Fact Sheet for NPDES Permit WA0031305

Nucor Steel Seattle, Inc.

Public Notice of Draft Permit: October 28, 2020

Purpose of this fact sheet

This fact sheet explains and documents the decisions the Department of Ecology (Ecology) made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for Nucor Steel Seattle, Inc. (Nucor).

This fact sheet complies with Section 173-220-060 of the Washington Administrative Code (WAC), which requires Ecology to prepare a draft permit and accompanying fact sheet for public evaluation before issuing an NPDES permit.

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty (30) days before issuing the final permit. Copies of the fact sheet and draft permit for Nucor, NPDES permit WA0030305, are available for public review and comment from October 28, 2020 until November 30, 2020. For more details on preparing and filing comments about these documents, please see **Appendix A - Public Involvement Information**.

Nucor reviewed the draft permit and fact sheet for factual accuracy. Ecology corrected any errors or omissions regarding the facility's location, history, discharges, or receiving water prior to publishing this draft fact sheet for public notice.

After the public comment period closes, Ecology will summarize substantive comments and provide responses to them. Ecology will include the summary and responses to comments in this fact sheet as **Appendix E** - **Response to Comments**, and publish it when issuing the final NPDES permit. Ecology generally will not revise the rest of the fact sheet. The full document will become part of the legal history contained in the facility's permit file.

Summary

Nucor is a steel mill which melts scrap steel, casts billets, roll rebar and merchant shapes. This permit covers the discharge from the steel mill plant to Elliott Bay and stormwater discharge to ground by means of infiltration at the slag/mill scale storage area located north of the steel mill, an area referred to as the North Parcel.

The steel mill is permitted to produce 1.1 million cast tons of steel per year. Wastewater at the steel mill plant consists of stormwater, groundwater infiltration, and occasional

non-contact cooling water. This combined water is treated and recycled for reuse in the cooling process and dust control processes, or discharged to Elliott Bay.

During an intense storm event where the total volume exceeds the wastewater treatment system design flow rate of 250 gpm, or when Longfellow Creek overflows into the plant (typically occurs when the storm event is greater than a 2-year, 24-hour storm event), the excess water is discharged directly to Elliott Bay.

Effluent limits proposed for the wastewater discharge at the steel mill plant in this permit include pH, and PCBs, and they are unchanged from those in the previous 2011 permit. The design flow rate is listed in a separate section of the permit, S10 Facility Loading.

Slag and mill scale are inert material co-products of the steel-making process. This product is stored on the North Parcel (north of the Spokane Street Bridge and west of Harbor Avenue), and sold as a commodity to many different industries. Stormwater from this area infiltrates into the ground, and there is no surface water runoff from this parcel (HartCrowser, 2004 Study).

Some areas of Elliott Bay are included in the State of Washington's 303 (d) list of impaired waters for water quality exceedances of fecal coliform bacteria in the water column, chemicals in fish tissue, and numerous sediment criteria in the sediment column. These are outside of the area of the discharge.

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Introduction

The Federal Clean Water Act (FCWA, 1972, and later amendments in 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 (NPDES), administered by the federal Environmental Protection Agency (EPA). The EPA authorized the state of Washington to manage the NPDES permit program in our state. Our state legislature accepted the delegation and assigned the power and duty for conducting NPDES permitting and enforcement to Ecology. The Legislature defined Ecology's authority and obligations for the wastewater discharge permit program in 90.48 RCW (Revised Code of Washington).

The following regulations apply to industrial NPDES permits:

- Procedures Ecology follows for issuing NPDES permits (chapter 173-220 WAC)
- Water quality criteria for surface waters (chapter 173-201A WAC)
- Water quality criteria for ground waters (chapter 173-200 WAC)
- Whole effluent toxicity testing and limits (chapter 173-205 WAC)
- Sediment management standards (chapter 173-204 WAC)
- Submission of plans and reports for construction of wastewater facilities (chapter 173-240 WAC)

These rules require any industrial facility owner/operator to obtain an NPDES permit before discharging wastewater to state waters. They also help define the basis for limits on each discharge and for performance requirements imposed by the permit.

Under the NPDES permit program and in response to a complete and accepted permit application, Ecology must prepare a draft permit and accompanying fact sheet, and make them available for public review before final issuance. Ecology must also publish an announcement (public notice) telling people where they can read the draft permit, and where to send their comments, during a period of thirty days (WAC 173-220-050). (See **Appendix A-Public Involvement Information** for more detail about the public notice and comment procedures). After the public comment period ends, Ecology may make changes to the draft NPDES permit in response to comment(s). Ecology will summarize the responses to comments and any changes to the permit in **Appendix E**.

Background Information

Table 1 General Facility Information

Facility Information	
Applicant:	Nucor Steel Seattle, Inc.
Facility Name and Address	2424 SW Andover Street Seattle, WA 98106 King County
Contact at Facility	Name: Patrick Jablonski Telephone #: (206) 933 2238
Responsible Official	Name: Mathew J. Lyons Title: General Manager
Industry Type	Steel Manufacturing
Categorical Industry	40 CFR Part 420, Iron and Steel Industry
Type of Treatment	pH neutralization, sedimentation with coagulant, activated carbon systems
SIC Codes	3312-Steel Production – Electric Arc Furnace Mini-mill
NAIC Codes	331111-Iron and Steel Mills and Ferroalloy Manufacturing
Permit Fee Category (WAC 173-224)	Iron and Steel: b) Mills
Facility Location (NAD83/WGS84 reference datum)	Latitude: 47.569899° N Longitude: 122.369234° W
Discharge Waterbody Name and Location (NAD83/WGS84 reference datum)	Discharge Location at Nucor (end of treatment) Outfall 001: Latitude: 47.571299° N Longitude: 122.367611° W Final Discharge Location to Elliott Bay via City Storm Sewer which travels north, underneath Terminal 5 property Outfall 002: Latitude: 47.583399° N Longitude: 122.370419° W

Permit Status	
Issuance Date of Previous Permit	March 24, 2011
Application for Permit Renewal Submittal Date	September 23, 2015
Date of Ecology Acceptance of Application	October 2, 2015
Permit fee category	Iron and Steel – b. Mills

Inspection Status	
Date of Last Non-sampling Inspection Date	December 17, 2015

Figure 1: Facility and discharge location to Elliot Bay.

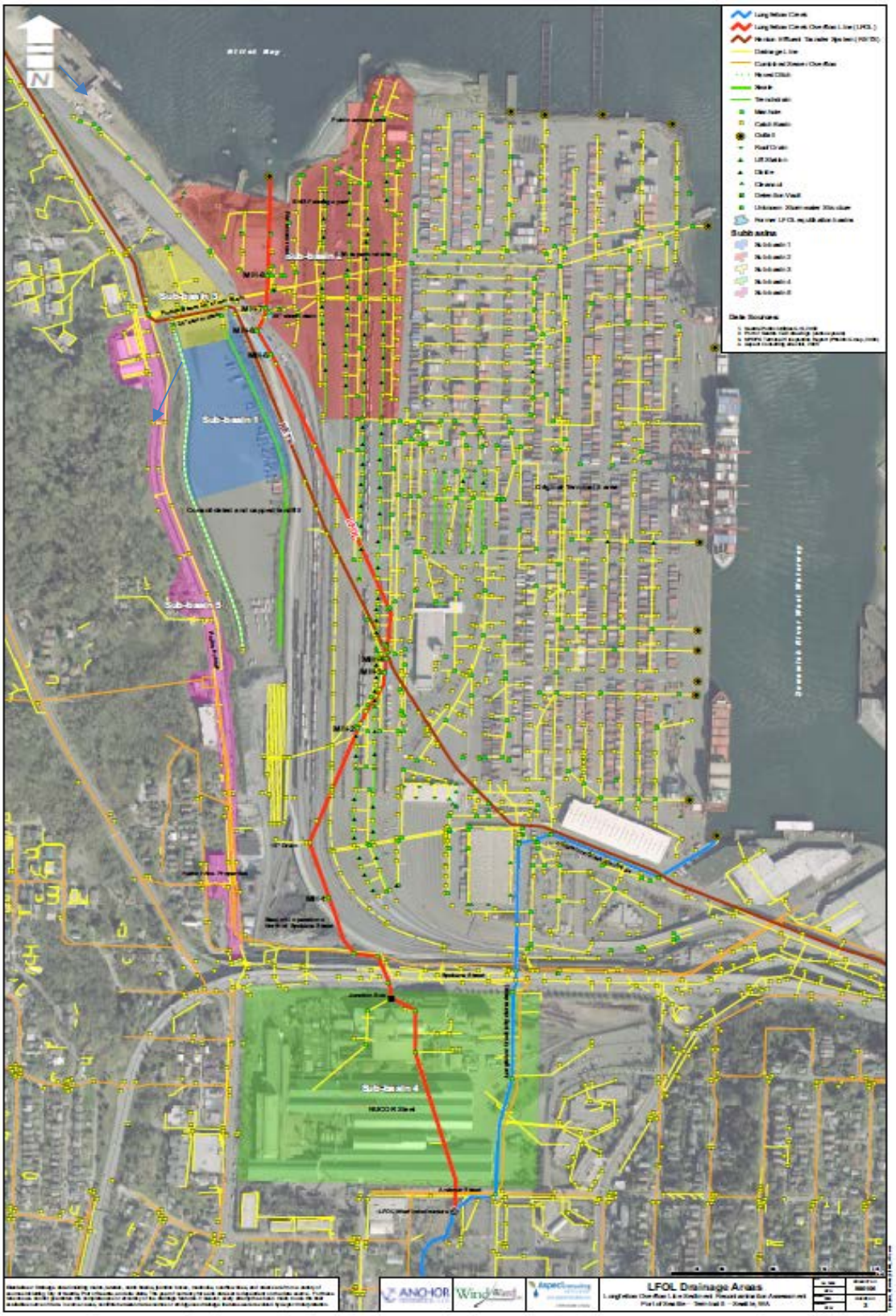


Figure 2: Facility location (in green shade) and Seattle storm drain system.

A. Facility description

History

Nucor Steel Seattle, Inc., (Nucor) operates a steel forming facility on the Duwamish tide flats in West Seattle. This facility was owned by Birmingham Steel Corporation (BSC) between May 1991 and December 2002. In December of 2002, Nucor Steel Seattle, Inc., purchased the property from BSC and began operating in that month. Two location maps are included as Figure 1 and 2.

Industrial Process

The facility consists of a melt shop, merchant mill, and support facilities. The melt shop is currently permitted by Puget Sound Clean Air Agency to produce 1.1 million tons of steel billets per year. The billets are then used to manufacture reinforcing steel at a rate of approximately 60,000 tons per month of finished product. The majority of water used by the mill is used to cool steel rolling machine parts in the production lines.

All process wastewaters operate on closed-loop recirculation systems. Solids are effectively removed from the contact cooling waters used in the billet and rolling mills. The separated water is returned to the system for reuse. Three non-contact cooling water systems also operate using recirculation through a series of cooling towers.

Operations and associated wastewater discharges at this facility consist of the following steps:

1) Receipt, storage, and separation of scrap material.
2) Melt down in the electric arc furnace. The equipment requires up to 90,000 gallons per day (gpd) of non-contact cooling water. Of this, up to 80,000 gpd are lost to the atmosphere while 10,000 gpd are recycled into the caster contact water system.
3) Billet formation and continuous caster - The molten steel enters the continuous casting mold where steel billets are formed. Cooling water used at this stage is directly sprayed on the billets. This contact cooling water is high in solids content and is discharged through a separator system to a scale pit and then reused in the process. Solids are retained in the scale pit, collected, and sold. This cooling water is discharged to King County POTW, under King County Major Discharge Authorization Number 4012-04.
4) Billet reheat in reheat furnace- Billets are reheated prior to rolling into finished product. Non-contact cooling water for this operation averages 15,000 gpd, and is recycled into the rolling mill contact water system.

5) Finished good rolling in rolling mill - The rollers that support the steel bars during the milling process require cooling. This contact cooling water also removes scale. The water is sent through the same solids separator and a scale pit to remove solids and oil before it is reused in the process. The unused water is discharged to King County POTW.

6) Baghouse- A baghouse cooling system circulates water through cooling jackets attached to the bearings of the fans. This water is cooled in a cooling tower and recycled back to the system.

7) When feasible, water in the wastewater treatment system is recycled into the process. Excess water is discharged to Elliott Bay.

Discharge and Treatment System Description

The discharge from the plant consists of stormwater, and ground water infiltrate (see Figures 4, 5, and 6 in Appendix D). Occasionally, a minimal volume of non-contact cooling water encountered during emergency maintenance from failed equipment or water described below (bullet #4) are released. This combined water is treated and discharged through Outfall 001 which connects to the 42-inch City storm sewer line that travels north, passing Spokane Street, underneath Terminal 5 property and eventually entering into Elliott Bay.

