MEMORANDUM

DATE: January 25, 2024

TO: Wastewater File #6-97-00-1-02
MidAmerican Energy – Neal North Energy Center

LOCATION: 1151 260th St, Sergeant Bluff, Iowa
Section 25, Township 87N, Range 48W
Woodbury County
42° 19' 34.5" N / 96° 22' 30.6" W
Field Office 3, EPA Region 7

FROM: Melinda McCoy

RE: Rationale for NPDES Permit

BACKGROUND

MidAmerican Energy Company owns and operates the Neal North Energy Center (hereinafter "Neal North"), which is a coal-fired steam electric power plant located on the east bank of the Missouri River south of Sergeant Bluff, Iowa. The standard industrial classification (SIC) code is 4911, electric services.

The facility produces electricity for distribution and sale to its customers by combusting coal to produce heat, which is then used to convert water to steam. Steam piped from the boiler then powers a turbine that is attached to an electric generator. The generator converts mechanical energy supplied by the turbine into electrical energy. After steam passes through the turbine, it flows into a condenser where the steam is cooled and condensed back into water for eventual reuse in the boiler. Each boiler-turbine-generator combination and its supporting components and systems is referred to as a "generating unit" or "unit."

Unit 3 is the only operating unit at Neal North. It began operating in 1975 and has a nameplate capacity of 584.1 megawatts (MW). The facility utilizes a cooling water intake structure (CWIS) on the Missouri River to provide once-through cooling water for Unit 3. The facility's wastewater discharges are described under the "Outfalls" heading below.

This rationale provides supporting information for the reissuance of the facility's National Pollutant Discharge Elimination System (NPDES) permit. Unless otherwise specified in this rationale, the term "prior permit" means the previous permit issued December 1, 2017, as most recently amended on February 1, 2022.

OUTFALLS

Neal North discharges wastewater to the Missouri River through outfalls 009 and 016. Outfall 017 is an internal outfall for sampling one of the wastestreams that discharges via outfall 016. Stormwater associated with industrial activity is also discharged through outfall 016. These outfalls are described below. Note that the outfall descriptions in the proposed permit have been updated to improve clarity.

Additionally, note that the facility's prior permit included outfall 018 for the discharge of legacy ash transport water and stormwater associated with ash pond closure activities. Ash pond closure has been completed. Therefore, outfall 018 is no longer included under the proposed permit.

009 Outfall 009 consists primarily of once-through cooling water, which comprises >99.5% of the effluent flow from this outfall. The Missouri River is the source water for once-through cooling. Most of the river water is used for once-through cooling of the Unit 3 main condenser before being returned to the river; however, a small portion of the river water is sent through strainers and then used in miscellaneous heat exchangers which, in turn, discharge via outfall 009. The outfall also includes a small percentage of intake screen wash water (<0.41%) and an even smaller percentage of blowdown from the Unit 3 boiler (<0.0012%). Well water is used for intake screen washing. Treated well water is used in the boiler. Discharge monitoring reports (DMRs) from November 2018 to October 2023 show that the greatest monthly average and daily maximum effluent flows for outfall 009 were both equal to 417.6 million gallons per day (MGD).

016 Outfall 016 is for the discharge from a lined settling pond that receives low volume waste, metal cleaning waste from internal outfall 017, and stormwater. DMRs from November 2018 to October 2023 show that the greatest monthly average and daily maximum effluent flows for outfall 016 were 1.22 MGD and 1.79 MGD, respectively. The low volume and metal cleaning wastes are described in more detail in the paragraphs that follow.

Low Volume Waste - The use of ash transport water at Neal North ceased after the facility installed dry bottom ash handling technology in 2018. The facility installed a mechanical drag system referred to as a submerged flight conveyor. The conveyor is now used to drag bottom ash out of the boiler. This technology requires the use of an underboiler quench water bath. Blowdown from the underboiler quench water bath system is considered a low volume waste. It is directed to the lined settling pond that discharges via outfall 016. The settling pond also receives other low volume wastes including: reverse osmosis (RO) reject, floor drains, demineralizer regeneration waste, and auxiliary boiler blowdown. Well water is used for most of these low volume waste generating activities, including the quench bath.

(Internal 017) Metal Cleaning Waste - The proposed permit includes an internal outfall (017) for sampling metal cleaning waste after any necessary treatment but prior to combining with any other wastestreams in the lined settling pond that discharges via outfall 016. Metal cleaning waste includes any wastewater resulting from cleaning any metal process equipment, regardless of whether or not chemical cleaning compounds are used. This is a change compared to the prior permit. Under the prior permit, only chemical metal cleaning waste was regulated at internal outfall 017, while nonchemical metal cleaning waste was considered part of the low volume waste regulated at outfall 016. This change is described in more detail later within this rationale.

RECEIVING WATERBODY USES

The Missouri River is an A1, B(WW-1), HH designated waterbody. A1 waters are protected for primary contact recreation where there is a considerable risk of people ingesting enough water to pose a health hazard.

Examples of such activities include swimming, diving, and water-skiing. B(WW-1) waters are suitable to maintain warm water game fish populations. They are also suitable for a resident aquatic community that includes a variety of native nongame fish and invertebrate species. HH (human health) waters are those in which fish are routinely harvested for human consumption. This includes waters that are designated as a drinking water supply and in which fish are routinely harvested for human consumption.

TOTAL MAXIMUM DAILY LOADS (TMDLs)

The 2022 Integrated Report was reviewed to identify any downstream waterbody use impairments. The Missouri River has an impaired primary contact recreation use due to elevated bacteria (*Escherichia coli*). It also has an impaired aquatic life use due to flow and habitat alterations. Two wetland areas along the Missouri River, referred to as Upper Blencoe Bend and Blencoe Bend, also have aquatic life use impairments due to flow alteration. Further downstream, Desoto Bend has an impaired primary contact recreation use due to turbidity and algal growth (chlorophyll-a). This facility has not been assigned any allocations from TMDLs at this time.

POLLUTANTS OF CONCERN (POCs)

In general, there are several categories of pollutants of concern. They may be pollutants regulated by applicable federal effluent limit guidelines (ELGs) or new source performance standards (NSPS). They may be pollutants reported on the NPDES permit renewal application or pollutants that are monitored or limited under the prior NPDES permit. They can also be pollutants expected to be in the effluent based on sources of raw water or wastewater or due to use of chemical additives at the facility, such as additives for water or wastewater treatment. Finally, they can be pollutants for which the facility was provided allocations in a TMDL.

The POCs for Neal North's outfalls are listed in Table 1. For these pollutants, the Department has evaluated the need for effluent limits under the "Effluent Limits" heading below. For other pollutants listed in the facility's permit renewal application, effluent limits were not considered necessary for one of the following reasons: the pollutant was not expected to be present in the discharge; the result reported for the pollutant was less than the laboratory's reporting level which, in turn, was less than the water quality standard (WQS); the pollutant was not expected to be present in an amount that can be treated or otherwise removed and no WQS are available; or, in the case of once-through cooling water, the pollutant is only present because of its presence in the river intake water. Iowa's WQS are found in the *Iowa Administrative Code* (IAC) at 567 IAC Chapter 61. Chemical additives are addressed under a separate heading further below.

Table 1. POCs

	Outfalls*	
Pollutant/Parameter	**009**	**016**
temperature	X	
total residual chlorine (TRC)	X	
pH	X	X
total suspended solids (TSS)	X	X
oil and grease (O&G)	X	X
aluminum		X
ammonia nitrogen		X
arsenic		X
barium		X
boron		X
chloride		X
chromium		X

Table 1. POCs (cont'd.)

Pollutant/Parameter	Outfalls*	
	009	016
cobalt		X
copper		X
iron		X
magnesium		X
manganese		X
molybdenum		X
nickel		X
nitrate-nitrite (as N)		X
polychlorinated biphenyls (PCBs)	X	X
sulfate		X

**An "X" means the pollutant is a POC for the outfall indicated. Reasons for the POC determination vary. For example, gray-highlighted cells indicate that federal ELGs for the pollutant indicated apply to at least one of the wastestreams in the outfall. Temperature is a POC for 009 because heat is added. In all other cases, a detectable result was reported on the permit renewal application.*

EFFLUENT LIMITS

Federal ELGs and NSPS for the Steam Electric Power Generating Point Source Category ("steam electric category") are established in the *Code of Federal Regulations* (CFR) at 40 CFR Part 423. Since Unit 3 at Neal North began operating in 1975, it is considered an existing source. Therefore, discharges of once-through cooling water, low volume waste, and metal cleaning waste from Unit 3 are subject to federal ELGs rather than NSPS. These ELGs include limits for best practicable control technology currently available (BPT) and best available technology economically achievable (BAT). The ELGs applicable to each of the facility's outfalls are described below, along with the Department's derivation of technology-based effluent limits (TBELs) from these ELGs.

Water quality-based effluent limits (WQBELs) have also been calculated for each of the facility's outfalls, and these are described below as well. The WQBELs were calculated in the attached wasteload allocation (WLA) dated December 21, 2023. The calculations used the effluent flows previously described under the "Outfalls" heading. WQBELs are included in the permit if there is reasonable potential for violation of the limit, unless the TBEL is more stringent than the WQBEL for a given pollutant. Several factors may be considered when determining reasonable potential. One of the most common factors used, particularly when limited data are available, is whether the maximum reported concentration is greater than one-half the limit from the WLA. Other factors are considered as necessary.

Outfall 009

ELGs

Once-Through Cooling Water

BAT limits apply to once-through cooling water discharges from existing sources at plants with a total rated electric generating capacity of 25 or more megawatts. These BAT limits are summarized in Table 2. They restrict the quantity and duration of TRC discharges per generating unit per day.

Table 2. ELGs for Once-Through Cooling Water

Wastewater Source	ELG Type	Pollutant	Daily Max (mg/L)	Allowable Duration Per Generating Unit Per Day	40 CFR Citation
Once-through Cooling Water *(Nameplate Capacity ≥25 MW)*	BAT	TRC	0.20	≤2 hours	423.13(b)(1) and (2)

Low Volume Waste

Boiler blowdown is considered a low volume waste. BPT limits apply to discharges of low volume waste from existing sources. These BPT limits are summarized in Table 3. They restrict the levels of pH and quantity of TSS and O&G that can be discharged.

Table 3. ELGs for Low Volume Waste

Wastewater Source	ELG Type	Pollutant	Range (s.u.)	Monthly Avg (mg/L)	Daily Max (mg/L)	40 CFR Citation
Low Volume Waste	BPT	pH	6.0-9.0	--	--	423.12(b)(1)
		TSS	--	30.0	100.0	423.12(b)(3)
		O&G	--	15.0	20.0	423.12(b)(3)

TBELs

TRC and FAC

Neal North uses water withdrawn from the Missouri River for the purpose of once-through cooling. Due to the sand content of the river water, the facility does not require the use of chlorine in the condenser cooling system. As the facility is not adding chlorine, the Department is continuing the prior permit's prohibition on the discharge of TRC and free available chlorine (FAC) from outfall 009. Compliance with this prohibition will ensure compliance with the BAT limits specified in 40 CFR § 423.13(b)(1) and (2).

pH, TSS, and O&G

Boiler blowdown from Unit 3 is mixed with once-through cooling water before being discharged through outfall 009. The boiler blowdown cannot be sampled prior to mixing with the cooling water and constitutes an extremely small portion (< 0.0012%) of the water discharged through this outfall. In an August 15, 2000 letter, MidAmerican Energy Company explained that water from the boiler is drained into a flash tank where the superheated water flashes into steam and hot water at atmospheric pressure and temperature. Effluent from the flash tank is too hot to be safely sampled without specialized equipment which is not currently installed.

Boiler blowdown should contain essentially no oil & grease and little if any TSS. As previously indicated, treated well water is used in the boiler at Neal North. Treatment includes both reverse osmosis and demineralization. Additionally, in its 1982 Development Document,[1] EPA stated that "boiler blowdown is usually of high quality and even may be of higher quality than the intake water." EPA's statistical analysis of discharge monitoring report data on the quality of boiler blowdown showed the mean concentration of TSS was 66 mg/L based on 230

[1] U.S. EPA. 1982. *Development Document for Final Effluent Limitations Guidelines, New Source Performance Standards, and Pretreatment Standards for the Steam Electric Point Source Category.* U.S. Environmental Protection Agency, Washington, D.C.

data points and oil & grease was 1.74 mg/L based on 151 data points. EPA also sampled three plants for verification purposes and found the concentrations of both TSS and oil & grease were <5 mg/L.

Based on this discussion, the Department does not feel justified in requiring installation of equipment that would be necessary to sample the boiler blowdown from Unit 3 prior to mixing with once-through cooling water in order that compliance with the federal effluent guidelines could be determined. Therefore, this permit does not specify TBELs for pH, TSS, or oil & grease for this wastestream.

