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OFFICE OF ENFORCEMENT

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*NPDES Compliance Monitoring
and
Waste Characterization
Louisiana Pacific Corporation
Samoa, California*

[December 5-12, 1977]

NATIONAL ENFORCEMENT INVESTIGATIONS CENTER

DENVER, COLORADO

AND

REGION IX SAN FRANCISCO

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NPDES COMPLIANCE MONITORING AND WASTE CHARACTERIZATION

LOUISIANA PACIFIC CORPORATION
SAMOA, CALIFORNIA

(December 5-12, 1977)

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National Enforcement Investigations Center - Denver
and
Region IX - San Francisco, California

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NO. CA0005894
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I. INTRODUCTION

On March 17, 1977, the California State Water Resources Control Board issued National Pollutant Discharge Elimination System (NPDES) Permit No. CA0005894 to the Louisiana Pacific Corporation [Appendix A] authorizing one process wastewater discharge to the Pacific Ocean, and three noncontact cooling water discharges to Humboldt Bay in northern California near Eureka [Figure 1]. The permit granted variances from national effluent limitations guidelines for BOD and pH, subject to approval by the Environmental Protection Agency Administrator. These variances were subsequently denied by EPA Administrator Douglas Costle on September 15, 1977. Effluent limitations effective July 1, 1977 are summarized in Table 1.

On August 25, 1977, the National Enforcement Investigations Center (NEIC) was requested by EPA Region IX to conduct an NPDES compliance monitoring and waste characterization study at the Louisiana Pacific Corporation pulp mill.

A notification letter was sent by NEIC to the Company on October 19, 1977, followed by a presurvey inspection during the week of October 31-November 4, 1977. From December 5-12, 1977, the NEIC conducted the requested study with the following objectives:

1. Determine NPDES effluent limitations compliance.
2. Conduct toxic substances monitoring.
3. Document the efforts of the Company over the past three years to meet established permit limits.

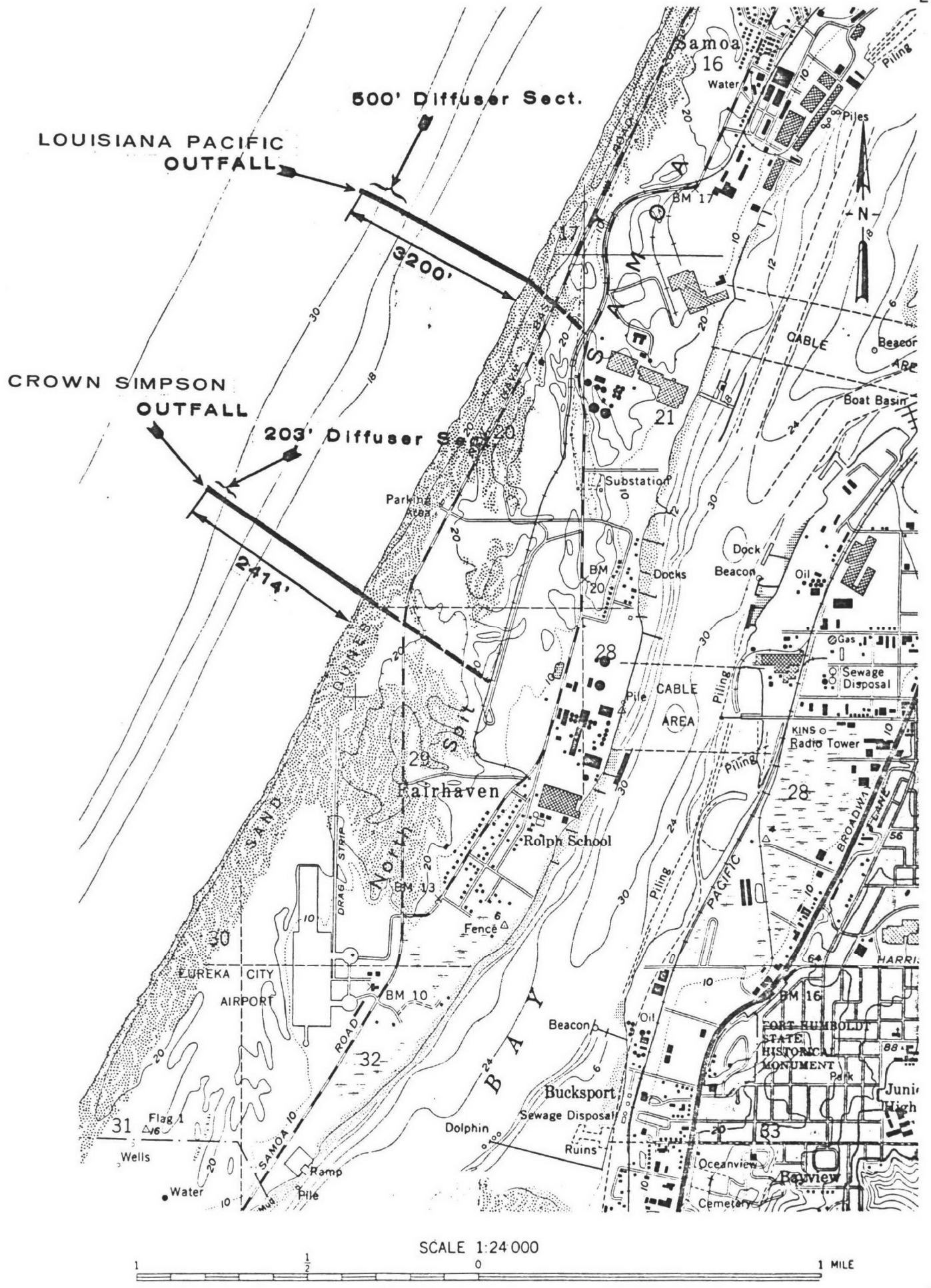


Figure 1. Outfall Locations - Crown Simpson and Louisiana Pacific Pulp Mills

Table 1
NPDES LIMITATIONS
(EFFECTIVE 7/1/77)
LOUISIANA PACIFIC CORPORATION

Constituents	Units	30-day Avg.	Daily Max.
Flow	m ³ /day x 10 ³ (mgd)	114 (30)	168 (44.4)
BOD ₅ (pulp)	kg (lb)/day	4,460 (9,821)	8,560 (18,849)
BOD ₅ (hydraulic barker)	kg (lb)/day	680 (1,500)	2,040 (4,500)
TSS (pulp) ^a	kg (lb)/day	9,080 (20,008)	16,800 (37,088)
TSS (hydraulic barker) ^a	kg (lb)/day	3,270 (7,200)	9,780 (21,550)
Oil and grease	mg/l	30-day median = 10 90th percentile = 15	
pH	Standard Units	within range of 5.0-9.0	
The discharge of noncontact cooling water to Humboldt Bay in excess of the following limits is prohibited:		22.0°C	24.0°C

a In addition to TSS in raw water supply.

In addition, since the Louisiana Pacific mill had been selected by The Effluent Guidelines Division of EPA as a screening site for Priority Pollutants,^{*} the NEIC sampled and analyzed for these parameters.

* Priority Pollutants are those derived from the June 7, 1976, Natural Resources Defense Council (NRDC) vs USEPA Settlement Agreement. For a listing of the pollutants, see Appendix B.

II. SUMMARY AND CONCLUSIONS

During December 5-12, 1977, the National Enforcement Investigations Center (NEIC) conducted an NPDES compliance monitoring and waste-characterization survey at the Louisiana Pacific Corporation pulp mill in northern California near Eureka. The mill produces approximately 553 m. tons (610 tons)/day of market-bleached kraft pulp, primarily for export. Wastewaters generated in the pulp mill processes as well as the hydraulic barker at the adjoining sawmill are discharged untreated to a Pacific Ocean outfall which terminates more than 610 m (2,000 ft) from shore at low water through a 152 m (500 ft) diffuser more than 9 m (30 ft) deep.

INPLANT POLLUTION CONTROL

Louisiana Pacific has sought to employ inplant controls with no external treatment to achieve Best Practicable Control Technology Currently Available (BPT) limitations for total suspended solids (TSS) and to gain a variance from BPT limitations for BOD and pH. Since 1973, the Company has made a number of inplant changes to reduce the loss of fiber and remove other suspended matter from waste streams. As will be noted below, these changes resulted, at least during the NEIC survey, in compliance with BPT TSS limits.

NPDES EFFLUENT LIMITATIONS COMPLIANCE

Effluent data collected during December 5-12, 1977 [Table 2], show Louisiana Pacific exceeded its NPDES limitation for BOD (pulp)

Table 2
NPDES COMPLIANCE MONITORING
LOUISIANA PACIFIC CORPORATION
December 5-12, 1977

Parameter	NPDES Permit				NEIC Results			
	30-Day Average		Daily Maximum		Average		Maximum	
	kg/day	lb/day	kg/day	lb/day	kg/day	lb/day	kg/day	lb/day
BOD (pulp)	4,460	9,821	8,560	18,849	14,000	30,000	18,000	40,000
BOD (hydraulic barker)	680	1,500	2,040	4,500	190	410	300	600
BOD (veneer)	128	283	385	849	b		b	
TSS (pulp) ^a	9,080	20,008	16,800	37,088	3,500	7,700	6,100	13,000
TSS (hydraulic barker) ^a	3,270	7,200	9,780	21,500	1,300	2,800	1,700	3,800
Oil and grease	30-day Median = 10 mg/l 90th percentile = 15 mg/l				Process wastewater: Average = 5.1 Range = 0.1-9.3 Hydraulic Barker: Average = 3.4 Range = 1.2-6.2			
pH	within range of 5.0-9.0 standard units				Process wastewater: Range = 2.3-10.0 Hydraulic Barker: Range = 1.8-12.3			

a In addition to TSS in raw water supply.

b Any contribution from this small source included in process wastewater flow [i.e., "BOD (Pulp)"].

30-day average (14,000 vs 4,460 kg/day). The BOD (pulp) daily maximum limit (8,560 kg/day) was exceeded on all seven days of sampling [Table 3]. The Company was also in violation of its NPDES pH limits (5.0-9.0) for both the pulp (2.3-10.0) and hydraulic barker (1.8-12.3) wastewaters. The Company was in compliance with BOD limits for the hydraulic barker, as well as TSS and oil and grease limits for both the pulp process and hydraulic barker wastewaters.

NPDES permitted discharges 002 and 003, which resulted from air compressor cooling, have been eliminated.

On December 8, 1977, at 1430 hr a grab sample was collected from the Company's once-through condenser discharge, 004, to ascertain whether any process wastewaters were present. The clear appearance of the sample and the BOD and TSS values of <3.7 and 17 mg/l, respectively, indicated no process wastewater contamination.

The Louisiana Pacific Corporation effluent was determined to be acutely toxic to fish. The 96-hour LC_{50} was calculated to be a 30.4% effluent concentration. Despite this demonstrated acute toxicity, it is estimated that the Company will be in compliance with the NPDES receiving water limitation of 0.05 toxic units at least 90% of the time.

COMPLIANCE WITH FUTURE NPDES LIMITS

Composite sampling data collected by NEIC for three consecutive days beginning December 6, 1977, indicate that most of the limits which begin to come into effect July 1, 1978, will be met. Exceptions include phenolic compounds (NPDES 50%* limit of 0.5 mg/l vs NEIC average of 1.0 mg/l), total chromium** (NPDES 50% limit of 0.005

* Concentration not to be exceeded more than 50% at the time.

** Unlike other future limits, does not become effective until July 1, 1983.

Table 3
BOD AND TSS COMPOSITE SAMPLING DATA
LOUISIANA PACIFIC CORP PULP MILL
Samoa, California
December 5-12, 1977

Station Location	Date ^a Dec 1977	Flow		BOD			TSS		Net Loadings	
		m ³ /day x 10 ³	mgd	mg/l	kg/day	lb/day	Gross mg/l	Intake ^b mg/l	Net mg/l	kg/day lb/day
Station	6	83.6	22.1	130	11,000	24,000	93	24	69	5,800 13,000
3400 -	7	89.3	23.6	180	16,000	35,000	57	13	44	3,900 8,700
Louisiana	8	91.6	24.2	140	13,000	28,000	53	25	28	2,600 5,700
Pacific	9	73.4	19.4	130	10,000	21,000	53	7	46	3,400 7,400
process	10	90.8	24.0	200	18,000	40,000	78	11	67	6,100 13,000
wastewater	11	74.9	19.8	220	16,000	36,000	40	3	37	2,800 6,100
at effluent	12	72.3	19.1	170	12,000	27,000	22	54	0	0 0
pump	Avg.	82.3	21.7	170	14,000	30,000	57	20	42	3,500 7,700
Station	6	- ^c	-	83	-	-	310	24	286	- -
3450 -	7	3.8	1.0	79	300	660	270	13	257	970 2,100
Louisiana	8	4.2	1.1	58	240	530	310	25	285	1,200 2,600
Pacific	9	3.8	1.0	48	180	400	400	7	392	1,500 3,300
Hydraulic	10	3.0	0.8	92	280	610	580	11	569	1,700 3,800
Barker	11	1.1	0.3	43	49	110	850	3	847	960 2,100
Wastewater	12	1.9	0.5	40	76	170	770	54	716	1,400 3,000
at Dis-	Avg.	3.0	0.8	63	190	410	500	20	480	1,300 2,800
charge to Ocean outfall pipeline										
TOTAL	6	-	-	-	-	-	-	24	-	- -
(Stations	7	93.1	24.6	174	16,300	35,660	66	13	53	4,870 10,800
3400 + 3450	8	95.8	25.3	135	13,240	28,530	64	25	39	3,800 8,300
= Ocean	9	77.2	20.4	125	10,180	21,400	70	7	63	4,900 10,700
Discharge)	10	93.8	24.8	196	18,280	40,610	92	11	81	7,800 16,800
	11	76.0	20.1	215	16,049	36,110	52	3	49	3,760 8,200
	12	74.2	19.6	166	12,076	27,170	72	54	18	1,400 3,000
	Avg.	85.0	22.5	168	14,000	32,000	-	20	51	4,400 9,600

^a Compositing period was 0700-0700. Date listed is day period ended

^b Raw water supply sampled at Crown Simpson Pulp Company intake. Both mills draw from the same water supply tank on the Samoa Peninsula.

^c Flow meter totalizer out 1000-1515, so no flow recorded.

mg/l vs NEIC average of 0.09 mg/l), and total identifiable chlorinated hydrocarbons (50% limit of 0.002 mg/l vs NEIC average of 2.9 mg/l). In addition, if the effluent toxicity remains at levels found during the NEIC survey, the Company will be in violation of the toxicity limits (50% and 10% limits of 1.5 and 2.0 toxic units respectively vs NEIC values of 3.3).

PRIORITY POLLUTANTS

Effluent composite samples collected December 6-9, 1977, indicated the presence of 14 and 19 Priority Pollutants in the process wastewater and hydraulic barker effluent, respectively. Two Priority Pollutants, di-n-butyl phthalate and diethyl phthalate, were present in the raw water supply in low concentrations, 1-3 ppb.

COMPANY FLOWS VS NEIC FLOWS

A comparison between process wastewater flows estimated by Louisiana Pacific based on mill raw water flows and those actually measured by NEIC indicated marginal agreement. The overall LP/NEIC flow ratio was 0.87. On three days there was greater than 20% difference between the values, and on three days there was $\leq 5\%$ difference.

SELF-MONITORING EVALUATION

An NEIC evaluation of the self-monitoring practices indicated the following deviations from prescribed/recommended techniques:

Sampling Techniques

1. Composite samples were collected by automatically collecting equal volume aliquots at equal time intervals. Since the flow rate is not constant and varies according to the downstream control valve setting, these composites were not flow proportional as required by the NPDES permit. Furthermore, these samples were not refrigerated during collection as prescribed.
2. The pH was determined on each of the 24-hour composite samples collected during the month, then averaged, and this one value was reported to the California Regional Water Quality Control Board, Santa Rosa, California. The NPDES permit requires a continuous measurement of pH.
3. Settleable solids were collected from the composite samples, not by grab samples as required by the NPDES permit.
4. Oil and grease sampling consisted of a single grab, not an 8-hour composite as required by the NPDES permit. However, collecting a composite sample for oil and grease is extremely impractical and not recommended by EPA.
5. Phenolic compounds composite samples were collected in a plastic container, not glass as prescribed, and not preserved or refrigerated during collection.

Flow Monitoring

1. As noted previously, the Company estimates process wastewater effluent flow with metered raw water flows. This

practice was determined to be marginally acceptable for daily flows, but precludes collecting flow-proportional effluent composite samples.

2. The location of the flow monitoring site for the hydraulic barker effluent (i.e., downstream from the clarifier sump pump) precludes instantaneous flow measurement and consequently flow proportioning of composite samples. The numerous severe fluctuations in flow also make it difficult to obtain an accurate measurement of total daily flow.
3. The Company did not have an established calibration frequency for the flow measurement systems. Calibrations should be conducted at least every six months or sooner if problems are indicated.

Analytical Procedures

1. The Company was using a modified procedure for oil and grease analyses. No required modification request had been made and no data had been collected to establish comparability with the EPA-approved method.
2. TSS procedures were performed as prescribed, except that filters were weighed directly out of the oven without desiccation. This technique will generally cause low results.
3. Though not specifically required by the NPDES permit, the Company had established no formal analytical quality control program.

Other

Despite the fact that the NPDES permit contains 30-day average and daily maximum loading limitations for both the process wastewater (listed as "Pulp" in permit) and hydraulic barker, the Company reports to the State of California a flow-weighted average concentration for a combination of the two discharges. No load calculations are transmitted, thereby precluding a determination of individual loadings.

III. BACKGROUND

MILL LOCATION AND PROCESS DESCRIPTION

The Louisiana Pacific pulp mill, which began operation in 1965, is located on the Samoa Peninsula in northern California, approximately 5 km (3 mi) north of the entrance to Humboldt Bay [Figure 2]. The mill is on the east side of the peninsula, about 1.2 km (0.75 mi) south of the town of Samoa and about 1.6 km (1 mi) north of the community of Fairhaven. It is one of two pulp mills on the peninsula, the other belonging to the Crown Simpson Pulp Company, approximately 1.2 km (0.75 mi) south of the Louisiana Pacific Mill. The peninsula is a low sandy area, approximately 13 km (8 mi) long and varying in width from 0.8 to 1.4 km (0.5 to 0.9 mi); consequently, the mill is only about 6 m (20 ft) above sea level. The total population on the peninsula south of Samoa Bridge is approximately 700.