- Stormwater is generated through precipitation runoff on the 52-acre site. Using the Western Washington Hydrology model, the volume of a 2-year 1-hour peak storm event generates 3,600 gpm of runoff.
- Groundwater infiltrate is the result of the inflow of groundwater to the underground stormwater collection and conveyance system at Nucor.
- Non-contact cooling water is generated from the electric arc furnace and reheat furnaces. The furnace cooling system recirculates water through water jackets around the main furnaces and blows down to the contact water systems, which are then occasionally blown down to King County Sewer. However occasional emergency maintenance situation will occur such as failed pipe or heat exchanger that requires discharge of non-contact cooling water to the on-site stormwater treatment system. The water used for cooling at the steel mill comes from a combination of city water, well water (restricted volume by water rights), and the recycled water from the treatment system.
- Infrequently, waters such as fire hydrant flushing, potable water, uncontaminated condensate from air conditions, coolers/chiller and other compressors and outside storage of refrigerated gases and liquids, water used for dust suppression as required by the facility's air quality permit, external building wash down, incidental windblown mist from cooling towers that collects on rooftops or adjacent portions of the facility but not intentionally discharge from the cooling tower can commingle in the stormwater treatment system and subsequently discharge.

All Known Available and Reasonable Methods of Treatment (AKART)

In 1996, the facility performed an AKART analysis which reviewed potential treatment alternatives for the waste streams generated from the site (Golder Associates, 1996a). The AKART evaluation process was designed to select the most appropriate technology for treatment, which would subsequently be used to determine technology-based standards. The AKART treatment system may not necessarily be adequate to attain water quality or human health-based standards. Based on the AKART analysis, Ecology determined the most appropriate and reasonable treatment system for the facility to be "baseline flow treatment with particulate removal and activated carbon adsorption." "Baseline flow" (250 gpm) represents the maximum combined non-contact cooling water and ground water infiltrate flows measured at the facility over a 13-month period. Ecology approved the subsequent engineering report which provided the design and sizing calculations for the AKART treatment option (Golder Associates, 1996b). Construction of the AKART treatment system was completed in 1997 and subsequently upgraded in 1998, 2001, 2008 and 2017.

Based on the last upgrade in 2017, the facility made two changes to the treatment system. Those changes consist of adding two sand filter skids with four tanks each, and adding three 5,000 lb GAC filters in series with full redundancy. The addition of the sand filters further reduces fines from entering the GAC tanks. The primarily purpose of the GAC tanks is to treat PCBs.

The treatment system consists of the following components (see Figure 5):

1) Collection of the wastewater by the conveyance system into the junction box;
2) pH adjustment by CO_2 sparging;
3) Coagulation;
4) Sedimentation by channel flow through a series of baker tanks;
5) Sand filtration using two sets of four-in-line san filter vessels;
6) Two 5,000 lb GAC filters in series for polishing with one for reserve.

Outfall Description

Nucor outfall pipeline starts where twin 24-inch diameter drop shafts transfer treated water directly to Nucor's 48-inch outfall pipe. The outfall pipe then runs approximately 65-feet to the property line and continues about another 100 feet to where it connects with the 42-inch City storm sewer line. This City storm sewer line, which is contributed to by multiple industrial and residential entities, travels north, underneath the Terminal 5 property for approximately 4,000 feet before reaching Elliot Bay.

Wastewater Discharge to King County Sanitary Sewer System

All of the process cooling water are discharged to the sanitary sewer system, under King County Major Discharge Authorization Number 4012-04. This permit limits flow to 250,000 gpd, and concentrations for some pollutant of concerns including metals.

Slag and Mill Scale Storage Area in the North Parcel

Nucor stores steel slag and mill scale on two properties north of the main steel mill referred to collectively as the North Parcel (Figure 7). The approximately 8-acre North Parcel is located north of the West Seattle Bridge. The southern portion (3 acres) of the North Parcel is owned by Nucor, and is located adjacent to the west of the Port of Seattle (POS) property referred to as Remediation Area 2 (RA2). The northern portion (5 acres) of the North Parcel is on land leased from POS within the area referred to as Remediation Area 3 (RA3) as shown on Figure 7. Other adjacent remediation areas in the vicinity of the North Parcel are collectively referred to as the Southwest Harbor Project (SWHP). The area directly underlying the North Parcel was largely filled with slag. The northern portion of the North Parcel also received refuse as part of the West Seattle Municipal Landfill.

Southern Portion: The 3-acre southern portion of the North Parcel was once part of a larger parcel owned by two previous steel mill operators and has historically been used for the storage of slag, mill scale and solid waste (e.g. construction rubble). Currently, mill scale is stored on a covered concrete pad. Two circular concrete walls (aka ringwalls) located in this area were formerly used as secondary containment for aboveground fuel oil storage tanks. The east ringwall is paved and used as a wet material storage pad. A relatively small amount of slag is stored in uncovered piles southeast of the ringwalls.

Northern Portion: The 5-acre northern portion of the North Parcel comprises POS-owned property leased to Nucor. Historical use of this property included municipal(?) landfill operations which were consolidated and capped as part of RA3 remedial actions. This area is also underlain largely by slag fill. However, the RA3 remedy included the installation of a geomembrane cap across most of the RA3 area (Ecology, 2012a). The northern portion of the North Parcel is currently comprised almost entirely of uncovered slag storage.

Slag and mill scale are the co-products of the steel-making process. These co-products contain metallic iron, zinc, lead, and manganese, as well as the metal oxides. These products are sold as a commodity to many different industries (e.g. the construction aggregate industry). Sampling of this material in 1987 indicated it was not classified as toxic for metals according RCRA (Tetra Tech, 1989). When present, arsenic is typically found at relatively low concentrations in slag produced by Nucor and was not detected in leachability (TCLP) tests at a detection limit of 0.005 mg/L (HartCrowser, 2004). Extensive sampling of the slag and mill scale compiled in the RI/FS report for RA2 indicated that although steel mill slag typically contains metals, there is substantial data indicating these metals are not readily

mobile (Black & Veatch, 1995). However, steel slag is mildly alkaline, with a solution pH generally in the range of 8 to 10 standard units.

Stormwater from the North Parcel infiltrates into the ground and does not leave the site as surface runoff (HartCrowser, 2004). According to Nucor, no surface runoff has been observed from this parcel during heavy storm events. Ecology confirmed this through several inspections conducted during the rainy season.

Ecology has requested that Nucor consider groundwater monitoring to assess water infiltration through slag storage at the North Parcel area. Nucor retained AECOM to conduct a study and model the pH of groundwater receiving stormwater inputs from the slag storage area in the North Parcel to its eventually discharge into Elliot Bay relative to groundwater and surface water quality criteria for pH.

The study concluded that conditions at the North Parcel preclude the implementation of a groundwater monitoring system. Those conditions are listed below:

- The prevalence of slag fill prevents differentiating any impacts of slag storage from underlying historic fill materials on groundwater pH.
- The presence of the geomembrane engineered remedial measure beneath and down gradient of the slag storage area precludes monitoring well installation.
- Areas further down gradient of the North Parcel are POS property and are not accessible to Nucor.

Furthermore, conditions indicate that existing stormwater controls at the property are protective of groundwater uses. Institutional controls limit land and groundwater use in the SWHP down gradient of the North Parcel, limiting potential down gradient groundwater receptors to ecological receptors in Elliot Bay. In addition, SWHP groundwater monitoring from 2008-2010 demonstrated that pH in the Fill Aquifer down gradient of the North Parcel and slag fill ranged between 6.14 and 8.13, indicating that localized alkaline conditions, if any, adjacent to the property are buffered, resulting in pH within the groundwater quality criteria down gradient of the North Parcel. The conclusion is supported by modeling results using 1-D reactive transport modeling with Geochemist's Workbench X1t code (AECOM, October 2019 and March 2020).

Based on the information presented above, Ecology has determined stormwater monitoring for the slag storage area at the North Parcel is not necessary in this permit (WA00031305).

Ringwalls - Alternative Discharge Option During Emergency Situations

Two circular concrete walls (aka ringwalls) located in the southern portion of the North Parcel were formerly used as secondary containment for aboveground fuel oil storage tanks. The tanks were decommissioned in the late 1970's. The ringwalls

are circular concrete walls constructed on compacted fill material, and are occasionally used as temporary holding structures and infiltration basins for stormwater.

Ringwall E and Ringwall W are approximately 112 and 104 feet in diameter, respectively. Both ringwalls are about 12 feet high, with walls about 10 inches thick. The ringwalls are about 6 feet apart. The floor of Ringwall E was sealed with pavement in 2009. It is used as a storage tank to hold sludge from the steel mill prior to haul off-site for disposal. The floor of Ringwall W is composed of slag fill, with a central area approximately 60 feet in diameter covered with crushed gravel and sand. A structural integrity review test was performed for the ringwalls in 1994 (1994 Engineering Report-Stormwater Management prepared for Birmingham Steel Corp by HartCrowser). The test indicated the integrity of the ringwalls to be intact.

The water pumped into Ringwall W infiltrates through the underlying soil at the base of the ringwalls. A pilot-scale infiltration test conducted as part of the 1994 engineering report, indicated a design infiltration rate during saturated conditions (vertical velocity) of 2.35 inches per hour.

Groundwater in the shallow aquifer unit beneath the ringwalls generally flows to the north and east where it discharges into Elliott Bay. In the area of the proposed infiltration, the horizontal direction of flow in the shallow fill is generally to the east. Groundwater flow direction in the fill is strongly influenced by the presence of the permeable gravel fill materials used to backfill the 72-inch storm drain.

Excess Flow During Heavy Storm Events

There are two scenarios where Nucor encounters excess flow in the treatment system. One scenario is during a heavy storm event where flow into the treatment system exceeds the treatment system design flow of 250 gpm, without overflow from the Longfellow Creek. During situations like this, King County would most likely not accept the flow to their sanitary sewer system. The other scenario is during heavy storm events with the addition of overflow from Longfellow Creek where flow into the treatment system exceeds 250 gpm.

When either scenario occurs, the excess flow (overflow weir from the junction box or inflow vault, see Figure 4) is discharged directly to Elliott Bay.

Overflow from Longfellow Creek

Occasionally, localized flooding in Longfellow Creek impacts Nucor's discharge. A 60-inch City of Seattle storm sewer redirects Longfellow Creek under normal flow conditions around the Nucor buildings, on the east side under Nucor's property. However, the 60-inch line is designed to handle a flow of only 110 cubic feet per second (cfs). A diversion dam designed and installed by the City of Seattle in the creek, allows overflow into the 42-inch storm line under Nucor's property. The

Longfellow Creek dam is designed to divert stormwater flows associated with 24-hour storm events having a recurrent interval greater than two years. In the past, Longfellow Creek has overflowed into the 42-inch line and has created a flood condition on the Nucor site. Management of stormwater on this property must, therefore, have contingency provisions for Longfellow Creek overflow. Consequently, the design of the AKART treatment system allows flows reaching the junction box (inflow vault) in excess of the 250 gpm design baseline flow to bypass the sedimentation and carbon adsorption units and be released directly to Elliott Bay via Outfall 001.

The last overflow event from Longfellow Creek reported by Nucor was in December 2019.

B. Description of the receiving water

Nucor discharges to Elliott Bay which is listed for these use designations in Chapter 173-201A WAC, Table 612:

Aquatic life use: Excellent quality
Recreation use: Primary contact recreation
Harvest use: All
Miscellaneous uses: Commerce and Navigation, Boating, Aesthetics, and wildlife habitat

Elliott Bay is a salt water bay that extends southeastward between West Point in the north and Alki Point in the south. The Duwamish Waterway empties into this bay. Seattle was founded on this body of water in the 1850s and has since grown to encompass it completely. It is used extensively for commercial shipping, boating, and other recreation.

C. Wastewater characterization

Nucor reported the concentration of pollutants in the discharge in the permit application and in discharge monitoring reports. The tabulated data represents the quality of the wastewater effluent discharged from June 2015 to June 2020. The wastewater effluent is characterized as follows:

Table 2 Wastewater Characterization

Parameter	Units	# of Samples	Average Value	Maximum Value	Permit Limit (Daily Max)
Flow	gpd	59	250,000	360,000	360,000
Copper	ug/L	59	1.55	7.13	--
Cadmium	ug/L	15	0.09	0.1	--
Oil & grease	mg/L	15	4.9	6	--
PCB	ug/L	59	0.01	0.057[1]	0.05
Temperature	°C	59	15.3	20.4	--

Parameter	Units	# of Samples	Minimum Value	Maximum Value	Permit Limit
pH	standard units	**59**	**7.41**	**8.89**	**Between the range of 6 and 9**

[1]Nucor reported one PCB sample result exceeded the QL value of 0.05 ug/L in December 2017. The reason for PCB exceedance is unknown.

