

**NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
FACT SHEET
For
Permit No. WA 000109-1**

State of Washington
DEPARTMENT OF ECOLOGY
Olympia, Washington 98504

In compliance with the provisions of
The State of Washington Water Pollution Control Law
Chapter 90.48 Revised Code of Washington
and
The Federal Water Pollution Control Act
(The Clean Water Act)
Title 33 United States Code, Section 1251 et seq.

**Georgia-Pacific West, Inc.
300 West Laurel
Bellingham, Washington**

TABLE OF CONTENTS

INTRODUCTION 4

BACKGROUND INFORMATION 5

Description of the Facility 5

 Location

 Activity

 Discharge location

Permit Status 5

 Table 1: Previous Effluent Limits

Summary of Compliance with the Previous Permit 5

Wastewater Characterization 6

PROPOSED PERMIT LIMITATIONS 6

Technology-Based Effluent Limitations 7

 Table 2: Final Effluent Limits 8

Bleach Plant Effluent Limitations 11

Surface Water Quality Based Effluent Limitations 11

 Numerical criteria for the protection of aquatic life 12

 Numerical criteria for the protection of human health

 Narrative criteria

 Antidegradation

 Critical conditions

 Mixing zones

 Description of the receiving water 13

 Surface water quality criteria

 Consideration of surface water quality based limits for numeric criteria

 Whole effluent toxicity 15

 Human health 16

 Sediment quality

 Purpose of Upcoming Sampling—

 Sediment Sampling Stations Location— 17

 Sediment Sampling and Analysis Plan Development—

 Future Sampling—

Ground Water Quality Limitations 17

Comparison of Effluent Limits with the Existing Permit 18

MONITORING REQUIREMENTS 18

Laboratory Accreditation 18

OTHER PERMIT CONDITIONS 18

Reporting and Recordkeeping 18

Spill Control Plan 18

Solid Waste Plan 18

Filter Plant Backwash 19

Outfall Evaluation 19

Treatment System Operating Plan 19

General Conditions 19

PERMIT ISSUANCE PROCEDURES	19
Permit Modifications	19
Recommendation for Permit Issuance	19
REFERENCES FOR TEXT AND APPENDICES	20
Appendix A—PUBLIC INVOLVEMENT INFORMATION	21
Appendix B—GLOSSARY	22
Appendix C—RECEIVING WATER TEMPERATURE CALCULATIONS	26
Appendix D—OUTFALL MAP	
Appendix E—RULE INTERPRETATION LETTER FROM THE E.P.A.	
Appendix F—FINAL EFFLUENT MERCURY DISCHARGE HISTORY	
Appendix G—REASONABLE POTENTIAL TO IMPACT Spreadsheet	

INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications—of 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One mechanism for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), designed by the Environmental Protection Agency (EPA). Within the State of Washington, the EPA delegated responsibility for its permit program; and our legislature—in **Chapter 90.48 RCW**—defined the Department of Ecology's authority and obligations for administering the federal wastewater discharge permit program among industries, municipalities and other large entities that benefit from using our water bodies.

The State of Washington adopted regulations to make its administration of the NPDES program fair and consistent. The regulations encompass *procedures* for issuing permits (**Chapter 173-220 WAC**), water quality *criteria* for surface and ground waters (**Chapters 173-200 and 201A WAC**), and sediment management *standards* (**Chapter 173-204 WAC**). These regulations support and define the requirements for wastewater discharge permits—how to write them, how to obtain them, and what types and quantities of discharges to waters of our state are allowable.

One of the writing/procedural requirements (**WAC 173-220-060**) is the preparation of a draft Permit and accompanying Fact Sheet. Notice of the availability of the draft, for public examination and comment, is required at least thirty days before the actual (final) Permit can be issued (**WAC 173-220-050**). The Fact Sheet and the draft Permit were available during a lengthy and vigorous period of public comment; please see the Response to Comments for details about the concerns and issues Ecology considered in writing the final Permit. See Appendix A--Public Involvement of this Fact Sheet for particular Public Notice procedures.

Georgia-Pacific West examined the initial Fact Sheet for accuracy and completeness. Identified errors and omissions were corrected, and preliminary discussions of changes in Permit terms and conditions took place before the Fact Sheet and draft Permit were published. The Fact Sheet will not be revised. After the public comment period closed, the Department sorted and summarized substantive comments about the draft Permit. Our responses to those comments—some of which resulted in changes to the final Permit—are being published in conjunction with the NPDES Permit and this Fact Sheet. The summary Response to Comments becomes part of the legal record/file of Permit No. WA 000109-1. Individuals who submitted written comments will receive a printed copy of the Fact Sheet, the NPDES Permit, and the Response to Comments; those who e-mailed their comments will receive electronic copies of the three documents. Copies of all three documents will be placed in repositories located in Bellingham and in Lacey.

APPLICANT INFORMATION: Georgia-Pacific West, Inc.

<u>Plant Location</u>	<u>Receiving Water</u>
300 West Laurel Bellingham, Washington	Bellingham Bay Water Quality Class A
<u>Industry Type</u>	<u>Discharge Location</u>
Bleached Sulfite Pulp and Paper Alcohol/lignin	Latitude 48°, 44', 05" N Longitude 122°, 30', 55" W

BACKGROUND INFORMATION

Description of the Facility

Location: The mill is located at 300 West Laurel Street in Bellingham, Washington. It is situated on the shoreline of Inner Bellingham Bay along the Whatcom Waterway.

Activity: The mill produces about 640 air dry tons/day of bleached sulfite pulp and paper products from virgin fiber. Alcohol and lignin products are also produced from the spent sulfite liquor.

Discharge Location: The treated mill wastewater is discharged via a 60" diameter, 8000 foot long outfall pipe with a 500 port diffuser (Outfall 009). The diffuser section is 2000 feet long, and is located at an average depth of 50 feet.

Permit Status

TABLE 1: PREVIOUS EFFLUENT LIMITS.

The previous permit for this facility was issued May 15, 1991. It placed effluent limitations on:

Parameter	Monthly Average	Daily Maximum	MONITORING Frequency	REQUIREMENTS Sample Type
<i>Biochemical Oxygen Demand (5-day), lbs/day</i>	24,736	47,394	Daily	24-hr Composite
<i>Total Suspended Solids, lbs/day</i>	38,991	72,572	Daily	24-hr Composite
<i>Mercury, lbs/day at MRU effluent</i>	0.05	0.11	Continuous	Recording
<i>pH</i>		5.0 to 9.0	Continuous	Recording

An application for permit renewal was submitted to the Department on November 14, 1995 and accepted by the Department on August 1, 1996.

Summary of Compliance with the Previous Permit

The facility last received an inspection in March of 1999. A compliance inspection with sampling was conducted in July of 1999.

During the history of the previous permit, Georgia-Pacific West demonstrated its compliance, based upon Discharge Monitoring Reports (DMR) it submitted to the Department, and upon performance reports verified by inspections the Department conducted. During the history of the previous permit, the following violations occurred:

- a. In August 1993, the mill caused exceedance of its permit limitation for mercury discharge. A discharge of 1.78 lbs of mercury occurred. This exceeded both the monthly average and the daily maximum limitation. A penalty of \$5000 was issued.
- b. In May 1994, the mill was unable to produce the daily recording for monitoring mercury discharge. The mill is required to maintain original discharge records. Thirty days elapsed before Ecology was notified. A penalty of \$15,500 was issued.
- c. In January 1995, the mill failed for three days to continuously monitor its mercury discharge. A penalty of \$6,000 was issued.
- d. In May 1997, the mill failed for 6.5 hours to continuously monitor its mercury discharge. A penalty of \$4,500 was issued.

Wastewater Characterization

A characterization of the discharge, evaluated over 1997 through 1998, is presented below:

<u>Parameter</u>	<u>Biennial Average</u>	<u>High/Low Range</u>
<i>Flow</i> (million gallons per day)	38.6	42.2/33.2
<i>pH</i>	-	7.9/6.1
<i>Biochemical Oxygen Demand</i> (lb/day)	15,900	17,500/8,800
<i>Total Suspended Solids</i> (lb/day)	35,800	37,400/21,500

PROPOSED PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. *Technology-based limitations* refer to the treatment methods available to neutralize or minimize the adverse effects of specific pollutants.