The Louisiana Pacific Corporation mill produces approximately 553 m. tons (610 tons)/day of market-bleached kraft pulp. Raw materials, including primarily redwood and douglas fir sawdust and chips from nearby lumber and plywood operations, are chemically digested by the kraft process in a single digester which was designed to produce 495 m. tons (550 tons)/day of pulp. The digester is reported to have a maximum capacity of 630 m. tons (700 tons)/day. The digested pulp is washed and screened, then bleached in six stages with washing following each. All washing in the bleach plant is skip-stage countercurrent.

Following bleaching, the pulp is formed into a continuous sheet for drying on steam cylinders and in an air drier. Dried pulp is cut into sheets, baled, and then sold primarily on the export market.

What can't be sold overseas is sold domestically. In addition to the pulp mill and bleach plant, the Company also operates a sawmill, stud-mill, and plywood mill on adjacent lands.

Production during the NEIC survey of Louisiana Pacific was as follows:

December 1977	Air Dry	
	m. ton	ton
5 ^a	477	526
6	549	605
7	598	659
8	519	572
9	560	617
10	576	635
11	<u>538</u>	<u>593</u>
Average	545	601

a Production day runs from 0800 hr of date listed to 0800 hr of following day.

PROCESS WATER

Process water is purchased from the Humboldt Bay Municipal Water District (HBMWD). It is diverted from the Mad River at the Essex Pumping Station, transported by pipe 19 km (12 mi) to a storage tank on the Samoa Peninsula, and piped to both the Louisiana Pacific and Crown Simpson pulp mills. Pretreatment at the mill can include pre-chlorination, physical-chemical clarification and filtration, and softening. Whether raw process water is subjected to all these pre-treatment processes is determined by use in the mill.

Process water use has declined from approximately 95,000 m³/d (25 mgd) in early 1976 to 76,000 m³/d (20 mgd) in late 1977. This has primarily resulted from the severe California drought which raised the specter of mill closure and stimulated tight controls on mill water use.

PROCESS WASTEWATER DISPOSAL

Outfall 001

Process wastewaters are collected by two main sewerage systems: an acid system which transports low pH wastewaters from the bleach plant, and an alkaline system which transports near-neutral and high-pH wastewater from the pulping processes and bleach plant [Figure 3]. In addition, septic tank overflow is discharged to the alkaline system. These wastewaters are discharged to a baffled sump, called "Manhole 5," where they are commingled with water treatment plant sludge. From the sump, they are delivered to the effluent pipeline by a single constant-speed pump. The discharge rate is controlled by a downstream valve which is regulated by the sump level. Just downstream of the pump these wastewaters are joined by a 20 cm (8 in) polyvinyl chloride (PVC) pipe which transports clarified effluent from the hydraulic barker at the adjoining sawmill, demineralizer effluent from the power boiler area, and clarified overflow from the power boiler scrubber. All these commingled wastewaters then flow through a 122 cm (48 in) woodstave pipe approximately 366 m (1,200 ft) to the beach, and then through approximately 975 m (3,200 ft) of 122 cm (48 in) reinforced concrete cylinder pipe to the Pacific Ocean [Figure 1]. Discharge is accomplished through a 152 m (500 ft) diffuser at a depth of over 9 m (30 ft) and more than 610 m (2,000 ft) from the shoreline at low water.

Outfalls 002 and 003

These discharges included non-contact cooling water from two compressors located in the loading dock area. Since the issuance of the NPDES permit in March 1977, the compressors have been removed from the area, thereby eliminating the discharges.

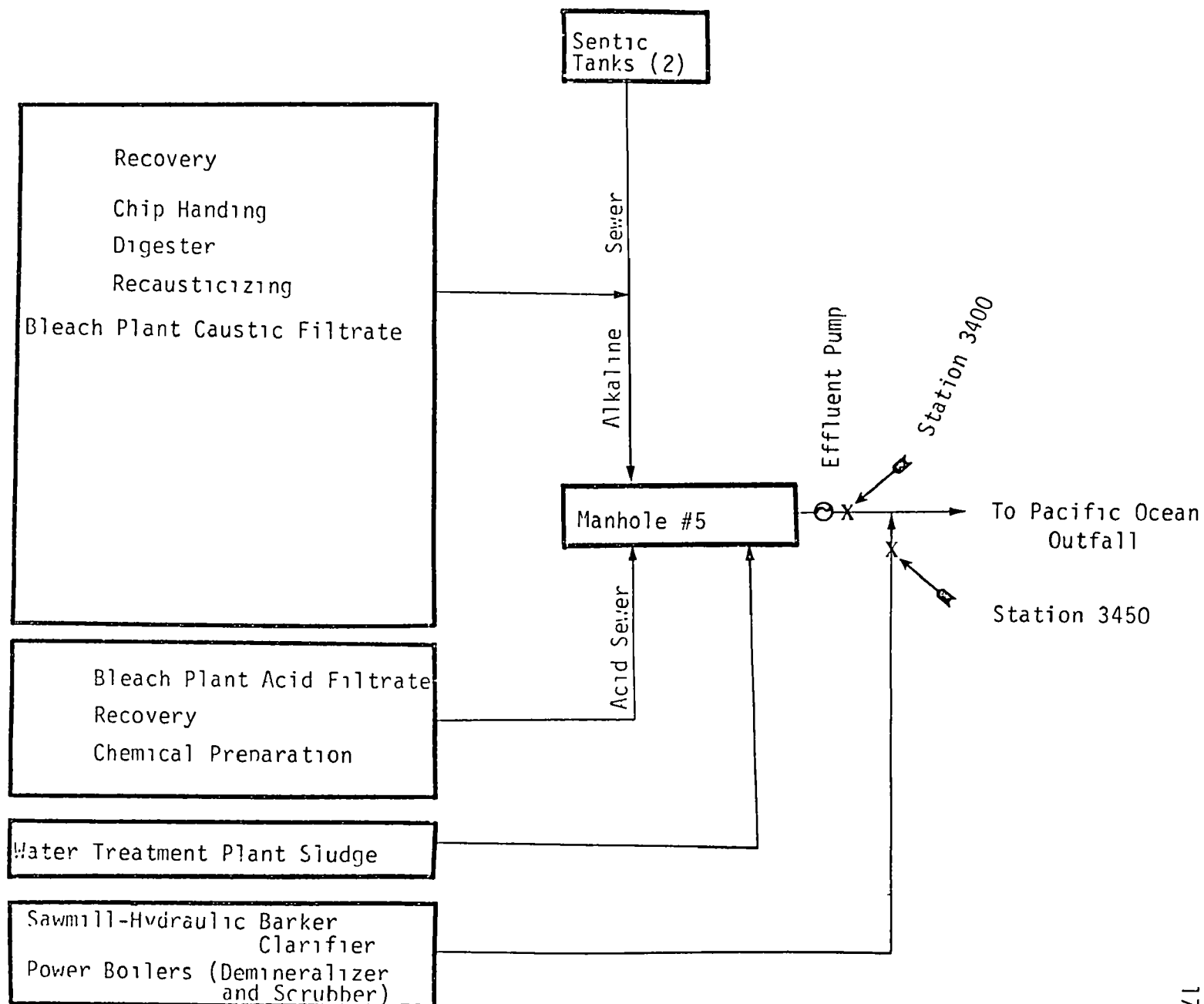


Figure 3. Louisiana Pacific Corporation
Samoa, California
Wastewater System

Outfall 004

Cooling for approximately 8 megawatts of the mill's 48 megawatt capacity is accomplished with once-through condensing water which is withdrawn from and returned to Humboldt Bay.

INPLANT POLLUTION CONTROL

The Louisiana Pacific Corporation has sought to employ inplant controls with no external treatment to achieve Best Practicable Control Technology Currently Available (BPT) limitations for TSS and to gain a variance from BPT limitations for BOD and pH. The inplant controls, all of which were installed prior to the NEIC survey, included:

1. The screen room floor drain system was modified prior to 1973 to collect all spills and return them to the unscreened stock chest. Equipment was also installed to dewater the screen-room rejects for burning in the hog fuel boiler.
2. A sidehill screen was installed in 1974 to dewater machine room cleaner rejects, which are then returned as fuel.
3. Fiber-bearing streams of the drier wet-end were separated and recycled in 1976 to the second- and third-stage bleach washer vats and the brown stock decker.
4. Brown stock washers were modified in 1977, and a spill collection system was installed to recycle formerly wasted fiber to the blow tank for reuse.

The above programs were designed to reduce the loss of fiber and remove other suspended matter from waste streams. In 1977, the Company also ceased discharging excess weak black liquor, a source of BOD and toxic chemicals. When the pulping unit was operated at peak capacity, in response to favorable market conditions, more black liquor was produced than could be processed through the recovery unit. It had been Company policy to sewer this excess weak black liquor. This policy was changed, allowing the recovery process to be production-rate limiting.

According to plant officials, the Company plans to make necessary changes to capture spilled fiber in the bleach washer area. They also plan to air strip sour condensate from the evaporators in the recovery area if it is determined that this will result in reduced effluent toxicity. No time schedules have been established.

IV. SURVEY METHODS

FLOW MEASUREMENT

Process Wastewaters

The Louisiana Pacific Corporation conducts no effluent flow monitoring of process wastewaters at its Samoa, California pulp mill. Effluent flows are estimated by first measuring raw water entering the mill with a flow tube (throat diameter 19.020 inches) from which pressure differential is transmitted to a meter, converted to flow and continuously recorded and totaled. The assumption is made that inplant water losses due to evaporation are balanced by moisture in the wood and chemicals used. Since a portion of the raw water is delivered to the City of Samoa, California and the adjoining sawmill, this metered flow is subtracted from total flow, ostensibly leaving the effluent flow.

Since the Company's assumption that total water-in equals water-out was untested, and the NPDES permit requires flow-proportional composite samples, it was necessary for NEIC to measure effluent flow. This was accomplished by using the tracer dilution technique, with lithium as the tracer [Appendix C].

Commencing the morning of December 5, 1977, flow was measured once each two hours with this technique. On the morning of December 10, this frequency was increased to once an hour.

To facilitate comparisons with the Company's flow estimates, NEIC requested that the raw water transmitting and recording systems

be calibrated. These calibrations were satisfactorily performed by Company employees on Friday, December 2, 1977, in the presence of NEIC personnel.

Hydraulic Barker Effluent Line

In the hydraulic barker line, immediately upstream of the point where it joins the outfall line, the Company has installed an orifice plate (bore = 5.820 inches) to measure flow. Pressure differentials are transmitted to a meter, converted to flow and continuously recorded and totaled. An NEIC inspection of the recording chart indicated numerous peaks and troughs separated by only a few minutes. It was determined that this resulted from "level-to-level" pumping at the hydraulic barker clarifier sump, thereby precluding accurate measurement of instantaneous flow. It was decided, however, that a reasonable estimate of total daily flow could be obtained, and the Company was requested to calibrate the transmitting and recording systems. These calibrations were satisfactorily performed by Company employees on Friday, December 2, 1977, in the presence of NEIC personnel.

SAMPLING TECHNIQUES AND LOCATIONS

During December 5-12, 1977, the NEIC collected wastewater samples at the Louisiana Pacific pulp mill for a wide range of parameters. Established chain-of-custody procedures were followed in the collection of all samples and field data and in the analysis of all samples except for minor deviations noted in Appendix C. Twenty-four-hour composite samples for BOD and TSS were collected from process wastewaters at the discharge side of the effluent pump and the hydraulic barker effluent line at a tap where the line joined the outfall line [Figure 3]. Composite aliquots were collected each hour.

In the case of the process wastewater, a flow rate was first determined by tracer dilution, aliquots were formed proportional to this flow for two consecutive hours, and the process was repeated. On the morning of December 10, 1977, the frequency of flow monitoring was increased to once an hour, affording a flow-proportional aliquot each hour. For the hydraulic barker effluent, equal-volume aliquots were collected hourly since, as stated previously, instantaneous flow measurement was impossible. Grab samples for oil and grease were collected three times a day at the same locations.

TSS composite samples to provide the allowed credit for solids in the raw water were collected from the intake line at the Crown Simpson Pulp Company. As noted previously, the same source of raw water is used by both mills. All raw water composites were formed with equal-volume aliquots collected hourly.

In addition to monitoring for NPDES compliance, samples were also collected for three consecutive days, beginning the morning of December 6 and continuing until December 9, 1977, to ascertain the presence or absence of Priority Pollutants [Appendix B]. A number of these pollutants, as well as any chlorinated hydrocarbons and phenolic compounds, are also limited in the future in the Company's NPDES Permit [Appendix A]. Composite samples for these pollutants were collected in a similar manner to those previously described except that all raw water samples were single grab samples, not composites. In addition, all samples from December 6-7, 1977 were analyzed for general organics.

All samples were stored at 4°C and preserved by techniques promulgated by EPA pursuant to Section 304(g) of the Federal Water Pollution Control Act (FWPCA).

BIOMONITORING TECHNIQUES

Commencing at 1500 hr on December 7, 1977, a 96-hour continuous-flow bioassay was conducted on a flow-proportional combination of the Louisiana Pacific Corporation process wastewater discharge and hydraulic barker effluent which constitute the ocean outfall discharge. The objective of this test was to determine if the wastewater discharge was acutely toxic to fish. Three-spined sticklebacks (Gasterosteus aculeatus Linnaeus) averaging approximately 4 cm in total length were used as test organisms. Detailed methodology of the bioassay procedures are included in Appendix D.

ANALYTICAL PROCEDURES

All samples were either analyzed in an NEIC mobile laboratory set up at the Crown Simpson Pulp Company or air-freighted to the NEIC laboratory in Denver, Colorado for analyses. Split samples were provided to the Louisiana Pacific Corporation for separate analysis. Pertinent analytical methodology and quality control statements are included in Appendix D.

SELF-MONITORING EVALUATION

During the December 5-12, 1977 NEIC study, the Company's self-monitoring practices were evaluated based on interviews with Company personnel and observations of monitoring equipment and procedures.

V. SURVEY FINDINGS

NPDES EFFLUENT LIMITATIONS COMPLIANCE

Effluent data collected during December 5-12, 1977 [Tables 2 through 5], show Louisiana Pacific exceeded its NPDES limits for BOD (pulp) 30-day average (14,000 vs 4,460 kg/day). The BOD (pulp) daily maximum (8,560 kg/day) limit was exceeded on all seven days of sampling. The Company also exceeded its NPDES pH limits (5.0-9.0) for both the pulp (2.3-10.0) and hydraulic barker (1.8-12.3) wastewaters. The BOD results for the hydraulic barker, as well as TSS and oil and grease results for both the pulp process and hydraulic barker wastewaters, were within the permit limits.

On December 8, 1977, at 1430 hr a grab sample was collected from the Company's once-through condenser discharge, 004, to ascertain whether any process wastewaters were present. The clear appearance of the sample and the BOD and TSS values of <3.7 and 17 mg/l, respectively, indicated no process wastewater contamination.

BIOMONITORING

The Louisiana Pacific Corporation effluent was determined to be acutely toxic to fish [Table 6]. The 96-hour LC_{50} was calculated to be a 30.4% effluent concentration.

* LC_{50} indicates the concentration (actual or interpolated) at which 50% of the test organisms died or would be expected to die.

Table 4
OIL AND GREASE DATA^a
LOUISIANA PACIFIC CORP. PULP MILL
Samoa, California
December 5-12, 1977

Station Location	Date Dec. 1977	Time hr	O/G mg/l	Station Location	Date Dec. 1977	Time hr	O/G mg/l
Station 3400 - Louisiana Pacific Process Wastewater at Effluent Pump	5	1100	4.6	Station 3450 - Louisiana Pacific Hydraulic Barker Wastewater at Outfall to Ocean	5	1100	2.5
		1600	7.6			1600	2.3
		Avg.	6.1			Avg.	2.4
	6	0212	9.3		6	0208	5.0
		0805	4.3			0805	1.2
		1615	7.9			1600	3.7
		Avg.	7.2			Avg.	3.3
	7	0001	3.4	Outfall Pipeline	7	0125	4.6
		1000	7.4			0955	5.5
		1745	5.0			1740	3.8
		2205	5.3			2225	6.2
		Avg.	5.3			Avg.	5.0
	8	1015	6.5	8	1018	3.6	
		1530	5.2		1535	5.7	
		2112	0.1		2133	4.1	
		Avg.	3.9		Avg.	4.5	
	9	0115	9.0	9	0125	4.7	
		1615	6.0		1615	4.6	
		Avg.	7.5		Avg.	4.6	
10	0300	1.6	10	0300	1.6		
	0600	2.6		0600	1.2		
	1800	1.9		1800	4.1		
	2312	3.7		2312	2.2		
	Avg.	2.4		Avg.	2.3		
11	0502	5.0	11	0502	2.2		
	1615	3.7		1625	2.4		
	2312	-		1800	-		
	Avg.	4.4		Avg.	2.3		
12	0610	2.1	12	0610	1.2		
5-12	AVG.	5.1	5-12	AVG.	3.4		

Table 5
pH AND TEMPERATURE DATA
LOUISIANA PACIFIC CORP. PULP MILL
Samoa, California
Dec 5-12, 1977