D. Summary of compliance with previous permit Issued

The previous permit placed effluent limits on flow, pH and PCBs.

In general, Nucor has complied with the effluent limits and permit conditions throughout the duration of the permit issued on March 24, 2011 with the exception of one PCB exceedance. Of the 59 samples conducted from June 2015 to June 2020, only one exceedance occurred and the reason for the exceedance is unknown. A follow up sample was conducted and the result indicates compliance with the permit limit. Ecology assessed compliance based on its review of the facility's information in the Permitting and Reporting Information System (PARIS), discharge monitoring reports (DMRs) and on facility inspections.

Table 3 Permit Submittals

Reports	Submitted date
Treatment System Operating Plan	6/19/2019 (annual review conducted 6/18/20)
Spill Plan Update	8/26/20

Reports	Submitted date
Stormwater Pollution Prevention Plan Update	8/26/20
Solid Waste Plan	09/23/2015

E. State environmental policy act (SEPA) compliance

State law exempts the issuance, reissuance or modification of any wastewater discharge permit from the SEPA process as long as the permit contains conditions that are no less stringent than federal and state rules and regulations (RCW 43.21C.0383). The exemption applies only to existing discharges, not to new discharges. This is an existing discharge.

Proposed Permit Limits

Federal and state regulations require that effluent limits in an NPDES permit must be either technology- or water quality-based.

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).
- Water quality-based limits are calculated so that the effluent will comply with the 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 (40 CFR 131.36).
- Ecology must apply the most stringent of these limits to each parameter of concern. These limits are described below.

The limits in this permit reflect information received in the application and from supporting reports (engineering, hydrogeology, etc.). Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the state of Washington. Ecology does not develop effluent limits for all reported pollutants. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation.

Ecology does not usually develop limits for pollutants not reported in the permit application but may be present in the discharge. The permit does not authorize discharge of the non-reported pollutants. During the five-year permit term, the facility's effluent discharge conditions may change from those conditions reported in the permit application. The facility must notify Ecology if significant changes occur in any constituent [40 CFR 122.42(a)]. Until Ecology modifies the permit to reflect additional discharge of pollutants, a permitted facility could be violating its permit.

A. Design criteria

Under WAC 173-220-150 (1)(g), neither flows nor waste loadings may exceed approved design criteria. The facility conducted an AKART analysis in 1996. Based on the analysis (Golder Associates, 1996a), Ecology determined the most appropriate and reasonable treatment system for the facility to be "baseline flow treatment with particulate removal and activated carbon adsorption at a rate of 250 gpm." Ecology approved the subsequent engineering report, which provided the design and sizing calculations for the proposed treatment system (Golder Associates, 1996b).

Storm events that exceed the hydraulic design criteria of stormwater treatment system may bypass the treatment system because Ecology has determined the system meets AKART requirements. Ecology would not consider this a violation of the conditions of the permit, if the bypass can meet water quality criteria. AKART for stormwater is constantly progressing and, as technology advances, facilities will have more cost effective, more efficient, and higher capacity treatment system options available. Ecology expects the facility to meet AKART and make the necessary improvements to its treatment system as the treatment technology evolves.

Table 4 Design Criteria for Existing Treatment System

Parameter	Design Quantity
Maximum design flow rate	360,000 gpd (250 gpm)

B. Technology-based effluent limits

Nucor is a categorical industry subject to Code of Federal Regulations, 40 CFR 420 Subpart D – Steelmaking, Subpart F – Continuous Casting, and Subpart G – Hot forming Subcategories. The facility falls under further categorization as a section mills – (1) carbon. The categorical parameters listed in these effluent guidelines are TSS, oil & grease, and pH for surface water discharge. However, since Nucor discharges process wastewater to the sanitary sewer system, these categorical limits would not apply to the facility.

The remaining waste streams from Nucor are stormwater and groundwater infiltration, and occasional unanticipated non-contact cooling water encountered when King County restricts flow into the sewer system during extreme heavy storm events with hydraulic backup problems at the plant. Nucor's combined wastewater is treated and discharged to Elliott Bay, subject to meeting the 40 CFR 420 surface water quality criteria.

pH—The technology-based limitation (categorical effluent limit) for pH is 6.0 to 9.0 standards units. This limitation is based on the demonstrated performance of simple

equalization or neutralization. Since extreme pH discharge is not a process pollutant of concern at this facility, the discharge of effluent outside the 6.0 to 9.0 range may indicate spills or the mismanagement of waste streams.

Table 5 Technology-based Limits

Parameter	Daily Minimum	Daily Maximum
pH	6.0 standard units	9.0 standard units

C. Surface water quality-based effluent limits

The Washington State surface water quality standards (chapter 173-201A WAC) are designed to protect existing water quality and preserve the beneficial uses of Washington's surface waters. Waste discharge permits must include conditions that ensure the discharge will meet the surface water quality standards (WAC 173-201A-510). Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin wide total maximum daily load study (TMDL).

Numerical criteria for the protection of aquatic life and recreation

Numerical water quality criteria are listed in the water quality standards for surface waters (chapter 173-201A WAC). They specify the maximum levels of pollutants allowed in receiving water to protect aquatic life and recreation in and on the water. Ecology uses numerical criteria 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 limits, the discharge must meet the water quality-based limits.

Numerical criteria for the protection of human health

Effective numeric water quality criteria for the protection of human health are promulgated in Chapter 173-201A WAC and 40 CFR 131.45. These criteria are designed to protect humans from exposure to pollutants linked to cancer and other diseases, based on consuming fish and shellfish and drinking contaminated surface waters. The water quality standards also include radionuclide criteria to protect humans from the effects of radioactive substances (See Section H-Human Health for PCB discussion).

Narrative criteria

Narrative water quality criteria (e.g., WAC 173-201A-240(1); 2006) limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge to levels below those which have the potential to:

- Adversely affect designated water uses.

- Cause acute or chronic toxicity to biota.
- Impair aesthetic values.
- Adversely affect human health.

Narrative criteria protect the specific designated uses of all fresh waters (WAC 173-201A-200, 2006) and of all marine waters (WAC 173-201A-210, 2006) in the state of Washington.

Antidegradation

Description--The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330; 2006) is to:

- Restore and maintain the highest possible quality of the surface waters of Washington.
- Describe situations under which water quality may be lowered from its current condition.
- Apply to human activities that are likely to have an impact on the water quality of surface water.
- Ensure that all human activities likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment (AKART).
- Apply three tiers of protection (described below) for surface waters of the state.

Tier I ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions. Tier II ensures that waters of a higher quality than the criteria assigned are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities. Tier III prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

Facility Specific Requirements--This facility must meet Tier I requirements.

- Dischargers must maintain and protect existing and designated uses. Ecology must not allow any degradation that will interfere with, or become injurious to, existing or designated uses, except as provided for in chapter 173-201A WAC.
- For waters that do not meet assigned criteria, or protect existing or designated uses, Ecology will take appropriate and definitive steps to bring the water quality back into compliance with the water quality standards.
- Whenever the natural conditions of a water body are of a lower quality than the assigned criteria, the natural conditions constitute the water quality criteria. Where water quality criteria are not met because of natural conditions, human

actions are not allowed to further lower the water quality, except where explicitly allowed in chapter 173-201A WAC.

Ecology's analysis described in this section of the fact sheet demonstrates that the proposed permit conditions will protect existing and designated uses of the receiving water.

Mixing zones

A mixing zone is the defined area in the receiving water surrounding the discharge port(s), where wastewater mixes with receiving water. Within mixing zones the pollutant concentrations may exceed water quality numeric standards, so long as the discharge doesn't interfere with designated uses of the receiving water body (for example, recreation, water supply, and aquatic life and wildlife habitat, etc.) The pollutant concentrations outside of the mixing zones must meet water quality numeric standards.

State and federal rules allow mixing zones because the concentrations and effects of most pollutants diminish rapidly after discharge, due to dilution. Ecology defines mixing zone sizes to limit the amount of time any exposure to the end-of-pipe discharge could harm water quality, plants, or fish.

The state's water quality standards allow Ecology to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already receive all known, available, and reasonable methods of prevention, control, and treatment (AKART). Mixing zones typically require compliance with water quality criteria within a specified distance from the point of discharge and must not use more than 25% of the available width of the water body for dilution [WAC 173-201A-400 (7) (b)].

Hydraulic modeling is used to estimate the amount of mixing within the mixing zone. Through modeling Ecology determines the potential for violating the water quality standards at the edge of the mixing zone and derives any necessary effluent limits. Steady-state models are the most frequently used tools for conducting mixing zone analyses. Ecology chooses values for each effluent and for receiving water variables that correspond to the time period when the most critical condition is likely to occur (see Ecology's *Permit Writer's Manual*). Each critical condition parameter, by itself, has a low probability of occurrence and the resulting dilution factor is conservative. The term "reasonable worst-case" applies to these values.

The mixing zone analysis produces a numerical value called a dilution factor (DF). A dilution factor represents the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. For example, a dilution factor of 4 means the effluent is 25% and the receiving water is 75% of the total volume of water at the boundary of the mixing zone. Ecology uses dilution factors with the water quality criteria to calculate reasonable potentials and effluent limits. Water quality standards include both aquatic life-based criteria and human health-based

criteria. The former are applied at both the acute and chronic mixing zone boundaries; the latter are applied only at the chronic boundary. The concentration of pollutants at the boundaries of any of these mixing zones may not exceed the numerical criteria for that zone.

Each aquatic life *acute* criterion is based on the assumption that organisms are not exposed to that concentration for more than one hour and more often than one exposure in three years. Each aquatic life *chronic* criterion is based on the assumption that organisms are not exposed to that concentration for more than four consecutive days and more often than once in three years.

The two types of human health-based water quality criteria distinguish between those pollutants linked to non-cancer effects (non-carcinogenic) and those linked to cancer effects (carcinogenic). The human health-based water quality criteria incorporate several exposure and risk assumptions. These assumptions include:

- A 70-year lifetime of daily exposures.
- An ingestion rate for fish or shellfish measured in kg/day.
- An ingestion rate of two and four tenths (2.4) liters/day for drinking water (increased from two liters/day in the 2016 Water Quality Standards update).
- A one-in-one-million ($1x10^{-6}$) cancer risk for carcinogenic chemicals.

This permit authorizes a small acute mixing zone, surrounded by a chronic mixing zone around the point of discharge (WAC 173-201A-400). The water quality standards impose certain conditions before allowing the discharger a mixing zone:

1. **Ecology must specify both the allowed size and location in a permit.**

   The proposed permit specifies the size and location of the allowed mixing zone (as specified below).

2. **The facility must fully apply "all known, available, and reasonable methods of prevention, control and treatment" (AKART) to its discharge.**

   Ecology has determined that the treatment provided at Nucor meets the requirements of AKART (see "Technology-based Limits").

3. **Ecology must consider critical discharge conditions.**

   Surface water quality-based limits are derived for the water body's critical condition (the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or designated waterbody uses). The critical discharge condition is often pollutant-specific or waterbody-specific.

   Critical discharge conditions are those conditions that result in reduced dilution or increased effect of the pollutant. Factors affecting dilution include the depth

of water, the density stratification in the water column, the currents, and the rate of discharge. Density stratification is determined by the salinity and temperature of the receiving water. Temperatures are warmer in the surface waters in summer. Therefore, density stratification is generally greatest during the summer months. Density stratification affects how far up in the water column a freshwater plume may rise. The rate of mixing is greatest when an effluent is rising. The effluent stops rising when the mixed effluent is the same density as the surrounding water. After the effluent stops rising, the rate of mixing is much more gradual. Water depth can affect dilution when a plume might rise to the surface when there is little or no stratification. Ecology uses the water depth at mean lower low water (MLLW) for marine waters. Ecology's *Permit Writer's Manual* describes additional guidance on criteria/design conditions for determining dilution factors.

The following critical conditions were used to model the discharge:

- Water depth at MLLW of 7.5 feet.
- Density profile with a difference of 22.92 sigma-t units between 7.5 feet and the surface.
- Average depth of the discharge above the sea floor within 200 feet of the discharge is 3 feet.
- Ambient current speed: 1.0 cm/sec perpendicular to the outfall.
- Effluent flow rate, yearly average is 150 gpm.
- Average effluent temperature:
  minimum 12°C
  high 24°C
- Number of ports and diameter: one 7-foot pipe but only 4 feet in effective diameter because of sediment deposition in the pipe.
- The horizontal velocity of the discharge will not exceed 0.019 m/sec.

