Minnesota Pollution Control Agency

National Pollutant Discharge Elimination System (NPDES)/

State Disposal System (SDS) Permit Program Fact Sheet

Permit Reissuance

MN0057207

Permittee:	U.S. Steel Corp 600 Grant St Pittsburgh, Pennsylvania 15219
Facility name:	U.S. Steel Corp - Minntac Tailings Basin Area County Road 102 Mountain Iron, Minnesota 55768
Current permit expiration date:	July 31, 1992
Public comment period begins:	November 15, 2016
Public comment period ends:	December 16, 2016
Receiving water:	Dark River – 2B, 3C, 4A & B, 5, 6 (2A, 3B downstream)
Permitting contact:	Erik Smith Minnesota Pollution Control Agency 520 Lafayette Rd N St. Paul, MN 55155-4194 651-757-2719 erik.smith@state.mn.us

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Purpose and participation

Applicable statutes

This fact sheet has been prepared according to the 40 CFR § 124.8 and 124.56 and Minn R. 7001.0100, subp. 3 in regards to a draft National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) permit to construct and/or operate wastewater treatment facilities and to discharge into waters of the State of Minnesota.

Purpose

This fact sheet outlines the principal issues related to the preparation of this draft permit and documents the decisions that were made in the determination of the effluent limitations and conditions of this permit.

Public participation

You may submit written comments on the terms of the draft permit or on the Commissioner's preliminary determination. Your written comments must include the following:

1. A statement of your interest in the permit application or the draft permit.
2. A statement of the action you wish the Minnesota Pollution Control Agency (MPCA) to take, including specific references to sections of the draft permit that you believe should be changed.
3. The reasons supporting your position, stated with sufficient specificity as to allow the Commissioner to investigate the merits of your position.

You may also request that the MPCA Commissioner hold a public informational meeting. A public informational meeting is an informal meeting which the MPCA may hold to help clarify and resolve issues.

In accordance with Minn. R. 7000.0650 and Minn. R. 7001.0110, your petition requesting a public informational meeting must identify the matter of concern and must include the following: items one through three identified above; a statement of the reasons the MPCA should hold the meeting; and the issues you would like the MPCA to address at the meeting.

In addition, you may submit a petition for a contested case hearing. A contested case hearing is a formal hearing before an administrative law judge. Your petition requesting a contested case hearing must include a statement of reasons or proposed findings supporting the MPCA decision to hold a contested case hearing pursuant to the criteria identified in Minn. R. 7000.1900, subp. 1 and a statement of the issues proposed to be addressed by a contested case hearing and the specific relief requested. To the extent known, your petition should include a proposed list of witnesses to be presented at the hearing, a proposed list of publications, references or studies to be introduced at the hearing, and an estimate of time required for you to present the matter at hearing.

You must submit all comments, requests, and petitions during the public comment period identified on page one of this notice. All written comments, requests, and petitions received during the public comment period will be considered in the final decisions regarding the permit. If the MPCA does not receive any written comments, requests, or petitions during the public comment period, the Commissioner or other MPCA staff as authorized by the Commissioner will make the final decision concerning the draft permit.

Comments, petitions, and/or requests must be submitted by the last day of the public comment period to:

Erik Smith
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155

The permit will be reissued if the MPCA determines that the proposed Permittee or Permittees will, with respect to the facility or activity to be permitted, comply or undertake a schedule to achieve compliance with all applicable state and federal pollution control statutes and rules administered by the MPCA and the conditions of the permit and that all applicable requirements of Minn. Stat. ch. 116D and the rules promulgated thereunder have been fulfilled.

More detail on all requirements placed on the facility may be found in the Permit document.

Summary of conditions in the draft permit

- Requirement to achieve interim sulfate concentrations in tailings basin pool water of 800 mg/L in 5 years and 357 mg/L in 10 years (or an alternative, approved concentration based on new research), and to determine what pollutant concentrations in the basin will result in downstream surface waters and groundwater meeting applicable water quality standards

- Compliance schedule for deep seepage discharges under State rules requiring:
    - Investigation of pollutant sources and flowpaths
    - Determination of achievable compliance dates for final surface water and groundwater standards
    - Begin construction of basin pool treatment/mitigation system within 49 months of issuance

- Compliance schedule for surface seep discharges under Federal rules requiring that the Dark River Seepage Collection and Return System (SCRS) be operational by 12/31/2017

- Additional monitoring wells near the property boundary

- New surface water monitoring in the Dark River, Timber Creek, Admiral Lake, and Little Sandy Lake

- Toxicity testing to protect the Sand and Dark Rivers

- Requirement that the permittee submit an application for permit modification within 90 days of the wild rice rulemaking being filed with the Secretary of State, to conduct a reasonable potential analysis and incorporate necessary limits to protect the wild rice beneficial use in all waters where the tailings basin is causing or contributing to an exceedance of the applicable standard.

Facility description

Background Information

Facility History and Existing Schedule of Compliance

The Minntac Tailings Basin has been in operation since approximately 1967, before passage of the Clean Water Act (CWA). U.S. Steel Corp. (USS) was first issued an NPDES/SDS permit to govern its discharges on September 30, 1987. This permit expired on July 31, 1992. USS continues to operate the Facility under the expired permit according to Minn. R. 7001.0160.

There has been a long-standing issue with increasing concentrations of pollutants in the tailings basin (notably sulfate, specific conductance, and hardness), and the impact this has had on groundwater and surface water. The MPCA and the Permittee have entered into several agreements to conduct studies and perform mitigation measures to reduce concentrations of sulfate and other pollutants in the tailings basin and surrounding waters. The mitigation efforts and investigations conducted at the basin have shown that there is significant seepage escaping the basin over its 8000+ acre footprint and that this seepage is causing exceedances of water quality standards in surface water and groundwater in a broad area surrounding the basin. Correction of these exceedances will require remedial measures, and it is axiomatic in the field of remediation that prevention of a pollutant release to the environment is easier and less costly in the long run than post-release cleanup measures. With that knowledge, the focus of the draft permit is on reducing the pollutant concentration at the basin as measured in the process water that is cycled through the taconite plant and basin. Not only does this water contribute to the total seepage from the basin, as it leaks out, but it also is "buried" as pore water within the fine tailings in the basin tailings disposal cells. Reducing the initial pollution concentration of this water at the time of its disposal in the basin will significantly reduce the mass of sulfate and other pollutants within the basin that will leak from it long-term. Final closure of the basin will require that ponded water within the basin be released for dam safety reasons, which would necessitate that there not be on-going active remedial measures, such as seepage pump-backs into the basin. Reducing the pollutant concentration in the water stored in the basin ponds and as tailings pore water (groundwater) would help to facilitate these closure conditions. This permit proposes basin concentration limits for sulfate to be met within five years and ten years.

Awareness of these issues has resulted in recent proposals by USS to address basin water quality, but USS has not yet completed any of the proposals. In March 2009 USS submitted an NPDES Permit Application that included plans to construct a 7000 gallon per minute Process Water Treatment System (PWTS), in part to satisfy a 2008 Stipulation Agreement for line 3 hardness issues. USS predicted the PWTS would lower the basin sulfate concentration from 900 to 350 mg/L in one permit cycle. USS then requested MPCA not act on the application while it investigated refinements to the proposed PWTS. Instead, USS proposed replacement of wet emissions scrubbers on the pelletizing furnaces with dry controls. This would remove a significant source of pollutants to the basin (as well as reduce air emissions) and was forecast to lower the basin sulfate concentration to 476 mg/L within 20 years. The phased installation of dry controls, beginning with line 6, was included in a June 9, 2011, Schedule of Compliance (SOC). In 2015, USS informed MPCA it did not intend to install dry controls.

Actions already completed under the SOC include the use of alternate make-up water with a lower sulfate concentration to mitigate the increased loading of sulfate to the basin water. Remaining actions from the SOC that are incorporated in this permit include constructing a Seepage Collection and Return System (SCRS) in the Dark River Watershed, meeting the sulfate standard in groundwater at the property boundary, and reducing tailings basin sulfate concentrations. These components of the SOC will be removed from the SOC with their inclusion in the reissued permit.

Distinction between discharges subject to regulation under state law and those subject to regulation under state and federal law

Within this fact sheet, the term "discharge" can have several meanings. The intended meaning will be denoted as follows:

- Discharge(H) – (Hydrologic definition): The flow of water, including any suspended solids, dissolved chemicals, and or biological materials from one water body or aquifer to another, or through a given cross-sectional area. This includes movement through **both surface water and ground water**.
- Discharge(NPDES) – (NPDES - CWA definition): Federal law requires a permit for any addition of a pollutant to **navigable waters** from any point source. Navigable waters means waters of the United States, including the territorial seas. State law applies the permit requirement to **surface waters** of the state under Minn. R. 7001.1030.
- Discharge(SDS) – (Minn. Stat. § 115.01 definition): The addition of any pollutant to the **waters of the state** or to any disposal system. This includes discharge to groundwater as described below.
    - "Waters of the state" means all streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, reservoirs, **aquifers**, irrigation systems, drainage systems and all other bodies or accumulations of water, surface or **underground**, natural or artificial, public or private, which are contained within, flow through, or border upon the state or any portion thereof. [Disposal systems or treatment works operated under permit or certificate of compliance of the agency are not "waters of the state" for purposes of water quality standards - Minn. R. 7050.0130(2)]

This permit contains conditions and limits on the management and discharge(H) of the facility's industrial process wastewater, stormwater, and onsite domestic wastewater effluent. The conditions and limits are derived from both state and federal authority. Those derived from state authority govern discharge(SDS) of wastewater from the tailings basin to groundwater, which is a water of the state but not a water of the United States (navigable water). Additionally, any indirect impacts to surface waters from pollutants that were transported from the tailings basin via groundwater are addressed under state statute based on the reasoning discussed below. MPCA has regulated under NPDES permits all seepage that emerges either from the side of the basin dam, or within the vicinity of the toe of the dam, that creates surface flow or ponded features that would not exist in the absence of the tailings basin. That practice will continue under this permit. The differentiation between this seepage and discharge(H & SDS) to groundwater is discussed below.

Discharge(H) from the tailings basin may occur as surface seepage points along the exterior toe of the outer basin dam. These features are similar to base of hillslope springs. Some are small and flow intermittently, while some of the larger seeps create ponded features with measureable flows of several hundred gallons per minute (gpm) into the adjacent wetlands and streams. The source of this water, particularly at the larger, persistent seeps, is primarily flow from the tailings basin traveling through or immediately under the basin dam.

Historically, MPCA has issued an NPDES permit establishing effluent limits and other conditions to regulate these near-basin seeps and intends to do so under this permit. NPDES permitting guidelines can be applied because flow from the large seeps is often observable, and with installation of a berm and outlet weir the flow can be measured, similar to flow from a ditch or channel. This allows quantification of flow volume and pollutant load, such that the reasonable potential to cause or contribute to exceedance of a water quality standard can be evaluated and, if necessary, effluent limits can be determined and applied. Although this seepage will be regulated under the NPDES portion of this permit, one requirement of this permit is to intercept/eliminate these seepage discharges(NPDES). This will reduce the loading of pollutants to surrounding surface waters, and elimination of this seepage is the fastest way to achieve compliance with NPDES requirements, rather than traditional effluent limits.

MPCA uses the term "deep seepage" to refer to wastewater that enters the underlying surficial aquifer throughout the area of the basin and does not discharge(H) to the ground surface adjacent to its source. The deep seepage travels as groundwater, which may emerge into the surrounding wetlands, lakes or stream channels as baseflow, or may remain in the subsurface within the regional groundwater flow system. The surficial aquifer beneath and surrounding the tailings basin consists of unconsolidated glacial sediments and as such, the movement of water through it is consistent with the physics of porous media flow. Within the aquifer, which at this facility extends laterally for several miles, water can move in any direction depending on the hydraulic head (water table) conditions, which vary spatially and over time. This flow system is neither confined nor discrete and is not consistent with the examples of underground conveyances explicitly mentioned in the CWA definition of a point source (i.e., is not a tunnel or discrete fissure). Flow through porous media is also subject to lateral dispersion, which is the mixing and spreading of the pollutant perpendicular to the path of fluid flow. There is a scaling factor to this phenomenon, whereby the degree of dispersion often increases at a greater rate as the flow path lengthens. Consequently, the area over which impacted groundwater may discharge(H) to surface water features can be thousands of feet in length, covering hundreds or thousands of acres, particularly when discharging(H) to wetlands. Although deep seepage may eventually commingle with surface water, the flow path that the pollutants travel from the basin to surface water is not a discernible, confined, and discrete conveyance, nor is there typically a discrete, discernible and measureable discharge(H) from groundwater to surface water from deep seepage. Precipitation that has infiltrated, along with other groundwater not directly impacted by the basin, may interact with the basin-affected water to alter its interaction with surface water. Therefore, in this permit the MPCA finds the transfer of pollutants via deep groundwater from the tailings basin to distant surface water (not adjacent to the basin) does not meet the CWA definition of a point source. Consequently, it is not a discharge(NPDES) under the CWA.