Time	Dec. 5-6			Sta. 6-7			Dec. 7-8			Dec. 8-9			Dec. 9-10			Dec. 10-11			Dec. 11-12		
	Sta. 3400 ^a	Sta. 3450 ^b	Sta. 3550 ^c	Sta. 3400	Sta. 3450	Sta. 3550	Sta. 3400	Sta. 3450	Sta. 3550	Sta. 3400	Sta. 3450	Sta. 3550	Sta. 3400	Sta. 3450	Sta. 3550	Sta. 3400	Sta. 3450	Sta. 3550	Sta. 3400	Sta. 3450	Sta. 3550
pH																					
0700	3.5	7.9	7.4	3.8	7.2	7.2	3.3	8.5	7.3	3.4	7.2	7.3	3.6	11.6	7.5	3.4	3.0	7.4	4.0	9.5	7.6
0800	4.9	7.8	6.9	4.0	7.5	7.4	3.1	7.6	7.1	2.7	7.8	7.4	3.6	9.3	7.6	8.0	7.0	7.6	4.1	8.8	7.5
0900	3.8	7.2	6.9	2.8	7.5	7.3	3.2	7.8	7.2	2.3	7.2	7.3	3.5	9.8	7.4	3.6	5.7	7.7	5.3	8.4	7.7
1000	3.7	3.3	7.3	8.2	7.8	7.5	2.6	9.5	7.2	4.5	6.8	7.3	4.7	11.3	7.5	6.1	11.6	7.6	4.7	11.1	7.6
1100	3.6	6.8	7.2	4.9	7.0	7.2	2.8	11.8	7.2	5.8	7.4	7.4	5.2	9.1	7.5	4.4	9.4	7.5	5.5	10.8	7.6
1200	4.8	6.7	7.3	3.2	7.2	7.0	2.6	8.4	7.0	4.4	9.8	7.5	6.7	7.2	7.4	3.0	9.2	7.6	4.4	2.4	7.5
1300	4.6	11.3	7.3	10.0	7.8	7.1	2.8	2.8	7.1	9.9	9.4	7.4	3.6	9.3	7.5	3.7	9.0	7.7	6.7	2.4	7.7
1400	2.6	5.2	7.2	4.0	7.0	7.2	3.3	7.3	7.2	-	7.1	7.5	3.3	8.6	7.6	2.9	9.0	7.3	6.1	4.4	7.7
1500	3.1	8.7	7.2	3.7	11.7	7.1	2.7	7.6	7.1	9.9	7.4	7.4	3.4	8.1	7.5	3.5	8.9	7.5	5.3	5.4	7.6
1600	2.8	8.4	7.3	3.0	10.1	7.2	2.8	9.6	-	4.4	7.2	7.6	4.4	5.5	7.7	2.9	9.1	7.5	5.5	4.0	7.5
1700	2.9	8.7	7.1	4.1	7.8	7.2	3.0	12.1	7.1	7.1	11.5	7.5	3.9	7.7	7.4	3.0	2.5	7.7	5.3	8.5	7.6
1800	2.7	8.1	7.2	3.3	6.3	7.3	2.9	8.3	7.2	10.0	-	7.6	3.9	7.1	7.6	2.9	7.9	7.6	5.8	9.3	7.7
1900	4.8	8.0	7.6	3.0	6.9	8.1	3.3	6.9	7.6	5.1	7.1	7.4	4.7	7.4	7.1	6.2	4.3	7.8	6.8	9.7	7.1
2000	5.5	8.5	7.5	4.0	6.9	7.5	3.1	2.3	6.9	3.1	7.6	7.9	6.3	9.0	7.2	6.2	2.0	7.6	4.2	9.3	7.1
2100	3.8	9.3	6.9	3.3	10.8	7.9	3.6	11.8	6.6	3.4	2.9	7.7	6.6	9.9	7.3	3.0	5.5	7.9	3.6	1.8	6.9
2200	4.8	7.6	7.5	3.2	9.0	7.5	3.7	2.6	7.7	4.0	7.2	7.6	6.1	8.5	7.6	3.1	8.9	7.9	6.0	11.7	7.0
2300	6.3	7.2	7.5	3.1	8.6	7.6	5.0	7.4	7.8	3.7	7.0	7.5	3.1	9.5	7.5	3.2	9.3	7.7	6.4	2.2	7.6
2400	6.5	7.7	7.4	3.8	7.4	7.4	4.5	7.6	7.1	4.0	7.1	7.4	5.4	7.2	7.5	5.5	9.5	7.7	3.8	9.8	7.7
0100	5.6	7.5	7.4	4.0	7.8	7.6	5.6	7.5	7.8	4.1	2.4	7.4	3.8	9.7	7.1	3.8	9.5	7.7	3.4	12.3	7.0
0200	4.9	8.8	7.4	3.6	7.7	7.5	4.4	7.9	7.6	4.0	6.3	7.8	3.6	7.0	7.7	4.1	11.2	8.0	3.7	10.5	7.6
0300	5.9	9.4	7.6	3.4	7.3	7.5	5.3	2.1	7.7	3.4	2.1	7.7	6.5	8.5	7.2	5.5	2.7	7.7	3.9	9.4	7.6
0400	5.2	8.6	7.4	8.7	4.3	7.4	4.8	7.3	7.7	8.9	6.7	7.9	3.2	9.5	7.7	3.5	4.0	7.8	3.5	4.2	7.5
0500	6.1	7.1	7.3	6.3	6.3	7.2	4.4	8.2	7.8	3.9	6.4	7.6	6.8	11.9	7.4	3.9	10.5	7.8	3.4	8.4	7.7
0600	3.8	7.2	7.4	4.3	4.3	7.7	6.5	2.3	7.6	4.1	8.9	7.9	4.0	10.9	7.9	9.4	9.5	7.8	3.7	2.3	7.3
Max.	6.5	11.3	7.6	10.0	11.7	8.1	6.5	12.1	7.8	10.0	11.5	7.9	6.8	11.9	7.9	9.4	11.6	8.0	6.8	12.3	7.7
Min.	2.6	3.3	6.9	2.8	4.3	7.0	2.6	2.1	6.6	2.3	2.1	7.3	3.1	5.5	7.1	2.9	2.0	7.3	3.4	1.8	6.9
TEMPERATURE (°C)																					
Max.	37.0	31.5	13.0	36.5	31.5	11.5	36.0	31.0	12.0	35.0	32.0	10.5	36.5	28.5	10.5	35.5	25.0	11.0	41.0	27.0	12.0
Min.	31.5	22.5	11.0	28.0	23.0	10.5	20.5	22.5	10.0	23.0	18.0	8.5	23.5	18.0	8.5	30.0	15.0	9.5	30.0	15.0	10.5
Avg.	34.5	26.0	12.0	33.5	27.4	11.5	32.0	25.5	11.5	31.0	22.0	10.0	35.0	24.0	9.5	34.0	20.5	10.5	31.0	22.0	11.5

a Louisiana Pacific process wastewater at effluent pump

b Louisiana Pacific hydraulic barrier wastewater at discharge to ocean outfall pipeline

c Raw water supply at intake to Crown Simpson Mill before any treatment processes (corrosion water supply for Louisiana Pacific and Crown Simpson)

Table 6
 96-HOUR FLOW-THROUGH SURVIVAL DATA
 LOUISIANA PACIFIC EFFLUENT
 December 1977

Time Period	% Survival						
	Effluent Concentration (%)						
	Control	5	9	16	28	37.5	50
24-hour	100	100	100	100	95	100	70
48-hour	100	100	100	100	95	100	20
72-hour	100	100	100	100	90	95	15
96-hour	100	100	100	100	85	0	0

It was not within the scope of this bioassay to isolate or identify the specific toxic components of the wastewater tested. However, the literature indicates that approximately 30 compounds have been identified as toxic contributors to pulp mill waste streams. Major toxic constituents are acid resins from debarking and kraft pulping processes, chlorolignins from acid bleaching, and chlorinated phenols, resin acids, and stearic acids from caustic bleaching.¹ The toxicity of pulp mill wastewaters can vary widely within and between mills. This is principally a result of variations of acid resin concentrations in the waste stream, which is primarily governed by the wood species composition. Highly resinous species such as douglas fir and various spruce woods in general produce waste streams of greater toxicity than effluents derived from low-resin woods such as western red cedar and redwood.² Wood chip age and geographical location of the wood source are also factors affecting resin acid content and therefore toxicity.³ For debarking streams, factors influencing toxicity can include log size, physical state and moisture content of the bark, severity of the debarking, and water temperature.¹

The NPDES permit for Louisiana Pacific contained no specific effluent toxicity limitation in effect at the time of the NEIC survey. However, the permit does control toxicity after initial dilution in the receiving water allowing a maximum of 0.05 toxic units [Appendix A]. The toxic unit value used in this context is derived by calculating the actual toxic unit ($100/LC_{50}$) for the effluent and dividing this value by an initial dilution factor. This factor as required in the NPDES permit, is 100:1 at least 50% of the time and 80:1 at least 90% of the time.

Based on data from the NEIC study, the actual toxic unit value was calculated to be 3.3. Assuming 3.3 toxic units is not exceeded, the Company will be in compliance with the receiving water limitation of 0.05 toxic units when initial dilution exceeds approximately 64:1.

This implies that if the Company is meeting the permit limitation requiring initial dilution to exceed 80:1 at least 90% of the time, and the toxicity of the effluent does not exceed 3.3 actual toxic units, the Company will be in compliance with the receiving water toxicity limitation (0.05 toxic units) at least 90% of the time.

In evaluating the toxicity of the Louisiana Pacific waste stream, two additional factors deserve mention: pH and BOD. As detailed in the Methods Section of this report [Appendix D], aeration of the wastewater was required to maintain dissolved oxygen levels adequate for fish survival. Without aeration, mortality would have occurred at the higher effluent concentrations due to dissolved oxygen depletion. The pH of the 24-hour effluent bioassay composites ranged from 5.4 to 5.5 standard units. This pH range is marginal for the survival of some fish species.⁴ However, hourly pH determinations of the aliquots which comprised the wastewater composite sample ranged from approximately 2 to 12 [Table 5]. Either of these extreme pH conditions would be acutely toxic to fish.⁴

COMPARISON WITH FUTURE NPDES LIMITATIONS

As indicated in Table 7, a number of other pollutants are also included in the Company's NPDES permit for future limitations. With the exception of total chromium which has a compliance date of July 1, 1983, the limits are not to be exceeded after July 1, 1978.

Composite sampling data collected by NEIC for three consecutive days beginning December 6, 1977 [Table 8] indicate that most of these limitations will probably be met, except phenolic compounds (50% limit of 0.5 mg/l vs NEIC average of 1.0 mg/l), total chromium (50% limit of 0.005 mg/l vs NEIC average of 0.09 mg/l), and total identifiable chlorinated hydrocarbons (50% limit of 0.002 mg/l vs NEIC average of

Table 7
COMPARISON BETWEEN LOUISIANA PACIFIC CORPORATION
FUTURE NPDES LIMITS AND NEIC DATA
COLLECTED DECEMBER 6-9, 1977

Constituents	Future NPDES Limits		NEIC Data, Dec. 6-9, 1977	
	50%	10%	Station 3400	Station 3450
	of time	of time	LP Process	LP Hydraulic
	mg/l		Wastewater	Barker
			mg/l	
Arsenic	0.01	0.02	<0.010	<0.012
Cadmium	0.02	0.03	<0.020	0.020
Copper	0.2	0.3	0.004	0.031
Lead	0.1	0.2	<0.005	0.042
Mercury	0.001	0.002	<0.001	<0.001
Nickel	0.1	0.2	<0.1	<0.1
Silver	0.02	0.04	<0.008	<0.008
Zinc	0.3	0.5	0.12	0.087
Cyanide	0.1	0.2	<0.01	0.14
Phenolic	0.5	1.0	1.0	0.075
Compounds				
Total Identifiable				
Chlorinated				
Hydrocarbons	0.002	0.004	2.9	0.003
Toxicity Concentration ^a	1.5	2.0	3.3 ^b	
Total Chromium	0.005	0.01	0.09	0.01

a Measured in toxic units

b 96-hour bioassay commenced 1500 on December 7, 1977 on combination of process wastewater (3400) and hydraulic barker (3450)

Table 8
METALS, CYANIDE, PHENOLICS AND CHLORINATED HYDROCARBONES DATA
LOUISIANA PACIFIC CORP.
Samoa, California
Dec 6-9, 1977

Station Location	Date ^b Dec 1977	Time hr	Parameters ^a																	Phenolic Compounds mg/l	Chlorinated Hydrocarbons mg/l
			Flow		Sb µg/l	As µg/l	Be µg/l	Cd µg/l	Cr µg/l	Cu µg/l	Pb µg/l	Hg µg/l	Ni mg/l	Se µg/l	Ag µg/l	Tl mg/l	Zn µg/l	Cn _T mg/l			
			m ³ /day x 10 ³	mgd																	
Station 3400	7		89.3	23.6	<30	<10	<0.2	<20	90	4	<5	<1	<0.1	<10	<8	<5	80	<0.01	1.2	2.9	
Louisiana Pacific	8		91.6	24.2	<30	<10	<0.2	<20	90	4	<5	<1	<0.1	<10	<8	<5	180	<0.01	1.0	2.9	
Process Wastewater	9		73.4	19.4	<30	<10	<0.2	<20	90	4	<5	<1	<0.1	<10	<8	<5	100	<0.01	0.85	3.0	
at Effluent Pump	Avg.		84.8	22.4	<30	<10	<0.2	<20	90	4	<5	<1	<0.1	<10	<8	<5	120	<0.01	1.0	2.9	
Station 3450	7		3.8	1.0	<30	<10	<0.2	20	10	39	46	<1	<0.1	<10	<8	<5	130	ND ^d	0.085	0.006	
Louisiana Pacific	8		4.2	1.1	<30	15	<0.2	20	10	24	51	<1	<0.1	<10	<8	<5	70	0.13	0.089	0.002	
Hydraulic Barker	9		3.8	1.0	<30	<10	<0.2	20	10	31	28	<1	<0.1	<10	<8	<5	60	0.14	0.050	0.002	
Wastewater at	Avg.		3.9	1.0	<30	12	<0.2	20	10	31	42	<1	<0.1	<10	<8	<5	87	0.14	0.075	0.003	
Discharge to Ocean Outfall Pipeline																					
Station 3550	6	1425			<30	<10	<0.2	<20	<10	<4	<5	<1	<0.1	<10	<8	<5	<40			ND ^d	
Raw Water Supply	6	1530																<0.01	0.005		
at Intake to	7	2100			<30	<10	<0.2	<20	<10	<4	<5	<1	<0.1	<10	<8	<5	<40		0.003	ND	
Crown Simpson Mill	8	1130			<30	<10	<0.2	<20	<10	<4	<5	<1	<0.1	<10	<8	<5	<40		0.006	ND	
Before any Treatment	Avg				<30	<10	<0.2	<20	<10	<4	<5	<1	<0.1	<10	<8	<5	<40	<0.01	0.005	ND	
Processes (Common Water Supply for Louisiana Pacific and Crown Simpson)																					
Detection Limit					30	10	0.2	20	10	4	5	1	0.1	10	8	5	40				

^a Key to Symbols: Sb - antimony, As - arsenic, Be - Beryllium, Cd - cadmium, Cr - chromium, Cu - copper, Pb - lead, Hg - mercury

Ni - nickel, Se - selenium, Ag - silver, Tl - thallium, Zn - zinc, Cn_T - total cyanide

^b Stations 3100 and 3450 data based on 24-hr composites of aliquots collected hourly from 0700-0700. Date listed is day compositing period ended.
Station 3550 data based on single grab sample per day since water supply considered stable source

^c Data not included as sample suspected of contamination

^d ND = None detected

^e From Priority Pollutant sampling. Note concentrations for Station 3400 are largely a result of chloroform [Table 9]

2.9 mg/l). In addition, if the effluent toxicity remains at levels found during the NEIC study, the Company will be in violation of toxicity limits (50% and 10% limits of 1.5 and 2.0 toxic units, respectively, vs NEIC value of 3.3) [Table 7].

PRIORITY POLLUTANTS

As noted previously, samples were also collected December 6-9, 1977 to determine the presence of Priority Pollutants [Table 9]. In addition, the samples from December 6-7, 1977 were analyzed for general organics [Table 10]. Fourteen and nineteen of the Priority Pollutants were identified in the process wastewater and hydraulic barker effluent, respectively. The compounds identified are representative of the natural wood products and chemicals used or created in pulping and bleaching processes. The polynuclear aromatic hydrocarbons [nos. 72-88 on Table 9] detected in the hydraulic barker effluent probably originate in the power boiler scrubber overflow since they can result from the combustion of fuels.

Two Priority Pollutants, di-n-butyl phthalate and diethyl phthalate, were present in the raw water supply in low concentrations, 1-3 ppb.

COMPANY FLOWS VS NEIC FLOWS

A comparison between the effluent flows estimated by Louisiana Pacific and those measured by NEIC yields marginal agreement [Table 11]. The overall LP/NEIC average is 0.87. The EPA has established a guideline* of $\pm 10\%$ for flow monitoring accuracy. As noted in Table 11,

* NPDES Compliance Sampling Manual, June 1977 (p. 57).