Technology-based limitations are either set by regulation or they are developed on a case-by-case basis (40 CFR 125.3, and **Chapter 173-220 WAC**). *Water quality-based limitations* refer to compliance with Surface Water Quality Standards (**Chapter 173-201A WAC**), Ground Water Standards (**Chapter 173-200 WAC**), Sediment Quality Standards (**Chapter 173-204 WAC**) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992). The Permit must apply more stringent of these two limits for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit rely, in part, on information received in the application. The effluent constituents identified in the application were evaluated on a technology- and a water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Nor are effluent limits always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances, the permit does not authorize discharge of the non-reported pollutants. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, or do not have a reasonable potential to cause a water quality violation.

Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional types or quantities of pollutants discharged.

Technology-Based Effluent Limitations—

On April 15, 1998 the Environmental Protection Agency published revised effluent guidelines for the pulp and paper industry in the Federal Register (98 FR 18503). These guidelines, known as the "Cluster Rule," replace the guidelines that were used to calculate the technology-based limitations in the mill's 1991 permit. According to State of Washington policy, Federal effluent regulations that are less than 5 years old, represent and satisfy Washington State's requirement that industries use "all known, available, and reasonable treatment" methods (AKART) to limit pollution discharges into Washington's waters. These guidelines are found in 40 CFR Part 430.

The proposed effluent limitations, based on maximum 12-month average production through 1998, are presented in Table 2. Table 2 also shows the limitations and monitoring requirements carried forward from the previous permit term, for the conventional pollutants. For the maximum 12-month average production through 1998, the mill produced a monthly average of 649 off the machine air-dried tons (ADT @ 10% H₂O) of surface and barometric condenser sulfite pulp, 84 ADT of the total production were New Source (NSPS) sulfite pulp. The pertinent regulatory basis for establishing numeric effluent limitations for these mill processes are found in 40 CFR 430.52 (surface and barometric condenser sulfite pulp), and 40 CFR 430.55 (NSPS), of the Code of Federal Regulations.

Georgia-Pacific West is classified by the EPA as a Sulfite Specialty Grade mill. Specifications of this production classification are published in Federal Register/Vol. 63, No. 72/April 15, 1998, pg.18557, under "6. Papergrade Sulfite Subcategory, a. *Segmentation of the Papergrade Sulfite Subcategory.*" at paragraph (3).

Georgia-Pacific West's bleach plant effluent permit conditions are based on the effluent guidelines' Subpart E – Papergrade Sulfite Subcategory the specialty grade sulfite pulp segment (CFR 430.51(c)(3)) described in a March 22, 2000 letter from the EPA (Appendix E). In order to demonstrate compliance with the requirement that a "...significant portion of production is characterized by pulp with a high percentage of alpha cellulose and high brightness sufficient to produce end products such as plastic molding compounds, saturating and laminating products, and photographic papers..." the Permit requires that Georgia-Pacific West report monthly total pulp production and monthly production of specialty grade pulps, as recommended by EPA.

The permit also includes effluent limits for adsorbable organic halides (AOX) of less than twenty micrograms per litre [$<20 \mu\text{g/L}$] based on the calcium-, magnesium-, or sodium-based sulfite segment (CFR 430.51(c)(1)). The $<20 \mu\text{g/L}$ AOX limit takes effect if specialty-grade pulp production falls below 25% of any 12-month rolling average. In order to better identify what the Permittee is required to report as specialty grade, the permit specifies that Puget Alpha 92, Puget Ultra, Puget Plus, and Puget Prime production off the pulp dryer grades be reported. These grades are the ones that Georgia-Pacific West identified to the EPA as "specialty grade" when this segment/subcategory was established.

TABLE 2: FINAL EFFLUENT LIMITS.

BOD and TSS allowances during the previous permit period are shown in parenthesis.

Parameter	Effluent Limitations		MONITORING REQUIREMENTS	
	Monthly Average	Daily Maximum	Frequency	Sample Type
<i>BOD (biochemical oxygen demand), lbs/day (5-day)</i>	20,587 (24,736)	39,417 (47,394)	Daily	24-hr Composite
<i>Total Suspended Solids, lbs/day</i>	32,377 (38,991)	60,320 (72,572)	Daily	24-hr Composite
<i>pH</i>	5.0 to 9.0		Continuous	Recording
<i>Temperature</i>	-	-	Continuous	Recording
<i>Flow (MGD)</i>	-	-	Continuous	Recording
<i>Production, Tons/dayⁱ</i>	-	-	Daily	Recording
<i>AOX, µg/Lⁱⁱ (adsorbable organic halides)</i>	-	< 20	Weekly	24 hour composite

ⁱ Report monthly total sulfite pulp production. Also, report total monthly production tonnage of specialty grade pulps that were produced, sold, or used for the production of end products such as plastic molding compound, saturating and laminating products, and photographic paper. Total Sulfite Production is defined as the sum of the Pulp Dryer off the machine production and the slush sent directly to the Tissue Mill, both expressed as 100% air dry tons (10% H₂O).

ⁱⁱ This limit shall go into effect only during the months when the 12-month rolling average production of specialty grade pulps that were produced, sold, or used for the production of end products such as plastic molding compound, saturating and laminating products, and photographic paper, is below 25% of total sulfite production for the same 12-month period. The 12-month accounting for the rolling average shall commence at permit issuance. This requirement, if triggered as indicated above, shall be in force after this initial 12-month accounting period. See Appendix E for the EPA letter to Ecology discussing this requirement.

Parameter	Effluent Limitations		Monitoring Requirements	
	Annual Average	Quarterly Maximum	Frequency	Sample Type
<i>TCDD</i>	0.14 mg/day ^{x/}	0.27 mg/day ^{y/}	Quarterly	24hr composite

x/ Annual Average

y/ Quarterly Maximum - For permit compliance purposes, the point of compliance shall be defined as the final effluent before discharge. Compliance with the permit limit shall be

demonstrated by direct mass loading calculation for final effluent with a detection above the minimum level (ML) of 10 pg/L.

TCDD—Georgia-Pacific has been monitoring the final effluent quarterly, as required in the existing permit. This has resulted in 20 data points during the past 5 years. Of those twenty analyses, there were four detects at 10 parts per quadrillion and the remainder were reported at less than 10 ppq. A “potential to exceed” the discharge limit determination at a concentration of 10 ppq, in a 140:1 dilution, and a coefficient of variation of 0.6, resulted in a requirement for a water quality based limit.(see Appendix G) A similar determination, using a TCDD concentration of 5 ppq, also resulted in a requirement for a water quality based limit.

Because of the lack of data, the Total Maximum Daily Load method of setting discharge limits is not readily transferable to Georgia-Pacific and Bellingham Bay. Ecology calculated this proposed TCDD limit for Georgia-Pacific West based upon compliance with the water quality criterion at the edge of the dilution zone. An arbitrary background concentration of 50% of the water quality standard for TCDD was assumed for Bellingham Bay.