WQBELs

Temperature

Since outfall 009 consists primarily of once-through cooling water, the need for temperature limits was evaluated.

The WLA dated December 21, 2023, includes monthly average and daily maximum temperature limits at outfall 009 for each month of the year. These limits are based on the results of a thermal study which utilized CORMIX modeling. The study was completed by Burns & McDonnell Engineering Company, Inc. on behalf of MidAmerican Energy Company in January 2011 (revised May 2011).

For each month from November 2018 to October 2023, the facility's monthly average discharge temperature at outfall 009 was at least 10.16°F below the average limit for the month. The proposed permit continues to include monthly average WQBELs for temperature at outfall 009. These limits come from the WLA and are the same as the limits included in the facility's prior permit.

For each month from November 2018 to October 2023, the facility's daily maximum discharge temperature at outfall 009 was at least 27.02°F below the maximum limit for the month. Based on this data, the Department continues to believe that there is no reasonable potential for the discharge to cause or contribute to a temperature WQS violation with respect to the daily maximum. Therefore, no daily maximum limits are included in the proposed permit for temperature at outfall 009.

Effluent monitoring requirements for temperature will continue year-round since discharge temperatures and effluent limits for temperature typically vary by month, and the monitoring data will be needed to evaluate reasonable potential at the next permit renewal given the presence of once-through cooling water in the discharge.

Iowa's WQS at 567 IAC 61.3(3)"b"(5) prohibit the rate of temperature change in receiving streams from exceeding 1°C per hour. When necessary, a narrative condition is included in NPDES permits to implement this standard. The narrative condition requires cessation of thermal inputs to the receiving water to occur gradually so as to avoid fish mortality due to cold shock during the winter months (November through March). This condition was included in the facility's prior permit and is continued in the proposed permit.

Lastly, the proposed permit includes a special page titled "Thermal Study." The page states that default procedures for calculating temperature effluent limits will be used for the next permit renewal unless a new thermal study is completed. It also states that if a new thermal study is conducted, it shall be submitted with the permit renewal application.

Outfall 016

ELGs

Low Volume Waste

The lined settling pond that discharges via outfall 016 receives several sources of low volume waste including: quench water blowdown, RO reject, floor drains, demineralizer regeneration waste, and auxiliary boiler blowdown. Therefore, the BPT limits for low volume waste previously summarized in Table 3 also apply to outfall 016. These BPT limits restrict the levels of pH and quantity of TSS and O&G that can be discharged.

Note that quench water blowdown does not fall under the definition of bottom ash transport water. 40 CFR § 423.11(p) defines "transport water" as "any wastewater that is used to convey fly ash, bottom ash, or economizer ash from the ash collection equipment or storage equipment, or boiler, and has direct contact with the ash." As previously noted, the use of ash transport water at Neal North ceased after the facility installed dry bottom ash handling technology in 2018. The facility installed a mechanical drag system referred to as a submerged flight conveyor. Quench water blowdown is not bottom ash transport water because the transport mechanism is the drag chain, not the water. EPA has supported this conclusion in several documents related to both its 2015 and 2020 rules revising the federal ELGs applicable to the steam electric category. Refer to the attached document titled "Excerpts Pertaining to Quench Water Blowdown from Mechanical Drag Systems."

Metal Cleaning Waste

The proposed permit includes an internal outfall (017) for sampling metal cleaning waste after any necessary treatment but prior to combining with any other wastestreams in the lined settling pond that discharges via outfall 016. The ELGs for metal cleaning waste are implemented at internal outfall 017, which is discussed later in this rationale.

TBELs

pH

The proposed permit requires pH at outfall 016 to be maintained within a range of 6.0 to 9.0 s.u. based on the BPT limits at 40 CFR § 423.12(b)(1). This TBEL is the same as that included in Neal North's prior permit. It is more stringent than the WQBEL calculated for pH at outfall 016 in the WLA dated December 21, 2023.

TSS and O&G

The proposed permit includes monthly average and daily maximum TSS concentration limits of 30.0 mg/L and 100.0 mg/L, respectively, at outfall 016. Monthly average and daily maximum O&G concentration limits of 15.0 mg/L and 20.0 mg/L, respectively, are also proposed for this outfall. These TBELs are based on the BPT limits for low volume waste at 40 CFR § 423.12(b)(3). They are the same as those included in Neal North's prior permit, except that a decimal has been added for consistency with the BPT limits. Iowa's WQS do not include numeric criteria for TSS or O&G.

Note that while the BPT limits for TSS and O&G are flow-normalized mass-based limits, 40 CFR § 423.12(b)(12) allows the limits to be expressed in terms of concentration only, at the permitting authority's discretion. Concentration-based TBELs are appropriate for TSS and O&G at outfall 016 since the metal cleaning waste and

stormwater that also discharge via outfall 016 are not considered diluting wastestreams for these two pollutants.

WQBELs

Sulfate

The Department performed a statistical reasonable potential analysis for sulfate using DMR data available from November 2018 to October 2023 and the sulfate limits calculated in the WLA dated December 21, 2023. Based on the attached results from this analysis, the Department does not believe there is reasonable potential for the discharge from outfall 016 to cause or contribute to a WQS violation for sulfate. Therefore, no WQBELs for sulfate are included in the proposed permit.

Remaining Pollutants

The remaining pollutants of concern for outfall 016 are listed in Table 4, along with each pollutant's effluent concentration as reported on the facility's permit renewal application. To evaluate whether there is reasonable potential for the discharge to cause or contribute to a WQS violation for each of these pollutants, the Department compared the reported effluent result with the monthly average WQBEL shown in Table 4. The monthly average WQBELs come from the WLA dated December 21, 2023, except in one case. The value shown in the table for cobalt is that typically used to implement Iowa's acute toxicity narrative criterion found at 567 IAC 61.3(2)"d" with no consideration for instream dilution. Also note that the monthly average WQBEL shown for ammonia nitrogen is the lowest calculated for any month.

For each pollutant listed in Table 4, the effluent result is well below 50% of the monthly average WQBEL. Therefore, there is no reasonable potential for the discharge from outfall 016 to cause or contribute to a WQS violation for any of these pollutants, and no WQBELs are included in the proposed permit for these pollutants at outfall 016.

Table 4. Outfall 016 Results for Remaining Pollutants

Pollutant	Effluent Result (mg/L)	Monthly Avg WQBEL (mg/L)
aluminum	0.0480	87.39
ammonia nitrogen	7.68	403.5
arsenic	0.00223	11.89
barium	0.189	7,163
boron	0.509	117.11
chloride	100	20,830
chromium	0.00288	0.5696
cobalt	0.000667	1.7
copper	<0.00180	0.9403
iron	0.513	34.96
magnesium	52.2	355,790
manganese	0.728	118.37
molybdenum	0.0136	4,436
nickel	0.00758	29.48
nitrate-nitrite (as N)	1.64	11,190

Whole Effluent Toxicity (WET) Testing and Limits

567 IAC 63.4 requires effluent toxicity testing for major dischargers. The proposed permit continues to include annual acute WET testing requirements and limits at outfall 016. This outfall is selected for toxicity testing because of the variety of wastestreams that contribute to the outfall. Additionally, all of the chemical additives reported on the facility's permit renewal application are associated with this outfall.

The WET tests are to be performed using *Ceriodaphnia dubia* (water flea) and *Pimephales promelas* (fathead minnow). The proposed permit requires 2.9% of the sample used for the tests to be effluent from the outfall and 97.1% of the sample to be dilution water. This dilution percentage is based on the December 21, 2023, WLA. The WET limits prohibit acute toxicity, as demonstrated by the annual acute WET tests. If the facility fails the annual test, the proposed permit then requires the facility to start testing on a quarterly basis until three successive tests are passed.

(Internal) Outfall 017

ELGs

Metal Cleaning Waste

BPT limits apply to metal cleaning waste, which is defined at 40 CFR § 423.11(d) and includes any wastewater resulting from cleaning any metal process equipment, regardless of whether or not chemical cleaning compounds are used. The BPT limits for TSS, O&G, copper, and iron are found at 40 CFR § 423.12(b)(5). The BPT limits for pH at 40 CFR § 423.12(b)(1) also apply to metal cleaning waste.

EPA has also established BAT limits, but only for chemical metal cleaning waste. These BAT limits are found at 40 CFR § 423.13(e). They are for copper and iron and are the same as the BPT limits applicable to metal cleaning waste. EPA reserved BAT limits for nonchemical metal cleaning waste (see 40 CFR § 423.13(f)).

The aforementioned ELGs are summarized in Table 5.

Table 5. ELGs for Metal Cleaning Waste

Wastewater Source	ELG Type	Pollutant	Range (s.u.)	Monthly Avg (mg/L)	Daily Max (mg/L)	40 CFR Citation
Metal Cleaning Waste *(applies whether or not chemicals are used during cleaning)*	BPT	pH	6.0-9.0	--	--	423.12(b)(1)
		TSS	--	30.0	100.0	423.12(b)(5)
		O&G	--	15.0	20.0	423.12(b)(5)
		copper	--	1.0	1.0	423.12(b)(5)
		iron	--	1.0	1.0	423.12(b)(5)
Chemical Metal Cleaning Waste	BAT	copper	--	1.0	1.0	423.13(e)
		iron	--	1.0	1.0	423.13(e)
Non-Chemical Metal Cleaning Waste	BAT	RESERVED				423.13(f)

Note that EPA adopted a policy in a memorandum dated June 17, 1975, which allowed for nonchemical metal cleaning waste to be considered a low volume waste despite the aforementioned definition for metal cleaning waste.[2] EPA reviewed the policy as part of its 1982 rulemaking to revise the federal ELGs for the steam electric

[2] See: *Effluent Limitations Guidelines, Pretreatment Standards and New Source Performance Standards Under Clean Water Act; Steam Electric Power Generating Point Source Category.* 45 Fed. Reg. 68333 (proposed October 14, 1980).

category and ultimately concluded that the policy could continue to be applied but only in those cases in which the policy had been applied in the past.[3]

In Neal North's prior permits, nonchemical metal cleaning waste was considered a low volume waste and was regulated at outfall 016, while chemical metal cleaning waste was considered a metal cleaning waste and was regulated at internal outfall 017. Discharges of metal cleaning waste are infrequent at Neal North, regardless of whether or not chemical cleaning compounds are used. And, the prior permitting approach unnecessarily complicates the permit and monthly DMR reporting requirements. Following discussion with the facility, the Department is proposing to apply the ELGs for metal cleaning waste to both the nonchemical and chemical metal cleaning waste at Neal North, with sampling requirements and TBELs to be applied at internal outfall 017.

TBELs

pH

The proposed permit requires pH at internal outfall 017 to be maintained within a range of 6.0 to 9.0 s.u. based on the BPT limits at 40 CFR § 423.12(b)(1). This TBEL is the same as that included in Neal North's prior permit.

TSS and O&G

The proposed permit includes monthly average and daily maximum TSS concentration limits of 30.0 mg/L and 100.0 mg/L, respectively, at internal outfall 017. Monthly average and daily maximum O&G concentration limits of 15.0 mg/L and 20.0 mg/L, respectively, are also proposed for this outfall. These TBELs are based on the BPT limits for metal cleaning waste at 40 CFR § 423.12(b)(5). They are the same as those included in Neal North's prior permit, except that a decimal has been added for consistency with the BPT limits.

40 CFR § 423.12(b)(12) allows the BPT limits for TSS and O&G to be expressed in terms of concentration only, at the permitting authority's discretion. Concentration-based TBELs are appropriate in this case since only metal cleaning waste is discharged via internal outfall 017.

Copper and Iron

The proposed permit includes monthly average and daily maximum concentration limits for copper and iron at internal outfall 017, all of which are equal to 1.0 mg/L. These TBELs are based on the BAT limits for chemical metal cleaning waste at 40 CFR § 423.13(e). Based on best professional judgement (BPJ), these TBELs also reflect the BAT level of control for nonchemical metal cleaning waste at Neal North. The proposed TBELs are the same as those included in Neal North's prior permit, except that they now also apply to nonchemical metal cleaning waste.

40 CFR § 423.13(m) allows the BAT limits for copper and iron to be expressed in terms of concentration only, at the permitting authority's discretion. Concentration-based TBELs are appropriate in this case since only metal cleaning waste is discharged via internal outfall 017.

[3] See: *Steam Electric Power Generating Point Source Category; Effluent Limitations Guidelines, Pretreatment Standards and New Source Performance Standards.* 47 Fed. Reg. 52297 (final November 19, 1982).

