to 60 lineal feet were extracted using this method. The lower (sandy) samples were composited into one representative sample, and the upper (root biomass/sediment) samples were composited into another representative sample. The lower (sandy) samples were then mixed and quartered (per ASTM C702-87) in a decontaminated stainless steel tray. Two diagonally opposing quarters of the mixed sample were carefully placed into a 16 oz. sample jar marked for testing, and the other two diagonally opposing quarters were carefully placed into another 16 oz. sample jar for archival. The upper (root biomass/sediment) samples were also mixed, quartered, and carefully put into 16 oz. jars using this method. All sample jars were put on ice in a cooler. SHN then decontaminated tne equipment before mobilizing to the upstream site (LVSU).

Samples were collected at seven upstream (LVSU) locations on April 17 using the same method as the downstream sampling.

Field operations then moved to the area north (upstream) of the current ash stockpile so that samples could be collected representing assumed ash operation, non-impacted creek sediments. The location LVSC was chosen for its channel and vegetation similarities to LVSL and LVSU. Samples were collected (on the same day, April 17, 1991) at seven locations in approximately 40 lineal feet of channel in the same manner as previously described.

Sampling Location Layout

Representatives of GP, SHN, and KT&A met at the upstream (LVSU) location on Little Valley Creek to determine the sampling location and depth of samples. The selected location coincided with the aquatic sampling (KT&A). The selected location was approximately 200 yards downstream of the June 25, 1990, sampling, due to the previous experience of more suitable fish sample retrieval (fish also collected 4/16). The downstream site was selected because it was used in 1990 and is immediately below the amended and stockpiled areas. The new sediment control sample location LVSC was chosen to provide data on sediment and aquatic vegetation (no fish found) out of potential impact by past or current (1991) ash amending operations. The chosen site is situated upstream and generally upwind (See Wind Rose Appendix B) of the 1991 ash stockpile location. Heavy over and understory vegetation separates the ash stockpile (1991) and the sampling location LVSC.

The stream characteristics were also an important factor. Similar reaches of channel sections were sought with: 1) slight meander, 2) relatively the same type of overstory and understory, and 3) similar channel sections. The first two stream characteristics, slight meander and similar over/understory, were available at the control and downstream locations while the upstream location LVSU was more open, relative to vegetation cover. The third characteristic, similar channel sections, was more difficult to realize. Three major tributaries to Little Valley Creek enter between the ash amending and stockpile areas (See Figure 1), thus altering the downstream channel area to a higher flow and less biomass (mat) development characterization. However, the three selected sampling locations were similar enough to allow both sediment and aquatic sampling to be conducted in the same stream reaches.

Sediment Sampling

A minimum of seven sampling points, at each sampling location, were collected. Samples were spaced a minimum of 5 feet from each other, at random locations in the stream bed.

The sampling began at the downstream location (LVSL) on April 16. The samples were taken, while moving upstream, using a split-spoon sampler. From the seven samples, approximately 2 inches of upper and lower sediments were extracted each time and placed into the appropriate covered bowl. After seven samples were extracted, it was determined that sufficient composites had been collected. The upper (root/biomass sediment) samples were marked "LVSL5." The lower (sandy sediment) samples were marked "LVSL6." The four jars were then placed on ice in a cooler. The equipment was then decontaminated before mobilizing to the upstream site (LVSU) on April 17. The upper (root biomass/sediment) representative sample was marked "LVSU3," and the lower (sandy sediment) representative sample was marked "LVSU4."

Sampling operations then mobilized to the north area, a new control (LVSC) area was selected, and sampling was conducted. The upper (root biomass/sediment) representative sample was marked "LVSC7" and the lower (sandy sediment) representative sample was marked "LVSC8." The jars were then placed on ice in the cooler. The twelve sample jars were transported back to SHN's Eureka office. The next day, April 18, six of the jars were appropriately shipped to the testing laboratory. The other six split samples were kept at SHN's Eureka office for archival.

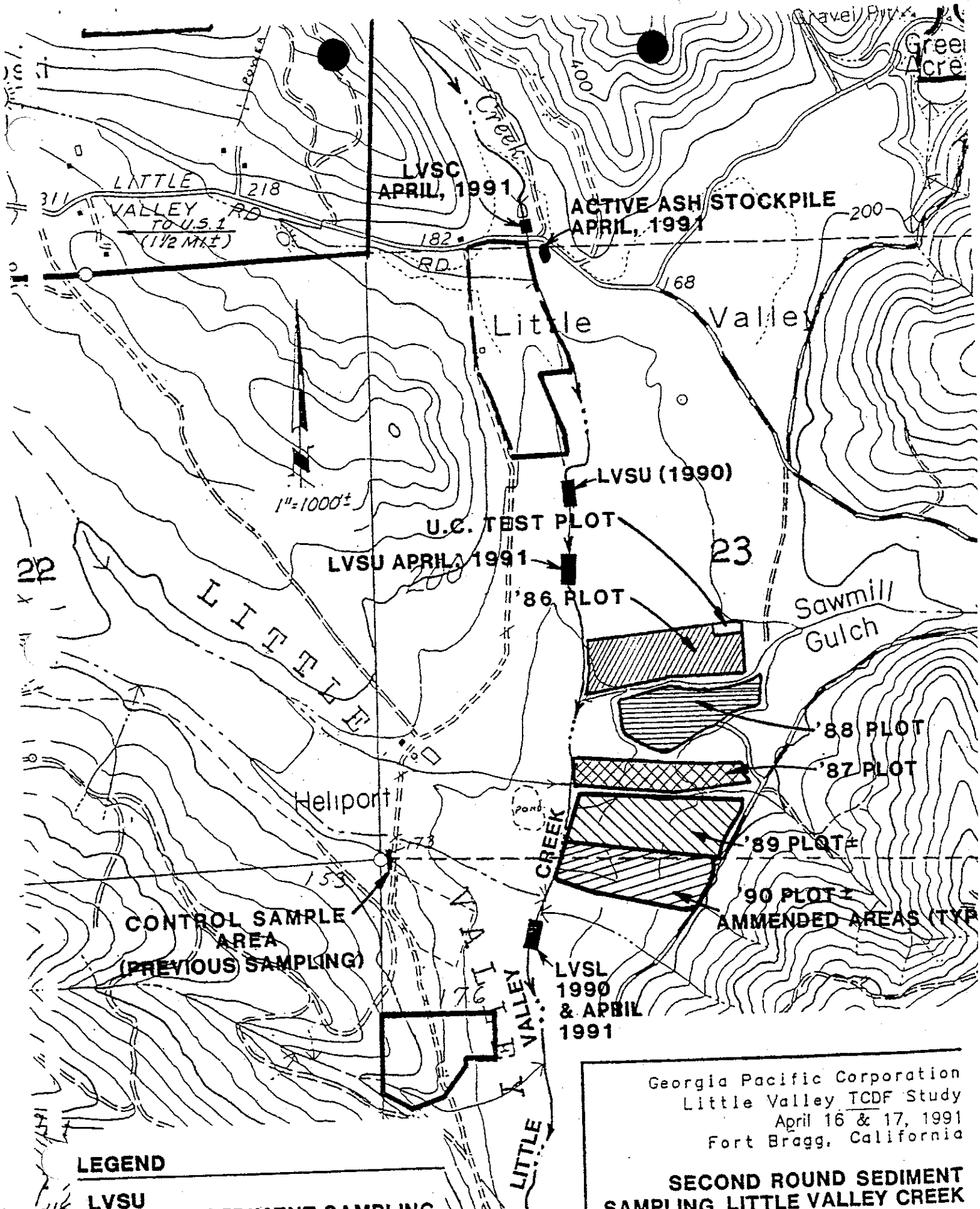
CONCLUSIONS

An approved (California Regional Water Quality Control Board, North Coast Region) sampling program was followed by SHN and supervised by GP.

Selection of a new sediment/aquatic vegetation sampling control location (LVSC) was authorized by GP to minimize doubt or conjecture as to the nature of the 1991 LVSU sampling location results relative to the potential impact of the 1991 ash stockpile location.

Care was taken to maintain clean equipment and minimize risks for potential cross contamination. Proper sample preparation and homogenization for analyses was performed at the laboratory under proper and controlled conditions. Turnaround time for transport to the testing laboratory was dependent upon the remoteness of the area and the available transport carriers. All samples were kept in iced, covered coolers during transport from the field to the repackaging snd shipping point in Eureka, California. The original log book will be sent to Mr. Gerald Tice, Georgia-Pacific Corporation, Atlanta, Georgia, and original chain-of-custody forms remain with the respective Cal-Lab and SHN archive personnel. Copies of the chain-of-custody forms held by SHN are included as Appendix B.

FIGURE



Georgia Pacific Corporation
Little Valley TCDF Study
April 16 & 17, 1991
Fort Bragg, California

SECOND ROUND SEDIMENT SAMPLING LITTLE VALLEY CREEK

SHN 88298.005

APPENDIX A

CHAIN-OF-CUSTODY RECORDS

Enseco

Page 1 of 1

CHAIN-OF-CUSTODY RECORD

SAMPLER (Signature) Martin E. Fay
Phone (707) 444-0427

Date Shipped 4-18-91
Airbill No. 1750 9014 965

Carrier UPS
Cooler No.

SHIP TO:
Enseco-Cal Lab
2544 Industrial **Blvd.**
West Sacramento, **CA** 95691
(916) 372-1393

ATTENTION:

SEND RESULTS TO:
Client Name GERALD TICE
Company GEORGIA PACIFIC CORPORATION
Address 133 PEACHTREE ST. NE
Atlanta, GA. 30303
Phone (404) 521-5094

PROJECT NAME LITTLE VALLEY Fruitvale, CA
PROJECT NO. (SHN) 882980.005 P.O. NO.

Relinquished by: (Signature)	Received by: (Signature)	Date	Time
Martin E. Fay			
Relinquished by: (Signature)	Received by: (Signature)	Date	Time
	Jenny Wilson	4-19-91	0915
Relinquished by: (Signature)	Received at lab by: (Signature)	Date	Time
Relinquished from lab by: (Signature)	Received by: (Signature)	Date	Time

ANALYSIS REQUEST

Sample ID Number	Sample Description	Date/Time Sampled	Analysis Requested	Sample Condition Upon Receipt
LVSL 5	Soil/Top 2 in.	4/16/91 1400	C14 to C19 + isomers (8290?)	Good
LVSL 6	Soil/Next 2 in.	1400		
LVSU 3	Soil/Top 2 in.	4/17/91 1115		
LVSU 4	Soil/Next 2 in.	1115		
LVSC 7	Soil/Top 2 in.	1420		
LVSC 8	Soil/Next 2 in.	1420		

Special Instructions/Comments: (1) Thoroughly mix contents of jar prior to analyses
(2). Verify requested analyses with G.P. ←
(3) Rush per discussion w/G.P.
(4.) Copy of CofC to M. LAY @ SHN 2630 Harrison, Eureka, CA. 95521

NOTE: UNUSED PORTIONS OF NON-AQUEOUS SAMPLES WILL BE RETURNED TO CLIENT

Expected Analytical T.A.T's: ____ Immediate Attention (200% surcharge) X RUSH (50-100% surcharge) ____ Standard

Cal Lab ID Number: *(for lab use only)*

Client Retains White Copy Only

(Revised 1/87)

REC'D APR 25 1991

CALLAB#057878

Enseco, Inc. - Cal Lab Analytical
2544 Industrial Blvd.
We . Sacramento, California 95691
(916) 372-1393

Date Received : 19 APR 91 09:15

Mr. Martin E. Lay
SH Consulting Engineers and Geologists
26) Harrison Ave
Eureka, California
95501

(7..) 444-0427

Project ID,
EPA Case, RMA Lot : GEPGA01 G.P. Little Valley DXNFUR 4/19/91
P.O. Number
Delivered By
Storage Location : R22
Logged in by : GHAMILTON

Six soil samples received in good condition under COC. Delivered by UPS.

Sample ID	Enseco ID	Client's label info	Date/Time Samp.	Containers
05 378-0001-SA	189462	LVSL 5	16 APR 91 14:00	1-500 CGJ
05 78-0001-MB	189463	Method Blank		Method Blank
05 d-0002-SA	189464	LVSL 6	16 APR 91 14:00	1-500 CGJ
05 378-0003-SA	189465	LVSU 3	17 APR 91 11:15	1-500 CGJ
05/878-0004-SA	189466	LVSU 4	17 APR 91 11:15	1-500 CGJ
057878-0005-SA	189467	LVSC 7	17 APR 91 14:20	1-500 CGJ
05 378-0006-SA	189468	LVSC 8	17 APR 91 14:20	1-500 CGJ

Samples not destroyed in testing are retained a maximum of thirty(30) days unless otherwise requested.

Cl .c Manager: Kathy Gill

Enseco

Page 1 of 1

CHAIN-OF-CUSTODY RECORD

SAMPLER: (Signature) Victor E. Ng

Phone (707) 444-0427

Date Shipped _____ Airbill No. _____

Carrier _____ Cooler No. _____

SHIP TO:

~~Enseco-Cal Lab~~
~~2544 Industrial Blvd.~~
~~West Sacramento, CA 95691~~
~~(916) 372-1393~~

ATTENTION: _____

SEND RESULTS TO:

Client Name GERARD TICE

Company GEORGIA PACIFIC CORPORATION

Address _____

Phone _____

PROJECT NAME LITTLE VALLEY PROJECT NO. 88298.005 (SHN) P.O. NO. —

Relinquished by: *(Signature)* — Received by: *(Signature)* — Date — Time

Relinquished by: *(Signature)* — Received by: *(Signature)* — Date — Time

Relinquished by: *(Signature)* — Received at lab by: *(Signature)* — Date — Time

Relinquished from lab by: *(Signature)* — Received by: *(Signature)* — Date — Time

ANALYSIS REQUEST

Sample ID Number	Sample Description	Date/Time Sampled	Analysis Requested	Sample Condition Upon Receipt
LVSL5	Soil/Top 2in	4/16/91 1400	Cl, TOC, Solvent (8290?)	
LVSL6	Next 2in	↓	↓	
LVSL3	Top 2in	4/17/91 1115		
LVSL4	Next 2in	1115		
LVSC7	Top 2in	1420		
LVSC8	Next 2in	1420		

Special Instructions/Comments:

SHN ARCHIVE: NO TEST UNLESS GP. AUTHORIZATION — SHIP TO GP. AS REQUESTED

NOTE: UNUSED PORTIONS OF NON-AQUEOUS SAMPLES WILL BE RETURNED TO CLIENT

Expected Analytical T.A.T's: _____ Immediate Attention (200% surcharge) _____ RUSH (50-100% surcharge) _____ Standard

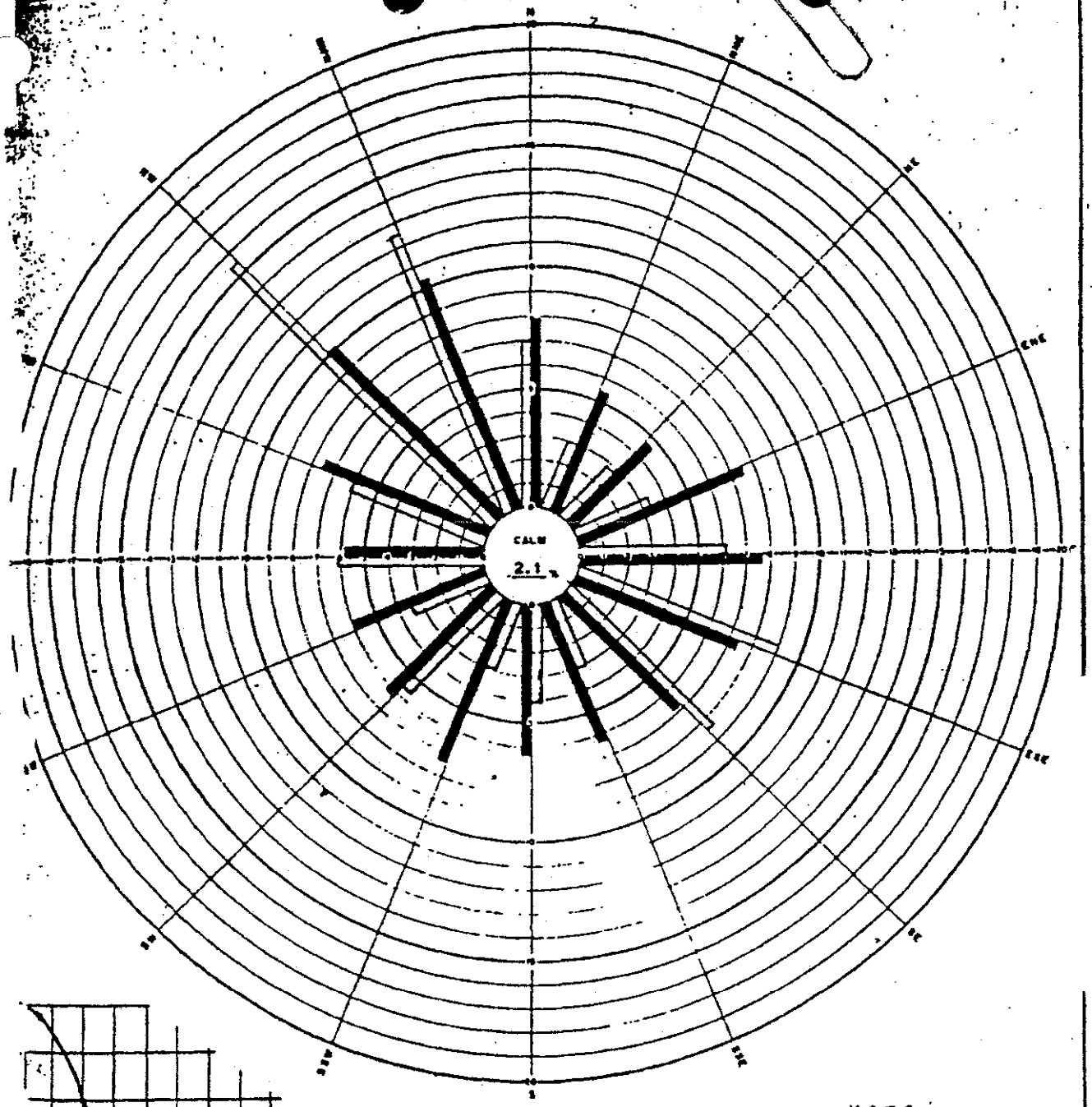
Cal Lab ID Number: (for *lab use only*)

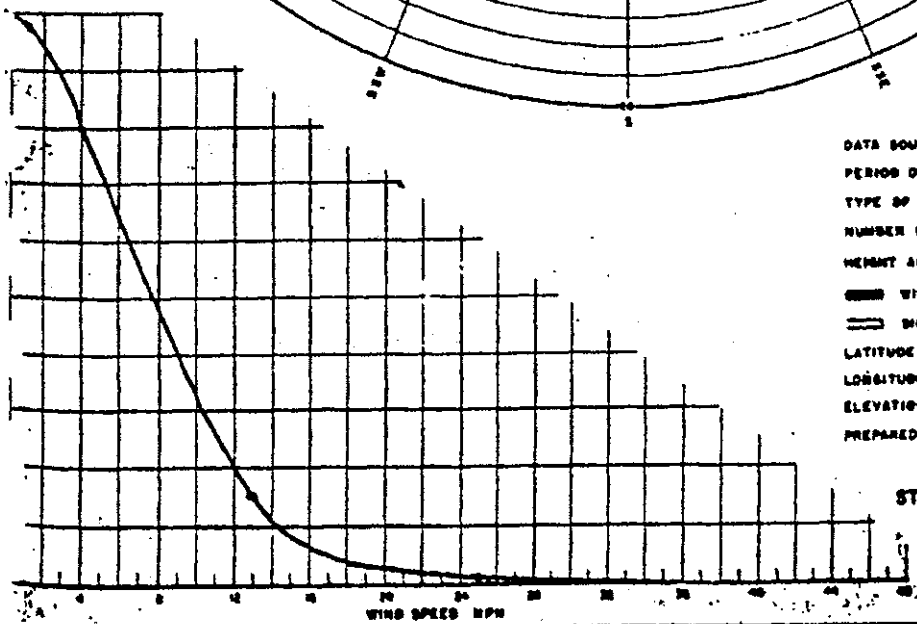
APPENDIX B

WIND ROSE

ANNUAL WIND ROSE

PLATE 53





DATA SOURCE: U.S.W.B.

PERIOD OF RECORD: 1943 - 49

TYPE OF OBSERVATION: HOURLY

NUMBER OF OBSERVATIONS: 17,271

HEIGHT ABOVE GROUND (FEET)

WIND SPEED IN MILES PER HOURS

DIRECTION BY PERCENT

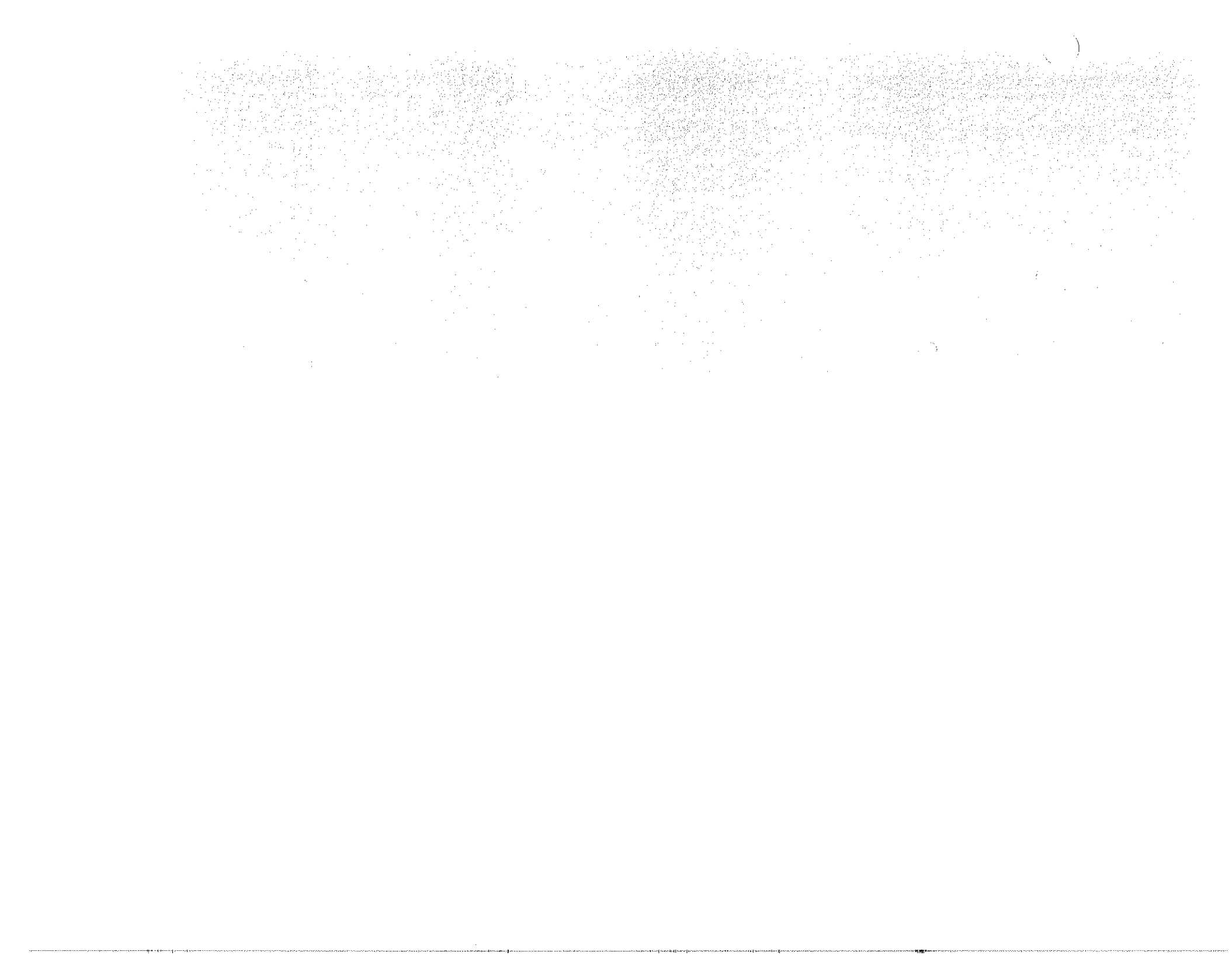
LATITUDE: 39°28' N

LONGITUDE: 123°49'

ELEVATION: 78'

PREPARED BY: R. BOOKIN DATE: 1-28-52

STATION FORT BRAGG



Georgia-Pacific Corporation
Wood Products
Manufacturing Division
P.O. Box 105603
Atlanta. Georgia 30348
Telephone (404) 521-4000

April 12, 1991

WATER QUALITY
CONTROL BOARD
REGION 1

APR 18 '91

Mr. Mark Neely
California Regional Water Quality
Control Board
North Coast Region
1440 Guerneville Road
Santa Rosa, CA 95403

☐BK ___ ☐RK ___
☐CJ ___ ☐LR ___
☐FR ___ ☐RB ___
☐RT ___ ☐KD ___
☐JH ___ ☐JB ___
☐SW ___ ☒ MDN/MKH
☐ ___ ☐REPLY
☐ALL STAFF ☐FILE G-P FT. BRAGG SOL ANNED.

RE: Little Valley Site
Aquatic Sampling
Fort Bragg, CA

Dear Mr. Neely:

I spoke to Frank Reichmuth yesterday and told him we wanted to move our sampling dates at Little Valley up one day to April 16 and 17, 1991. He was not sure of your schedule but indicated it would be acceptable to go ahead with those dates, and so we plan to do that.

I have determined that if we obtain the samples next week as planned, Enseco Lab will be able to complete the analysis in four(4) weeks, which will allow us to have a report to you by May 31, 1991. I believe you indicated this schedule, although tight, will allow this issue to be on the agenda for the June, 1991 NCRWQCB board meeting so that our permit can be renewed before its' scheduled July 1, 1991 expiration.

This schedule, of course, depends on everything occurring as planned, and, as you know, that doesn't always happen. There is always the possibility of problems obtaining the samples in the field, lab delays or other unforseen problems. I will let you know immediately if there is a delay.

As you know, we have not been able to conduct this aquatic sampling because of excessive rain in the area. High water and flooding conditions which existed have made sampling impossible. Had ve been able to do the sampling in early March, 1991 as we had scheduled, we would have been able to submit the results much earlier.

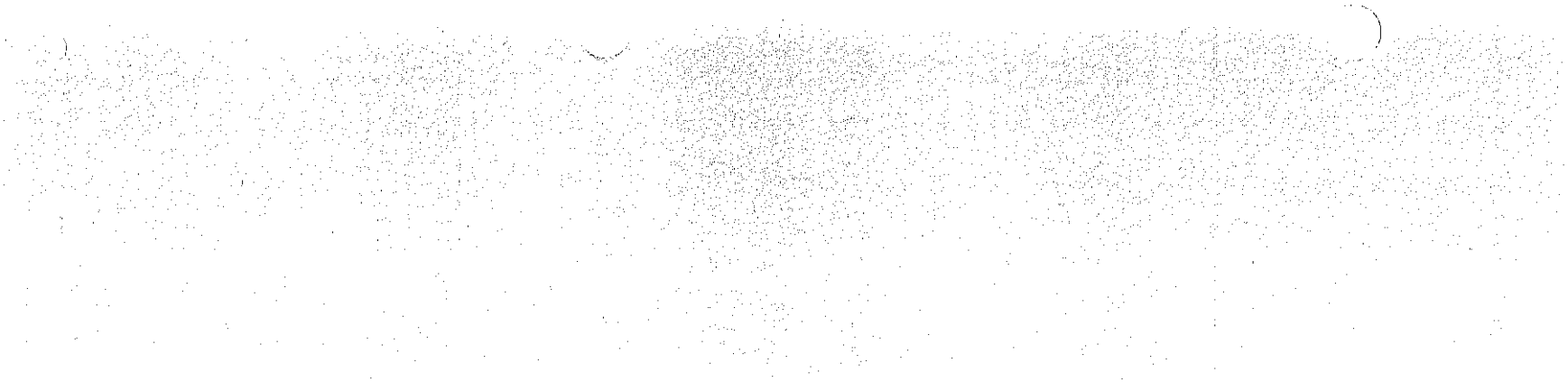
We look forward to seeing you at Fort Bragg on April 16, 1991.

Very truly yours,

GERALD W. TICE
SENIOR MANAGER
ENVIRONMENTAL ENGINEERING
BUILDING PRODUCTS

GWT/pcw

CC: Mr. D. Whitman



California Analytical Laboratory

Enseco
A CORNING company

May 1, 1991
Lab ID: **057880**

Gerald Tice
Georgia Pacific
133 Peachtree St. NE
Atlanta, GA **30348**

Dear Mr. Tice:

Enclosed is the report for the six plant and four fish samples which were received at Enseco-Cal Lab on 19 April 1991.

The report consists of the following sections:

I Sample Description
II Analysis Request
III Quality Control Report
IV Analysis Results

As you requested, three root samples and two fish samples were archived and were not analyzed.

If you have any questions, please feel free to call

Sincerely,

Michael J. Miille, Ph.D.
Division Director

Kathleen A. Gill
Program Administrator

mow

Enseco Incorporated
2544 Industrial Boulevard
West Sacramento, California 95691
916/372-1393 Fax: 916/372-7768

I Sample Description

See the attached Sample Description Information.

The samples were received under chain-of-custody.

II Analysis Reauest

The following analytical test was requested.

Lab ID	Analysis Description
057880-1 thru 3,7,8	Cl_4-Cl_8 Dioxins/Furans plus 2,3,7,8-Substituted Isomers

III Oualitv Control

A. Project Specific QC. No project specific QC (i.e., spikes and/or duplicates) was requested.

B. Method Blank Results. A method blank is a laboratory-generated sample which assesses the degree to which laboratory operations and procedures cause false-positive analytical results for your samples.