The end-of-pipe TCDD effluent concentration was calculated based on: 1) the dilution ratio achieved within the dilution zone, 2) the water quality criterion of 0.014 ppq (ingestion of aquatic organisms only), and 3) assuming a background concentration of 0.007 ppq of TCDD in Bellingham Bay. The dilution ratio of receiving water to effluent, for this facility, has been approved at 140:1. The final effluent TCDD concentration is:

$$[\text{TCDD}_{\text{con}}] = \text{dilution ratio} \bullet \text{water quality criterion} \bullet 0.5$$

$$[\text{TCDD}_{\text{con}}] = 140 \bullet 0.014 \bullet (0.5)$$

$$[\text{TCDD}_{\text{con}}] = 0.98 \text{ ppq}$$

The waste load allocation based on an average Georgia Pacific effluent flow of 38.6 MGD is:

$$[\text{TCDD}_{\text{mass}}] = (\text{TCDD}_{\text{con}} 10^{-15}) \bullet (38.6 \bullet 10^6 \text{ gal/day}) \bullet (8.34 \text{ lbs/gal}) \bullet (4.54 \bullet 10^5 \text{ mg/lb})$$

$$[\text{TCDD}_{\text{mass}}] = (\text{TCDD}_{\text{con}} 10^{-15-4}) \bullet (38.6 \bullet 10^6 \text{ gal/day}) \bullet (8.34 \text{ lbs/gal}) \bullet (4.54 \bullet 10^5 \text{ mg/lb})$$

$$[\text{TCDD}_{\text{mass}}] = 0.98 \bullet 38.6 \bullet 8.34 \bullet 4.54 \bullet 10^{-4}$$

$$[\text{TCDD}_{\text{mass}}] = 0.14 \text{ mg/day}$$

This represents the annual average for TCDD. A quarterly maximum was calculated based on the 30-day maximum variability factor (VF₃₀) of 1.91 for BOD₅ (Development Document for Effluent Limitations Guidelines and Standards for the Pulp, Paper and Paperboard, October, 1982). Assuming VF₃₀ for TCDD is equal to VF₃₀ for BOD₅, the quarterly maximum limit is VF₃₀ • annual average • (1.91 • 0.14 mg/day), or 0.27 mg/day.

An annual average limit of 0.14 milligrams per day (mg/day), and a quarterly maximum limit of 0.27 mg/day, have been added to the limits for outfall 009. Georgia-Pacific West is changing the pulp bleaching process to 100% chlorine dioxide substitution to comply with the bleach plant chlorinated hydrocarbon and final effluent AOX limits; therefore, the final effluent TCDD limits will not take effect until after the mandatory compliance date of April 15, 2001.

COD—The EPA’s “Cluster Rule” Effluent Guidelines contain a reference to COD. The EPA has reserved a placeholder for COD limits—agency staff are collecting data, with the stated intent to include COD limits in future additions to the Effluent Guidelines. The EPA encourages permitting authorities to consider including COD limitations in NPDES permits for Subpart B (Bleached Papergrade Kraft and Soda Subcategory) and E (Papergrade Sulfite Subcategory) NPDES Permit applicants. COD limitations were considered by the EPA as a possible means of ensuring that the process operation minimizes the discharge of all organic compounds, including toxic organic compounds not readily biodegraded. The EPA did not include COD limitations in the 1998 edition of its Effluent Guidelines, because the data available did not adequately characterize COD from sources other than the pulping and bleaching processes. Preliminary data suggested that COD contributed by these other sources may be as great as the COD contribution from the pulp mill and bleach plant. Ecology does not have data available to make this determination and does not have the resources to generate such data; therefore, COD limits are not included in the Permit. If the EPA promulgates revisions to its Effluent Guidelines that do include COD limits, Ecology will reopen the Permit to include them.

Color—The EPA proposed BAT limitations for color, for application to the Bleached Papergrade Kraft and Soda subcategory only. The EPA accepted commenters’ assertions that color is a concern that is more appropriately addressed in individual permits, based on applicable water quality standards. There are two water quality criteria in **Chapter 173-201A WAC**, *Water Quality Standards for Surface Waters of the State of Washington*, that are sometimes thought of as color-related. The first is the turbidity standard. Turbidity is measured by nephelometric turbidity units (NTU). NTUs are a measure of the light scattered by suspended material in the water, and are not influenced by color; thus, a color limit would not address the turbidity standard. The second is a narrative aesthetic standard—which is influenced by color—but, it is subjective and difficult to protect with a numerical limit. Ecology lacks available data to determine appropriate limits to protect the aesthetic standards using color limits; we also lack the resources to generate such data. Therefore, a color limit was not included in the Permit.

Chlor/Alkali Plant Closure and Mercury—Until June of 1999, Georgia-Pacific operated a mercury cell chlor/alkali plant. The waste water from that plant, after treatment in a mercury recovery unit (MRU), was discharged to the pulp mill final effluent. The MRU discharge had a production-based effluent limit, derived from the EPA Effluent Guidelines (BAT) for mercury cell chlor-alkali plants. The existing NPDES Permit has weekly final effluent monitoring requirements for mercury at a 0.2 µg/L detection level. These data were evaluated, using the EPA’s Technical Support Document as our guide, to determine the potential to exceed the water quality standards at the edge of the zone (chronic dilution 140:1). By this calculation there is no potential to exceed the water quality standards (see Appendix G).

Since Georgia-Pacific West closed the chlor-alkali plant, and has commenced demolishing the facility and performing site cleanup under Washington’s Model Toxics Control Act, the existing production based limits no longer apply. The MTCA Agreed Demolition Order includes a discharge limit of 0.03 lbs/day of mercury, for the effluent from the MRU that still discharges to the pulp mill final effluent. This limit was determined by evaluating the data from the MRU during normal operation of the chlor-alkali facility. Since the MRU now treats only storm water or clean-up/washdown water—but not process water—we used half of the previous Permit limit.

This effluent limit has been included in the permit. Mercury limits at the MRU will be removed in the next Permit cycle, if the MRU discharge is discontinued.

The Department assumes that, with the absence of the chlor-alkali plant discharge, the mercury levels in the final effluent will eventually be nondetectable. But, since there are potential historic mercury-contaminated sites in the mill, (e.g., the ASB is a MTCA-listed site for mercury,) it is important to determine whether those potential sources are contributing to pollutant loading of the receiving water. Therefore, the Permit requires continued mercury monitoring at the final effluent.

A mercury source evaluation sampling plan also is required. Mercury data, collected at the final effluent since the chlor-alkali plant was shut down, shows 33 out of 34 samples that were less than the detection level of 0.2 µg/L. The hits for mercury were at the 0.2 µg/L detection level (see Appendix F). The permit includes a requirement to initiate the mercury source evaluation sampling at the next scheduled sampling period, to determine the etiology of the mercury if the concentration equals or exceeds 1 µg/L (five times the detection level) for three successive samples. This data will be used to identify other possible sources of mercury in the mill, and determine their contribution to the mercury loading of the receiving water.

Bleach Plant Effluent Limitations

Limits for Chlorinated Hydrocarbons, Per 40 CFR Part 430.54 (3) (i).

Except as noted, the point of compliance for this section of parameters is the Bleach Plant Effluent; the sample type is 24-hour composite, per 40 CFR Part 430 Subpart B, becoming **effective May, 2001**.

CAS Number	Pollutant	Daily Maximum	Monitoring Frequency	Point of Compliance
1198556	Tetrachlorocatechol	< 5.0 µg/L	Monthly	Bleach Plant Effluent
2539175	Tetrachloroguaiacol	< 5.0 µg/L	Monthly	Bleach Plant Effluent
2539266	Trichlorosyringol	< 2.5 µg/L	Monthly	Bleach Plant Effluent
2668248	4,5,6-trichloroguaiacol	< 2.5 µg/L	Monthly	Bleach Plant Effluent
32139723	3,4,6-trichlorocatechol	< 5.0 µg/L	Monthly	Bleach Plant Effluent
56961207	3,4,5-trichlorocatechol	< 5.0 µg/L	Monthly	Bleach Plant Effluent
57057837	3,4,5-trichloroguaiacol	< 2.5 µg/L	Monthly	Bleach Plant Effluent
58902	2,3,4,6-tetrachlorophenol	< 2.5 µg/L	Monthly	Bleach Plant Effluent
60712449	3,4,6-trichloroguaiacol	< 2.5 µg/L	Monthly	Bleach Plant Effluent
87865	Pentachlorophenol	< 5.0 µg/L	Monthly	Bleach Plant Effluent
88062	2,4,6-trichlorophenol	< 2.5 µg/L	Monthly	Bleach Plant Effluent
95954	2,4,5-trichlorophenol	< 2.5 µg/L	Monthly	Bleach Plant Effluent
1746016	TCDD	< 10 pg/L	Monthly	Bleach Plant Effluent
51207319	TCDF	< 10 pg/L	Monthly	Bleach Plant Effluent

Surface Water Quality-Based Effluent Limitations

In order to protect existing water quality, and to preserve the designated beneficial uses of Washington's surface waters, waste discharge permits must be conditioned such that the discharge will not diminish the receiving water body's established Surface Water Quality

Standards (**Chapter 173-201A WAC**). Surface water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin wide total maximum daily loading study (TMDL).