STORMWATER

Neal North discharges storm water associated with industrial activity via outfall 016. Prior permits for the facility required preparation and implementation of a storm water pollution prevention plan (SWPPP) to minimize or eliminate discharges of pollutants in storm water. The facility is in the best position to identify potential sources contributing pollutants to storm water, evaluate appropriate mechanisms to minimize storm water contamination, and assess the effectiveness of the SWPPP. Therefore, the Department believes the most appropriate way to continue to minimize the discharge of pollutants in storm water runoff at this facility is to require continued implementation of the SWPPP and updates as needed.

The proposed permit describes certain minimum elements that must be addressed in the SWPPP, including requirements to conduct annual comprehensive site compliance evaluations and quarterly inspections for assessing the effectiveness of the SWPPP. These measures support an adaptive management approach that allows the facility to evaluate the adequacy of the SWPPP on a continuing basis so that improvements to pollution prevention measures and controls can be identified and implemented

PROHIBITIONS

The “Prohibitions” page of the proposed permit continues the two prohibitions from Neal North’s prior permit. The first prohibition implements 40 CFR § 423.12(b)(2) which states that “there shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.” The second prohibits the discharge of chlorine (FAC and TRC) from outfall 009, as previously described.

CHEMICAL ADDITIVES

Chemical additives are evaluated for their potential to cause violations of WQS, including the general prohibition on discharges that cause acutely toxic conditions at 567 IAC 61.3(2)“d”. While nine additives were identified on the facility’s permit renewal application, an estimated discharge concentration of 0.0 mg/L was reported for three of these additives, including: sodium hydroxide, sulfuric acid, hydrogen peroxide. Department approval is not required for additives that are not expected to be present in the discharge. For the six remaining additives, Table 6 provides the additive name, supplier, location and product use information, estimated discharge concentration, and an acute toxicity test result. Discharge of the additive is not expected to cause acute toxicity if the estimated discharge concentration is less than 50% of the acute toxicity test result.

As described in further detail below the table, the acute toxicity test result may either be for the product or an active ingredient, and it may come from the safety data sheet (SDS) provided with the permit renewal application or from another source. The result shown in Table 6 is the lowest acute toxicity test result available for a freshwater species that inhabits warm water. In most cases, the result is an LC_{50}, which represents the concentration that is lethal to 50% of a given test group. In one case, the result is an EC_{50}, which is similar in concept except the effect being measured can either be lethal (i.e., mortality) or sublethal (e.g., growth or reproduction effects). EC_{50} results for sublethal effects are typically lower in magnitude than LC_{50} results.

Table 6. Chemical Additives Summary

Outfall(s)	Supplier	Additive Name	Location and Product Use	Estimated Discharge Concentration (mg/L)	Toxicity Test Result (mg/L)	Result Type	Test Duration (hours)	Test Species
016	Ashland	Aqua ammonia 26 DEG BE	Boiler pH control	0.011	see discussion below			
016	Acros Organics BVBA	Sodium phosphate, tribasic	Boiler treatment	0.044	151	LC50	96	*Gambusia affinis*
016	Consolidated Water Solutions	CC 030	RO membrane cleaner	0.00062	120	LC50	72	*Daphnia magna*
016	Consolidated Water Solutions	CC 5000X	RO antiscalant	0.0016	527	EC50	48	*Daphnia magna*
016	Anodamine, Inc.	Anodamine HPFG (surface active polyamines)	Boiler corrosion control	0.00187	>100	LC50	96	*Pimephales promelas*
016, 017	Fisher Scientific	Ammoniated EDTA	Boiler cleaning	230	705	LC50	96	*Lepomis macrochirus*

The additives listed in Table 6 were previously approved by the Department. Five were approved as part of the September 1, 2017, permit renewal effort. CC 030 was approved in the attached letter dated January 18, 2018.

According to the SDS for Aqua ammonia 26 DEG BE, this additive contains 30-40% ammonia. Ammonia is a component of ammonia nitrogen. WQBELs for ammonia nitrogen were calculated the WLA dated December 21, 2023. The most stringent monthly average WQBEL for ammonia nitrogen was 403.5 mg/L, which is much higher than the estimated discharge concentration reported for this additive as a whole (0.011 mg/L). This WQBEL is also much higher than the ammonia nitrogen effluent result reported on the permit renewal application for outfall 016 (7.68 mg/L). Additionally, the proposed permit includes both pH and WET limits at outfall 016. Based on this information, the Department does not believe there is reasonable potential for the facility's use of Aqua ammonia 26 DEG BE to cause or contribute to acutely toxic conditions. Therefore, this additive remains approved for discharge.

The toxicity test result for sodium phosphate, tribasic was obtained from a Department search of EPA's ECOTOX database.[4]

CC 030 is comprised of 40-50% citric acid and 6% 1-Hydroxyethylidene-1, 1-diphosphonic acid, which is the primary active ingredient CC 5000X. The toxicity test result of 120 mg/L is for the citric acid component of CC 030. It is listed in the table because it is more stringent than the toxicity test result of 527 mg/L for CC 5000X. The 120 mg/L toxicity test result comes from the attached SDS for citric acid, which was provided as part of the antidegradation alternatives analysis for CC 030 approved by the Department on January 18, 2018.

The toxicity test results of 527 mg/L for CC 5000X and >100 mg/L for Anodamine HPFG come from the SDSs for the additives, which were provided as part of the facility's permit renewal application.

The facility's permit renewal application notes that ammoniated EDTA is a boiler cleaning chemical and that boiler cleaning is a rare occurrence. Ammoniated EDTA is a derivative of Ethylenediaminetetraacetic acid (EDTA). The toxicity test result of 705 mg/L for ammoniated EDTA is from a summary table provided by the facility as part of its permit renewal application. Based on a search of EPA's ECOTOX database, the Department believes this result is for tetraammonium EDTA (CAS No. 22473785), which is a type of ammoniated EDTA.

The estimated discharge concentrations for sodium phosphate tribasic, CC 030, CC 5000X, Anodamine HPFG, and ammoniated EDTA are less than 50% of their respective toxicity test results, which represent a threshold

[4] Curated toxicity data were retrieved from the ECOTOXicology Knowledgebase, U.S. Environmental Protection Agency. http:/www.epa.gov/ecotox/ (November 8, 2023).

below which acute toxicity is not expected to occur. Therefore, these five additives remain approved for discharge.

The proposed permit continues to include a special page that describes several items that need to be submitted to the Iowa DNR at least 45 days prior to the discharge of any new chemical additive. These items include an SDS, estimated discharge concentration, and antidegradation documentation.

EFFLUENT MONITORING REQUIREMENTS

Outfall 009

The proposed permit continues the prior permit's daily effluent monitoring frequency for flow and temperature at outfall 009. The daily frequency is based on BPJ. The facility discharges a large heat load to the Missouri River necessitating frequent monitoring to ensure compliance with water quality standards for temperature.

Outfall 016

The proposed permit continues to require WET testing at outfall 016 on an annual basis pursuant to 567 IAC 63.4(1).

Effluent monitoring frequencies for the remaining pollutants/parameters at outfall 016 were initially evaluated based on the *Supporting Document for Permit Monitoring Frequency Determination* ("Supporting Document") cited at 567 IAC 63.3. The Supporting Document considers the toxicity of the pollutant (group), existing monitoring data (potential), and the ratio of effluent flow to stream flow (flow). Each of these is given a rating which determines the category, or recommended minimum monitoring frequency. The permit writer has discretion to adjust this as needed. For physiochemical parameters, the Supporting Document requires monitoring at the same frequency as the most frequently monitored pollutant, but no less than once per month. Table 7 shows the output from the Supporting Document.

Table 7. Supporting Document Output for Outfall 016

Outfall	Pollutant/ Parameter	Group	Potential	Flow	Frequency
016	flow	physiochemical			1x/month
	pH	physiochemical			1x/month
	O&G	1	1	1	1x/3 months - 1x/year
	TSS	1	1	1	1x/3 months - 1x/year

Next, the Department considered the frequencies required under the prior permit. These are shown in Table 8, alongside the output from the Supporting Document, and the frequencies that have been selected for inclusion in the proposed permit.

Since installation of the submerged flight conveyor was not completed until 2018, no effluent data was available for outfall 016 when the prior permit was reissued on December 1, 2017. The prior permit's frequencies for O&G and TSS were based on BPJ. Effluent data is now available for the outfall. When this data was evaluated using the Supporting Document, it resulted in a recommended minimum monitoring frequency of once every three months to once per year. As previously noted, the permit writer has discretion to adjust this as needed. Given the variety of wastestreams contributing to the outfall, the Department believes a monthly frequency for TSS

and O&G is more appropriate to ensure compliance with TBELs. Therefore, the Department is proposing to continue the prior permit's monthly frequency for TSS and apply a monthly frequency for O&G.

A monthly frequency is proposed for flow and pH to match the frequency for TSS and O&G. The prior permit's weekly frequency for flow and pH was set to match the weekly Nutrient Reduction Strategy monitoring requirements, which were removed via a permit amendment issued November 1, 2019.

Table 8. Frequency Comparisons for Outfall 016

Outfall	Pollutant/ Parameter	Prior Permit	Supporting Document	Proposed Permit
016	flow	1x/week	1x/month	1x/month
	pH	1x/week	1x/month	1x/month
	O&G	1x/2 weeks	1x/3 months - 1x/year	1x/month
	TSS	1x/month	1x/3 months - 1x/year	1x/month

(Internal) Outfall 017

The facility's prior permit required effluent monitoring of chemical metal cleaning wastes at internal outfall 017. The monitoring location was described as following treatment, if necessary, but prior to mixing with any other wastestreams. Under the proposed permit, effluent monitoring is required for metal cleaning waste, regardless of whether or not chemical cleaning compounds are used. The pollutants/parameters to be monitored are the same as those previously monitored and include: flow, pH, O&G, TSS, copper, and iron.

The prior permit included a weekly frequency for all six pollutants/parameters based on BPJ to ensure compliance with TBELs. DMRs for internal outfall 017 show that there have been no discharges of chemical metal cleaning waste since the prior permit was reissued on December 1, 2017. And, nonchemical metal cleaning waste wasn't regulated at internal outfall 017 under the prior permit. For these reasons, no effluent data are currently available for metal cleaning waste. Since no effluent data are available, the Department is proposing to continue the prior permit's weekly frequency based on BPJ.

Effluent Monitoring Summary Table

Table 9 summarizes the proposed effluent monitoring requirements for outfalls 009, 016, and (internal) 017. It also identifies the sample type (e.g., grab, composite), monitoring frequency and basis, and how the frequency has changed compared to the prior permit. The sample types shown in Table 9 are the same as those required under the facility's prior permit.

Table 9. Effluent Monitoring Summary

Outfall(s)	Pollutant/ Parameter	Location	Frequency	Sample Type	Monitoring Basis	Compared to Prior Permit
009	Flow	Final Effluent	Daily	24-Hr Total	BPJ	Same
	Temperature	Final Effluent	Daily	Measurement	BPJ	Same
016	Acute Toxicity, Ceriodaphnia	Final Effluent	1x/Year	24-Hr Composite	567 IAC 63.4(1)	Same
	Acute Toxicity, Pimephales	Final Effluent	1x/Year	24-Hr Composite	567 IAC 63.4(1)	Same
	Flow	Final Effluent	1x/Month	24-Hr Total	Supporting Doc	Less
	pH	Final Effluent	1x/Month	Grab	Supporting Doc	Less
	O&G	Final Effluent	1x/Month	Grab	BPJ	Less
	TSS	Final Effluent	1x/Month	24-Hr Composite	BPJ	Same

Table 9. Effluent Monitoring Summary (cont'd.)

Outfall(s)	Pollutant/ Parameter	Location	Frequency	Sample Type	Monitoring Basis	Compared to Prior Permit
017	Flow	Final Effluent	1x/Week	24-Hr Total	Supporting Doc	Same
	pH	Final Effluent	1x/Week	Grab	Supporting Doc	Same
	Copper	Final Effluent	1x/Week	24-Hr Composite	BPJ	Same
	Iron	Final Effluent	1x/Week	24-Hr Composite	BPJ	Same
	O&G	Final Effluent	1x/Week	Grab	BPJ	Same
	TSS	Final Effluent	1x/Week	24-Hr Composite	BPJ	Same

ANTIDEGRADATION & BACKSLIDING

This permit does not authorize the new or increased discharge of any pollutants. Therefore, antidegradation review is satisfied. This permit does not include any limits that are less stringent than the previous permit. Therefore, backsliding review is satisfied.