4. Supporting information must clearly indicate the mixing zone would not:

- Have a reasonable potential to cause the loss of sensitive or important habitat,
- Substantially interfere with the existing or characteristic uses of the water body,
- Result in damage to the ecosystem, or
- Adversely affect public health.

Ecology established Washington State water quality criteria for toxic chemicals using EPA criteria. EPA developed the criteria using toxicity tests with numerous organisms and set the criteria to generally protect the species

tested and to fully protect all commercially and recreationally important species.

EPA sets acute criteria for toxic chemicals assuming organisms are exposed to the pollutant at the criteria concentration for one hour. They set chronic standards assuming organisms are exposed to the pollutant at the criteria concentration for four days. Dilution modeling under critical conditions generally shows that both acute and chronic criteria concentrations are reached within minutes of discharge.

The discharge plume does not impact drifting and non-strong swimming organisms because they cannot stay in the plume close to the outfall long enough to be affected. Strong swimming fish could maintain a position within the plume, but they can also avoid the discharge by swimming away. Mixing zones generally do not affect benthic organisms (bottom dwellers) because the buoyant plume rises in the water column. Ecology has additionally determined that the effluent will not exceed 33 degrees C for more than two seconds after discharge; and that the temperature of the water will not create lethal conditions or blockages to fish migration.

Ecology evaluates the cumulative toxicity of an effluent by testing the discharge with whole effluent toxicity (WET) testing.

Ecology reviewed the above information, the specific information on the characteristics of the discharge, the receiving water characteristics and the discharge location. Based on this review, Ecology concluded that the discharge does not have a reasonable potential to cause the loss of sensitive or important habitat, substantially interfere with existing or characteristics uses, result in damage to the ecosystem, or adversely affect public health if the permit limits are met.

5. The discharge/receiving water mixture must not exceed water quality criteria outside the boundary of a mixing zone.

Ecology conducted a reasonable potential analysis, using procedures established by the EPA and by Ecology, for each pollutant of concern and concluded the discharge/receiving water mixture will not violate water quality criteria outside the boundary of the mixing zone if permit limits are met.

6. The size of the mixing zone and the concentrations of the pollutants must be minimized.

At any given time, the effluent plume uses only a portion of the acute and chronic mixing zone, which minimizes the volume of water involved in mixing. Because tidal currents change direction, the plume orientation within the mixing zone changes. The plume mixes as it rises through the water column

therefore much of the receiving water volume at lower depths in the mixing zone is not mixed with discharge. Similarly, because the discharge may stop rising at some depth due to density stratification, waters above that depth will not mix with the discharge. Ecology determined it is impractical to specify in the permit the actual, much more limited volume in which the dilution occurs as the plume rises and moves with the current.

Ecology minimizes the size of the mixing zone (in the form of the dilution factor) using design criteria with a low probability of occurrence. For example, Ecology uses the expected 95th percentile pollutant concentration, the 90th percentile background concentration, the centerline dilution factor, and the lowest flow occurring once in every ten years to perform the reasonable potential analysis.

Because of the above reasons, Ecology has effectively minimized the size of the mixing zone authorized in the proposed permit.

7. Maximum size of mixing zone.

The authorized mixing zone does not exceed the maximum size restriction.

8. Acute mixing zone.

- **The discharge/receiving water mixture must comply with acute criteria as near to the point of discharge as practicably attainable.**

  Ecology determined the acute criteria will be met at 10% of the distance of the chronic mixing zone.

- **The pollutant concentration, duration, and frequency of exposure to the discharge will not create a barrier to migration or translocation of indigenous organisms to a degree that has the potential to cause damage to the ecosystem.**

  As described above, the toxicity of any pollutant depends upon the exposure, the pollutant concentration, and the time the organism is exposed to that concentration. Authorizing a limited acute mixing zone for this discharge assures that it will not create a barrier to migration. The effluent from this discharge will rise as it enters the receiving water, assuring that the rising effluent will not cause translocation of indigenous organisms near the point of discharge (below the rising effluent).

- **Comply with size restrictions.**

  The mixing zone authorized for this discharge complies with the size restrictions published in chapter 173-201A WAC.

D. Designated uses and surface water quality criteria

Applicable designated uses and surface water quality criteria are defined in chapter 173-201A WAC. In addition, the U.S. EPA set human health criteria for toxic pollutants (EPA 1992). The table included below summarizes the criteria applicable to this facility's discharge.

- Aquatic life uses are designated using the following general categories. All indigenous fish and non-fish aquatic species must be protected in waters of the state.
  a. Extraordinary quality salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.
  b. Excellent quality salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.
  c. Good quality salmonid migration and rearing; other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.
  d. Fair quality salmonid and other fish migration.

The Aquatic Life Uses and the associated criteria for this receiving water are identified in the table below.

Table 6 Marine Aquatic Life Uses and Associated Criteria

Excellent Quality	
Temperature Criteria – Highest 1D MAX	16°C (60.8°F)
Dissolved Oxygen Criteria – Lowest 1-Day Minimum	6.0 mg/L
Turbidity Criteria	• 5 NTU over background when the background is 50 NTU or less; or • A 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
pH Criteria	pH must be within the range of 7.0 to 8.5 with a human-caused variation within the above range of less than 0.5 units.

- To protect shellfish harvesting, fecal coliform organism levels must not exceed a geometric mean value of 14 colonies/100 mL, and not have more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 43 colonies/100 mL.

The recreational uses for this receiving water are identified below.

Table 7 Recreational Uses

Recreational Use	Criteria
Primary Contact Recreation	Fecal coliform organism levels must not exceed a geometric mean value of 14 colonies/100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 43 colonies /100 mL.

- The *miscellaneous marine water uses* are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

E. Water quality impairments

Within a mile of the outfall, portions of Elliott Bay are included on the current 303(d) list for exceeding fecal coliform bacteria in the water column; PCBs, PAHs, and other organic chemicals in fish tissue; and over 45 organic, inorganic, and metallic compounds in sediment (many associated with the West Duwamish Waterway Record of Decision for Todd Pacific Shipyards. See https://fortress.wa.gov/ecy/waterqualityatlas/map.aspx) The impairments are shown by grids of about 200 acres or 0.3 sq. mile based on samples taken in that grid. The 303(d) list also reports numerous water quality exceedances in the marine sediments, however none of these are in the grid where this discharge occurs.

F. Evaluation of surface water quality-based effluent limits for narrative criteria

Ecology must consider the narrative criteria described in WAC 173-201A-160 when it determines permit limits and conditions. Narrative water quality criteria limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge which have the potential to adversely affect designated uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health.

Ecology considers narrative criteria when it evaluates the characteristics of the wastewater and when it implements all known, available, and reasonable methods of treatment and prevention (AKART) as described above in the technology-based limits section. When Ecology determines if a facility is meeting AKART it considers the pollutants in the wastewater and the adequacy of the treatment to prevent the violation of narrative criteria.

In addition, Ecology considers the toxicity of the wastewater discharge by requiring whole effluent toxicity (WET) testing when there is a reasonable potential for the discharge to contain toxics. Ecology's analysis of the need for WET testing for this discharge is described later in this fact sheet.

G. Evaluation of surface water quality-based effluent limits for numeric criteria

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). Toxic pollutants, for example, are near-field pollutants; their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as biological oxygen demand (BOD) 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.

With technology-based controls (AKART), predicted pollutant concentrations in the discharge exceed water quality criteria. Ecology therefore authorizes a mixing zone in accordance with the geometric configuration, flow restriction, and other restrictions imposed on mixing zones by chapter 173-201A WAC.

Chronic Mixing Zone--WAC 173-201A-400(7)(b) specifies that mixing zones must not extend in any horizontal direction from the discharge ports for a distance greater than 200 feet plus the depth of water over the discharge ports and may not occupy more than 25% of the width of the water body as measured during MLLW.

The horizontal distance of the chronic mixing zone for Outfall 002 (the actual discharge location to Elliot Bay) is 200 feet (192.5 feet plus 7.5 feet water depth). The mixing zone extends from the bottom to the top of the water column.

Acute Mixing Zone--WAC 173-201A-400(8)(b) specifies that in estuarine waters a zone where acute criteria may be exceeded must not extend beyond 10% of the distance established for the chronic zone.

The acute mixing zone for Outfall 002 extends 20 feet in any direction from the outfall pipe.

The Mixing Zone Study (Golder Associates, 1996) submitted by Nucor was approved by Ecology in 1996. The study used EPA “PLUMES” model (EPA/600/R-4/086, March 22, 1994). Based on the output results, the dilution factors for acute zone of 20 feet and chronic zone of 200 feet are summarized below. Human Health related dilution was not evaluated, but would be greater than 30 because those standards are applied to average conditions over a 70 year exposure period.

Table 8 Dilution Factors (DF)

Criteria	Acute	Chronic
Aquatic Life	11	30

Ecology determined the impacts of metals, other toxics, and temperature as described below, using the dilution factors in the above table. The derivation of surface water quality-based limits also takes into account the variability of pollutant concentrations in both the effluent and the receiving water.

pH--Compliance with the technology-based limits of 6.0 to 9.0 will assure compliance with the water quality standards of surface waters because of the high buffering capacity of marine water.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require Ecology to place limits in NPDES permits on toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. Ecology does not exempt facilities with technology-based effluent limits from meeting the surface water quality standards.

The following toxic pollutants are present in the discharge: copper, cadmium and PCBs. Ecology conducted a reasonable potential analysis on these parameters to determine whether it would require effluent limits in this permit.

Based on the data collected from June 2015 to May 2020, Ecology determined that copper, cadmium, and PCBs pose no reasonable potential to exceed the water quality criteria for aquatic toxicity at the edge of the approved mixing zone using procedures given in EPA, 1991 (**Appendix D**). Therefore, Ecology determined no limits are necessary for copper and cadmium in the permit. However, copper is required to continue to be monitored as scrap metal for melting is not all covered, occasional discharge of cooling water to the treatment system when the sanitary sewer experiences hydraulic back up problems during heavy storm events, and the water quality chronic criterion for copper is very low.

Despite the fact that the reasonable potential analysis indicates that a limit for PCB is not needed, Ecology proposes maintaining the previous permit limit for PCBs, which was set at the quantitation level of 0.05 µg/L using EPA test method 608.3, to remain in this permit. The reasoning is based on 1) the Nucor site area is known to be contaminated with PCBs, and the source for PCBs is the soil and groundwater, 2) the water quality aquatic life chronic criterion for PCBs is very low (0.03 µg/L), and 3) Elliott Bay continues to be listed in the current 303(d) for exceeding PCBs in the sediments and fish tissue.

Temperature--The state temperature standards for marine waters (WAC 173-201A-210) include multiple elements:

- Annual 1-Day maximum criteria
- Incremental warming restrictions
- Protections against acute effects

Ecology evaluates each criterion independently to determine reasonable potential and derive permit limits.

- Annual 1-Day maximum criteria

  Each marine water body has an annual maximum temperature criterion [WAC 173-201A-210(1)(c)(i)-(ii) and WAC 173-201A-612]. These threshold criteria (e.g., 13, 16, 19, 22°C) protect specific categories of aquatic life by controlling the effect of human actions on water column temperatures. The threshold criteria apply at the edge of the chronic mixing zone. Criteria for marine waters and some fresh waters are expressed at the highest 1-Day annual maximum temperature (1-DMax). Ecology concludes that there is no reasonable potential to exceed the temperature standard when the mixture of ambient water and effluent at the edge of the chronic mixing zone is less than the criteria of 13°C.

- Incremental warming criteria

  The water quality standards limit the amount of warming human sources can cause under specific situations [WAC 173-201A-210(1)(c)(i)-(ii)]. The incremental warming criteria apply at the edge of the chronic mixing zone. At locations and times when background temperatures are cooler than the assigned threshold criterion, point sources are permitted to warm the water by only a defined increment (T_i), calculated as:

  $$T_i = \frac{12}{(T_{amb} - 2)}$$

  This increment is permitted only to the extent doing so does not cause temperatures to exceed the annual maximum criteria.

  At locations and times when a threshold criterion is being exceeded due to natural conditions, all human sources, considered cumulatively, must not warm the water more than 0.3°C above the naturally warm condition. When Ecology has not yet completed a TMDL to address documented temperature impairments, our policy allows each point source to warm water at the edge of the chronic mixing zone by 0.3°C. This is true regardless of the background temperature and even if doing so would cause the temperature at the edge of a mixing zone to exceed the numeric threshold criteria. Allowing a 0.3°C warming for each point source is reasonable and protective where the dilution factor is based on 25% or less of the critical flow. This is because the fully mixed effect on temperature will only be a fraction of the 0.3°C cumulative allowance (0.075°C or less) for all human sources combined.