Numerical criteria for the protection of aquatic life: "Numerical" water quality criteria are numerical values specifying the levels of pollutants that may be discharged to a receiving water while maintaining protection of aquatic life. Numerical criteria set forth in the Water Quality Standards are used, along with chemical and physical data for the wastewater and receiving water, to derive the effluent limits in the discharge Permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in the Permit.

Numerical criteria for the protection of human health: The U.S. EPA has promulgated 91 numeric water quality criteria, for the protection of human health, applicable to Washington State (EPA 1992). These criteria are designed to protect humans from pollution-related cancer and other diseases; and are primarily based upon predictable contamination exposures via fish and shellfish consumption or drinking water from surface waters.

Narrative criteria: In addition to numerical criteria, "narrative" water quality criteria (**WAC 173-201A-030**) limit the discharge of toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (**WAC 173-201A-130**) and marine (**WAC 173-201A-140**) waters in the State of Washington.

Antidegradation: The State of Washington's Antidegradation Policy prohibits discharges into a receiving water from further degrading the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, or in cases when the natural conditions of a receiving water are of higher quality than the criteria assigned, the natural conditions constitute the water quality criteria. More information on the State Antidegradation Policy can be obtained by referring to **WAC 173-201A-070**.

The Department's review of existing records did not determine whether the ambient water quality in Bellingham Bay is either higher or lower than the designated classification criteria given in **Chapter 173-201A WAC**; the Department used, therefore, the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

Critical conditions: Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impacts on the aquatic biota, human health, and existing or characteristic water body uses.

Mixing Zones: Our Water Quality Standards allow the Department of Ecology to authorize mixing zones, around a point of discharge, in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known,

available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of **WAC 173-201A-100**.

The National Toxics Rule (EPA, 1992) allows the regulator to require that the chronic mixing zone meet human health criteria.

Description of the receiving water: The facility discharges to Bellingham Bay which is designated as a Class A receiving water in the vicinity of the outfall. Characteristic uses of Class A receiving waters include the following: “*fish migration; fish and shellfish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.*” Water quality of this class shall meet or exceed the requirements for all or substantially all uses.

Surface water quality criteria: Applicable criteria are defined in **Chapter 173-201A WAC** for aquatic biota. In addition, the U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for Georgia-Pacific West’s discharges are summarized below.

The primary water quality standard parameters that could be affected by the discharge, and the required standard, are as follows:

<i>Fecal Coliforms</i>	14 organisms/100 mL maximum geometric mean
<i>Dissolved Oxygen</i>	6 mg/L minimum
<i>Temperature</i>	16 degrees Celsius maximum or incremental increases above background
<i>pH</i>	7.0 to 8.5 standard units
<i>Turbidity</i>	less than 5 NTU above background
<i>Toxics</i>	No toxics in toxic amounts

Consideration of surface water quality-based limits for numeric criteria: Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls that the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in **Chapter 173-201A WAC**. The dilution factors of effluent-to-receiving water that occur within these zones, have been determined at the critical condition by using the EPA’s PLUMES Model. A Dilution Ratio study conducted in February 1994, determined dilution values as 57 to 1 for the acute zone, and 140 to 1 for the chronic zone.

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). A pollutant such as Biochemical Oxygen Demand is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of surface water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

The impacts of dissolved oxygen deficiency, temperature, pH, and other toxic pollutants were determined as shown below, using the dilution factors described above.

BOD₅--This discharge with technology-based limitations results in a small amount of BOD loading relative to the large amount of dilution occurring in the receiving water at critical conditions. Technology-based limitations will be protective of dissolved oxygen criteria in the receiving water.

Temperature--The impact of the discharge on the temperature of the receiving water was modeled by mixing analysis at the critical condition by $T_f = (T_e + 140T_{rw})/141$. Where T_f is the final temperature at the edge of dilution due to the influence of the effluent, T_e is the effluent temperature, and T_{rw} is the temperature of the receiving water before mixing. The receiving water temperature at the critical condition is 16°C and the effluent temperature is 32° Celsius. The predicted resultant temperature at the boundary of the chronic mixing zone is 16.1° Celsius as such incremental rise is 0.1° Celsius.

Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters.

pH--Because of the high buffering capacity of marine water, compliance with the technology-based limits of 5 to 9 will assure compliance with the Water Quality Standards for Surface Waters.

Turbidity--The impact of turbidity was evaluated based on the range of turbidity in the effluent and turbidity of the receiving water. Due to the large degree of dilution, it was determined that the turbidity criteria would not be violated outside the designated mixing zone.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The following toxins, with Water Quality or Human Health Standards, were determined to be present in the discharge: *Chromium, Copper, Mercury, Zinc, Chloroform, Cyanide, Naphthalene*. Limited valid ambient background data was available. A calculation of “reasonable potential to exceed” the standards, resulted in no reasonable potential for all the above mentioned pollutants (see Appendix G). This permit requires yearly monitoring for all priority pollutants.

Low level concentrations of some pesticides have been detected in the final effluent. At this time, Georgia-Pacific West’s industry classification is not presumed to be a source of pesticides. Two samples of effluent have been tested with mixed results. More tests, with lower detection levels, will be used on effluent samples before this Permit expires. Should pesticides be detected in this new sample, further monitoring may be required.

The proposed Permit requires monitoring for mercury at the final outfall. Based upon more than five years of collected data, we made a determination of “no reasonable potential to exceed water quality standards.” Technology based limits used in the past, and enforced at the chlorine

production facility where mercury was used, are no longer valid. Georgia-Pacific West's production of chlorine has permanently ceased; subsequently, we expect the discharge of mercury to be eliminated. The regulation of any remaining discharge of mercury has been assumed by Ecology staff working under MTCA (Washington's cleanup laws) authority.

Whole effluent toxicity: The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent; therefore, this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests are providing an indication of the potential lethal effect of the effluent to organisms in the receiving environment.

Chronic toxicity tests measure various sub-lethal toxic responses such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test of an organism with an extremely short life cycle or a partial life cycle test on a critical stage of one of a test organism's life cycles. Organism survival is also measured in some chronic toxicity tests.

Accredited WET testing laboratories have the proper WET testing protocols, data requirements, and reporting format. Accredited laboratories are knowledgeable about WET testing and capable of calculating an NOEC, LC₅₀, EC₅₀, IC₂₅, etc. All accredited labs have been provided the most recent version of the Department of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* which is referenced in the permit. Any Permittee interested in receiving a copy of this publication may call the Ecology Publications Distribution Center 360-407-7472 for a copy. Ecology recommends that Permittees send a copy of the acute or chronic toxicity sections(s) of their permits to their laboratory of choice.

An effluent characterization for acute and chronic toxicity was conducted during the previous permit term. The WET tests during effluent characterization indicate that no reasonable potential exists to cause receiving water acute toxicity. Chronic toxicity was measured during effluent characterization. This toxicity was found to be at levels that, in accordance with WAC 173-205-050(2)(a), have a reasonable potential to cause receiving water toxicity.

This permit includes new limits for 2,3,7,8-TCDD, 2,3,7,8-TCDF, and twelve chlorinated phenolics at the bleach plant effluent, that will require Georgia-Pacific West to change the bleach plant process. The facility must be in compliance with the bleach plant effluent limits by April 15, 2001. Georgia-Pacific West's technological change, from its current elemental chlorine bleaching process to an oxygen delignification followed by chlorine dioxide process, will enable them to comply with these limits. This change in bleaching technology should change effluent toxicity. In accordance with **WAC 173-205-060(1)**, the anticipated changes require another effluent characterization for toxicity. The Permit includes a requirement that Georgia-Pacific West monitor chronic toxicity quarterly, during the period between permit issuance and the effluent characterization study; the effluent characterization study will commence June, 2001.