Table 9
PRIORITY POLLUTANTS^a
LOUISIANA PACIFIC CORPORATION
Samoa, California
December 6-9, 1977

		Station 3400 ¹				Station 3450				Station 3550 Raw water supply at intake to C. S. Mill before any treatment processes (common water supply for L.P. and C.S.)				Det. Limit
Compound Number	Compound	L.P. process waste- water at effluent pumps				L.P. hydraulic barker wastewater at dischg. to ocean outfall pipeline								
		12/7	12/8	12/9	Avg	12/7	12/8	12/9	Avg.	12/6 @1530	12/7 @2000	12/8 @1030	Avg.	
1	Acenaphthene													0.2
2	Acrolein ^b													
3	Acrylonitrile ^b													
4	Benzene ^j	<0.5	1	6	<2	<0.5	<1	<1	<0.8					0.5
5	Benzidine													1.
6	Carbon tetrachloride ^j													0.5
7	Chlorobenzene ^j													0.5
8	1,2,4-Trichlorobenzene													0.4
9	Hexachlorobenzene													0.3
10	1,2-Dichloroethane ^j													0.5
11	1,1,1-Trichloroethane ^j	12	10	38	20									0.5
12	Hexachloroethane													0.2
13	1,1-Dichloroethane ^j													0.5
14	1,1,2-Trichloroethane ^j													1
15	1,1,2,2-Tetrachloroethane ^j													1
16	Chloroethane ^j													
17	Bis(chloromethyl) ether ^g													
18	Bis(2-chloroethyl) ether													0.2
19	2-Chloroethylvinyl ether ^b													
20	2-Chloronaphthalene													0.1
21	2,4,6-Trichlorophenol	29	32	25	29									3
22	para-Chloro-meta-cresol													3
23	Chloroform ^j	2,600	2,800	2,900	2,800	6	2	2	3					0.5
24	2-Chlorophenol													13
25	1,2-Dichlorobenzene													0.2
26	1,3-Dichlorobenzene													0.4
27	1,4-Dichlorobenzene													0.4
28	3,3'-Dichlorobenzidine ^b													
29	1,1-Dichloroethylene ^j													0.5
30	1,2-trans-Dichloroethylene ^j													0.5
31	2,4-Dichlorophenol	14	11	<10	<12									2
32	1,2-Dichloropropane ^j													0.5
33	1,2-Dichloropropylene ^j													1.5
34	2,4-Dimethylphenol ^b													
35	2,4-Dinitrotoluene ^b													

Table 9 (Continued)
 PRIORITY POLLUTANTS
 LOUISIANA PACIFIC CORPORATION
 Samoa, California
 December 6-9, 1977

Compound Number	Compound	Station 3400 ²				Station 3450				Station 3550 Raw water supply at intake to C.S. Mill before any treatment processes (common water supply for L.P. and C.S.)				Det. Limit
		L P. process wastewater at effluent pumps				L P. hydraulic barker wastewater at dischg. to ocean outfall pipeline								
		12/7	12/8	12/9	Avg.	12/7	12/8	12/9	Avg.	12/6 @1530	12/7 @2000	12/8 @1030	Avg.	
36	2,6-Dinitrotoluene													0.4
37	1,2-Diphenylhydrazine ^b													4.
38	Ethylbenzene ^j													0.1
39	Fluoranthene					0.53	1.3	0.33	0.72					
40	4-Chlorophenyl phenyl ether ^b													0.4
41	4-Bromophenyl phenyl ether													0.1
42	Bis(2-chloroisopropyl) ether													0.2
43	Bis(2-chloroethoxy) methane													0.5
44	Methylene chloride ^{d, b}													
45	Methyl chloride ^{d, b}													
46	Methyl bromide ^j													
47	Bromoform ^j													2
48	Dichlorobromomethane ^j	10	<0.5	<0.5	<4									0.5
49	Trichlorofluoromethane ^j													2
50	Dichlorofluoromethane ^{b, j}													1.5
51	Chlorodibromomethane ^j													0.3
52	Hexachlorobutadiene													1.5
53	Hexachlorocyclopentadiene													0.1
54	Isophorone													0.1
55	Naphthalene					26	37	11	25					0.2
56	Nitrobenzene													4
57	2-Nitrophenol													100
58	4-Nitrophenol													2
59	2,4-Dinitrophenol													4
60	4,6-Dinitro-o-cresol													0.1
61	N-Nitrosodimethylamine													0.2
62	N-Nitrosodiphenylamine													2.
63	N-Nitrosodi-n-propylamine													6
64	Pentachlorophenol													11
65	Phenol	630	530	360	510	160	730	260	380					0.1
66	Bis(2-ethylhexyl) phthalate	<0.5	<0.5	1.7	<0.9									0.1
67	Butyl benzyl phthalate													0.1
68	Di-n-butyl phthalate	1.4	0.5	<10 ^c	<4	0.31	0.61	0.47	0.46	<0.1	1.0	<0.1	<0.4	0.1
69	Di-n-octyl phthalate													0.1
70	Diethyl phthalate	1.2	<0.5	<0.5	<0.7	0.70	0.55	1.1	0.45	1.0	3.0	2.0	2.0	0.1

Table 9 (Continued)
 PRIORITY POLLUTANTS
 LOUISIANA PACIFIC CORPORATION
 Samoa, California
 December 6-9, 1977

		Station 3400 <i>i</i>				Station 3450				Station 3550 Raw water supply at intake to C.S. Mill before any treatment processes (common water supply for L.P. and C.S.)				Det Limit
Compound Number	Compound	L.P. process waste- water at effluent pumps				L.P. hydraulic barker wastewater at dischg. to ocean outfall pipeline								
		12/7	12/8	12/9	Avg.	12/7	12/8	12/9	Avg.	12/6 @1530	12/7 @2000	12/8 @1030	Avg.	
71	Dimethyl phthalate					<0.25	<0.1	<0.1	<0.15					0.1
72	Benzo(a) anthracene													0.2
73	Benzo(a)pyrene ^b													
74	3,4-Benzofluoranthene ^b													
75	Benzo(u)fluoranthene ^b													
76	Chrysene ^h													
77	Acenaphthylene					1.6	5.2	1.5	2.8					0.1
78	Anthracene ^e					6.4	9.2	2.5	6.0					0.1
79	Benzo(g,h,i)perylene ^b													
80	Fluorene					0.25	0.42	<0.1	<0.26					0.1
81	Phenanthrene ^e													
82	Dibenzo(a,h) anthracene ^b													
83	Indeno (1,2,3-cd)pyrene ^b													
84	Pyrene					0.65	2.2	0.33	1.1					0.1
85	Tetrachloroethylene ^j													1
86	Toluene ^j	6	5	1	4									0.5
87	Trichloroethylene ^j													1
88	Vinyl chloride ^{j,b}													
89	Aldrin													0.2
90	Dieldrin													0.2
91	Chlordane													2
92	4,4'-DDT													0.5
93	4,4'-DDE													0.1
94	4,4'-DDD													0.5
95	a-Endosulfan-Alpha													0.1
96	b-Endosulfan-Beta													0.2
97	Endosulfan sulfate ^b													
98	Endrin													0.2
99	Endrin aldehyde ^b													
100	Heptachlor													0.2
101	Heptachlor epoxide													0.2
102	a-BHC-Alpha													0.2
103	b-BHC-Beta													0.2
104	r-BHC (lindane)-Gamma													0.2
105	g-BHC-Delta													0.2

12/9/77
 PRIORITY POLLUTANTS
 LOUISIANA PACIFIC CORPORATION
 Samoa, California
 December 6-9, 1977

Compound Number	Compound	Station 3400 ⁱ				Station 3450				Station 3550 Raw water supply at intake to C.S. Mill before any treatment processes (common water supply for L.P. and C.S)				Det. Limit
		L.P. process waste- water at effluent pumps				L.P. hydraulic barker wastewater at dischg. to ocean outfall pipeline								
		12/7	12/8	12/9	Avg.	12/7	12/8	12/9	Avg.	12/6	12/7	12/8	Avg.	
										@1530	@2000	@1030		
106	PCB-1242													1
107	PCB-1254													1
108	PCB-1221													1
109	PCB-1232													1
110	PCB-1248													1
111	PCB-1260													2
112	PCB-1016													1
113	Toxaphene													5
114	Antimony													30
115	Arsenic													10
116	Asbestos ^b													
117	Beryllium													0.2
118	Cadmium													20
119	Chromium	90	90	90	90									10
120	Copper	4	4	4	4									4
121	Cyanide													10
122	Lead													5
123	Mercury													1
124	Nickel													0.1
125	Selenium													10
126	Silver													8
127	Thallium													5
128	Zinc	80	180	100	120									40
129	2,3,7,8-Tetrachlorodibenzo- p-dioxin													

^a All concentrations in micrograms per liter (ug/l). Except thallium and nickel in milligrams per liter.

^b Compound not measured due to analytical difficulties in the methodology or standard availability.

^c Data for this parameter for this sample was inadvertently discarded prior to quantitation.

^d Presence is unexplained but identification is within criteria established by the method.

^e Phenanthrene and anthracene cannot be resolved, data reported represents either or both of these compounds.

^f Detection limits for extractable organics are based on a 2l extract concentrated to 1.0 ml. Volatile organics are for 5 ml of sample.

^g bis (chloromethyl) ether is not stable in water and cannot be recovered from the standard.

^h Crysenes and benzo(a)anthracene cannot be resolved, data reported represents either or both of these compounds.

ⁱ Extractable organics were measured at 5 ml extract volume. The detection limits for these samples for the extractable organics are therefore 5 times those reported in the last column.

^j Denotes a non-extractable parameter for organics, e.g. volatile organics

^k Station 3400 and 3450 data based on 24-hour composites collected hourly from 0700-0700. Date listed is day compositing period ended. Station 3550 data based on single grab sample per day since water supply considered stable source.

Table 10
GENERAL ORGANICS DATA
LOUISIANA PACIFIC CORPORATION
Samoa, California
Dec. 6-7, 1977

Compound	Station		
	3400 L.P. process wastewater at effluent pump	3450 L.P. hydraulic wastewater at discharge to outfall pipeline	3550 Raw water supply at intake to Crown Simpson Mill before any treatment processes (Common water supply for C.S. and L.P.)
	µg/l		
Acenaphthalene		3	
Acetovanillin ^a	110		
Allyl isovalerate ^a	410		
Alpha-pinene	200	12	
Alpha-terpineol	1,100		
Beta-thujene ^a	60		
Biphenyl		3	
Borneol	700		
Camphor		2	
Dibenzofuran		1	
Dibutylphthalate			1
1,3-dichlorocyclohexane	180		
Diethylphthalate		2	1
2,4-dihydroacetophenone ^a	50		
Dimethyl disulfide ^a	2,400		
3,3-dimethyl-3-phenyl propionic acid ^a	2,500		
1,4-dimethyl-4-vinylcyclohexene ^a	290		
Fenchyl alcohol ^a		2	
Guaiacol	2,200	6	
Limonene	56		
Naphthalene		31	
Para-cresol		MS ^b	
Phenol		110	
2,3,4-trithiapentane ^a	30		
Vanillin ^a	12	5	

^a Identification by comparison to reference spectra only; no pure standard was available for direct comparison. Quantities are estimates only

^b Mass spectrometric identification only, below GC-FID detection limits for quantitation.

Table 11
COMPARISON OF FLOWS DURING
DECEMBER 5-12, 1977
NEIC vs. LOUISIANA PACIFIC

Month	Day ^a	NEIC ^b		Flow Louisiana Pacific ^c		LA:NEIC
		$\frac{m^3}{d} \times 10^3$	mgd	$\frac{m^3}{d} \times 10^3$	mgd	
December	5-6	83.6	22.1	71.2	18.8	0.85
	6-7	89.3	23.6	70.8	18.7	0.79
	7-8	91.6	24.2	71.2	18.8	0.78
	8-9	73.4	19.4	72.7	19.2	0.99
	9-10	90.8	24.0	69.6	18.4	0.77
	10-11	74.9	19.8	71.5	18.9	0.95
	11-12	72.3	19.1	71.5	18.9	0.99
Average		82.3	21.7	71.2	18.8	0.87

a Flows were determined 0700-0700.

b NEIC effluent flows determined every two hours from 12/5-12/10.
Beginning 0700 on 12/10, flows determined every hour.

c LP effluent flow estimated by Company as raw water flow minus
City of Samoa, California and sawmill flows.

there were four days when this criterion was exceeded and on three days there was >20% difference between the values. On the other hand, there were three days when there was close agreement (December 8-9, 10-11, and 11-12) between the two values ($\leq 5\%$ difference). It should also be noted that two of the three days with close agreement were the last two days of the survey when the NEIC flow monitoring frequency was increased from once every two hours to once an hour. It is not known whether this is coincidental or significant.

Although the daily flow values are marginally acceptable, the Company's practice of using raw water flows and then forming composite samples with equal-volume aliquots is unacceptable since it does not reflect the diurnal fluctuations in flow. The EPA recommends^{*} that "If the flow rate does not vary by more than $\pm 15\%$ of the average flow rate, a time-intervalled composite...will provide a representative measurement of the wastewater characteristics and load discharged over the sampling period." As noted in Figure 4, diurnal flow rate changes were considerably in excess of this criterion.

SELF-MONITORING EVALUATION

The NEIC evaluation of the permittee's self-monitoring practices indicated the following procedures deviated from the prescribed/recommended techniques:

Sampling Techniques

1. Composite samples were collected by automatically collecting equal-volume aliquots at equal time intervals. Since the flow rate is not constant and varies according to the

* NPDES Compliance Sampling Manual, June 1977 (p. 28)

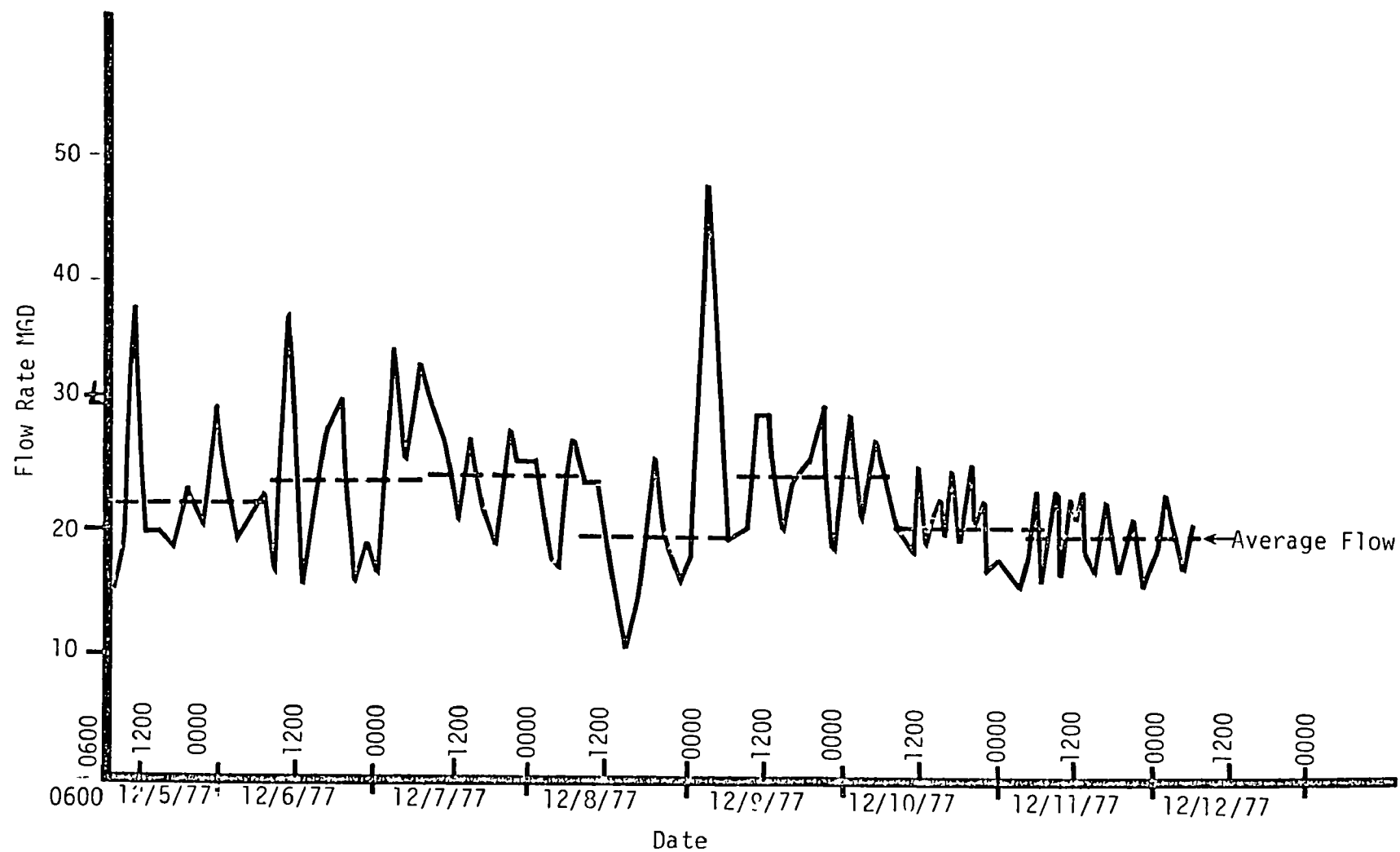


Figure 4. Diurnal Flow Variation
Louisiana Pacific Corp., Samoa, California
Dec 5-12, 1977

downstream control valve setting, these composites were not flow-proportional as required by the NPDES permit. Furthermore, these samples were not refrigerated during collection as prescribed.

2. The pH was determined on each of the 24-hour composite samples collected during the month, then averaged, and this one value reported to the California Regional Water Quality Control Board, Santa Rosa, California. The NPDES permit requires continuous measurement of pH.
3. Settleable solids were collected from the composite samples, not by grab samples as required by the NPDES permit.
4. Oil and grease sampling consisted of a single grab, not an 8-hour composite as required by the NPDES permit. However, collecting a composite sample for oil and grease is extremely impractical and is not recommended by EPA.
5. Composite samples for phenolic compounds were collected in a plastic container, not glass as prescribed, and were not preserved or refrigerated during collection.

Flow Monitoring

1. As noted previously, the Company estimates process wastewater effluent flow with metered raw water flows. This practice was determined to be marginally acceptable for daily flows, but precludes collecting flow-proportional effluent composite samples.

2. The location of the flow monitoring site for the hydraulic barker effluent (i.e., downstream from the clarifier sump pump) precludes instantaneous flow measurement and consequently flow proportioning of composite samples. The numerous severe fluctuations in flow also make it difficult to obtain an accurate measurement of total daily flow.
3. The Company did not have an established calibration frequency for the flow measurement systems. Calibration should be conducted at least every six months or sooner if problems are indicated.

Analytical Procedures

1. The Company was using a modified procedure for oil and grease analyses [Appendix C]. No formal modification request had been made, as prescribed, and no data had been collected to establish comparability with the EPA-approved method.
2. TSS procedures were performed as prescribed, except that filters were weighed directly out of the oven without desiccation. This technique will generally cause low results.
3. Though not specifically required by the NPDES permit, the Company had established no formal analytical quality control program.

Other

Despite the fact that the NPDES permit contains 30-day average and daily maximum loading limitations for both the process wastewaters

(listed as "Pulp" in permit) and hydraulic barker, the Company reports to the State of California a flow-weighted average concentration for a combination of the two discharges. No load calculations are transmitted, thereby precluding a determination of individual loadings.

REFERENCES

1. Leach, J.U. and Thakore, A.M. (1976), Compounds Toxic to Fish in Pulp Mill Waste Streams. Proceedings of the 8th International Conference of the International Association of Water Pollution Research, Sydney, Australia, October 17-22, 1976.
2. Swan, E.P. (1973), Resin Acids and Fatty Acids of Canadian Pulpwoods - A Review of the Literature. Information Report VP-X-115 Canadian Forestry Service, Department of the Environment, Ottawa, Ont.
3. Rogers, I.H. (1973), Isolation and Chemical Identification of Toxic Components of Kraft Mill Wastes Pulp Paper Mag Can. 74, T303-T308.
4. Water Quality Criteria (1972) EPA-R3-73-033.