- Temperature Acute Effects

  1. Instantaneous lethality to passing fish: The upper 99th percentile daily maximum effluent temperature must not exceed 33°C; unless a dilution analysis indicates ambient temperatures will not exceed 33°C 2-seconds after discharge.

2. General lethality and migration blockage: Measurable (0.3°C) increases in temperature at the edge of a chronic mixing zone are not allowed when the receiving water temperature exceeds either a 1DMax of 23°C or a 7DADMax of 22°C.
3. Lethality to incubating fish: Human actions must not cause a measurable (0.3°C) warming above 17.5°C at locations where eggs are incubating.

Protections for temperature acute effects

Instantaneous lethality to passing fish: The upper 99th percentile daily maximum effluent temperature must not exceed 33°C, unless a dilution analysis indicates ambient temperatures will not exceed 33°C two seconds after discharge.

General lethality and migration blockage: Measurable (0.3°C) increases in temperature at the edge of a chronic mixing zone are not allowed when the receiving water temperature exceeds either a 1DMax of 23°C or a 7DADMax of 22°C.

Lethality to incubating fish: Human actions must not cause a measurable (0.3°C) warming above 17.5°C at locations where eggs are incubating.

Reasonable Potential Analysis

Annual summer maximum, and incremental warming criteria: Ecology calculated the reasonable potential for the discharge to exceed the annual summer maximum, and the incremental warming criteria at the edge of the chronic mixing zone during critical condition. No reasonable potential exists to exceed the temperature criterion where:

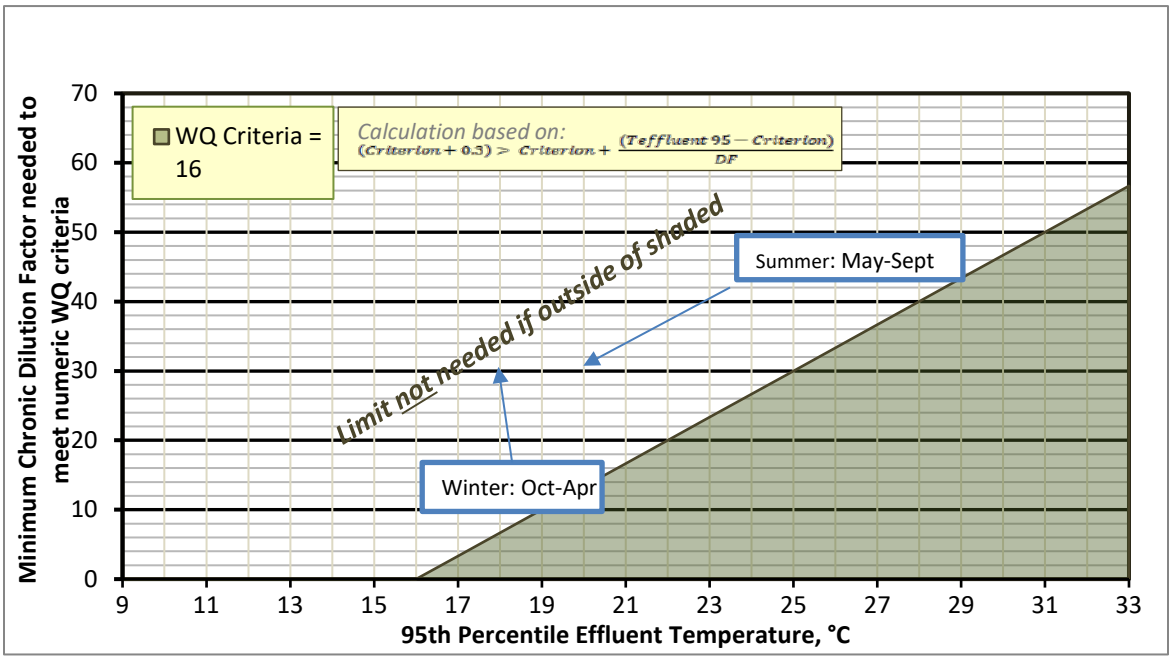
(Criterion + 0.3) > [Criterion + (Teffluent95 – Criterion)/DF].

Criterion = the applicable temperature criterion,

Teffluent95 = the 95th percentile of the effluent temperature,

DF = dilution factor.

The figure below graphically portrays the above equation and shows the conditions when a permit limit will apply.



Calculations yield the following:

Chronic dilution factor at mixing zone boundary is 30.

Summer: May-Sept (16 + 0.3) > (16 + (20.1– 16)/30) = 16.3>16.14 True

Winter: Oct-Apr (16 + 0.3) > (16 + (17.9– 16)/30) = 16.3>16.06 True

Based on the calculation above, a temperature limit is not needed in this permit. Furthermore, Nucor's effluent outfall line receives cooling underground by traveling at least 4,000 feet before it discharges into Elliott Bay. Thus, the effluent temperature is not expected to exceed the water quality temperature standard.

H. Human health

Effective numeric water quality criteria for the protection of human health are promulgated in Chapter 173-201A WAC and 40 CFR 131.45. These criteria are designed to protect humans from exposure to pollutants linked to cancer and other diseases, based on consuming fish and shellfish and drinking contaminated surface waters. The water quality standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

Ecology evaluated the discharge's potential to violate the water quality standards as required by 40 CFR 122.44(d) by following the procedures published in the *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001) and Ecology's *Permit Writer's Manual* to make a reasonable potential determination. The evaluation showed that the discharge has no reasonable potential to cause a violation of the human health marine criterion for PCB at the edge of the mixing zone (See Appendix D). Reasonable potential for human health

criteria is based on the 50th percentile effluent value. In this case, Nucor's data was mostly not detected at the quantitation level using approved test method 608 for PCB. Thus, the 50th percentile effluent value is calculated to be zero. However, given the human health marine criterion for PCB is so low (0.00017 ug/L), which is below the quantitation level of the PCB approved test method 608.3, Ecology proposes maintaining the previous permit limit for PCBs, which was set at the quantitation level of 0.05 µg/L using EPA test method 608.3, to remain in this permit.

I. Sediment quality

The aquatic sediment standards (chapter 173-204 WAC) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400). You can obtain additional information about sediments near the Outfall 001 at the Aquatic Lands Cleanup Unit website. https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Sediment-cleanups

Through a review of the discharger characteristics and of the effluent characteristics, Ecology determined that this discharge has no reasonable potential to violate the sediment management standards.

J. Groundwater quality limits

The groundwater quality standards (chapter 173-200 WAC) protect beneficial uses of groundwater. Permits issued by Ecology must not allow violations of those standards (WAC 173-200-100).

Stormwater from the North Parcel infiltrates into the ground surface. However, due to the reasons described under the North Parcel section on page 11 of the fact sheet, Ecology has determined setting groundwater limits at the North Parcel are not practical in this permit.

K. Whole effluent toxicity

The water quality standards for surface waters forbid discharge of effluent that has the potential to cause toxic effects in the receiving waters. Many toxic pollutants cannot be measured by commonly available detection methods. However, laboratory tests can measure toxicity directly by exposing living organisms to the wastewater and measuring their responses. These tests measure the aggregate toxicity of the whole effluent, so this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Using the screening criteria in chapter 173-205-040 WAC, Ecology determined that toxic effects caused by unidentified pollutants in the effluent are unlikely. Therefore,

this permit does not require WET testing. Ecology may require WET testing in the future if it receives information indicating that toxicity may be present in this effluent.

L. Comparison of effluent limits with the previous permit issued on March 24, 2011

Table 9 Comparison of Previous and Proposed Effluent Limits

	Previous Effluent Limits		Proposed Effluent Limits	
Parameter	**Average Monthly**	**Maximum Daily**	**Average Monthly**	**Maximum Daily**
Outfall 001				
Total Flow	---	360,000 gpd (250 gpm)		The same design flow rate is listed in S10 of the permit
PCBs	0.05 µg/L (Quantitation Level)	0.05 µg/L (Quantitation Level)	0.05 µg/L (Quantitation Level)	0.05 µg/L (Quantitation Level)

Parameter	Basis of Limit	Limit	Limit
pH	Technology	Between 6 and 9 s.u.	Between 6 and 9 s.u.

Monitoring Requirements

Ecology requires monitoring, recording, and reporting (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and that the discharge complies with the permit's effluent limits.

If a facility uses a contract laboratory to monitor wastewater, it must ensure that the laboratory uses the methods and meets or exceeds the method detection levels required by the permit. The permit describes when facilities may use alternative methods. It also describes what to do in certain situations when the laboratory encounters matrix effects. When a facility uses an alternative method as allowed by the permit, it must report the test method, detection level (DL), and quantitation level (QL) on the discharge monitoring report or in the required report.

A. Wastewater monitoring

Nucor monitors for flow, oil & grease, pH, temperature, copper, lead, zinc, and PCBs to characterize the effluent. A total of 3 influent samples is required during the dry period for PCBs. The monitoring schedule is detailed in the proposed permit under Special Condition S.2. Specified monitoring frequencies take into account the

quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring.

B. Lab accreditation

Ecology requires that facilities must use a laboratory registered or accredited under the provisions of chapter 173-50 WAC, Accreditation of Environmental Laboratories, to prepare all monitoring data (with the exception of certain parameters listed in the permit).

Other Permit Conditions

A. Reporting and record keeping

Ecology based Special Condition S3 on its authority to specify any appropriate reporting and record keeping requirements to prevent and control waste discharges (WAC 173-220-210).

B. Non routine and unanticipated wastewater

Occasionally, this facility may generate wastewater which was not characterized in the permit application because it is not a routine discharge and was not anticipated at the time of application. These wastes typically consist of waters used to pressure-test storage tanks or fire water systems or of leaks from drinking water systems.

The permit authorizes the discharge of non-routine and unanticipated wastewater under certain conditions. The facility must characterize these waste waters for pollutants and examine the opportunities for reuse. Depending on the nature and extent of pollutants in this wastewater and on any opportunities for reuse, Ecology may:

- Authorize the facility to discharge the wastewater.
- Require the facility to treat the wastewater.
- Require the facility to reuse the wastewater.

This permit condition includes provision for occasional local flooding. This facility is flooded when Longfellow Creek and stormwater flow exceeds the capacity of the City of Seattle conveyance system at the diversion dam at SW Andover Street. These events typically occur every couple of years (2-year storm event) and are beyond the facility's control. The facility's system is not designed to treat the flood water volume. The treatment system continues to operate during these events, but the flooding may overwhelm the capacity. The permit includes a separate reporting requirement for when flooding occurs.

C. Spill plan

This facility stores a quantity of chemicals on-site that have the potential to cause water pollution if accidentally released. Ecology can require a facility to develop best management plans to prevent this accidental release [Section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080].

Nucor 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 facility to update this plan and submit it to Ecology.

D. Solid waste control plan

Nucor may cause pollution of the waters of the state through inappropriate disposal of solid waste or through the release of leachate from solid waste.

This proposed permit requires Nucor to update the approved solid waste control plan designed to prevent solid waste from causing pollution of waters of the state. The facility must submit the updated plan to Ecology for review. You can obtain an Ecology guidance document, which describes how to develop a Solid Waste Control Plan, at: https://fortress.wa.gov/ecy/publications/documents/0710024.pdf .

G. Operation and maintenance manual

Ecology requires industries to take all reasonable steps to properly operate and maintain their wastewater treatment system in accordance with state and federal regulations [40 CFR 122.41(e) and WAC 173-220-150 (1)(g)]. One of the key components of the operation and maintenance manual is the Treatment System Operating Plan (TSOP). The facility has prepared and submitted a TSOP as required by state regulation for the construction of wastewater treatment facilities (WAC 173-240-150). This proposed permit requires Nucor to update the approved TSOP (S4.A of the permit). Implementation of the procedures in the operation and maintenance manual ensures the facility's compliance with the terms and limits in the permit.

H. Stormwater pollution prevention plan

In accordance with 40 CFR 122.44(k) and 40 CFR 122.44 (s), the proposed permit includes requirements for the development and implementation of a SWPPP along with BMPs to minimize or prevent the discharge of pollutants to waters of the state. BMPs constitute Best Conventional Pollutant Control Technology (BCT) and Best Available Technology Economically Achievable (BAT) for stormwater discharges. Ecology has determined that Nucor must update the existing SWPPP and implement adequate BMPs in order to meet the requirements of "all known, available, and reasonable methods of prevention, control, and treatment" (AKART). A SWPPP requires a facility to implement actions necessary to manage stormwater to comply

with the state's requirement under chapter 90.48 RCW to protect the beneficial uses of waters of the state.