No target parameters were detected in the method blank associated with your samples at or above the detection limits noted on the data sheet in the Analytical Result Section.

IV Analysis Results

Test methods for all analyses except chlorinated dioxins and furans, may include minor modifications of published EPA Methods such as reporting limits or parameter lists. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e., no correction is made for moisture content, unless the method requires or the client requests that such correction be made.

For pulp and paper industry samples, test methods for chlorinated dioxin/furan analyses will follow NCASI Technical Bulletin 551 unless otherwise noted. Pulp and sludge samples are air dried and prepared per this method. All results for these analyses, including detection limits, are reported on a dry weight basis.

Detection limits are reported on a sample specific basis. All results are recovery corrected per the isotope dilution technique.

Results are on the attached data sheets.

Enseco
A Corning Company

SAMPLE DESCRIPTION INFORMATION
for
Georgia Pacific

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
057880-0001-SA	LVL-ROOTS 1	TISSUE	16 APR 91	16:00	19 APR 91
057880-0001-MB	Method Blank	TISSUE			19 APR 91
057880-0002-SA	LVU-ROOTS	TISSUE	17 APR 91	12:20	19 APR 91
057880-0003-SA	LVC-ROOTS	TISSUE	17 APR 91	14:00	19 APR 91
057880-0004-SA	LVL-ROOTS-ARCHIVE	TISSUE	16 APR 91	16:50	19 APR 91
057880-0005-SA	LVU-ROOTS-ARCHIVE	TISSUE	17 APR 91	12:20	19 APR 91
057880-0006-SA	LVC-ROOTS-ARCHIVE	TISSUE	17 APR 91	15:00	19 APR 91
057880-0007-SA	LVU-FISH	TISSUE	16 APR 91	10:54	19 APR 91
057880-0007-MB	Method Blank	TISSUE			19 APR 91
057880-0008-SA	LVL-FISH	TISSUE	16 APR 91	14:50	19 APR 91
057880-0009-SA	LVU-FISH-ARCHIVE	TISSUE	16 APR 91	14:50	19 APR 91
057880-0010-SA	LVL-FISH-ARCHIVE	TISSUE	16 APR 91	10:54	19 APR 91

Enseco
A Corning Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Georgia Pacific
Client ID: Method Blank
Lab ID: 057880-0001-MB
Matrix: TISSUE
Authorized: 19 APR 91

Sampled: NA
Prepared: 23 APR 91

Received: NA
Analyzed: 26 APR 91

Sample Amount 10.0 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	0.55	
2,3,7,8-TCDF	ND	pg/g	0.16	
PeCDFs (total)	ND	pg/g	0.28	
1,2,3,7,8-PeCDF	ND	pg/g	0.28	
2,3,4,7,8-PeCDF	ND	pg/g	0.19	
HxCDFs (total)	ND	pg/g	0.23	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.19	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.15	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.16	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.23	
HpCDFs (total)	ND	pg/g	0.32	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	0.32	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.13	
OCDF	ND	pg/g	0.51	
Dioxins				
TCDDs (total)	ND	pg/g	1.2	
2,3,7,8-TCDD	ND	pg/g	0.31	
PeCDDs (total)	ND	pg/g	0.28	
1,2,3,7,8-PeCDD	ND	pg/g	0.28	
HxCDDs (total)	ND	pg/g	0.51	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.48	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.51	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.30	
HpCDDs (total)	ND	pg/g	0.61	
1,2,3,4,6,7,8-HpCDD	ND	pg/g	0.61	
OCDD	ND	pg/g	1.6	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Karen Evers

Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A Corning Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Georgia Pacific
Client ID: Method Blank
Lab ID: 057880-0001-MB
Matrix: TISSUE
Authorized: 19 APR 91

Sampled: NA
Prepared: 23 APR 91

Received: NA
Analyzed: 26 APR 91

Sample Amount 10.0 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	34
13C-2,3,7,8-TCDD	30
13C-1,2,3,7,8-PeCDD	25
13C-1,2,3,6,7,8-HxCDD	26
13C-1,2,3,4,6,7,8-HpCDD	23
13C-OCDD	12

ND = Not detected
NA = Not applicable

Reported By: Karen Evers

Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A Corning Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Georgia Pacific
Client ID: LVL-ROOTS 1
Lab ID: 057880-0001-SA
Matrix: TISSUE
Authorized: 19 APR 91

Sampled: 16 APR 91
Prepared: 23 APR 91

Received: 19 APR 91
Analyzed: 26 APR 91

Sample Amount 10.0 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	1.8	
2,3,7,8-TCDF	ND	pg/g	0.26	
PeCDFs (total)	ND	pg/g	0.22	
1,2,3,7,8-PeCDF	ND	pg/g	0.14	
2,3,4,7,8-PeCDF	ND	pg/g	0.070	
HxCDFs (total)	ND	pg/g	0.21	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.21	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.12	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.14	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.16	
HpCDFs (total)	ND	pg/g	0.30	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	0.30	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.10	
OCDF	ND	pg/g	0.52	
Dioxins				
TCDDs (total)	ND	pg/g	2.7	
2,3,7,8-TCDD	ND	pg/g	0.23	
PeCDDs (total)	ND	pg/g	0.26	
1,2,3,7,8-PeCDD	ND	pg/g	0.26	
HxCDDs (total)	ND	pg/g	0.040	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.040	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.030	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.020	
HpCDDs (total)	ND	pg/g	0.66	
1,2,3,4,6,7,8-HpCDD	ND	pg/g	0.41	
OCDD	ND	pg/g	2.3	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Karen Evers
Approved By: Mike Filigenzi

The cover letter is an integral part of this report.
Rev 230787

Enseco
A Corning Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Georgia Pacific
Client ID: LVL-ROOTS 1
Lab ID: 057880-0001-SA
Matrix: TISSUE Sampled: 16 APR 91 Received: 19 APR 91
Authorized: 19 APR 91 Prepared: 23 APR 91 Analyzed: 26 APR 91

Sample Amount 10.0 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	54
13C-2,3,7,8-TCDD	51
13C-1,2,3,7,8-PeCDD	49
13C-1,2,3,6,7,8-HxCDD	54
13C-1,2,3,4,6,7,8-HpCDD	50
13C-OCDD	35

ND = Not detected
NA = Not applicable

Reported By: Karen Evers Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A Corning Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Georgia Pacific Corp.
client ID: Method Blank
Lab ID: 057880-0002-MB
Matrix: TISSUE Sampled: NA Received: NA
Authorized: NA Prepared: 08 KAY 91 Analyzed: 14 MAY 91

Sample Amount: 50 6
Percent Moisture: NA

Parameter	Result	Units	Detection Limit
Furans			
TCDFs (total)	ND	pg/g	0.24
2,3,7,8-TCDF	ND	pg/g	0.24
PeCDFs (total)	ND	pg/g	0.43
1,2,3,7,8-PeCDF	ND	pg/g	0.43
2,3,4,7,8-PeCDF	ND	pg/g	0.43
HxCDFs (total)	ND	pg/g	0.39
1,2,3,4,7,8-HxCDF	ND	pg/g	0.34
1,2,3,6,7,8-HxCDF	ND	pg/g	0.25
2,3,4,6,7,8-HxCDF	ND	pg/g	0.39
1,2,3,7,8,9-HxCDF	ND	pg/g	0.33
HpCDFs (total)	ND	pg/g	0.51
1,2,3,4,6,7,8-HpCDF	ND	pg/g	0.37
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.51
OCDF	ND	pg/g	0.78
Dioxins			
TCDDs (total]	ND	pg/g	0.55
2,3,7,8-TCDD	ND	pg/g	0.55
PeCDDs (total)	ND	pg/g	0.51
1,2,3,7,8-PeCDD	ND	pg/g	0.51
HxCDD (total)	ND	pg/g	0.59
1,2,3,4,7,8-HxCDD	ND	pg/g	0.53
1,2,3,6,7,8-HxCDD	ND	pg/g	0.59
1,2,3,7,8,9-HxCDD	ND	pg/g	0.39
HpCDDs (total)	ND	pg/g	0.71
1,2,3,4,6,7,8-HpCDD	ND	pg/g	0.71
OCDD	ND	pg/g	5.1

(continued on following page)

ND=Not Detected
NA-Not Applicable

Reported by: Najat Mobaslat Approved by: Hike Filigenzi

The cover letter is an integral part of this report.

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A Corning Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Georgia Pacific Corp.
Client ID: Method Blank
Lab ID: 057880-0002-ME
Matrix: TISSUE Sampled: NA Received: NA
Authorized: NA Prepared: 08 MAY 91 Analyzed: 14 MAY 91

Sample Amount: 5.0 G
Percent Moisture: NA

	% Recovery
13C-2,3,7,8-TCDF	98
13C-2,3,7,8-TCDD	87
13C-1,2,3,7,8-PeCDD	67
13C-1,2,3,6,7,8-HxCDD	62
13C-1,2,3,4,6,7,8-HpCDD	72
13C-OCDD	62

ND=Not Detected
NA=Not Applicable

Reported by: Najat Mobaslat Approved by: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A Corning Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Georgia Pacific Corp.
Client ID: LVU-Roots (Re-extraction)
Lab ID: 057880-0002-SA
Matrix: TISSUE Sampled: 17 APR 91 Received: 19 APR 91
Authorized: 19 APR 91 Prepared: 08 MAY 91 Analyzed: 14 MAY 91

Sample Amount: 5.0 G
Percent Moisture: NA

Parameter	Result	Units	Detection Limit
Furans			
TCDFs (total)	ND	pg/g	0.47
2,3,7,8-TCDF	ND	pg/g	0.40
PeCDFs (total)	ND	pg/g	0.62
1,2,3,7,8-PeCDF	ND	pg/g	0.44
2,3,4,7,8-PeCDF	ND	pg/g	0.62
HxCDFs (total)	ND	pg/g	0.66
1,2,3,4,7,8-HxCDF	NO	pg/g	0.58
1,2,3,6,7,8-HxCDF	NO	pg/g	0.42
2,3,4,6,7,8-HxCDF	ND	pg/g	0.66
1,2,3,7,8,9-HxCDF	ND	pg/g	0.56
HpCDFs (total)	ND	pg/g	0.38
1,2,3,4,6,7,8-HpCDF	ND	pg/g	0.28
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.38
OCDF	ND	pg/g	0.70
Dfoxins			
TCDDs (total)	ND	pg/g	0.68
2,3,7,8-TCDD	ND	pg/g	0.58
PeCDDs (total)	ND	pg/g	0.61
1,2,3,7,8-PeCDD	ND	pg/g	0.61
HxCDD (total)	ND	pg/g	0.67
1,2,3,4,7,8-HxCDD	ND	pg/g	0.67
1,2,3,6,7,8-HxCDD	ND	pg/g	0.62
1,2,3,7,8,9-HxCDD	ND	pg/g	0.41
HpCDDs (total)	ND	pg/g	1.1
1,2,3,4,6,7,8-HpCDD	ND	pg/g	1.1
OCDD	ND	pg/g	5.8

(continued on following page)

ND=Not Detected
NA-Not Applicable

Reported by: Najat Mobaslat Approved by: Mike Flligenzi

The cover letter is an integral part of this report.

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A Corning Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Georgia Pacific Corp.
Client ID: LVU-Roots (Re-extraction)
Lab ID: 057880-0002-SA
Matrix: TISSUE Sampled: 17 APR 91 Received: 19 APR 91
Authorfzed: 19 APR 91 Prepared: 08 MAY 91 Analyzed: 14 MAY 91

Sample Amount: 5.0 6
Percent Moisture: NA

	% Recovery
13C-2,3,7,8-TCDF	94
13C-2,3,7,8-TCDD	89
13C-1,2,3,7,8-PeCDD	49
13C-1,2,3,6,7,8-HxCDD	49
13C-1,2,3,4,6,7,8-HpCDD	61
13C-OCDD	56

ND=Not Detected
NA=Not Applicable

Reported by: Najat Mobaslat Approved by: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A Corning Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Georgia Pacific
Client ID: LVC-ROOTS
Lab ID: 057880-0003-SA
Matrix: TISSUE Sampled: 17 APR 91 Received: 19 APR 91
Authorized: 19 APR 91 Prepared: 23 APR 91 Analyzed: 26 APR 91

Sample Amount 10.0 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	2.6	
2,3,7,8-TCDF	ND	pg/g	0.23	
PeCDFs (total)	ND	pg/g	0.95	
1,2,3,7,8-PeCDF	ND	pg/g	0.26	
2,3,4,7,8-PeCDF	ND	pg/g	0.35	
HxCDFs (total)	ND	pg/g	0.74	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.27	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.16	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.15	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.37	
HpCDFs (total)	ND	pg/g	0.36	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	0.33	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.12	
OCDF	ND	pg/g	0.92	
Dioxins				
TCDDs (total)	ND	pg/g	2.2	
2,3,7,8-TCDD	ND	pg/g	0.28	
PeCDDs (total)	ND	pg/g	0.53	
1,2,3,7,8-PeCDD	ND	pg/g	0.19	
HxCDDs (total)	ND	pg/g	0.29	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.29	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.26	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.19	
HpCDDs (total)	ND	pg/g	0.83	
1,2,3,4,6,7,8-HpCDD	ND	pg/g	0.53	
OCDD	ND	pg/g	2.5	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Brett Bordelon Approved By: Mike Filigenzi

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Georgia Pacific
Client ID: LVC-ROOTS
Lab ID: 057880-0003-SA
Matrix: TISSUE
Authorized: 19 APR 91

Sampled: 17 APR 91
Prepared: 23 APR 91

Received: 19 APR 91
Analyzed: 26 APR 91

Sample Amount 10.0 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	45
13C-2,3,7,8-TCDD	41
13C-1,2,3,7,8-PeCDD	39
13C-1,2,3,6,7,8-HxCDD	41
13C-1,2,3,4,6,7,8-HpCDD	42
13C-OCDD	32

ND = Not detected
NA = Not applicable

Reported By: Brett Bordelon

Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

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A Corning Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Georgia Pacific
Client ID: Method Blank
Lab ID: 057880-0007-MB
Matrix: TISSUE Sampled: NA Received: NA
Authorfzed: 19 APR 91 Prepared: 23 APR 91 Analyzed: 26 APR 91

Sample Amount 10.0 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	2.5	
2,3,7,8-TCDF	ND	pg/g	0.18	
PeCDFs (total	ND	pg/g	1.0	
1,2,3,7,8-PeC F	ND	pg/g	0.18	
2,3,4,7,8-PeCDF	ND	pg/g	0.18	
HxCDFs (total)	ND	pg/g	0.19	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.16	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.11	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.17	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.19	
HpCDFs (total)	ND	pg/g	0.23	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	0.21	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.15	
OCDF	ND	pg/g	0.45	
Dioxins				
TCDDs (total)	ND	pg/g	3.0	
2,3,7,8-TCDD	ND	pg/g	0.27	
PeCDDs (total	ND	pg/g	0.20	
1,2,3,7,8-PeC D	ND	pg/g	0.20	
HxCDDs (total)	ND	pg/g	0.18	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.18	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.17	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.12	
HpCDDs (total)	ND	pg/g	0.60	
1,2,3,4,6,7,8-HpCDD	ND	pg/g	0.32	
OCDD	ND	pg/g	2.0	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Maricon Estrada Approved By: Mike Filigenzi

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Rev 230787

Enseco
A Corning Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Georgia Pacific
Client ID: Method Blank
Lab ID: 057880-0007-MB
Matrix: TISSUE Sampled: NA Received: NA
Authorized: 19 APR 91 Prepared: 23 APR 91 Analyzed: 26 APR 91

Sample Amount 10.0 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	52
13C-2,3,7,8-TCDD	48
13C-1,2,3,7,8-PeCDD	44
13C-1,2,3,6,7,8-HxCDD	46
13C-1,2,3,4,6,7,8-HpCDD	42
13C-OCDD	30

ND = Not detected
NA = Not applicable

Reported By: Maricon Estrada Approved By: Mike Filigenzi

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Rev 230787

Enseco
A Corning Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Georgia Pacific
Client ID: LVU-FISH
Lab ID: 057880-0007-SA
Matrix: TISSUE
Authorized: 19 APR 91
Sampled: 16 APR 91
Prepared: 23 APR 91
Received: 19 APR 91
Analyzed: 26 APR 91

Sample Amount 5.0 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	6.4	
2,3,7,8-TCDF	ND	pg/g	0.53	
PeCDFs (total)	ND	pg/g	1.5	
1,2,3,7,8-PeCDF	ND	pg/g	0.20	
2,3,4,7,8-PeCDF	ND	pg/g	0.87	
HxCDFs (total)	ND	pg/g	1.3	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.31	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.23	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.22	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.26	
HpCDFs (total)	ND	pg/g	0.64	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	0.57	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.68	
OCDF	ND	pg/g	1.4	
Dioxins				
TCDDs (total)	ND	pg/g	5.0	
2,3,7,8-TCDD	ND	pg/g	0.74	
PeCDDs (total)	ND	pg/g	0.63	
1,2,3,7,8-PeCDD	ND	pg/g	0.63	
HxCDDs (total)	ND	pg/g	0.58	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.58	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.52	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.38	
HpCDDs (total)	ND	pg/g	0.93	
1,2,3,4,6,7,8-HpCDD	ND	pg/g	0.93	
OCDD	ND	pg/g	4.6	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Maricon Estrada
Approved By: Mike Filigenzi

The cover letter is an integral part of this report.
Rev 230787

Enseco
A Corning Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Georgia Pacific
Client ID: LVU-FISH
Lab ID: 057880-0007-SA
Matrix: TISSUE Sampled: 16 APR 91 Received: 19 APR 91
Authorized: 19 APR 91 Prepared: 23 APR 91 Analyzed: 26 APR 91

Sample Amount 5.0 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	54
13C-2,3,7,8-TCDD	51
13C-1,2,3,7,8-PeCDD	48
13C-1,2,3,6,7,8-HxCDD	50
13C-1,2,3,4,6,7,8-HpCDD	45
13C-OCDD	27

ND = Not detected
NA = Not applicable

Reported By: Maricon Estrada Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A Corning Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Georgia Pacific
Client ID: LVL-FISH
Lab ID: 057880-0008-SA
Matrix: TISSUE
Authorized: 19 APR 91
Sampled: 16 APR 91
Prepared: 23 APR 91
Received: 19 APR 91
Analyzed: 26 APR 91

Sample Amount . 10.0 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	4.0	
2,3,7,8-TCDF	ND	pg/g	0.32	
PeCDFs (total)	ND	pg/g	1.5	
1,2,3,7,8-PeCDF	ND	pg/g	0.25	
2,3,4,7,8-PeCDF	ND	pg/g	0.27	
HxCDFs (total)	ND	pg/g	0.27	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.21	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.15	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.11	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.13	
HpCDFs (total)	ND	pg/g	0.43	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	0.38	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.17	
OCDF	ND	pg/g	1.3	
Dioxins				
TCDDs (total)	ND	pg/g	3.9	
2,3,7,8-TCDD	ND	pg/g	0.42	
PeCDDs (total)	ND	pg/g	1.7	
1,2,3,7,8-PeCDD	ND	pg/g	0.34	
HxCDDs (total)	ND	pg/g	0.50	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.26	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.23	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.17	
HpCDDs (total)	ND	pg/g	0.66	
1,2,3,4,6,7,8-HpCDD	ND	pg/g	0.66	
OCDD	ND	pg/g	2.8	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Maricon Estrada
Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

Enseco
A Corning Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Georgia Pacific
Client ID: LVL-FISH
Lab ID: 057880-0008-SA
Matrix: TISSUE Sampled: 16 APR 91 Received: 19 APR 91
Authorized: 19 APR 91 Prepared: 23 APR 91 Analyzed: 26 APR 91

Sample Amount 10.0 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	39
13C-2,3,7,8-TCDD	34
13C-1,2,3,7,8-PeCDD	32
13C-1,2,3,6,7,8-HxCDD	35
13C-1,2,3,4,6,7,8-HpCDD	27
13C-OCDD	14

ND = Not detected
NA = Not applicable

Reported By: Maricon Estrada Approved By: Mike Filigenzi

The cover letter is an inte ral part of this report.
Rev 238787

Enseco

CHAIN-OF-CUSTODY RECORD

SAMPLER: (Signature) Dan Gruss
Phone (707) 459-0681
Date Shipped 4/18/91
Airbill No.
Carrier Federal Express
Cooler No. 1

SHIP TO:
Enseco-Cal Lab
2544 Industrial Blvd.
West Sacramento, CA 95691
(916) 372-1393
ATTENTION:

SEND RESULTS TO:
Client Name GERALD ICE
Company GEORGIA-PACIFIC CORPORATION
Address 133 PEACHTREE ST. N.E. (30303)
PO BOX 105603 ATLANTA GA 30348
Phone (404) 521-5084

PROJECT NAME GP-FOOT BEACH (LITTLE VALLEY) PROJECT NO. 90-065 P.O. NO.

Relinquished by: (Signature)	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Received by: (Signature) Jerry Wilson	4-19-91	0925
Relinquished by: (Signature)	Received at lab by: (Signature)	Date	Time
Relinquished from lab by: (Signature)	Received by: (Signature)	Date	Time

ANALYSIS REQUEST

Sample ID Number	Sample Description	Date/Time Sampled	Analysts Requested	Sample Condition Upon Receipt
LVL-ROOTS1			TCDD, TCDF, C14 to C18 & ISOMERS (8290)	good
LVU-ROOTS		4/17/91 12:20 PM	TCDD, TCDF, C14 to C18 & isomers (8290)	
LVC-ROOTS		4/17/91 2:50 PM	TCDD, TCDF, C14 to C18 & isomers (8290)	
LVL_ROOTS-	4:50 PM	4/16/91 ~~4/20~~	Do not test	
LVU-	-ARCHIVE 12:00	4/17/91	"	
LVC-	-ARCHIVE 5:00 PM	4/17/91	"	

Special Instructions/Comments: ① Thorough, with, - for cleaning of all mud + elements. ② Do not test archive samples. ③ Rush per discussion with G.P. ④ Verify ~~test~~ analysis requested with G.P. ⑤ Archive the archive samples until further notice.

NOTE: UNUSED PORTIONS OF NON-AQUEOUS SAMPLES WILL BE RETURNED TO CLIENT

Expected Analytical TAT's: ____ Immediate Attention (200% surcharge) R✓ush (50-100% surcharge) ____ Standard

Cal Lab ID Number: *(for lab use only)*

Client Retains White Copy Only

(Revised 1/87)

Enseco

CHAIN-OF-CUSTODY RECORD

SAMPLER: (Signature) [signature]
Phone (707) 239-0681
Date Shipped 4/18/91
Airbill No.
Carrier Federal Express
Cooler No. #1

SHIP TO:
Enseco-Cal Lab
2544 **Industrial** Blvd.
West Sacramento. CA *95691*
(916) *372-1393*
ATTENTION:

SEND RESULTS TO:
Client Name GERALD TICE
Company GEORGIA-PACIFIC CORPORATION
Address 133 PEACHTREE ST N.E. (30303)
P.O. BOX 105603 ATLANTA GA. 30348
Phone (404) 521-5084

PROJECT NAME _____ PROJECT NO. _____ P.O. NO. _____

Relinquished by: *(Signature)*	Received by: *(Signature)*	Date	Time
Relinquished by: *(Signature)*	Received by: *(Signature)*	Date	Time
	Jerry Wilson	4-19-91	0925
Relinquished by: *(Signature)*	Received at lab by: *(Signature)*	Date	Time
Relinquished from lab by: *(Signature)*	Received by: *(Signature)*	Date	Time

ANALYSIS REQUEST

Sample ID Number	Sample Description	Date/Time Sampled	Analysis Requested	Sample Condition Upon Receipt
[redacted]				
LVL-FISH		4/16/91 10:54 AM	TCDD, TCDF, C14 to C18 & isomers (8290)	good
LVL FISH		4/16/91 2:50 PM	TCDD, TCDF, C14 to C18 & isomers (8290)	
LVL-FISH-ARCHIVE		4/16/91 12:50 PM	Do not test	
[redacted]				
LVL-FISH-ARCHIVE		4/16/91 10:54 AM	Do not test.	

Special Instructions/Comments: (1) Do not test archive samples. (2) Archive the archive samples until further notice. (3) Rush per discussion with GP

NOTE: **UNUSED PORTIONS** OF **NON-AQUEOUS SAMPLES** WILL **BE RETURNED** TO **CLIENT**

Expected Analytical T.A.T's: ____ Immediate Attention (200% surcharge) ____✓____ **RUSH** (50-100% surcharge) ____ **Standard**

Cal Lab ID Number: *(for lab use only)*

Client Retains *White* Copy Only

(Revised 1/87)

Enseco
A CORNING Company

May 3, 1991
Lab ID: 057878

Gerald Tice
Georgia Pacific
133 Peachtree St. NE
Atlanta, GA 30348

Dear Mr. Tice:

Enclosed is the report for the six soil samples for your Little Valley Project, Number (SHN)88298.005, which were received at Enseco-Cal Lab on 19 April 1991.

The report consists of the following sections:

I Sample Description
II Analysis Request
III Quality Control Report
IV Analysis Results

If you have any questions, please feel free to call.

Sincerely,

Michael J. Miille, Ph.D.
Division Director

Kathleen A. Gill
Program Administrator

nm

Enseco Incorporated
2544 Industrial Boulevard
West Sacramento, California 95691
916/372-1393 Fax: 916/372-7768

Enseco
A Corning Company

I Sample Description

See the attatched Sample Description Information.

The samples were received under chain-of-custody.

II Analysis Request

The following analytical test was requested.

Lab ID	Analysis Description
057878-1 thru 6	Cl_4-Cl_8 Dioxins/Furans plus 2,3,7,8- Substituted Isomers

III Quality Control

A. Project Specific QC. No project specific QC (i .e., spikes and/or duplicates) was requested.

B. Method Blank Results. A method blank is a laboratory-generated sample which assesses the degree to which laboratory operations and procedures cause false-positive analytical results for your samples.

No target parameters were detected in the method blank associated with your samples at or above the detection limits noted on the data sheet in the Analysis Results Section.

IV Analysis Results

Test methods for all analyses except chlorinated dioxins and furans, may include minor modifications of published EPA Methods such as reporting limits or parameter lists. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e., no correction is made for moisture content, unless the method requires or the client requests that such correction be made.

For pulp and paper industry samples, test methods for chlorinated dioxin/furan analyses will follow NCASI Technical Bulletin 551 unless otherwise noted. Pulp and sludge samples are air dried and prepared per this method. All results for these analyses, including detection limits, are reported on a dry weight basis.

Detection limits are reported on a sample specific basis. All results are recovery corrected per the isotope dilution technique.

Results are on the attached data sheets.