Human health: Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department made a determination of the discharges' potential to cause an exceedance of the water quality standards, as required by 40 CFR 122.44(d). The discharges' potential was evaluated in accord with procedures given in the Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) and in the Department's Permit Writer's Manual (Ecology Publication 92-109, July, 1994). Our evaluation indicated that the discharges have no reasonable potential to cause a violation of water quality standards, established for human health-based criteria; thus, an effluent limit is not warranted.

Sediment quality: The Department has promulgated aquatic sediment standards (**Chapter 173-204 WAC**) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for a discharge to cause a violation of applicable standards (**WAC 173-204-400**). The need for continuing sediment evaluation is established on a case by case basis.

Purpose of Upcoming Sampling—

Model Confirmation. To empirically confirm site-specific model results which predicted that an average 1993 diffuser area sediment mercury concentration of 0.6 mg/kg would, in three years, decrease to 0.39 mg/kg (i.e., below the mercury sediment quality standard [SQS] of 0.41 mg/kg); and reach a steady state concentration of 0.36 mg/kg in six years.

Previous Sampling. Mercury, 4-methylphenol, and phenols have been detected at levels above SQS and/or cleanup screening level (CSL) in the diffuser area and/or along the shoreline edge of the model grid.

The September 1993 *Baseline Sediment Characterization* data results have been negated, due to the use of detection limits (DLs) which exceeded SQS and/or CSL criteria for most or all chemicals in the following categories: HPAHs, LPAHs, PCBs, chlorinated benzenes, phenolic compounds, and phthalate esters.

Industry Specific Chemicals. The Sediment Management Standards (SMS) allows for the analysis of *potentially toxic contaminants known or suspected to be associated with a given site for which there are presently no numerical criteria (WAC 173-204-320(5))*. An analyses for polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), guaiacols, and resin acids—compounds associated with the pulp and paper industry—will, therefore, be conducted at this site. Methods of analyses for these compounds are to be determined by Georgia-Pacific West in accordance with the PSEP Protocols, and sufficient quality control data associated with the analyses should be provided in the Data Report.

Upcoming Study Requirements. The sampling effort will be considered Georgia-Pacific West's baseline sediment characterization for all SMS chemicals (the exception being that mercury will

be the only metal analyzed) and for the aforementioned industry specific chemicals. Georgia-Pacific West should (a) revisit the problems that were encountered in 1993, and (b) use Sediment Management Unit's (SMU) SAP guidance and (c) the latest PSEP Protocols, to avoid repeating previous sampling and laboratory problems.

Sediment Sampling Stations Location—

Sampling stations should be located in the area presumed to be impacted by Georgia-Pacific West's effluent. Placement decisions should take into account the predominant subsurface current. The 1993 predominant current direction appears to differ from that presented in the Whatcom Waterway Remedial Investigation Figures 8-2 and 8-4. A determination of the predominant subsurface current needs to be made in order to finalize sample stations' location.

Sediment Sampling and Analysis Plan Development—

The last SAP with updated information is a good starting point taking into account the following comments in addition to what has already been stated. These comments can be used to improve on upcoming work.

Guidance. Since the 1992 SAP, the SMU has prepared the *Sediment Sampling and Analysis Plan Appendix* (SAPA) which provides SAP development guidance. Updated Tables 1 and 5 can be found on SMU's website (<http://www.wa.gov/ecology/sea/smu/sediment.html>) under the *Further information is available* section. SAPA Tables 11 - 15 will be updated in the future to be consistent with the latest PSEP Protocols. Regardless of what is listed in the SAPA, the latest PSEP Protocols and EPA methods should be used for all analyses.

Detection limits should be at a level sufficient to meet the SQS chemical criteria (**WAC 173-204-320**). Recommended sample preparation methods, cleanup methods, analytical methods, and detection limits are presented in SAPA Table 5 (updated September 1996). Detection limits should be sufficiently low that low total organic carbon (TOC) levels (as low as 0.5%) will not cause detection levels to exceed the SQS when the data are organic carbon normalized. This can be achieved by analyzing samples for TOC levels before completing the organic chemical analyses.

Future Sampling—

Assuming a 1999 baseline sediment sampling is performed, re-sampling efforts will begin by the end of this upcoming permit cycle (2000 permit; ~2005 sampling). The purpose of this sampling would be to confirm that Georgia-Pacific West's mercury source has been completely removed (with the closing of the chlor-alkali plant) and is no longer impacting diffuser area sediments (i.e., effectiveness monitoring).

Ground Water Quality Limitations

The Department has promulgated Ground Water Quality Standards (**Chapter 173-200 WAC**) to protect beneficial uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (**WAC 173-200-100**). Georgia-Pacific West has no discharge to ground and the waste water treatment lagoon is bounded on three sides by Bellingham Bay; therefore, no limitations are required for potential effects to ground water.

Comparison of Effluent Limits with the Existing Permit

	<i>BOD</i> (lbs/day)		<i>TSS</i> (lbs/day)	
	<u>MAX</u>	<u>AVE/mon</u>	<u>MAX</u>	<u>AVE/mon</u>
Current limit:	47,394	24,736	72,572	38,991
Proposed limits	39,417	20,587	60,320	32,377

MONITORING REQUIREMENTS

Required (**WAC 173-220-210** and 40 CFR 122.41) monitoring, recording, and reporting verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

The monitoring schedule is detailed in the proposed permit under Condition S.1. Specified monitoring frequencies must account for the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring.

Laboratory Accreditation

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. The laboratory at this facility is accredited for pH, BOD, TSS, and mercury.

OTHER PERMIT CONDITIONS

Reporting and Recordkeeping

The conditions of S4. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (**WAC 173-220-210**).

Spill Control Plan

The Department has determined that Georgia-Pacific West stores a quantity of chemicals that have the potential to cause water pollution if accidentally released. The Department has the authority to require the Permittee to develop “best management plans” to prevent this accidental release under section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and under **RCW 90.48.080**.

Georgia-Pacific West has developed a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs. The proposed permit requires the Permittee to update this plan and submit it to the Department.

Solid Waste Plan

The Department has determined that Georgia-Pacific West has a potential to pollute the waters of the state with leachate of solid waste.

This proposed permit requires, under the authority of **RCW 90.48.080**, that Georgia-Pacific West update its solid waste plan, and that the update result in a plan designed to prevent solid waste from causing pollution of the waters of the state. The plan must be submitted to the local permitting agency for approval, if necessary, and to the Department.

Filter Plant Backwash

Georgia-Pacific West filters fresh water it receives from the City of Bellingham. The filters at the plant are backwashed as part of their normal operation. Filter plant backwash is directed to the facility's wastewater treatment system. Removed solids are not discharged directly to state waters.

Outfall Evaluation

Proposed permit condition S.6 requires Georgia-Pacific West to conduct an outfall inspection and submit a report detailing the findings of that inspection. The purpose of the inspection is to determine the condition of the discharge pipe and diffusers, and to evaluate the extent of sediment accumulations in the vicinity of the outfall.

Treatment System Operating Plan

In accordance with state **WAC 173-220-150 (1)(g)** and federal (40 CFR 122.41(e)) regulations, Georgia-Pacific West is required to take all reasonable steps to properly operate and maintain the treatment system. An update of the treatment system operation and maintenance manual will be submitted to Ecology for evaluation, as required by state regulation (**WAC 173-240-150**), for the construction of wastewater treatment facilities.

General Conditions

General Conditions are based directly on state and federal law and regulations, and they have been standardized for all individual industrial NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

Permit Modifications

The Department may modify this permit to impose numerical limitations—if necessary to meet Water Quality Standards for Surface Waters, Sediment Quality Standards, or Water Quality Standards for Ground Waters—based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies. The Department may also modify this permit as a result of new or amended state or federal regulations.