The SWPPP must identify potential sources of stormwater contamination from industrial activities and identify how it plans to manage those sources of contamination to prevent or minimize contamination of stormwater. Nucor must continuously review and revise the SWPPP as necessary to assure that stormwater discharges do not degrade water quality. It must retain the SWPPP on-site or within reasonable access to the site and available for review by Ecology.

I. General conditions

Ecology bases the standardized General Conditions on state and federal law and regulations. They are included in all individual industrial NPDES permits issued by Ecology.

Permit Issuance Procedures

A. Permit modifications

Ecology may modify this permit to impose numerical limits, if necessary to comply with water quality standards for surface waters, with sediment quality standards, or with water quality standards for groundwaters, after obtaining new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state or federal regulations.

B. Proposed permit Issuance

This proposed permit includes all statutory requirements for Ecology to authorize a wastewater discharge under the NPDES program. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the state of Washington. Ecology proposes to issue this permit for a term of 5 years.

REFERENCES FOR TEXT AND APPENDICES

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1979. *In-stream Deoxygenation Rate Prediction*. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

Appendix A--Public Involvement Information

Ecology proposes to reissue a permit to Nucor Steel Seattle, Inc. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology will place a Public Notice of Draft on October 28, 2020 in the Seattle Times to inform the public and to invite comment on the proposed draft National Pollutant Discharge Elimination System permit and fact sheet.

The notice:

- Tells where copies of the draft Permit and Fact Sheet are available for public evaluation (a local public library, the closest Regional or Field Office, posted on our website).
- Offers to provide the documents in an alternate format to accommodate special needs.
- Urges people to submit their comments, in writing, before the end of the Comment Period
- Tells how to request a public hearing of comments about the proposed NPDES permit.
- Explains the next step(s) in the permitting process.

Ecology has published a document entitled *Frequently Asked Questions about Effective Public Commenting* which is available on our website at https://fortress.wa.gov/ecy/publications/SummaryPages/0307023.html

You may obtain further information from Ecology by telephone, (425) 649-7201, or by writing to the address listed below.

Water Quality Permit Coordinator
Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

The primary author of this permit and fact sheet is Jeanne Tran, P.E..

Appendix B--Your Right to Appeal

You have a right to appeal this permit to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of the final permit. The appeal process is governed by chapter 43.21B RCW and chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2) (see glossary).

To appeal you must do the following within 30 days of the date of receipt of this permit:

- File your appeal and a copy of this permit with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this permit on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in chapter 43.21B RCW and chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608
Pollution Control Hearings Board 1111 Israel RD SW STE 301 Tumwater, WA 98501	**Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

Appendix C--Glossary

1-DMax or 1-day maximum temperature -- The highest water temperature reached on any given day. This measure can be obtained using calibrated maximum/minimum thermometers or continuous monitoring probes having sampling intervals of thirty minutes or less.

7-DADMax or 7-day average of the daily maximum temperatures -- The arithmetic average of seven consecutive measures of daily maximum temperatures. The 7-DADMax for any individual day is calculated by averaging that day's daily maximum temperature with the daily maximum temperatures of the three days prior and the three days after that date.

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

AKART -- The acronym for "all known, available, and reasonable methods of prevention, control and treatment." AKART is a technology-based approach to limiting pollutants from wastewater discharges, which requires an engineering judgment and an economic judgment. AKART must be applied to all wastes and contaminants prior to entry into waters of the state in accordance with RCW 90.48.010 and 520, WAC 173-200-030(2)(c)(ii), and WAC 173-216-110(1)(a).

Alternate point of compliance -- An alternative location in the groundwater from the point of compliance where compliance with the groundwater standards is measured. It may be established in the groundwater at locations some distance from the discharge source, up to, but not exceeding the property boundary and is determined on a site specific basis following an AKART analysis. An "early warning value" must be used when an alternate point is established. An alternate point of compliance must be determined and approved in accordance with WAC 173-200-060(2).

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

Ammonia -- Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Annual average design flow (AADF -- average of the daily flow volumes anticipated to occur over a calendar year.

Average monthly (intermittent) discharge limit-- The average of the measured values obtained over a calendar months' time taking into account zero discharge days.

Average monthly discharge limit -- The average of the measured values obtained over a calendar months' time.

Background water quality -- The concentrations of chemical, physical, biological or radiological constituents or other characteristics in or of groundwater at a particular

point in time upgradient of an activity that has not been affected by that activity, [WAC 173-200-020(3)]. Background water quality for any parameter is statistically defined as the 95% upper tolerance interval with a 95% confidence based on at least eight hydraulically upgradient water quality samples. The eight samples are collected over a period of at least one year, with no more than one sample collected during any month in a single calendar year.

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, and treatment BMPs.

BOD_5 -- Determining the five-day 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 BOD_5 is used in modeling to measure the reduction of dissolved oxygen in receiving waters 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_5 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.

Categorical pretreatment standards -- National pretreatment standards specifying quantities or concentrations of pollutants or pollutant properties, which may be discharged to a POTW by existing or new industrial users in specific industrial subcategories.

Chlorine -- A chemical used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic toxicity -- The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. 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 for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations. In addition it includes as a minimum, sampling and

analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Ecology may conduct additional sampling.

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 collected 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.

Date of receipt – This is defined in RCW 43.21B.001(2) as five business days after the date of mailing; or the date of actual receipt, when the actual receipt date can be proven by a preponderance of the evidence. The recipient's sworn affidavit or declaration indicating the date of receipt, which is unchallenged by the agency, constitutes sufficient evidence of actual receipt. The date of actual receipt, however, may not exceed forty-five days from the date of mailing.

Detection limit -- The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the pollutant concentration is above zero and is determined from analysis of a sample in a given matrix containing the pollutant.

Dilution factor (DF) -- 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, for example, a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Distribution uniformity -- The uniformity of infiltration (or application in the case of sprinkle or trickle irrigation) throughout the field expressed as a percent relating to the average depth infiltrated in the lowest one-quarter of the area to the average depth of water infiltrated.

Early warning value -- The concentration of a pollutant set in accordance with WAC 173-200-070 that is a percentage of an enforcement limit. It may be established in the effluent, groundwater, surface water, the vadose zone or within the treatment process. This value acts as a trigger to detect and respond to increasing contaminant concentrations prior to the degradation of a beneficial use.

Enforcement limit -- The concentration assigned to a contaminant in the groundwater at the point of compliance for the purpose of regulation, [WAC 173-200-020(11)]. This limit assures that a groundwater criterion will not be exceeded and that background water quality will be protected.

Engineering report -- A document that thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or 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 a period of time as is feasible.

Groundwater -- Water in a saturated zone or stratum beneath the surface of land or below a surface water body.

Industrial user -- A discharger of wastewater to the sanitary sewer that is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

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 includes contaminated stormwater and, also, leachate from solid waste facilities.

Interference -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

- Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

- Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Local limits -- Specific prohibitions or limits on pollutants or pollutant parameters developed by a POTW.

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 limit -- The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is the maximum discharge of a pollutant measured during a calendar day

Maximum day design flow (MDDF) -- The largest volume of flow anticipated to occur during a one-day period, expressed as a daily average.

Maximum month design flow (MMDF) -- The largest volume of flow anticipated to occur during a continuous 30-day period, expressed as a daily average.

Maximum week design flow (MWDF) -- The largest volume of flow anticipated to occur during a continuous 7-day period, expressed as a daily average.

Method detection level (MDL) -- See Detection Limit.

Minor 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.

Mixing zone -- An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The permit specifies the area of the authorized mixing zone that Ecology defines following 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.

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

Pass-through -- A discharge which exits the POTW into waters of the State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

Peak hour design flow (PHDF) -- The largest volume of flow anticipated to occur during a
one-hour period, expressed as a daily or hourly average.

Peak instantaneous design flow (PIDF) -- The maximum anticipated instantaneous flow.

Point of compliance -- The location in the groundwater where the enforcement limit must not be exceeded and a facility must comply with the Ground Water Quality Standards. Ecology determines this limit on a site-specific basis. Ecology locates the point of compliance in the groundwater as near and directly downgradient from the pollutant source as technically, hydrogeologically, and geographically feasible, unless it approves an alternative point of compliance.

Potential significant industrial user (PSIU) --A potential significant industrial user is defined as an Industrial User that does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;

b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).
Ecology may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation level (QL) -- Also known as Minimum Level of Quantitation (ML) – The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to (1,2,or 5) x 10^n, where n is an integer. (64 FR 30417).
ALSO GIVEN AS:
The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose. (Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency December 2007).

Reasonable potential -- A reasonable potential to cause a water quality violation, or loss of sensitive and/or important habitat.

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).

Sample Maximum -- No sample may exceed this value.

Significant industrial user (SIU) --

1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;

2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR 403.8(f)(6)].

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

Slug discharge -- Any discharge of a non-routine, episodic nature, including but not limited to an accidental spill or a non-customary batch discharge to the POTW. This may include any pollutant released at a flow rate that may cause interference or pass through with the POTW or in any way violate the permit conditions or the POTW's regulations and local limits.

Soil scientist -- An individual who is registered as a Certified or Registered Professional Soil Scientist or as a Certified Professional Soil Specialist by the American Registry of Certified Professionals in Agronomy, Crops, and Soils or by the National Society of Consulting Scientists or who has the credentials for membership. Minimum requirements for eligibility are: possession of a baccalaureate, masters, or doctorate degree from a U.S. or Canadian institution with a minimum of 30 semester hours or 45 quarter hours professional core courses in agronomy, crops or soils, and have 5,3,or 1 years, respectively, of professional experience working in the area of agronomy, crops, or soils.

Solid waste -- All putrescible and non-putrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged material, and recyclable materials.

Soluble BOD_5 -- Determining the soluble fraction of Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of soluble organic material present in an effluent that is utilized by bacteria. Although the soluble BOD_5 test is

not specifically described in Standard Methods, filtering the raw sample through at least a 1.2 um filter prior to running the standard BOD_5 test is sufficient to remove the particulate organic fraction.

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 stormwater drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based effluent limit -- A permit limit based on the ability of a treatment method to reduce the pollutant.

Total coliform bacteria--A microbiological test, which detects and enumerates the total coliform group of bacteria in water samples.

Total dissolved solids--That portion of total solids in water or wastewater that passes through a specific filter.

Total maximum daily load (TMDL) --A determination of the amount of pollutant that a water body can receive and still meet water quality standards.

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 limits 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 imposed on the concentration of an effluent parameter to prevent the concentration of that parameter from exceeding its water quality criterion after discharge into receiving waters.

Appendix D--Technical Calculations

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found in the PermitCalc workbook on Ecology's webpage at: http://www.ecy.wa.gov/programs/wq/permits/guidance.html.

Reasonable Potential Calculation

Facility	Nucor
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	11.0	30.0
Human Health Carcinogenic		
Human Health Non-Carcinogenic		

Pollutant, CAS No. & NPDES Application Ref. No.			COPPER - 744058 6M Hardness dependent	CADMIUM - 7440439 4M Hardness dependent	Polychlorinated biphenyls (PCB's) 53469219, 11097691, 1104282, 11141165, 12672296, 11096825, 12674112 18P-24P									
Effluent Data	# of Samples (n)		59	15	59									
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
	Effluent Concentration, ug/L (Max. or 95th Percentile)		4.607	0.1	0.0184									
	Calculated 50th percentile Effluent Conc. (when n>10)				0									
Receiving Water Data	90th Percentile Conc., ug/L		1	0.076	0									
	Geo Mean, ug/L				0									
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	4.8	42	10									
		Chronic	3.1	9.3	0.03									
	WQ Criteria for Protection of Human Health, ug/L		-	-	0.00017									
	Metal Criteria Translator, decimal	Acute	0.83	0.994	-									
		Chronic	0.83	0.994	-									
	Carcinogen?		N	N	Y									

Aquatic Life Reasonable Potential

Effluent percentile value			0.950	0.950	0.950									
s	$s^2=\ln(CV^2+1)$		0.555	0.555	0.555									
Pn	$Pn=(1-\text{confidence level})^{1/n}$		0.950	0.819	0.950									
Multiplier			1.00	1.50	1.00									
Max concentration (ug/L) at edge of…		Acute	1.257	0.083	0.002									
		Chronic	1.094	0.078	0.001									
Reasonable Potential? Limit Required?			**NO**	**NO**	**NO**									

Ambient background data: Central Elliott Bay, station LTED04.