In finding that the deep seepage is not an NPDES discharge, the MPCA notes that it is consistent with Effluent Limit Guidelines and New Source Performance Standards for the mining industry published by the U.S. Environmental Protection Agency (EPA). In the preamble to these longstanding guidelines, EPA stated:

> the Agency does not propose to regulate seepage from impoundments at ore mines and mills other than those extracting uranium. The extent to which such seepage adversely affects navigable waters (as opposed to groundwater) is highly problematic. Frequently, even when seepages reaches navigable waters, it does not constitute a point source discharge – a discernible, confined and discrete conveyance – and is therefore not subject to effluent limitations.
>
> 47 Fed. Reg. 25,682, 25,702 (June 14, 1982).

In addition to the ways that deep seepage does not conform to the physical description of a point source, the EPA has recently revised the definition of waters of the United States to explicitly exclude "groundwater, including groundwater drained through subsurface drainage systems." *See* Clean Water Rule: Definition of "Waters of the United States," 80 Fed. Reg. 37,054, 37,099 (June 29, 2015) (to be codified at 40 CFR § 122.2). While the definition is not currently in force, it demonstrates EPA's intent not to regulate groundwater directly. Thus, to the extent that deep seepage is a groundwater problem, it seems appropriate to treat it as an issue best resolved under state law.

Although Federal regulations do not govern discharges(H) to groundwater or seepage from tailings basins, state law gives MPCA authority to require permits for the operation of disposal systems discharging(S & H) to waters of the state. Minn. Stat. § 115.03, subd. 1(e). A person operating a disposal system is required to have a permit under Minn. Stat. § 115.07. The Minntac tailings basin meets the definition of disposal system in Minn. Stat. § 115.01, subd. 5. Waters of the state include all accumulations of water, surface or underground (Minn. Stat. § 115.01, subd. 23). Consequently, MPCA intends to regulate basin seepage to groundwater and deep seepage expected to eventually impact surface water as discharges(SDS) to a water of the state in accordance with State Disposal System Permit guidelines.

Facility Location Legal Description

The U.S. Steel - Minntac Tailings Basin Area facility (facility) is located in multiple Sections of Township 59 North, Ranges 18 and 19 West, Mountain Iron, St. Louis County, Minnesota.

The facility covers approximately 8700 acres (13.6 square miles) and consists of the Minntac tailings basin, the drainage area contributing surface runoff to the basin, and all wastewater disposal systems within the area designated on the map on page 13. The contributing drainage area includes part of an overburden/rock stockpile area to the southwest of the basin, as well as part of the Minntac plant area. That portion of the plant area which drains to the basin includes the concentrator, the agglomerator, the sewage treatment plant, the lube storage area, a substation, the plant area reservoir, and part of the crushing facilities.

Facility Operations Description

The principal activity at this facility is taconite processing. At the maximum operating rate, the facility can produce 15 million long tons of taconite pellets per year. The Minntac plant consists of a series of crushers and screens, a crusher thickener, a concentrator, an agglomerator, and various auxiliary facilities. The concentrator utilizes a series of mills, magnetic separators, classifiers, hydroclones, hydroseparators, screens and thickeners, as well as a flotation process. Chemical additives include flocculants and various flotation reagents. The flocculants include Calgon M-5729, added to the crushing plant dust collector slurry at a rate of one pound per hour (lb/hr), and Calgon M-5372 or equivalent cationic homopolymers, added to the concentrator tailings slurry prior to the thickening stage at a rate of 170 lb/hr. The flotation reagentsinclude: (a) an alkyl ether primary amine acetate or alkyl ether diamine acetate collector, Arosurf MG-83, Arosurf MG-83A, Tomah DA-17-5% Acetate, or equivalent (alkyl chain R no greater than C_{14}), added at a maximum rate of 295 lb/hr; (b) an alcohol frother, methyl isobutyl carbinol, Arosurf 2057, Nalflote 8848, or equivalent (mixed C_4 to C_9 aliphatic alcohols only), added at a maximum rate of 101 lb/hr; and (c) anti-foaming agents Oreprep D-202 or Nalco 7810 Antifoam, added at a maximum rate of 162 lb/hr.

The agglomerator receives the concentrate, which is then dewatered by disc filters. The filter cake is then mixed with bentonite and formed into pellets in balling drums. The pellets are dried, heated, and fired in a grate kiln, and then loaded for rail transport.

Wastewater inputs to the tailings basin consist of the following, with their estimated average rates:

- Fine tailings slurry/concentrator process water — 22,000 gpm
- Agglomerator process water — 14,800 gpm
- Sewage plant discharge, formerly covered under NPDES/SDS Permit MN0050504 — 40 gpm
- Laboratory wastewater (neutralized) — 3,650 gal/yr
- Plant non-process water (wet scrubber discharge, floor wash, roof runoff, non-contact cooling water — Unknown
- Runoff from plant area, stockpile areas and adjacent upland areas — Unknown

The agglomerator process water, sewage plant discharge, laboratory wastewater, plant non-process water and surface runoff from the plant area enter the south side of the basin through a series of pipes and ditches to the north of the concentrator and agglomerator buildings, in Section 28. Surface runoff from the upland area to the southeast of the basin enters through a series of four culverts through the perimeter dam. Runoff from the stockpile area and upland area to the southwest of the basin enters by seepage through the perimeter dam.

An average of 21 million long tons of dry fine tailings and 14 million long tons of dry coarse tailings are disposed of each year in the tailings basin. The coarse tailings are generated from the classifier, following the first stage of milling and magnetic separation. The fine tailings are generated from the crusher thickener overflow and the tailings thickener underflow. The fine tailings slurry and concentrator process water is directed by gravity flow through pipes from the Step I, II, and III thickeners to a fine tailings pump house, which lifts the slurry for disposal through a series of open ditches to the Minntac tailings basin. The flow from the flotation process is restricted to Step I thickeners, but is mixed with discharge from Steps II and III in the pump house. The basin is segmented into several cells, and the fine tailings spigot point is periodically moved from one cell to another. A permanent pumping station located within the basin returns water to the plant site reservoir. The station is located on the east side of Cell 1 (SE ¼, Section 15). Calcium chloride is occasionally used as a chemical dust suppressant on the basin and haul-roads in the facility. Some coarse tailings are used for sanding on roads in the facility during the winter, and others are sold as aggregate product.

The various basin cells are separated by dams, each constructed of a single berm of coarse tailings placed by truck and various pieces of auxiliary equipment. Most of the perimeter dam for the tailings basin was constructed by spigotting a fine tailings slurry into the core between parallel inner and outer coarse tailings dams; that part of the perimeter dam on the southwest side of the basin was constructed in the same manner as the interior basin dams. The coarse tailings dams were constructed by truck in ten foot lifts. The perimeter dam spigot lines are located on the dry side (outer) of the core; this created a surface slope from the dry side down to the wet (inner) side, thus causing the water from the slurry to pond on the wet side of the core and seep through the wet side dam to the retained water within the disposal facility. Peat was removed from the original ground area to be occupied by the perimeter dam, and a ten-foot-deep key-way was dug in the glacial drift prior to spigotting fine tailings into the core portion of this area.

A demolition debris landfill (Solid Waste Permit SW-240) is located on the southeast corner of Cell A-2, but was closed per MPCA guidelines in 2013. The abandoned Minntac dump site (Agency Landfill Inventory Number SL-183) is located in the southwest corner of Cell 1 (SW ¼, SE ¼, Section 21 and NW ¼, NE ¼, Section 28). Paper, lunch wastes, wood scraps, scrap metal, mill grease, and waste oil were disposed of at this dump during its period of operation.

MPCA adopted a minor permit modification in 2010 to allow the construction of a Seep Collection and Return System (SCRS) as required by a SOC originally entered into by the USS and the MPCA on November 14, 2007, and as amended by Amendment No. 1 on February 25, 2010.

A domestic wastewater treatment plant (WWTP) for the facility was previously covered under SDS permit number MN0050504, but will be incorporated into this permit. The plant consists of a lift station which discharges to bar screens followed by an activated sludge package plant. The package plant is an extended aeration Infilco Accelo-BIOX Type "C" Plant. It provides continual aeration, mixing, recirculation, settling, and clarification within a single circular unit. Raw domestic wastewater is introduced at the bottom, outer zone of the unit; aeration and mixing is provided by a sparge ring at the bottom of this outer zone. Mixed liquor from the outer zone overflows into an inner cone that provides settling; the settling sludge is returned by gravity to the outer zone as return activated sludge (RAS). A cylindrical clarification zone within the inner cone then discharges through a peripheral launder. The effluent is disinfected using sodium hypochlorite prior to routing from the system to the tailings basin. Monitoring of the effluent to the basin will occur at WS008. Waste activated sludge is periodically pumped directly from the outer zone as needed and transported to the Mt. Iron WWTP. The Minntac WWTP was designed for an average flow of 0.06 million gallons per day (MGD) and a maximum flow of 0.09 (MGD). The WWTP is a Class C facility.

Stormwater

Facilities that discharge stormwater associated with industrial activity as defined at 40 CFR § 122.26(b)(14) are required to either apply for an NPDES stormwater permit or include in their permit application information pertaining to

stormwater sufficient to allow the permitting authority to include stormwater requirements in the facility's NPDES/SDS permit.

Stormwater permits typically require the Permittee to monitor for benchmark parameters, develop a stormwater pollution prevention plan that contains descriptions of the measures and controls the Permittee will implement, and to perform monitoring and inspection.

Stormwater effluent limitations can be numeric or in the form of best management practices, which are control measures used by the Permittee to eliminate or reduce the exposure of pollutants to rain, snow, snowmelt, and the runoff generated from these events. A stormwater pollution prevention plan typically requires the organization of a pollutant prevention team, development of a site map, including the location of potential pollutant sources and drainage patterns, and the description of the measures used to limit the exposure of pollutants to stormwater or to treat polluted stormwater prior to discharging it to local waterways.

Because all stormwater at this facility is contained within the tailings basin, additional monitoring points and numeric limitations specific to stormwater are not needed. The Permittee will manage stormwater by utilizing best management practices and a pollution prevention plan.

Site Geology and Hydrology

Geology at the site consists of a thin layer of heterogeneous glacial outwash sediments comprised of variably interbedded and intergraded silty sands, gravels and thin clay units with occasional cobbles and boulders. The glacial deposits range in thickness from 0 to 100 feet, although most of the area has 10 to 20 feet. The sediments are overlain by a thin layer of organic rich soils, including peat deposits in the lowest-lying areas. The glacial sediments are generally thinnest at the southern part of the site along the Laurentian Divide and deepen to the north. The underlying bedrock is granitic and is not known to serve as an aquifer in the area. The bedrock surface is irregular and generally mimics the surface topography in that local highlands are underlain by elevated bedrock knobs and wetlands and surface water features are generally situated over bedrock depressions.

The tailings basin also straddles a north-south trending watershed divide and has buried the headwaters of the major streams in those watersheds, the Dark River to the west and the Sand River to the east. The headwaters for both streams are now adjacent to the basin dam. Each stream is situated over a roughly U-shaped bedrock depression that is up to approximately 100 feet deep. The western half of the northern dam is also on the southern boundary of the Johnson Creek watershed which extends north from the tailings basin. There is no identifiable channelized surface flow leading away from the basin to surface water features in this watershed.