Recommendation for Permit Issuance

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to control toxics, protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this proposed Permit be issued—and effective for a period of 5 years.

REFERENCES FOR TEXT AND APPENDICES

The United States **Environmental Protection Agency** (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Tsivoglou, E.C., and J.R. Wallace.

The Washington State **Department of Ecology**.

1994. Permit Writer's Manual. Publication Number 92-109

Wright, R.M., and A.J. McDonnell.

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a National Pollutant Discharge Elimination System Permit to Georgia-Pacific West. The proposed Permit contains performance conditions and effluent limitations that are based upon federal and state requirements—technological standards and water quality criteria, applied to the facility operations described in this Fact Sheet.

Each facility has some unique characteristics. The Department selects the most stringent Special Conditions for the Permit to assure that the facility can continue to operate competitively, while meeting the intent of the NPDES permitting program—to preserve water quality for the use and enjoyment of future generations. A self-identified “ad hoc committee” of individuals, who represent not-for-profit environmental organizations and tribal interests, participated in discussions during Ecology’s preparations for drafting the initial Special Conditions of this Permit. Between January and May, 2000, Ecology staff met with the group three times—to listen, answer questions, and discuss our reasons for selecting one alternative over another.

The Department published a *Public Notice of Draft* (PNOD) on May 10, 2000 in the *Bellingham Herald* advising the community that a draft Permit and Fact Sheet were available for individual examination. Copies of the draft Permit, Fact Sheet, and related documents were available for inspection and copying at Ecology’s Bellingham office, at Whatcom County Libraries, and at Ecology’s headquarters building in Lacey. The Notice invited interested persons to submit their written comments about the draft Permit and Fact Sheet to the writer/regulator:

J. Mark Dirkx
Department of Ecology
Industrial Section
PO Box 47706
Olympia, WA 98504-7706

The purpose of the public comment process was to give the populace of the affected community an opportunity to assure that the Permit was as fair, and as protective, as possible. The extended formal comment period was from May 12 to August 18.

We hoped that comments would refer to specific text in the draft Permit, followed by a proposed modification or concern, when possible. Some people had questions about technology, about the accuracy and completeness of factual information, or the scope of the Department’s authority over the facility; other people urged us to re-examine the adequacy of environmental protection, or to change Permit Conditions, highlighting other concerns about issuing this Permit. The agency accepted postal letters and electronic mail, between May 12 and August 18; and on June 28, Ecology staff also traveled to Bellingham to record oral comments about the draft Permit.

The Department considered all comments received within the extended public comment period, in deciding to issue the wastewater discharge permit, and in formulating the Permit Conditions. Printed copies of the Department's Response to Comments about the Permit for Georgia-Pacific West are available upon request. The Response document will be mailed directly (by postal or electronic transmission) to people who expressed an interest in this Permit, either by submitting formal comment or by asking to be included on the mailing list. Printed copies will be added to Information Repositories located at Ecology’s Bellingham office, at Whatcom County libraries, and at Ecology’s headquarters building in Lacey, to maximize public access to the full record.

APPENDIX B—GLOSSARY

Acute Toxicity--The lethal effect of a compound on an organism that occurs in a short period of time, usually 48 to 96 hours.

AKART-- An acronym for “all known, available, and reasonable methods of treatment”.

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

AOX—The procedure used to estimate the level of chlorinated hydrocarbons (adsorbable organic halides) in the water.

Average Monthly Discharge Limitation --The average of the measured values obtained over a calendar month's time.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks; sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, or treatment activities.

BOD₅--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD₅ is used in modeling to measure the reduction of dissolved oxygen in a receiving water, after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

Chronic Toxicity--The effect of a compound on an organism, over a relatively long time—often 1/10 or more, of an organism's lifespan. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit, or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a "Compliance Inspection - Without Sampling"; at minimum, it includes sampling and analysis for all parameters with limits in the permit, to ascertain compliance with those limits.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.)

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring --Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction (e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.)

EC₅₀--Effect Concentration. The concentration when the defined effect on the organism is observed for 50% of the population tested.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report contains the appropriate information required in **WAC 173-240-060** or **WAC 173-240-130**.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

HPAHs--High Molecular Weight Polycyclic Aromatic Hydrocarbons. Carbonaceous particles that demonstrate carcinogenic properties.

IC₂₅--Inhibition Concentration. The concentration when inhibition of the organism's sexual maturity is observed for 25% of the population tested.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term also includes contaminated storm water (runoff) or leachate from solid waste (disposal) facilities.

LC₅₀--Lethal Concentration. The concentration when organism mortality is observed for 50% of the population tested.

LPAHs--Low Molecular Weight Polycyclic Aromatic Hydrocarbons. Carbonaceous particles that demonstrate carcinogenic properties.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day—or any continuous 24-hour period—that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported, with 99% confidence, that the analyte concentration is above zero; it is determined from analysis of a sample in a given matrix containing the analyte.

Mixing Zone--An area that surrounds an effluent discharge, within which water quality criteria (limits) may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in state regulations (**Chapter 173-201A WAC**).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits (issued under both State and Federal laws.)

NOEC--No Observable Effects Concentration. The highest concentration where there are no observable effects to the test organism.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Quantitation Level (QL)-- A calculated value five times the MDL (method detection level).

Responsible Corporate Officer-- A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding \$25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C—RECEIVING WATER TEMPERATURE

The point of compliance with the temperature standard is at the edge of the chronic mixing zone.

For the Class A waters of Bellingham Bay, the Maximum Temperature standard is 16 degrees Celsius, with a maximum allowable rise of $12/(\text{ambient temperature} - 2)$.

When ambient temperatures exceed 16° the maximum allowable rise is 0.3 degrees.

Chronic dilution is 140 parts receiving water to 1 part effluent

An energy balance is used to make the temperature determination:

each parcel of water has an energy value

eq. 1: $Q_{\text{effluent}} + Q_{\text{receiving water}} = Q_{\text{final}}$ when the mixture is complete

eq. 2: $Q = \text{mass}(m) \times \text{specific heat}(c) \times \text{temp}(T)$
substituting eq. 2 into eq. 1

eq. 3: $m_e \times c_e \times T_e + m_{rw} \times c_{rw} \times T_{rw} = m_f \times c_f \times T_f$

e = effluent
rw = receiving water
f = final mixture

assume:

-all specific heats (c) are identical and cancel from above equation

-unit masses i.e. effluent mass = 1, receiving water mass = 140, mass final = 1 + 140