Marine Temperature Reasonable Potential and Limit Calculation

Based on WAC 173-201A-200(1)(c)(i)--(ii) and Water Quality Program Guidance. All Data inputs must meet WQ guidelines. The Water Quality temperature guidance document may be found at: http://www.ecy.wa.gov/biblio/0610100.html

INPUT	May-Sep	Oct-Apr
1. Chronic Dilution Factor at Mixing Zone Boundary	30.0	30.0
2. Annual max 1DADMax Ambient Temperature (Background 90th percentile)	17.5 °C	17.5 °C
3. 1DADMax Effluent Temperature (95th percentile)	20.1 °C	17.9 °C
4. Aquatic Life Temperature WQ Criterion	16.0 °C	16.0 °C
OUTPUT		
5. Temperature at Chronic Mixing Zone Boundary:	17.59 °C	17.51 °C
6. Incremental Temperature Increase or decrease:	0.09 °C	0.01 °C
7. Incremental Temperature Increase 12/(T-2) if T≤ crit:	---	---
8. Maximum Allowable Temperature at Mixing Zone Boundary:	17.80 °C	17.80 °C
A. If ambient temp is warmer than WQ criterion		
9. Does temp fall within this warmer temp range?	YES	YES
10. Temp increase allowed at mixing zone boundary, if required:	NO LIMIT	NO LIMIT
B. If ambient temp is cooler than WQ criterion but within 12/(T_{amb}-2) and within 0.3 °C of the criterion		
11. Does temp fall within this incremental temp. range?	---	---
12. Temp increase allowed at mixing zone boundary, if required:	---	---
C. If ambient temp is cooler than (WQ criterion-0.3) but within 12/(T_{amb}-2) of the criterion		
13. Does temp fall within this Incremental temp. range?	---	---
14. Temp increase allowed at mixing zone boundary, if required:	---	---
D. If ambient temp is cooler than (WQ criterion - 12/(T_{amb}-2))		
15. Does temp fall within this Incremental temp. range?	---	---
16. Temp increase allowed at mixing zone boundary, if required:	---	---
RESULTS		
17. Do any of the above cells show a temp increase?	**NO**	**NO**
18. Temperature Limit if Required?	**NO LIMIT**	**NO LIMIT**

Appendix E—Site Maps

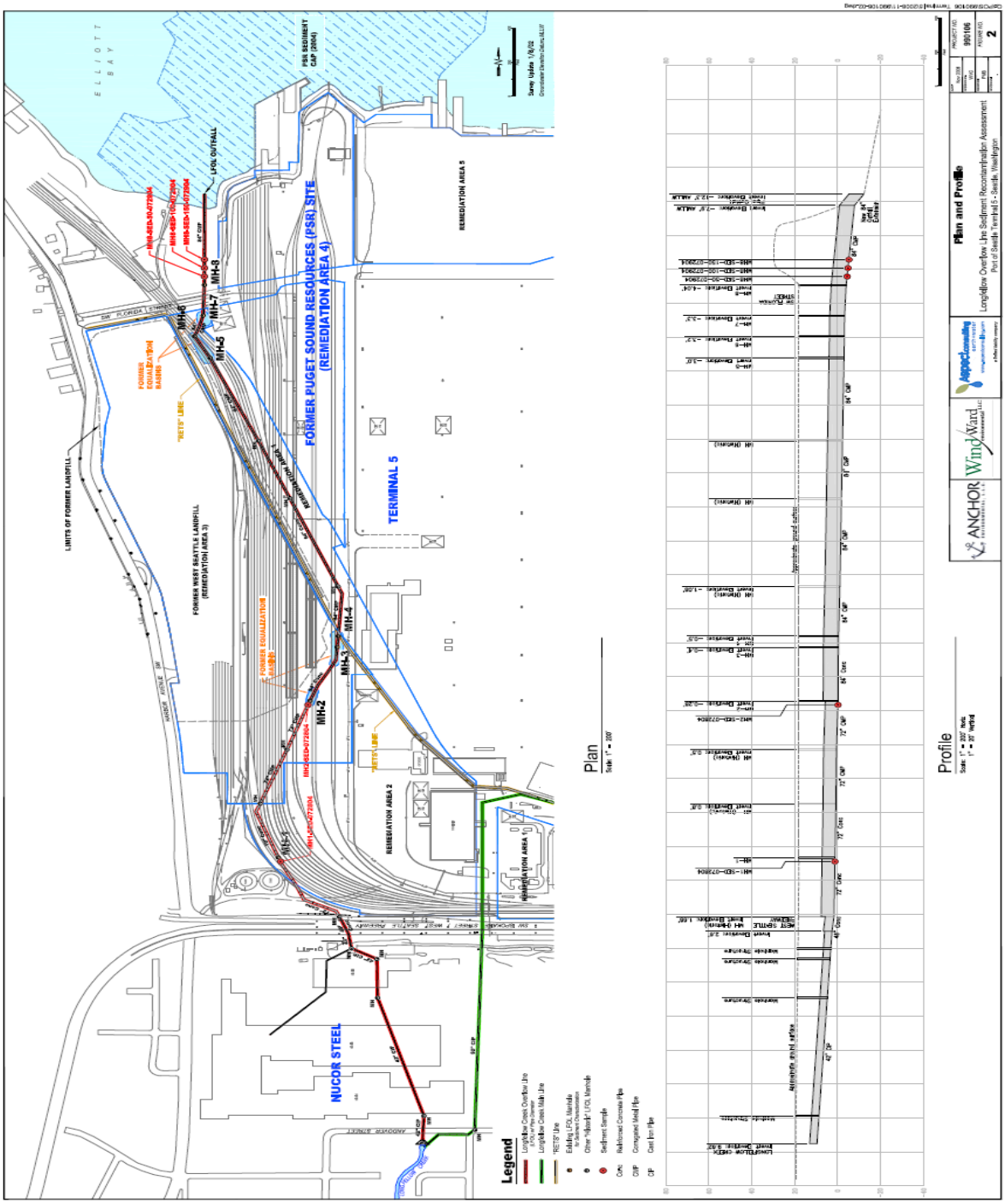

Figure 3: Discharge line to Elliott Bay

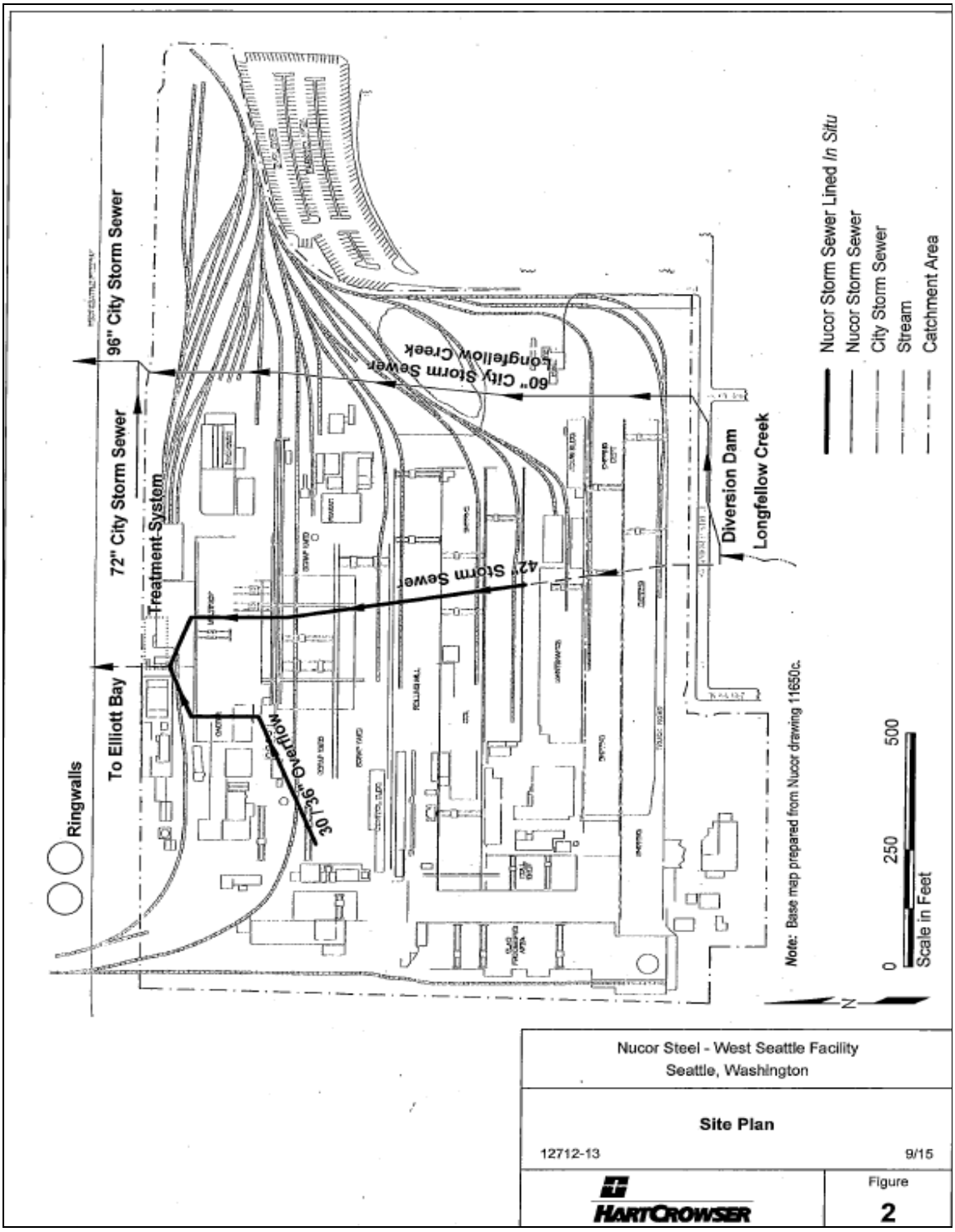

Figure 4: Longfellow Creek flows into two storm drain lines under Nucor.