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SAMPLE DESCRIPTION INFORMATION
for
Georgia Pacific

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
057878-0001-SA	LVSL 5	SOIL	16 APR 91	14:00	19 APR 91
057878-0001-MB	Method Blank	SOIL			19 APR 91
057878-0002-SA	LVSL 6	SOIL	16 APR 91	14:00	19 APR 91
057878-0003-SA	LVSU 3	SOIL	17 APR 91	11:15	19 APR 91
057878-0004-SA	LVSU 4	SOIL	17 APR 91	11:15	19 APR 91
057878-0005-SA	LVSC 7	SOIL	17 APR 91	14:20	19 APR 91
057878-0006-SA	LVSC 8	SOIL	17 APR 91	14:20	19 APR 91

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Georgia Pacific
Client ID: Method Blank
Lab ID: 057878-0001-MB
Matrix: SOIL
Authorized: 19 APR 91
Sampled: NA
Prepared: 22 APR 91
Received: NA
Analyzed: 25 APR 91

Sample Amount 10.0 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	0.47	
2,3,7,8-TCDF	ND	pg/g	0.47	
PeCDFs (total)	ND	pg/g	0.44	
1,2,3,7,8-PeCDF	ND	pg/g	0.44	
2,3,4,7,8-PeCDF	ND	pg/g	0.44	
HxCDFs (total)	ND	pg/g	1.1	
1,2,3,4,7,8-HxCDF	ND	pg/g	1.1	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.63	
1,2,3,7,8,9-HxCDF	ND	pg/g	1.1	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.93	
HpCDFs (total)	ND	pg/g	2.2	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	1.8	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	2.2	
OCDF	ND	pg/g	0.94	
Dioxins				
TCDDs (total)	ND	pg/g	0.65	
2,3,7,8-TCDD	ND	pg/g	0.65	
PeCDDs (total	ND	pg/g	0.41	
1,2,3,7,8-PeC D	ND	pg/g	0.41	
HxCDDs (total)	ND	pg/g	1.7	
1,2,3,4,7,8-HxCDD	ND	pg/g	1.7	
1,2,3,6,7,8-HxCDD	ND	pg/g	1.2	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.89	
HpCDDs (total)	ND	pg/g	0.91	
1,2,3,4,6,7,8-HpCDD	ND	pg/g	0.91	
OCDD	ND	pg/g	4.4	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Monte White
Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Georgia Pacific
Client ID: Method Blank
Lab ID: 057878-0001-MB
Matrix: SOIL Sampled: NA Received: NA
Authorized: 19 APR 91 Prepared: 22 APR 91 Analyzed: 25 APR 91

Sample Amount 10.0 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	73
13C-2,3,7,8-TCDD	73
13C-1,2,3,7,8-PeCDD	59
13C-1,2,3,6,7,8-HxCDD	48
13C-1,2,3,4,6,7,8-HpCDD	56
13C-OCDD	44

ND = Not detected
NA = Not applicable

Reported By: Monte White Approved By: Mike Filigenzi

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Georgia Pacific
Client ID: LVSL 5
Lab ID: 057878-0001-SA
Matrix: SOIL
Authorized: 19 APR 91

Sampled: 16 APR 91
Prepared: 22 APR 91

Received: 19 APR 91
Analyzed: 25 APR 91

Sample Amount 10.2 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	0.49	
2,3,7,8-TCDF	ND	pg/g	0.49	
PeCDFs (total)	ND	pg/g	0.61	
1,2,3,7,8-PeCDF	ND	pg/g	0.61	
2,3,4,7,8-PeCDF	ND	pg/g	0.61	
HxCDFs (total)	ND	pg/g	2.0	
1,2,3,4,7,8-HxCDF	ND	pg/g	2.0	
1,2,3,6,7,8-HxCDF	ND	pg/g	1.1	
1,2,3,7,8,9-HxCDF	ND	pg/g	2.0	
2,3,4,6,7,8-HxCDF	ND	pg/g	1.7	
HpCDFs (total)	13	pg/g	--	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	2.5	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	3.3	
OCDF	ND	pg/g	4.2	
Dioxins				
TCDDs (total)	ND	pg/g	0.59	
2,3,7,8-TCDD	ND	pg/g	0.59	
PeCDDs (total)	ND	pg/g	0.76	
1,2,3,7,8-PeCDD	ND	pg/g	0.76	
HxCDDs (total)	ND	pg/g	2.1	
1,2,3,4,7,8-HxCDD	ND	pg/g	2.1	
1,2,3,6,7,8-HxCDD	ND	pg/g	1.4	
1,2,3,7,8,9-HxCDD	ND	pg/g	1.1	
HpCDDs (total)	14	pg/g	--	
1,2,3,4,6,7,8-HpCDD	7.7	pg/g	--	
OCDD	39	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Monte White

Approved By: Mike Filigenzi

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Georgia Pacific
Client ID: LVSL 5
Lab ID: 057878-0001-SA
Matrix: SOIL Sampled: 16 APR 91 Received: 19 APR 91
Authorized: 19 APR 91 Prepared: 22 APR 91 Analyzed: 25 APR 91

Sample Amount 10.2 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	72
13C-2,3,7,8-TCDD	73
13C-1,2,3,7,8-PeCDD	41
13C-1,2,3,6,7,8-HxCDD	32
13C-1,2,3,4,6,7,8-HpCDD	38
13C-OCDD	29

ND = Not detected
NA = Not applicable

Reported By: Monte White Approved By: Mike Filigenzi

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Georgia Pacific
Client ID: LVSL 6
Lab ID: 057878-0002-SA
Matrix: SOIL — Sampled: 16 APR 91 — Received: 19 APR 91
Authorized: 19 APR 91 — prepared: 22 APR 91 — Analyzed: 25 APR 91

Sample Amount 10.1 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	0.70	
2,3,7,8-TCDF	ND	pg/g	0.59	
PeCDFs (total)	ND	pg/g	1.4	
1,2,3,7,8-PeCDF	ND	pg/g	1.4	
2,3,4,7,8-PeCDF	ND	pg/g	1.4	
HxCDFs (total)	ND	pg/g	4.5	
1,2,3,4,7,8-HxCDF	ND	pg/g	4.5	
1,2,3,6,7,8-HxCDF	ND	pg/g	2.6	
1,2,3,7,8,9-HxCDF	ND	pg/g	4.5	
2,3,4,6,7,8-HxCDF	ND	pg/g	3.8	
HpCDFs (total)	ND	pg/g	7.4	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	5.6	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	7.4	
OCDF	ND	pg/g	6.8	
Dioxins				
TCDDs (total)	ND	pg/g	1.4	
2,3,7,8-TCDD	ND	pg/g	1.4	
PeCDDs (total)	ND	pg/g	1.8	
1,2,3,7,8-PeCDD	ND	pg/g	1.8	
HxCDDs (total)	ND	pg/g	1.9	
1,2,3,4,7,8-HxCDD	ND	pg/g	1.9	
1,2,3,6,7,8-HxCDD	ND	pg/g	1.9	
1,2,3,7,8,9-HxCDD	ND	pg/g	1.9	
HpCDDs (total)	ND	pg/g	2.9	
1,2,3,4,6,7,8-HpCDD	ND	pg/g	2.9	
OCDD	18	pg/g	--	

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ND = Not detected
NA = Not applicable

Reported By: Najat Mobaslat — Approved By: Mike Filigenzi

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Georgia Pacific
Client ID: LVSL 6
Lab ID: 057878-0002-SA
Matrix: SOIL
Authorized: 19 APR 91

Sampled: 16 APR 91
Prepared: 22 APR 91

Received: 19 APR 91
Analyzed: 25 APR 91

Sample Amount 10.1 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	71
13C-2,3,7,8-TCDD	71
13C-1,2,3,7,8-PeCDD	30
13C-1,2,3,6,7,8-HxCDD	25
13C-1,2,3,4,6,7,8-HpCDD	29
13C-OCDD	18

ND = Not detected
NA = Not applicable

Reported By: Najat Mobaslat

Approved By: Mike Filigenzi

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Georgia Pacific
Client ID: LVSU 3
Lab ID: 057878-0003-SA
Matrix: SOIL
Authorized: 19 APR 91
Sampled: 17 APR 91
Prepared: 22 APR 91
Received: 19 APR 91
Analyzed: 25 APR 91

Sample Amount 10.1 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	0.72	
2,3,7,8-TCDF	ND	pg/g	0.44	
PeCDFs (total)	ND	pg/g	0.75	
1,2,3,7,8-PeCDF	ND	pg/g	0.75	
2,3,4,7,8-PeCDF	ND	pg/g	0.74	
HxCDFs (total)	ND	pg/g	2.0	
1,2,3,4,7,8-HxCDF	ND	pg/g	2.0	
1,2,3,6,7,8-HxCDF	ND	pg/g	1.1	
1,2,3,7,8,9-HxCDF	ND	pg/g	2.0	
2,3,4,6,7,8-HxCDF	ND	pg/g	1.7	
HpCDFs (total)	11	pg/g	--	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	1.9	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	1.9	
OCDF	ND	pg/g	3.9	
Dioxins				
TCDDs (total)	ND	pg/g	0.75	
2,3,7,8-TCDD	ND	pg/g	0.75	
PeCDDs (total)	ND	pg/g	1.1	
1,2,3,7,8-PeCDD	ND	pg/g	1.1	
HxCDDs (total)	ND	pg/g	1.5	
1,2,3,4,7,8-HxCDD	ND	pg/g	1.5	
1,2,3,6,7,8-HxCDD	ND	pg/g	1.5	
1,2,3,7,8,9-HxCDD	ND	pg/g	1.5	
HpCDDs (total)	9.2	pg/g	--	
1,2,3,4,6,7,8-HpCDD	5.1	pg/g	--	
OCDD	35	pg/g	--	

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ND = Not detected
NA = Not applicable

Reported By: Najat Mobaslat
Approved By: Mike Filigenzi

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Georgia Pacific
Client ID: LVSU 3
Lab ID: 057878-0003-SA
Matrix: SOIL
Authorized: 19 APR 91

Sampled: 17 APR 91
Prepared: 22 APR 91

Received: 19 APR 91
Analyzed: 25 APR 91

Sample Amount 10.1 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	71
13C-2,3,7,8-TCDD	69
13C-1,2,3,7,8-PeCDD	35
13C-1,2,3,6,7,8-HxCDD	28
13C-1,2,3,4,6,7,8-HpCDD	33
13C-OCDD	23

ND = Not detected
NA = Not applicable

Reported By: Najat Mobaslat

Approved By: Mike Filigenzi

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Georgia Pacific
Client ID: LVSU 4
Lab ID: 057878-0004-SA
Matrix: SOIL
Authorized: 19 APR 91

Sampled: 17 APR 91
Prepared: 22 APR 91

Received: 19 APR 91
Analyzed: 25 APR 91

Sample Amount 10.2 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	0.85	
2,3,7,8-TCDF	ND	pg/g	0.43	
PeCDFs (total)	ND	pg/g	0.57	
1,2,3,7,8-PeCDF	ND	pg/g	0.57	
2,3,4,7,8-PeCDF	ND	pg/g	0.56	
HxCDFs (total)	ND	pg/g	1.7	
1,2,3,4,7,8-HxCDF	ND	pg/g	1.2	
1,2,3,6,7,8-HxCDF	ND	pg/g	1.7	
1,2,3,7,8,9-HxCDF	ND	pg/g	1.6	
2,3,4,6,7,8-HxCDF	ND	pg/g	1.4	
HpCDFs (total)	ND	pg/g	2.0	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	1.8	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	1.6	
OCDF	ND	pg/g	1.2	
Dioxins				
TCDDs (total)	ND	pg/g	0.93	
2,3,7,8-TCDD	ND	pg/g	0.93	
PeCDDs (total)	ND	pg/g	0.69	
1,2,3,7,8-PeCDD	ND	pg/g	0.69	
HxCDDs (total)	ND	pg/g	1.3	
1,2,3,4,7,8-HxCDD	ND	pg/g	1.2	
1,2,3,6,7,8-HxCDD	ND	pg/g	1.3	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.77	
HpCDDs (total)	ND	pg/g	1.8	
1,2,3,4,6,7,8-HpCDD	ND	pg/g	1.8	
OCDD	15	pg/g	--	

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ND = Not detected
NA = Not applicable

Reported By: Karen Evers

Approved By: Mike Filigenzi

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Georgia Pacific
Client ID: LVSU 4
Lab ID: 057878-0004-SA
Matrix: SOIL
Authorized: 19 APR 91

Sampled: 17 APR 91
Prepared: 22 APR 91

Received: 19 APR 91
Analyzed: 25 APR 91

Sample Amount 10.2 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	73
13C-2,3,7,8-TCDD	68
13C-1,2,3,7,8-PeCDD	60
13C-1,2,3,6,7,8-HxCDD	51
13C-1,2,3,4,6,7,8-HpCDD	60
13C-OCDD	40

ND = Not detected
NA = Not applicable

Reported By: Karen Evers

Approved By: Mike Filigenzi

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A Corning Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Georgia Pacific
Client ID: LVSC 7
Lab ID: 057878-0005-SA
Matrix: SOIL
Authorized: 19 APR 91

Sampled: 17 APR 91
Prepared: 22 APR 91

Received: 19 APR 91
Analyzed: 25 APR 91

Sample Amount 10.0 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	0.49	
2,3,7,8-TCDF	ND	pg/g	0.49	
PeCDFs (total)	ND	pg/g	0.65	
1,2,3,7,8-PeCDF	ND	pg/g	0.65	
2,3,4,7,8-PeCDF	ND	pg/g	0.65	
HxCDFs (total)	ND	pg/g	2.9	
1,2,3,4,7,8-HxCDF	ND	pg/g	2.9	
1,2,3,6,7,8-HxCDF	ND	pg/g	1.6	
1,2,3,7,8,9-HxCDF	ND	pg/g	2.9	
2,3,4,6,7,8-HxCDF	ND	pg/g	2.4	
HpCDFs (total)	ND	pg/g	3.1	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	3.1	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	3.1	
OCDF	ND	pg/g	4.1	
Dioxins				
TCDDs (total)	ND	pg/g	0.77	
2,3,7,8-TCDD	ND	pg/g	0.77	
PeCDDs (total)	ND	pg/g	1.0	
1,2,3,7,8-PeCDD	ND	pg/g	1.0	
HxCDDs (total)	ND	pg/g	1.1	
1,2,3,4,7,8-HxCDD	ND	pg/g	1.1	
1,2,3,6,7,8-HxCDD	ND	pg/g	1.1	
1,2,3,7,8,9-HxCDD	ND	pg/g	1.1	
HpCDDs (total)	ND	pg/g	1.8	
1,2,3,4,6,7,8-HpCDD	NO	pg/g	1.8	
OCDD	13	pg/g	--	

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ND = Not detected
NA = Not applicable

Reported By: Najat Mobaslat

Approved By: Mike Filigenzi

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A Corning Company

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Georgia Pacific
Client ID: LVSC 7
Lab ID: 057878-0005-SA
Matrix: SOIL
Authorized: 19 APR 91

Sampled: 17 APR 91
Prepared: 22 APR 91

Received: 19 APR 91
Analyzed: 25 APR 91

Sample Amount 10.0 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	66
13C-2,3,7,8-TCDD	64
13C-1,2,3,7,8-PeCDD	39
13C-1,2,3,6,7,8-HxCDD	31
13C-1,2,3,4,6,7,8-HpCDD	40
13C-OCDD	29

ND = Not detected
NA = Not applicable

Reported By: Najat Mobaslat

Approved By: Mike Filigenzi

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CHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Enseco
A Corning Company

Client Name: Georgia Pacific
Client ID: LVSC 8
Lab ID: 057878-0006-SA
Matrix: SOIL Sampled: 17 APR 91 Received: 19 APR 91
Authorized: 19 APR 91 Prepared: 22 APR 91 Analyzed: 26 APR 91

Sample Amount 10.0 G
Percent Moisture NA

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	0.35	
2,3,7,8-TCDF	ND	pg/g	0.35	
PeCDFs (total)	ND	pg/g	0.41	
1,2,3,7,8-PeCDF	ND	pg/g	0.41	
2,3,4,7,8-PeCDF	ND	pg/g	0.41	
HxCDFs (total)	ND	pg/g	0.75	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.75	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.75	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.75	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.75	
HpCDFs (total)	ND	pg/g	1.5	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	1.5	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	1.5	
OCDF	ND	pg/g	2.1	
Dioxins				
TCDDs (total)	ND	pg/g	0.54	
2,3,7,8-TCDD	ND	pg/g	0.54	
PeCDDs (total)	ND	pg/g	0.51	
1,2,3,7,8-PeCDD	ND	pg/g	0.51	
HxCDDs (total)	ND	pg/g	0.63	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.63	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.63	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.63	
HpCDDs (total)	3.9	pg/g	--	
1,2,3,4,6,7,8-HpCDD	ND	pg/g	2.3	
OCDD	11	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Najat Mobaslat Approved By: Mike Filigenzi

The cover letter is an integral part of this report.

POLYCHLORINATED DIOXINS/FURANS, ISOMER SPECIFIC ANALYSIS (CONT.)

Method 8290

Enseco
A Corning Company

Client Name: Georgia Pacific
Client ID: LVSC 8
Lab ID: 057878-0006-SA
Matrix: SOIL Sampled: 17 APR 91 Received: 19 APR 91
Authorized: 19 APR 91 Prepared: 22 APR 91 Analyzed: 26 APR 91

Sample Amount 10.0 G
Percent Moisture NA

	% Recovery
13C-2,3,7,8-TCDF	73
13C-2,3,7,8-TCDD	74
13C-1,2,3,7,8-PeCDD	65
13C-1,2,3,6,7,8-HxCDD	62
13C-1,2,3,4,6,7,8-HpCDD	60
13C-OCDD	43

ND = Not detected
NA = Not applicable

Reported By: Najat Mobaslat Approved By: Mike Filigenzi

Enseco

CHAIN-OF-CUSTODY RECORD

SAMPLER (Signature) [signature] Date Shipped 4-18-91 Carrier UPS

Phone (707) 444-427 Airbill No. 1790 9014 965 Cooler No.

SHIP TO:
Enseco-Cal Lab
2544 Industrial Blvd.
West Sacramento, CA 95691
(916) 372-1393
ATTENTION:

SEND RESULTS TO:
Client Name GERALD TICE
Company GEORGIA PACIFIC CORPORATION
Address 133 PEACHTREE ST. NE
Atlanta GA. 30303
Phone (404) 521-9084

PROJECT NAME LITTLE VALLEY, Ft. Bragg, CA PROJECT NO. 99299.005 (SHN) P.O. NO.

Relinquished by: (Signature)	Received by: (Signature)	Date	Time
[signature]			
Relinquished by: (Signature)	Received by: (Signature) [signature]	Date 4-19-91	Time 0915
Relinquished by: (Signature)	Received at lab by: (Signature) [signature]	Date	Time
Relinquished from lab by: (Signature)	Received by: (Signature)	Date	Time

ANALYSIS REQUEST

Sample ID Number	Sample Description	Date/Time Sampled	Analysis Requested	Sample Condition Upon Receipt
LVSL 5	Soil/Top 2 in.	4/16/91 1400	C14 to C19 + ISOMERS (9290?)	Good
LVSL 6	Soil/Next 2 in.	1400		
LVSU 3	Soil/Top 2 in.	4/17/91 1115		
LVSU 4	Soil/Next 2 in.	1115		
LVSC 7	Soil/Top 2 in.	1420		
LVSC 8	Soil/Next 2 in.	1420		

Special Instructions/Comments:
(1) Thoroughly mix contents of jar prior to analyses
(2) Verify requested analyses with G.P. ←
(3) Rush per w/ G.P.
(4) Copy of C of C to M. LAY @ SHN 2630 Harrison, Eureka, CA. 95521

NOTE: UNUSED PORTIONS OF NON-AQUEOUS SAMPLES WILL BE RETURNED TO CLIENT

Expected Turnaround Time: Immediate Attention (200% surcharge) ____ X RUSH (50-100% surcharge) ____ Standard

Cal Lab ID Number: (for lab use only)

CLIENT RETAINS White Copy Only (Revised 1/87)

Karen Theiss and Associates.

Biological and Environmental Consultants

P.O. Box 3005 • McKinleyville, CA 95521 • (707) 839-0681

May 16, 1991

Mr. Gerald W. Tice
Georgia-Pacific Corporation
P.O. Box 105605
Atlanta, GA 30348-5605

RE: Aquatic Sampling Program
Soil Amendment Project
Ft. Bragg, CA
#90-065

Dear Mr. Tice:

Enclosed please find the report addressing Phase II sampling for the aquatic bioaccumulation study at Little Valley Creek near Fort Bragg, California. Samples were collected on April 16 and 17, 1991 and shipped on April 18, via Federal Express, from Eureka to Enseco-Cal Laboratory, Sacramento. It is my understanding from Marty Lay that the samples arrived at the laboratory in good condition for analysis. The attached report- follows the format of the protocol prepared for Phase II of the study. Should you have any questions or comments about the report, please give me a call.

Sincerely,

KAREN THEISS AND ASSOCIATES

Karen C. Theiss

Encl.

AQUATIC BIOACCUMULATION STUDY
LITTLE VALLEY CREEK, FORT BRAGG
GEORGIA-PACIFIC CORPORATION

PHASE II

I. PROJECT DESCRIPTION

Georgia-Pacific Corporation of Ft. Bragg, California, is investigating the extent of aquatic bioaccumulation of dioxins and furans in the vicinity of its ash stockpile/amendment area in Little Valley Creek. Karen Theiss and Associates was retained to collect, prepare for analysis, and ship appropriate fish and aquatic plant samples to test for bioaccumulation in the creek system. Sampling for Phase II of the Bioaccumulation Study was undertaken on April 16 and 17, 1991.

II. BACKGROUND

A preliminary investigation into bioaccumulation of dioxins and furans by aquatic organisms in Little Valley Creek was conducted in June 1940 by Karen Theiss and Associates. This study resulted in the collection and analysis of Threespine Stickleback (Gasterosteus *aculeatus*) from above and below the ash amendment sites. Test results from both sites were low, approximating background levels (pers. comm., Frank Reichmuth, North Coast Regional Water Quality Control Board). The results seem to indicate that the Threespine Stickleback in the immediate vicinity of the test plots are not bioaccumulating dioxins or furans from the amendment site.

As part of the permit issued by the North Coast Regional Water Quality Control Board (NRWQCB), Georgia-Pacific was required to expand the aquatic bioaccumulation study to include additional Stickleback analysis and collection and analysis of an appropriate aquatic plant species. Since issuance of its permit in August 1990, Georgia-Pacific has stockpiled ash upstream of the June 1990 control sampling locations.

III. GOALS AND OBJECTIVES

The preliminary investigation resulted in the selection of a suitable fish species for analysis, and the procurement of preliminary data on the presence of dioxins and furans. The goal of the present study is to amplify on the previous investigation in order to achieve a better understanding of the extent of aquatic bioaccumulation in Little Valley Creek. The specific objectives

are as follow:

- collect and analyze Threespine Stickleback from the same sampling points as 1990 and from a quiescent pool above the new (1990) stockpile/amendment site;

- determine an appropriate aquatic plant test species;

- collect and analyze the vegetative test species from the same sampling locations as the Threespine Stickleback.

IV. METHODOLOGY

A. Target Species

Stream sampling in June 1990 revealed that the Threespine Stickleback was likely the only appropriate target species present in sufficient numbers for collection and analysis. This species was collected in the June 1990 sampling program, and, for consistency, was collected again during the Phase II sampling period.

Slough sedge (*Carex obnupta*) was chosen as the target plant species. It is a perennial emergent, with a fibrous root system anchored in the bed or lower slopes of the channel. Fibrous roots, being more shallow, are expected to have more exposure to sediments than tap roots, and may thus have a greater potential for bioaccumulation. Slough sedge was abundantly present at all sampling locations.

B. Sample Timing

The target species were collected on April 16 and 17, 1991. This period provided sufficient numbers of stickleback for collection. This is also the period of active vegetative growth and nutrient uptake.

C. Sample Locations

Three sample locations were used for Phase II collection, as shown on the attached map:

LVL - Little Valley Creek, lower site. This is the same location as the 1990 test site, which is downstream of all stockpile and amendment areas. This area includes quiescent pools, a dense though narrow riparian corridor, and sparse to moderately dense emergent vegetation.

LVU- Little Valley Creek, upstream site. This is the same location as the 1990 control site, which is upstream of all pre-1990 stockpile and amendment sites. It is downstream of the area

put into operation under the permit extension granted in August 1990. This area also includes quiescent pools, sparse to absent riparian vegetation, and moderate density emergent vegetation.

LVC - Little Valley Creek, control site. This site is new for 1991 sampling, due to the location of the August 1990 stockpile location. It is located about 50 feet northerly of the culvert crossing under the access road to Little Valley, and is upstream of all current and past stockpile and amendment site. There are several narrow, quiescent channels in the sample area; the riparian canopy cover is quite dense and mature, with moderately density emergent vegetation. No stickleback were found at this site (or at any other points above the new stockpile area). Vegetation samples were collected from this area.

D. Sample Collection

Prior to sampling at all sites, a-decontamination procedure was performed on a metal sampling bucket used for holding the samples. This procedure consisted of a soapy water wash (Liquinox), dionized water (DI) rinse, methanol rinse, DI rinse, hexane rinse, and a final DI rinse.

Sampling for Threespine Stickleback was by use of a small pole seine and had-held dip nets. Visibility was very poor due to the high sediment/suspended solid concentration in the creek waters. Stickleback were hand-picked off the seine using clean latex surgical gloves and placed into a decontaminated metal bucket filled with distilled water (DI). When enough fish were collected, they were rinsed again with DI and placed into clean glass jars provided by Enseco-Cal Laboratory in Sacramento, CA.

Plant material was loosened from the substrate by digging with a shovel and by hand. Clean latex surgical gloves were used to handle all plant material. The root system was rinsed in-stream to remove the bulk of soil material, and was then cut from the shoot, using decontaminated scissors, and placed into a decontaminated metal bucket filled with DI until sufficient sample was collected. The plant material was rinsed 'again with DI and placed into clean glass jars provided by the laboratory. Special instructions to the laboratory directed further washing of roots by agitation with distilled water prior to analysis.

As noted, a separate test sample and archive sample for both fish and root was collected at each site. All samples were frozen and then shipped on dry ice via Federal Express to Enseco-Cal Laboratory, Sacramento, CA for analysis. The archive samples were also shipped to Enseco-CAl Laboratory for storage in their freezer.

V. SAMPLE DATA

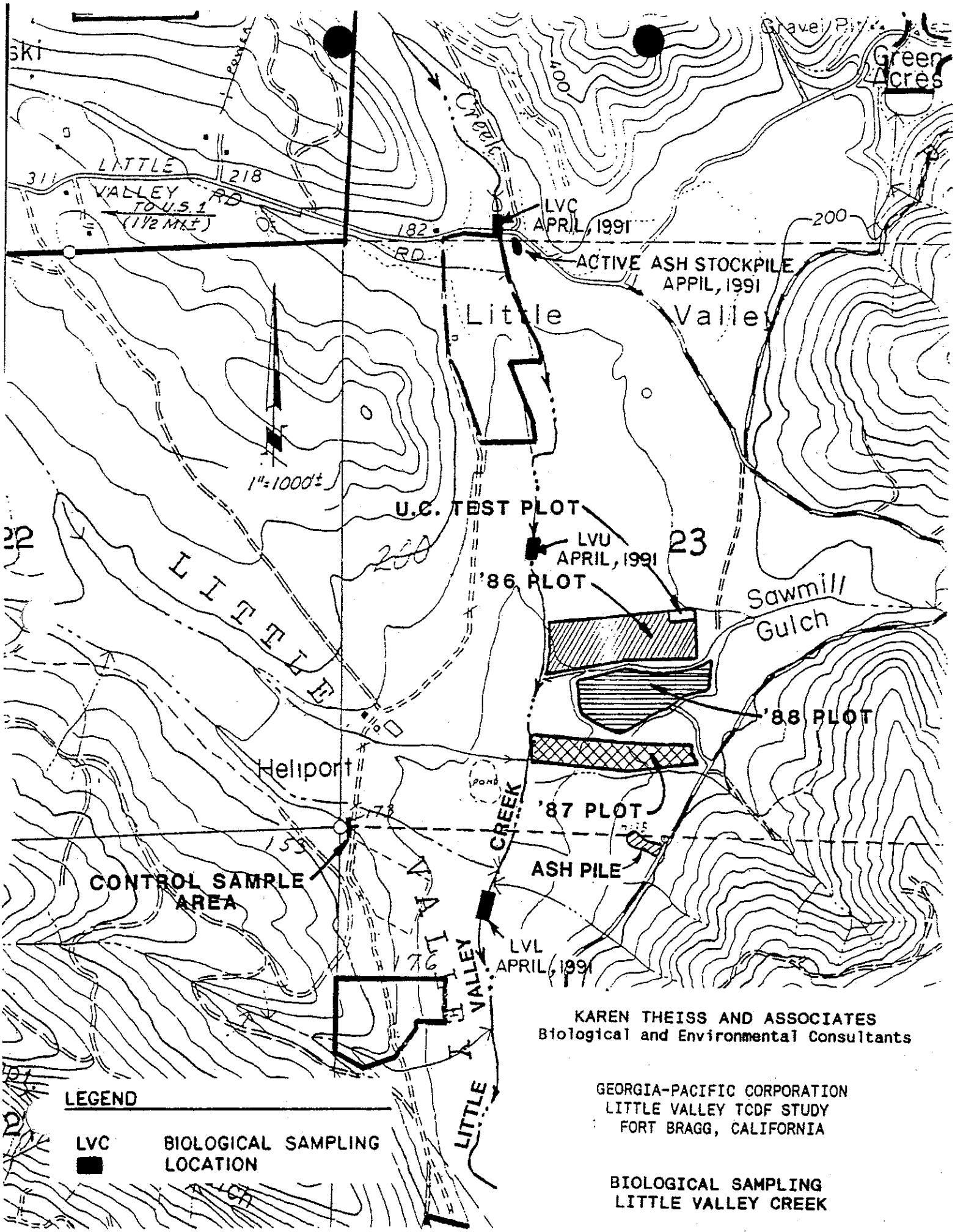
Following is pertinent data for the fish samples:

Site	Type	# Individuals	Total Weight	Length
LVL	Test	25	45 gm	45-70mm
LVL	Archive	43	53 gm	40-60mm
LVU	Test	24	20 gm	28-62mm
LVU	Archive	33	24 gm	25-65gm

No samples were collected from the LVC site due to lack of specimens.

Following is pertinent data for the vegetation samples:

Site	Type	Weight
LVL	Test	55 gm
LVL	Archive	45 gm
LVU	Test	42 gm
LVU	Archive	55 gm
LVC	Test	45 gm
LVC	Archive	40 gm



KAREN THEISS AND ASSOCIATES
Biological and Environmental Consultants

GEORGIA-PACIFIC CORPORATION
LITTLE VALLEY TCDF STUDY
FORT BRAGG, CALIFORNIA

BIOLOGICAL SAMPLING
LITTLE VALLEY CREEK

Georgia-Pacific Corporation
133 Peachtree Street, N.E. (30303)
P.O. Box 105605
Atlanta, Georgia 30348-5605
Telephone (404) 521-4000

June 3, 1991

Mr. Benjamin D. Kor
Executive Director
California Regional Water Quality
Control Board
North Coast Region
1440 Guerneville Road
Santa Rosa, CA 95403

RE: Georgia-Pacific Corporation
April 1990 Aquatic Sampling Results
Ash Amendment Project
Fort Bragg, CA

Dear Mr. Kor:

As required by Order No. 90-154 adopted by the North Coast Regional Water Quality Control Board (NCRWQCB) on August 16, 1990, Georgia-Pacific submits the results of its aquatic sampling program conducted April 16 and 17, 1991 at the Little Valley Creek which is adjacent to our ash soil amending site. This report is submitted in duplicate.

This study was similar to the one conducted on June 25, 1990 except that it was expanded, at the request of the NCRWQCB, to include fibrous root samples obtained from aquatic plants growing in the creek stream bed. Of course the purpose of the study was to further address any potential bioaccumulation threat to the aquatic habitat of Little Valley Creek. To maintain consistency with the previous sampling efforts, Georgia-Pacific again contracted with Karen Theiss and Associates of McKinleyville, CA to perform the aquatic sampling and SHN Consulting Engineers and Geologist of Eureka, CA to conduct the stream sediment sampling. Also Enseco Labs of Sacramento, CA was again utilized to perform all the analytical testing. A copy of both consultants reports are enclosed which explains in detail the entire sampling program. Also enclosed are copies of all lab reports from Enseco Labs.