Given the position of the tailings basin on the edge of the Laurentian Divide, and the greatly elevated hydraulic head (30+ feet) that has been created within it, the general groundwater flow is away from the basin, primarily to the east and west, and to a lesser degree to the north. After more than 40 years of operation, essentially all groundwater in the surficial aquifer beneath the basin is likely to be tailings-impacted. Due to the extreme head gradient (water table slope) across the dams (~0.05), and the relatively shallow gradient in the surrounding wetlands (~0.001 to 0.003), considerable emergent flow at and near the base of the dams is expected, and has been observed. This is supported by monitoring and modeling results in the vicinity of monitoring well GW012 which show the presence of an upwards vertical gradient near the basin that diminishes with distance from the basin. Emergent groundwater seepage at the toe of the basin dam flows into the Dark River and Sand River. It has been permitted under the existing permit at compliance/monitoring locations SD001 and SD002, respectively. These sites measure flows from specific seepage points along the basin. Average flows over the past decade have been approximately 0.14 million gallons per day (MGD) at SD001 and 0.28 MGD at SD002 (prior to seep collection). Air photos and seepage surveys by USS indicate that there are other areas of shallow seepage that do not report to the monitoring stations. Projects to collect seepage have been completed on the

east side of the basin. The permittee is in the final stages of wetlands permitting for a similar system on the west side to collect seepage along the Dark River.

In 2010, the permittee installed a seep collection and return system (SCRS) along roughly 1 ¾ miles of the east side of the basin including SD002. The SCRS system consists of catch basins located in each of the 13 identified seepage locations, hydraulically connected by subsurface high-density polyethylene piping to pump stations. Each of the seepage areas has been shaped and graded to promote seepage flow to the catch basins. Sheet pile cut-off walls were installed downgradient of each catch basin, connecting areas of higher elevation on either side of each discrete seepage location, to a depth of approximately 15 feet below existing ground level to ensure that surrounding wetlands are minimally impacted. The SCRS system consists of two subsystems, one collecting seepage from the northern section and the other from the southern section. Each subsystem terminates in a pump station consisting of a concrete vault containing a duplex pump system capable of returning the collected seepage back to the tailings basin. This system collected an average of 0.78 MGD in October of 2010. The system captures 0.5 MGD more flow than the Permittee previously reported for SD002, as this was only one of several known seeps in this area. Construction of a similar system on the west and northwest sides of the basin is required under the June 9, 2011, SOC and is incorporated into this permit. The Dark River SCRS design is currently being revised to minimize wetland impacts and it is anticipated to be installed and operational during the term of this permit.

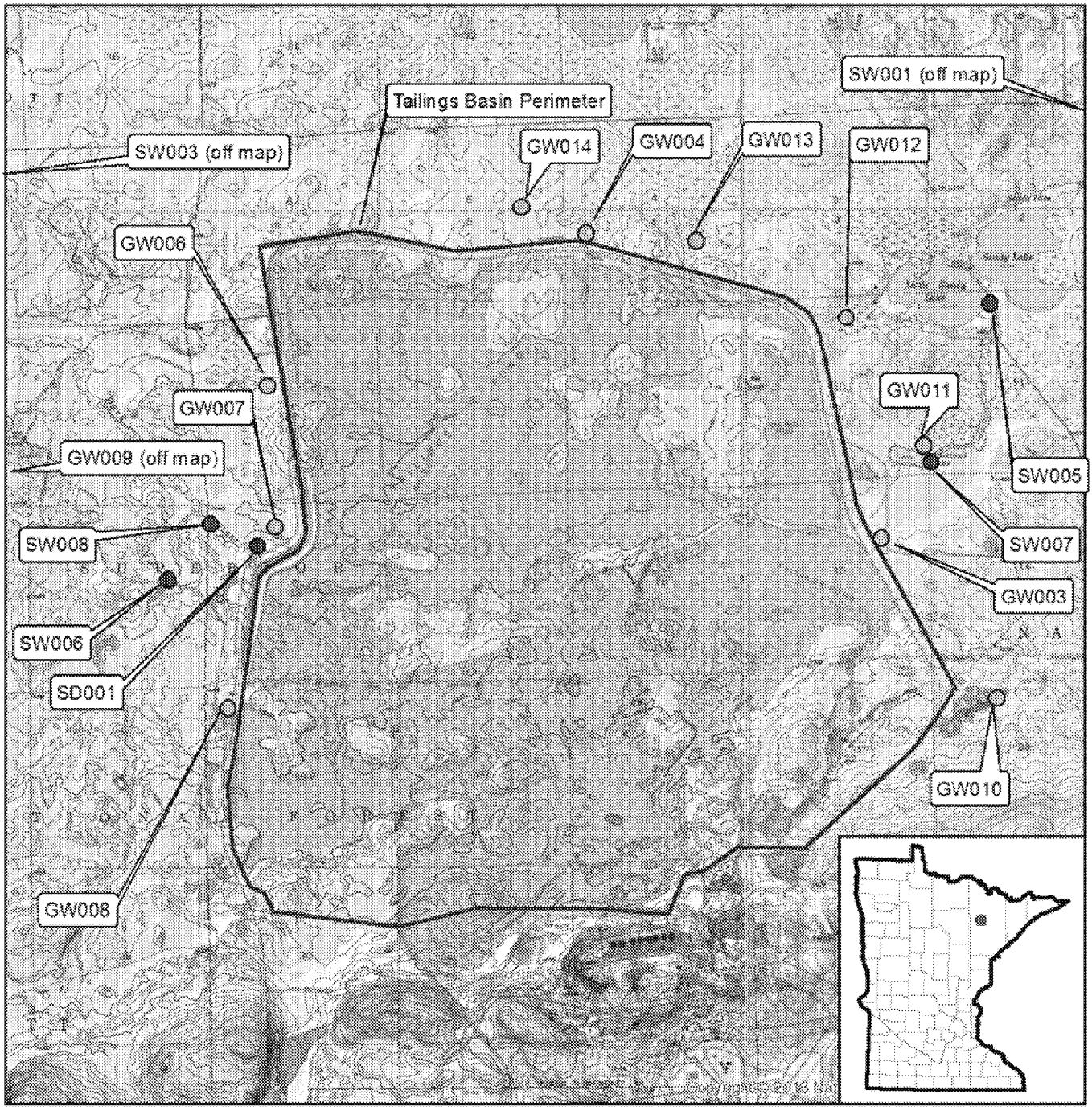
NPDES Outfall Monitoring Station Legal Description

SD001 (formerly SD020) on the west toe in the SE ¼, NE ¼, NW ¼, Section 18, is the only monitored outfall subject to compliance with NPDES guidelines under the CWA in this joint NPDES/SDS permit. Monitoring has been conducted at the SD001 sampling station due to its position at the headwaters of the Dark River, and because it is thought to be representative of the multiple dam seeps existing on the west and northwest perimeter of the tailings basin.

Figure 1 - Map of permitted facility

Topographic Map of Permitted Facility

MN0057207: US Steel Minntac Tailings Basin
T59N, R18W, Sections 3-10, 14-23, 27-30
Mt. Iron, St. Louis County, Minnesota