COOLING WATER INTAKE REQUIREMENTS AND FINAL BTA DETERMINATIONS MADE UNDER 40 CFR § 125.90-98

Cooling Water Intake Description

The Neal North single cooling water intake structure ("Structure") consists of the following:

Location

42°19' 27.0" north latitude and 96° 22' 49.6" west longitude. The Structure is located on the eastern shoreline of the Missouri River at River Mile 718.5.

Source Waterbody Information

The Missouri River is both the source and receiver of the once-through cooling system circulating water. The Missouri River has a 7Q10 flow of 8,645 cubic feet per second (cfs) and a Harmonic Mean Flow Rate of 25,073 cfs. A bathymetric study was conducted on August 1, 2006, when the water surface elevation and flow were estimated at 1,058.91 feet (ft) above sea level and 32,162 cfs, respectively. At the approximate location of Neal North Energy Center, the Missouri River was 702 ft wide and had a maximum depth of 15.0 ft. The average depth of the Missouri River in the vicinity of the Structure was 10.07 ft.

General Description

The Neal North Energy Center is a 584 MW base-load generating station. The Structure provides once-through cooling water for Unit 3's main condenser. Unit 3 is the only operating unit at Neal North, and its intake is subject to the Final Rule.

The Structure is equipped two pump chambers, each of which is divided into three 11-foot 2-inch wide bays. Each bay has a trash rack, a vertical traveling screen and two sets of guides which can be used for stop logs. Four conventional traveling screens are located approximately 22 ft behind the trash racks. Each screen is 10 ft wide and approximately 33 ft high with 3/8-inch wire mesh openings. Approximately 61% of the screen area is open, providing an available screen area of 124.5 square feet (ft^2).

Major Components

The screens have rotational speeds of 5 and 10 ft per minute. On the descending side of the traveling screens, high-pressure sprays up to 85 pounds per square inch (psi) wash the debris into the debris trough. The traveling screens do not have specialized fish buckets.

Maximum Design Intake Flow (DIF)

The Structure houses two circulating water pumps, each with a capacity of 145,500 gallons per minute (gpm), located approximately 25 ft behind the traveling screens. The design intake flow (DIF) (including both circulating pumps) is 419 MGD. Using the DIF and the Harmonic Mean Flow of the River, the percentage of the total Missouri River flow withdrawn by the Structure is 3.1%.

Maximum Design Intake Velocity

The through-screen design intake velocity at the point of withdrawal is 2.13 ft/second.

Actual Intake Flow (AIF)

The actual intake flow averages 254.1 MGD. Using the AIF, the percentage of the total Missouri River flow withdrawn by the Structure averages 1.6%.

Percent Used for Cooling

The facility uses 100% of the water withdrawn from the Missouri River for cooling water purposes.

Nearby Intakes

CF Industries is about 2,100 ft upstream of the Neal North intake structure, and MidAmerican Energy Neal South is about 1.75 miles downstream of Neal North. Both facilities have cooling water intake structures.

Emergency Intake Structure

There is no emergency intake at the facility.

Impingement Mortality BTA Determination

Because selection of an impingement option is not required at this point per 40 CFR § 125.94(b)(1), MidAmerican has committed to comply with the impingement mortality standard in 40 CFR § 125.94(c) as soon as practicable once the Department makes a BTA determination for entrainment. Thus, the Department must make an interim impingement mortality finding now. Given that the percentage of the total Mississippi River flow withdrawn by the intake structures is around 1.6%, the current intake structure represents interim BTA. The Department has included a schedule in the proposed permit for MidAmerican Energy Neal North Energy Center to submit their selected impingement option.

Entrainment BTA Determination

The existing intake system has been identified by the Department as the best technology available for minimizing entrainment at this intake structure. The social costs far exceed the social benefits for the three technologies evaluated. The fourth alternative is infeasible. The following technologies were evaluated: (1)

mechanical draft cooling towers with makeup from groundwater, (2) fine mesh modified traveling screens (permanent and seasonal), (3) fine mesh, cylindrical, wedgewire screens, and (4) alternate sources of cooling water. Each technology was evaluated using the criteria listed in 40 CFR § 125.98(f)(2) and, where relevant, the criteria listed in 40 CFR § 125.98(f)(3). See the tables below for analyses:

Numbers and types of organisms entrained, including T&E species and designated critical habitat	Based on the two years of entrainment sampling (excluding the nonnative, invasive Asian carp), the annual entrainment at NNEC is estimated to range from 56.1 to 95.5 million ichthyoplankton. The nonnative, invasive Asian carp were only collected in Year 1. The most dominant species entrained (in order of dominance and excluding Asian carp) were freshwater drum (*Aplodinotus grunniens*), carpsucker/buffalo (Carpiodes/Ictiobus), suckers (Catostomidae including white sucker [*Catostomus commersonii*]), and carp/minnows (Cyprinidae including common carp [*Cyprinus carpio*], and shiners [*Notropis* sp.), accounting for approximately over 84 percent of entrainment in both years. Freshwater drum were the most abundant taxa entrained during Year 1 (67 percent), and Year 2 (66 percent). Larvae were the dominant life stage accounting for over 89 percent of the annual entrainment estimate in Year 1 and 72 percent in Year 2.

Mechanical Draft Cooling Towers with Makeup from Groundwater	
Estimated Entrainment Reduction	100% with makeup from groundwater
Impact of changes in particulate emissions or other pollutants	Closed cycle cooling would result in an increase of 8.28 tons per year of PM emissions. There would be increases in CO2, NOx and SO_2 of 12,181, 30.8, and 15.6 tons in a typical year, respectively.
Land availability	There is sufficient space on-site, provided some infrastructure is demolished or relocated.
Remaining useful plant life	This is not a critical factor.
Quantified and qualitative social benefits	Social cost of $148.4M to $186.9M Social benefits of $356,600 to $631,500 Estimation of all of non-water quality social costs (PM emissions, fogging/ icing, safety, etc.) and other externalities would only increase the social costs.
Any other factors in 40 CFR § 125.98(f)(3) that are considered	Plant average output losses of 4.6 MW during winter and 9.8 MW during non-winter. The total net parasitic load is estimated to be 18,500 MWh. Increased water consumption of 6.54 MGD

Fine Mesh Modified Traveling Screens	
Estimated Entrainment Reduction (permanent and seasonal installation)	Based on site-specific data and survival from laboratory studies, the expected entrainment reduction would be: • 0.5-mm mesh: 16% to 39% • 1.0-mm mesh: 16% to 27% • 2.0-mm mesh: 5% to 13%
Impact of changes in particulate emissions or other pollutants	Minor. Similar to existing conditions.
Land availability	There is sufficient space on-site.
Remaining useful plant life	This is not a critical factor.
Quantified and qualitative social benefits	The social cost of installing permanent modified traveling screen with a fish handling and return system (regardless of mesh size) is estimated to cost $19.86M to $23.90M. The social cost of installing seasonal modified traveling screen with a fish return system is estimated to cost $20.63M to $25.01M. There is not a significant difference in screen equipment pricing for the varying fine mesh sizes (≤2.0-mm). The maximum social benefit over 20 years ranges from $29,400 to $186,000.
Any other factors in 40 CFR § 125.98 (f)(3) that are considered	None are critical factors.

Fine Mesh, Cylindrical, Wedgewire Screens	
Estimated Entrainment Reduction (permanent and seasonal installation)	Based on site-specific data and survival from laboratory studies, the expected entrainment reduction would be: • 0.5-mm: 95% • 1.0-mm: 71% • 2.0-mm: 65%
Impact of changes in particulate emissions or other pollutants	Minor
Land availability	Land availability is not an issue. However, there are navigational hazards to commercial and recreational boating. It will require significant in-water work and USACE permitting challenges.
Remaining useful plant life	This is not a critical factor.
Quantified and qualitative social benefits	• 0.5-mm mesh: Social cost of $38.21M to $44.54M. Maximum social benefits over 30 years of $231,000 to $598,600. • 1.0-mm mesh: Social cost of $35.71M to $41.22M. Maximum social benefits over 30 years of $174,000 to $450,900. • 2.0-mm mesh: Social cost of $31.28M to $35.96M. Maximum social benefits over 30 years of $157,600 to $408,600.

Any other factors in 40 CFR § 125.98(f)(3) that are considered	Plant shutdown could occur from high debris loading, biofouling, and winter icing. Screen damage from commercial vessels could occur, impacting the ability to obtain sufficient cooling water.

Alternative Sources of Cooling Water	
Estimated Entrainment Reduction (permanent and seasonal installation)	Entrainment reductions would be proportional to the reduction in intake flow. For cooling tower makeup, 4 to 5 vertical wells would be required to reduce entrainment by 2.5 percent. One high capacity well (HCW) would be required for cooling tower makeup. Closest wastewater source cannot meet the cooling tower makeup requirements. For fine mesh screening systems, a total of 160 to 213 vertical wells and 28 to 42 HCWs would be required to reduce entrainment 100 percent. Closest wastewater source can provide only 1.3% of the DIF.
Impact of changes in particulate emissions or other pollutants	None
Land availability	For cooling tower makeup, the total area needed is estimated to be 2.9 to 3.4 areas, along with 500 linear ft along the riverbank for the HCW. For fine mesh screens, the total area required for wells and HCWs would be 325 to 434 acres along with 14,000 to 21,000 ft along the riverbank.
Remaining useful plant life	This is not a critical factor.
Quantified and qualitative social benefits	Water reuse and the use of wastewater for cooling tower makeup and the screening systems were determined to be infeasible. As such, social costs and social benefits were not prepared for water reuse and alternate sources for cooling water.
Any other factors in 40 CFR § 125.98(f)(3) that are considered	There are no alternative water sources available that have the capacity to supply the quantity of water necessary to meet the once-through system water demand.

Intake Structure Standard Requirements

Visual or Remote Inspections

The permittee is required to conduct visual or remote inspections of the intake structure at least weekly during periods of operation, pursuant to 40 CFR § 125.96(e).

Annual Certification and Report

The permittee must complete an annual certification and report per 40 CFR § 125.97.

Reporting Requirements

The permittee is required to submit an annual certification statement and report, pursuant to 40 CFR § 125.97(c).

Records

Records related to 316(b) must be kept until the subsequent permit is issued per 40 CFR § 125.97(d).

Endangered Species Act

40 CFR § 125.98(b)(1) requires the inclusion of this provision in all permits subject to 316(b) requirements. Contact the US Fish and Wildlife Service with inquiries regarding incidental take of federally-listed threatened and endangered species.

Future BTA

This is a final entrainment BTA determination made in accordance with the requirements of the federal regulations in 40 CFR § 125.90-98, based upon the materials submitted by the permittee through 40 CFR § 122.21(r). Future BTA determinations will be made under the same regulations, but the permittee may request that some application materials be waived under 40 CFR § 125.95(c) and 40 CFR § 125.98(g).

Operation and Maintenance

Operation and maintenance of the cooling system is required per 40 CFR § 125.98(b)(2).