An additional change in the April 1991 program pertains to the sampling locations. The upstream, or control, sampling location used for the 1990 sampling program is now located downstream of the current ash stockpiling activity, which was commenced in the fall of 1990 as allowed by Order No. 90-154. For this reason a

new control site was selected upstream of the current stockpile location. The new control site is shown on the enclosed site plans contained in each consultants report. To maintain; continuity with the 1990 sampling, however, the 1990 upstream location was retained. As rill be noted in the report, fish samples were not obtained from the new control site. An, extensive effort was made to locate fish specimens at this site but they were not present. In fact, specimens were sought downstream of the new control site but appeared to be present only as far upstream as the 1990 upstream site. Apparently this is about as far as the stickleback migrate in the Little Valley Creek. This was also confirmed during the 1990 sampling event.

Sampling Results

Table 1 summarizes the lab results of the aquatic plant root samples and the fish samples. As can be seen all results are reported as not-detected (ND). Table 2 summarizes the lab results of the sediment samples. Some low levels of HpCDFs (total), HpCDDs (total), 1,2,3,4,6,7,8 - HpCDD and OCDD are reported.

For comparison purposes, Table 1A and Table 2A have been provided which have the 1990 results added. These values are shown in ( ) to the right of the 1991 values. As already noted, all the 1991 root and fish sample results are reported as not-detected. For the sediment sample results, the number of reported values are considerably less than for 1990 and those reported are very similar to the 1990 values. These results continue to show no evidence of bioaccumulation in the aquatic environment proximate to the ash amended sites. Based on this we request that the NCRWQCB renew our permit for ash amending at the Little Valley site at it's June 1991 board meeting.

An additional comment, upon renewal of this permit, we ask the board to minimize any on-going sampling requirements in regards to the bioaccumulation issue. These sampling events are very costly, the 1991 event cost $30,000 +. Although we recognize our obligation to assess the environmental consequences of our actions, (the downstream samples show no evidence of bioaccumulation after six years of ash soil amending activity) I want to note for the record that these studies which have been on-going since 1988 have cost Georgia-Pacific almost $150,000. Your consideration of our request will be appreciated.

Very truly yours,

GERALD W. TICE
SENIOR MANAGER
ENVIRONMENTAL ENGINEERING
BUILDING PRODUCTS

GWT/pcw
Enclosures

cc: Mr. T. Deer w/enclosures
Mr. D. Whitman w/enclosures

File - Ft. Bragg - Ash Study

Enclosures: Plant Root and Fish Lab Analyses - Enseco
Soil Sediment Lab Analyses - Enseco
Aquatic Sampling Report - Karen Theiss & Associates
Sediment Sampling Procedures Report - SHN
Sediment Sampling Log - SHN

TABLE 1

GEORGIA-PACIFIC CORPORATION

FORT BRAGG, CA

ASH AMENDMENT PROJECT

LITTLE VALLEY CREEK AQUATIC SAMPLING RESULTS,

ROOTS AND FISH

April 1991

(Results Reported in pg/g)

	Roots			FISH	
	LVC	LVU	LVL	LVU	LVL
Furans					
TCDFs (total)	ND	ND	ND	ND	ND
2,3,7,8-TCDF	ND	ND	ND	ND	ND
PeCDFs (total)	ND	ND	ND	ND	ND
1,2,3,7,8-PeCDF	ND	ND	ND	ND	ND
2,3,4,7,8-PeCDF	ND	ND	ND	ND	ND
HxCDFs (total)	ND	ND	ND	ND	ND
1,2,3,4,7,8-HxCDF	ND	ND	ND	ND	ND
1,2,3,6,7,8-HxCDF	ND	ND	ND	ND	ND
2,3,4,6,7,8-HxCDF	ND	ND	ND	ND	ND
1,2,3,7,8,9-HxCDF	ND	ND	ND	ND	ND
HpCDFs (total)	ND	ND	ND	ND	ND
1,2,3,4,6,7,8-HpCDF	ND	ND	ND	ND	ND
1,2,3,4,7,8,9-HpCDF	ND	ND	ND	ND	ND
OCDF	ND	ND	ND	ND	ND
Dioxins					
TCDDs (total)	ND	ND	ND	ND	ND
2,3,7,8-TCDD	ND	ND	ND	ND	ND
PeCDDs (total)	ND	ND	ND	ND	ND
1,2,3,7,8-PeCDD	ND	ND	ND	ND	ND
HxCDDs (total)	ND	ND	ND	ND	ND
1,2,3,4,7,8-HxCDD	ND	ND	ND	ND	ND
1,2,3,6,7,8-HxCDD	ND	ND	ND	ND	ND
1,2,3,7,8,9-HxCDD	ND	ND	ND	ND	ND
HpCDDs (total)	ND	ND	ND	ND	ND
1,2,3,4,6,7,8-HpCDD	ND	ND	ND	ND	ND
OCDD	ND	ND	ND	ND	ND

Notes:

1. LVC = Little Valley Control
2. LVU = Little Valley Upper (Upstream) (Old upstream site used for 1990 sampling).
3. LVL = Little Valley Lower (Downstream) (Old downstream site ured for 1990 sampling).
4. No fish were found at LVC site.

TABLE 2
GEORGIA-PACIFIC CORPORATION
FORT BRAGG, CA
ASH AMENDMENT PROJECT
LITTLE VALLEY CREEK AQUATIC SAMPLING RESULTS
STREAM SEDIMENT
April 1991
(Results Reported in pg/g)

	SEDIMENT											
	LVSC-7	LVSC-8		LVSU-3	LVSU-4			LVSL-5		LVSL-6		
Furans												
TCDFs (total)	ND	ND		ND	ND			ND		ND		
2,3,7,8-TCDF	ND	ND		ND	ND			ND		ND		
PeCDFs (total)	ND	ND		ND	ND			ND		ND		
1,2,3,7,8-PeCDF	ND	ND		ND	ND			ND		ND		
2,3,4,7,8-PeCDF	ND	ND		ND	ND			ND		ND		
HxCDFs (total)	ND	ND		ND	ND			ND		ND		
1,2,3,4,7,8-HxCDF	ND	ND		ND	ND			ND		ND		
1,2,3,6,7,8-HxCDF	ND	ND		ND	ND			ND		ND		
2,3,4,6,7,8-HxCDF	ND	ND		ND	ND			ND		ND		
1,2,3,7,8,9-HxCDF	ND	ND		ND	ND			ND		ND		
HpCDFs (total)	ND	ND		11	ND			13		ND		
1,2,3,4,6,7,8-HpCDF	ND	ND		ND	ND			ND		ND		
1,2,3,4,7,8,9-HpCDF	ND	ND		ND	ND			ND		ND		
OCDF	ND	ND		ND	ND			ND		ND		
Dioxins												
TCDDs (total)	ND	ND		ND	ND			ND		ND		
2,3,7,8-TCDD	ND	ND		ND	ND			ND		ND		
PeCDDs (total)	ND	ND		ND	ND			ND		ND		
1,2,3,7,8-PeCDD	ND	ND		ND	ND			ND		ND		
HxCDDs (total)	ND	ND		ND	ND			ND		ND		
1,2,3,4,7,8-HxCDD	ND	ND		ND	ND			ND		ND		
1,2,3,6,7,8-HxCDD	ND	ND		ND	ND			ND		ND		
1,2,3,7,8,9-HxCDD	ND	ND		ND	ND			ND		ND		
HpCDDs (total)	ND	3.9	6	9.2	ND			14		ND		
1,2,3,4,6,7,8-HpCDD	ND	ND	.01	5.1	ND	.051		7.7		ND	.077	
OCDD	13	11	.001	35	.15	.035 / .086	.015 / .015	39		18	.029 / .116	.018 / .018

Notes:
1. LVSC = Little Valley Sediment Control
2. LVSU = Little Valley Sediment Upper (Upstream) (In vicinity of old upstream site used for 1990 sampling).
3. LVSL = Little Valley Sediment Lower (Downstream) (Old downstream site used for 1990 sampling).
4. Samples LVSC-7, LVSU-3 and LVSL-5 are top 2" of sediment consisting of root/biomass. Samples LVSC-8, LVSU-4 and LVSL-6 are the next 2" of sediment consisting of ss sediment.

TABLE 1-A

GEORGIA-PACIFIC **CORPORATION**

FORT BRAGG, CA

ASH **AMENDMENT** PROJECT

L I TTLE VALLEY CREEK AQUAT I C SAMPL I NG RESULTS

ROOTS AND FISH

April 1991

(Results Reported in **pg/g**)

	Roots			FISH				
	LVC	LVU	LVL		LVU	LVL		
Furans								
TCDFs (total)	ND	ND	ND		ND	ND		
2,3,7,8-TCDF	ND	ND	ND		ND	ND		
PeCDFs (total)	ND	ND	ND		ND	ND		
1,2,3,7,8-PeCDF	ND	ND	ND		ND	ND		
2,3,4,7,8-PeCDF	ND	ND	ND		ND	ND		
HxCDFs (total)	ND	ND	ND		ND	ND		
1,2,3,4,7,8-HxCDF	ND	ND	ND		ND	ND		
1,2,3,6,7,8-HxCDF	ND	ND	ND		ND	ND		
2,3,4,6,7,8-HxCDF	ND	ND	ND		ND	ND		
1,2,3,7,8,9-HxCDF	ND	ND	ND		ND	ND		
HpCDFs (total)	ND	ND	ND		ND	ND		
1,2,3,4,6,7,8-HpCDF	ND	ND	ND		ND	ND		
1,2,3,4,7,8,9-HpCDF	ND	ND	ND		ND	ND		
OCDF	ND	ND	ND		ND	ND		
Dioxins								
TCDDs (total)	ND	ND	ND		ND	ND		
2,3,7,8-TCDD	ND	ND	ND		ND	ND		
PeCDDs (total)	ND	ND	ND		ND	ND		
1,2,3,7,8-PeCDD	ND	ND	ND		ND	ND		
HxCDDs (total)	ND	ND	ND		ND	ND	LVU	LVL
1,2,3,4,7,8-HxCDD	ND	ND	ND		ND	ND		
1,2,3,6,7,8-HxCDD	ND	ND	ND		ND	ND		
1,2,3,7,8,9-HxCDD	ND	ND	ND		ND	ND		
HpCDDs (total)	ND	ND	ND		ND (3.3)	ND (2.4)	ϕ	ϕ
1,2,3,4,6,7,8-HpCDD	ND	ND	ND	0.01	ND (2.3)	ND (1.6)	.023	.016
OCDD	ND	ND	ND	0.001	ND (71)	ND (15)	.071	.015
							.094	.031

Notes:

1. LVC = Little Valley Control
2. LVU = Little Valley Upper **(Upstream)** (Old **upstream** rite used for 1990 **sampling).**
3. LVL = **Little Valley** Lower **(Downstream)** (Old downstream **site** used for 1990 **sampling).**
4. **No fish** were found at LVC rite.

TABLE 2-A

GEO PACIFIC CORPORATION

FORT BRAGG, CA

ASH AMENDMENT PROJECT

LITTLE VALLEY CREEK AQUATIC SAMPLING RESULTS

STREAM SEDIMENT

April 1991

(Results Reported in pg/g)

	SEDIMENT									
	LVSC-7	LVSC-8		LVSU-3	LVSU-4			LVSL-5	LVSL-6	
Furans						3	4			5 6
TCDFs (total)	ND	ND	ϕ	ND (.96)	ND (.49)			ND (1.0)	ND (.43)	
2,3,7,8-TCDF	ND	ND		ND	ND			ND	ND	
PeCDFs (total)	ND	ND	ϕ	ND	ND			ND (.15)	ND	
1,2,3,7,8-PeCDF	ND	ND		ND	ND			ND	ND	
2,3,4,7,8-PeCDF	ND	ND		ND	ND			ND	ND	
HxCDFs (total)	ND	ND	ϕ	ND (2.7)	ND (1.3)			ND (1.1)	ND (.72)	
1,2,3,4,7,8-HxCDF	ND	ND		ND	ND			ND	ND	
1,2,3,6,7,8-HxCDF	ND	ND		ND	ND			ND	ND	
2,3,4,6,7,8-HxCDF	ND	ND		ND	ND			ND	ND	
1,2,3,7,8,9-HxCDF	ND	ND		ND	ND			ND	ND	
HpCDFs (total)	ND	ND	ϕ	11 (6.2)	ND (2.8)			13 (2.6)	ND (.73)	
1,2,3,4,6,7,8-HpCDF	ND	ND	.01	ND (2.0)	ND (.90)			ND (.91)	ND (.73)	.091 .073
1,2,3,4,7,8,9-HpCDF	ND	ND	.01	ND	ND			ND	ND	
OCDF	ND	ND	.001	ND (5.3)	ND (2.4)			ND (1.9)	ND (2.2)	.002 .002
Dioxins										
TCDDs (total)	ND	ND	ϕ	ND	ND (.54)			ND	ND	
2,3,7,8-TCDD	ND	ND		ND	ND			ND	ND	
PeCDDs (total)	ND	ND		ND	ND			ND	ND	
1,2,3,7,8-PeCDD	ND	ND		ND	ND			ND	ND	
HxCDDs (total)	ND	ND	ϕ	ND (3.6)	ND (1.8)			ND (.73)	ND	
1,2,3,4,7,8-HxCDD	ND	ND		ND	ND			ND	ND	
1,2,3,6,7,8-HxCDD	ND	ND		ND	ND			ND	ND	
1,2,3,7,8,9-HxCDD	ND	ND		ND	ND			ND	ND	
HpCDDs (total)	ND	3.9	ϕ	9.2 (14)	ND (6.5)			14 (6.1)	ND (4.7)	
1,2,3,4,6,7,8-HpCDD	ND	ND	.01	5.1 (7.8)	ND (3.9)	.05		7.7 (3.7)	ND (3.2)	.077 .032
OCDD	13	11	.001	35 (43)	15 (22)	.035	.015	39 (18)	18 (16)	.039 .018 .209 .125
						.085	.015			

Notes:

1. LVSC = Little Valley Sediment Control
2. LVSU = Little Valley Sediment Upper (Upstream) (In vicinity of old upstream site used for 1990 sampling).
3. LVSL = Little Valley Sediment Lower (Downstream) (Old downstream site used for 1990 sampling).
4. Samples LVSC-7, LVSU-3 and LVSL-5 are top 2" of sediment consisting of root/biomass. Samples LVSC-8, LVSU-4 and LVSL-6 are the next 2" of sediment consisting of sandy sediment.

Georgia-Pacific Corporation
133 Peachtree Street, N.E. (30303)
P.O. Box 105605
Atlanta, Georgia 30348-5605
Telephone (404) 521-4000

June 3, 1991

Mr. Benjamin D. Kor
Executive Director
California Regional Water Quality
Control Board
North Coast Region
1440 Guerneville Road
Santa Rosa, CA 95403

OVERNIGHT MAIL

RE: June 1991 Quarterly Progress Report
Georgia-Pacific Corporation
Fort Bragg soil Amendment Project

Dear Mr. Kor:

This quarterly progress report is submitted in compliance with Waste Discharge Requirements Order No. 90-154 for Georgia-Pacific's Fort Bragg soil amendment project.

Since the March 1991 quarterly report, we have completed the additional Little Valley Creek aquatic sampling as required by Order No. 90-154. All consultants reports and analysis have been completed and our report was submitted to your office on June 3, 1991.

The results of this latest sampling, which was conducted on April 16 and 17, 1991, continue to show no evidence of bioaccumulation in the aquatic environment at ,thissite as a result of the ash amending activity.

With the completion of this sampling effort, all sampling and analysis required by Order No. 90-154 have been satisfied.

Please let me know if there are any questions concerning this quarterly report.

Very truly yours/

GERALD W. TICE
SENIOR MANAGER
ENVIRONMENTAL ENGINEERING
BUILDING PRODUCTS

GWT/pcw

cc: Mr. C. T. Howlett, Jr.
Mr. A. T. Johnson
Mr. J. J. Tice
Mr. T. Treichelt
Mr. D. B. Whitman
Mr. T. E. Deer, Jr.

Pile - Port Bragg - Ash Study

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA. CA 95403
(707) 576.2220

F

June 5, 1991

Mr. John Blue
Intergrated Waste Management Board
1020 Ninth Street, Suite 100
Sacramento, CA 95814

File

Dear Mr. Blue:

Enclosed is a copy of the dioxin/furan sampling results from the Georgia Pacific Corporation, ash soil amendment project in Fort Bragg. If you have any questions, please call

Sincerely,

Frank C. Reichmuth
Senior Water Resource Control Engineer

FCR:tam/fcrblue

Enclosure

F

PETE WILSON, Governor

STATE OF CALIFORNIA

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA, CA 95403
(707)576-2220

June 10, 1991

Mr. Gerald Tice
Chief Environmental Engineer
Georgia-Pacific Corporation
P.O. Box 105603
Atlanta, GA 30348

Dear Mr. Tice:

Enclosed is a copy of the draft Regional Board Order No. 91-93, revised Waste Discharge Requirements for the Georgia-Pacific Fort Bragg Soil Amendment. This Order will be considered by the Regional Board during its regular meeting on June 27, 1991, at the Eureka City Council Chambers. We would appreciate it if you could send us *any* comments you may have as soon as possible.

Please call if you have any questions.

Sincerely

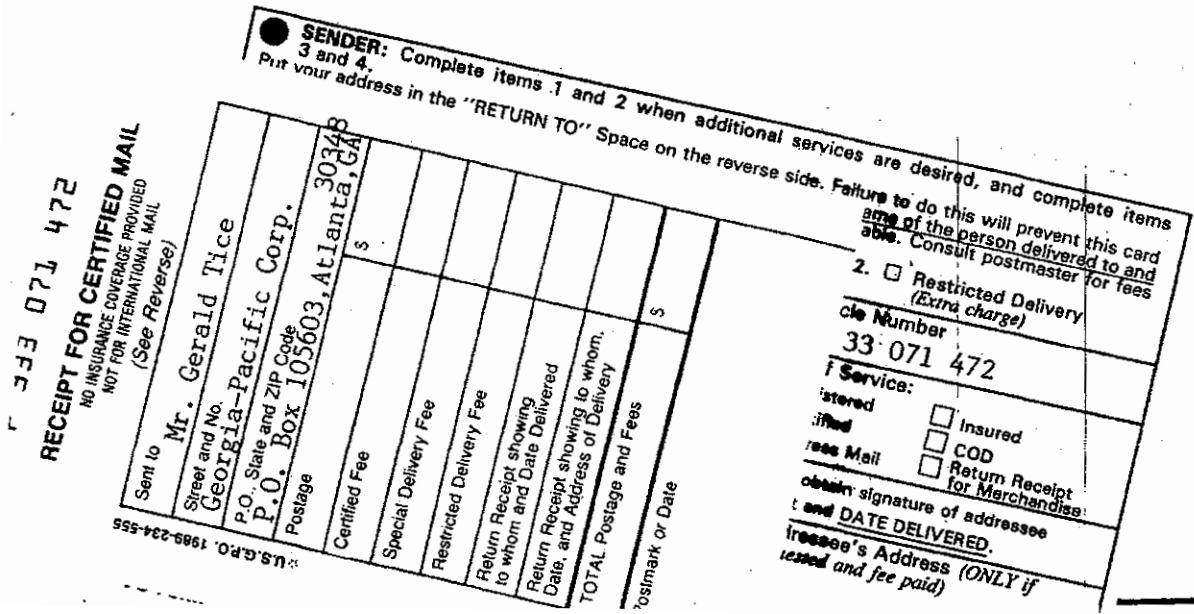
Mark K. Ned~
Associate Engineering Geologist

MKN:tam/gpastrns

Enclosure

Certified-Return Receipt Requested

cc: Don Whitman, Georgia-Pacific Corporation, 90 W. Redwood Avenue, Fort Bragg, CA 95437



STATE OF CALIFORNIA

REGIONAL WATER QUALITY CONTROL BOARD
DEPARTMENT OF HEALTH SERVICES
WASTE MANAGEMENT BOARD
DEPARTMENT OF FORESTRY

APPLICATION FOR FACILITY PERMIT WASTE DISCHARGE

This form is to be used for filing a/an: (check all appropriate)

1. [X] **REPORT OF WASTE DISCHARGE** (pursuant to Division 7 of the State Water Code)
2. [ ] **APPLICATION FOR A HAZARDOUS WASTE FACILITY PERMIT** (pursuant to Health and Safety Code Section 25200)
3. [ ] **APPLICATION FOR A SOLID WASTE FACILITIES PERMIT** (pursuant to Government Code Section 66796.30)
4. [ ] **APPLICATION FOR A RUBBISH DUMP PERMIT** (pursuant to Public Resources Code Sections 43714375 and 44381

FOR OFFICE USE ONLY	
Form 200 Rec'd	
Fee (RWQCB)	(SWMB)
Letter to Discharger	
Report Rec'd	
Effective Date	
COF Notified	
OOHS No.	
SWMB No.	

I. FACILITY

NAME OF FACILITY: Georgia-Pacific Corporation — TELEPHONE #: (707) 964-5651

ADDRESS: 90 West Redwood Ave., Fort Bragg, CA — ZIP CODE: 95437

B. NAME OF LEGAL OWNER OF FACILITY: Georgia-Pacific Corporation — TELEPHONE #: (404) 521-5084

ADDRESS: 133 Peachtree St., N.E., Atlanta, GA — ZIP COD: 30303

C. NAME OF BUSINESS OPERATING FACILITY: Same as A above — TELEPHONE #: ( )

ADDRESS: — ZIP CODE:

D. TYPE OF BUSINESS OPERATING FACILITY

Sole Proprietorship [ ] Partnership [X] Corporation Government Agency

E. NAME OF OWNER(S) OF BUSINESS OPERATING FACILITY: Same as B above — TELEPHONE #: ( )

ADDRESS WHERE LEGAL NOTICE MAY BE SERVED: — ZIP CODE:

II. REASON FOR FILING

CHECK ALL APPROPRIATE:

- A. [ ] New discharge or facility
- B. [X] Existing discharge or facility
- C. [ ] Increase in quantity of discharge
- D. [ ] Change in character of discharge
- E. [ ] Change in place or method of disposal
- F. [ ] Change in design or operation
- G. [ ] Change in business operating facility
- H. [ ] Enlargement of existing facility
- I. [ ] Other (explain below)

III. TYPE OF OPERATION

CHECK ALL APPROPRIATE:

- A. [ ] Transfer station
- B. [ ] Solid waste disposal site
- C. [ ] Hazardous waste disposal rite
- D. [ ] Sewage treatment
- E. [ ] Industry (on-site disposal facility)
- F. [ ] Industry (discharge to sewer)
- G. [ ] Woodwaste site
- H. [X] Other (explain below)

This is an ash amending site for increased pasture yield

IV. TYPE OF WASTE

CHECK ALL APPROPRIATE:

- A. [ ] Sewage, sewage sludge, and/or septic tmk pumpings
- B. [ ] Industrial wastes
- C. [ ] Municipal solid wastes
- [ ] Hazardous wastes
- E. [ ] Agricultural wastes
- F. [ ] Animal wastes
- G. [X] Forest product wastes (Boiler Ash)
- H. [ ] Construction/demolition wastes
- I. [ ] Inert materials
- J. [ ] Dead animals
- K. [ ] Tires
- L. [ ] Other (explain below)

V. SITE DESIGN CAPACITY

A. PRESENT POPULATION OR CAPACITY	B. DESIGN POPULATION OR ULTIMATE CAPACITY	C. LIFE EXPECTANCY (YEARS)
233 Acres (currently planned for use.)	300 Acres	5 to 8 years

VI. QUANTITY OF WASTES

A. PRESENT OR PROPOSED DAILY FLOW (IN MGD):	MAXIMUM	AVERAGE	B. DESIGN FLOW (IN MGD)
	N/A	N/A	N/A

C. SOLID WASTE DISPOSAL TE (IN TONS OR BIC YARDS):	DAILY QUANTITY	TOTAL IN PLACE QUANTITY	D. AREA IN WHICH SOIL WILL BE DISTURBED (IN ACRES)	TOTAL SITE AREA
	60 cu.yds./day	128.000 cu.yds.	23 Acres/hr.	1300 Acres May

VII. LOCATION Or POINT OF DISPOSAL OR OPERATION

(DESIGN AND ATTACH MAP, SKETCH, OR LOCATION ON U.S.G.S. QUADRANGLE MAP, 7.5 OR 15 MINUTE SERIES.)
LIST DISTANCES OR BEARING AND DISTANCE FROM SECTION CORNER Or QUARTER CORNER, SECTION, TOWNSHIP, RANGE, BASE AND MERIDIAN:

See Attached Maps

VIII. SOURCE OF WATER SUPPLY (CHECK ALL APPROPRIATE)

A. ☐ MUNICIPAL OR UTILITY SERVICE: N/A

NAME OF WATER PURVEYOR

ADDRESS OF PURVEYOR

B. ☐ INDIVIDUAL (Wells) N/A

C. ☐ SURFACE SUPPLY: N/A

NAME OF STREAM, LAKE, SPRING, ETC. (IF NAMED)

TL. OF WATER RIGHTS
☐ Riparian ☐ Appropriation

WATER RIGHTS PERMIT OR LICENSE #

IX. ENVIRONMENTAL IMPACT REPORT (EIR)

Has an EIR been prepared for this project?	☐ Yes	☒ No	Note: Extensive environmental impact study has been conducted on this site and is on file with the North Coast Regional office.
If "Yes", please enclose a copy.			
If "No": will an EIR be prepared?	☐ Yes	☒ No	
Will a negative declaration be prepared?	☐ Yes	☒ No	
If "Yes", please answer the following:			

WHO WILL PREPARE THE NEGATIVE DECLARATION?

APPROX. DATE OF COMPLETION

CERTIFICATION

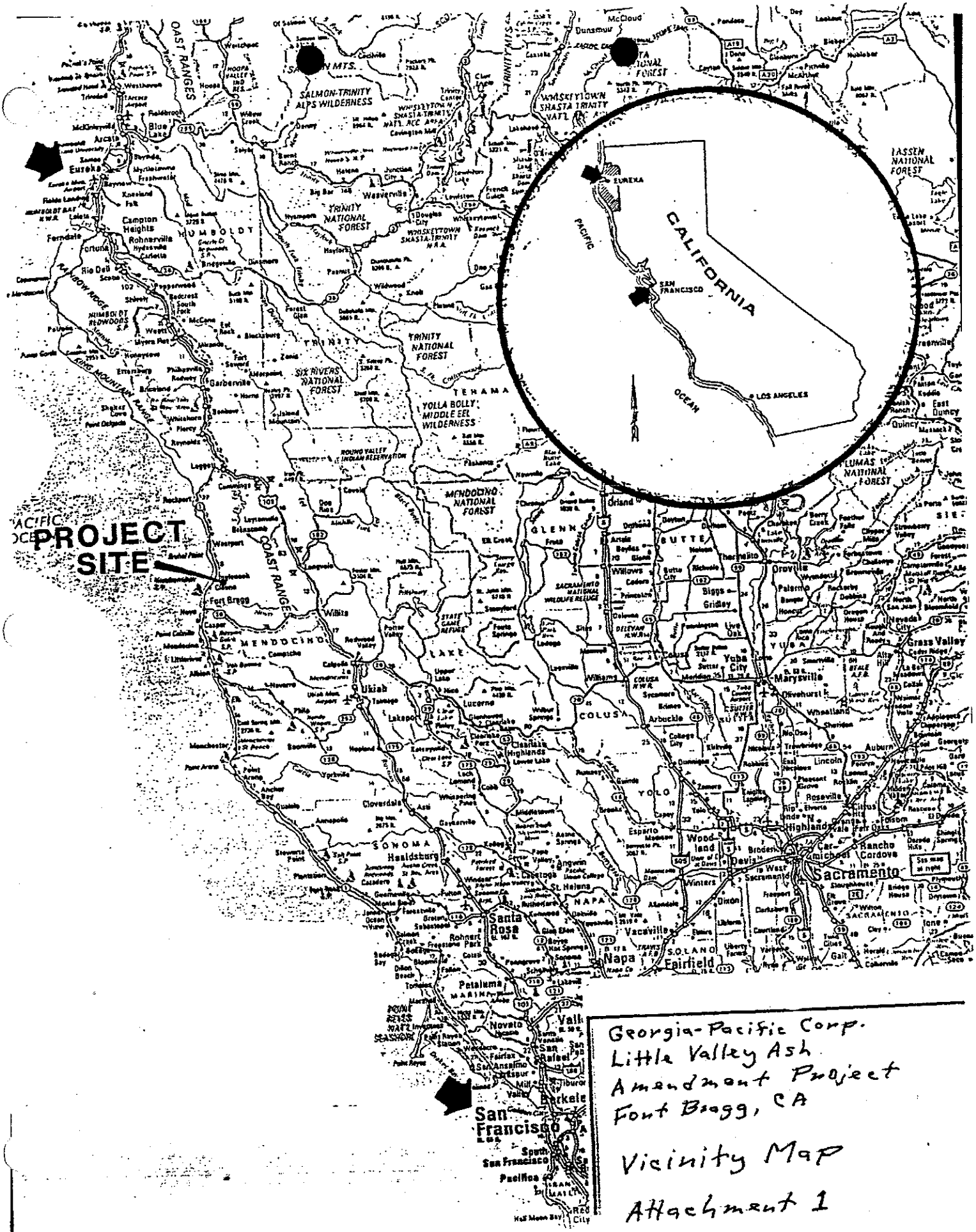
I hereby certify under penalty of perjury that the information provided in this application and in any attachments is true and accurate to the best of my knowledge.

SIGNATURE OF OWNER OF FACILITY	SIGNATURE OF OPERATOR OF FACILITY
Gerald W. Tice	Donald B. Whitman
PRINTED OR TYPED NAME: Gerald W. Tice	PRINTED OR TYPED NAME: Donald B. Whitman
TITLE: Senior Manager-Environmental Engineering-Building Products	DATE: 2-26-91
TITLE: Plant Manager	DATE:

LIST TITLES OF ANY ATTACHMENTS:

Attachment 1 - Vicinity Map
Attachment 2 - Little Valley Ash Amendment Aregs

You will be notified of the correctness of filing and submittal of any additional information deemed necessary to complete your Report of Waste Discharge pursuant to Division 7. Section 13250 of the State Water Code. or to complete your permit application pursuant to Government Code Section 66796 30 and Health and Safety Code Section 25200.