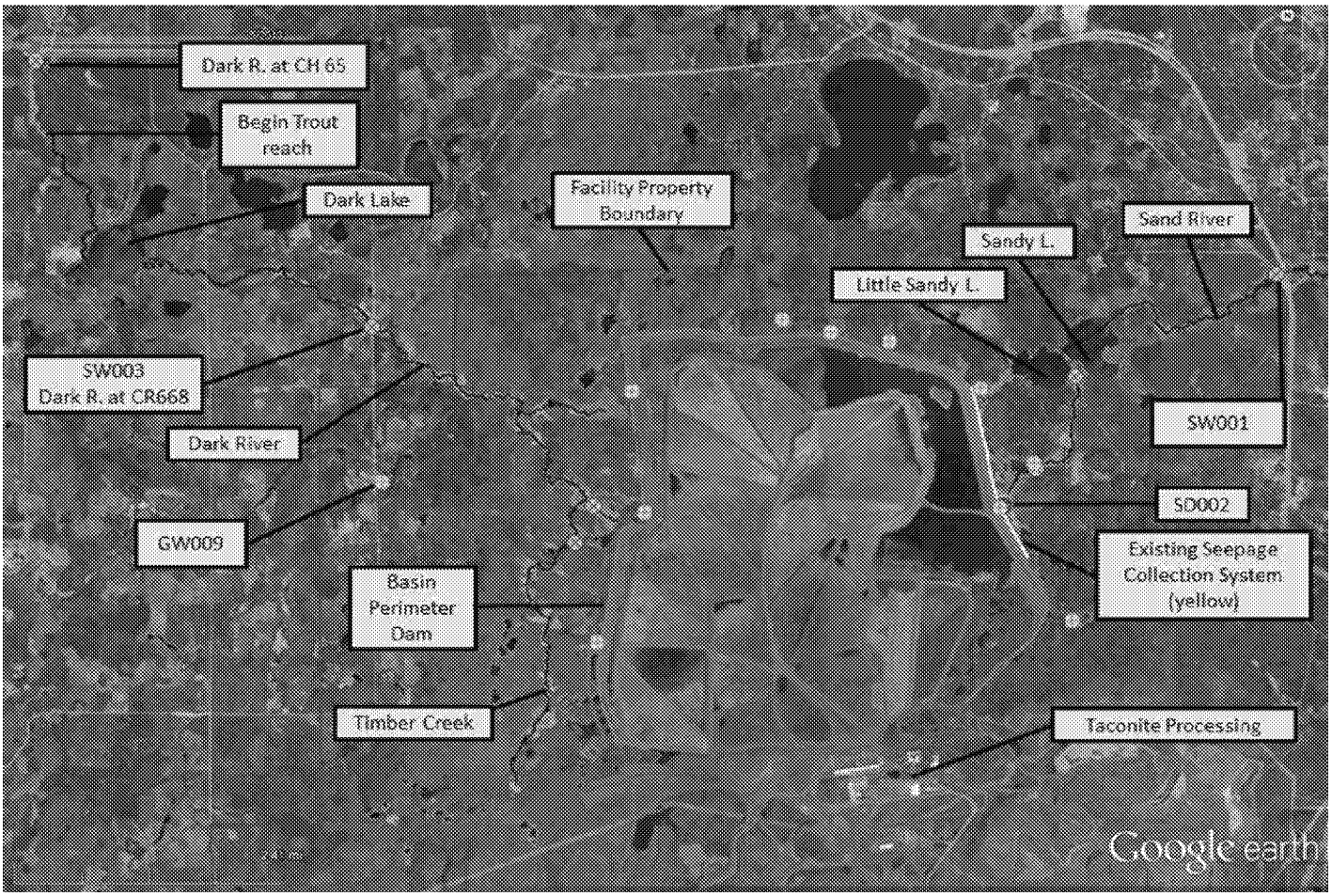


Map produced by: MPCA Staff, 1/30/2015
Source: USGS Quad
Scale: 1:50,000

0 0.5 1 2 Miles

N

Figure 2 – Minntac Tailings Basin aerial photo

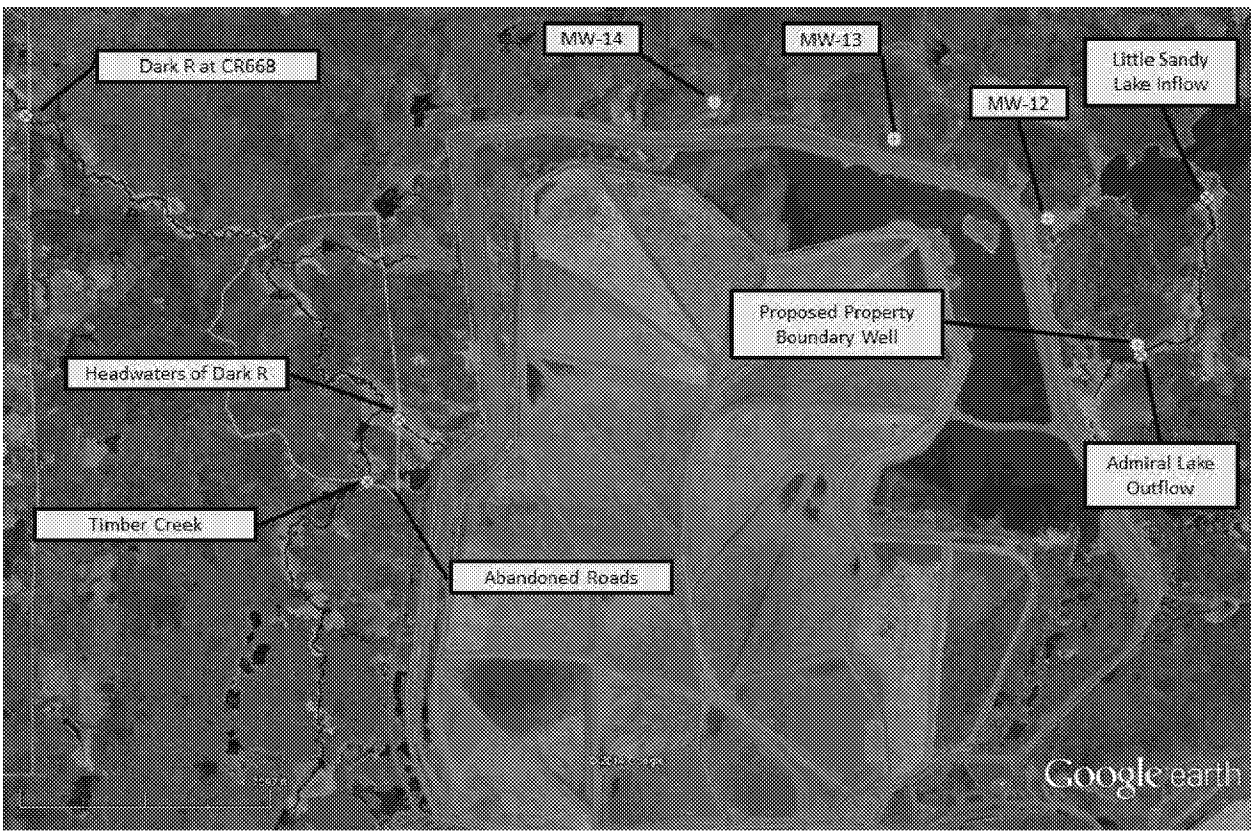


Surface Water Monitoring Locations

Under this permit, the Permittee will be required to establish sampling stations (described below) for monitoring of surface water quality in surface water downgradient of the tailings basin (consistent with Minn. R. 7050.0150, subp. 8). Where the tailings basin is causing or contributing to exceedance of water quality standards in these downgradient waters, final compliance limits are established in this permit along with a schedule for determining when those limits can be met.

Surface water monitoring for compliance with numeric water quality standards and narrative criteria is proposed in streams and lakes that are, or have the potential to be, affected by discharge(H) from the tailings basin. On the west side, this includes the Dark River and Timber Creek. On the east side this includes the Sand River which originates near the basin and passes through Admiral Lake, Little Sandy Lake, and Sandy Lake. To the north, there are no surface water features known or suspected of receiving discharge(H) from the basin. There is a lesser hydraulic gradient to the north than to either the east or west and monitoring has not shown any impact to Sand Lake from the basin. Sampling conducted there in 2010 and 2011 indicated an average sulfate concentration of 3.2 mg/L and specific conductance of approximately 100 uS/cm, which are in the anticipated range of background concentrations for these parameters in this region. Therefore, no monitoring of Sand Lake is proposed at this time.

Figure 3 – Monitoring locations new to this permit



Timber Creek (Class 2B, 3C, 4A, 4B, 5 and 6) originates on the north flank of the Laurentian Divide and flows to the north, generally parallel to the west side of the basin and at an average distance of about ½ mile from it. With a total length of about 4.4 miles, Timber Creek flows north into the Dark River approximately 2000 feet downstream from the Dark River's headwaters at the toe of the basin. There is no known flow or analytical information for Timber Creek. Air photo analysis shows the creek to be roughly 10 feet wide, where channelized. However, the stream passes through many shallow, flooded wetlands and would be difficult to follow on the ground. Compliance monitoring is proposed for Timber Creek because seeps on the southwest corner of the basin appear in air photos to be tributary to it, and it likely receives emergent groundwater that originated at the tailings basin as a portion of its baseflow. A surface water sampling station for compliance monitoring is proposed where the creek crosses an abandoned roadway, roughly one-half mile upstream from Timber Creek's confluence with the Dark River (Figure 3). This location was chosen because it would allow for assessment of impacts from possible groundwater and surface water contamination that could occur along almost the full length of the stream and because the abandoned roadway may provide a means of access from a basin perimeter road roughly one-third of a mile away.

The Dark River (Class 2B, 3C, 4A, 4B, 5, and 6) originates just outside of the tailings basin near current monitoring station SD001 and flows approximately 7.5 miles before entering Dark Lake (Class 2B, 3C, 4A, 4B, 5 and 6). It continues flowing north out of Dark Lake for 1.59 miles where its designation changes to a trout stream (Class 1B, 2A, 3B, 4A, 4B, 5, and 6) for the next 7.91 miles. After the trout stream reach, the river continues for 1.36 miles before entering the Sturgeon River, which flows north for 28.27 miles before entering the Little Fork River. Sampling has been conducted for a limited set of parameters at two downstream locations on the Dark River under the SOC. Sample location D-1 is where the Dark River crosses County Road 668 (~4 river miles from the basin) and location D-1a is where the river crosses County Road 65, which is within the trout stream reach (Class 1B, 2A, 3B, 4A, 4B, 5, and 6), roughly 1 ¼ miles downstream from where the designation starts. These locations are shown on Figure 2. Elevated concentrations of sulfate, total dissolved solids,

bicarbonate, hardness, and specific conductance have been observed at locations D-1 and D-1A, with periodic exceedances of applicable surface water standards for these pollutants (see Table 1). Information on biological assessments in the Dark River is included in the section on Receiving Waters later in this document.

Table 1 – Dark River monitoring results

Dark River at CR-668 (D-1)	**Bicarbonate (HCO3 as CaCO3)**	**Total Dissolved Solids**	**Total Sulfate**	**Hardness (Ca + Mg, as CaCO3)**	**Specific Conductance**
	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(microSiemens/cm)
Relevant Standard	*250*	*700*	*1000*	*N/A*	*1000*
Date of Measurement					
11/8/2011	**417**	**1658**	741	1220	NM
1/6/2012	**505**	**1950**	909	1430	**2367**
6/5/2012	209	**749**	298	555	988
9/19/2012	**463**	**1600**	763	1320	**2164**
11/27/2012	**432**	**1650**	750	1200	**2103**
1/10/2013	**682**	**1880**	920	1550	**2422**
5/17/2013	244	**744**	335	590	**1091**
9/12/2013	**476**	**1620**	689	1100	**2026**
11/25/2013	**479**	**1610**	767	1220	**2137**
1/24/2014	**547**	**1920**	814	1420	**2424**
5/23/2014	187	548	238	430	826
Dark River at CH65 (D-1A)	**Bicarbonate (HCO3 as CaCO3)**	**Total Dissolved Solids**	**Total Sulfate**	**Hardness (Ca + Mg, as CaCO3)**	**Specific Conductance**
	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(microSiemens/cm)
Relevant Standard	*250*	*500*	*250*	*250*	*1000*
Date of Measurement					
11/8/2011	**288**	**986**	**426**	**764**	NM
1/6/2012	**308**	**1040**	**489**	**788**	**1412**
6/5/2012	119	460	167	**311**	587
9/19/2012	206	**576**	244	**496**	877
11/27/2012	**252**	**829**	**361**	**636**	**1161**
1/10/2013	**251**	**796**	**399**	**702**	**1178**
5/17/2013	126	416	164	**306**	602
9/12/2013	208	**605**	236	**437**	823
11/25/2013	**287**	**865**	**392**	**678**	**1239**
1/24/2014	**312**	**920**	**390**	**710**	**1319**
5/23/2014	101	348	125	236	488
NM indicates parameter not measured					
Bold values indicates exceedance of standard					

Monitoring results and the configuration of the local water table indicate that pollutants enter the Dark River from the tailings basin via surface flow, which originates at seeps such as SD001, and groundwater flow that enters the Dark River as baseflow both near the basin and at unknown distances downgradient from the basin. The SCRS along the western basin margin is designed to capture the current surface flow from SD001 as well as shallow groundwater flow. This will likely result in a change in the observable location of the headwaters of the Dark River, as well as a significant decrease in concentrations of parameters in this area, particularly during times of high meteoric water input (i.e., snow melt). Due to this, the possibility exists that under some hydrologic conditions, downstream tailings-impacted baseflow contributions could cause an increase in the concentrations of some parameters from what is observed at the headwaters. To assess this, and to ensure that the Permittee does not cause or contribute to an excursion above water quality standards, the permit proposes monitoring for compliance in the Dark River at two locations: a headwaters location and a downstream location where it is likely that most or all of the tailings-impacted baseflow has emerged (Figure 2). The proposed headwaters location is just upstream from where Timber Creek joins the Dark River. MPCA selected this location because it should still have measureable flow after the SCRS is operational due to its distance from the basin. The exact location of both the Timber Creek and Dark River headwaters sampling stations will be determined by field conditions.

Insufficient information exists regarding the groundwater flow patterns and groundwater-surface water interactions along the Dark River to know at what point the river has ceased receiving tailings-impacted baseflow. Determining this would likely require a significant study in terms of time and expenditure. The existing SOC sampling point D-1 at the County Road 668 (CR668) crossing is 4.4 river miles downstream from its origin at the basin and 2.3 miles linearly distant from the nearest portion of the basin. It is very likely that this location is far enough from the basin that there is not any significant loading to the river downstream of this point, and it is the first downstream point on the river that has existing maintained access. For these reasons, the permit lists this location (CR668 crossing) as the downstream sampling point on the Dark River. Compliance monitoring requirements are required in the draft permit at this location to ensure and evaluate compliance with water quality standards unique to the downstream portion of the Dark River designated as a trout stream. Concentrations of key parameters at the CH65 location within the trout stream reach are fairly consistently about one-half of those observed at the CR668 sampling point during same-day sampling events; thus, establishing permit compliance limits at the CR668 sampling point to protect the downstream trout stream use of the Dark River is reasonable.

The Sand River (Class 2B, 3C, 4A, 4B, 5, and 6) originates just outside of the tailings basin near former monitoring station SD-002 and flows approximately 1/4 mile before entering Admiral Lake. It exits the east side of the lake and flows roughly 1 ¼ miles to Little Sandy Lake, which flows directly into Sandy Lake through an opening approximately 60 feet wide in a peninsula that otherwise separates the two lakes. The lakes are also known as the Twin Lakes (Class 2B, 3C, 4A, 4B, 5, and 6). The river exits the east end of Sandy Lake and flows east 11.84 miles where it joins the Pike River. Under the existing permit, monitoring was done for sulfate and flow at SW001 which is where the Sand River crosses Highway 53, approximately 2 ½ miles downstream from Sandy Lake (Figure 2). Additionally, under an agreement between the Bois Forte Band of Chippewa and USS, monitoring has been conducted since 2010 by the 1854 Treaty Authority at four locations: the inlet to Little Sandy Lake, the middle of Little Sandy Lake, the middle of Sandy Lake, and the outlet of Sandy Lake, identified as Twin 1, 2, 3, and 4, respectively. Monitoring at these locations as well as SW001 has shown elevated concentrations of sulfate, total dissolved solids, bicarbonate, and specific conductance with some concentrations exceeding applicable water quality standards. Not all parameters for which there are applicable water quality standards have been monitored. Information on biological assessments in the Sand River is included in the section on Receiving Waters later in this document.

Like the monitoring proposed for the Dark River and for similar hydrologic reasons, compliance monitoring is proposed along the Sand River and its associated lakes at a headwaters location and a downstream location. With operation of the SCRS on the east side of the tailings basin, there is no longer any observable flow at SD-002. The segment of the Sand River between the basin and Admiral Lake is poorly channelized and hard to discern. For this reason the "headwaters" sampling station is proposed to be where the Sand River exits Admiral Lake on its east side. There is no known monitoring data for Admiral Lake, and a compliance point at the lake's outlet would be representative of the water quality in the lake resulting from both stream inflow and groundwater contributions and would possibly also allow for flow monitoring if a definable channel is present or can be established. Coupled with chemical analysis, flow monitoring will allow for calculation of pollutant mass flux. This could be used to determine where contaminant mass may be entering the river system.