APPENDIX A

LOUISIANA PACIFIC CORPORATION
NPDES PERMIT NO. CA0005894

EXHIBIT B

STATE WATER RESOURCES CONTROL BOARD

ORDER NO. 77-6
NPDES NO. CA0005894

WASTE DISCHARGE REQUIREMENTS
FOR
LOUISIANA-PACIFIC CORPORATION
Humboldt County

The California State Water Resources Control Board (State Board) finds that:

1. Louisiana-Pacific Corporation and its predecessor, Georgia-Pacific Corporation, have submitted applications for federal permits, a technical report pursuant to the Water Quality Control Plan for Ocean Waters of California (Ocean Plan), and supplemental information in letters and petitions which describe the corporation's discharges to the Pacific Ocean and Humboldt Bay.
2. Louisiana-Pacific Corporation discharges effluents containing pollutants from kraft pulping processes, pulp bleaching processes, and pulp drying processes located in its bleached kraft market pulp mill; from its water treatment plant processes, and from a hydraulic Barker at its sawmill into the Pacific Ocean, a water of the United States. Minor amounts of steam vent liquors from softwood veneer manufacturing processes which use direct steaming for the conditioning of logs, powerplant wastewaters, waste-bearing stormwater runoff, and domestic sewage are contained in the discharge. These effluents, which flow at up to 30 MGD, are discharged through diffusers located near Latitude 40°47'N., Longitude 124°11'W., from a 3000-foot outfall at a depth of 35 to 40 feet. This discharge is hereby designated 001.

The discharger has eliminated discharge of industrial process wastes to Humboldt Bay, however, the proximity of mill operations to the bay may result in discharge of spills, waste-bearing stormwater runoff or leachate from chips or fuel to Humboldt Bay.

The discharger discharges noncontact cooling water from two compressors, hereby designated 002 and 003, and a powerplant hereby designated 004, to Humboldt Bay at points located near Latitude 40°47'N., Longitude 124°13'W.

Mill activities may result in discharge of waste or leachate from chips or fuel to groundwater of the Suisun Peninsula.

3. The Regional Board adopted the Water Quality Control Plan for the North Coastal Basin (Basin Plan) on March 20, 1975, and adopted revisions thereto on March 25, 1976. The Basin Plan incorporates the Ocean Plan and the Water Quality Control Policy for the Enclosed Bays and Estuaries of California. It contains effluent limitations and water quality objectives for Pacific Ocean discharges and prohibits most discharges to Humboldt Bay.
4. The beneficial uses of Pacific Ocean and Humboldt Bay include:
 - a. industrial water supply
 - b. navigation
 - c. water contact recreation
 - d. noncontact water recreation
 - e. ocean commercial and sport fishing
 - f. marine habitat
 - g. fish migration
 - h. fish spawning
 - i. shellfish harvesting
5. The beneficial uses of shallow fresh groundwater on the Samoa Peninsula include domestic water supply. The uncertainty of supply and the susceptibility of this water to degradation from over pumping, percolation of sewage, by salinity from dredged material disposal and other activities has encouraged development by the Humboldt Bay Municipal Water District (HBMD) of a water system utilizing Mad River supply. Groundwater in areas relying upon its use should be protected with minimum risk of degradation from waste discharges.
6. The discharger has requested exemptions from:
 - a. Ocean Plan Table A effluent limitations on:
Floating particulates
Suspended solids
Settleable solids
Turbidity, and
pH,
 - b. Ocean Plan Table B effluent limitations on chromium
 - c. the time schedule provision of State Board Resolution No. 74-5; and
 - d. EPA Effluent Limitations Guidelines based limitations on.

BOD and pH.

- 7 Regarding the exemptions from Ocean Plan effluent limitations requested by the discharger:
- a. Floating Particulates. The absence of any limitations on floating particulates will not interfere with compliance with the water quality objectives set forth in Chapter II of the Ocean Plan and will not interfere with compliance with the effluent quality requirements set forth in Chapter IV, Table B of the Ocean Plan.
 - b. Suspended Solids. Discharge of suspended solids at the rates specified herein will not interfere with compliance with the water quality objectives set forth in Chapter II of the Ocean Plan and will not interfere with compliance with the effluent quality requirements set forth in Chapter IV, Table B of the Ocean Plan. Since the suspended solids from the water treatment plant consist of silt from the Mad River that would normally be discharged to the ocean, it is appropriate that the limitations on suspended solids be on a net basis. Thus, the monitoring requirements will be established so as to give credit for suspended solids resulting from water treatment plant operations.
 - c. Settleable Solids. The absence of any limitations on settleable solids will not interfere with compliance with the water quality objectives set forth in Chapter II of the Ocean Plan and will not interfere with compliance with the effluent quality requirements set forth in Chapter IV, Table B of the Ocean Plan.
 - d. Turbidity. The absence of any limitations on turbidity will not interfere with compliance with the water quality objectives set forth in Chapter II of the Ocean Plan and will not interfere with compliance with the effluent quality requirements set forth in Chapter IV, Table B of the Ocean Plan in that the turbidity from the water treatment plant consists of silt and clay from the Mad River that would normally be discharged to the ocean.
 - e. pH. Discharge of effluents with a pH within the range specified herein will not interfere with compliance with the water quality objectives set forth in Chapter II of the Ocean Plan and will not interfere with compliance with the effluent quality requirements set forth in Chapter IV, Table B of the Ocean Plan.
 - f. Chromium and Time Schedule Provision of State Board Resolution No. 71-5. The discharger has presented substantial evidence that compliance with chromium limitations based on Chapter IV, Table B of the Ocean Plan is not possible through application of source controls and the best practicable control technology currently available.

14. The discharger is currently discharging under waste discharge requirements issued by the Regional Board on September 4, 1968, and is monitoring and reporting under Monitoring and Reporting Program No. 74-212 adopted by the Regional Board on December 31, 1974.

IT IS HEREBY ORDERED THAT Louisiana-Pacific Corporation, in order to meet the provisions contained in Division 7 of the California Water Code and regulations and guidelines adopted thereunder, shall comply with the following.

A. Prohibitions

1. The discharge of waste to Humboldt Bay, except as provided under B. 4. of this order, is prohibited.
2. The discharge of waste to shallow groundwaters of the Sane Peninsula, except in which groundwater is unsuitable for domestic use, is prohibited.
3. The discharge of waste to the Pacific Ocean, except as provided under D. 2. of this order, is prohibited.
4. Discharge of radioactive materials in excess of the limits prescribed in Section 30269 of the California Administrative Code is prohibited.
5. Discharge of any wastewater pollutants resulting from plywood manufacturing which utilizes veneer as a raw material is prohibited.

B. Effluent Limitations

1. The discharge of an effluent to the Pacific Ocean which exceeds the following is prohibited:

<u>Constituents</u>	<u>Units</u>	<u>30-day^{a/} Average</u>	<u>30-day^{b/} Median</u>	<u>30-day^{c/} 90th %ile</u>	<u>Daily Maximum</u>
Flow	MGD	30	--	--	36
BOD ₅ (pulp)	lbs/day ^{d/}	9,821	--	--	18,849

- ^{a/} The average of values in any 30 consecutive day period. Compliance will not be determined if fewer than four samples are analyzed.
- ^{b/} The value which is not exceeded in 50 percent of the samples in any 30 consecutive day period. Compliance will not be determined if fewer than four samples are analyzed.
- ^{c/} The value which is not exceeded in 90 percent of the samples in any 30 consecutive day period. Compliance will not be determined if fewer than four samples are analyzed.
- ^{d/} Based on 610 tons per day average annual production.

<u>Constituent</u>	<u>Units</u>	<u>30-day^a/ Average</u>	<u>30-day^b/ Median</u>	<u>90-day^c/ 90th %tile</u>	<u>Daily Maximum</u>
BOD ₅ (Hyd. Barker)	lbs/cu.ft. ^f / lbs/day	0.03 1,500	-- --	-- --	0.09 4,500
BOD ₅ (Veneer)	lbs/cu.ft. ^g / lbs/day	0.015 283	-- --	-- --	0.045 849
Suspended Solids ^c / (pulp)	lbs/day ^d	20,008	--	--	37,088
Suspended Solids ^c / (Hyd. Barker)	lbs/ft. ^f / lbs/day	0.144 7,200	-- --	-- --	0.431 21,550
Grease & Oil	mg/l	--	10	15	--
pH	within the limits 5.0 and 9.0				

2. The discharge of an effluent in excess of the following limits is prohibited. h/1/

<u>Constituents</u>	<u>Units</u>	<u>50% of time</u>	<u>10% of time</u>
Arsenic	mg/l	0.01	0.02
Cadmium	mg/l	0.02	0.03
Copper	mg/l	0.2	0.3
Lead	mg/l	0.1	0.2
Mercury	mg/l	0.001	0.002
Nickel	mg/l	0.1	0.2

c/ In addition to the suspended solids in the raw water supply
f/ Pounds of BOD₅ or suspended solids per cubic foot of wood
processed through the hydraulic barker.

g/ Pounds of BOD₅ per cubic foot of production in terms of veneer,
if that is the final product of this facility, or per cubic foot
of plywood if the veneer is further processed into plywood at
this facility

h/ The maximum allowable daily mass emission rate for each constituent
listed in Item 2 above shall be calculated from the total waste
flow occurring each specific day and the concentration specified
(continued on next page).

8. On June 21, 1976, the discharger submitted to the Regional Board a request for variance from EPA effluent limits based on fundamentally different factors. The request was supplemented by testimony and evidence presented by the discharger during the course of public hearings before both the Regional Board and the State Board.

Based upon said testimony and evidence, the State Board finds that effluent exceeding the EPA guideline limitations for BOD and pH has substantially no adverse effect on the marine environment when properly diffused; that there will be few if any water quality benefits associated with treatment for BOD or pH, that there will be substantial environmental and energy costs associated with treatment for BOD and/or pH; and that, therefore, under the precedent established by the U. S. Court of Appeals (Fourth Circuit) in its decision in the case of Appalachian Power Company vs. Train, a variance from the EPA guideline limitations is warranted. The State Board therefore grants herein a variance from effluent limitations from EPA guideline limitations for pH and for BOD generated in the pulp mill, subject to final approval of the variance by the Administrator of EPA.

9. EPA has not promulgated an effluent guideline for hydraulic barking operations associated with saw mills. The State Board finds that application of a separate limit based on the EPA Guidelines for the Barking Subcategory of the Timber Products Processing Point Source Category (40 CFR 429.12) for BOD and suspended solids contributed by the sawmill hydraulic barker is appropriate.
10. Except as provided in Finding 6, above, effluent limitations pursuant to Section 301 of the Federal Water Pollution Control Act and amendments thereto are applicable to the discharge. The limits are contained in Code of Federal Regulations.
11. The discharger has requested that limits for BOD as established in Code of Federal Regulations be deleted from requirement for discharge to open ocean waters by diffusers. The State Board finds that adoption of BOD limitations is appropriate to its regulation of discharges to the Pacific Ocean.
12. The State Board has notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with an opportunity to submit their written views and recommendations.
13. The State Board in a public hearing heard and considered all comments pertaining to the discharge.

<u>Constituents</u>	<u>Units</u>	<u>of time</u>	<u>of time</u>
Silver	mg/l	0.02	0.04
Zinc	mg/l	0.3	0.5
Cyanide	mg/l	0.1	0.2
Phenolic Compounds	mg/l	0.5	1.0
Total Chlorine Residual	mg/l	1.0	2.0
Ammonia (expressed as nitrogen)	mg/l	40.0	60.0
Total Identifiable Chlorinated Hydrocarbons 1/	mg/l	0.002	0.004
Toxicity Concentration	tu	1.5	2.0

3. The discharge of an effluent in excess of the following limits is prohibited: h/1/

<u>Constituent</u>	<u>Units</u>	<u>50% of time</u>	<u>10% of time</u>
Total Chromium	mg/l	0.005	0.01

4. The discharge of noncontact cooling water to Humboldt Bay in excess of the following limits is prohibited:

<u>30-day Average</u>	<u>Daily Maximum</u>
22.0°C	24.0°C

5. Upon approval by the Administrator of EPA of the finding of "fundamental difference" cited in Finding 8, above, the following limitations shall apply in lieu of the limitations in B. 1., above, for the following parameters. The limitations contained in B. 1. shall continue to apply for all other parameters. Should the Administrator approve a variance but find that limitations other than the following are appropriate, the Regional Board shall revise these waste discharge requirements consistent with the limitations approved by the Administrator.

- h/ in waste discharge requirements as that not to be exceeded more than 10 percent of the time. The mass emission rate of the discharge during any 24-hour period shall not exceed the maximum allowable daily mass emission rate.
- 1/ The maximum allowable monthly mass emission rate for each constituent listed in Item 2 above shall be calculated from the total waste flow occurring in each specific month and the concentration specified in waste discharge requirements as that not to be exceeded more than 50 percent of the time. The mass emission rate of the discharge during any monthly period shall not exceed the maximum allowable monthly mass emission rate.
- 2/ Total Identifiable Chlorinated Hydrocarbons shall be measured by summing the individual concentrations of DDT, DDD, DDE, aldrin, BHC, chlordane, endrin, heptachlor, lindane, dieldrin, polychlorinated biphenyls, and other identifiable chlorinated hydrocarbons.

<u>Constituent</u>	<u>Units</u>	<u>30-day Average</u>	<u>Daily Maximum</u>
OD ₅ (pulp)	lbs/day ^{d/}	48,800	97,600
within the limits 3.0 and 10.0			

C. Receiving Water Limitations

1. The discharge shall not cause floating particulates, foam, or grease and oil to be visible.
2. The discharge shall not cause aesthetically undesirable discoloration of the ocean surface.
3. The transmittance of natural light shall not be significantly reduced at any point outside the initial dilution zone.
4. The discharge shall not cause the dissolved oxygen concentration outside the initial dilution zone at any time to be depressed more than 10 percent from that which occurs naturally.
5. The discharge shall not cause the pH outside the initial dilution zone to be changed at any time more than 0.2 units from that which occurs naturally.
6. The discharger shall not cause a violation of any other applicable existing water quality standard for the receiving water adopted pursuant to the Federal Water Pollution Control Act and implementing regulations. If more or less stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the Federal Water Pollution Control Act and implementing regulations, the Regional Board shall revise or modify this order in accordance with such more or less stringent standards.
7. In areas where shellfish are harvested, the discharge shall not cause the median total coliform organism concentration to exceed 70 per 100 ml nor shall the total coliform organism concentration exceed 230 per 100 ml 10 percent of the time.
8. The concentration of organic materials in marine sediments shall not be increased above that which would degrade marine life.
9. The discharge shall not cause toxic conditions to exist in the receiving water.

10. The discharge shall not cause the following limits to be exceeded after initial dilution:

<u>Constituents</u>	<u>Units</u>	<u>50 Per-centile</u>	<u>90 Per-centile</u>	<u>Maximum</u>
Grease and Oil	mg/m ²	10	20	--
Floating Particulates	mg dry wt/m ²	1.0	1.5	--
Toxicity	Toxicity Units	--	--	0.05

D. Provisions

1. Neither the treatment nor the discharge of pollutants shall create a pollution or a nuisance as defined by the California Water Code.
2. The discharge shall achieve rapid initial dilution and effective dispersion to minimize concentrations of pollutants not removed by treatment. The diffusion system shall provide an initial dilution of effluent with seawater exceeding 100:1 at least 50 percent of the time and exceeding 80:1 at least 90 percent of the time.
3. The discharge of noncontact cooling waters shall not elevate the temperature of Humboldt Bay to the detriment of beneficial uses of Humboldt Bay.
4. The discharger shall comply with the following time schedules to assure compliance with Effluent Limitations B. 1., B. 2., B. 3., and B. 5. All other provisions of this permit shall be applicable upon adoption.

<u>Task</u>	<u>Compliance Date</u>	<u>Report of Compliance Due</u>
<u>Limitations B. 1. and B. 5.</u>		
Commence preparation of plans and specifications for control facilities	April 1, 1977	April 15, 1977
Compliance	July 1, 1977	July 15, 1977
<u>Limitations B. 2.</u>		
Progress report	May 1, 1977	May 15, 1977
Commence construction of control facilities	January 1, 1978	January 15, 1978
Compliance	July 1, 1978	July 15, 1978

<u>Task</u>	<u>Compliance Due</u>	<u>Report of Compliance Due</u>
<u>Limitations B 3.</u>		
Progress report	October 1, 1977	October 15, 1977
Progress report	July 1, 1978	July 15, 1978
Progress report	April 1, 1979	April 15, 1979
Progress report	January 1, 1980	January 15, 1980
Commence preparation of plans and specifications for control facilities	July 1, 1980	July 15, 1980
Progress report	April 1, 1981	April 15, 1981
Commence construction of control facilities	January 1, 1982	January 15, 1982
Progress report	October 1, 1982	October 15, 1982
Compliance	July 1, 1983	July 15, 1983

The discharger shall submit to the Regional Board on or before each compliance report date, a report detailing his compliance or noncompliance with the specific schedule date and task.

If noncompliance is being reported, the reasons for such noncompliance shall be stated, plus an estimate of the date when the discharger will be in compliance. The discharger shall notify the Regional Board by letter when he has returned to compliance with the time schedule.

5. The discharger shall notify the Regional Board not later than 180 days in advance of implementation of any plans to alter production capacity of the product line of the manufacturing, producing or processing facility by more than ten percent. Such notification shall include submittal of a new Report of Waste Discharge and appropriate filing fee.
6. The discharger shall file with the Regional Board a Report of Waste Discharge at least 120 days before making any material change or proposed change in the character, location or volume of the discharge
7. The discharger shall submit to the Regional Board by January 30 of each year, an annual summary of the quantities of all chemicals, listed by both trade and chemical names which are used for cooling and/or boiler water treatment and which are discharged.

The discharger shall submit to the Regional Board each month with the monthly effluent monitoring report a summary of the quantity of chromium contained in any chemicals used which reach the waste stream or which might reach the waste stream in the event of an upset or breakdown.