PROJECT SITE
CALIFORNIA
EUREKA
SAN FRANCISCO
LOS ANGELES
PACIFIC
OCEAN
Georgia-Pacific Corp.
Little Valley Ash
Amendment Project
Fort Bragg, CA
Vicinity Map
Attachment 1

F:6: G.P. Ash Soil Amend.
F

STATE OF CALIFORNIA PETE WILSON, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION

1440 GUERNEVILLE ROAD,
SANTA ROSA, CA 95403
(707) 576-2220

June 11, 1991

Mr. Gerald Tice
Chief Environmental Engineer
Georgia-Pacific Corporation
P. O. Box 105603
Atlanta, GA 30348

Dear Mr. Tice:

In order to reissue Waste Discharge Requirements for the Little Valley Soil Amendment site at the August 1991 Regional Board meeting, you will need to submit a Report of Waste Discharge (ROWD) to the Regional Board by July 15, 1991. In order to be complete, the ROWD should include the following information:

- The enclosed Form 200 and a filing fee of $800.00;
- A list of the applicable Best Management Practices to be utilized to prevent any potential discharge of ash to waters of the state, including setback from streams, maximum time of storage, and minimum tillage acreage per application;
- The application rates of ash to land, as determined by the studies completed by University of California at Davis advisors;
- The application rates of any fertilizer to land as part of the forage crop production;
- A final report summarizing and discussing the results of the sampling that has been done to date, including Toxic Equivalency Factors (TEFs);
- Types of grass seed used and the manner in which the forage is used;
- An updated map showing both areas that have been amended and present and future amending areas.

Further sampling may be required in the future should any new concerns about water quality impacts arise, or should Georgia-Pacific propose to reamend previously amended areas. Feel free to call me if you have any questions.

Sincerely,

Mark K. Neely
Associate Engineering Geologist

MKN:tam/gpashltr

Enclosure

STATE OF CALIFORNIA

PETE WILSON, *Governor*

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA, CA 95403
(707) 676-2220

June 11, 1991

NOTICE

PROPOSED WASTE DISCHARGE REQUIREMENTS

FOR

GEORGIA-PACIFIC CORPORATION
FORT BRAGG SOIL AMENDMENT

Mendocino County

Comments or recommendations you may have concerning the proposed Order should be submitted in writing to the Regional Board by June 24. 1991. Comments received after this date cannot be given full consideration.

Benjamin D. Kor
Executive Officer

Attachment

cc: SWRCB, Division of Water Quality, Attn: Archie Matthews
SWRCB, Office of the Chief Counsel, Attn: Frances McChesney
DFG, Sacramento
DFG, Yountville
Mendocino County Health Department, Attn: Gerald F. Davis
DOHS, EMB, Santa Rosa, Attn: District Representative
DWR, Central District, Sacramento, Attn: Robert Matteoli
USDI, Fish and Wildlife Service, Sacramento
Dept. Parks and Recreation, Sacramento, Attn: James M. Doyle
Mendocino County Planning Department, Ukiah, Attn: Ray Hall

3. The Regional Board adopted Waste Discharge Requirements Order No. 90-32 for the stockpiling of woodwaste ash on February 22, 1990. The permit had an expiration date of July 1, 1991. It modified the previous Order No. 86-3 by not permitting the *amending* of the ash but allowing the interim stockpiling to proceed, *pending* a study by Georgia-Pacific on the hazard posed by bioaccumulation of low levels of chlorodibenzofurans (DF) and chlorodibenzodioxins (CDD). 2,3,7,8-tetrachloro-p-dibenzodioxin is listed as being carcinogenic under the Safe Drinking Water and Toxic Enforcement Act of 1986. Resumption of soil emending under the permit was made contingent on a study finding the bioaccumulation potential to be negligible. Georgia-Pacific submitted sampling data which found the ash to have a toxic equivalency factor (TEF) of 3.02 to 3.83 parts per trillion (ppt), a TEF for fish tissue of 0.03 to 0.10 ppt, and a TEF for stream sediment of 0.03 to 0.15 ppt. The TEF method is a procedure for assessing the risks associated with exposures to complex mixtures of CDD's and CDF's, and relates their toxicity to the highly studied 2,3,7,8-tetrachlorodibenzodioxin (TCDD).

4. On the basis of the limited data submitted, the risk of bioaccumulation of chlorodibenzodioxins and chlorodibenzofurans was small. The Regional Board adopted Waste Discharge Requirements Order No. 90-154 on August 23, 1990, allowing the amending of ash to soil, and requiring a second round of aquatic sampling. The expiration date remained as July 1, 1991.

5. The second round of aquatic sampling, scheduled for March 1991, was postponed due to high water from the heavy rains of March and did not take place until mid-May 1991. Sample results were not transmitted to staff until June 4, 1991, resulting in insufficient time to analyze the sampling results prior to adoption of WDRs in June 1991. Therefore, Waste Discharge Requirements Order No. 91-93 is an interim permit to allow continued stockpiling and amending until review of all of the sampling data is complete. Order No. 91-93 has an expiration date of September 1, 1991. The Regional Board may consider adoption of final Waste Discharge Requirements in August 1991 pending the results of the aquatic sampling and the submittal of a new Report of Waste Discharge.

6. The Board adopted the Water Quality Control Plan for the North Coast Region on April 28, 1988. The plan was approved by the State Water Resources Control Board on November 15, 1988. It includes, by reference, the Water Quality Control Plan for Ocean Waters of California which was adopted by the State Water Resources Control Board on September 22, 1988. Both Plans include water quality objectives and receiving water limitations. The basin plan contains a prohibition against new waste discharges to all coastal streams and natural drainageways that flow directly to the ocean.

7. The beneficial uses of Little Valley Creek and *Pudding* Creek include:

   a. municipal and domestic water supply
   b. agricultural water supply
   c. potential industrial service water supply
   d. potential industrial process water supply
   e. groundwater recharge
   f. water contact recreation
   g. non-contact water recreation
   h. warm freshwater habitat
   i. wild freshwater habitat
   j. wildlife habitat
   k. fish migration
   l. fish spawning

8. The County of Mendocino has zoned this area as timber production and does not require a permit for a use of the land consistent with this zoning. The Board has determined that compliance with this Order will mitigate any potential adverse water quality impact. These waste discharge requirements constitute a minor modification to land and is exempt from CEQA under Section 15304, Title 14 CCR.

9. The Board has notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the proposed discharge and has provided them with an opportunity for a public meeting and an opportunity to submit their written views and recommendations.

10. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

THEREFORE, IT IS HEREBY ORDERED, that in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, the discharger shall comply with the following:

A. PROHIBITIONS:

1. There shall be no discharge of ash to surface streams at any time.

B. SPECIFICATIONS:

1. Runoff of ash to land not under the control of the discharger is prohibited.

2. The stockpiling and amending of ash shall not cause a pollution or nuisance as defined in Section 13050 of the California Water Code.

3. No ash materials shall be deposited outside of the soil amendment areas shown on Attachment "A".

4. The soil amendment area shall be protected from any washout or erosion of ash or covering materials and from inundation which could occur as a result of floods having a recurrence interval of 100 years.

5. Annually, prior to the anticipated rainfall period, a cover crop shall be established in the soil amendment ares to prevent erosion of the site.

6. During the rainy season, only the active area of ash placement shall be left exposed to rainfall. The active area shall not be excessively large for incorporation operations and vegetation establishment.

7. Discharge of any waste not specifically regulated by this Order is prohibited.

C. PROVISIONS:

1. Availability

A copy of this Order and a copy of the facility spill contingency plan shall be maintained at the discharge facility and be available at all times to operating personnel.

2. Operation and Maintenance

The discharger must maintain in good working order and operate as efficiently as possible any facility or control system installed by the discharger to achieve compliance with the waste discharge requirements.

3. Change in Discharge

The discharger must promptly report to the Board any material change in the character, locations, or volume of the discharge.

4. Change in Ownership

In the event of any change in control or ownership or land or waste discharge facilities presently owned or controlled by the discharger, the discharger must notify the succeeding owner or operator of the existence of this Order by letter, a copy of which must be forwarded to this office.

Vested Rights

This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, nor protect the discharger from his liability under federal, State, or local laws, nor create a vested right for the discharger to continue the waste discharge.

6. Severability

Provisions of these waste discharge requirements are severable. If any provision of these requirements is found invalid, the remainder of these requirements shall not be affected.

7. Monitoring

The discharger must comply with the Contingency Planning and Notification Requirements Order No. 74-151, Monitoring and Reporting Program No. 91-93 and any modification to these documents as specified by the Executive Officer. Such documents are attached to this Order and incorporated herein. Chemical, bacteriological, and bioassay analyses must be conducted at a laboratory certified for such analyses by the State Department of Health Services. In the event a certified laboratory is not available to the discharger, analyses performed by a noncertified laboratory will be accepted.

8. Inspections

The discharger shall permit authorized staff of the Board:

a. entry upon premises in which an effluent source is located or in which any required records are kept;
b. access to copy any records required to be kept under terms and conditions of this Order;
c. inspection of monitoring equipment or records; and
d. sampling of any discharge.

9. Noncompliance

In the event the discharger is unable to comply with any of the conditions of this Order due to:

a. breakdown of waste treatment equipment;
b. accidents caused by human error or negligence; or
c. other causes such as acts of nature;

the discharger must notify the Executive Officer by telephone as soon as he or his agents have knowledge of the incident and confirm this notification in writing within two weeks of the telephone notification. The written notification shall include pertinent information explaining reasons for the noncompliance and shall indicate what steps are being taken to prevent the problem from recurring.

10. Revisions of Requirements

The Board will review this Order periodically and may revise requirements when necessary.

11. This Order expires on September 1, 1991.

Certification

I, Benjamin D. Kor, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, North Coast Region, on June 27, 1991.

Benjamin D. Kor
Executive Officer

(gpashwdr)

California Regional Water Quality Control Board
North Coast Region

MONITORING AND REPORTING PROGRAM NO. 91-93

FOR

GEORGIA-PACIFIC CORPORATION
FORT BRAGG SOIL AMENDMENT

Mendocino County

Monitoring

The discharger shall record the approximate volume of ash deposited at the site each month.

Stormwater Runoff Monitoring

Grab samples shall be taken periodically when streams are flowing from the points shown on the attached map. Samples shall be analyzed as follows:

Constituent	Units	Frequency
pH	pH units	Weekly
COD	mg/l	November, January, and March

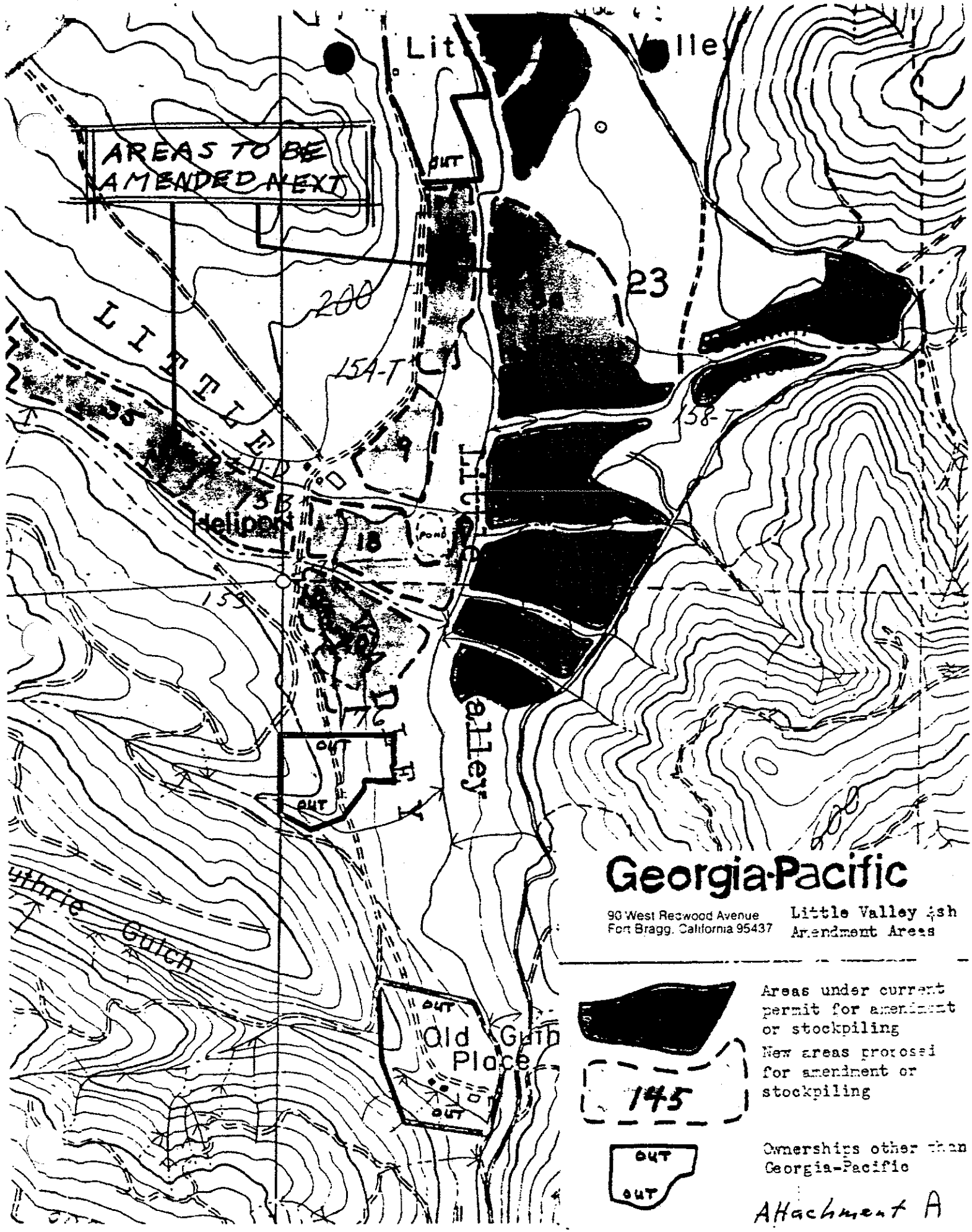
Weekly rainfall totals shall also be recorded and reported.

Reporting

Monitoring reports shall be submitted monthly to the Board by the fifteenth of the month. Copies of signed laboratory sheets shall be submitted with any monthly summary report.

Ordered by _____
Benjamin D. Kor
Executive Officer

June 27, 1991


AREAS TO BE AMENDED NEXT
Lit
Valle
OUT
23
200
LITTLE
15A-T
15B-T
Little Valley
Heliport
18
OUT
OUT
Uthrie Gulch
Old Gulch Place
OUT
OUT
Georgia-Pacific
90 West Redwood Avenue
Fort Bragg, California 95437
Little Valley Ash Amendment Areas
Areas under current permit for amendment or stockpiling
New areas proposed for amendment or stockpiling
145
OUT
OUT
Ownerships other than Georgia-Pacific
Attachment A

California Regional Water Quality Control Board
North Coast Region

CONTINGENCY PLANNING AND NOTIFICATION REQUIREMENTS

FOR

ACCIDENTAL SPILLS AND DISCHARGES

ORDER NO. 74-151

The California Regional Water Quality Control Board, North Coast Region, finds that:

1. Section 13225 of the Porter-Cologne Water Quality Act requires the Regional Board to perform general duties to assure positive water quality control.

2. The Regional Board has been advised of situations in which preparations for, and response to accidental discharges and spills have been inadequate.

3. Persons discharging waste or conveying, supplying, storing. or managing wastes or hazardous materials' have the primary responsibility for contingency planning, incident reporting and continuous and diligent action to abate the effects of such unintentional or accidental discharge.

THEREFORE, IT IS HEREBY ORDERED THAT:

I. All persons who discharge wastes or convey, supply, store, or otherwise manage wastes or other hazardous material shall:

A. Prepare and submit to this Regional Board, according to a time schedule prescribed by the Executive Officer, a contingency plan defining the following:

1. Potential locations and/or circumstances under which accidental discharge incidents might be expected to *occur*,

2. Possible water quality effects of accidental discharges.

3. The conceptual plan for cleanup and abatement of accidental discharge incidents, including:

a. The individual who will be in charge of cleanup and abatement activities on behalf of the discharger,

b. The equipment and manpower available to the discharger to implement the cleanup and abatement plans.

B. Immediately report to the Regional Board any accidental discharge incidents. Such notification shall be made by telephone as soon as the responsible person or his agent has knwledge of the incident.

. Immediately begin diligent and continuous action to cleanup and abate the effects of any unintentional or accidental discharge. Such action shall inciude temporary measures to abate the discharge prior to completing permanent repairs to damaged facilities.

D. Confirm the telephone notification in writing wit* mu weeks of the telephone notification. The written notification shall include: reasons for the discharge, duration ard volume of the discharge, steps taken co correct the problem and steps being taken to prevent the problem from recurring.

II. Upon original receipt of phone report (I.B.), the Executive Officer shall immediately notify all affected agencies and known users of waters affected by the unintentional or accidental discharge.

III. Provide updated information to the Regional Board in the event of change of staff. size of the facility. or change of operating procedures which will affect the previously established contingency plan.

IV. The Executive Officer or his employees shall maintain liaison with the discharger and other affected agencies and persons to provide assistance in cleanup and abatement activities.

V. The Executive Officer shall transmit copies of this Order to all persons whose discharges of waste handling activities are governed by Waste Discharge Requirements or an NDPES permit. Such transmittal shall include a current listing of telephone numbers of the Executive Officer and his key employees ko facilitate compliance with Item I.B of this Order.

Ordered

Executive Officer

July 24, 1974
(Retyped February 15. 1990)

Your primary notification should be to the Regional Board office in Santa Rosa at (707) 576-2220. During off hours, you will be able to leave a recorded message at that number and. if you have s spill or discharge emergency. you will also be referred to the State Office of Emergency Services (OES) at (800) 852-7550. OES maintains a 'roster of key employees and will relay your notification to Regional Board staff.

California Regional Water Quality Control Board
North Coast Region

GENERAL MONITORING AND REPORTING PROVISIONS

February 3, 1971
(Retyped June 13, 1989)

GENERAL PROVISIONS FOR SAMPLING AND ANALYSIS

Unless otherwise noted, all sampling, sample preservation, and analyses shall be conducted in accordance with the current edition of "Standard Methods for the Examination of Water and Waste Water" or approved by the Executive Officer.

All analyses shall be performed in a Laboratory certified to perform such analyses by the California State Department of Health or a laboratory approved by the Executive Officer.

All samples shall be representative of the waste discharge under the conditions of peak load.

GENERAL PROVISIONS FOR REPORTING

For every item where the requirements are not met, the discharger shall submit a statement of the actions undertaken or proposed which will bring the discharge in full compliance with requirements at the earliest time and submit a timetable for correction.

By January 30 of each year, the discharger shall submit an annual report to the Regional Board The report shall contain both tabular and graphical summaries of the monitoring data obtained during the previous year. In addition, the discharger shall discuss the compliance record and the corrective actions taken or planned which may be needed to bring the discharge into full compliance with the waste discharge requirements.

The discharger shall file a written report within 90 days after the average dry weather flow for any month that equals or exceeds 75 percent of the design capacity of the waste treatment or disposal facilities. The report shall contain a schedule for studies, design, and other steps needed to provide additional capacity or limit the flow below the design capacity prior to the time when the waste flow rate equals the capacity of the present units.

GEORGIA-PACIFIC CORPORATION'S
LITTLE VALLEY SOIL AMENDMENT PROJECT

BEST MANAGEMENT PRACTICES
July, 1991

Woodwaste flyash is generated by a power plant operated at a Georgia-Pacific sawmill located in the town of Fort Bragg, California. The ash is considered a nonhazardous decomposable waste that has beneficial uses as an agricultural fertilizer and liming agent. Georgia-Pacific utilizes the ash as a soil amendment to approximately 300 acres of local pasture land along the Little Valley Creek. Not only does the soil amendment of ash help to support a more productive grass and clover crop but provides a feasible method of disposing of the flyash.

The State of California Regional Water Quality Control Board has promulgated waste discharge requirements for soil amendment utilizing woodwaste ash. Included are requirements for drainage control and management practices for stockpiling ash to minimize the potential for discharges of ash to surface streams. To meet these requirements the following list of "Best Management Practices" has been developed for the Little Valley Soil Amendment Project.

- A minimum 50 foot buffer shall be maintained between ash incorporation activities and any watercourse, whether perennial, intermittent, or ephemeral.

- The minimum tillage acreage for ash amendment is 2 acres. Any acreage less than this is not feasible for heavy equipment operation.

- The application rate of ash to land is 6 inches of ash over the approved site to be amended. Incorporation of ash into the soil shall proceed as follows:

  a. Before ash application, rip soil onsite to a depth of 36 inches.
  b. Spread ash over the site to a depth of 6 inches.
  c. Disc ash into the soil to a depth of approximately 36 inches.
  d. To smooth out the rough areas resulting from deep discing, a shallow disc shall be passed over the site as required.
  e. Perform final levelling of the site using a log pulled behind a tractor.
  f. Harrow the site immediately prior to seeding.

Georgia-Pacific Corporation
Little Valley Soil Amendment Project
BEST MANAGEMENT PRACTICES (continued)

- During the summer period the ash shall be accumulated on the site for a period of 2 weeks, afterwhich it shall be incorporated into the soil. If a need arises to store the ash for a longer period then the Regional Board staff shall be notified.

- Amended sites shall be seeded between September 1 and October 1. The U-C Davis prescribed seed mixture shall consist of two mixtures as follows:

  Mix #1 - 10% Nungrain subclover, 30% Woogenenellup subclover, 30% Trikkala subclover, and 30% Mount Barker subclover.

  Mix #2 - 80% Berber orchard grass and 20% annual rye grass.

  The application rate of each mixture shall be 20 pounds per acre. The seed shall be applied using a drill seeder such as a Brillion, Duncan, or equal. No commercial fertilizer shall be applied to the site.

- Once an area has been amended and planted, there shall be no passage of vehicles or equipment over the amended area except for harvesting of the cover crop.

- Harvesting of the cover crop shall occur during the summer months and on those amended areas that have established complete vegetative coverage. The crop shall be cut, baled, and used for cattle feed.

- Due to wet weather and the inability of heavy equipment to work effectively in the wet soils the ash shall be stock-piled during the months of October through March.

SUMMARY REPORT OF CDF/CDD STUDY ACTIVITIES CONDUCTED ON THE LITTLE VALLEY FLYASH SOIL AMENDMENT SITE 1988 - 1991

GEORGIA-PACIFIC CORPORATION
FORT BRAGG, CALIFORNIA
JULY 1991

INTRODUCTION

Georgia-Pacific Corporation operates a large sawmill located at Fort Bragg, California which primarily produces redwood and Douglas fir lumber. Steam used in the operation of the sawmill is obtained from three (3) woodwaste-fired boilers. The woodwaste fuel used in these boilers consists primarily of hogged green sawdust and bark. Ash produced by the boilers is collected by multicyclone collectors followed by wet scrubbers. The collected ash, after dewatering, is placed in a large dump hopper for disposal. The approximate volume of ash generated is 1,400 cu. yards (about 500 tons) per month

Ash disposal has for a number of years been accomplished via a highly successful soil amendment project located at a site several miles from the plant site. The project, consisting of several hundred acres located in an area known locally as Little Valley, began operation under Waste Discharge Requirements Order No. 86-3 issued by the California North Coast Regional Water Quality Control Board.

As a result of concerns over low-level CDF/CDD contamination of ash from the Fort Bragg operation and the fate of these compounds in the environment, a sequence of studies was initiated in 1988. This sequential study was comprised of six (6) discrete field study efforts with results reported to the North Coast Regional Board in three (3) separate reports. While all three reports served to address the original concerns of the board, the scope of each successive effort was adjusted in response to information gleaned on concerns raised by the previous effort. The end result, we feel, is a comprehensive evaluation of the environmental concerns associated with the utilization of wood flyash as a beneficial soil amendment on coastal range lands. The following is an executive summary of the objectives, activities, and results of each individual report (already submitted to the board including all data, site maps, quality assurance documentation, etc.):

> The initial effort was to be a sampling and analysis program designed to address three key areas of concern to the Regional Board: the potential for wind-blown transport of ash components in the amended soil to off-site locations (with emphasis on transport to the aquatic environment), the potential for bioaccumulation of TCDF's (the only CDF/CDD congener known to be in the ash at that time) in terrestrial/aquatic organisms exposed to ash-amended soil, and the potential for bioaccumulation of TCDF in the amendment site cover crop available for grazing.

This program consisted of three (3) phases of field sampling conducted on November 15-16, 1988; Xarch 20, 1989; and July 18-19, 1989 with a comprehensive report issued to the Board on December 21, 1989. The following is an excerpt from the Conclusions section of that report:

Phase I

As noted in the Test Program and Analytical Results sections pertaining to Phase I, all results were non-detect for 2,3,7,8 TCDF and total TCDF on all samples.

The worm samples taken from the 1986, 1987 and 1988 amend areas represent varying degrees of long term exposure to TCDF in the amended soil, however, sample results indicate no bioaccumulation effect. Grass samples taken from the 1988 amended site show no initial uptake of TCDF in the emerging cover crops. Soil samples taken at the 30: depth also indicate no leaching potential into the subsoil.

During the Phase I sampling it was observed that there were no nearby streams which vere likely to be impacted by potential wind blown duet or would come in contact with the amended fields themselves. As noted in the Test Program discussion, geographical details and historical weather data for the area indicated that direct wind borne sampling would be difficult if not impossible. At this point in the study it was concluded that a mathematical model approach would be more appropriate.

phase II

Grass samples obtained during Phase II from the 1988 amended plot show non-detect for 2,3,7,8 TCDF and total TCDF. These results, as with the earlier tests, continue to confirm no uptake of TCDF in the now maturing cover crop. (It is noted that for all grass samples from the amended plot analyzed in this study the detection limit was less than 1/2 parts per trillion).

Soil samples taken at the 30" depth continue to indicate no potential for leaching or transport of TCDP to the subsoil or groundvater. The low level of 2,3,7,8 TCDF and total TCDF in the amended composite soil sample (No. 108) taken from 0" - 28 1/2" confirm previous observations that lov levels of TCDF are present in the ash itself.

Phase III

Grass samples taken during the Phase III sampling event again show non-detect for 2,3,7,8 TCDF and total TCDF. These results are further indication of no uptake or bioaccumulation in the cover crop.

Composite mil samples taken in the amended soil (0"-30" depth) continue to confirm the presence of TCDF in the ash as amended.

Composite soil samples taken at the 30"-32" depth indicate non-detect except sample No. LV-205 which indicates a very slight amount (1.9 pg/g) of total TCDF. As noted in the Analytical Results section, a small amount of ash was observed in some samples taken at this depth because of uneven surface conditions and resulting variations in tillage depth. this is the most likely explanation for the positive results in this sample.

In preparation for the modelling study. which was intended to supply the data required by the Dust Sampling Plan, dust samples were taken with the intent to analyze for particle size distribution, soil density and moisture content. As indicated in the Test Program section, these samples could only be obtained by peeling back the thick thatch cover provided by the cover crop. It was then abundantly clear that this dense barrier would make the entrainment of wind blown dust an impossibility. This lead us to conclude that, although wind blown dispersion of TCDF laden tap soil is a valid theoretical concern, physical conditions at the site indicate that this possibility is simply not a practical consideration.

- The second effort was initiated in response to additional concerns raised by the Regional Board with regard to the need to re-survey Ft. Bragg ash for the presence of all CDF/CDD congeners using current, higher resolution analytical techniques and with regard to the need for sampling of aquatic sediments and aquatic animals (fish) in order to resolve the question of bioaccumulation in Little Valley Creek. This program consisted of two phases of field sampling conducted on May 30, 1990 and June 25, 1990 with a comprehensive report issued to the Board on July 16, 1990. This report contained the following text discussing the sampling results:

A review of the ash data shows lov level quantities of several furan and dioxin congeners. A calculated TEQ for this data shows an average of 3.5 ppt (full congener). As such, the level of concern for the toxicity of the ash itself is quite low. (See J.J. Tice, IV memo, attached, which compares the 2,3,7,8 (only) TEQ for the ash to the 104 Mill Study. The Ft. Bragg ash TEQ is similar to that of a high grade of paper.)

Low levels of furan and dioxin congeners were found in both the upstream and downstream sediment samples. A calculated TEQ for the upstream samples were 0.15 and 0.07 ppt and the downstream samples were 0.06 and 0.09 ppt. This indicates no evidence of release of ash related furans/dioxins to the aquatic environment.

A review of the aquatic tissue samples show a calculated TEQ of 0.09 and 0.03 ppt, respectively, for upstream and downstream samples. As such, there is no evidence of bioaccumulation in the aquatic environment proximate to the ash amended sites.

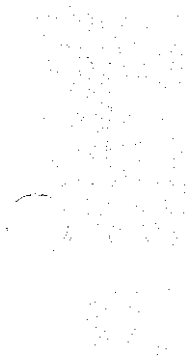
- The third and most recent effort was initiated in compliance with a requirement contained in Regional Board Order No. 90-154 that Georgia-Pacific conduct an additional study in the aquatic habitat of Little Valley Creek in order to expand and confirm the earlier study's results with respect to aquatic bioaccumulation. This program consisted of a single field sampling phase conducted on April 16-17, 1991 with a comprehensive report issued to the Board on June 3, 1991. This report contained the following text discussing the sampling results:

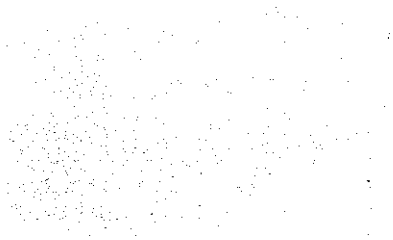
  Table 1 summarizes the lab results of the aquatic plant root samples and the fish samples. As can be seen all results are reported as not-detected (ND). Table 2 summarizes the lab results of the sediment samples. Some low levels of HpCDFs (total), HpCDDs (total), 1,2,3,4,6,7,8 - HpCDD and OCDD are reported.