Sampling conducted by the 1854 Treaty Authority from 2010 through 2012 showed that concentrations of water quality parameters impacted by the tailings basin are greatest at the upstream Twin 1 location and decrease at each successive downstream sampling location. Therefore, the most representative "downstream" sampling location on the Sand River is proposed to be at the inflow of the river to Little Sandy Lake, at the general location of the current Twin 1 sampling point.

Sampling at SW001 will continue under this permit so that the gross pollutant loading to the Sand River can be monitored and compared to a significant period of record to assess the ongoing impact of the tailings basin, the

effectiveness of mitigation efforts, and determine whether limits are needed to protect surface water along this portion of the Sand River.

Groundwater Monitoring Locations
Minn. R. 7060.0600, subp.6, requires all persons operating a disposal system to monitor the affected underground waters at the direction of the agency. Under this permit, the Permittee will be required to monitor groundwater quality downgradient of the tailings basin at existing and proposed monitoring wells. Where the tailings basin is causing or contributing to exceedance of groundwater quality standards at the property boundary, final compliance limits are established in this permit.

The Permittee currently conducts monitoring at ten monitoring wells, installed to depths ranging from 14.5 to 34.8 feet below the ground surface around the basin. Wells GW003, GW004, GW006, GW007, and GW008 are located roughly adjacent to the outer basin dam and all show significantly elevated pollutant concentrations. Well GW009 is about 2 ¼ miles west of the basin and does not appear to be impacted by pollutants from the basin. GW010 is located roughly 1200 feet east of the southeast corner of the basin and appears to be cross-gradient, but monitoring results are variable and may reflect impact from the basin. Monitoring at these wells will continue under this permit to assess ongoing impacts to groundwater; however, because they are all distant from the property boundary, limits will not be established. Wells GW012, GW013, and GW014 are located along the property boundary; therefore, compliance limits are established at these wells. Monitoring at well GW014 will be required once annually in October as previous monitoring at this well has shown limited impact from the tailings basin. The permit will require the Permittee to install an additional groundwater monitoring location (GW011) near the property boundary in the vicinity of Admiral Lake. A well nest, consisting of shallow (water table or uppermost mineral soil), intermediate and deep wells, is to be installed to monitor groundwater flow in the bedrock valley which roughly underlies the Sand River. Following installation, the permittee will be required to conduct three rounds of sampling, and the well with the highest concentration of sulfate will receive the GW011 designation and be used as the compliance monitoring location.

Tailings Basin Process Water Monitoring and Limits

Monitoring of the concentration of sulfate (as the pollutant of greatest concern and as a surrogate for other dissolved solids) in the active tailings basin pond will be required in the permit to assess compliance with interim limits of 800 mg/L within 5 years of permit issuance, and
357 mg/L within 10 years from permit issuance. One goal of the investigation into the sources and flowpaths of contaminants from the basin is to determine a basin sulfate concentration that would lead to compliance with all applicable surface water and groundwater quality standards during operation and closure. If this concentration should differ from the interim limit of 357 mg/L and PCA agrees with this finding, then the permit will be modified to reflect that change.

Components and Treatment Technology

Current Information
The facility uses a wastewater treatment system for the blowdown from the Agglomerator Line wet scrubber. The wastewater treatment system includes: a scrubber water recirculation tank, an equalization/precipitation tank, lime slurry make-up and feed system, 1st stage thickener, polymer make-up and feed system, scrubber solids settling/storage pond, and all related piping and equipment.

Scrubber blowdown water from the recirculation tank is sent to the equalization/precipitation tank at an average rate of 50 gallons per minute (gpm). Lime is added to the equalization/precipitation tank to increase calcium concentrations and promote calcium sulfate (gypsum) precipitation. Settling of the precipitated solids occurs in the 1st Stage Thickener.

Polymer may be added to the 1st Stage Thickener to enhance solids settling. The solids are sent to a 25 acre-foot, composite lined settling/storage pond located on-site for the dewatering, and possible ultimate disposal, of the solids generated from the treatment system. The overflow from the 1st Stage Thickener is sent to either the Concentrate Thickener or Slurry Mix Tank. Available alkalinity in the concentrate slurry converts from bicarbonate to carbonate and allows calcium carbonate precipitation. The calcium carbonate precipitate is then removed in the disc filters along with the concentrate and made into pellets. The filtrate from the disc filters is then used as process water and eventually sent to the tailings basin. The treatment system is specifically designed to achieve a "no net increase" in mass loading of sulfate and calcium to the tailings basin. Fluoride removal also occurs due to the reactive nature of fluoride with excess calcium.

Changes to Facility or Operation

Make-up Water

The operation currently imports approximately 4.64 MGD of water from the Mt. Iron pit at the mining area to make up for losses that occur during taconite processing and recirculation of the water through the tailings basin ponds. Under Part 7.ppp of the June 9, 2011, SOC, the MPCA identified the use of alternate make up water with a lower sulfate concentration than Mt. Iron pit water as a means to mitigate the increased loading of sulfate to the basin water, and required a study to evaluate alternative water sources. To fulfill this requirement, the permittee identified Sump 6 at the mining area as a suitable source, a pipeline was constructed, and the permittee began to utilize a minimum of 2000 gpm (monthly average) of Sump 6 water on January 26, 2015.

To enable possible further reductions in loading of sulfate and hardness to the basin, this permit authorizes the Permittee to manage its intake water supply source(s), without modification to this permit, when the following conditions are met:

1. The proposed water source is of an equivalent or better water quality, with respect to concentrations of total sulfate, hardness (Ca + Mg), total dissolved solids and bicarbonate, than the water source (sole or composite) being utilized at the time of the requested change, and of any Mt. Iron pit or Sump 6 water source that may be available but is not being utilized at that time.
2. The appropriation has received an applicable permit from the Department of Natural Resources (DNR), if required.
3. The appropriation has received other applicable permits (401/404 permits), if required.
4. Utilization of the water source complies with all applicable dam safety regulations.
5. The appropriation has completed the environmental review process, if required.
6. the water has been analyzed in accordance with the guidelines described in Total Facility – General Requirements - Sampling subsection of the permit for the following primary parameters: alkalinity (bicarbonate as CaCO3), total sulfate, hardness (Ca+Mg as CaCO3), total dissolved solids; and secondary parameters: aluminum (total), ammonia, antimony (total), arsenic (total), barium (total), boron (total), cadmium, chloride, cobalt, (total), copper, fluoride, iron (total), lead, manganese (total), mercury, molybdenum, pH, phosphorous, salinity, selenium, silver, sodium, specific conductance, strontium, total dissolved solids, temperature, thallium, turbidity, TSS, and zinc; and,
7. If concentrations of any secondary parameters identified in subheading 6 in the proposed source water exceed that of the existing make up water, USS must submit documentation for MPCA approval that utilization of the water source is not likely to cause or contribute to exceedances of applicable water quality standards in waters of the State downgradient and downstream of the Facility.

Recent Compliance History

The most recent compliance inspection occurred on November 15, 2011. Identified concerns and corrective actions are summarized below.

Inspection Summary

A Compliance Evaluation Inspection was conducted on November 15, 2011, by John Thomas and Andrew Streitz of the MPCA to determine the facility's compliance with the terms and conditions of its NPDES/SDS permit. Tom Moe of USS Minntac accompanied the MPCA inspectors during the inspection. The inspectors made the following findings and comments as a result of the inspection.

Areas of Concern or General Comments:

1. During the review period of July 2010 through September 2011, Discharge Monitoring Reports (DMRs) were submitted complete and on-time. The Permittee began submitting DMRs electronically in August 2010. During the review period there were no effluent limit violations at SD001 or SD002.

2. There has been no discharge at SD002 after June 2010, when the seep collection and return system became fully operational.

3. The Seepage Collection and Return system was fully operational by July 2011. Flow meters are installed at each of the pumping stations. There are two pump stations - one is located at catchbasin #5, which receives gravity flow from catchbasins #1 - #4 and #6 - #9. The second pumpstation is located at catchbasin 10, which is located near proposed monitoring well #11 (west of Admiral Lake). Catchbasin #10 receives gravity flow from shallow de-watering wells #11 - #13. De-watering well #13 is located at the northeast corner of the tailings basin, near peizometer #5.

4. Flow through the weir at SD001 was unrestricted – there was sufficient drop on the outfall side of the weir to allow accurate flow measurement at SD001.

Alleged Violations/Corrective Actions:

1. Violation: NPDES/SDS Permit No. MN0057207 Chapter 4 Part 3.1 states, in-part that on an annual basis, the mass of sulfate leaving the scrubber system shall be less than or equal to the mass of sulfate entering the scrubber system.

   For calendar year 2010, there was a net increase of 57,558 pounds of sulfate mass to the tailings basin due to operation of the Line 3 scrubber system.

   Corrective Action: The June 9, 2011, SOC between USS and MPCA contains requirements to address this ongoing violation. No further response is required to address this violation at this time.

2. Violation: NPDES/SDS Permit No. MN0057207 Chapter 4 Part 3.2 states that on an annual basis the number of moles of excess hydroxide ion (Step 4) must be equal to or greater than the number of moles of excess calcium and magnesium (Step 3) in the thickener overflow stream.

   For calendar year 2010, there was a net increase of 741,468 pounds of hardness mass to the tailings basin due to operation of the scrubber system.

Corrective Action: The June 9, 2011, SOC between USS and MPCA contains requirements to address this ongoing violation. No further response is required to address this violation at this time.

3. Violation: NPDES/SDS Permit No. MN0057207 Chapter 7 Part 10.1 indicates:

   The Permittee shall properly operate and maintain the systems used to achieve permit compliance. Proper operation and maintenance includes effective performance, adequate funding, adequate staffing and training, and adequate process and laboratory controls, including appropriate quality assurance procedures.

   NPDES/SDS Permit No. MN0057207 Chapter 7 Part 10.2 states:

   The Permittee is responsible for insuring system reliability and shall install adequate backup or support systems to achieve permit compliance and prevent the discharge of untreated or inadequately treated waste. These systems may include alternative power sources, auxiliary treatment works and sufficient storage volume for untreated wastes.

   Information submitted with the August 2011 DMRs for NPDES/SDS Permit No. MN0057207 indicates that pipelines used to pump line 3 thickener overflow to the Step I Reclaim Thickener or the Concentrate Thickener became plugged either due to scaling or plugging with excess solids. In addition, the Step I Reclaim Thickener was taken out of service between August 3, 2011, and October 13, 2011, due to operational error that caused damage of thickener components. The result was that during the period of August 13 – August 20, 2011, the wastestream from the line 3 scrubber bypassed the hardness reduction component of the line 3 scrubber wastewater treatment system.

Corrective Action: within 30 days of receipt of the inspection report, submit a written response indicating measures that will be taken to ensure that:

1. The extent of hardness scaling of pipelines will be regularly assessed such that line cleaning and/or replacement will occur prior to pipeline plugging.
2. Overflow from the classifiers which handle spillage from the grate will be monitored to prevent excess coarse material from plugging the pipelines from the 287 sump.
3. The Step I Reclaim Thickener will not be overloaded with solids.

Recent Monitoring History

A table (Table 7) with the last 12 months of monitoring results is included at the end of this document.

Receiving Water(s)

Use Classification

For the SD001 outfall, the receiving water is the Dark River (Class 2B, 3C, 4A, 4B, 5, and 6, with additional 1B, 2A and 3B classification for the designated trout stream portion). These use classifications include aquatic life and recreation, industrial consumption, agriculture and wildlife, and aesthetic enjoyment and navigation, and other beneficial uses not specifically listed.

Use Classification Descriptions

Class 1 waters, domestic consumption.
Domestic consumption includes all waters of the state that are or may be used as a source of supply for drinking, culinary or food processing use, or other domestic purposes and for which quality control is or may be necessary to protect the public health, safety, or welfare.

Class 2 waters, aquatic life, and recreation.
Aquatic life and recreation includes all waters of the state that support or may support fish, other aquatic life, bathing, boating, or other recreational purposes, and for which quality control is or may be necessary to protect aquatic or terrestrial life or their habitats, or the public health, safety, or welfare.

Class 3 waters, industrial consumption.
Industrial consumption includes all waters of the state that are or may be used as a source of supply for industrial process or cooling water, or any other industrial or commercial purposes, and for which quality control is or may be necessary to protect the public health, safety, or welfare.