8. The requirements prescribed herein do not authorize the commission of any act causing injury to the property of another, nor protect the discharger from his liabilities under federal, state, or local laws other than those adopted pursuant to the Federal Water Pollution Control Act, nor guarantee the discharger a capacity right in the receiving waters.
9. The discharge of any radiological, chemical, or biological warfare agent is prohibited.
10. The discharger shall permit the Regional Board:
 - a. entry upon premises (during normal business hours) 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
11. All discharges authorized by this order shall be consistent with the terms and conditions of this order. The discharge of any pollutant more frequently than or at a level in excess of that identified and authorized by this order shall constitute a violation of the terms and conditions of this order.
12. The discharger shall comply with a Monitoring and Reporting Program issued by the Regional Board Executive Officer and the General Provisions for Monitoring and Reporting and any modifications to these documents as specified by the Regional Board Executive Officer. Monitoring reports shall be submitted to the Regional Board and U. S. Environmental Protection Agency for each month, by the 15th day of the following month, beginning not later than the date specified in the Monitoring and Reporting Program issued by the Regional Board Executive Officer. Monitoring and Reporting Program No. 74-712 shall remain in effect until superseded or revoked.
13. The discharger shall 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.

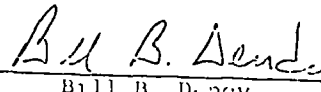
14. Collected screening, sludge, and other solids removed from liquid waste shall be disposed of at a legal point of disposal, and in accordance with the provisions of Division 7.5 of the California Water Code. For the purpose of this requirement, a legal point of disposal is defined as one for which waste discharge requirements have been prescribed by a Regional Water Quality Control Board and which is in full compliance therewith.
15. After notice and opportunity for a hearing, this order may be terminated or modified for cause, including, but not limited to:
 - a. violation of any term or condition contained in this order;
 - b. obtaining this order by misrepresentation, or failure to disclose fully all relevant facts;
 - c. a change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge
16. If a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Federal Water Pollution Control Act, or amendments thereto, for a toxic pollutant which is present in the discharge authorized herein and such standard or prohibition is more stringent than any limitation upon such pollutant in this order, the Regional Board shall conduct a public hearing and consider revising or modifying this order in accordance with such toxic effluent standard or prohibition and so notify the discharger.
17. 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 shall notify the Regional Board 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 were taken to correct the problem and the dates thereof, and what steps are being taken to prevent the problem from recurring.

18. This order expires five years from the date of adoption and the discharger must file a Report of Waste Discharge in accordance with Title 23, California Administrative Code, not later than 180 days in advance of such date as application for issuance of new waste discharge requirements.
19. In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the discharger, the discharger shall notify the succeeding owner or operator of the existence of this order by letter, a copy of which shall be forwarded to the Regional Board.
20. By January 1, 1981, the discharger shall submit to the Regional Board a plan for achieving effluent limitations representing Best Available Technology Economically Achievable as determined by applying the EPA effluent limitations guidelines applicable to this discharge on that date. If the discharger desires a variance for economic reasons under the provisions of Section 301(c) of the FWPCA, such a request, along with all supporting material required by applicable regulations, shall be submitted to the Regional Board by July 1, 1980.
21. This order shall serve as a National Pollutant Discharge Elimination System permit pursuant to Section 402 of the Federal Water Pollution Control Act, or amendments thereto, and shall take effect at the end of ten days from the date of adoption hereof, provided the Regional Administrator has no objections.
22. These waste discharge requirements supersede the waste discharge requirements issued by the Regional Board on September 4, 1968.

Certification

I, Bill B. Dendy, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an order adopted by the California State Water Resources Control Board on MAR 17 1977



Bill B. Dendy
Executive Officer

California Regional Water Quality Control Board
North Coast Region

ORDER NO. 77-110

FOR

LOUISIANA-PACIFIC CORPORATION PULP MILL
ENFORCEMENT ORDER FOR ISSUANCE OF A TIME SCHEDULE

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

1. The State Water Resources Control Board on March 17, 1977 adopted Order No. 77-6 (NPDES No. CA 0005894) prescribing Waste Discharge Requirements including a time schedule for the Louisiana-Pacific Corporation Pulp Mill in accordance with the statutory requirements of the Federal Water Pollution Control Act and the California Water Code. The NPDES Permit contains a compliance date of July 1, 1977 for achieving effluent limitations as required by the Federal Act.
2. The discharger has diligently pursued compliance with the NPDES Permit however, compliance cannot be achieved according to the imposed time schedule.

In adopting requirements on March 17, 1977 the State Board found a fundamental difference in factors concerning the waste discharge and granted a request for variance from Federal Effluent Limitation for Biochemical Oxygen Demand and pH. The variance is subject to approval by the Administrator of C.P.A. The Administrator's ruling on the variance is forthcoming.

3. The Board has notified the discharger and interested agencies and persons of its intent to adopt a time schedule for compliance for the discharger.
4. The Board in a public hearing heard and considered all comments pertaining to the discharger's ability to achieve compliance.

IT IS HEREBY ORDERED that, in accordance with Water Code Section 13300, the Louisiana-Pacific Corporation Pulp Mill shall comply with TSD and pH limits contained in Effluent Limitation B.1 of State Board Order No. 77-6 according to the following tasks and within the designated time frame following the final ruling with regard to the Regional Administrator's determination of variance.

<u>Task</u>	<u>Compliance Period</u>	<u>Report of Compliance Due</u>
a. Complete preparation of plans and specifications for control facilities.	2 months	15 days following completion of each task
b. Complete preparation of plans and specifications for control facilities.	6 months	-
c. Complete construction of control facilities	12 months	-
d. Full compliance	<u>2 months</u>	-
Total time elap; 1 -		22 months

Order No. 77-110

This Order shall take effect at the end of ten days from the date of adoption provided the Regional Administrator has no objections. This order expires on (to be determined).

This Board declares that it does not intend to undertake further enforcement action to bring the discharger into compliance with Effluent Limitations B.1 and B.4 as contained in State Board Order No. 77-5 (NPDES No. CA 0005354) provided:

1. The discharger complies fully with all terms of the time schedule contained in this order,
2. The discharger complies fully with all terms of the permit except as affected by the provisions of this order;
3. Circumstances do not occur which would warrant an action under Section 504 of the Federal Water Pollution Control Act.

The action taken by this Board pertaining to the time schedule does not preclude the possibility of actions to enforce the permit by third parties pursuant to Section 505 of the Federal Water Pollution Control Act.

Certification

I, David C. Joseph, Executive Officer, do hereby certify 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 23, 1977.

David C. Joseph
Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
NORTH COAST REGION1000 WOODBURY CENTER
SANTA ROSA, CALIFORNIA 95401
Tel. 707-545-2620

JUN 9 11 3 AM '77



June 8, 1977

Mr. Greg Fisher
U.S. Environmental Protection Agency
160 California Street
San Francisco, CA 94111

Dear Mr. Fisher:

Attached are copies of the Monitoring and Reporting Programs being followed, at present, by the dischargers.

The rationale which served at the time the programs were adopted are no longer applicable, thus the programs are being reviewed with the dischargers in anticipation of a major revision.

Guidance for the revision action includes:

1. S.W.R.C. Order No. W.Q. 77-6,
2. Standard Methods -- both portions,
3. Technical literature from U.S., Europe and Canada and elsewhere;
4. Oceanographic study reports submitted by Harborlab Co., discharger Authority.

The latest addition to our file, a copy of EPA's on 26, 1977, regarding Division of the Administrator Re: Variance Request at all control points as influence on the existing programs, will also propose the Scientific Order which was circulated on June 2, 1977.

If you have any questions or recommendations, please advise.

Sincerely,

Tom W. Johnson

Senior Water Resources Specialist

Attachment:

cc: Mr. Johnson, 6/8/77

December 31, 1974

Mr. Herman Amberg, Director of Environmental Services
Crown-Zellerbach
904 N.W. Drake Street
Gresham, Washington 98607

Dear Mr. Amberg:

Enclosed herewith is Monitoring and Reporting Program No. 74-211. This Monitoring and Reporting Program will be considered part of September 4, and December 4, 1961 Waste Discharge Requirements, in lieu of a valid NPDES permit. As you probably know, the NPDES permit contained in Order No. 74-211 is not valid because EPA objected to the Regional Board's action regarding BOD and Suspended Solids effluent requirements.

Please note that the program is to begin on February 1, 1976. If you have any questions or comments, please contact us.

Sincerely,

David C. Joseph
Executive Officer

Enclosure

cc: Dr. Rudolph Eschling
Fritz Graff, Crown-Simpson, Fairhaven

CRW:jf

SEND - Be sure to follow instructions on other side

PLEASE FURNISH SERVICE(S) AND CIRCLE BY CHECKED DIGIT(S) (Additional charges collect for these services)	
<input type="checkbox"/> Short notice when delivered	<input type="checkbox"/> Deliver ONLY to addressees

RECEIPT
Received the numbered article described below

REGISTRATION NO.	SIGNATURE OR NAME OF ADDRESSEE (This always to filled in)
TO	Mr. Herman Amberg
FROM	David C. Joseph
DATE RECEIVED	12/31/74

California Regional Water Quality Control Board
North Coast Region

MONITORING AND REPORTING PROGRAM NO. 74-213

for

LOUISIANA-PACIFIC CORPORATION PULP MILL AND
BUILDING PRODUCTS DIVISION, SAIDA

Humboldt County

EFFLUENT MONITORING

A sampling station shall be located where the representative samples of effluent can be obtained from outfall 001.

<u>Constituent</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Minimum Frequency of Analysis</u>
Flow	MGD	Continuous	—
BOD	mg/l	24-hr composite	2/week
Suspended Solids (NFR)	mg/l	24-hr composite	2/week
Fecal Coliform	MPN/100 ml	grab	monthly
pH	pH Units	Continuous	—
Grease and Oil	mg/l	8-hr composite	2/week
Settleable Solids	ml/l	grab	daily
Turbidity	JTU	24-hr composite	daily
Arsenic	mg/l	24-hr composite	quarterly
Cadmium	mg/l	24-hr composite	annually
Copper	mg/l	24-hr composite	annually
Total Chromium	mg/l	24-hr composite	quarterly
Lead	mg/l	24-hr composite	quarterly
Mercury	mg/l	24-hr composite	annually
Nickel	mg/l	24-hr composite	annually
Silver	mg/l	24-hr composite	annually
Zinc	mg/l	24-hr composite	annually
Cyanide	mg/l	24-hr composite	quarterly
Phenolic Compounds	mg/l	24-hr composite	quarterly
Ammonia	mg/l	grab	annually
Total Identifiable			
Chlorinated Hydrocarbons	mg/l	grab	annually
Toxicity Concentration	Toxicity Units	8-hr composite	monthly
Radioactivity	PCi/l	grab	once every 5 years

WATER TREATMENT PLANT WASTE SOLIDS MONITORING

A sampling station shall be located where the representative samples of waste solids can be obtained.

<u>Constituent</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Minimum Frequency of Analysis</u>
Turbidity	JTU	24-hr composite	daily
Flow	MGD	Continuous	—
Suspended Solids	ml/l	grab	2/week
Settleable Solids	ml/l	grab	2/week
Coagulant	lbs/day	Continuous	—

Monitoring and Reporting
Program No. 74-213

STORM WATER MONITORING

Sampling stations shall be located at points to be approved by the Executive Officer where there is a discharge of storm water to the waters of the state.

<u>Constituent</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Minimum Frequency of Analysis</u>
Volatile Solids	mg/l	grab	1/
Settleable Solids	ml/l	grab	1/
pH	pH Units	grab	1/
Toxicity	TU	grab	2/
Rainfall	inches/day		Daily Oct. 1 through April 1

- 1/ During every storm of intensity greater than 0.5"/24 hrs but not more than once a week.
- 2/ During every storm of intensity greater than 1.0"/24 hrs but not more than once a month.

COOLING WATER MONITORING

<u>Constituent</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Minimum Frequency of Analysis</u>
Temperature	°C	grab	2/week

A sampling station shall be located where the representative samples of cooling water can be obtained. A second sampling station shall be located at least 50 feet off shore where a representative sample of Humboldt Bay can be obtained.

RECEIVING WATER MONITORING

<u>Station No.</u>	<u>Description</u>
A-1	surface, on the outfall
A-2	mid-depth, on the outfall
A-3	bottom, on the outfall
B-1	surface, 500 ft north of outfall, parallel to shore
B-2	mid-depth, 500 ft north of outfall, parallel to shore
B-3	bottom, 500 ft north of outfall, parallel to shore
C-1	surface, 500 ft south of outfall, parallel to shore
C-2	mid-depth, 500 ft south of outfall, parallel to shore
C-3	bottom, 500 ft south of outfall, parallel to shore

Monitoring and Reporting
Program No. 74-213

<u>Station No.</u>	<u>Description</u>
D-1*	surf sample on pipeline
D-2*	surf sample 500 ft north of pipeline
D-3*	surf sample 500 ft south of pipeline
E-1	surface, 500 ft west of outfall, perpendicular to shore
E-2	mid depth, 500 ft west of outfall, perpendicular to shore
E-3	bottom, 500 ft west of outfall, perpendicular to shore

* All D samples are surface samples taken from shore

<u>Constituent</u>	<u>Units</u>	<u>Station No.</u>	<u>Type of Sample</u>	<u>Frequency of Analysis</u>
Coliform	MPN	All stations	grab	quarterly
Grease and Oil	mg/m ²	A-1, B-1, C-1, E-1	grab	quarterly
Floating Particulates	mg dry wt/m ²	A-1, B-1, C-1, E-1	grab	quarterly
Transmittance	%/m	A-2, B-2, C-2, E-2	grab	quarterly
pH	pH Units	All stations	—	quarterly
Dissolved Oxygen	mg/l	All stations	—	quarterly
Radioactivity	PCl/l	All stations	grab	once every 5 years
Current Direction	—	A-1	—	quarterly

The ocean outfall and diffuser shall be monitored weekly for leaks, breakage, and malfunction. A statement on the sufficiency of the outfall system shall be included in every monitoring report.

Monitoring reports shall be submitted to the Board for each month by the 15th day of the following month, beginning not later than February 1, 1976.

Ordered by

David C. Joseph
Executive Officer

December 30, 1974

APPENDIX B
PRIORITY POLLUTANTS LISTING

PRIORITY WATER POLLUTANTS LISTED IN NRDC v. TRAIN
| CONSENT DECREE

<u>Compound Name,</u>	
1. *acenaphthene	10. 1,2-dichloroethane
2. *acrolein	11. 1,1,1-trichloroethane
3. *acrylonitrile	12. hexachloroethane
4. *benzene	13. 1,1-dichloroethane
5. *benzidine	14. 1,1,2-trichloroethane
6. *carbon tetrachloride (tetrachloro- methane)	15. 1,1,2,2-tetrachloroethane
*Chlorinated benzenes (other than dichlorobenzenes)	16. chloroethane
7. chlorobenzene	*Chloroalkyl ethers (chloromethyl, chloroethyl and mixed ethers)
8. 1,2,4-trichlorobenzene	17. bis(chloromethyl) ether
9. hexachlorobenzene	18. bis(2-chloroethyl) ether
*Chlorinated ethanes (including 1,2- dichloroethane, 1,1,1-trichloro- ethane and hexachloroethane)	19. 2-chloroethyl vinyl ether (mixed
	*Chlorinated naphthalene
	20. 2-chloronaphthalene

*Specific compounds and chemical classes as listed
in the consent decree.

*Chlorinated phenols (other than those listed elsewhere; includes trichlorophenols and chlorinated cresols)		*Haloethers (other than those listed elsewhere)	
2,4,6-trichlorophenol	40.	4-chlorophenyl phenyl ether	
parachlorometa cresol	41.	4-bromophenyl phenyl ether	
*chloroform (trichloromethane)	42.	bis(2-chloroisopropyl) ether	
*2-chlorophenol	43.	bis(2-chloroethoxy) methane	
* <u>Dichlorobenzenes</u>		* <u>Halomethanes</u> (other than those listed elsewhere)	
1,2-dichlorobenzene	44.	methylene chloride (dichloromethane)	
1,3-dichlorobenzene	45.	methyl chloride (chloromethane)	
1,4-dichlorobenzene	46.	methyl bromide (bromomethane)	
* <u>Dichlorobenzidine</u>	47.	bromoform (tribromomethane)	
3,3'-dichlorobenzidine	48.	dichlorobromomethane	
*Dichloroethylenes (1,1-dichloroethylene and 1,2-dichloroethylene)	49.	trichlorofluoromethane	
1,1-dichloroethylene	50.	dichlorodifluoromethane	
1,2-trans-dichloroethylene	51.	chlorodibromomethane	
*2,4-dichlorophenol	52.	*hexachlorobutadiene	
*Dichloropropane and dichloropropene	53.	*hexachlorocyclopentadiene	
1,2-dichloropropane	54.	*isophorone	
1,2-dichloropropylene (1,3-dichloropropene)	55.	*naphthalene	
*2,4-dimethylphenol	56.	*nitrobenzene	
* <u>Dinitrotoluene</u>		* <u>Nitrophenols</u> (including 2,4-dinitrophenol and dinitrocresol)	
2,4-dinitrotoluene	57.	2-nitrophenol	
2,6,-dinitrotoluene	58.	4-nitrophenol	
*1,2-diphenylhydrazine	59.	*2,4-dinitrophenol	
*ethylbenzene	60.	4,6-dinitro-o-cresol	
*fluoranthene		* <u>Nitrosamines</u>	
	61.	N-nitrosodimethylamine	

-
62. N-nitrosodiphenylamine
63. N-nitrosodi-n-propylamine
64. *pentachlorophenol
65. *phenol
- *Phthalate esters
66. bis(2-ethylhexyl) phthalate
67. butyl benzyl phthalate
68. di-n-butyl phthalate
69. di-n-octyl phthalate
70. diethyl phthalate
71. dimethyl phthalate
- *Polynuclear aromatic hydrocarbons
72. benzo(a)anthracene
 (1,2-benzanthracene)
73. benzo (a) pyrene (3,
 4-benzopyrene)
74. 3,4-benzofluoranthene
75. benzo(k)fluoranthene (11,
 12-benzofluoranthene)
76. chrysene
77. acenaphthylene
78. anthracene
79. benzo(ghi)perylene (1,
 12-benzoperylene)
80. fluorene
81. phenanthrene
82. dibenzo (a,h)anthracene (1,2,
 5,6-dibenzanthracene)
83. indeno (1,2,3-cd)pyrene (2,
 3-o-phenylenepyrene)
84. pyrene
85. *tetrachloroethylene

86. *toluene
87. *trichloroethylene
88. *vinyl chloride (chloroethylene)
- Pesticides and Metabolites
89. *aldrin
90. *dieldrin
91. *chlordan (technical mixture
 & metabolites)
- *DDT and metabolites
92. 4,4'-DDT
93. 4,4'-DDE (p,p'-DDX)
94. 4,4'-DDD (p,p'-TDE)
- *endosulfan and metabolites
95. a-endosulfan-Alpha
96. b-endosulfan-Beta
97. endosulfan sulfate
- *endrin and metabolites
98. endrin
99. endrin aldehyde
- *heptachlor and metabolites
100. heptachlor
101. heptachlor epoxide
- *hexachlorocyclohexane (all isomers)
102. a-BHC-Alpha
103. b-BHC-Beta
104. r-BHC (lindane)-Gamma
105. g-BHC-Delta

<u>*polychlorinated biphenyls (PCB's)</u>		118.	*Cadmium (Total)
106.	PCB-1242 (Arochlor 1242)	119.	*Chromium (Total)
107.	PCB-1254 (Arochlor 1254)	120.	*Copper (Total)
108.	PCB-1221 (Arochlor 1221)	121.	*Cyanide (Total)
109.	PCB-1232 (Arochlor 1232)	122.	*Lead (Total)
110.	PCB-1248 (Arochlor 1248)	123.	*Mercury (Total)
111.	PCB-1260 (Arochlor 1260)	124.	*Nickel (Total)
112.	PCB-1016 (Arochlor 1016)	125.	*Selenium (Total)
113.	*Toxaphene	126.	*Silver (Total)
114.	*Antimony (Total)	127.	*Thallium (Total)
115.	*Arsenic (Total)	128.	*Zinc (Total)
116.	*Asbestos (Fibrous)	129.	**2,3,7,8 - tetrachlorodibenzo -p-dioxin (TCDD)
117.	*Beryllium (Total)		

*Specific compounds and chemical classes as listed
in the consent decree.