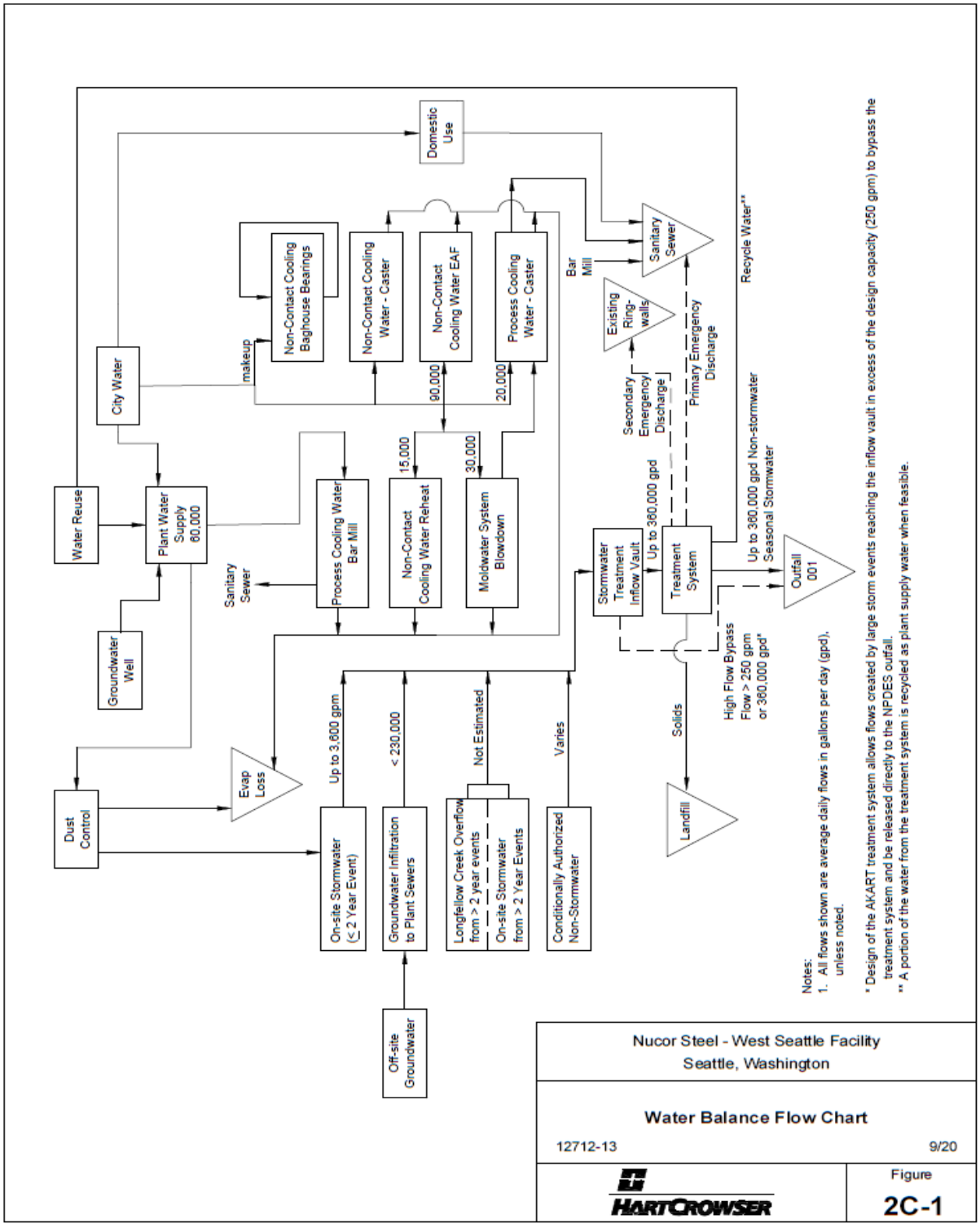

Figure 5: Water Balance Flow Chart

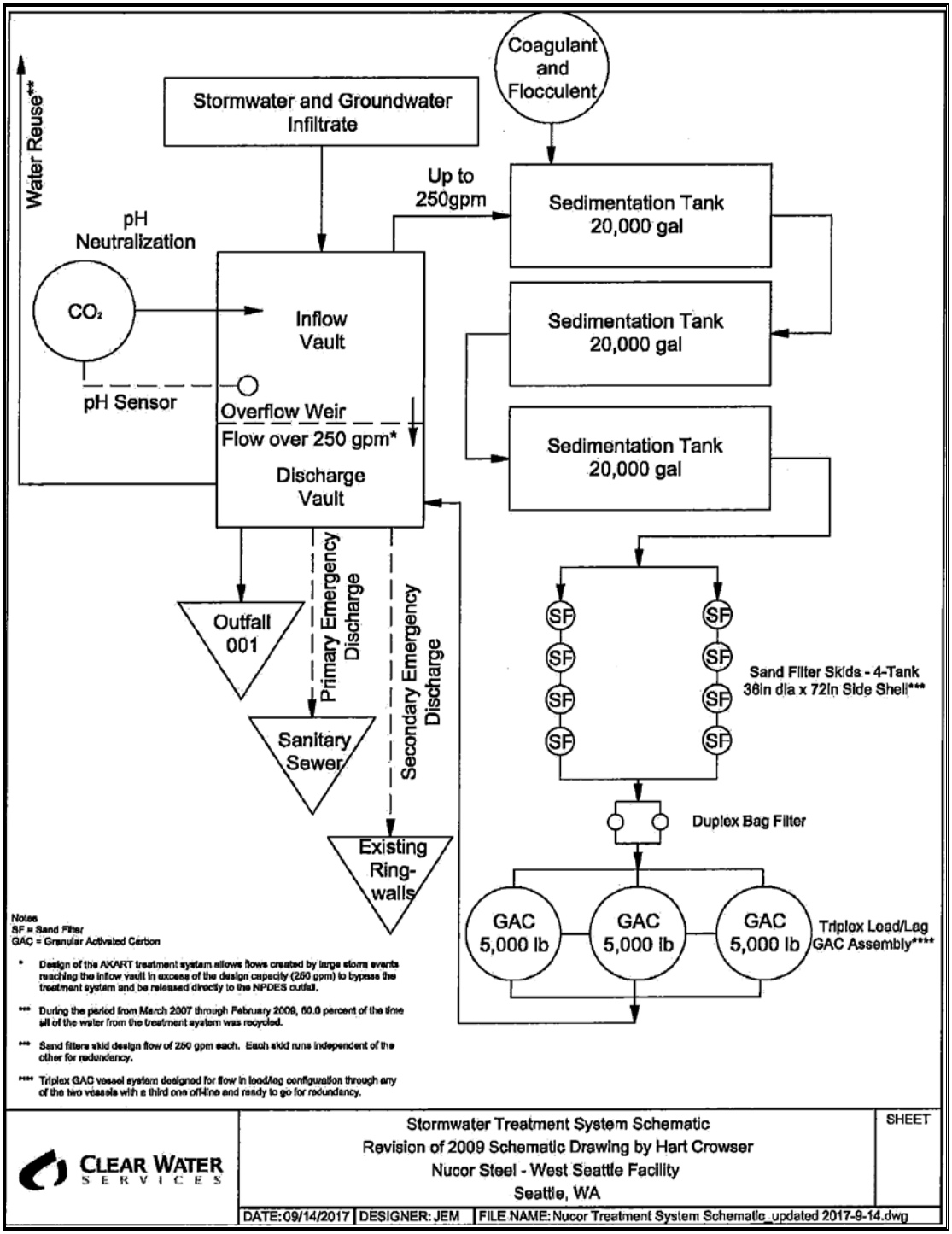

Figure 6: Stormwater Treatment System Schematic

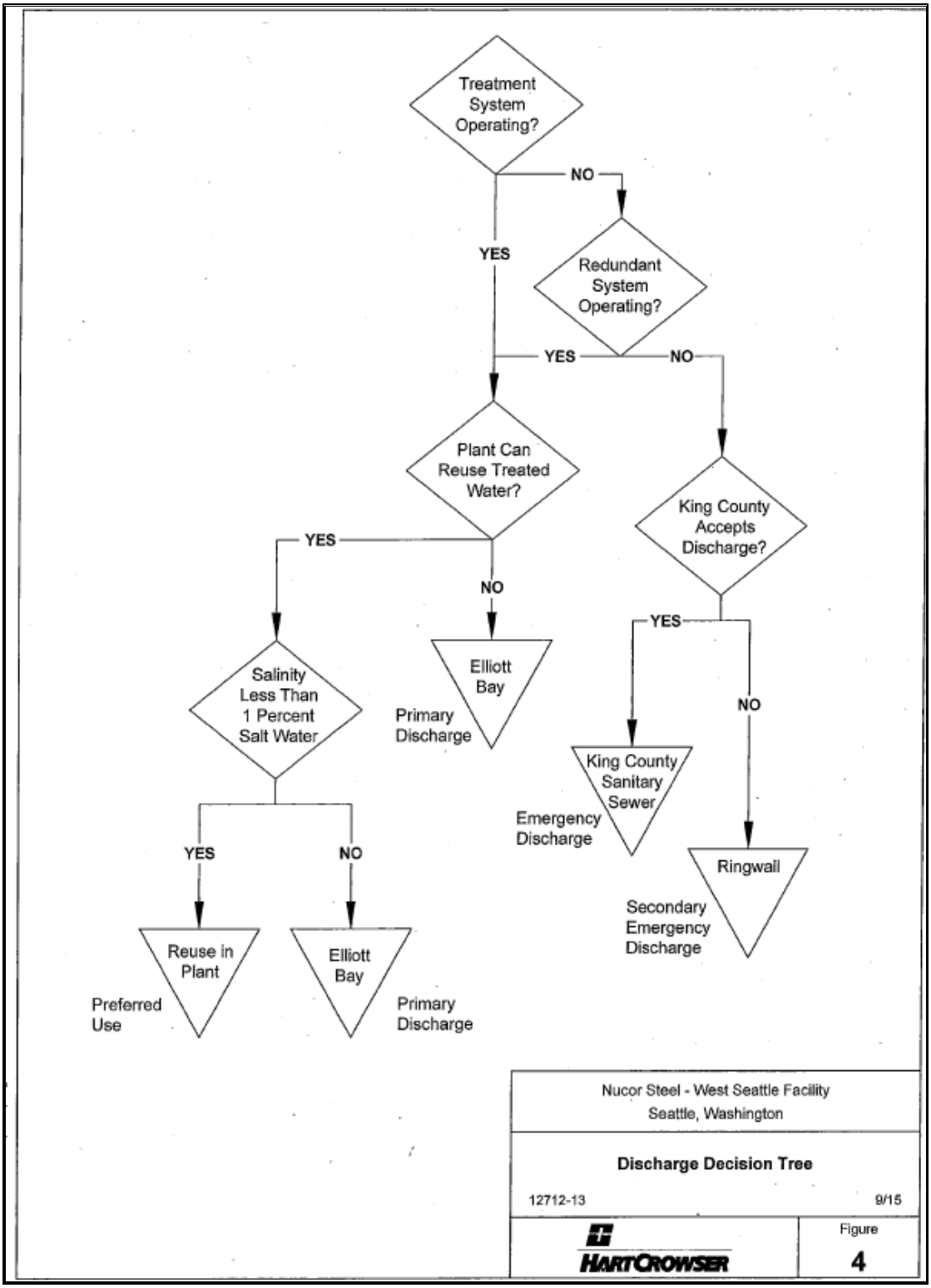

Figure 7: Discharge Decision Tree

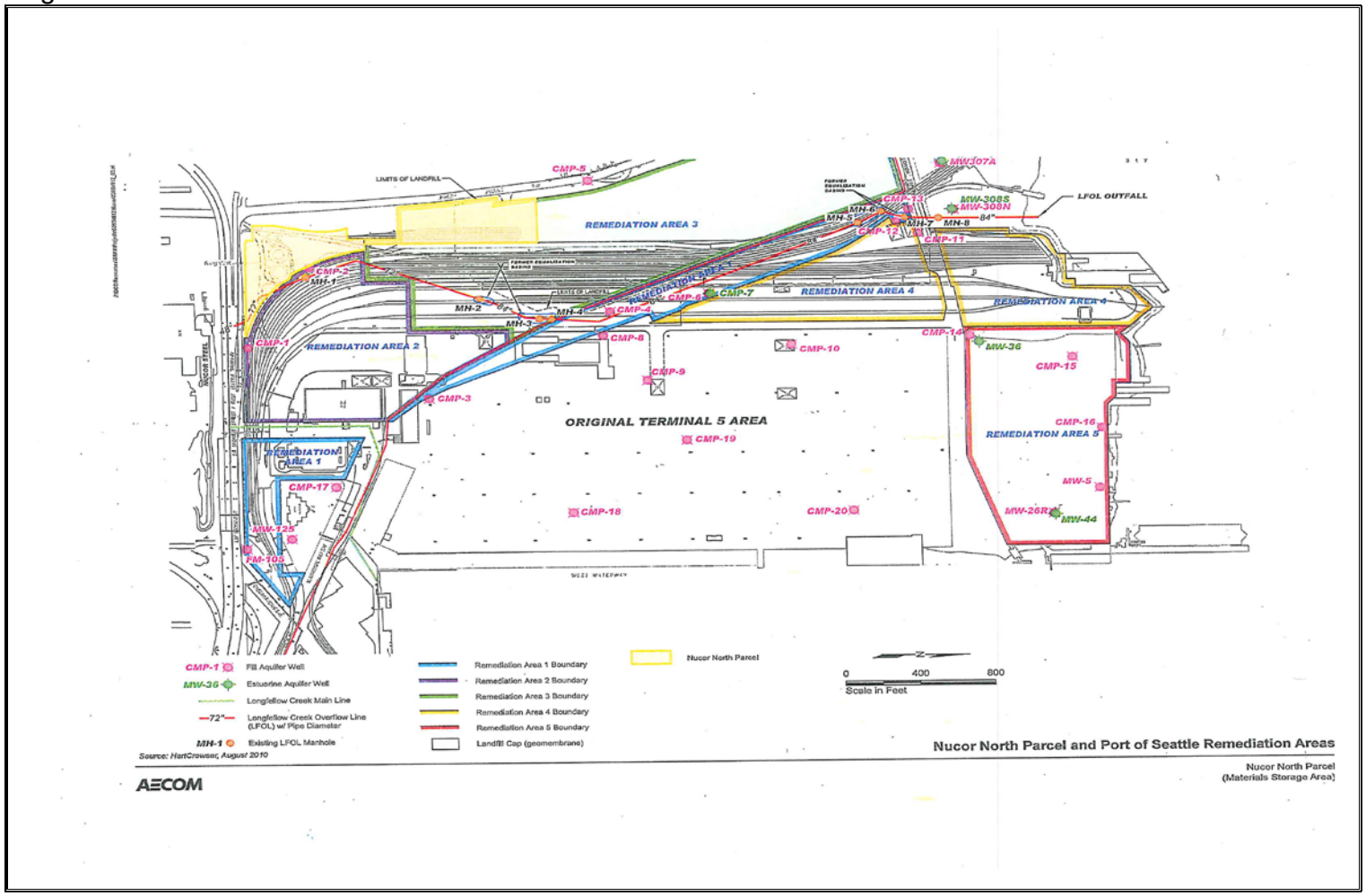

Figure 8: Slag & Mill Scale storage area at the North Parcel

Appendix F--Response to Comments

[Ecology will complete this section after the public notice of draft period.]