Class 4 waters, agriculture, and wildlife.
Agriculture and wildlife includes all waters of the state that are or may be used for any agricultural purposes, including stock watering and irrigation, or by waterfowl or other wildlife, and for which quality control is or may be necessary to protect terrestrial life and its habitat, or the public health, safety, or welfare.

Class 5 waters, aesthetic enjoyment, and navigation.
Aesthetic enjoyment and navigation includes all waters of the state that are or may be used for any form of water transportation or navigation or fire prevention, and for which quality control is or may be necessary to protect the public health, safety, or welfare.

Class 6 waters, other uses, and protection of border waters.
Other uses include all waters of the state that serve or may serve the uses in subparts 2 to 6, or any other beneficial uses not listed in this part, including, without limitation, any such uses in this or any other state, province, or nation of any waters flowing through or originating in this state, and for which quality control is or may be necessary for the declared purposes in this part, to conform with the requirements of the legally constituted state or national agencies having jurisdiction over such waters, or for any other considerations the MPCA may deem proper.

Impairments
The receiving water impairments downstream of the Minntac tailings basin are shown in Table 2 below.

Table 2 – Downstream receiving waters impairments

West Side Discharge (SD001):

Downstream Impairments	Number of Impaired Reaches	TMDL Status
Sturgeon River	**2**	
Mercury in Fish Tissue	2	*See Wasteload Allocation (WLA) section below.*
Little Fork River	**11**	
Mercury in Fish Tissue	7	*See WLA section below.*
Turbidity	4	These impairments are part of the Little Fork River Major Watershed project. The stressor ID process is underway and a draft TMDL has not been completed.
Rainy River	**7**	
Mercury in Fish Tissue	7	*See WLA section below.*
Lake of the Woods: Main Lake	**3**	
Mercury in Fish Tissue	1	*See WLA section below.*
Nutrient/Eutrophication Biological Indicators	2	A draft TMDL is expected to be completed sometime in 2016-2017. There is no WLA assigned to this discharge at this time. (*10/28/13 phone conversation with Cary Hernandez)*

Wasteload Allocations:
There is no known draft or final WLA assigned to these discharge points (SD001 and SD002) at this time.

There are a number of mercury impairments downstream of the permitted discharge points (SD001 and SD002). Mercury impairments are addressed through the Statewide Mercury TMDL and the associated Mercury Permit Writers Guidance.

Additional Information:
There are a number of PCB in fish tissue (PCBF) and perfluorooctane sulfonate (PFOS) impairments that were not specifically outlined in this review. TMDLs are not underway for PCBF or PFOS impairments at this time.

Biological Assessment
The Little Fork River Watershed Monitoring and Assessment Report published in September 2011 describes biological assessments undertaken on the Dark River in 2005 and 2008 for the MPCA's intensive watershed monitoring strategy. Assessments were conducted (in increasing distance from the basin) at CR668 (4.4 mi.), Hwy 25 (7 mi.), and CR688 (17.5 mi.). The Little Fork WMAR included the following discussion on the results:

> For the Dark River, the two stations upstream of Dark Lake produced passing IBI [index of biotic integrity] scores for both fish and macroinvertebrates which coincided with high habitat scores. Station 08RN045 (Hwy 25) yielded an excellent [macroinvertebrate] IBI score of 86. The furthest downstream

station on the Dark River, 99NF120 (CR688), is within a designated coldwater stream reach and thus was not assessed during the 2010 assessment cycle. The biological communities do look healthy, brook trout and high numbers of mottled sculpin were sampled during the earlier summer months, and will most likely show full support when assessment tools become available to assess coldwater streams.

Limited field chemistry parameters were collected during each IBI assessment. Specific conductance at the CR668 location was 1083 and 1811 uS/cm during the June and August 2005 assessments, respectively. Those values are within the range of measurements from the past few years at this location (744 to 2424 uS/cm). These locations are slated to be reassessed in 2018 per the 10 year cycle of the watershed monitoring strategy.

Intensive watershed monitoring began in the Vermillion River watershed in 2015, including an assessment on the Sand River at CR303 which is roughly 11 miles downstream of the tailings basin. Although MPCA does not expect to issue a final report until 2017, sampling found an initial fish IBI score of 77.7 at that location, which is a high passing score.

Existing Permit Effluent Limits

The existing NPDES/SDS Permit MN0057207 included technology based effluent limits for seepage discharges(NPDES) and monitoring without limits for surface water, groundwater and internal waste streams. A summary of monitored parameters is shown in Table 3 below.

Table 3 – Monitored parameters under existing permit

Parameter	Limit	Units	Limit Type	Effective Period	Frequency
GW003, 004, 006-010					
Amines		mg/L	Single Value	Apr, Jul, Oct	1 x month
Elevation of GW Relative to Mean Sea Level		ft.a.m.s.l.	Single Value	Apr, Jul, Oct	1 x month
Temperature		Deg C	Single Value	Apr, Jul, Oct	1 x month
pH		SU	Single Value	Apr, Jul, Oct	1 x month
Specific Conductance		umh/cm	Single Value	Apr, Jul, Oct	1 x month
Total Sulfate		mg/L	Single Value	Apr, Jul, Oct	1 x month
SD001 & SD002					
pH	6.0-9.0	SU	InstantMin / InstantMax	Jan-Dec	1 x month
Specific Conductance		umh/cm	CalMoMax	Jan-Dec	1 x month
Total Sulfate		mg/L	CalMoMax	Jan-Dec	1 x month
Flow		mgd	CalMoTot / CalMoAvg / Daily Max	Jan-Dec	2 x month
Oil & Grease	10 / 15	mg/L	CalMoAvg / Daily Max	Jan-Dec	2 x month
Total Susp. Solids	20 / 30	mg/L	CalMoAvg / Daily Max	Jan-Dec	2 x month
SW001					
Total Sulfate		mg/L	Single Value	Jan-Dec	1 x month
Flow		mgd	Single Value	Jan-Dec	1 x month
SW002					
Amines		mg/L	Single Value	Jan-Dec	2 x year
Toxicity, Whole Effluent (Acute)		TUa	Single Value	Jan-Dec	2 x year
WS002					
Calcium, Dissolved (as Ca)		mg/L	CalMoAvg	Jan-Dec	1 x week
Chloride, Total		mg/L	CalMoAvg	Jan-Dec	1 x week
Hardness, Ca & Mg, Calculated (as CaCO3)		mg/L	CalMoAvg	Jan-Dec	1 x week
Sulfate, Dissolved (as SO4)		ug/L	CalMoAvg	Jan-Dec	1 x week
Flow		mgd	CalMoAvg	Jan-Dec	1 x week
WS003					
Calcium, Dissolved (as Ca)		mg/L	CalMoAvg	Jan-Dec	1 x week
Chloride, Total		mg/L	CalMoAvg	Jan-Dec	1 x week
Fluoride, Total (as F)		mg/L	CalMoAvg	Jan-Dec	1 x month
Hardness, Ca & Mg, Calculated (as CaCO3)		mg/L	CalMoAvg	Jan-Dec	1 x week
pH		SU	CalMoMin	Jan-Dec	1 x week
Flow		mgd	CalMoAvg	Jan-Dec	1 x week
WS004					
pH		SU	CalMoMax	Jan-Dec	1 x week
WS005					
pH		SU	CalMoMax	Jan-Dec	1 x week
WS006 & WS007					
Amines		mg/L	Single Value	Jan-Dec	1 x year
Toxicity, Whole Effluent (Acute)		TUa	Single Value	Jan-Dec	1 x year
Evaporation, accumulated		in	CalMoTot	Jan-Dec	1 x month
Precipitation		in	CalMoTot	Jan-Dec	1 x month

Technology Based Effluent Limits (TBELs)
EPA has established TBELs for the mining industry. 40 CFR subp. A—Iron Ore Subcategory § 440.10. Federally required TBELs apply for pH (6.0-9.0 SU), TSS (30 mg/L daily max./20 mg/L mo. avg.), and dissolved iron (2.0 mg/L daily max./1.0 mg/L mo. avg.). TSS (60 mg/L daily max. / 30 mg/L mo. avg.) and pH compliance limits were instituted at SD001 and SD002.

Water Quality Based Effluent Limits (WQBELs)
There are no WQBELs in the existing permit.

Proposed Permit Limits and Monitoring

Technology Based Effluent Limits
EPA regulations at 40 CFR § 440.10 establish TBELs for pH (6.0-9.0 SU), TSS (30 mg/L daily max. / 20 mg/L mo. avg.), and dissolved iron (2.0 mg/L daily max./1.0 mg/L mo. avg.). These values will be compliance limits at SD001 under this permit.

Water Quality Based Limits
Reasonable Potential for Chemical Specific Pollutants (40 CFR § 122.44 (d)(1))
Federal regulations require MPCA to evaluate the discharge to determine whether the discharge has the reasonable potential to cause or contribute to a violation of water quality standards. The MPCA must use acceptable technical procedures, accounting for variability (coefficient of variation [CV]), when determining whether the effluent causes, has the reasonable potential to cause, or contribute to an excursion of an applicable water quality standard. Projected Effluent Quality (PEQ) derived from effluent monitoring data is compared to Preliminary Effluent Limits (PELs) determined from mass balance inputs. Both determinations account for effluent variability. Where PEQ exceeds the PEL, there is reasonable potential to cause or contribute to a water quality standards excursion. When reasonable potential is indicated the permit must contain a WQBEL for that pollutant.

SD001 is the effluent monitoring station in this permit. There was sufficient DMR data to conduct reasonable potential analysis for sulfate and specific conductance at this station. Both parameters were found to have reasonable potential to cause or contribute to a water quality standards excursion Table 4 shows the values used in the reasonable potential calculations.

Table 4 – SD001 reasonable potential analysis

Parameter		Sulfate (mg/L)	Specific Conductance (mg/L)
Plant Flow	(mliters/d)	0.53	0.53
(ADW)	(mgd)	0.14	0.14
River $7Q_{10}$	(mliters/d)	0.00	0.00
(Class 2B)	(mgd)	0	0
River 7Q10	(cfs)		
Background Conc.		0.8	0.8
Continuous Std (cs)		1000	1000
Maximum Std (ms)			
Final Acute Value			
Waste Ld Allocation:			
	WLAcs	1000	1000
	WLAms		
Coeff of Variation (CV)		0.10855119	0.097333503
Variance		0.01171448	0.009429216
Std. Dev.		0.10823344	0.097104149
Duration (n days)		30	30
Long Term Ave.-LTA			
	u_4/u_{30}	6.86166164	6.866424161
	u	6.85600075	6.861867425
	LTAcs	955.14	959.66
	u_1		
	LTAms		
Use LTAcs < LTAms:			
WQBEL: Daily Max.		1221.4	1197.2
	s^2_n	0.00587439	0.004725722
	s_n	0.07664459	0.068743884
	u_n	6.85892079	6.864219172
Mo.Av. (2x)		1080.31	1072
Max Meas Effl Value		**1320.00**	**3180**
# data points		166	166
PEQ factor		1	1
Proj Effl Qual.(PEQ)		**1320**	**3180**
PEQ > Daily Max		TRUE	TRUE
PEQ> Monthly Ave		TRUE	TRUE
PEQ > FAV		NA	NA
Reasonable Potential		Yes	Yes

Dark River – Trout Reach Concentration Analysis

The goal of this analysis is to determine whether projected surface water concentrations at the beginning of the Class 1B, 2A, 3B, 4A, 4B, 5, 6 reach of the Dark River (AUID 0903005-525) will meet water quality standards.

The Dark River begins near the Minntac tailing basin and flows westward. Flow in the initial reaches of the Dark River is dominated by the Minntac tailing basin drainage. The Dark River flows approximately 10 miles and through Dark Lake before it reaches the Class 1B, 2A, 3B, 4C, 5, 6 designated reach. The Dark River and Dark Lake are designated as Class 2B, 3C, 4A, 4B, 5, 6 waterbodies until the Class 1B, 2A, 3B reach.

The data set is based on two sampling events in May and June of 2014 at SD001. As a result, there is a maximum of two data points for each analyte.

All limits and conclusions found in the analysis are intended to be preliminary. This document is not a replacement of a waterbody assessment.