**This compound was specifically listed in the consent
degree. Because of the extreme toxicity (TCDD). We are recommending
that laboratories not acquire analytical standard for
this compound.

APPENDIX C
METHODS, ANALYTICAL PROCEDURES AND QUALITY CONTROL

FLOW MONITORING TECHNIQUE - LOUISIANA PACIFIC CORP.
SAMOA, CALIFORNIA
December 1977

Flow monitoring at Louisiana Pacific was accomplished with the tracer dilution technique, using lithium as the tracer. The concept employed is that mass is conserved (i.e., mass of tracer-in equals mass of tracer-out). Fundamental to the use of this technique are the following conditions:

1. A conservative tracer.
2. A constant tracer injection rate and an accurate measurement of the rate.
3. An accurate measurement of the tracer concentrate, background tracer levels, and diluted tracer in the flow stream to be measured.
4. Complete mixing in the flow stream to be measured.

It was determined that all these respective criteria could be met by:

1. Using lithium (Li) in the form of lithium chloride as a tracer. Preliminary studies included spiking the wastewater with known amounts of lithium and analyzing for % recovery. Overall average recovery was 100%.
2. Metering the injected tracer solution with low flow rate, high precision pumps. During the survey, injection rate was checked at least twice/day with a graduated cylinder and stop watch.
3. Measuring Li concentration with a Perkin-Elmer Model 403 Atomic Absorption Spectrophotometer. This instrument was calibrated before each use with lithium standards of known

concentration. Concentrate samples were analyzed at least once/day during the survey. Background samples were collected and analyzed each time a flow measurement was performed.

4. Injecting the lithium chloride concentrate solution into the suction side of the effluent pump and monitoring the diluted Li tracer on the discharge side. Preliminary studies conducted on site indicated the tracer reached the discharge monitoring site in less than one minute and reached a steady state condition. During the survey, three minutes of tracer dosing was allowed to provide a factor of safety.

Flow was calculated with the following equation:

$$Q = \frac{q \cdot C_q \cdot F}{C - C_b}$$

where Q is unknown flow (mgd)

q is injection rate (l/min)

C_q is lithium concentration of injection solution (mg/l)

C is lithium concentration downstream of injection (mg/l)

C_b is background concentration of lithium (mg/l)

F is factor to convert l/min to mgd

$$(380.45 \times 10^{-6} \frac{\text{min} \cdot \text{gal}}{\text{day} \cdot \text{liter}})$$

BIOASSAY METHODS

Toxicity testing consisted of a 96-hour bioassay performed according to standardized methods.^{1,2,3} A continuous flow proportional diluter was used which provided a series of six effluent concentrations and a 100% dilution water control. Test chambers were of all glass construction and of 8 liter capacity. Flow rates were regulated to provide a minimum of nine volumetric exchanges of test water for each test chamber for each 24-hour period.

The test fish (three-spined stickleback) used were purchased through a commercial dealer (Alax Fish Company, San Rafael, California). The dealer provides indigenous wild fish, therefore no data are available on the specific life stage of these organisms. Fish were acclimated for 48-hours prior to testing at four different salinities. The salinity gradient ranged from fresh water to sea water concentrations equal to 25, 50, and 100%. Test fish used in the bioassay were selected from the specific salinity which most closely approximated the salinity of the test water.

Dilution water used was filtered sea water obtained from the Humboldt Marine Laboratory, located at Trinidad, California. The dilution water was stored in 1,100 liter (300 gal) epoxy coated reservoirs and was replenished every twenty-four hours.

Bioassay test water from the process wastewater discharge was collected at the discharge side of the effluent pump at Station 3400 by flow proportional 24-hour composites. Since this waste stream did

not include the discharge from the hydraulic barker, a second equal volume composite was collected from it. The two composites were combined proportional to their respective daily flows and the resulting composite was used for the bioassay. Composites were replenished daily. Prior to introduction into the diluter system, the wastewater was prediluted to a 50% effluent concentration. Makeup water for predilution consisted of unfiltered Mad river water collected at the intake to the Crown Simpson mill (Station 3550).

Each test chamber was monitored daily for pH, temperature and dissolved oxygen concentration [Table 1]. In addition, the high and low concentrations were analyzed for total ammonia with an Orlon Model 901 Microprocessor. Temperature variation of the test water was restricted to $\pm 1^{\circ}\text{C}$ utilizing a constant temperature recirculating water bath.

The BOD of the effluent was sufficiently high such that at a 50% effluent concentration, dissolved oxygen levels were reduced to less than 2 ppm within 24 hours. To maintain adequate dissolved oxygen levels, mild aeration was utilized in all test chambers.

Mortalities in each test chamber were recorded at 24-hour intervals. The LC_{50} value was calculated by a computerized tape program⁴ rather than the Litchfield-Wilcoxon method because of the limited number of test concentrations that evoked a partial response of the test organisms.

REFERENCES

1. Office of Research and Development, July 1973. Biological Field and Laboratory Methods. Cincinnati: EPA-670/4-73-001.
2. National Environmental Research Center, April 1975. Methods for Acute Toxicity Tests with Fish, Macroinvertebrates, and Amphibians. Corvallis, Oregon: EPA-660/3-75-009.
3. Water Control Criteria 1972. EPA-R3-73-003, March 1973.
4. Spearman-Kärber Analysis 1972 Wang SWAP Program Library No. S-173-7.7.

CHEMISTRY

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TABLE 1
Physical-Chemical Characteristics of Diluted Effluent
Louisiana Pacific
December, 1977

Parameter	Control (Sea Water)	Effluent Concentration (%)					
		5	9	16	28	37.5	50
24-hour							
DO mg/l	8.0	7.5	7.5	7.5	7.5	7.5	6.5
pH	7.6	7.5	7.3	7.1	6.9	6.7	6.6
temp °C	16.0	16.5	17.0	16.5	17.0	17.0	17.5
NH ₃ mg/l	0.05						0.90
48-hour							
DO mg/l	7.0	6.5	6.0	6.0	6.5	6.0	6.0
pH	7.2	7.1	7.1	6.9	6.7	6.4	6.1
temp °C	16.5	17.5	17.5	17.5	17.5	17.5	17.5
NH ₃ mg/l	0.12						0.59
72-hour							
DO mg/l	7.5	6.5	7.0	6.5	7.0	6.5	6.5
pH	7.7	7.2	7.3	7.1	7.0	7.0	6.9
temp °C	16.5	17.0	17.5	17.0	17.5	17.5	18.0
NH ₃ mg/l	0.11						0.72
96-hour							
DO mg/l	7.5	7.0	7.0	7.0	6.5	6.0	6.0
pH	7.5	7.3	7.3	7.0	6.8	6.7	6.7
temp °C	17.0	17.5	17.0	18.0	18.0	18.0	18.0
NH ₃ mg/l	0.12						0.58

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT
NATIONAL ENFORCEMENT INVESTIGATIONS CENTER
BUILDING 53, BOX 25227, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

TO Chief
Chemistry Branch

DATE January 17, 1978

FROM Technical Coordinator
Inorganics and Air

SUBJECT Results of BOD, TSS, Oil and Grease, Total Cyanides, and Phenol Analyses

Attached is a summary of the BOD, TSS, oil and grease, cyanides, and phenol results.

<u>Constituent</u>	<u>Analytical Procedure</u>	<u>Reference</u>
DO	Membrane electrode probe	Standard Methods, 14th Ed., 1978, p. 450
BOD	Full bottle dilution technique with settled raw sewage used as seed	Standard Methods, 14th Ed., 1975, p. 543
TSS	Gravimetric, millipore filter - Whatman GFC	Standard Methods, 14th Ed., 1975, p. 94
Cyanides	Total, reflux distillation with the testing of the catch solution for sulfides and sulfites	Standard Methods, 14th Ed., 1975, pp. 365, 367, and 370
Phenols	4-AAP with distillation, extraction, and testing of the distillates for sulfites	Standard Methods, 14th Ed., 1975, pp. 576, 577, and 580

Due to the processes involved in the pulp and paper mills, sulfides and sulfites were suspected as possible interferences. Sulfides interfere negatively in the color development steps of both total cyanides and phenol procedures. In the phenol samples very few, if any, sulfur compounds such as hydrogen sulfide and sulfur dioxide would remain in the samples collected because of H_3PO_4 and $CuSO_4$ used as preservatives.

The total cyanide reflux distillation method liberates the sulfur during the procedure and the sulfides and sulfites are trapped within the sodium hydroxide catch solutions. Since sulfides were suspected in all the samples, they were checked by adding one gram of cadmium carbonate to each of the diluted sodium hydroxide catch solutions. A yellow precipitate indicates that sulfides are present. The cadmium removes the sulfides from the catch solutions as cadmium sulfide so that it cannot interfere with the color development part of the test. However, sulfides can react with cyanides at

a high pH to form thiocyanates and give low cyanide results. Therefore, the cyanide values reported for those samples where precipitates were observed may be lower than originally present.

The catch solutions yielded a yellow precipitate for samples 3400-30-1207 and 3500-01-1207.

Sulfites present in the samples also interfere negatively in the color development steps of the phenol and total cyanide methodologies. Each distillate and catch solution was tested for the presence of sulfites. To an aliquot of each was added one drop of hydrogen peroxide and three drops of barium perchlorate. The formation of a precipitate would indicate the presence of sulfites. No precipitates were found in the aliquots from the catch solutions or distillates thus indicating that sulfites were not present in the samples.

A number of reference samples were also analyzed along with the survey samples. These results are summarized below:

<u>Constituent</u>	<u>Reference Source</u>	<u>Theoretical Value, mg/l</u>	<u>Concentration Found, mg/l</u>
BOD	EPA	14-34	17
BOD	ERA	65-87	68
TSS	ERA	34-40	35
Oil and Grease	ERA	16-20	15
Oil and Grease	NEIC	100	98

EPA reference standard supplied by EMSL-Cincinnati.

ERA reference standards supplied by Environmental Resource Associates.

NEIC reference standard for oil and grease prepared by adding 100 mg of vacuum pump oil to one liter of distilled water.



D. David Vietti

Attachments

Chief
Chemistry Branch

January 20, 1978

W. L. Abbott
Technical Coordinator, Trace Metals

California Pulp Mills

Attached is a list of results of metals analysis of subject samples for priority pollutants. Except for mercury, cadmium, and zinc, all samples were analyzed by flameless atomic absorption using the Perkin-Elmer graphite furnace and auto sampler. Mercury was analyzed by the automated cold vapor technique as described by El-Awady et al.^{1/} Only zinc was present in concentrations above flame detection limits permitting the use of flame AA for analysis of this parameter. Cadmium was also analyzed by flame AA showing levels below the detection limit. Since percent recoveries were good and the flame detection limit was one tenth that proposed for effluent limitations, rerunning using the graphite furnace was deemed unnecessary.

Preparation procedures followed those described in the manual, "Sampling and Analysis Procedures for Screening Industrial Effluents for Priority Pollutants," published by the Effluent Guidelines Division of EPA. It was found during the analysis for lead and copper that nonreproducible results often were obtained when the samples contained chloride ions. During the char cycle metal chlorides apparently volatilized. The addition of phosphoric acid to the samples permitted the volatilization of the chloride as HCl, leaving the more stable metal phosphate which would then volatilize at the desired atomization temperature. This procedure was subsequently followed for silver and chromium analysis in the expectation that a similar increase in reproducibility would result. This produced a slightly larger signal, but repeatability was not improved.

Since the method of standard additions was followed except for mercury and zinc, concentrations were normalized for spike recoveries; therefore, percent recovery data do not apply. For the other metals, however, spike recovery data are listed below:

Sample No.	Hg	Zn	Cd
3400-30-1208	--	103%	98%
3400-30-1209	84%	--	--
3500-30-1208	84%	--	--
3500-30-1209	--	102%	92%

^{1/} Analytical Chemistry, Vol. 48, No. 1, January 1976.

These values are within quality control guidelines. Since the replicate data were at or below detection limits, precision estimators could not be used. However, no analytical anomalies were observed.

As can be seen, the lowest concentrations of all elements were found in the raw water (samples numbered 3550). The Louisiana-Pacific debarker water (3450) displayed elevated concentrations of copper and lead which did not appear in significant concentrations in the LP process wastewater (3400), but did appear in the Crown-Simpson process wastewater (3500). Levels of zinc up to about four times the detection limit were found in all waste streams. The greatest amount being in the LP process wastewater during one composite period. Chromium levels were all low but above the detection limit in the LP process waste stream.

Please note that all values are reported in micrograms per liter (ug/l) except nickel and thallium which are expressed in milligrams per liter (mg/l).

William L. Abbott

Attachment

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT
NATIONAL ENFORCEMENT INVESTIGATIONS CENTER
BUILDING 53, BOX 25227, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

TO Chief
Chemistry Branch

DATE March 8, 1978

FROM W. L. Abbott

SUBJECT Eureka California Pulp Mills

Our normal procedure of sample preparation for flameless AA analysis employs the EPA mild digestion technique. This technique was used to prepare samples for five elements (Ni, Pb, Cu, Cr, and Tl), contrary to the instructions given in "Sampling and Analysis Procedures for Screening of Industrial Effluents." This change in procedure was done in the interest of expediting the analyses. The preparation procedure, however, had no material effect on the results as reported.

While the method of standard additions was required for all graphite furnace analyses, three parameters--namely nickel, thallium, and antimony--all yielded absorbance readings that would give less than detectable concentrations in the unspiked samples regardless of the corrections that could be made under the method. The spiked portions were therefore not analyzed in the interest of conserving time. This shortcut can in no way alter the reported results.



William L. Abbott

ORGANICS

Analytical Methodology

Priority Pollutants:

Samples for priority pollutant analysis were treated as described in the EPA document "Sampling and Analysis Procedures for Screening of Industrial Effluents for Priority Pollutants" March 1977 revised April 1977. Specific information about each method follows.

Volatile Organics:

Grab samples were composited in the laboratory with gas-tight syringes to avoid contamination. One ug each of bromochloromethane and 1,4-dichlorobutane were added as internal standards to each 5 ml composited sample. This aliquot was then purged with helium for 12 minutes and the organics trapped on a Tenax resin trap. This trap was then heated to 180°C for 4 minutes and the organics desorbed onto the gas chromatographic (GC) column for analysis. The GC column was 8 feet x 1/8 inch stainless steel packed with 0.2% Carbowax 1500 on 60/80 mesh Carbopack C. The column was held at room temperature during the desorption cycle, then held at 60°C for 4 minutes followed by temperature programming at 8°/minute to 170°C.

The mass spectra were collected using a Finnigan 1015 electron impact ionization quadrupole mass spectrometer (MS) interfaced to a Systems Industries System 150 data system. Identifications were made by comparing the relative intensities of three selected ions for each compound of interest and the retention time to those of a pure standard. Once identified, the compound was quantitated by comparing the compound's ion intensity in the sample to that in the standard. The stability of the instrument and the sample purging efficiency were monitored by comparing the response of the internal standards. The percent relative standard deviations of the selected ion intensities from the bromochloromethane and 1,4-dichlorobutane internal standards were 16 and 20 percent respectively at the 200 ppb concentration level.

Neutral-Base Extractables:

24-hour composite samples were analyzed by extraction with dichloromethane (CH_2Cl_2) at a pH greater than 11. The neutral-basic fraction was then concentrated to 1 or 5 ml, depending on the expected concentrations of pollutants and screened by injection onto a GC equipped with a flame ionization detector (FID) (described in the general organics procedure). Samples containing peaks were then spiked with 20 ng/ul of per-deuteroanthracene (d_{10} anthracene) as an internal standard. Analysis was then performed by GC/MS as described in the EPA priority pollutants document using a 6 foot x 2 mm glass column packed with 3% OV-17 on 80-100 mesh GC-Q.

Pollutants that were identified by GC/MS were then quantitated by comparing the response of the ion of interest in the sample to the response of the pure compound. The d_{10} anthracene was used to accurately relate the instrument responses of both the sample and standard. This procedure is known as the Internal Standard Method and is described in detail in the EPA document.

The quality of the data was monitored by a number of checks. Solvent recovery was used to monitor the extraction procedure. Recoveries averaged: $80\% \pm 8\%$, low = 67%, high = 91%. GC/MS performance and sensitivity were measured by analyzing 20 ng of deca-fluorotriphenylphosphine (DFTPP) and meeting the specifications outlined by Eichelberger, et.al.¹⁷ In addition, a standard containing 40 ng of benzidine was analyzed to prove the ability to chromatograph low level basic compounds.