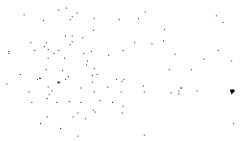
  For comparison purposes, Table 1A and Table 2A have been provided which have the 1990 results added. These values are shown in ( ) to the right of the 1991 values. As already noted, all the 1991 root and fish sample results are reported as not-detected. For the sediment sample results, the number of reported values are considerably less than for 1990 and those reported are very similar to the 1990 values. These results continue to show no evidence of bioaccumulation in the aquatic environment proximate to the ash amended sites. Based on this we request that the NCRWQCB renew our permit for ash amending at the Little Valley site at it's June 1991 board meeting.

In addition to the above discussion (contained along with all data, etc. in the comprehensive report), a calculation and discussion (copy attached) of the toxicity equivalents (TEQ) was provided by Dr. J.J. Tice IV of our Washington, D.C. Environmental Affairs office. Dr. Tice notes that the overall 1991 TEQ results are slightly lower than the 1990 TEQ results indicating no indication of bioaccumulation due to our soil amendment activities.

In summary, the first portion of our program addressed the levels of TCDF's in the amended soil, the potential for movement of TCDF's to the subsoil and groundwater, the potential for bioaccumulation of TCDF's in the cover crop and the potential for bioaccumulation of TCDF's in terrestrial animals (earthworms) in contact with the amended soil. The results clearly dispelled any environmental concerns in these areas. The second portion of the program expanded the scope of our investigation to all CDF's and CDD's and provided detailed sampling and analysis of the ash as well as aquatic sediments and aquatic animals (fish) in Little Valley Creek. TEQ's were calculated and no evidence of bioaccumulation nor significant risk was found. The third portion of the study repeated sampling and analysis of aquatic sediments and aquatic animals and added sampling and analysis of the root zones of aquatic plants in Little Valley Creek. TEQ's were calculated and, again, no evidence of bioaccumulation nor significant risk was found.







G.P. Soil Amendment

STATE OF CALIFORNIA — PETE WILSON, *Governor*

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA, CA 95403
(707) 576-2220

July 3, 1991

Mr. Gerald Tice
Chief Environmental Engineer
Georgia-Pacific Corporation
P.O. Box 105603
Atlanta, GA 30348

Dear Mr. Tice:

Enclosed is a copy of your Waste Discharge Requirements Order No. 91-93 for the Fort Bragg Soil Amendment, as adopted by the Regional Board on July 27, 1991. Please note that the Permit will expire on September 1, 1991, and a Report of Waste Discharge for renewal is due before July 15, 1991. Renewel of the Permit at the August Board meeting will, of course, be contingent on the resolution of the bioaccumulation question.

If you have any questions, please call Mark Neely at this office.

Sincerely,

Benjamin D. Kor
Executive Officer

MKN:tam/translet

Enclosure

Certified-Return Receipt Requested

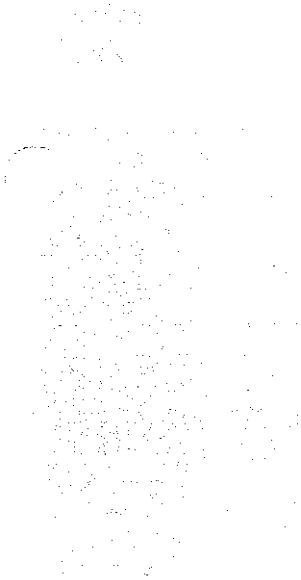
UNITED STATES POSTAL SERVICE
OFFICIAL BUSINESS
SENDER INSTRUCTIONS
Print your name, address and ZIP Code in the space below.
• Complete items 1, 2, 3, and 4 on the reverse.
• Attach to front of article if space permits, otherwise affix to back of article.
• Endorse article "Return Receipt Requested" adjacent to number.
RETURN TO

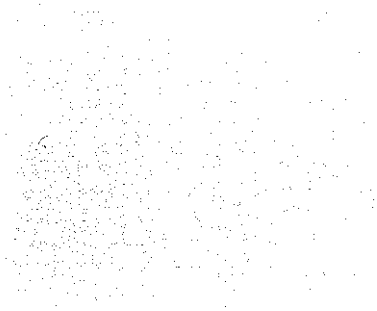
CALIF. REGIONAL WATER QUALITY CONTROL BOARD
JUL 12 '91
RECEIVED

U.S.MAIL
PENALTY FOR PRIVATE USE, $300

Print Sender's name address and ZIP Code in the space below.
CALIF. REGIONAL WATER QUALITY
CONTROL BOARD-NORTH COAST REGION
1440 Guerneville Road
Santa Rosa, California 95403

U.S.G.P.O. 1989-234-555
Postage $
Sent to Mr. Gerald Tice
Georgia-Pacific Corp.
P.O. Box 105603
P.O. State and ZIP Code Atlanta, GA 30348
RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)
P 333 071 489





STATE OF CALIFORNIA

PETE WILSON, *Governor*

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION**

1440 GUERNEVILLE ROAD
SANTA ROSA, CA 95403
(707) 576-2220

July 3, 1991

NOTICE OF ADOPTION

OF

WASTE DISCHARGE REQUIREMENTS

GEORGIA-PACIFIC CORPORATION
FORT BRAGG SOIL AMENDMENT

Mendocino County

Waste Discharge Requirements for the above named discharger were adopted by the California Regional Water Quality Control Board, North Coast Region on July 27, 1991. The Order was adopted as originally proposed.

Benjamin D. Kor
Executive Officer

cc: SWRCB, Division of Water Quality, Attn: Archie Matthews
DFG, Sacramento
DFG, Yountville
Mendocino County Health Department, Attn: Gerald F. Davis
DOHS, EMB, Santa Rosa, Attn: District Representative
DWR, Central District, Sacramento, Attn: Robert Matteoli
USDI, Fish and Wildlife Service, Sacramento
Dept. Parks and Recreation, Sacramento, Attn: James M. Doyle
Mendocino County Planning Department, Ukiah, Attn: Ray Hall

Georgia-Pacific Corporation
P.O. Box 1618
Eugene, Oregon 97440
(503) 689-1221

July 8, 1991

Mr. Mark Neely
California Regional Board
Quality Control Board
1440 Guerneville Road
Santa Rosa,, California 95403

Dear Mr. Neely:

Enclosed is the June 1991 Monitoring and Reporting Program Report,, as per Order NO. 90-154 for Georgia-Pacific Corporation at Fort Bragg (Little Valley),, California.

If you have any questions please contact me.

Sincerely,,

Peter M. Fetter

Peter M. Fetter
Environmental Engineer

PMF/nj

Enclosure

GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTH OF JUNE, 1991

Monitoring and Report Order NO. 90-154, Soil Amending Project:

Week Of	Ash Deposited North Area	Rainfall Details
3 - 8	420 yds^3	0 Inches
10 - 15	400	0
17 - 22	480	0
24 - 29	320	.60
	1620 yds^3	.60 Inches

The total number of treated acres is 83.8 acres

WATER MONITORING AND TESTING

Epemeral draws were dry during the month June. No. ph taken.

DEPOSITION

All ash was deposited in the north area for the month of June,, 1991.

Georgia-Pacific

intracompany memo

to	Distribution	location/facility code	Various
from	J. J. Tice IV	location/facility code	Washington, D.C.
subject	Ft. Bragg 1991 Data: Toxicity Equivalents	date	July 11, 1991

Toxicity equivalents (TEQ) have been calculated from the 1991 Ft. Bragg sample results using the I-TEFs/89 Toxicity equivalent factors. Where available, the 1990 results are shown in parentheses. To put these results in perspective, selected 104 mill results are also included. Attached also is a copy of the 1990 report.

Ft. Bragg Samples

Sample	Description	Parts Per Trillion TEQ Full Congener	Parts Per Trillion TEQ 2,3,7,8 Only
LVSC-7	Sediment - Control, Top 2"	0.013	ND
LVSC-8	Sediment - Control, Next 2"	0.011	ND
LVSU-3	Sediment - Upstream, Top 2"	0.086 (0.15)	ND
LVSU-4	Sediment - Upstream, Next 2"	0.015 (0.07)	ND
LVSL-5	Sediment - Downstream, Top 2"	0.116 (0.06)	ND
LVSL-6	Sediment - Downstream, Next 2"	0.018 (0.09)	ND
LVC	Roots - Control	ND	ND
L W	Roots - Upstream	ND	ND
LVL	Roots - Downstream	ND	ND
LVC	Fish - Control	--- No Fish Found ---	
L W	Fish - Upstream	ND (0.09)	ND
LVL	Fish - Downstream	ND (0.03)	ND

104 Mill Study

Sample	Parts Per Trillion TEQ - 2,3,7,8 Only Minimum	Median	Maximum
Pulp - Hardwood	ND	5.5	85
Pulp - Softwood	ND	9.7	195
Pulp - Sulfite	ND	0.2	90
Sludge - All kraft	ND	45.6	700

Conclusions

1. The 1991 results are comparable to the 1990 results (the 1991 results are actually overall slightly lower).

2. These results continue to show no bioaccumulation due to our amending the soil with ash.

3. The downstream sediment (0.116 ppt TEQ) is comparable* to:

Pulp - hardwood	:	less than 3rd percentile
Pulp - softwood	:	less than 2nd percentile
Sludge - all kraft	:	less than 1st percentile

*Assuming that the 104 mill data is distributed linearly over the concentration range up to the respective median.

Already the background levels of dioxins and furans are innocuous.

John J. Tice

J. J. Tice IV

Encl.

JJT/lmw

Distribution

Dave Modi - Washington, D.C.
Seymour L. Friess - Arlington, VA (DFHL&S, Inc.)
Laurence Otwell - Atlanta, GA (GA030 G-16)
Gerald Tice - Atlanta, GA (GA030 6-16)
Tim Treichelt - Sacramento, CA

cc: C. T. Howlett, Jr. - Atlanta, GA (GA030 G-38)
Maggie Dean - Washington, D.C.
Tom Kemeny - Atlanta, GA (GA030 G-38)

FILE - G-P FT. BRAGG
SOIL AMENDMENT

Georgia-Pacific

intracompany memo

to Mr. Donald Whitman — location/facility code CA060 Fort Bragg

from D. W. Baker — location/facility code GA030 Atlanta G16

subject **PERMIT APPLICATION** — date July 17, 1991

Attached is the original permit application for the Little Valley project. Please sign the back of the form and forward the application to:

Mr. Hark Neely
Associate Engineering Geologist
California Regional Water Quality
Control Board
1440 Guerneville Road
Santa Rosa, California 95403

If you have any questions please call myself or Gerald.

Sincerely,

Donald W Baker

Donald W. Baker, P.E.
Environmental Engineer
Eastern Area
Building Products

DWB/jhd

Attachment

cc: Mr. G. W. Tice
Mr. L. P. E. Otwell

RECEIVED
JUL 19 '91

☐ DK ☐ RK
☐ DH ☐ LB
☐ TB ☐ CHS
☐ RT ☐ RD
☐ JH ☐ JS
☐ SW ☐
☑ HD ☐ REPLY
☐ ALL STAFF ☑ FILE G-P FT. BRAGG SOIL AMEND.

STATE OF CALIFORNIA

REGIONAL WATER QUALITY CONTROL BO.
DEPARTMENT OF HEALTH SERVICES
SOLID WASTE MANAGEMENT BOARD
DEPARTMENT OF FORESTRY

APPLICATION FOR FACILITY PERMIT/WASTE DISCHARGE

This form is to be used for filing a/an: (check all appropriate)

1. [X] REPORT OF WASTE DISCHARGE (pursuant to Division 7 of the State Water Code)
2. [ ] APPLICATION FOR A HAZARDOUS WASTE FACILITY PERMIT (pursuant to Health and Safety Code Section 25200)
3. [ ] APPLICATION FOR A SOLID WASTE FACILITIES PERMIT (pursuant to Government Cod. Section 66796.30)
4. [ ] APPLICATION FOR A RUBBISH DUMP PERMIT (pursuant to Public Resources Code Sections 4371—4375 and 4438)

FOR OFFICE USE ONLY
Form 200 Rec'd
Fee (HW(1CB) (SWMB)
Letter to Discharger
Report Rec'd
Effective Date
CDF Notified
WHS No.
SWMB No.

I. FACILITY

A. NAME OF FACILITY: GEORGIA-PACIFIC CORPORATION — TELEPHONE #: (707)964-5651
ADDRESS: 90 West Redwood Avenue, Fort Bragg, California 95437 — ZIP CODE:

B. NAME OF LEGAL OWNER OF FACILITY: GEORGIA-PACIFIC CORPORATION — TELEPHONE #: (404)521-5084
ADDRESS: 133 Peachtree Street, N.E. Atlanta, Georgia 30303 — ZIP CODE:

C. NAME OF BUSINESS OPERATING FACILITY: Same as above — TELEPHONE #: ( )
ADDRESS: — ZIP CODE:

D. TYPE OF BUSINESS OPERATING FACILITY
[ ] Sole Proprietorship [ ] Partnership [X] Corporation [ ] Government Agency

E. NAME OF OWNER(S) OF BUSINESS OPERATING FACILITY — TELEPHONE #: ( )
ADDRESS WHERE LEGAL NOTICE MAY BE SERVED — ZIP CODE:

II. REASON FOR FILING

CHECK ALL APPROPRIATE:

A. [ ] New discharge or facility
B. [X] Existing discharge or facility
C. [ ] Increase in quantity of discharge
D. [ ] Change in character of discharge
E. [ ] Change in piece or method of disposal
F. [ ] Change in design or operation
G. [ ] Change in business operating facility
H. [ ] Enlargement of existing facility
I. Other (explain below)

III. TYPE OF OPERATION

CHECK ALL APPROPRIATE:

A. [ ] Transfer nation
B. [ ] Solid waste disposal site
C. [ ] Hazardous waste disposal site
D. [ ] Sewage treatment
E. [ ] Industry (on-site disposal facility)
F. [ ] Industry (discharge to sewer)
G. [ ] Woodwaste site
H. [X] Otbr (explain below)

This is an ash amending site for increased pasture yield.

IV. TYPE OF WASTE

CHECK ALL APPROPRIATE:

A. [ ] Sewage, sewage sludge, and/or septic tank pumpings
B. [ ] Industrial wastes
C. [ ] Municipal solid wastes
D. [ ] Hazardous wastes
E. [ ] Agricultural
F. [ ] Animal wastes
G. [X] Forest product wastes (Boiler Ash)
H. [ ] Construction/demolition wastes
I. [ ] Inert materials
J. [ ] Dead animals
K. [ ] Tires
L. [ ] Other (explain below)

V. SITE DESIGN CAPACITY

A. PRESENT POPULATION OR CAPACITY	B. DESIGN POPULATION OR ULTIMATE CAPACITY	C. LIFE EXPECTANCY (YEARS)
238 Acres (currently planned)	300 Acres	5 to 8 Years

Georgia-Pacific

WESTERN WOOD PRODUCTS MANUFACTURING DIVISION
PORTLAND, OREGON

No. 904164

OW 7333-1 (

[redacted] VENDOR NO.

904164 8752

DATE MO.	DAY	YEAR	VENDOR INVOICE NUMBER		INVOICE AMOUNT	AMOUNT PAID
				PO 32296		
			Filing fee for re-issue of waste discharge requirements for Little Valley Soil Amendment Site			$800.00*

WATER QUALITY CONTROL BOARD REGION 1

JUL 18 '91

☐ BK ____ ☐ RK ____
☐ CJ ____ ☐ LR ____
☐ FR ____ ☐ BB ____
☐ RT ____ ☐ KD ____
☐ JH ____ ☐ JS ____
☐ SW ____ ☐ ____
☐ ____ ☐ REPLY
☐ ALL STAFF ☐ FILE

Georgia-Pacific Corporation
133 Peachtree Street, N.E. (30303)
P.O. Box 105605
Atlanta, Georgia 30348-5605
Telephone (404) 521-4000

WATER QUALITY CONTROL BOARD REGION 1

JUL 18 '91

July 17, 1991

Mr. Hark K. Neely
Associate Engineering Geologist
California Regional Water Quality
Control Board
North Coast Region
1440 Guerneville Road
Santa Rosa, CA 95403

☐BK ___ ☐RK ___
☐CJ ___ ☐LR ___
☐FR ___ ☐BB ___
☐RT ___ ☐KD ___
☐JH ___ ☐JS ___
☐SW ___ ☐ ___
☐ ___ ☐REPLY
☐ALL STAFF ☐FILE G-P Ft. Bragg So. Lateral

RE: Georgia-Pacific Corporation
Ash Amendment Project
Final Summary Report

Dear Mr. Neely:

As requested by your letter dated June 11, 1991, we are enclosing a completed report of Waste Discharge Requirements application for the Little Valley ash amending site operated by Georgia-Pacific at Fort Bragg, CA. Included with the application is our check for $800.00.

Also enclosed is our final summary report, best management practices plan and updated map of the Little Valley site.

Please let me know if there are any questions about this material.

Very truly yours,

[redacted]

GERALD W TICE
SENIOR MANAGER
ENVIRONMENTAL ENGINEERING
BUILDING PRODUCTS

GWT/pcw
Enclosure

cc: Mr. T. Deer w/enclosures
Mr. D. Whitman w/enclosures

File - Ft. Bragg - Ash Study

Enclosures: Waste Discharge Application
Summary Report
Best Management Practices Plan
Updated Map - Little Valley

STATE OF CALIFORNIA

REGIONAL WATER QUALITY CONTROL BOARD
DEPARTMENT OF HEALTH SERVICES
SOLID WASTE MANAGEMENT BOARD
DEPARTMENT OF FORESTRY

APPLICATION FOR FACILITY PERMIT/WASTE DISCHARGE

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2. [ ] APPLICATION FOR A HAZARDOUS WASTE FACILITY PERMIT (pursuant to Health and Safety Code Section 25200)
3. [ ] APPLICATION FOR A SOLID WASTE FACILITIES PERMIT (pursuant to Government Cod. Section 66796.30)
4. [ ] APPLICATION FOR A RUBBISH DUMP PERMIT (pursuant to Public Resources Code Sections 4371-4375 and 4438)

FOR OFFICE USE ONLY
Form 200 Rec'd
Fee (RWQCB) (SWMB)
Letter to Discharger
Report Rec'd
Effective Date
CDF Notified
DOHS No.
SWMB No.

I. FACILITY

A. WAY. OC FACILITY: GEORGIA-PACIFIC CORPORATION — TELEPHONE #: (707) 964-5651
ADDRESS: 90 West Redwood Avenue, Fort Bragg, California 95437 — ZIP COD.

B. NAME OF LEGAL OWNER OC FACILITY: GEORGIA-PACIFIC CORPORATION — TELEPHONE #: (404) 521-5084
ADDRESS: 133 Peachtree Street, N.E. Atlanta, Georgia 30303 — ZIP CODE

C. NAME OF BUSINESS OPERATING FACILITY: Same as above — TELEPHONE #: ( ) — ZIP CODE

TYPE OF BUSINESS OPERATING FACILITY
[ ] Sole Proprietorship [ ] Partnership [X] Corporation [ ] Government Agency

E. NAME OF OWNER(S) OF BUSINESS OPERATING FACILITY — TELEPHONE #: ( )
ADDRESS WHERE LEGAL NOTICE MAY BE SERVED — ZIP CODE

II. REASON FOR FILING

CHECK ALL APPROPRIATE:

A. [ ] New discharge or facility
B. [X] Existing discharge or facility
C. [ ] Increase in quantity of discharge
D. [ ] Change in character of discharge
E. [ ] Change in place or method of disposal
F. [ ] Change in design or operation
G. [ ] Change in business operating facility
H. [ ] Enlargement of existing facility
I. [ ] Other (explain below)

III. TYPE OF OPERATION

CHECK ALL APPROPRIATE:

A. [ ] Transfer station
B. [ ] Solid waste disposal site
C. [ ] Hazardous waste disposal site
D. [ ] Sewage treatment
E. [ ] Industry (on-site disposal facility)
F. [ ] Industry (discharge to sewer)
G. [ ] Woodwaste tit.
H. [X] Other (explain below)

This is an ash amending site for increased pasture yield.

IV. TYPE OF WASTE

CHECK ALL APPROPRIATE:

A. [ ] Sewage, sewage sludge, and/or septic tank pumpings
B. [ ] Industrial wastes
C. [ ] Municipal solid wastes
D. [ ] Hazardous wastes
E. [ ] Agricultural wastes
F. [ ] Animal wastes
G. [X] Forest product wastes (Boiler Ash)
H. [ ] Construction/demolition wastes
I. [ ] Inert materials
J. [ ] Dead animals
K. [ ] Tires
L. [ ] Other (explain below)

V. SITE DESIGN CAPACITY

A. PRESENT POPULATION OR CAPACITY	B. DESIGN POPULATION OR ULTIMATE CAPACITY	C. LIFE EXPECTANC
238 Acres (currently planned)	300 Acres	5 to 8 Years

VI. QUANTITY OF WASTES

A. PRESENT OR PROPOSED DAILY FLOW (IN MGD):	MAXIMUM	AVERAGE	B. DESIGN FLOW (IN MGD)
	N/A	N/A	N/A

SOLID WASTE DISPOSAL SITE (IN TONS OR CUBIC YARDS):	DAILY	TOTAL IN PLACE QUANTITY	D. AREA IN WHICH SOIL WILL BE DISTURBED (1* ACRES)	TOTAL SITE AREA
	60 cu. yds/day	143,000 cu.yds.	23 Acreslyr.	3 0 Acres Max.

VII. LOCATION OF POINT OF DISPOSAL OR DPLRATION

(DESIGN AND ATTACH MAP, SKETCH, OR LOCATION ON U.S.G.S. QUADRANGLE MAP, 7.5 OR 15 MINUTE SERIES.)
LIST DISTANCES OR BEARING AND DISTANCE FROM SECTION CORNER OW QUARTER CORNER, SECTION, TOWNSHIP, RANGE, BASE AND MERIDIAN:

See attached maps

VIII. SOURCE OF WATER SUPPLY (CHECK ALL APPROPRIATE)

A. ☐ MUNICIPAL OR UTILITY SERVICE: N/A

NAME OF WATER PURVEYOR

ADDRESS OF PURVEYOR

B. ☐ INDIVIDUAL (Wells) N/A

C. ☐ SURFACE SUPPLY: N/A

NAME OF STREAM, LAKE, SPRING, ETC. (IF NAMED)

TYPE OF WATER RIGHTS: ☐ Riparian ☐ Appropriation

WATER RIGHTS PERMIT OR LICENSE

IX. ENVIRONMENTAL IMPACT REPORT (EIR)

Has an EIR been prepared for this project? If "Yes", please enclose a copy.	☐ Yes	☒ No	**NOTE:** Extensive environmental impact study has been conducted on this site and is on file with the North Coast Regional office.
If "No", will an EIR be prepared?	☐ Yes	☐ No	
Will a negative declaration be prepared?	☐ Yes	☒ No	

If "Yes", please answer the following:

WHO WILL PREPARE THE NEGATIVE DECLARATION? | APPROX. DATE OF COMPLETION

CERTIFICATION

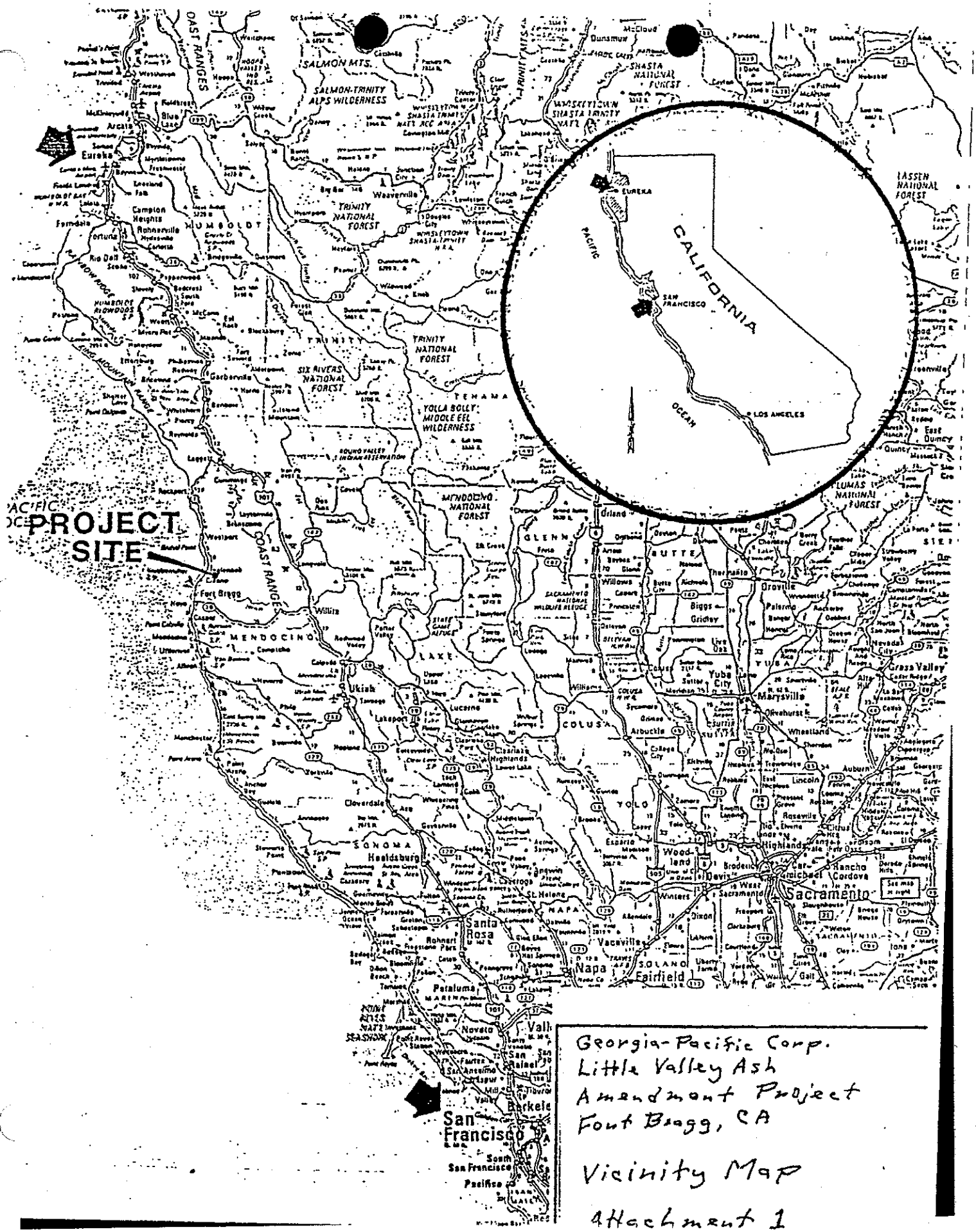
I hereby certify under penalty of perjury that the information provided in this application and in any attachments is true and accurate to the best of my knowledge.

SIGNATURE OF OWNER OF FACILITY	SIGNATURE OF OPERATOR OF FACILITY
PRINTED OR TYPED NAME: Gerald W. Tice	PRINTED OR TYPED NAME: Donald B. Whitman
TITLE: Senior Manager - Environmental Engineering - Building Products	DATE
TITLE: Plant Manager	DATE

LIST TITLES OF ANY ATTACHMENTS:

Attachment 1 - Vicinity Map
Attachment 2 - Little Valley Ash Amendment Areas

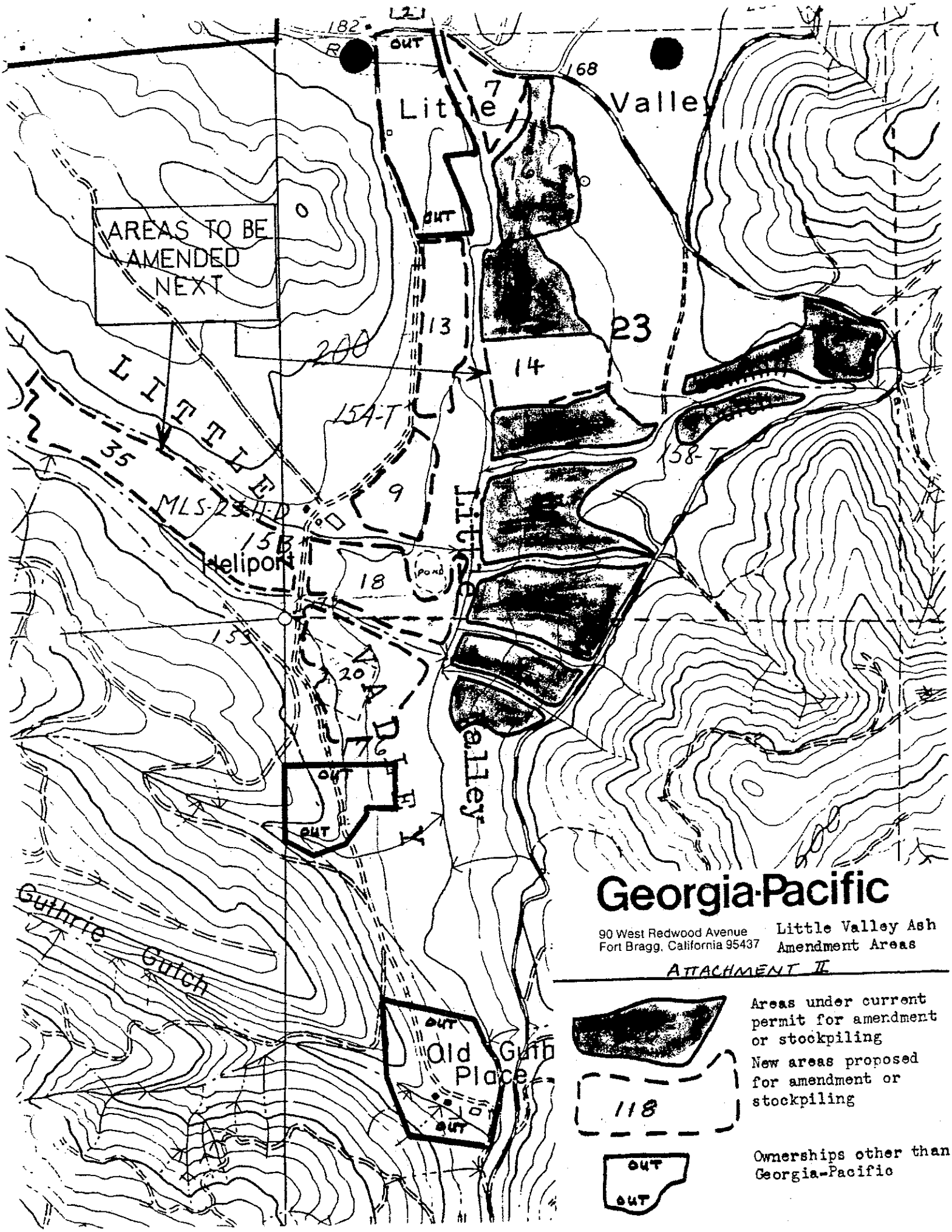
You will be notified of the correctness of filing fee and submittal of any additional information deemed necessary to complete your Report of Waste Discharge pursuant to Division 7, Section 13260 of the State Water Code, or to complete your permit application pursuant to Government Code Section 66796.30 and Health and Safety Code Section 25200.