Flow Calculations and Dilution Ratios

To adequately account for dilution, the 7Q10 flow rate at the beginning of the 1B, 2A, 3B reach was calculated.

The 7Q10 flow rate at discontinued USGS gauge #05131000 was calculated by the USGS as 2.975 cubic feet per second (cfs) using the period of record of 1943 to 1979. The drainage area of #05131000 was calculated by the USGS to be 58 square miles.

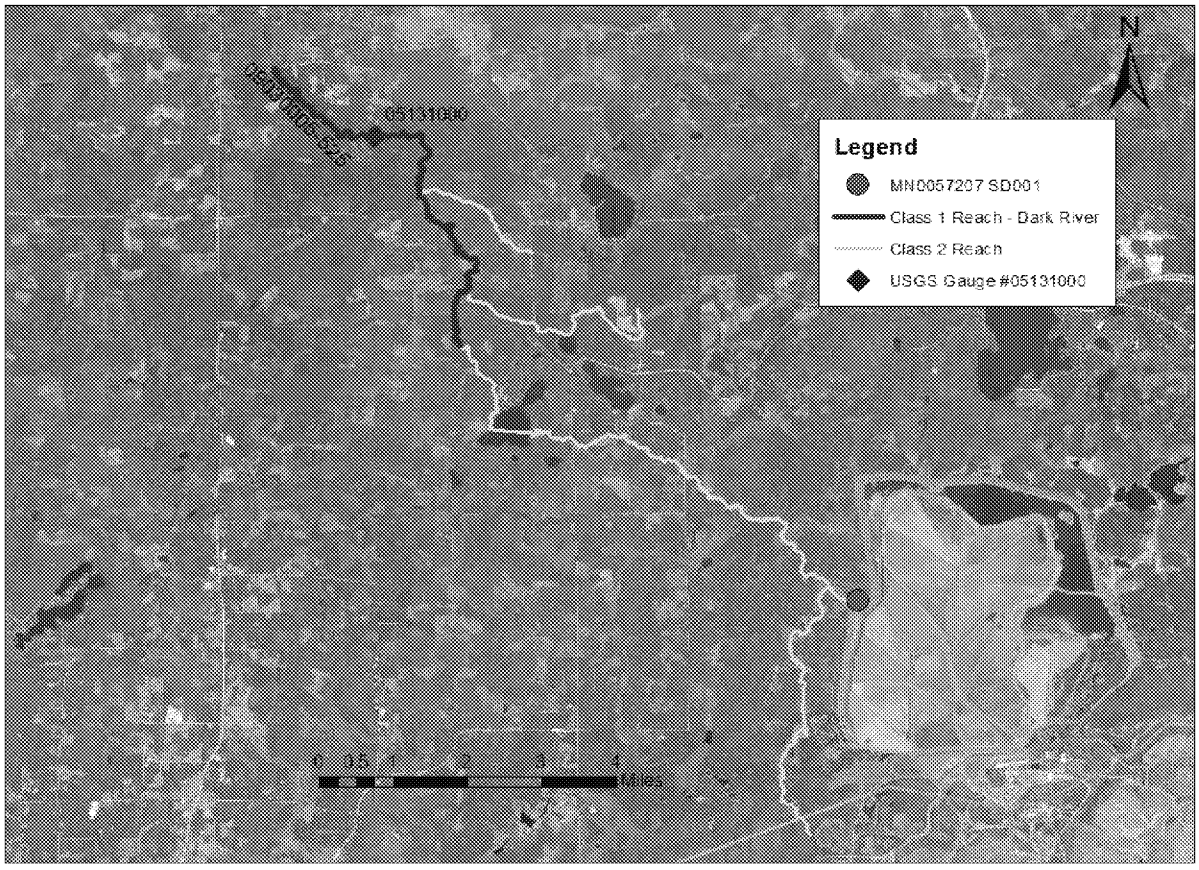
The drainage area at the beginning of the 1B, 2A, 3B was determined to be 38 square miles.

The 7Q10 flow rate at the beginning of the 1B, 2A, 3B reach was calculated as 1.95 cfs. This was calculated by multiplying 2.975 cfs by the ratio the drainage area of #5131000 to the drainage area of the 1B, 2A, 3B reach.

The flow rate exiting the Minntac tailings basin westward was assumed to be 2.63 cfs at 7Q10 conditions. The flow rate leaving SD001 was assumed to be 0.21 cfs at 7Q10 conditions.

The dilution ratio between the 7Q10 flow rate at the 1B, 2A, 3B reach and the flow exiting the Minntac tailing basin westward is 0.43. The dilution ratio between the 7Q10 flow rate at the 1B, 2A, 3B reach and SD001 is 0.043.

Figure 4. The Class 1B reach of the Dark River



Concentration Analysis

A full reasonable potential analysis cannot be performed because a minimum of ten data points is required to perform a reasonable potential analysis. The draft permit includes additional monitoring requirements to allow a full reasonable potential analysis upon reissuance.

In place of a reasonable potential analysis for the current reissuance, MPCA used the available concentration and flow data to evaluate whether discharges would exceed water quality standards. The available two data points for each parameter were averaged, adjusted for dilution and compared to applicable water quality standards. All of the parameters were assumed to be completely conservative with respect to their fate from SD001 to the beginning of the 1B, 2A, 3B reach. The stream dilution water was assumed to have a concentration of 0 mg/L for all parameters for the purpose of this analysis.

The 2A limits for Cadmium, Chromium, Copper, Lead, Nickel, and Zinc were calculated using the minimum hardness of 50 mg/L.

The dilution ratio of 0.043 was used for evaluating the Manganese concentration at the beginning of the 1B, 2A, 3B reach on the Dark River.

There were only possible exceedances of state standards for hardness, specific conductance and total dissolved solids at the beginning of the 1B, 2A, 3B reach when adjusted for dilution (See Table 5 below). Every other parameter did not have an exceedance of a state standard.

Table 5 – Trout reach concentration analysis

Parameter	WQ Standards						SD001		SD001 Average	Likely Concentration at start of 1B reach	Above or Below Applicable Standards?
	1B	2A	3B	4A	4B	404	14-May	14-Jul			
Alkalinity (Bicarbonate as CaCO3) mg/L				250			503	420	461.5	196.44	Below
Bicarbonates (HCO3)				305			613.66	512.4	563.03	239.66	Below
Ammonia (unionized ug/L)		16					0.27	0	<0.27	<0.27	Below
Fluoride (mg/L)							1.4	1.4	1.4	0.6	Below
Hardness (Ca+Mg as CaCO3)			250				1690	1574	1632.21	694.78	Yes, 3C
pH		6.5-8.5	6-9	6-8.5	6-9		7.1	7.12	7.11	NA	NA
Nitrogen (mg/L)							<1.0	<1.0	<1.0	<1.0	Below
Nitrate - Nitrite (mg/L)							3.6	4.3	3.95	1.68	Below
Phosphorous (N lakes & Forest) ug/L		30					2	11	6.5	2.77	Below
Specific Conductance (uS/cm)				1000			2670	2689	2679.5	1140.57	Yes, 4A
Sulfate***											
TDS (mg/L)				700			2200	2230	2215	942.85	Yes, 4A
TSS (mg/L)		10				20-30	<1.0	3	≤3	≤3	No
Turbidity (NTU)		25						1.9	1.9	0.81	No
Aluminum Total (ug/L)		87					<5.6	<2.8	<5.6	<5.6	No
Antimony Total (ug/L)	6	5.5					<0.25	<0.5	<0.5	<0.5	No
Arsenic Total (ug/L)	10	2					0.81	1.2	1.01	0.43	No
Barium (ug/L)	2000						51.8	51.7	51.75	22.03	No
Beryllium (ug/L)	4						<0.018	0.054	≤0.054	≤0.054	No
Boron Total (ug/L)				500			270	217	243.5	103.65	No
Bromide (mg/L)							0.85	0.91	0.88	0.37	NA
Cadmium (ug/L)	5	0.66					<0.03	<0.059	<0.03	<0.03	No
Calcium (mg/L)								177	177	75.34	No
Chloride (mg/L)		230	100				131	139	135	57.46	No
Chromium (total) ug/L	100	117					<0.26	<0.62	<0.62	<0.62	No
Cobalt, Total (ug/L)		5					1.2	0.76	0.98	0.42	No

*** See explanation in text above

Table 5 – Trout reach concentration analysis (continued)

Parameter	WQ Standards						SD001		SD001 Average	Likely Concentration at start of 1B reach	Above or Below Applicable Standards?
Copper (ug/L)	1300	6.4					3.2	<0.73	≤3.2	≤3.2	No
Iron Total (mg/L)	300					1-2	0.296	0.385	0.34	0.14	No
Lead (ug/L)	15	1.3					<0.028	<0.028	<0.028	<0.028	No
Magnesium (mg/L)								275	275	117.06	No
Manganese Total (ug/L)	50						1760	1730	1745	78.97	No
Mercury (ng/L)		6.9					0.81	0.355	0.58	0.25	No
Molybdenum (ug/L)							2.9	<2.3	≤2.9	≤2.9	No
Nickel (salts) ug/L		88					1.3	<1.1	≤1.3	≤1.3	No
Selenium (ug/L)	50	5					3.5	3.7	3.6	1.53	No
Silver (ug/L)	100	0.12					<0.1	<0.2	<0.2	<0.2	No
Thallium (ug/L)	2	0.28					0.1	<0.028	≤0.1	≤0.1	No
Tin (ug/L)							0.03	<0.053	≤0.03	≤0.03	No
Titanium (ug/L)							<10	<20	<20	<20	No
Zinc (ug/L)	5000	59					4	<0.54	≤4	≤4	No

Salty Discharge Monitoring

As a result of increased concern regarding the environmental impacts of "salty discharges," MPCA staff determined that there is a need to obtain more information from dischargers. In general, the MPCA staff will require industrial and municipal facilities with continuous, periodic/seasonal, or intermittent waste flows where the receiving water stream flow to effluent design flow dilution ratio under low flow conditions is less than 5:1 (annual climatic 7Q10: Average Dry Weather Design Flow [domestic] or Maximum Daily Design Flow [industrial]) to monitor effluent for parameters listed in Table 6. Additionally, the MPCA plans to require facilities with salty waste streams from concentrating treatment technologies (e.g., reverse osmosis, ion exchange, membrane filtration, etc.) and food processing industries using density-based (saline) sorting processes to monitor for the parameters in Table 6, regardless of the receiving water to effluent flow dilution ratio. This includes POTWs that accept salty waste streams from water treatment plants or certain sectors of industrial facilities.

As the MPCA is collecting this information to determine if limits should be applied, the MPCA will generally allow Permittees to request a reduction in monitoring if after two years of data (or 10 data points for controlled discharges at ponds), if the monitoring does not indicate a reasonable potential to exceed a water quality standard.

Table 6 - Salty discharge monitoring parameters

Analyte	Units (Jan – Dec MoMax)	WQ Standard/Justification
Chloride	mg/L	Class 2 and 3
Ca and Mg Hardness as CaCO3	mg/L	Class 3
Specific Conductance	umhos/cm	Class 4A
Total Dissolved Salts (a.k.a:solids)	mg/L	Class 4A
Sulfates as SO4	mg/L	Class 4A (where applicable),4B
Bicarbonates (HCO3)	mg/L	Class 4A
Sodium	mg/L	Class 4A
*Calcium	mg/L	Class 4A
*Magnesium	mg/L	Class 4A
*Potassium	mg/L	Class 4A
Whole Effluent Toxicity (WET)**		Use EPA Method 821-R-02-013 for chronic WET testing for fathead minnows and Ceriodaphnia dubia, if the receiving water is a Class 2 (fisheries waters) or 821-R-02-012 for acute WET testing fathead minnows Ceriodaphnia dubia and Daphnia magna, if the discharge does not impact a Class 2 water

* Analytes necessary to calculate Sodium as %total cations. The sodium water quality standard is 60% of total cations
**WET testing will be applied to permittees on a case-by-case basis.