MidAmerican Energy - Neal North Energy Center

This Package Contains

WASTELOAD ALLOCATION CALCULATIONS & NOTES

ENVIRONMENTAL SERVICES DIVISION
WATER QUALITY-BASED PERMIT LIMITS

SECTION VI: WATER QUALITY-BASED PERMIT LIMITS

Facility Name: MidAmerican Energy - Neal North Energy Center — Sewage File Number: 6-97-00-1-02

Parameters	Ave. Conc. (mg/l)	Max. Conc. (mg/l)	Ave. Mass (lbs/d)	Max. Mass (lbs/d)
Outfall No. 009	**ADW = 417.6 MGD & AWW = 417.6 MGD**			
Temperature	Monthly Average		Daily Maximum	
Month	T (C)	T (F)	T (C)	T (F)
January	20.7	69.3	100.0	212.0
February	20.5	68.9	100.0	212.0
March	29.1	84.4	100.0	212.0
April	41.8	107.2	100.0	212.0
May	46.6	115.9	100.0	212.0
June	49.7	121.5	72.3	162.1
July	51.7	125.1	52.5	126.4
August	50.7	123.3	64.4	147.9
September	48.2	118.8	88.8	191.8
October	38.1	100.6	87.6	189.8
November	30.1	86.2	100.0	212.0
December	20.3	68.5	100.0	212.0

Stream Network/Classification of Receiving Stream: Missouri River (A1, B(WW-1), HH)

Annual critical low flows in Missouri River at the outfall:
1Q10 flow 6,409 cfs, 7Q10 flow 8,645 cfs, 30Q10 flow 9,748 cfs, 30Q5 flow 11,834 cfs, harmonic mean flow 25,073 cfs

Performed by: Nolan Underwood

ENVIRONMENTAL SERVICES DIVISION
WATER QUALITY-BASED PERMIT LIMITS

SECTION VI: WATER QUALITY-BASED PERMIT LIMITS

Facility Name: MidAmerican Neal North Energy Center — Sewage File Number: 6-97-00-1-02

Parameters	Ave. Conc. (mg/l)	Max. Conc. (mg/l)	Ave. Mass (lbs/d)	Max. Mass (lbs/d)
Outfall No. 016	**ADW = 1.22 MGD & AWW = 1.79 MGD**			
Ammonia - Nitrogen				
January	596.0	596.0	6113.0	6113.0
February	716.5	716.5	7323.5	7323.5
March	589.0	589.0	6033.0	6033.0
April	403.5	403.5	4132.5	4132.5
May	489.2	489.2	5000.3	5000.3
June	491.1	491.1	5023.8	5023.8
July	491.1	491.1	5023.8	5023.8
August	491.1	491.1	5023.8	5023.8
September	404.1	404.1	4134.3	4134.3
October	405.2	405.2	4149.7	4149.7
November	404.3	404.3	4141.1	4141.1
December	403.9	403.9	4143.2	4143.2
Chloride	20,830	20,830	214,900	214,900
Sulfate	50,780	50,780	523,800	523,800
TRC	0.6642	0.6642	6.848	6.848
Molybdenum	4,436	4,436	45,742	45,742
Boron	117.11	117.11	1,207.48	1,207.48
Manganese	118.37	118.37	1,220.46	1,220.46
Magnesium	355,790	355,790	3,623,899	3,623,899
pH	4.1-14 standard units			

Major Facility Acute WET Testing Ratio: Use 2.9% of effluent and 97.1% of dilution water for the testing

Stream Network/Classification of Receiving Stream: Missouri River (A1, B(WW-1), HH)

Annual critical low flows in Missouri River at the outfall:
1Q10 flow 6,409 cfs, 7Q10 flow 8,645 cfs, 30Q10 flow 9,748 cfs, 30Q5 flow 11,834 cfs, harmonic mean flow 25,073 cfs

Performed by: Nolan Underwood

ENVIRONMENTAL SERVICES DIVISION
WATER QUALITY-BASED PERMIT LIMITS

SECTION VI: WATER QUALITY-BASED PERMIT LIMITS

Facility Name: MidAmerican Energy - Neal North Energy Center — Sewage File Number: 6-97-00-1-02

Parameters	Ave. Conc. (mg/l)	Max. Conc. (mg/l)	Ave. Mass (lbs/d)	Max. Mass (lbs/d)
Outfall No. 016	**ADW = 1.22 MGD & AWW = 1.79 MGD**			
Toxics				
1,1,1-Trichloroethane	9.229E+02	9.229E+02	9.516E+03	9.516E+03
1,1-Dichloroethylene	1.888E+03	1.888E+03	1.946E+04	1.946E+04
1,2-Dichloroethane	4.919E+02	2.063E+03	5.007E+03	2.127E+04
1,2-Dichloropropane	1.994E+02	1.994E+02	2.030E+03	2.030E+03
2,3,7,8-TCDD (Dioxin)	6.780E-08	6.780E-08	6.901E-07	6.901E-07
3,3-Dichlorobenzidine	3.723E-01	3.723E-01	3.789E+00	3.789E+00
4,4' DDT	4.591E-04	3.845E-02	4.676E-03	3.965E-01
Aldrin	6.647E-04	1.049E-01	6.766E-03	1.081E+00
Aluminum	8.739E+01	8.739E+01	9.011E+02	9.011E+02
Antimony	3.845E+02	3.845E+02	3.965E+03	3.965E+03
Arsenic (III)	1.189E+01	1.189E+01	1.226E+02	1.226E+02
Barium	7.163E+03	7.163E+03	7.386E+04	7.386E+04
Benzene	5.768E+02	5.768E+02	5.947E+03	5.947E+03
Benzo(a)Pyrene	2.393E-01	2.393E-01	2.436E+00	2.436E+00
Beryllium	1.748E+01	1.748E+01	1.802E+02	1.802E+02
Bis(2-ethylhexyl)phthalate	2.925E+01	2.925E+01	2.977E+02	2.977E+02
Bromoform	1.861E+03	1.861E+03	1.894E+04	1.894E+04
Cadmium	2.043E-01	2.043E-01	2.107E+00	2.107E+00
Carbon Tetrachloride	2.127E+01	7.533E+02	2.165E+02	7.768E+03
Chlordane	1.974E-03	8.390E-02	2.010E-02	8.651E-01
Chloride	2.083E+04	2.083E+04	2.149E+05	2.149E+05
Chlorobenzene	5.628E+02	5.628E+02	5.803E+03	5.803E+03
Chlorodibromomethane	1.728E+02	1.728E+02	1.759E+03	1.759E+03
Chloroform	6.249E+03	6.249E+03	6.360E+04	6.360E+04
Chloropyrifos	2.902E-03	2.902E-03	2.992E-02	2.992E-02
Chromium (VI)	5.696E-01	5.696E-01	5.873E+00	5.873E+00
Copper	9.403E-01	9.403E-01	9.695E+00	9.695E+00
Cyanide	7.691E-01	7.691E-01	7.930E+00	7.930E+00
Dichlorobromomethane	2.260E+02	2.260E+02	2.300E+03	2.300E+03
Dieldrin	7.179E-04	8.390E-03	7.307E-03	8.651E-02
Endosulfan	7.691E-03	7.691E-03	7.930E-02	7.930E-02
Endrin	3.006E-03	3.006E-03	3.100E-02	3.100E-02
Ethylbenzene	7.918E+02	7.918E+02	8.164E+03	8.164E+03
Fluoride	2.739E+02	2.739E+02	2.825E+03	2.825E+03
gamma-Hexachlorocyclohexane (Lindane)	3.321E-02	3.321E-02	3.424E-01	3.424E-01

Heptachlor	1.050E-03	1.818E-02	1.069E-02	1.874E-01

ENVIRONMENTAL SERVICES DIVISION
WATER QUALITY-BASED PERMIT LIMITS

SECTION VI: WATER QUALITY-BASED PERMIT LIMITS

Facility Name: MidAmerican Energy - Neal North Energy Center — Sewage File Number: 6-97-00-1-02

Parameters	Ave. Conc. (mg/l)	Max. Conc. (mg/l)	Ave. Mass (lbs/d)	Max. Mass (lbs/d)
Outfall No. 016	**ADW = 1.22 MGD & AWW = 1.79 MGD**			
Toxics				
Heptachlor epoxide	5.185E-04	1.818E-02	5.277E-03	1.874E-01
Hexachlorobenzene	3.856E-03	3.856E-03	3.924E-02	3.924E-02
Hexachlorocyclopentadiene	6.908E+02	6.908E+02	7.034E+03	7.034E+03
Iron	3.496E+01	3.496E+01	3.604E+02	3.604E+02
Lead	3.531E+00	6.901E+00	3.597E+01	7.116E+01
Mercury (II)	5.758E-02	5.758E-02	5.937E-01	5.937E-01
Nickel	2.948E+01	2.948E+01	3.040E+02	3.040E+02
Nitrate as N	1.119E+04	1.119E+04	1.153E+05	1.153E+05
Nitrate+Nitrite as N	1.119E+04	1.119E+04	1.153E+05	1.153E+05
para-Dichlorobenzene	6.992E+01	6.992E+01	7.209E+02	7.209E+02
Parathion	2.272E-03	2.272E-03	2.343E-02	2.343E-02
Pentachlorophenol (PCP)	1.019E+00	1.019E+00	1.050E+01	1.050E+01
Phenols	2.295E+01	8.739E+01	2.338E+02	9.011E+02
Polychlorinated Biphenyls (PCBs)	8.509E-04	6.992E-02	8.660E-03	7.209E-01
Polynuclear Aromatic Hydrocarbons (PAHs)	1.377E-02	1.049E+00	1.403E-01	1.081E+01
Selenium	6.747E-01	6.747E-01	6.957E+00	6.957E+00
Silver	4.358E-01	4.358E-01	4.494E+00	4.494E+00
Sulfate	5.078E+04	5.078E+04	5.238E+05	5.238E+05
Tetrachloroethlyene	4.387E+01	4.387E+01	4.466E+02	4.466E+02
Thallium	2.952E-01	2.090E+01	3.006E+00	2.155E+02
Toluene	2.295E+01	8.739E+01	2.338E+02	9.011E+02
Total Residual Chlorine (TRC)	6.642E-01	6.642E-01	6.848E+00	6.848E+00
Toxaphene	9.181E-04	2.552E-02	9.351E-03	2.631E-01
trans-1,2-Dichloroethylene	8.792E+01	8.792E+01	8.953E+02	8.953E+02
Trichloroethylene (TCE)	3.672E+01	1.398E+02	3.740E+02	1.442E+03
Vinyl Chloride	3.191E+01	3.191E+01	3.248E+02	3.248E+02
Zinc	7.536E+00	7.536E+00	7.770E+01	7.770E+01

WLAs/Permit Limits for MidAmerican Energy - Neal North Energy Center's Wastewater Discharge

These wasteload allocations and water quality-based permit limitations are for MidAmerican Energy - Neal North Energy Center's wastewater discharge. The wasteload allocations/permit limits are based on the Water Quality Standards (IAC 567.61) and the "Iowa Wasteload Allocation (WLA) Procedure," effective November 11, 2020. The chloride allocation/permit limits are based on the criteria that became effective on November 11, 2009.

The water quality-based limits in this WLA are calculated to meet the surface water quality criteria to protect downstream uses. There could be technology-based limits applicable to this facility that are more stringent than the water quality-based limits shown in this WLA. The technology-based limits could be derived from either federal guidelines based on different industrial categories or permit writer's judgment.

1. BACKGROUND:
MidAmerican Energy - Neal North Energy Center discharges a stream of wastewater from two outfalls, outfall 16 and outfall 9. Effluent flows and pollutants of concern for each outfall can be seen in Table 1.

Outfall 9 consists of once-through non-contact cooling water from unit 3, non-contact cooling water used in various desanders and strainers, unit 3 boiler blowdown, and intake screen wash water, discharging to the Missouri River (at 42° 19' 24.6" N, 96° 22' 46.5" W).

Outfall 016 consists of blowdown from under-boiler submerged flight conveyor quench water, reverse osmosis reject, floor drains, low volume waste, demineralizer regeneration waste, metal cleaning waste, auxiliary boiler blowdown, and stormwater, discharging to the Missouri River (at 42° 19' 10.7" N, 96° 22' 31.0" W).

Table 1: Outfall flows and pollutants of concern

Outfall	ADW (MGD)	AWW (MGD)	Pollutants
009	417.6	417.6	Temperature
016	1.22	1.79	Sulfate, Iron, WET Testing, All Chapter 61 Table 1, pH, Ammonia, Boron, Magnesium, Manganese, Molybdenum

Route of flow and use designations:
Missouri River is an A1, B(WW-1), HH designated use waterbody. The designations have been adopted in Iowa's state rule described in the rule-referenced document of "Surface Water Classification," effective July 24, 2019. Based on the pollutants of concern, the use designations of waterbodies further downstream will not impact the resulting limits for this facility.

Critical low flow determination:
The annual critical low flows in Missouri River at the outfall are estimated based on the Drainage Area Ratio (DAR) method from "Methods for estimating selected low-flow frequency statistics and harmonic mean flows for streams in Iowa" (2012, revised 2017) and flow statistics obtained at USGS gage station 06486000, located on Missouri River at Sioux City, Iowa.

This facility utilizes a large volume of surface water that is drawn from the Missouri River upstream from Outfall 009. However, the limits for Outfall 009 are based on a thermal study, and Outfall 016 is downstream from Outfall 009, after the water is returned to the river. Thus, the total river flows (intake flow not subtracted) are used for WLA calculations for the protection of the Missouri River.

Table 2: Annual critical low flows

Location	D.A. (mi^2)	1Q10 (cfs)	7Q10 (cfs)	30Q10 (cfs)	30Q5 (cfs)	Harmonic mean (cfs)
Missouri River at the outfall	315,518	6,409	8,645	9,748	11,834	25,073
Missouri River at the USGS gage 06486000	314,600	6,390	8,620	9,720	11,800	25,000

CORMIX temperature study:
This facility conducted a thermal study in January 2011. That study specified temperature limits as discussed in Section 3. The results of the old CORMIX study can be used in this WLA and will be considered for one final NPDES permit before expiring. If desired, a new study can be completed and considered in the calculation of the limits for this facility's future NPDES permits.

2. TOTAL MAXIMUM DAILY LOAD (TMDL) LIMITATIONS:
The following waterbodies in the discharge route are on the 2022 impaired waters list:

- Missouri River for flow alteration, habitat alteration, and bacteria (indicator bacteria – *E. coli*)
- Upper Blencoe Bend for flow alteration
- Desoto Bend turbidity and algal growth (chlorophyll-a)

This facility has not been assigned allocations from any TMDLs at this time.