Georgia-Pacific Corp.
Little Valley Ash
Amendment Project
Fort Bragg, CA

Vicinity Map

Attachment 1


AREAS TO BE AMENDED NEXT
Little Valley
Helipport
Old Gulch Place
Guthrie Gulch
OUT
118
Georgia-Pacific
90 West Redwood Avenue
Fort Bragg, California 95437
Little Valley Ash Amendment Areas
ATTACHMENT II
Areas under current permit for amendment or stockpiling
New areas proposed for amendment or stockpiling
Ownerships other than Georgia-Pacific

STATE OF CALIFORNIA

PETE WILSON, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA, CA 95403
(707) 576-2220

July 23, 1991

NOTICE

PROPOSED WASTE DISCHARGE REQUIREMENTS

FOR

GEORGIA-PACIFIC CORPORATION
FORT BRAGG SOIL AMENDMENT

Mendocino County

Comments or recommendations you may have concerning the proposed Order should be submitted in writing to the Regional Board by August 5, 1991. Comments received after this date cannot be given full consideration.

Benjamin D. Kor
Executive Officer

Attachment

cc: SWRCB, Division of Water Quality, Attn: Archie Matthews
SWRCB, Office of the Chief Counsel, Attn: Frances McChesney
DFG, Sacramento
DFG, Yountville
Mendocino County Health Department, Attn: Gerald F. Davis
DOHS, EMB, Santa Rosa, Attn: District Representative
DWR, Central District, Sacramento, Attn: Robert Matteoli
USDI, Fish and Wildlife Service, Sacramento
Dept. Parks and Recreation, Sacramento, Attn: James M. Doyle
Mendocino County Planning Department, Ukiah, Attn: Ray Hall

F

STATE OF CALIFORNIA — PETE WILSON, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD-
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA, CA 95403
(707) 576-2220

July 23, 1991

Mr. Gerald Tice
Chief Environmental Engineer
Georgia-Pacific Corporation
P.O. Box 105603
Atlanta, GA 30348

Dear Mr. Tice:

Enclosed is a copy of the draft Regional Board Order No. 91-121, revised Waste Discharge Requirements for the Georgia-Pacific Fort Bragg Soil Amendment. This Order will be considered by the Regional Board during its regular meeting on August 22, 1991, at the Rohnert Park City Council Chambers. We would appreciate it if you could send us any comments you may have as soon as possible.

Please call if you have any questions.

Sincerely

Mark K. Neely
Associate Engineering Geologist

MKN:tam/gpastrns

Enclosure

Certified-Return Receipt Requested

cc: Don Whitman, Georgia-Pacific Corporation, 90 W. Redwood Avenue, Fort Bragg, CA 95437

PS Form 3800, June 1985 ☆U.S.G.P.O. 1989-234-555

P 333 071 491

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

Sent to	Mr. Gerald Tice
Street and No.	Georgia-Pacific Corp.
P.O. State and ZIP Code	P.O. Box 105603 Atlanta, GA 30348
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom. Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date	

Georgia-Pacific Corporation
P.O. Box 1618
Eugene, Oregon 97440
Telephone (503) 689-1221

August 10, 1991

Mr. Mark Neely
California Regional Board
Quality Control Board
1440 Guerneville Road
Santa Rosa, California 95403

Dear Mr. Neely:

Enclosed is the July 1991 Monitoring and Reporting Program Report, as per Order No. 90-154 for Georgia-Pacific Corppration at Fort Bragg (Little Valley), California.

The enclosed Little Valley map shows an additional 2.22 acres that is now being amended on the south portion of the acreage that has been specified for amendment.

We will continue to use the best management practices as we have in the past. This consists specifically of maintaining a 50 ft. set-back from stream areas and refraining from amending activities on high wind days.

If you have any questions please contact me.

Sincerely,

Peter Fetter/jp

Peter M. Fetter
Environmental Engineer

PMF: jp

Enclosures

GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTH OF JULY, 1991

Monitoring and Report Order No. 90-154, Soil Amending Project:

Week of	Ash Deposited North Area	Rainfall Details
1 - 6	240 yds^3	
8 - 13	480	Insufficient rainfall.
15 - 20	460	
22 - 27	420	
29 - 31	260	
	1860 yds^3	

The total number of treated acres is 86.02 acres

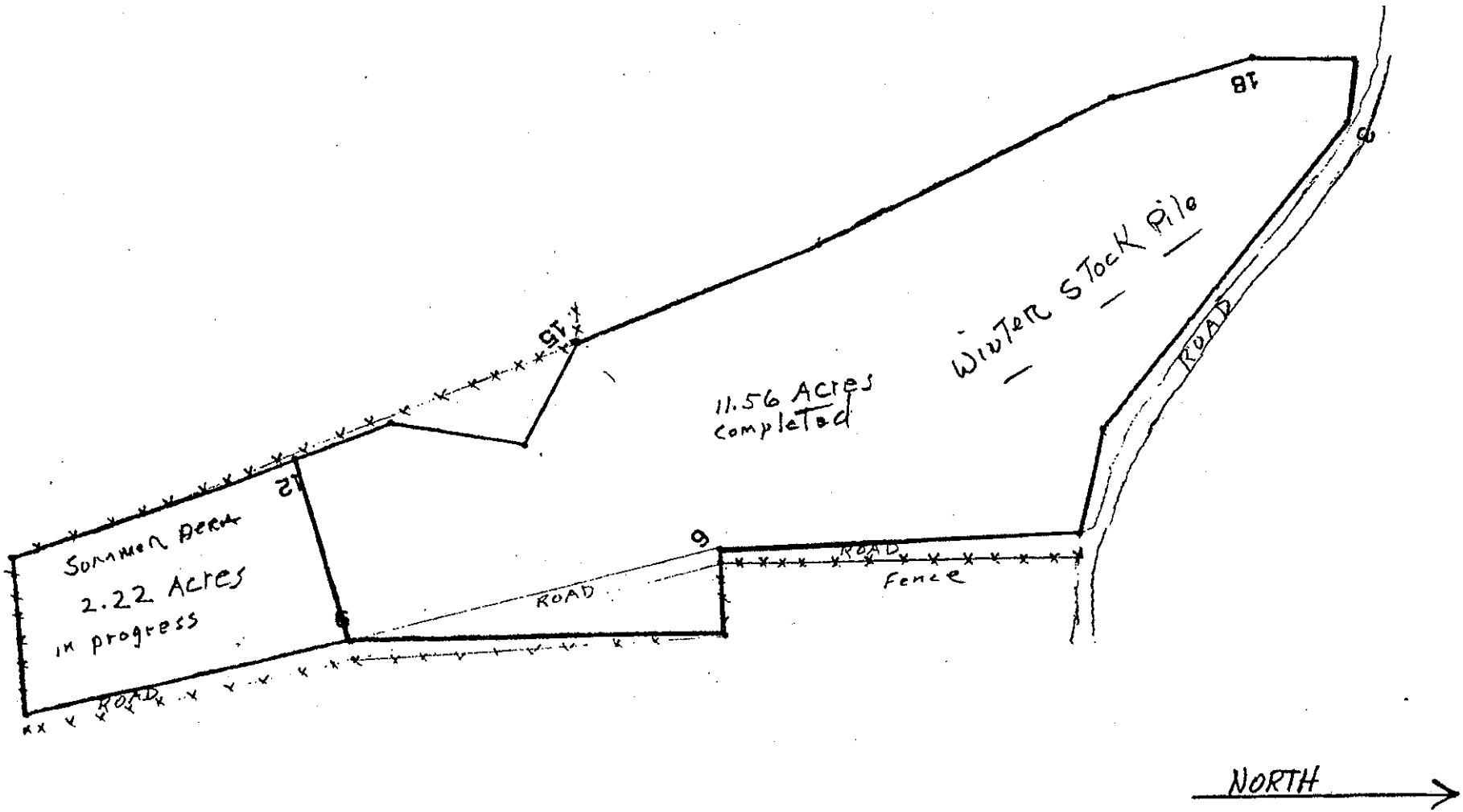
WATER MONITORING AND TESTING

Epemeral draws were dry during the month of July. No pH taken.

DEPOSITION

All ash was deposited in the north area for the month of July, 1991.

NORTH LITTLE VALLEY ASH DISPOSAL (S261917D)
FT/IN = 200



STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA, CA 95403
(707) 576-2220

PETE WILSON, Governor

August 26, 1991

Mr. Gerald Tice
Chief Environmental Engineer
Georgia-Pacific Corporation
P. O. Box 105603
Atlanta, GA 30348

Dear Mr. Tice:

Enclosed is a copy of your Waste Discharge Requirements Order No. 91-121 for the Fort Bragg Soil Amendment, as adopted by the Regional Board on August 22, 1991.

If you have any questions, please call Mark Neely at this office.

Sincerely,

Benjamin D. Kor
Executive Officer

MKN:tam/gpashcv2

Enclosure

PRELIMINAR

California Regional Water Quality Control Board
North Coast Region

ORDER NO. 91-121
ID NO. 1B85030PMEN

WASTE DISCHARGE REQUIREMENTS

For

GEORGIA-PACIFIC CORPORATION
FORT BRAGG SOIL AMENDMENT

Mendocino County

The California Regional Water Quality Control Board, North Coast Region (hereinafter Board) finds that:

1. Georgia-Pacific Corporation (hereinafter discharger) submitted a Report of Waste Discharge dated July 17, 1991. The permittee has paid an annual fee as per Section 2200 of Subchapter 9 of the California Code of Regulations and, therefore, is not required to submit a separate filing fee.

2. The Report of Waste Discharge describes the use of woodwaste ash, a nonhazardous decomposable waste, as a soil amendment using applicable Best Management Practices pursuant to Section 2511(f) of Title 23, Chapter 15 of the California Code of Regulations. The woodwaste is generated by the power plant operated at the Georgia-Pacific sawmill. The soil amendment site is located in Little Valley within Sections 14, 22, 23, 24, and 26 of T19N, R17W, MDB&M on 330 acres of pasture land along Little Valley Creek. Drainage controls and *management* practices for stockpiling the ash are designed to prevent a discharge of ash to surface streams. These include:

   a. Retention of a minimum 50 foot buffer between incorporation activities and any watercourse, whether perennial, intermittent, or ephemeral.

   b. Ash should not be allowed to accumulate for more than two weeks during the summer period. It should be incorporated as soon as there is enough ash to feasibly incorporate with heavy equipment (approximately two acres). Regional Board staff must be notified if a need arises to store the ash for longer periods.

   c. The application *rate* shall be six inches of ash over the approved site. The soil is ripped to a depth of 36 inches, after which it is disced in to a depth of 36 inches, then smoothed and leveled.

   d. Amended areas must be seeded between September 1 and October 1. Any delay must be reported to the Regional Board. The seed mixture shall be that prescribed by UC-Davis, at a rate of 20 pounds per acre.

e. Once an area has been incorporated and planted with grass seed, there shall be no passage of vehicles or equipment over the amended area until the forage crop is harvested. Harvesting will be done *during* the summer on areas with complete vegetative cover. There shall be no direct grazing of animals on the amended areas.

f. The ash shall be stockpiled during the months of October to March or whenever the soil is too wet for equipment use.

3. The Regional Board adopted Waste Discharge Requirements Order No. 91-93 for the stockpiling and amending of woodwaste ash. The permit had an expiration date of July 1, 1991, by which time the discharger was to have completed a study on the hazard posed by bioaccumulation of low levels of chlorodibenzofurans (CDF) and chlorodibenzodioxins (CDD). 2,3,7,8-tetrachloro-p-dibenzodioxin is listed as being carcinogenic under the Safe Drinking Water and Toxic Enforcement Act Of 1986. Renewal of the permit was made contingent on the study finding the bioaccumulation potential to be negligible. Georgia-Pacific submitted sampling data which found the ash to have a toxic equivalency factor (TEF) of 3.02 to 3.83 parts per trillion (ppt), a TEF for fish tissue of 0.03 to 0.10 ppt, and a TEF for stream sediment of 0.03 to 0.15 ppt. The TEF method is a procedure for assessing the risks associated with exposures to complex mixtures of CDD's and CDF's, and relates their toxicity to the highly studied 2,3,7,8-tetrachlorodibenzodioxin (TCDD).

4. The results of the analysis of ash, amended soil, grass grown on amended soil, stream sediment, and aquatic biota including fish tissue and plants, have been reviewed by Regional Board and State Board staff and the Department of Health Services, who have concluded that the bioaccumulation potential is negligible under the conditions of this permit.

5. The Board adopted the Water Quality Control Plan for the North Coast Region on April 28, 1989. The plan was approved by the State Water Resources Control Board on November 15, 1988. It includes, by reference, the Water Quality Control Plan for Ocean Waters of California which was adopted by the State Water Resources Control Board on September 22, 1988. Both Plans include water quality objectives and receiving water limitations. The basin plan contains a prohibition against new waste discharges to all coastal streams and natural drainageways that flow directly to the ocean.

6. The beneficial uses of Little Valley Creek and Pudding Creek include:

   a. municipal and domestic water supply
   b. agricultural water supply
   c. potential industrial service water supply
   d. potential industrial process water supply
   e. groundwater recharge
   f. water contact recreation
   g. non-contact water recreation
   h. warm freshwater habitat
   i. cold freshwater habitat
   j. wildlife habitat
   k. fish migration
   1. fish spawning

7. The County of Mendocino has zoned this area as timber production and does not require a permit for a use of the land consistent with this zoning. These waste discharge requirements constitute a minor modification to land and are exempt from CEQA under Section 15304 Title 14 CCR.

8. The Board has notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the proposed discharge and has provided them with an opportunity for a public meeting and an opportunity to submit their written views and recommendations.

9. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

THEREFORE, IT IS HEREBY ORDERED, that in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, Waste Discharge Requirements Order No. 91-93 is hereby rescinded and the discharger shall comply with the following:

A. PROHIBITIONS:

1. There shall be no discharge of ash to surface streams at any time.

B. SPECIFICATIONS:

1. Runoff of ash to land not under the control of the discharger is prohibited.

2. The stockpiling and amending of ash shall not cause a pollution or nuisance as defined in Section 13050 of the California Water Code.

3. No ash materials shall be deposited outside of the soil amendment areas shown on Attachment "A".

4. The soil amendment area shall be protected from any washout or erosion of ash or covering materials and from inundation which could occur as a result of floods having a recurrence interval of 100 years.

5. Annually, prior to the anticipated rainfall period, a cover crop shall be established in the soil amendment area to prevent erosion of the site.

6. k i n g the rainy season, only the active area of ash placement shall be left exposed to rainfall. The active area shall not be excessively large for incorporation operations and vegetation establishment.

7. Discharge of any waste not specifically regulated by this Order is prohibited.

C. PROVISIONS:

1. Availability

A copy of this Order and a copy of the facility spill contingency plan shall be maintained at the discharge facility and be available at all times to operating personnel.

2. Operation and Maintenance

The discharger must maintain in good working order and operate as efficiently as possible any facility or control system installed by the discharger to achieve compliance with the waste discharge requirements.

3. Change in Discharge

The discharger must promptly report to the Board any material change in the character, locations, or volume of the discharge.

4. Change in Ownership

In the event of any change in control or ownership or land or waste discharge facilities presently owned or controlled by the discharger. the discharger must notify the succeeding owner or operator of the existence of this Order by letter, a copy of which must be forwarded to this office.

5. Vested Rights

This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, nor protect the discharger from his liability under federal, State, or local laws, nor create a vested right for the discharger to continue the waste discharge.

6. Severability

Provisions of these waste discharge requirements are severable. If any pmvision of these requirements is found invalid, the remainder of these requirements shall not be affected.

7. Monitoring

The discharger must comply with the Contingency Planning and Notification Requirements Order No. 74-151, Monitoring and Reporting Program No. 91-121 and any modification to these documents as specified by the Executive Officer. Such doc —ts are attached to this Order and incorporated herein. Chemical, bacteriological, and bioassay analyses must be conducted at a laboratory certified for such analyses by the State Department of Health Services. In the event a certified laboratory is not available to the discharger, analyses performed by a noncertified laboratory will be accepted.

8. Inspections

The discharger shall permit authorized staff of the Board:

a. entry upon premises in which an effluent source is located or in which any required records are kept;
b. access to copy any records required to be kept under terns and conditions of this Order;
c. inspection of monitoring equipment or records; and
d. sampling of any discharge.

9. Noncompliance

In the event the discharger is unable to comply with any of the conditions of this Order due to:

a. breakdown of waste treatment equipment;
b. accidents caused by human error or negligence; or
c. other causes such as acts of nature;

the discharger must notify the Executive Officer by telephone as soon as he or his agents have knowledge of the incident and confirm this notification in writing within two weeks of the telephone notification. The written notification shall include pertinent information explaining reasons for the noncompliance and shall indicate what steps are being taken to prevent the problem from recurring.

10. Revisions of Requirements

The Board will review this Order periodically and may revise requirements when necessary.

Certification

I, Benjamin D. Kor, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, North Coast Region, on August 22, 1991.

Benjamin D. Kor
Executive Officer

(gpashwdr)

California Regional Water Quality Control Board
North Coast Region

MONITORING AND REPORTING PROGRAM NO. 91-121

FOR

GEORGIA-PACIFIC CORPORATION
FORT BRAGG SOIL AMENDMENT

Mendocino County

Monitoring

The discharger shall record the approximate volume of ash deposited at the site each month.

Stormwater Runoff Monitoring

Grab samples shall be taken periodically when streams are flowing from the points shown on the attached map. Samples shall be analyzed as follows:

Constituent	Units	Frequency
pH	pH units	Weekly
COD	mg/l	November, January, and March

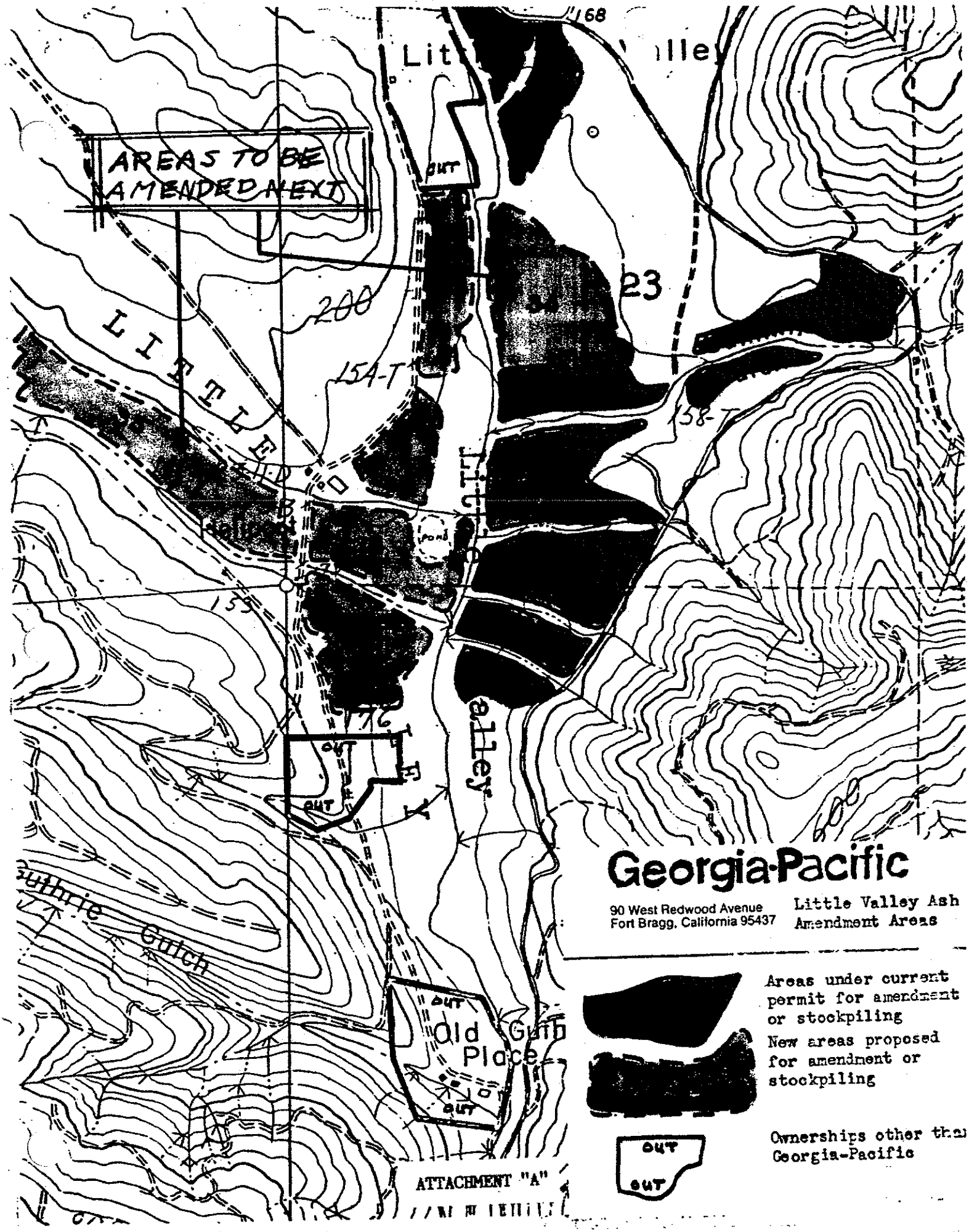
Weekly rainfall totals shall also be recorded and reported.

Reporting

Monitoring reports shall be submitted monthly to the Board by the fifteenth of the month. Copies of signed laboratory sheets shall be submitted with any monthly summary report.

ordered by _____
Benjamin D. Kor
Executive Officer

August 22, 1991



Georgia-Pacific

90 West Redwood Avenue
Fort Bragg, California 95437

Little Valley Ash Amendment Areas

Areas under current permit for amendment or stockpiling

New areas proposed for amendment or stockpiling

OUT
OUT

Ownerships other than Georgia-Pacific

Georgia-Pacific Corporation
900 S.W Fifth Avenue
Portland, Oregon 97204
Telephone (503) 222-5561
(503) 221-0835

September 26, 1991

Mr. Mark Neely
North Coast Regional Water
Quality Control Board
1440 Guerneville Road
Santa Rosa, CA 95403

Dear Mr. Neely:

Enclosed is the August 1991 Monitoring Report for Georgia-Pacific Corporation at Fort Bragg (Little Valley), California, as per Monitoring and Reporting Program No. 91-121. As per your earlier telephone approval, this report is slightly delayed due to personnel changes.

The enclosed Little Valley map shows an additional 2.2 acres that is now being amended on the south portion of the acreage that has been specified for amendment.

We will continue to use the best management practices as we have in the past. This consists specifically of maintaining a 50 ft. set-back from stream areas and refraining from amending activities on high wind days.

If you have any questions please contact me.

Sincerely,

Steven A. Petrin
Sr. Environmental Engineer

SP:cc
Enclosures

GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTH OF AUGUST, 1991

Monitoring and Reporting Order No. 91-121, Soil Amendment Program

Week of	Ash Deposited North Area (yds^3)	Rainfall Details
1 - 3	120	
4 - 10	340	Insufficient rainfall.
11 - 17	400	
18 - 24	240	
25 - 31	380	
	1480 yds^3	

The total number of treated acres to date = ~~86.02~~ acres

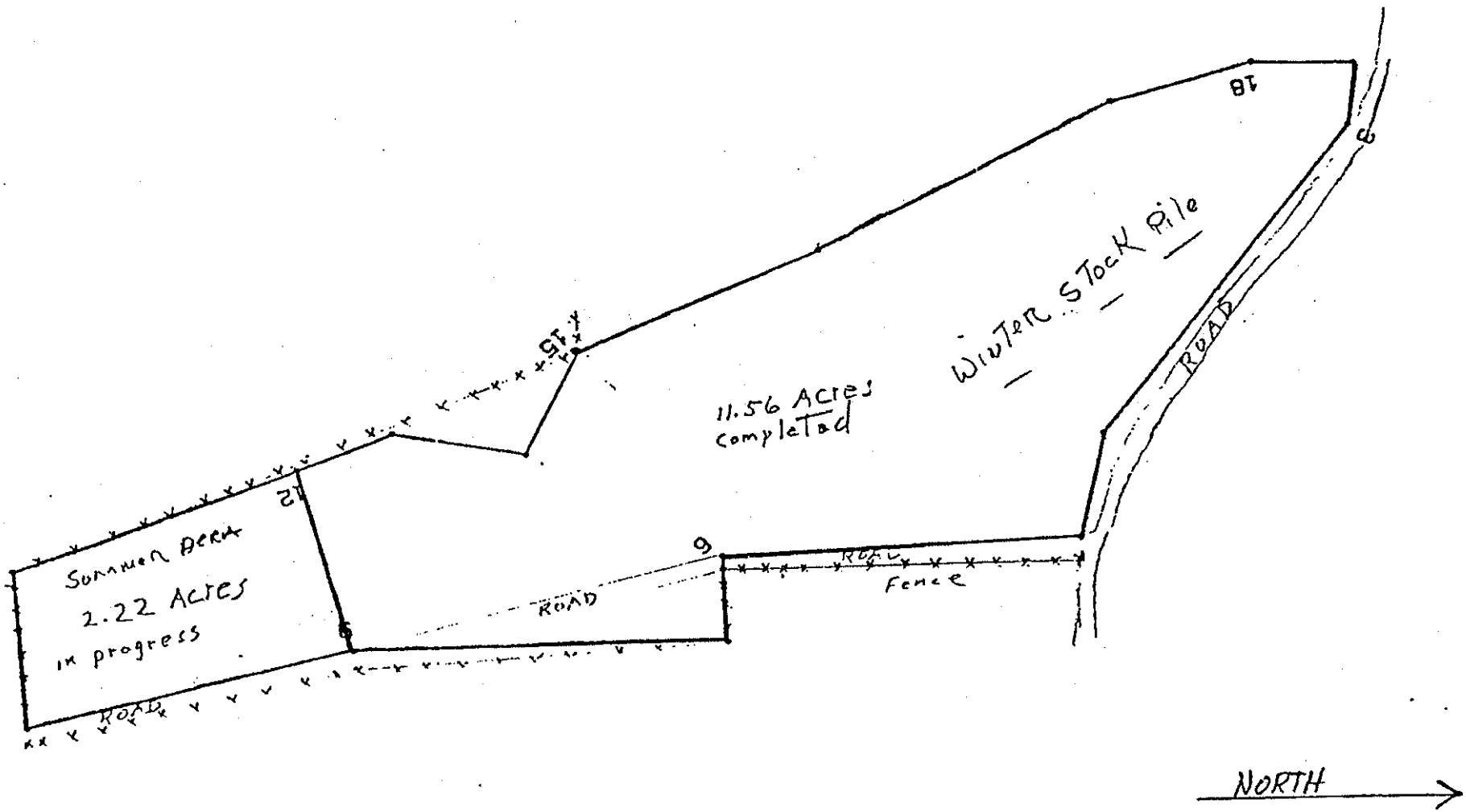
Water Monitoring and Testing

Epemeral draws were dry during month of August. No pH taken.

Deposition

All ash was deposited in the north aea for the month of August. 1991.

NORTH LITTLE VALLEY ASH DISPOSAL (S261917D)
FT/IN = 200



STATE OF CALIFORNIA — PETE WILSON, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION
1440 GUERNEVILLE ROAD
SANTA ROSA. CA 95403
(707) 576-2220

October 22, 1991

Dr. Dave Siegel
Office of Environmental Health Hazard Assessment
Hazardous Waste Toxicology Section
714 "P" Street
Sacramento, CA 95814

Dear Dr. Siegel:

You will recall that on October 3, 1991, I called you for assistance in determining the potential hazards posed by the direct grazing of animals on lands utilized for the use of boiler ash as a soil amendment. The Georgia-Pacific Corporation uses woodwaste ash from the boilers at their Ft. Bragg mill as a soil amendment on lands owned by the company. The Waste Discharge Requirements we issued for them specifies that there shall be no direct grazing of animals on amended ground. However, they wish to begin amending activities on the property of a nearby landowner who runs a working cattle ranch. The incentive for the rancher is the demonstrated effectiveness of the ash at promoting excellent growth of forage. Therefore he wishes to allow the grazing of cows due to the prohibitive cost of haying.