rewriting eq. 3 with assumptions

eq.4: $1 \times T_e + 140 \times T_{rw} = 141 \times T_f$

T_f = temp at the mixing zone edge

solve for

T_f

$T_f = (T_e + 140T_{rw})/141$

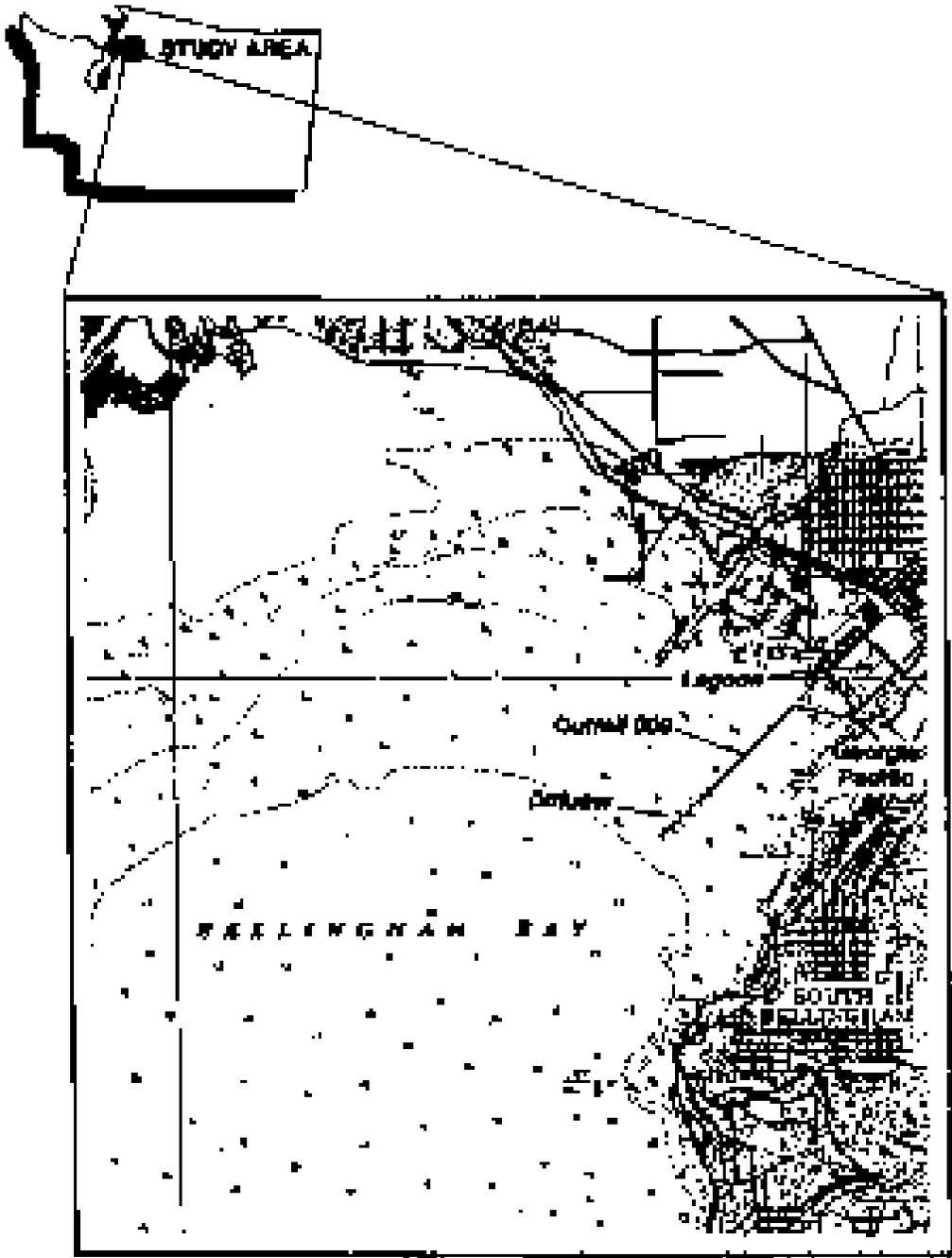
Insert critical conditions: T_e max is 32 C, T_{rw} critical is 16 C

$T_f = (32 + 140 \times 16)/141$

$T_f = 16.11$

the 0.1 rise is less than 0.3 max rise allowed for all dischargers.

APPENDIX D—OUTFALL MAP



APPENDIX E

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1200 State Avenue
Seattle, WA 98101



MAR 23 1990

Reply To
Attn: Mr. CPW-130

Tom Frickmanova, Director
Washington Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Dear Mr. Frickmanova:

In your February 3, 2000 letter, you requested EPA to provide you with an official interpretation of the "Effluent Guidelines for pulp and paper production" (40 CFR § 430), as applied to the Georgia-Pacific Bellingham mill. We appreciate your patience in awaiting this response, which required a considerable amount of coordination with EPA Headquarters personnel who were intimately involved in the development and promulgation of the pulp and paper regulations, hereafter referred to as the Cluster Rules.

The specialty grade segment of the Papergrade Solite Subcategory of the Cluster Rules was created to address two specific and unique situations. The first was raised by Georgia-Pacific, which claimed that it could not produce certain high alpha, high brightness pulps at its Bellingham mill with a totally chlorine free (TCF) bleaching process, but rather that it needed to use an elemental chlorine free (ECF) bleaching process.

In response to Georgia-Pacific's claim, the Agency modified the proposed regulations and defined specialty grade solite mills in the final regulations as follows:

"The specialty grade solite pulp segment consists of those papergrade solite mills where a significant portion of production is characterized by pulp with a high percentage of alpha cellulose and high brightness sufficient to produce end products such as plastic molding compounds, laminating and bonding products, and photographic papers."

40 CFR § 430.51(c)(3). In the preamble to the Cluster Rules, EPA stated that it considered an appropriate threshold for "significant portion of production" to be 25 percent or more. See 63 Fed. Reg. 18504, 18557 (April 15, 1998). EPA based this 25 percent figure on data and information provided by Georgia-Pacific during the development of the regulation. EPA then promulgated Best Available Technology limitations for specialty grade solite mills based on ECF bleaching processes.

The second unique situation was raised by Fraser Papers, which claimed that it could not produce high brightness specialty pulps for the production of high brightness fine papers at its Park Falls, Wisconsin mill with TCF bleaching, but rather needed to use an ECF bleaching process.

In response to Fraser Papers' claim, the Agency modified the proposed regulations as follows:

"The specialty grade segment also includes those mills where a major portion of production is 91 ISO brightness and above"

We now understand that, since 1994, the production of high alpha, high brightness pulps at the Bellingham mill declined such that Georgia-Pacific is not able to show that such production constitutes a significant portion of its production. In view of the mill's decline in production of high alpha, high brightness pulps, we understand that Georgia-Pacific has provided production data to the Department of Ecology showing that the major portion of its pulp production exceeded a brightness of 91 ISO. On these grounds, Georgia-Pacific asserts that the mill qualifies as a specialty grade sulfate mill. Upon further investigation, EPA has learned that the major portion of the pulp produced at this high brightness was being used for the production of tissue, not high brightness specialty fine papers.

At no time during the development of the Cluster Rules did Georgia-Pacific provide the Agency with any information or data supporting a contention that pulps for the production of tissue could not be made with TCF bleaching. We note that several bleached papergrade sulfate mills produce tissue using TCF bleaching processes. Indeed, in May 1998, Georgia-Pacific representatives informed EPA representatives that the Bellingham mill was awaiting a corporate decision regarding construction of additional tissue production. If such production was to be constructed at the Bellingham facility, then essentially the mill's entire pulp production would be devoted to tissue production. Under those circumstances, Georgia-Pacific informed EPA that the mill would install TCF bleaching. Moreover, we have further researched the record for the Cluster Rules and find nothing submitted by Georgia-Pacific indicating that the high alpha, high brightness specialty grade pulps would be used to produce tissue. Therefore, considering all of these facts, EPA did not intend the specialty grade pulp segment to include production of high alpha, high brightness pulps for tissue. In a recent letter to the Agency dated March 3, 2000, Georgia-Pacific states that it is part of its business strategy to produce specialty grade pulps at the Bellingham mill and that they "will exceed 25% Specialty Pulp production over the term of our new permit."

We wish to make it clear that the production of high brightness pulps for the production of tissue does not qualify the Georgia-Pacific Bellingham mill or any other calcium-, magnesium- or sodium-based papergrade sulfate mill as a specialty grade mill. In order for the Georgia-Pacific Bellingham mill to be classified as a specialty grade mill, and be regulated by the relevant limitations for that segment, the mill must produce a significant portion of total mill

production (which EPA considers to be at least 25 percent) in specialty grade pulps, with a high percentage of alpha cellulose) and high brightness sufficient to produce end products such as plastic molding compounds, saturating and laminating products, and photographic papers, during the entire term of the permit.

An additional point of importance relates to the portion of total mill production that EPA would consider appropriate to count toward the significant portion of production as stated in the applicability of this segment (40 CFR § 430.51(c)(3)) and intended by EPA. The specialty grade segment of the papergrade sulfate subcategory was created by the Agency with the intention that pulps from calcium-, sodium- and magnesium-based sulfate mills could continue to be produced for specialty end products such as plastic molding compound, saturating and laminating products, and photographic papers, and specialty fine paper with high brightness of 91 ISO and above. If Georgia-Pacific produces pulps that meet the specific criteria for the production of these end products but sells or uses the pulps for products that are produced by other mills with TCF bleaching, i.e. tissues, or fine paper with lower than 91 ISO brightness, the production of such pulps should not be credited towards the threshold for significant portion of production to be classified as a specialty grade mill. Therefore, EPA recommends that your agency require Georgia-Pacific, as part of its permit, to provide the State, on a monthly basis, with production data showing the total tons of pulp production at the facility as well as the tons of specialty grade pulps that were produced and sold or used for the production of end products such as plastic molding compound, saturating and laminating products, and photographic paper.