The results presented in this report are wasteload allocations based on meeting the State's current water quality standards in the receiving waterbody. Additional and/or more stringent effluent limits may be applicable to this discharge based on approved TMDLs for impaired waterbodies, which may provide watershed based wasteload allocations. Information on impaired streams in Iowa and approved TMDLs can be found at the following website: http://www.iowadnr.gov/Environmental-Protection/Water-Quality/Watershed-Improvement/Impaired-Waters.

3. CALCULATIONS:
The WLAs/permit limits for outfall 16 are calculated based on the facility's Average Dry Weather (ADW) flow of 1.22 MGD and its Average Wet Weather (AWW) flow of 1.79 MGD. Calculations for outfall 9 are based on inputs from the 2011 COREMIX study and can be seen in the study report.

Only wasteload allocations/permit limits (water quality-based effluent limits) calculated using DNR approved design flows can be applied in NPDES permits. Water quality-based effluent limits calculated using proposed flows that have not been approved by the DNR for permitting and compliance may be used for informational purposes only.

The water quality-based permit concentration limits are derived using the allowed stream flow and the ADW flow, while the loading limits are derived using the allowed stream flow and the AWW flow.

Toxics and TRC (Outfall 016):
The toxics wasteload allocations will consider the procedures included in the 2000 revised WQS and the 2007 chemical criteria.

To protect the aquatic life use:
Important to toxics is the use of the 1Q10 stream flow in association with the acute wasteload allocation calculation. The chronic WLA will continue to use the 7Q10 stream flow in its calculations. In this case, 10% of the 7Q10 flow and 1% of the 1Q10 flow in Missouri River at the outfall are used as the Mixing Zone (MZ) and the Zone of Initial Dilution (ZID), respectively.

Effective November 11, 2020, water quality criteria for metals (excluding aluminum) are expressed as dissolved in IAC 567.61. Using EPA dissolved metal translators, water quality-based effluent limits in this WLA are expressed as total recoverable.

Effective November 11, 2020, water quality criteria for aluminum are expressed as bioavailable in IAC 567.61. Water quality-based effluent limits for aluminum in this WLA are expressed as total recoverable.

To protect the human health (HH) use:
For pollutants that are non-carcinogenic and have criteria for HH protection, the criteria apply at the end of the MZ, which in this case is 10% of the 30Q5 flow in Missouri River at the outfall.

For pollutants that are carcinogenic and have criteria for HH protection, the criteria apply at the end of the MZ, which in this case is 10% of the harmonic mean flow in Missouri River at the outfall.

Final limits:
The maximum limits are those calculated for the protection of the aquatic life use and the average limits are the more stringent between those for the protection of the aquatic life use and those for the protection of the HH use.

The TRC limits are based on a sampling frequency of 1/week, the limits for other toxics are based on a sampling frequency of 1/week.

Magnesium (Outfall 016):
Currently there is no numeric water quality criteria for magnesium. The guideline values for magnesium for livestock watering is 800 mg/l. It must be met at the boundary of the MZ, which in this case is 10% of the 7Q10 flow in the Missouri River at the outfall of this facility.

Ammonia Nitrogen (Outfall 016):
Standard stream background pH, temperatures, and concentrations of NH3-N are mixed with the discharge from the facility's effluent pH and temperature values to calculate the applicable instream criteria for the protection of Missouri River.

Based on the ratio of the stream flow to the discharge flow, 2.5% of the 1Q10 flow and 25% of the 30Q10 flow in Missouri River at the outfall are used as the ZID and the MZ, respectively. In the Missouri River early life protection will begins in February and runs through September.

The monthly background pH, temperatures, and NH3-N concentrations shown in Table 3 are used for the wasteload allocation/permit limits calculations based on the Year 2000 ammonia nitrogen criteria. Table 4 shows the statewide monthly effluent pH and temperature values for industrial facilities. Table 5 shows the calculated ammonia nitrogen wasteload allocations for this facility.

Table 3: Background pH, temperatures, and NH3-N concentrations for use with Year 2000 ammonia nitrogen criteria for the Missouri River

Months	pH	Temperature (°C)	NH_3-N (mg/l)
January	8.1	0.5	0.05
February	8.0	0.5	0.05
March	8.1	4.5	0.11
April	8.3	11.2	0.03
May	8.2	17.1	0.02
June	8.2	23.0	0.01
July	8.2	26.0	0.01
August	8.2	25.8	0.01
September	8.3	21.0	0.01
October	8.3	14.0	0.01
November	8.3	7.0	0.02
December	8.3	1.0	0.04

Table 4: Standard effluent pH and temperature values for industrial facilities

Months	pH	Temperature (°C)
January	7.9	17.83
February	8.1	17.83
March	8.0	27.67
April	8.2	33.89
May	8.3	35.89
June	8.2	38.67
July	8.2	40.61
August	8.2	39.61
September	8.3	34.50
October	8.2	31.89
November	8.2	29.39
December	8.1	24.67

Table 5: Wasteload allocations for ammonia nitrogen for the protection of aquatic life

Months	ADW-based*		AWW-based**	
	Acute (mg/l)	Chronic (mg/l)	Acute (mg/l)	Chronic (mg/l)
January	596.0	4335.9	409.5	2956.3
February	716.5	3080.2	490.6	2100.1
March	589.0	2568.0	404.1	1750.9
April	403.5	1930.6	276.8	1316.3
May	489.2	1936.1	334.9	1320.1
June	491.1	1328.3	336.5	905.6
July	491.1	1092.4	336.5	744.8
August	491.1	1106.7	336.5	754.6
September	404.1	1283.8	276.9	875.3
October	405.2	2023.4	278.0	1379.6
November	404.3	3171.9	277.4	2162.6
December	403.9	3146.1	277.5	2145.0

*: bases for concentration limits; **: bases for mass loading limits

Chloride and Sulfate (Outfall 016):

The chloride and sulfate criteria became effective on November 11, 2009 and apply to all Class B waters. The default hardness for background and effluent is 200 mg/l.

Chloride criteria are functions of hardness and sulfate concentration, shown as follows:

$$\text{Acute criteria} = 287.8*(\text{Hardness})^{0.205797}*(\text{Sulfate})^{-0.07452}$$
$$\text{Chronic criteria} = 177.87*(\text{Hardness})^{0.205797}*(\text{Sulfate})^{-0.07452}$$

Sulfate criteria, shown in Table 6, are functions of hardness and chloride concentration and serve as both the acute and chronic criteria.

Table 6: Sulfate criteria

Hardness (mg/l as CaCO3)	Sulfate criteria (mg/l)		
	Chloride < 5 mg/l	5 mg/l <= Chloride < 25 mg/l	25 mg/l <= Chloride < 500 mg/l
< 100	500	500	500
100<=H<=500	500	(-57.478+5.79*H+54.163*Cl)*0.65	(1276.7+5.508*H-1.457*Cl)*0.65
H> 500	500	2,000	2,000

The acute criteria apply at the end of the ZID, and the chronic criteria apply at the end of the MZ. In this case, 10% of the 7Q10 flow and 1% of the 1Q10 flow in Missouri River at the outfall are used as the MZ and the ZID, respectively.

The default chloride concentration for both background water and effluent is 34 mg/l, while the default sulfate concentration for both background water and effluent is 63 mg/l. The limits are calculated based on an assumed sampling frequency of 1/week.

Iron (Outfall 016):

Iron criteria are defined in the issue paper "Iron Criteria and Implementation for Iowa's Surface Waters" (November 11, 2020). A dissolved iron criterion of 1 mg/L applies at the end of the ZID for both general

use and designated use streams. In this case, the ZID is 1% of the 1Q10 flow in Missouri River at the outfall. Water quality-based effluent limits for iron in this WLA are expressed as total recoverable.

Boron, Manganese, and Molybdenum (Outfall 016):
There are no numerical criteria for boron, manganese, or molybdenum in Iowa's water quality standards. However, the water quality standards specify, in the form of narrative criteria, that all surface waters shall be free from materials attributable to wastewater discharges or agricultural practices in concentrations or combinations which are acutely toxic to human, animal, or plant life (567 IAC 61.3(2)d).

This narrative criterion is implemented through the concept of establishing a no effect level or LC_0 as described in the 'Iowa Wasteload Allocation Procedure'. The LC_0 or the estimate of the concentration that will not be acutely toxic is determined by calculating the value of ½ the 48 or 96-hour LC_{50} for the most sensitive resident species. In cases with multiple applicable 48 or 96-hour LC_{50} values, the Species Mean Acute Value (SMAV) was used.

There is limited toxicity data available for the toxics. The criteria are shown in Table 7. These apply at the end of the ZID. In this case, 1.0% of the 1Q10 flow in the Missouri River at the outfall are used as the ZID.

Table 7: Narrative Criteria for Select Toxics

Toxic	Criterion (mg/l)	Toxicity End Point	Toxicity Testing Organism
Boron	3.35	1/2 48hrLC_{50}	Water Flea
Manganese	3.386	1/2 SMAV	Midge
Molybdenum	126.9	1/2 SMAV	Fathead Minnow

pH (Outfall 016):
Iowa Water Quality Standards (IAC 567.61.3.(3).a.(2) and IAC 567.61.3.(3).b.(2)) require that pH in Class A or Class B waters "shall not be less than 6.5 nor greater than 9.0." The criteria apply at the end of the MZ, which is 10% of the 7Q10 flow in Missouri River at the outfall.

TDS:
Effective November 11, 2009, the site-specific TDS approach is no longer applicable; instead, the new chloride and sulfate criteria became applicable. However, the TDS level should be controlled to a level such that the narrative criteria stated in IAC 567.61.3 are fulfilled.

Major Facility Acute WET Testing Ratio:
The acute whole effluent toxicity (WET) testing ratio is calculated using the ADW design flow and 1% of the 1Q10 flow in Missouri River at the outfall as the ZID.

Temperature (Outfall 009):
This facility conducted a thermal study in January 2011. The study calculated 30-day average limits based on the 3°C rise criterion, daily maximum limits based on the 32°C max criterion, and rate of change limits based on the 1°C per hour rate of change criterion. The thermal study was based on navigation season (April – September) and non-navigation season (October – March) 7Q10 flows of 21,284 and 10,090 cfs, respectively. The thermal study was based on a discharge flow of 495,000 gpm (712.8 MGD) which is much higher than the current discharge flows (ADW = 417.6 MGD, AWW = 417.6 MGD). This is because generating unit 1 and unit 2 were retired in April 2016. However, at the lower discharge flow rate the limits in the study are considered to still be applicable and protective. The 30-

day average and daily maximum temperature limits from the 2011 thermal study are shown on Page 1 of this report.

Allowed Maximum Effluent Temperature Change:
Cessation of thermal inputs to the receiving water by a thermal discharge shall occur gradually so as to avoid fish mortality due to cold shock during the winter months (November through March). The basis for this requirement is to allow fish associated with the discharge-heated mixing zone to acclimate to the decreasing temperature. Likewise, when the discharge resumes the temperature would need to be increased gradually to avoid negative impacts to aquatic life in the receiving stream.

4. PERMIT LIMITATIONS:
- *Based on the Year 2006 Water Quality Standards and 2002 Permit Derivation Procedure.*

The acute and chronic WLAs are used as the values for input into the current permit derivation procedure. Under the 2002 permit derivation procedure, only for toxic parameters is the monitoring frequency considered in the calculation of final limits. The water quality-based limits are shown on Pages 1 – 4 of this report.

Excerpts Pertaining to Quench Water Blowdown from Mechanical Drag Systems

USEPA. June 7, 2013. *Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category; Proposed Rule*. 78 FR 34449.

> Alternatively, some furnaces are fitted with mechanical drag systems where the bottom ash drops into a water-filled trough, but the ash is removed using a submerged mechanical drag conveyor that drags the bottom ash out of the furnace. At the end of the trough, the drag chain reaches an incline, which dewaters the bottom ash by gravity, draining the water back to the trough as the ash moves up the conveyor. The bottom ash is often dumped into a nearby bunker for temporary storage. As the bottom ash continues dewatering in the nearby bunker, water that drains from the system may be discharged; however, EPA does not consider this water from the bunker to be bottom ash transport water because the mechanical conveyor, and not the water, is the transport mechanism that moves the ash away from the boiler. Instead, the wastewater draining from the bunker would be low volume wastes.

USEPA. September 2015. *Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category: EPA's Response to Public Comments (Part 4 of 10)*. Office of Water, Washington, D.C. 20460. Document Control #EPA-HQ-OW-2009-0819-4510-A2. Pages 4-350 to 4-351.