Acid Extractables:

After base-neutral extraction, the samples were acidified to $\text{pH} < 2$ and extracted again with CH_2Cl_2 . The acid extracts were concentrated and screened as with the base-neutral extracts. The extracts were then spiked with 20 ng/ μl of d_{10} anthracene as an internal reference standard and analyzed by GC/MS using a 6 foot x 2 mm glass column packed with 60/80 mesh Tenax. Pollutants identified were quantitated as described in the base-neutrals procedure.

Solvent recoveries averaged $89\% \pm 7\%$ with 74% and 97% being the low and high recoveries respectively. The GC/MS was monitored by chromatographing 100 ng of penta-chlorophenol.

Pesticides:

Each sample was extracted and concentrated using the methodology recommended for priority pollutant pesticide analysis, i.e. extraction with 3 x 60 ml of 15% methylene chloride in hexane and concentration using the Kuderna-Danish evaporative concentrator. The samples were then analyzed with an EC-GC fitted with a 3% OV-101 column. Any suspicious peaks were checked by rerunning the sample on a 5% OV-210 column.

Six of the samples contained too many interferences to be analyzed directly. These samples (#3500-12/7, 3400-12/8, 3400-12/9, 3500-12/9, 3500-12/8, and 3400-12/7) were cleaned up with a 15 cm basic alumina column, deactivated with 3% H_2O and eluted with eight 50 ml volumes of 10% ethyl ether in hexane and one 150 ml volume of benzene. The individual fractions were then analyzed for pesticides.

General Organics:

Screening the extracts on GC-FID showed the samples from each station to be very similar. Therefore, samples from the first survey day (12/7) were analyzed for general organics. The extracts were analyzed by GC-FID using a Varian 1400 GC equipped with a 10 foot x 2 mm glass column packed with 6% OV-101 on 60/80 mesh GC-Q. The column was programmed from 80 to 220°C at 60°/minute. Helium was the carrier gas at a flow of 20 ml/minute.

The extracts were then analyzed by GC/MS using the same column conditions as used for screening. The data were reduced and analyzed by comparison of the sample spectra to reference spectra contained in the following libraries:

Eight Peak Index of Mass Spectra, Mass Spectrometry Data Centre, AWRE, Aldermaston, Reading, U.K. 1974.

Registry of Mass Spectral Data, John Wiley & Sons, New York, 1974.

In addition, manual interpretation based on known ion fragmentation pathways supplemented the data evaluation.

Some of the compounds tentatively identified in the samples were available at NEIC and these standards were then analyzed by GC/MS. In these cases, the spectra and retention times could be matched and the identities unambiguously confirmed. Compounds not confirmed have been footnoted in the data table.

The compounds identified by GC/MS were then quantitated by comparison of the sample GC-FID responses to the GC-FID responses of pure standards at known concentrations. Where pure standards were not available, the concentrations were estimated based on the responses of similar compounds at similar retention times.

Nitrosamines:

Approximately 1 liter of the sample was serially extracted with two 50 ml portions of CH_2Cl_2 . Any emulsions formed during the extractions were broken with the addition of Na_2SO_4 . The extracts were dried with Na_2SO_4 and concentrated to between 1 and 2 ml in a Kuderna-Danish evaporative-concentrator at 58-60°C. Approximately, 0.75 ml of isooctane was added to the extract before concentration to act as a "keeper."

The extracts were analyzed by gas chromatography-thermal energy analysis (GC-TEA). The gas chromatographic column used was 20 feet x 1/8 inch stainless steel packed with 10% Carbowax 20 M with 1% KOH on 60/80 mesh Chromosorb WAW at 165°C with an injector temperature of 200°C.

The following nitrosamines can be measured by this procedure:

dimethylnitrosamine, methylpropylnitrosamine, ethylpropylnitrosamine, diethylnitrosamine, di-n-propylnitrosamine, ethylbutylnitrosamine, methyl-ethylnitrosamine, propylbutylnitrosamine, methylamylnitrosamine, di-n-butyl nitrosamine, nitrosopiperidine, nitrosopyrrolidine, nitrosomorpholine, and diamylnitrosamine.

1/ Anal. Chem., 47, 995 (1975).

Laboratory Visited: Louisiana-Pacific Corporation
Samoa, California
Pulp Laboratory

Date of Visit: December 9, 1977

Parameters: BOD5, TSS, O&G, SS, pH, phenols, turbidity, and trace metals

Monitoring Sites: Process wastewater discharge and hydraulic debarker effluent

Personnel Contacted: George Kruse, Environmental Technician

Lab Facilities: The lab was built in 1965 and the approximate dimensions are 50' x 60'. The overall impression perceived was that of an orderly, clean, working lab.

Analytical methods/sampling: The EPA approved methods for BOD5, SS, phenols, pH, turbidity, and trace metals are used. The BOD5's are analyzed using the azide modification of the Winkler titration. Seeded blank corrections appeared to be within normal range limitations.

The standard method for non-filterable residue is used except that the filters are weighed directly out of the oven without desiccation. This technique will generally cause lower results.

The EPA method for Oil and Grease is followed up to the point where the extract is taken to dryness. The freon is distilled down to about 10 ml and transferred into a tared aluminum weighing pan. The dish is then placed on a hotplate, and the solvent is evaporated. The pan is placed in a 105°C oven for 15 minutes, and weighed directly from the oven without desiccation. The analytical balance used is a Mettler model H6T.

Because the evaporation temperature used is 25°C higher than the EPA approved method, volatile oils may be driven off, causing lower results.

The analyst stated that to his knowledge, no comparative data was available to show that this procedure was acceptable.

The Direct Photometric Method for measurement of phenols as described in 14th ed. Standard Methods is followed without exception. The Nephelometric Method for determination of turbidity is used. All trace metals are analyzed according to the atomic absorption methods in EPA Methods Manual. All elements except lead are digested by the total metals procedure. The Special Extraction Procedure is used for lead.

The chemists contacted had a very good working knowledge of the analytical procedures used. A one gallon plastic jug was used for most of the composite samples, and a one quart glass jar with Teflon liner for oil and grease, and phenols. Oil and Grease samples were preserved with 5 ml 50% HCl, and cooled to 4°C. Phenols were preserved with H₃PO₄, CuSO₄, and refrigerated at 4°C. Trace metals were preserved with HNO₃. All other samples were refrigerated only. Analyses were performed well within the recommended holding time.

Equipment and Supplies: A Corning digital pH meter is used for making pH measurements. The meter is calibrated daily with pH 4 and 10 buffers. The weighing is done on a Mettler model H6T analytical balance. The instrument is checked monthly with class S weights, and yearly by a Mettler serviceman. Turbidity is analyzed with a Hach model 2100 turbidimeter. Phenols are measured on a Bausch and Lomb Spectronic 20 spectrophotometer. The instrument used for trace metals analysis is a Varian Atomic Absorption Spectrophotometer. The AA is serviced yearly by a Varian serviceman. A supply of good quality distilled water is on hand.

Data Handling: All raw data is recorded on individual worksheets, and tabulated on DMR forms.

AQC Program: There is no participation in EPA or any other cross-check program. Blind samples are not tested. This lab has not been certified by the state of California. No replicates or standard additions are analyzed, and blanks are tested only for BOD₅, and Oil and Grease. There was not an NBS thermometer available for calibrations.

Recommendations:

- 1) Institute an active quality control program consisting of blanks, replicates, standard additions, etc. performed on a routine basis.
- 2) Desiccate TSS filters before weighing. Or provide comparative data to prove there is no appreciable difference in methods.
- 3) Since the O&G method does not comply with the EPA-approved method, comparative tests should be performed and the data submitted for alternate test procedure approval.

APPENDIX D
NEIC CHAIN-OF-CUSTODY PROCEDURES

ENVIRONMENTAL PROTECTION AGENCY
NATIONAL ENFORCEMENT INVESTIGATIONS CENTER

CHAIN OF CUSTODY PROCEDURES

June 1, 1975

GENERAL

The evidence gathering portion of a survey should be characterized by the minimum number of samples required to give a fair representation of the effluent or water body from which taken. To the extent possible, the quantity of samples and sample locations will be determined prior to the survey.

Chain of Custody procedures must be followed to maintain the documentation necessary to trace sample possession from the time taken until the evidence is introduced into court. A sample is in your "custody" if:

1. It is in your actual physical possession, or
2. It is in your view, after being in your physical possession, or
3. It was in your physical possession and then you locked it up in a manner so that no one could tamper with it.

All survey participants will receive a copy of the survey study plan and will be knowledgeable of its contents prior to the survey. A pre-survey briefing will be held to re-appraise all participants of the survey objectives, sample locations and Chain of Custody procedures. After all Chain of Custody samples are collected, a de-briefing will be held in the field to determine adherence to Chain of Custody procedures and whether additional evidence type samples are required.

SAMPLE COLLECTION

1. To the maximum extent achievable, as few people as possible should handle the sample.
2. Stream and effluent samples shall be obtained, using standard field sampling techniques.
3. Sample tags (Exhibit I) shall be securely attached to the sample container at the time the complete sample is collected and shall contain, at a minimum, the following information: station number, station location, data taken, time taken, type of sample, sequence number (first sample of the day - sequence No. 1, second sample - sequence No. 2, etc.), analyses required and samplers. The tags must be legibly filled out in ballpoint (waterproof ink).
4. Blank samples shall also be taken with preservatives which will be analyzed by the laboratory to exclude the possibility of container or preservative contamination.
5. A pre-printed, bound Field Data Record logbook shall be maintained to record field measurements and other pertinent information necessary to refresh the sampler's memory in the event he later takes the stand to testify regarding his actions during the evidence gathering activity. A separate set of field notebooks shall be maintained for each survey and stored in a safe place where they could be protected and accounted for at all times. Standard formats (Exhibits II and III) have been established to minimize field entries and include the date, time, survey, type of samples taken, volume of each sample, type of analysis, sample numbers, preservatives, sample location and field measurements such as temperature, conductivity,

DO, pH, flow and any other pertinent information or observations. The entries shall be signed by the field sampler. The preparation and conservation of the field logbooks during the survey will be the responsibility of the survey coordinator. Once the survey is complete, field logs will be retained by the survey coordinator, or his designated representative, as a part of the permanent record.

6. The field sampler is responsible for the care and custody of the samples collected until properly dispatched to the receiving laboratory or turned over to an assigned custodian. He must assure that each container is in his physical possession or in his view at all times, or locked in such a place and manner that no one can tamper with it.
7. Colored slides or photographs should be taken which would visually show the outfall sample location and any water pollution to substantiate any conclusions of the investigation. Written documentation on the back of the photo should include the signature of the photographer, time, date and site location. Photographs of this nature, which may be used as evidence, shall be handled recognizing Chain of Custody procedures to prevent alteration.

TRANSFER OF CUSTODY AND SHIPMENT

1. Samples will be accompanied by a Chain of Custody Record which includes the name of the survey, samplers' signatures, station number, station location, date, time, type of sample, sequence number, number of containers and analyses required (Fig. IV). When turning over the possession of samples, the transferor and transferee will sign, date and time the sheet. This record sheet allows transfer of custody of a group of samples in the field, to the mobile laboratory or when samples are dispatched to the NEIC - Denver laboratory. When transferring a portion of the samples identified on the sheet to the field mobile laboratory, the individual samples must be noted in the column with the signature of the person relinquishing the samples. The field laboratory person receiving the samples will acknowledge receipt by signing in the appropriate column.
2. The field custodian or field sampler, if a custodian has not been assigned, will have the responsibility of properly packaging and dispatching samples to the proper laboratory for analysis. The "Dispatch" portion of the "Chain of Custody Record shall be properly filled out, dated, and signed.
3. Samples will be properly packed in shipment containers such as ice chests, to avoid breakage. The shipping containers will be padlocked for shipment to the receiving laboratory.
4. All packages will be accompanied by the Chain of Custody Record showing identification of the contents. The original will accompany the shipment, and a copy will be retained by the survey coordinator.
5. If sent by mail, register the package with return receipt requested. If sent by common carrier, a Government Bill of Lading should be obtained. Receipts from post offices, and bills of lading will be retained as part of the permanent Chain of Custody documentation.
6. If samples are delivered to the laboratory when appropriate personnel are not there to receive them, the samples must be locked in a designated area within the laboratory in a manner so that no one can tamper with them. The same person must then return to the laboratory and unlock the samples and deliver custody to the appropriate custodian.

LABORATORY CUSTODY PROCEDURES


1. The laboratory shall designate a "sample custodian." An alternate will be designated in his absence. In addition, the laboratory shall set aside a "sample storage security area." This should be a clean, dry, isolated room which can be securely locked from the outside.
2. All samples should be handled by the minimum possible number of persons.
3. All incoming samples shall be received only by the custodian, who will indicate receipt by signing the Chain of Custody Sheet accompanying the samples and retaining the sheet as permanent records. Couriers picking up samples at the airport, post office, etc. shall sign jointly with the laboratory custodian.
4. Immediately upon receipt, the custodian will place the sample in the sample room, which will be locked at all times except when samples are removed or replaced by the custodian. To the maximum extent possible, only the custodian should be permitted in the sample room.
5. The custodian shall ensure that heat-sensitive or light-sensitive samples, or other sample materials having unusual physical characteristics, or requiring special handling, are properly stored and maintained.
6. Only the custodian will distribute samples to personnel who are to perform tests.
7. The analyst will record in his laboratory notebook or analytical worksheet, identifying information describing the sample, the procedures performed and the results of the testing. The notes shall be dated and indicate who performed the tests. The notes shall be retained as a permanent record in the laboratory and should note any abnormalities which occurred during the testing procedure. In the event that the person who performed the tests is not available as a witness at time of trial, the government may be able to introduce the notes in evidence under the Federal Business Records Act.
8. Standard methods of laboratory analyses shall be used as described in the "Guidelines Establishing Test Procedures for Analysis of Pollutants," 38 F.R. 28758, October 16, 1973. If laboratory personnel deviate from standard procedures, they should be prepared to justify their decision during cross-examination.
9. Laboratory personnel are responsible for the care and custody of the sample once it is handed over to them and should be prepared to testify that the sample was in their possession and view or secured in the laboratory at all times from the moment it was received from the custodian until the tests were run.
10. Once the sample testing is completed, the unused portion of the sample together with all identifying tags and laboratory records, should be returned to the custodian. The returned tagged sample will be retained in the sample room until it is required for trial. Strip charts and other documentation of work will also be turned over to the custodian.
11. Samples, tags and laboratory records of tests may be destroyed only upon the order of the laboratory director, who will first confer with the Chief, Enforcement Specialist Office, to make certain that the information is no longer required or the samples have deteriorated.

EXHIBIT I

EPA, NATIONAL ENFORCEMENT INVESTIGATIONS CENTER			
Station No.	Date	Time	Sequence No.
Station Location			<input type="checkbox"/> Grab <input type="checkbox"/> Comp.
<input type="checkbox"/> BOD <input type="checkbox"/> Solids <input type="checkbox"/> COD <input type="checkbox"/> Nutrients	<input type="checkbox"/> Metals <input type="checkbox"/> Oil and Grease <input type="checkbox"/> D.O. <input type="checkbox"/> Bact. <input type="checkbox"/> Other	Remarks/Preservative:	
Samplers:			

Front

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 BUILDING 53, BOX 25227, DENVER FEDERAL CENTER
 DENVER, COLORADO 80225



Back

EXHIBIT II

FOR _____ SURVEY, PHASE _____, DATE _____

TYPE OF SAMPLE _____

ANALYSES REQUIRED

[illegible]

REMARKS

Samplers: _____

FIELD DATA RECORD

[illegible]

ENVIRONMENTAL PROTECTION AGENCY
Office Of Enforcement
NATIONAL ENFORCEMENT INVESTIGATIONS CENTER
Building 53, Box 25227, Denver Federal Center
Denver, Colorado 80225

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GPO 854 - 8. 1

REVIEW OF CHAIN-OF-CUSTODY PROCEDURES

LOUISIANA PACIFIC CORPORATION

Samoa, California

December 5 - 12, 1977

Records pertaining to the Louisiana Pacific Corporation pre-survey reconnaissance and monitoring survey were evaluated against the established NEIC chain-of-custody procedures. Specifically, field data records, log books, sample tags, and chain-of-custody records were reviewed to determine the nature and scope of any deviations from the NEIC chain-of-custody procedures. If a deviation was discovered, an assessment was made of the impact of the deviation on the survey results. The following is the result of this evaluation.

During the December 6 - 9, 1977 screening sampling for Priority Pollutants, four grab samples for volatile organics (Sequence Nos. 01 and 02 from Stations 3400 and 3450 on December 8, 1977) were misplaced at the mobile laboratory and not shipped to Denver for analysis. The protocol for Priority Pollutants samples calls for collecting at least one volatile organic grab/day to accompany the composite sample. Since NEIC was collecting 4 grabs/day, the loss of two grab samples from each station did not jeopardize adhering to the protocol.

At 1430 hr on December 8, 1977, a grab sample of once-through condensing water effluent (Permit Discharge No. 004) was collected to ascertain the presence or absence of process wastewaters. This sample was properly tagged and entered in a field log book. However, no Chain-of-Custody Sheet was prepared. The sample was hand-carried to the NEIC mobile laboratory and transferred to a chemist for analysis. The sample was entered into the lab records and analyzed.

The TSS and BOD composite samples from Stations 3400 and 3450 for December 9, 1977 were properly collected, tagged and delivered to the mobile laboratory for analysis. The samples were received by the field analysts, logged in and analyzed. However, no entries were made for these samples on the formal chain-of-custody sheets. Bioassay samples were not kept under custody during collection because of the large volume of water required for the tests [up to 600 l (160 gal)]. However the sample containers were kept next to the monitoring locations and checked at least hourly for tampering. There was no evidence of tampering. Dilution water for the flow-through bioassay was stored in epoxy-coated wooden reservoirs outside of the mobile laboratory at the Crown Simpson mill site. There was no evidence of tampering.

The evaluation conducted, including the items referenced above, indicated that deviations from established NEIC chain-of-custody procedures were insignificant and, thereby, are considered to have had no impact on the results, conclusions, and/or recommendations contained in this report.