The NPDES permit regulations (40 CFR § 122.43(d)(1)) provide that permits for effluents discharges from other than publicly owned treatment works shall contain average monthly discharge limitations. In the instant case, such discharge limitations are intricately linked to production so that reporting of production is necessary to assure compliance. Because EPA intended that the specialty grade production requirements be an annual average, use of the previous month's production for compliance purposes would be unduly restrictive. For these reasons we would recommend the use of a rolling 12 month average for confirming the applicability of this segment and for demonstrating compliance.

Additionally, in order to address the potential situation where the production of specialty grade pulp would not meet EPA's intended threshold for significant portion of total pulp production (40 CFR § 430.51(c)(3)), EPA recommends that the permit contain two sets of effluent limitations. The first set of effluent limitations would be derived from the effluent limitations for the specialty grade sulfate segment (40 CFR § 430.54(a)(3)(i)) and would apply to the Bellingham mill for those periods of time when the 12 month rolling average production of high alpha, high brightness pulps used for plastic molding compound, saturating and laminating products, and photographic paper is 25 percent or more of total mill pulp production. The second set of effluent limitations would be derived from the effluent limitations for the calcium-, magnesium-, or sodium-based papergrade sulfate segment (40 CFR § 430.54(a)(1)) and would apply during those periods of time when the 12 month rolling average production of pulps that are high alpha, high brightness pulps is less than 25 percent of total mill pulp production.

If you have questions regarding this determination or desire additional information with regard to this matter, please do not hesitate to contact me. Your staff should contact Dan Borison, our pulp and paper mill expert, at (206) 553-1491, or Randy Smith, our Water Office Director at (206) 553-1261.

Sincerely,



For
Chuck Clarke
Regional Administrator

cc: Megan White, Ecology
Carol Krueger, Ecology

APPENDIX F

G-P Mercury in final effluent

All values in ppb, u indicates nondetect at the given value

	sample 1	sample 2	sample 3	sample 4	sample 5	sample 6		
Jan-88	0.2u	0.2u	0.2	0.4	0.2			
Feb-88	0.2u	0.3	0.2u	0.2				
Mar-88	0.3	0.4	0.2u	0.2u	1.1			
Apr-88	0.5	0.2u	0.2u	0.2u				
May-88	0.2u	0.2u	0.2	0.2u	0.2u			
Jun-88	0.2	0.2	0.2	0.2				
Jul-88	0.3	0.3	0.3	0.2				
Aug-88	0.2u	0.2u	0.3	0.2	0.3			
Sep-88	0.2u	0.2u	0.2u	0.2u				
Oct-88	0.2	0.2u	0.2u	0.2u				
Nov-88	0.2u	0.2u	0.2	0.3	0.3			
Dec-88	0.4	0.2	0.2	0.3				
Jan-89	0.3	0.2u	0.2u	0.2u	0.2		11/88 @	
Feb-89	0.3	0.2	0.2u	0.3			0.2 or >	
Mar-89	0.2	0.2u	0.2	0.3				45
Apr-89	0.4	0.2u	0.2	0.2				
May-89	0.6	0.2	0.2	0.2	0.2			
Jun-89	0.2u	0.2u	0.2u	0.2u			grand	total
nondetects	7	11	8	7	1	1	total u/s	samples
							35	80

Chlorine Plant slope production June 29, 1990

Jul-90	0.2u	0.2u	0.2u	0.2u	
Aug-90	0.2u	0.2u	0.2	0.2u	0.2u
Sep-90	0.2u	0.2u	0.2u	0.2u	
Oct-90	0.2u	0.2u	0.2u	0.2u	
Nov-90	0.2u	0.2u	0.2u	0.2u	
Dec-90	0.2u	0.2u	0.2u	0.2u	
Jan-91	0.2u	0.2u	0.2u	0.2u	0.2u
Feb-91	0.2u	0.2u	0.2u	0.2u	

APPENDIX G

THIS appendix provides information on the results of the 2003-2004 survey of the 100 most common metals. The information is presented in a table that lists the metals, their chemical symbols, and their atomic numbers. The table also lists the metals' physical and chemical properties, such as their melting and boiling points, and their densities. The table is organized by metal group, and the metals are listed in order of increasing atomic number within each group.

Parameter	Acute		Chronic		Metal	CAS No.	Molecular Weight	Density (g/cm ³)	Melting Point (°C)	Boiling Point (°C)	Atomic Diff. Factor	Chemical Diff. Factor
	mg/kg	µg/L	mg/kg	µg/L								
Barium	1000	1000	1000	1000	Barium	7440-39-9	137.33	3.62	850	1640	12	140
Cadmium	1000	1000	1000	1000	Cadmium	7440-08-9	112.41	8.65	321	908	12	140
Copper	1000	1000	1000	1000	Copper	7440-50-9	63.546	8.96	1083	2567	12	140
Lead	1000	1000	1000	1000	Lead	7440-30-9	207.2	11.34	327	1750	12	140
Mercury	1000	1000	1000	1000	Mercury	7440-10-9	200.59	13.55	337	356.7	12	140
Nickel	1000	1000	1000	1000	Nickel	7440-02-0	58.69	8.90	1455	2865	12	140
Vanadium	1000	1000	1000	1000	Vanadium	7440-50-6	50.94	6.0	1910	3400	12	140
Zinc	1000	1000	1000	1000	Zinc	7440-66-3	65.38	7.14	419.5	907	12	140
Aluminum	1000	1000	1000	1000	Aluminum	7429-90-0	26.98	2.7	933	2542	12	140
Chromium	1000	1000	1000	1000	Chromium	7440-47-3	52.00	7.19	1907	2635	12	140
Cobalt	1000	1000	1000	1000	Cobalt	7440-48-4	58.93	8.86	1495	2707	12	140
Iron	1000	1000	1000	1000	Iron	7440-08-6	55.845	7.87	1538	2861	12	140
Manganese	1000	1000	1000	1000	Manganese	7440-07-4	54.938	7.47	1246	2101	12	140
Selenium	1000	1000	1000	1000	Selenium	7440-08-6	78.96	4.51	221	685	12	140
Silver	1000	1000	1000	1000	Silver	7440-07-4	107.868	10.49	961	2163	12	140
Titanium	1000	1000	1000	1000	Titanium	7440-50-9	47.88	4.54	1668	3555	12	140
Zinc	1000	1000	1000	1000	Zinc	7440-66-3	65.38	7.14	419.5	907	12	140
Aluminum	1000	1000	1000	1000	Aluminum	7429-90-0	26.98	2.7	933	2542	12	140
Chromium	1000	1000	1000	1000	Chromium	7440-47-3	52.00	7.19	1907	2635	12	140
Cobalt	1000	1000	1000	1000	Cobalt	7440-48-4	58.93	8.86	1495	2707	12	140
Iron	1000	1000	1000	1000	Iron	7440-08-6	55.845	7.87	1538	2861	12	140
Manganese	1000	1000	1000	1000	Manganese	7440-07-4	54.938	7.47	1246	2101	12	140
Selenium	1000	1000	1000	1000	Selenium	7440-08-6	78.96	4.51	221	685	12	140
Silver	1000	1000	1000	1000	Silver	7440-07-4	107.868	10.49	961	2163	12	140
Titanium	1000	1000	1000	1000	Titanium	7440-50-9	47.88	4.54	1668	3555	12	140
Zinc	1000	1000	1000	1000	Zinc	7440-66-3	65.38	7.14	419.5	907	12	140