> The definition clearly states that transport water is wastewater that is used to convey the ash. Water generated from the mechanical drag system (MDS) is not subject to the bottom ash transport water limitations and standards. In a mechanical drag system, the mechanical scraper is used to convey the ash; therefore, these systems do not use water as the medium of transport and do not constitute a transport water system. Therefore, water generated from the mechanical drag system is not subject to the final rule requirements for bottom ash transport water. As such, the water draining from the bottom ash is also not transport water.

USEPA. August 2020. *Response to Public Comments for Revisions to the Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category.* Office of Water, Washington, D.C. 20460. Document Control #EPA-HQ-OW-2009-0819-9015. Page 2-123.

> Some commenters requested that EPA clarify that MDS quench bath water is a low volume waste, not bottom ash transport water, and requested EPA revise the definition of "low volume waste" accordingly. The final rule preamble and the Supplemental TDD clarify that MDS quench bath water is not bottom ash transport water, but rather should be managed as low volume waste. See Appendix A of the final rule preamble (defined terms for purposes of the preamble) and Section 4.2 of the Supplemental TDD. EPA disagrees that the definition of low volume waste needs to be revised to specifically include MDS quench water. The definition of transport water in the final rule regulatory text and the Supplemental TDD clearly state that MDS quench water is not bottom ash transport water.

USEPA. August 2020. *Supplemental Technical Development Document for Revisions to the Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category*. Office of Water, Washington, D.C. 20460. EPA-821-R-20-001. Page 4-9.

> A mechanical drag system collects bottom ash from the bottom of the EGU through a transition chute and sends it into a water-filled trough. The water bath in the trough quenches the hot bottom ash as it falls from the EGU and seals the EGU gases. The drag system uses a parallel pair of chains attached by crossbars at regular intervals. In a continuous loop, the chains move along the bottom of the water bath,

dragging the bottom ash toward the far end of the bath. The chains then move up an incline, dewatering the bottom ash by gravity and draining the water back to the trough. Because the bottom ash falls directly into the water bath from the bottom of the EGU and the drag chain moves constantly on a loop, bottom ash removal is continuous. The dewatered bottom ash is often conveyed to a nearby collection area, such as a small bunker outside the EGU building, from which it is loaded onto trucks and either sold or transported to a landfill. See Section 7.3.3 of the 2015 TDD for more specific system details.

The mechanical drag system does generate some wastewater (i.e., residual water that collects in the storage area as the bottom ash continues to dewater). This wastewater is either recycled back to the quench water bath or directed to the low volume waste system. This wastewater is not BA transport water because the transport mechanism is the drag chain, not the water (see 40 CFR 423.11(p)).

MidAmerican Energy - Neal North Energy Center (#9700102)
Reasonable Potential Calculations for Sulfate
(Outfall 016)

Date	Sulfate			
	Concentration		Mass	
	30-day avg	max	30-day avg	max
10/31/2023	201.50000	202.00000	587.76150	754.35300
9/30/2023	220.50000	240.00000	777.49650	800.64000
8/31/2023	223.50000	261.00000	745.59600	870.69600
7/31/2023	286.00000	356.00000	1028.32200	1336.06800
6/30/2023	183.00000	206.00000	643.84800	687.21600
5/31/2023	231.50000	318.00000	844.42500	1326.06000
4/30/2023	165.00000	168.00000	409.07700	607.98600
3/31/2023	165.33333	180.00000	535.42800	675.54000
2/28/2023	253.50000	283.00000	481.84350	590.05500
1/31/2023	143.50000	152.00000	299.19750	316.92000
12/31/2022	136.00000	148.00000	252.70200	258.54000
11/30/2022	190.33333	215.00000	317.47600	358.62000
10/31/2022	187.00000	202.00000	155.95800	168.46800
9/30/2022	190.00000	191.00000	158.46000	159.29400
8/31/2022	187.33333	192.00000	676.37400	701.81100
7/31/2022	148.50000	153.00000	429.71850	540.43200
6/30/2022	152.00000	173.00000	633.84000	721.41000
5/31/2022	132.50000	148.00000	276.26250	308.58000
4/30/2022	171.50000	176.00000	858.18600	880.70400
3/31/2022	215.00000	290.00000	945.06100	1209.30000
2/28/2022	253.50000	277.00000	1009.14000	1155.09000
1/31/2022	104.00000	104.00000	173.47200	216.84000
12/31/2021	170.00000	216.00000	354.45000	450.36000
11/30/2021	208.33333	228.00000	730.16700	855.68400
10/31/2021	217.00000	221.00000	63.00870	79.93890
9/30/2021	223.00000	278.00000	836.91900	1043.33400
8/31/2021	226.00000	239.00000	848.17800	896.96700
7/31/2021	218.00000	225.00000	818.15400	844.42500
6/30/2021	202.66667	229.00000	718.37980	859.43700
5/31/2021	193.00000	193.00000	515.07840	515.07840
4/30/2021	177.00000	178.00000	717.32340	964.93800
3/31/2021	219.66667	248.00000	625.94480	754.26960
2/28/2021	211.50000	234.00000	670.28580	741.59280
1/31/2021	159.00000	172.00000	503.23560	616.82640
12/31/2020	206.33333	247.00000	665.25400	1029.99000
11/30/2020	172.50000	191.00000	518.95650	716.82300
10/31/2020	153.50000	178.00000	320.04750	371.13000
9/30/2020	194.50000	223.00000	405.53250	464.95500
8/31/2020	193.50000	219.00000	403.44750	456.61500
7/31/2020	189.50000	213.00000	395.10750	444.10500
6/30/2020	192.00000	219.00000	400.32000	456.61500
5/31/2020	138.50000	145.00000	288.77250	302.32500
4/30/2020	187.00000	215.00000	1849.64520	2187.58200
3/31/2020	208.00000	247.00000	1174.73070	1235.98800
2/29/2020	195.50000	212.00000	1031.32440	1166.93280
1/31/2020	192.33333	227.00000	1114.91900	1609.20300
12/31/2019	209.00000	213.00000	1481.60100	1509.95700

MidAmerican Energy - Neal North Energy Center (#9700102)
Reasonable Potential Calculations for Sulfate
(Outfall 016)

Date	Sulfate			
	Concentration		Mass	
	30-day avg	max	30-day avg	max
11/30/2019	266.50000	268.00000	1599.27840	1768.08000
10/31/2019	197.66667	212.00000	1168.21160	1379.10240
9/30/2019	191.50000	195.00000	1116.80940	1160.26080
8/31/2019	222.00000	225.00000	1305.91890	1369.84500
7/31/2019	218.66667	225.00000	1282.94220	1369.84500
6/30/2019	197.00000	208.00000	1149.66900	1353.08160
5/31/2019	172.00000	181.00000	1081.42000	1117.05960
4/30/2019	222.00000	252.00000	1434.64680	1828.46160
3/31/2019	189.50000	250.00000	1817.74470	1925.78940
2/28/2019	185.50000	209.00000	965.52180	1094.37480
1/31/2019	153.50000	175.00000	742.51020	846.51000
12/31/2018	210.00000	242.00000	868.69440	1001.06688
11/30/2018	237.00000	242.00000	980.38368	1001.06688
Reasonable probability:				
long term ave	194.3528	215.4833	753.4030	873.9040
std	33.4118	43.6511	407.8920	466.2217
cv	0.1719	0.2026	0.5414	0.5335
n	60	60	60	60
max	286.000	356.000	1849.645	2187.582
Pn	0.9261	0.9261	0.9261	0.9261
ND	1.4475	1.4475	1.4475	1.4475
a^2	0.0291	0.0402	0.2571	0.2505
a	0.1707	0.2005	0.5070	0.5005
mult	1.1618	1.1927	1.5611	1.5522
c	332.2617	424.5836	2887.5454	3395.5299
WLA	50,780	50,780	523,800	523,800
Is c > WLA?	no	no	no	no
Violations	0	0	0	0
% compliance	100.0	100.0	100.0	100.0
% limit	0%	0%	0%	0%

The WLA values are from the 12/21/2023 WLA
Analysis performed by: Melinda McCoy on 1/9/2024

Color Key:

DON'T TOUCH
insert WLA values
Results

6-97-00-1-02
Yellow

DEPARTMENT OF NATURAL RESOURCES

GOVERNOR KIM REYNOLDS
LT. GOVERNOR ADAM GREGG
DIRECTOR CHUCK GIPP

January 18, 2018

JACOB ARNOLD, SENIOR ENVIRONMENTAL ANALYST
MIDAMERICAN ENERGY COMPANY
4299 NW URBANDALE DRIVE
DES MOINES, IA 50322

Re: Antidegradation Analysis for Discharge of CC 030 and NALCO® 2895
NPDES Permit 9700102

Dear Mr. Arnold:

The Iowa Department of Natural Resources has completed a review of the above-referenced antidegradation alternatives analysis dated October 2017 and revised November 27, 2017. Public notice was completed on November 23, 2017. No comments were received by the facility during the public notice period.

Per Subrule 564 IAC 61.2(2) and the 2010 EPA-approved Iowa Antidegradation Implementation Procedure (AIP), the Department has made the following findings:

- The level of water quality necessary to protect applicable beneficial uses is fully maintained. Water quality shall not be degraded to a level that does not comply with applicable Water Quality Standards (WQS).
    - We are in agreement with the applicant's analysis that concludes that the selected alternative of the addition and subsequent discharge of CC 030 and NALCO® 2895 for the maintenance of reverse osmosis and boiler systems will ensure recreation, aquatic life, and human health beneficial uses are fully maintained and that the water quality will not be degraded to a level that does not comply with the WQS applicable for these uses. See page 23 of the analysis submitted by the applicant. The Department hereby adopts that portion of the applicant's analysis as its own.
    - The selected alternative of the addition of CC 030 and NALCO® 2895 should pose no risk of a water quality standard violation

- The highest statutory and regulatory requirements for new and existing point sources are achieved.
    - The Department is in agreement that the selected alternative will meet the highest statutory and regulatory requirements for this discharge. Page 22 shows that Alternative 4 is practicable. The Department hereby adopts that portion of the analysis as its own.

- All cost-effective and reasonable BMPs for nonpoint source pollution control are implemented.
    - See Section 8 of the AIP.

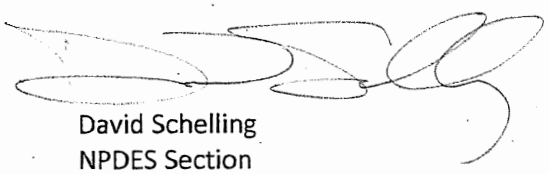
- Allowing degradation of water quality is necessary and accommodates important economic or social development in the area where the surface water is located.
    - The Department is in agreement with the applicant's determination that the selected alternative is the least degrading reasonable alternative. Further, no reasonable alternatives exist to prevent degradation. This portion of the analysis is found at page 22 and is hereby adopted by the Department as its own.

    - The Department is in agreement that the applicant has presented the social and economic importance of the project in accordance with Section 3.3 of the AIP. This portion of the analysis is found on page 24 and is hereby adopted by the Department as its own.

The approval of this antidegradation alternatives analysis satisfies the antidegradation requirements be able to discharge CC 030 and NALCO® 2895 from outfall 016 as described in the analysis. This approval does not require modification of the facility's NPDES permit. As such, the facility may begin discharging CC 030 and NALCO® 2895 from outfall 016, as described in the analysis, upon receipt of this approval letter.

Please contact me at 515-725-8407 or david.schelling@dnr.iowa.gov if you have questions regarding this approval. MidAmerican Energy Company should retain this letter on file as proof of the antidegradation alternatives analysis approval.