Based on concerns first expressed by staff of the State Water Resources Control Board about the bioaccumulation potential of the low levels of dioxins and furans found in the ash, we required G P to undertake a series of tests to determine the levels of such compounds in ash, amended soil, earthworms, aquatic sediments, and fish. They found the risk to be quite small. You should have most of this data on file.

We hereby request any assistance you could give us on this question. Can cows be grazed on land used for the amending of soil? If so, is there a recommended interval of time following amendment of the ash before grazing can occur safely? Are there any management practices that might further minimize any risk? We would greatly appreciate any light you can shed on these questions. Please call if you need any more information or if there is any way I *can* assist you.

Sincerely.

Mark K. Neely
Associate Engineering Geologist

MKN: tam/siegel

cc: Mr. Steve Petrin, Georgia-Pacific Corp., 900 SW 5th Avenue, 18th Floor, Portland, OR 97204

STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
DEPARTMENT OF HEALTH SERVICES
SOLID WASTE MANAGEMENT BOARD
DEPARTMENT OF FORESTRY

APPLICATION FOR FACILITY PERMIT/WASTE DISCHARGE

This form is to be used for filing a/an: (check all appropriate)

1. [X] **REPORT OF WASTE DISCHARGE** (pursuant to Division 7 of the State Water Code)
2. [ ] **APPLICATION FOR A HAZARDOUS WASTE FACILITY PERMIT** (pursuant to Health and Safety Code Section 25200)
3. [ ] **APPLICATION FOR A SOLID WASTE FACILITIES PERMIT** (pursuant to Government Code Section 66796.30)
4. [ ] **APPLICATION FOR A RUBBISH DUMP PERMIT** (pursuant to Public Resources Code Sections 4371–4375 and 4438)

FOR OFFICE USE ONLY
Form 200 Rec'd _____
Fee (RWQCB) _____ (SWMB) _____
Letter to Discharger _____
Report Rec'd _____
Effective Date _____
CDF Notified _____
DOHS No. _____
SWMB No. _____

I. FACILITY

A. NAME OF FACILITY
GEORGIA-PACIFIC CORPORATION
TELEPHONE #: (707) 964-5651
ADDRESS
90 WEST REDWOOD AVENUE, FORT BRAGG, CA 95437

B. NAME OF LEGAL OWNER OF FACILITY
GEORGIA-PACIFIC CORPORATION
TELEPHONE #: (404) 521-5084
ZIP CODE
133 PEACHTREE ST., N.E., ATLANTAT, GA 30303

C. NAME OF BUSINESS OPERATING FACILITY
SAME AS "A", ABOVE
TELEPHONE #: ( )
ADDRESS

D. TYPE OF BUSINESS OPERATING FACILITY
[ ] Sole Proprietorship [ ] Partnership [X] Corporation [ ] Government Agency

E. NAME OF OWNER(S) OF BUSINESS OPERATING FACILITY
SAME AS "B", ABOVE
TELEPHONE #: ( )
ADDRESS WHERE LEGAL NOTICE MAY BE SERVED
ZIP CODE

II. REASON FOR FILING

CHECK ALL APPROPRIATE!

A. [ ] New discharge or facility
B. [X] Existing discharge or facility
C. [ ] Increase in quantity of discharge
D. [ ] Change in character of discharge
E. [X] Change in place or method of disposal
F. [ ] Change in design or operation
G. [ ] Change in business operating facility
H. [ ] Enlargement of existing facility
I. [ ] Other (explain below)

III. TYPE OF OPERATION

(CHECK ALL APPROPRIATE!)

A. [ ] Transfer station
B. [ ] Solid waste disposal site
C. [ ] Hazardous waste disposal site
D. [ ] Sewage treatment
E. [ ] Industry (on-site disposal facility)
F. [ ] Industry (discharge to sewer)
G. [ ] Woodwaste site
H. [ ] Other (explain below)

SOIL AMENDING PROJECT PURSUANT TO 23 CCR 2511(f)

IV. TYPE OF WASTE

CHECK ALL APPROPRIATE!

A. [ ] Sewage, sewage sludge, and/or septic tank pumpings
B. [ ] Industrial wastes
C. [ ] Municipal solid wastes
D. [ ] Hazardous wastes
E. [ ] Agricultural wastes
F. [ ] Animal wastes
G. [X] Forest product wastes (boiler ash)
H. [ ] Construction/demolition wastes
I. [ ] Inert materials
J. [ ] Dead animals
K. [ ] Tires
L. [ ] Other (explain below)

V. SITE DESIGN CAPACITY

A. PRESENT POPULATION OR CAPACITY: 201,000 yd^3
B. DESIGN POPULATION OR ULTIMATE CAPACITY: 201,000 yd^3
C. LIFE EXPECTANCY (YEARS):

FORM 200 (REV. 5/90) (OVER)

VI. QUANTITY OF WASTES

A. PRESENT OR PROPOSED DAILY FLOW (IN MGD):	MAXIMUM: N/A	AVERAGE:	D. DESIGN FLOW (IN MGD)

C. SOLID WASTE DISPOSAL SITE (IN TONS OR CUBIC YARDS):	DAILY QUANTITY: N/A	TOTAL IN PLACE QUANTITY	D. AREA IN WHICH SOIL WILL BE DISTURBED (IN ACRES): 21 ac/yr	TOTAL SITE AREA: 249

VII. LOCATION OF POINT OF DISPOSAL OR OPERATION

(DESIGN AND ATTACH MAP, SKETCH, OR LOCATION ON U.S.G.S. QUADRANGLE MAP, 7.5 OR 15 MINUTE SERIES.)

LIST DISTANCES OR BEARING AND DISTANCE FROM SECTION CORNER *or* QUARTER CORNER, SECTION, TOWNSHIP, RANGE, BASE AND MERIDIAN:

Sections 4 & 5, T18N, R17W

Sections 32 & 33, T19N, R17W

Mt. Diablo Meridian

(See Attached Maps A & B)

VIII. SOURCE OF WATER SUPPLY (CHECK ALL APPROPRIATE)

A. ☐ MUNICIPAL OR UTILITY SERVICE:

NAME OF WATER PURVEYOR: N/A

ADDRESS OF PURVEYOR:

B. ☐ INDIVIDUAL (Wells)

C. ☐ SURFACE SUPPLY:

NAME OF STREAM, LAKE, SPRING, ETC. (IF NAMED):

TYPE OF WATER RIGHTS: ☐ Riparian ☐ Appropriation

WATER RIGHTS PERMIT OR LICENSE:

IX. ENVIRONMENTAL IMPACT REPORT (EIR)

Has an EIR been prepared for this project? If "Yes", please enclose a copy.	☐ Yes	☒ No	-Extensive environmental review already on file with Regional Board.
If "No", will an EIR be prepared?	☐ Yes	☒ No	
Will a negative declaration be prepared?	☐ Yes	☒ No	-Exempt from CEQA under 14 CCR 15304

If "Yes", please answer the following:

WHO WILL PREPARE THE NEGATIVE DECLARATION?

APPROX. DATE OF COMPLETION:

CERTIFICATION

I hereby certify under penalty of perjury that the information provided in this application and in any attachmanta is true and accurate to the best of my knowledge.

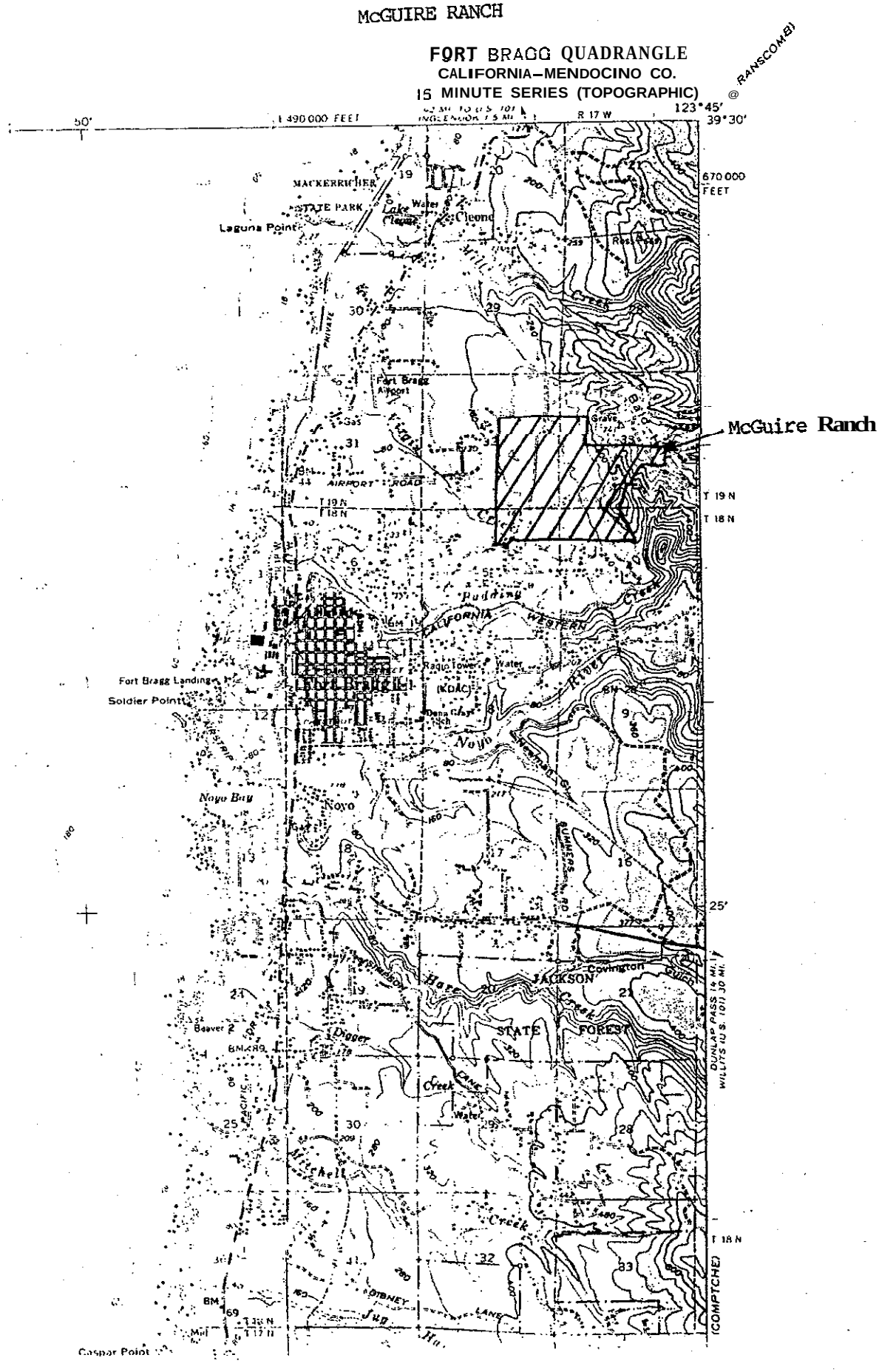
SIGNATURE OF OWNER or FACILITY	SIGNATURE OF OPERATOR OF FACILITY
X Ted Deer	X Ted Deer
PRINTED OR TYPED NAME: TED DEER	PRINTED OR TYPED NAME: TED DEER
TITLE: Resource Mgr. DATE: 10/28/91	TITLE: Resource Mgr. DATE: 10/28/91

LIST TITLES OF ANY ATTACHMENTS:

You will be notified of the correctness of filing fee and submittal of any additional information deemed necessary to complete your Report of Waste Discharge pursuant to Division 7, Section 13260 of the State Water Code, or to complete your permit application pursuant to Government Code Section 65796.30 and Health and Safety Code Section 25200.

EXHIBIT "A"
McGUIRE RANCH

URCES



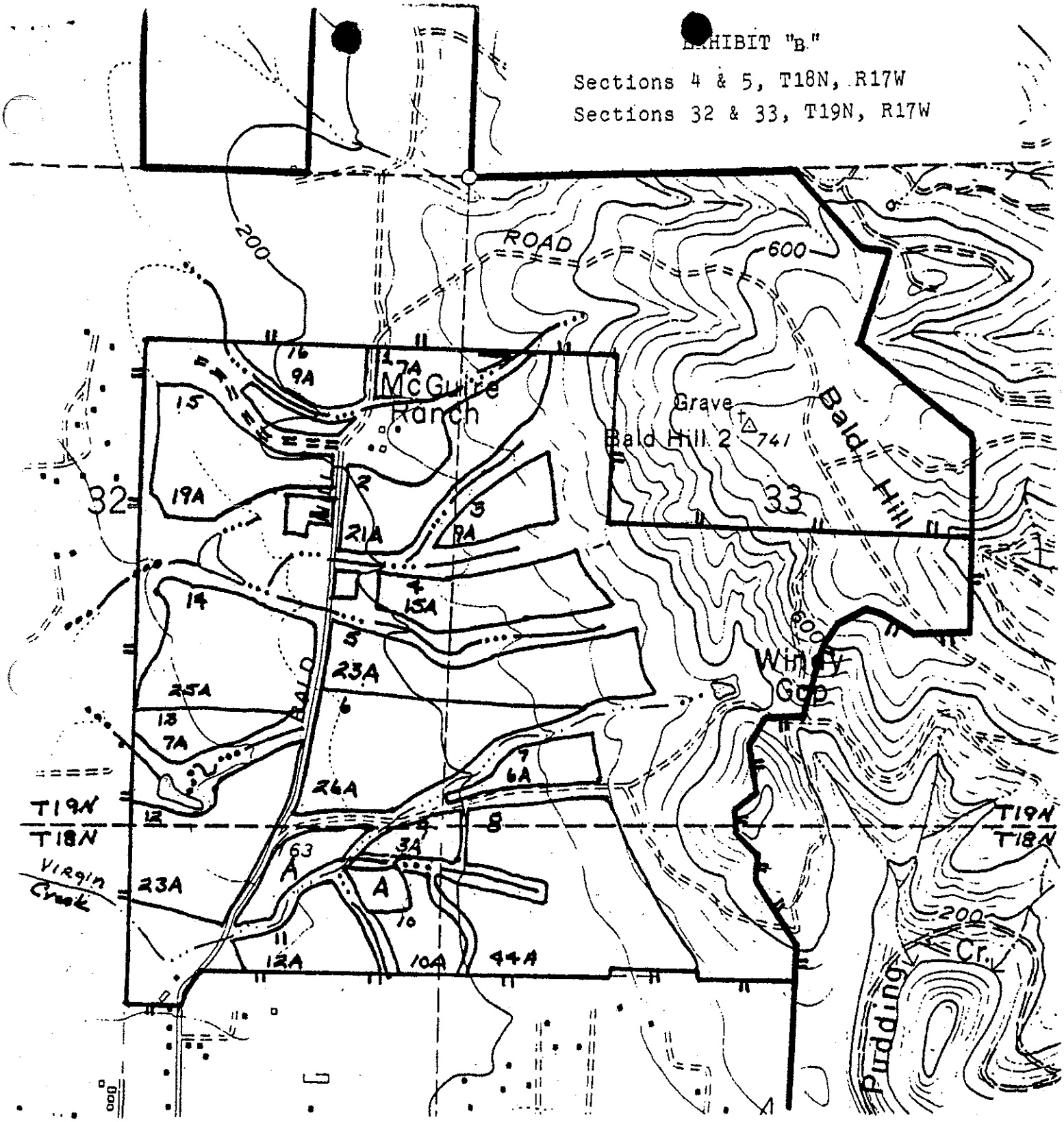


EXHIBIT "B"
Sections 4 & 5, T18N, R17W
Sections 32 & 33, T19N, R17W
ROAD
200
600
McGuire Ranch
Grave
Bald Hill 2 741
Bald Hill
32
33
T19N
T18N
Virgin Creek
Whitey Gap
Pudding Cr.
Property Line
Streams
1 - Field Number
6A - Number of Acres (Planimetered)
A - Amended Field

Georgia-Pacific Corporation
900 S.W. Fifth Avenue
Portland, Oregon 97204
Telephone (503) 222-5561
FAX (503) 221-0835

October 28, 1991

Mr. Mark Neely
Assoc. Engineering Geologist
North Coast Regional Water
Quality Control Board
1440 Guerneville Road
Santa Rosa, CA 95403

Re: Georgia-Pacific Corporation
Boiler Ash Soil Amendment Project
Amendment to Report of Waste Discharge

Dear Mr. Neely:

Enclosed is a completed report of waste discharge application for purposes of amending our current order 91-121 to expand operations to the McGuire Ranch property.

As we are already paying annual fees for existing order 91-121, we understand that this amendment does not require a filing fee.

Below are further comments and explanations on those portions of the application that need further explication:

II-E. In general, we consider this project a beneficial use, rather than a "disposal," of waste. We have, however, checked box E as it seems most applicable.

V. The "design capacity" is based upon 249 amendable acres (see VI-D) to a depth of 6 inches. At current generation rates, this is approximately 12 years of amending activity.

VI-C. We have not been viewing it as a "solid waste disposal site," so we have not completed this section. However, for your information, we are currently generating 50 cubic yards per day.

VI-D. Total amended acreage will be 249 acres. Total area of the McGuire property is 593 acres (based upon planimeter measurements).

VII. We have attached both a vicinity map (Exhibit A) and a plot map (Exhibit B). We have delineated the fields proposed for amending on the plot map. Here is a summary of the information on the map:

Field Number	Acreage	Field Number	Acreage
1	7	9	3
2	21	10	10
3	9	11	12
4	15	12	23
5	23	13	7
6	26	14	25
7	6	15	19
8	44	16	9
		Total Acreage	249

IX. There has already been extensive environmental review of our soil amending activities and this information is on file with the Regional Board. Further, it is our understanding from Finding #7 of order 91-121 that this soil amending activity is a minor modification to land and is exempt from CEQA analysis.

We intend to conduct activities at the site under previously agreed to BMPs and the conditions of the current Order 91-121, with the exception of the portion of Finding 2e pertaining to cattle grazing (see below). We have not yet finalized our agreement with McGuire, but it will almost certainly leave all amending and handling operations in Georgia-Pacific's hands. Thus, we will still maintain control of the operations.

As we have discussed, we request that the prohibition on grazing in order 91-121 be removed. Finding 4 of Order 91-121 recognizes that the soil amending operation is essentially safe. The potential for use of the ash is also severely restricted by this provision and would essentially make the McGuire site unavailable. A provision excluding grazing animals until the first cover crop is established would be workable and would protect the amended sites from disturbance.

We propose to conduct stockpiling operations this winter on the northeast portion of the amending area. We recognize that this will require quick review of the application in order to begin operations before heavy rains begin--such review would be most appreciated.

Please feel free to call me if you should have any questions.

Sincerely,

Steven A. Petrin
Sr. Environmental Engineer
Western Area Building Products

SP:cc

cc: Lowell Ambrosini
Gerald Tice
Ted Deer
Jerry Barr
Larry Lake

Georgia-Pacific Corporation
900 S.W. Fifth Avenue
Portland, Oregon 97204
Telephone (503) 222-5561
FAX (503) 221-0835

October 31, 1991

Mr. Mark Neely
Assoc. Engineering Geologist
North Coast Regional Water
Quality Control Board
1440 Guerneville Road
Santa Rosa, CA 95403

Re: Georgia-Pacific Corporation
Boiler Ash Soil Amendment Project
Amendment to Report of Waste Discharge

Dear Mr. Neely:

Attached is an amended page 1 of our report of waste discharge for the McGuire Ranch. We had failed to check the appropriate box in item III.

Sincerely,

Steven A. Petrin
Sr. Environmental Engineer
Western Area Building Products

SP:cc
Attachment

cc: L. Lake
G. Tice

STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
DEPARTMENT OF HEALTH SERVICES
SOLID WASTE MANAGEMENT BOARD
DEPARTMENT OF FORESTRY

APPLICATION FOR FACILITY PERMIT/WASTE DISCHARGE

This form is to be used for filing a/an: (check all appropriate)

1. [X] REPORT OF WASTE DISCHARGE (pursuant to Division 7 of the State Water Code)
2. [ ] APPLICATION FOR A HAZARDOUS WASTE FACILITY PERMIT (pursuant to Health and Safety Code Section 25200)
3. [ ] APPLICATION FOR A SOLID WASTE FACILITIES PERMIT (pursuant to Government Code Section 66796.30)
4. [ ] APPLICATION FOR A RUBBISH DUMP PERMIT (pursuant to Public Resources Code Sections 4371-4375 and 4438)

FOR OFFICE USE ONLY
Form 200 Rec'd
Fee (RWQCB) (SWMB)
Letter to Discharger
Report Rec'd
Effective Date
CDF Notified
DOHS No.
SWMB No.

I. FACILITY

A. NAME OF FACILITY: GEORGIA-PACIFIC CORPORATION — (707) 964-5651
ADDRESS: 90 WEST REDWOOD AVENUE, FORT BRAGG, CA 95437
B. NAME OF LEGAL OWNER OF FACILITY: GEORGIA-PACIFIC CORPORATION — (404) 521-5084
ADDRESS: 133 PEACHTREE ST., N.E., ATLANTAT, GA 30303
C. NAME OF BUSINESS OPERATING FACILITY: SAME AS "A", ABOVE — TELEPHONE # ( )
D. TYPE OF BUSINESS OPERATING FACILITY
[ ] Sole Proprietorship [ ] Partnership [X] Corporation [ ] Government Agency
E. NAME OF OWNER(S) OF BUSINESS OPERATING FACILITY: SAME AS "B", ABOVE — TELEPHONE # ( )
ADDRESS WHERE LEGAL NOTICE MAY BE SERVED

II. REASON FOR FILING

CHECK ALL APPROPRIATE

A. [ ] New discharge or facility
B. [X] Existing discharge or facility
C. [ ] Increase in quantity of discharge
D. [ ] Change in character of discharge
E. [X] Change in place or method of disposal
F. [ ] Change in design or operation
G. [ ] Change in business operating facility
H. [ ] Enlargement of existing facility
I. [ ] Other (explain below)

III. TYPE OF OPERATION

CHECK ALL APPROPRIATE

A. [ ] Transfer station
B. [ ] Solid waste disposal site
C. [ ] Hazardous waste disposal site
D. [ ] Sewage treatment
E. [ ] Industry (on-site disposal facility)
F. [ ] Industry (discharge to sewer)
G. [ ] Woodwaste site
H. [X] Other (explain below)

SOIL AMENDING PROJECT PURSUANT TO 23 CCR 2511(f)

IV. TYPE OF WASTE

CHECK ALL APPROPRIATE

A. [ ] Sewage, sewage sludge, and/or septic tank pumpings
B. [ ] Industrial wastes
C. [ ] Municipal solid wastes
D. [ ] Hazardous wastes
E. [ ] Agricultural wastes
F. [ ] Animal wastes
G. [X] Forest product wastes (boiler ash)
H. [ ] Construction/demolition wastes
I. [ ] Inert materials
J. [ ] Dead animals
K. [ ] Tires
L. [ ] Other (explain below)

V. SITE DESIGN CAPACITY

A. GROSS DESIGN CAPACITY: 201,000 yd^3
B. REMAINING CAPACITY: 201,000 yd^3
C. LIFE EXPECTANCY (YEARS): 12 Years

FORM 200 (REV. 9/90) (OVER)

Georgia-Pacific Corporation
90 West Redwood Avenue
Fort Bragg, California 95437
Telephone (707) 964-5651

November **15,** 1991

Mr. Mark Neely
North Coast Regional Water
Quality Control Board
1440 Guerneville Road
Santa Rosa, CA **95403**

Dear Mr. Neely:

Enclosed is the October **1991** Monitoring Report for Georgia-Pacific Corporation at Fort Bragg (Little Valley), California, as per Monitoring and Reporting Program No. **91-121.**

The enclosed Little Valley map shows the additional 2.2 acre working area that is now being amended on the south portion of the acreage that has been approved for amendment.

We will continue to use the best management practices as we have in the past. This consists specifically of maintaining a **50** ft. set-back from stream areas and refraining from amending activities on high wind days.

If you have any questions please contact me.

Sincerely,

Larry Lake

Larry Lake
Environmental Site Coordinator

LL:pb
Enclosures

GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTH OF OCTOBER, 1991

Monitoring and Reporting Order No. 90-154, Soil Amending Project

Week of	Ash Deposited North Area Yds^3	Rainfall Details INCHES
1 - 5	187	
6 - 12	289	
13 - 19	221	
20 - 26	306	1.85
27 - 31	0	.65
	1,003 Yds^3	2.50 INCHES

The total number of treated acres to date = 86.02 acres

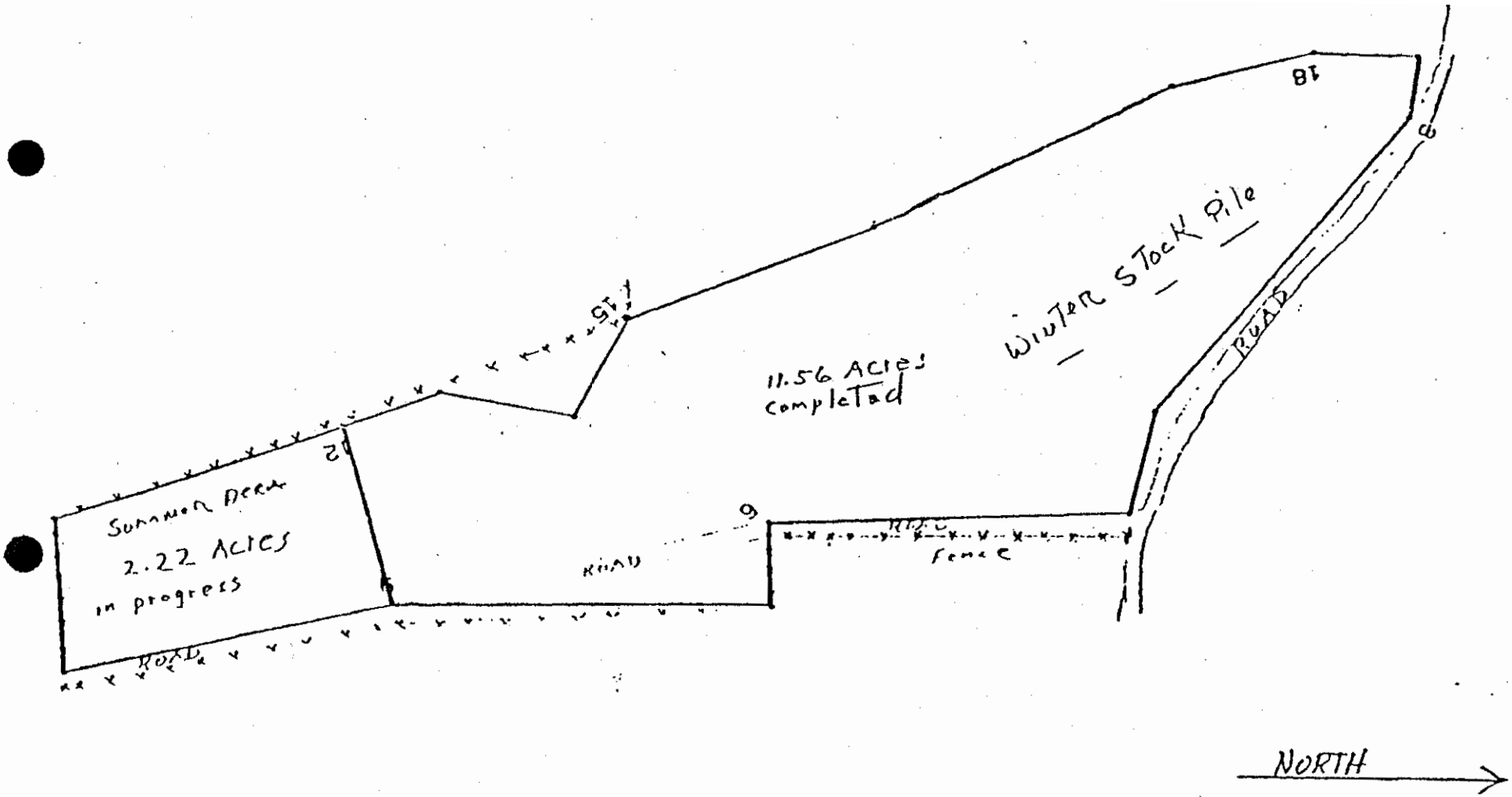
Water Monitoring and Testing

Insufficient water flow to run tests

Desposition

All ash was deposited in the north area for the month of October 1991

NORTH LITTLE VALLEY ASH DISPOSAL (S261917D)
1"/IN = 200



Georgia-Pacific Corporation 90 West Redwood Avenue
Fort Bragg, California 95437
Telephone (707) 964-5651

December 4, **1991**

Mr. Mark Neely
North Coast Regional Water
Quality Control Board
1440 Guerneville Road
Santa Rosa, CA 95403

Dear Mr. Neely:

Enclosed is the **November 1991** Monitoring Report for **Georgia-Pacific** Corporation at Fort **Bragg** (Little Valley), California, **as** per Monitoring and Reporting Program No. **91-121.**

There has been no activity for the month of November at the Little Valley site. All material is being stored on site at the present time.

When we resume activity we will continue to use the best management practices as we have in the past. This consists specifically of maintaining a 50 **ft.** set-back from streams areas and refraining from amending activities on high wind days.

If you have any questions please contact me.

Sincerely,

Larry Lake

Larry Lake
Environmental Site Coordinator

LL:pb
Enclosures

GEORGIA-PACIFIC LITTLE VALLEY REPORT

MONTH OF OCTOBER. 1991

Monitoring and Reporting Order No. 90-154, Soil Amending

This print is not the same as Oct 19, in w/Abv'91 report letter

Week of	Ash Deposited North Area	Rainfal. Details
	Yds^3	INCHES
1 - 2	0	
3 - 9	0	
10 - 16	0	
17 - 23	0	1.25
24 - 30	0	.30
	0 Yds^3	1.55 INCHES

The total number of treated acres to date = 86.02 acre6

Water Monitorinn and Testing

Insufficient water flow to run tests.

Desposition

No ash deposited for the month of November 1991.