Sincerely,



David Schelling
NPDES Section

cc: DNR Field Office 3
Christopher Petersen, P.E., Snyder & Associates, Inc – via email

World Headquarters
Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

MSDS No: M00072

SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Citric Acid
Catalog Number: 2106269

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00072
Chemical Name: 2-Hydroxy-1,2,3-Propanetricarboxylic Acid
CAS Number: 77-92-9
Additional CAS No. (for hydrated forms): -
5949-29-1, monohydrate
Chemical Formula: $C_6H_8O_7$
Chemical Family: Organic Acid
Intended Use: Laboratory Use

2. HAZARDS IDENTIFICATION

GHS Classification:
Hazard categories: Serious Eye Damage/Eye Irritation:Eye Irrit. 2 Skin Corrosion/Irritation: Skin Irrit. 2 . .
GHS Label Elements:
WARNING

Hazard statements: . . Causes serious eye irritation. Causes skin irritation.
Not applicable
Precautionary statements: Wear protective gloves / protective clothing / eye protection / face protection. Call a POISON CENTER or doctor/physician if you feel unwell. Take off contaminated clothing and wash before reuse. Wear eye protection. IF ON SKIN: Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
HMIS:
Health: 1
Flammability: 1
Reactivity: 0
Protective Equipment: X - See protective equipment, Section 8.
NFPA:
Health: 1
Flammability: 1
Reactivity: 0
Symbol: Not applicable
WHMIS Hazard Classification: Class D, Division 2, Subdivision B - Toxic material (other toxic effects)
WHMIS Symbols: Other Toxic Effects

3. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Components according to GHS:

Citric Acid

CAS Number: 77-92-9
Chemical Formula: $C_6H_8O_7$
GHS Classification: Eye Irrit. 2 H319; Skin irrit. 2, H315
Percent Range: 100.0
Percent Range Units: weight / weight
PEL: 15 mg/m^3 as total dust; 5 mg/m^3 as respirable dust
TLV: 10 mg/m^3 as inhalable dust; 3 mg/m^3 as respirable dust

WHMIS Symbols: Other Toxic Effects

4. FIRST AID MEASURES

General Information: In the event of exposure, show this Material Safety Data Sheet and label (where possible) to a doctor.
Advice to doctor: Treat symptomatically.
Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.
Skin Contact (First Aid): Wash skin with plenty of water. Call physician if irritation develops. Remove contaminated clothing.
Inhalation: Remove to fresh air. Give artificial respiration if necessary.
Ingestion (First Aid): Give large quantities of water. If you feel unwell, contact a physician. Never give anything by mouth to an unconscious person.

5. FIRE FIGHTING MEASURES

Flammable Properties: Can burn in fire, releasing toxic vapors. Material is not classified as flammable according to GHS criteria.
Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear. Evacuate area and fight fire from a safe distance.
Extinguishing Media: Carbon dioxide Dry chemical. Water.
Extinguishing Media NOT To Be Used: Not applicable
Fire / Explosion Hazards: Contact with metal nitrates may cause explosion.
Hazardous Combustion Products: Toxic fumes of: carbon monoxide, carbon dioxide.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:
Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance. Outside of the US, only persons properly qualified according to state or local regulations should respond to a spill involving chemicals.
Containment Technique: Stop spilled material from being released to the environment. Cover spilled solid material with sand or other inert material.
Clean-up Technique: If permitted by regulation, Scoop up spilled material into a large beaker and dissolve with water. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution. Otherwise, Pick up spill for disposal and place in a closed container Dispose of in accordance with local, state and federal regulations or laws.
Evacuation Procedure: Evacuate as needed to perform spill clean-up. If conditions warrant, increase the size of the evacuation.
DOT Emergency Response Guide Number: Not applicable

7. HANDLING AND STORAGE

Handling: Avoid contact with eyes skin Do not breathe dust. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.
Storage: Keep container tightly closed when not in use.
Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls: Maintain general industrial hygiene practices when using this product.
Personal Protective Equipment:
Eye Protection: safety glasses with top and side shields
Skin Protection: lab coat nitrile gloves In the EU, the selected gloves must satisfy the specifications of EU Directive 89/686/EEC and standard EN 374 derived from it.
Inhalation Protection: adequate ventilation
Precautionary Measures: Avoid contact with: eyes skin Do not breathe: dust Wash thoroughly after handling.
TLV: 10 mg/m^3 as inhalable dust; 3 mg/m^3 as respirable dust
PEL: 15 mg/m^3 as total dust; 5 mg/m^3 as respirable dust
For Occupational Exposure Limits (OEL) for ingredients, see section 3 - Composition/Information on Ingredients.:

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: White crystals
Physical State: Solid
Molecular Weight: 192
Odor: Odorless
Odor Threshold: Not applicable
pH: 2 (1% solution)
Metal Corrosivity:
Corrosivity Classification: Not classified as corrosive to metals according to GHS criteria.
Steel: Not Applicable
Aluminum: Not Applicable
Specific Gravity/ Relative Density (water = 1; air =1): 1.67
Viscosity: Not applicable
Solubility:
Water: 750 g/L
Acid: Soluble
Other: Soluble in ethanol and methanol. Insoluble in chloroform and benzene.
Partition Coefficient (n-octanol / water): -1.64
Coefficient of Water / Oil: Not available
Melting Point: 153 °C (307 °F)
Decomposition Temperature: 175 °C (347 °F)
Boiling Point: Not applicable
Vapor Pressure: Not applicable
Vapor Density (air = 1): Not applicable
Evaporation Rate (water = 1): Not applicable
Volatile Organic Compounds Content: Not applicable
Flammable Properties: Can burn in fire, releasing toxic vapors. Material is not classified as flammable according to GHS criteria.
Flash Point: Not applicable
Method: Not applicable
Flammability Limits:
Lower Explosion Limits:
Upper Explosion Limits:
Autoignition Temperature: 540 °C (1004 °F)
Explosive Properties:
Not classified according to GHS criteria.
Oxidizing Properties:
Not classified according to GHS criteria.
Reactivity Properties:
Not classifed as self-reactive, pyrophoric, self-heating or emitting flammable gases in contact with water according to GHS criteria.
Gas under Pressure:
Not classified according to GHS criteria.

10. STABILITY AND REACTIVITY

Chemical Stability: Stable when stored under proper conditions.
Mechanical Impact: None reported
Static Discharge: None reported.
Reactivity / Incompatibility: May explode in contact with: metal nitrates
Hazardous Decomposition: Heating to decomposition releases toxic fumes of carbon monoxide and carbon dioxide.
Conditions to Avoid: Excess moisture

11. TOXICOLOGICAL INFORMATION

Toxicokinetics, Metabolism and Distribution:
Important metabolite of Krebs cycle. Chronic exposure may cause effects due to its ability to chelate metals, which could impair body's ability to absorb Ca and Fe.
Toxicologically Synergistic Products: None reported
Acute Toxicity: Toxicological Testing Route Data Given Below Based on classification principles, the classification criteria are not met. Generally Recognized as Safe (GRAS) designation by US Food and Drug Administration
Oral Rat LD50 = 3000 mg/kg
Dermal Rat LD50 > 2000 mg/kg
Specific Target Organ Toxicity - Single Exposure (STOT-SE): Data insufficient for classification
Inhalation Rat TDLo = 0.180 mg/L - Impaired liver and biochemical changes.
Specific Target Organ Toxicity - Repeat Exposure (STOT-RE): Data insufficient for classification
Oral Rat TDLo 9300 mg/kg/15 days - Biochemical changes and changes in blood serum compostion. Inhalation Rat TDLo = 0.180 mg/L - Impaired liver and biochemical changes.
Skin Corrosion/Irritation: Irritating to skin.
Skin - Rabbit - 500 mg/24 hr - Moderate irritation.
Eye Damage: Irritating to eyes.
Sensitization: Based on classification principles, the classification criteria are not met.
CMR Effects/Properties (carcinogenic, mutagenic or toxic to reproduction): No germ cell mutagenicity, carcinogenicity or reproductive toxicity data found. Based on classification principles, the classification criteria are not met.
IARC Listed: No
NTP Listed: No
O.S.H.A. Listed: No
Symptoms/Effects:
Ingestion: May be harmful if swallowed Large doses may cause: gastrointestinal tract irritation abdominal pain vomiting
Inhalation: No effects anticipated Large doses may cause: respiratory tract irritation
Skin Absorption: May be harmful if absorbed through skin.
Chronic Effects: Citric acid chronic overexposure may cause effects due to the ability of citric acid to chelate metals, which could impair the body's ability to absorb calcium and iron.
Medical Conditions Aggravated: Pre-existing: Eye conditions Skin conditions Respiratory conditions

12. ECOLOGICAL INFORMATION

Product Ecological Information: 96 hr Lepomis macrochirus LC50 = 1516 mg/L; 72 hr Daphnia magna LC50 = 120mg/L; LC50 48 hr Leuciscus idus melanotus LC50 = 440 mg/L; 48 hr Crustaceans LC50 = 160 mg/L.
Based on classification principles, not classified as hazardous to the environment. Mobility in soil: Highly mobile No bioaccumulation potential. Rapidly biodegradable.
CEPA Categorization: Not Persistent or Bioaccumulative. Not inherently toxic to aquatic organisms.
Ingredient Ecological Information: --
Not applicable

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: Not applicable
Special Instructions (Disposal): Work in an approved fume hood. Dilute to 3 to 5 times the volume with cold water. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. If permitted by regulation, Open cold water tap completely, slowly pour the reacted material to the drain. Allow cold water to run for 5 minutes to completely flush the system. Otherwise, Check with national, local municipal and state authorities and waste contractors for pertinent local information on the disposal of this article.
Empty Containers: Rinse three times with an appropriate solvent. Collect rinsate and dispose of according to local, state or federal regulations. In the US, rinsate from empty containers is classified as hazardous waste and should be disposed of at

an E.P. A. approved facility. Rinsate from empty containers may contain sufficient product to require disposal as hazardous waste.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information. In Europe: Chemical and analysis solutions must be disposed of in compliance with the respective national regulations. Product packaging must be disposed of in compliance with the country-specific regulations or must be passed to a packaging return system.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Not Currently Regulated

--

Hazard Class: NA

Subsidiary Risk: NA

ID Number: NA

Packing Group: NA

T.D.G.:

Proper Shipping Name: Not Currently Regulated

--

Hazard Class: NA

Subsidiary Risk: NA

UN Number/PIN: NA

Packing Group: NA

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Not Currently Regulated

--

Hazard Class: NA

Subsidiary Risk: NA

ID Number: NA

Packing Group: NA

I.M.O.:

Proper Shipping Name: Not Currently Regulated

--

Hazard Class: NA

Subsidiary Risk: NA

ID Number: NA

Packing Group: NA

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

--

302 (EHS) TPQ (40 CFR 355): Not applicable

304 CERCLA RQ (40 CFR 302.4): Not applicable

304 EHS RQ (40 CFR 355): Not applicable

Clean Water Act (40 CFR 116.4): Not applicable

RCRA: Contains no RCRA regulated substances.

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): None

California Perchlorate Rule CCR Title 22 Chap 33: Not applicable

Trade Secret Registry: Not applicable

National Inventories:

U.S. Inventory Status: TSCA Listed: Yes

CAS Number: 77-92-9

Canadian Inventory Status: DSL Listed: Yes

EEC Inventory Status: EINECS Listed: Yes

Australian Inventory (AICS) Status: Listed

New Zealand Inventory (NZIoC) Status: Listed

Korean Inventory (KECI) Status: Listed

Japan (ENCS) Inventory Status: Listed

China (PRC) Inventory (MEP) Status: Listed

16. OTHER INFORMATION

References: Technical Judgment. The Merck Index, 11th Ed. Rahway, New Jersey: Merck and Co., Inc., 1989. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. Sax, N. Irving. Dangerous Properties of Industrial Materials, 7th Ed. New York: Van Nostrand Reinhold Co., 1989. Sax, N. Irving and Richard J. Lewis, Sr., revised by. Hawley's Condensed Chemical Dictionary, Eleventh Ed. New York: Van Nostrand Reinhold Co., 1987. Patty, Frank A. Industrial Hygiene and Toxicology, 3rd Revised Edition. Volume 2. New York: A Wiley-Interscience Publication, 1981. NIOSH Registry of Toxic Effects of Chemical Substances, 1985-86. Cincinnati: U.S. Department of Health and Human Services, April, 1987. List of Dangerous Substances Classified in Annex I of the EEC Directive (67/548) - Classification, Packaging and Labeling of Dangerous Substances, Amended July 1992. In-house information. Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. IUCLID Dataset Year 2000 for CAS No. Hoyt & Gewanter (1992) Citrate. In de Oude NT (ed). The handbook of environmental chemistry. Volume 3 Part F, Anthropogenic compounds, Detergents. Springer Verlag: Berlin. Pp. 229-242 P & G Ingredient Safety Information (www.ScienceInA Box.com)

Complete Text of H phrases referred to in Section 3: H319 Causes serious eye irritation. H315 Causes skin irritation.

Revision Summary: Substantial revision to comply with EU Reg 1272/2008, Reg 1907/2006 and UN GHS (ST/SG/AC.10/36/Add.3).

Date of MSDS Preparation:

Day: 28

Month: May

Year: 2014

MSDS Prepared: MSDS prepared by Product Compliance Department extension 3350

CCOHS Evaluation Note: It is offered under the interim policy that was established by Health Canada permitting use of GHS-formatted safety data sheets in Canada prior to revision of CPR to GHS. It is offered under exemption from WHMIS labeling as specified in the Controlled Products Regulation (CPR) Section 17. This product has been classified and labeled in accordance with the requirements of GHS (ST/SG/AC.10/36/Add.3).

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.