Iron and Manganese Monitoring

The permittee will be required to monitor for iron and manganese in groundwater under this permit without limits. The geochemical behavior of these elements is such that the concentration of dissolved iron and manganese ions is controlled more by the local redox state of the groundwater than by proximity to an elevated source (J.D. Hem, Study and Interpretation of the Chemical Characteristics of Natural Water. 3rd ed., U.S. Geological Survey Water Supply Paper 2254). At this facility, as well as other facilities, there is little correlation between the concentrations discharged(H) to groundwater and those measured in the downgradient monitoring wells. Observed manganese concentrations in the tailings basin water have been roughly 280 ug/L, while monitoring well results have ranged from 102 ug/L to 4558 ug/L. Concentrations in groundwater at GW009, which is an unimpacted background well, have been 139 to 167 ug/L, which is higher than several wells that are impacted by the basin. Iron and manganese are distinguishable from other parameters in that their concentrations do not correlate with any other parameter related to tailings basin discharge. Also, most dissolved species of the ions will readily precipitate when exposed to dissolved oxygen concentrations typical of surface water or groundwater in contact with the atmosphere. Consequently, the ability of elevated concentrations to persist downgradient is generally limited. Monitoring data collected through this permit and through studies undertaken by DNR will be evaluated at the next reissuance to determine if limits are appropriate.

Compliance Limits in Surface Waters

As part of state conditions controlling discharges(SDS) to groundwater, this permit will establish surface water monitoring stations in waters that are potentially impacted by groundwater from this facility. The permit will establish limits for these surface waters based on applicable water quality ambient standards. The permit will require monthly monitoring. The MPCA has begun rulemaking to revise class 3 & 4 surface water quality standards. MPCA expects to complete this rulemaking during the period of investigation and mitigation planning outlined in the schedule of compliance. Any changes to surface water quality standards for pollutants for which there are limits specified in this permit may require modification to the permit to reflect the conclusions of the rulemaking.

Final Limits
To protect the Class 3 (industrial consumption) and Class 4A (agriculture) designated uses of surface water bodies, monthly monitoring results must meet the state water quality ambient standard for an applicable pollutant no less than 90 percent of the time. Therefore the Permittee will be in violation of permit conditions during a given monitoring period when the following occurs:

- The monitoring result for that month exceeds the permit limit.
- The compliance limit has been exceeded for that monitoring location greater than 10 percent of the time over the preceding 12 months in which monitoring was completed, ending during the most recent reporting month.

This method is protective of water quality because:

- It is consistent with how impairments are determined for similar non-toxic, conventional pollutants.
- The uses (industrial and agricultural) being protected by these standards are unlikely to be disrupted by excursions that represent a limited percentage of total water volume appropriated for the use.
- It accounts for the statistical possibility that an analytical result may falsely exceed the limit due to deviation from the true concentration that is within the acceptable range of accuracy for that analytical technique.

Sulfate Limits – Wild Rice
The legislature passed a law during the special session in 2015 stating "when issuing, modifying, or renewing national pollutant discharge elimination system (NPDES) or state disposal system (SDS) permits, the agency shall endeavor to protect wild rice, and in doing so shall be limited by the following conditions: (i) the agency shall not require permittees to expend money for design or implementation of sulfate treatment technologies or other forms of sulfate mitigation." 2015 Minn. Laws 1st Sp. Sess. Ch. 4, Art. 4, Sec. 136. The law stipulated that this and other limitations will remain in effect "Until the commissioner of the Pollution Control Agency amends rules refining the wild rice water quality standard in Minnesota rules, part 7050.0224, subpart 2, to consider all independent research and publicly funded research and to include criteria for identifying waters and a list of waters subject to the standard."

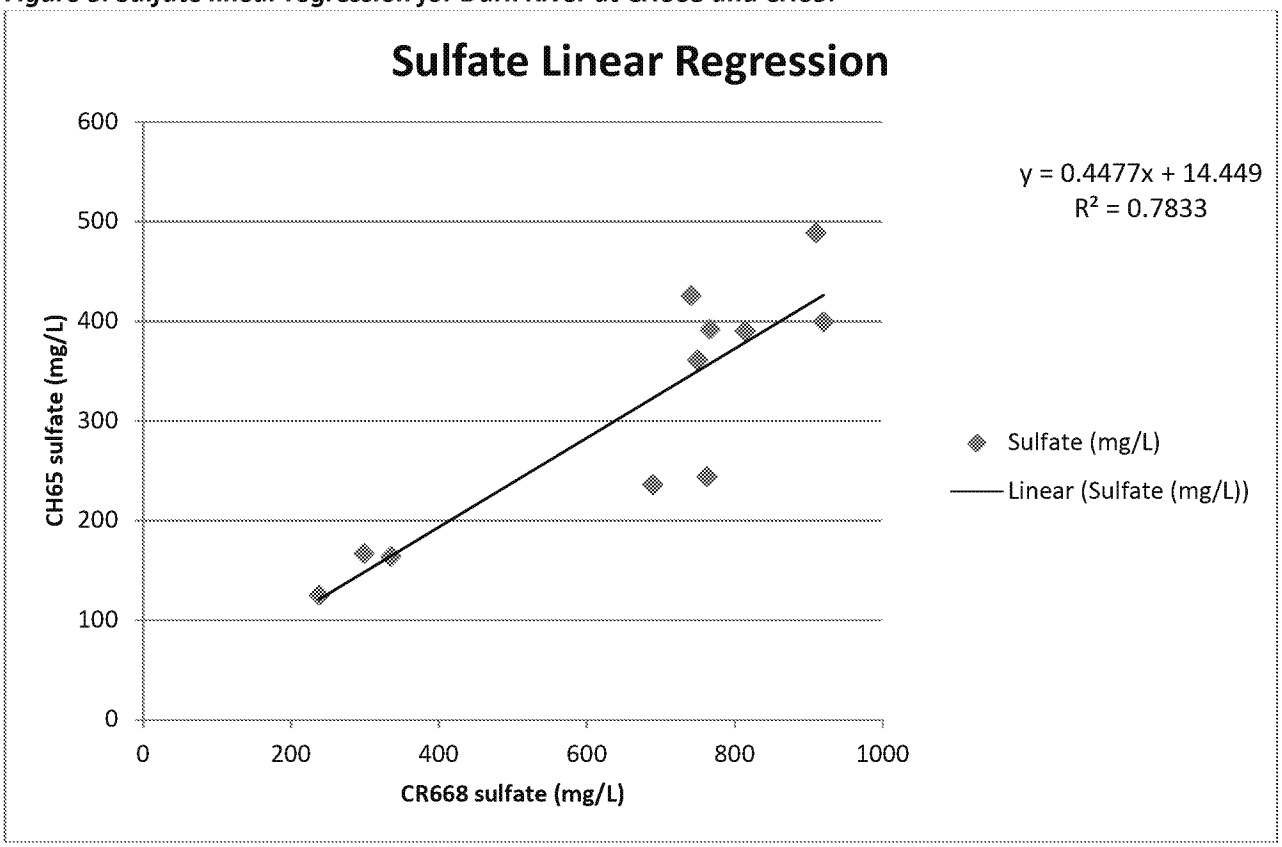
To be consistent with this legislation, the draft permit contains no sulfate limits for wild rice and does not require expenditures related to wild rice sulfate limits. MPCA anticipates that upon amendment of the rules as described above, Sandy Lake and Little Sandy Lake will be designated as wild rice waters subject to the wild rice sulfate water quality standard and that measures specifically to reduce the concentrations of sulfate in the Twin Lakes will be necessary. Upon adoption of a new wild rice sulfate water quality standard, the agency will require the Permittee to submit an application for a permit modification with the data necessary to establish sulfate limits protective of wild rice in Sandy and Little Sandy Lakes, if needed.

The law also provides that "the agency may require sulfate minimization plans in permits." The draft permit requires specific actions be taken to lessen sulfate concentrations in groundwater that will lead to reductions in the twin lakes at a rate equivalent to or greater than possible sulfate minimization plan actions.

Sulfate Monitoring – Dark River Trout Reach
The Dark River flows north out of Dark Lake for 1.59 miles where its designation changes to a trout stream (Class 1B, 2A, 3B, 4A, 4B, 5, and 6) for the next 7.91 miles. Concentrations of key parameters at the CH65 location within the trout stream reach are fairly consistently about one-half of those observed at the CR668 sampling point (SW003) during same-day sampling events, as shown in Figure 5. Therefore, permit compliance limits that are protective of the Class 1B uses unique to the trout reach portion of the Dark River can be monitored at SW003 with a sufficient degree of certainty. For all parameters of concern, when final compliance limits are met at SW003, the water quality standards unique to the trout reach should be met also, except for sulfate. Consequently, the final compliance limit for sulfate at SW003 is derived from the 250 mg/L water quality standard that is applicable at the trout reach. This results in a final compliance limit for sulfate as monitored at SW003 of 525 mg/L, based on the linear regression relationship shown below. When the Dark River SCRS becomes operational, it is possible that changes to the Dark River flow may cause the correlation

between concentrations at CR668 and CH65 to change as well. To assess this possibility, after the Dark River SCRS is operational, samples will be collected monthly from both locations for 12 months and will be analyzed for the parameters specified in the limits and monitoring requirements section of this permit for station SW003. If results indicate that the mathematical relationship has changed by more than five percent, or if there is no longer a consistent correlation, the Permittee must submit an application for a permit modification within 90 days after the 12-month sampling period.

Figure 5. Sulfate linear regression for Dark River at CH668 and CH65.



Additional Reguirements

Compliance Schedules

This permit contains two compliance schedules. One addresses discharges(SDS) to groundwater that impact waters of the state, and one addresses surface discharge(NPDES) to waters of the state and waters of the United States.

As required by Minn. R. 7001.0150, subp. 2. Special conditions, this permit contains a compliance schedule to mitigate the tailings basin's discharge(SDS) to groundwater that has caused and is causing waters of the state (groundwater and surface water) to exceed applicable water quality criteria and numeric standards (hereinafter referred to as the "SDS Compliance Schedule"). A separate compliance schedule, or "schedule of compliance" as described in 40 CFR § 122.2, addresses dam seepage (surface and shallow groundwater with a direct hydrologic connection to surface water) that discharges(NPDES) to the Dark River and its tributary wetlands (hereinafter referred to as the "NPDES Compliance Schedule").

SDS Compliance Schedule

The SDS Compliance Schedule for mitigation of discharge(SDS) to groundwater is intended to eliminate the exceedance of applicable water quality criteria and numeric standards for the designated uses of the waters of the state (both groundwater and surface waters) surrounding and downstream of the tailings basin. Monitoring and investigative activities have shown concentrations of certain parameters in surface water and groundwater that exceed applicable numeric standards. For surface water, the known parameters are bicarbonate, hardness, specific conductance, sulfate and total dissolved salts (solids) and for groundwater they are sulfate and total dissolved solids. Exceedances for some or all of these parameters have been observed in the Dark River, Little Sandy Lake, Sandy Lake, and groundwater at the northeast property boundary and basin perimeter. Based on the area hydrology, MPCA expects similar exceedances in Timber Creek, Admiral Lake, and the Sand River from the tailings basin to Little Sandy Lake, although MPCA does not have monitoring data from those locations.

Minn. R. 7001.0150, subp. 2 states:

> Each draft and final permit must contain conditions necessary for the permittee to achieve compliance with applicable Minnesota or federal statutes or rules, including each of the applicable requirements in parts 7045.0450 to 7045.0649 and 7045.1390, and any conditions that the agency determines to be necessary to protect human health and the environment. If applicable to the circumstances, the conditions must include:
>
> A. A schedule of compliance that leads to compliance with the appropriate Minnesota or federal statute or rule. The schedule of compliance must **require compliance in the shortest reasonable period of time** or by a specified deadline if required by Minnesota or federal statute or rule. If appropriate, the schedule of compliance must include interim dates, which in no case may be separated by more than one year. A permit with a schedule of compliance must require the submission to the commissioner of progress reports. The progress reports must be submitted not later than 14 days after each interim and final date of compliance regarding the permittee's compliance or noncompliance with the schedule of compliance and they must explain any instance of noncompliance and state the actions that have been taken to correct the noncompliance.

All activities under this schedule require compliance with final limits in "the shortest reasonable period of time." During the term of this permit, the MPCA will require the permittee to better determine the fate and transport of tailings basin pollutants, and identify and select the approach for implementation methods that will work best to restore compliance. The MPCA anticipates that the next 5-year permit will contain refined dates for final compliance at applicable monitoring locations. Under this permit, initial construction of mitigation measures is required within 49 months of

permit issuance, and the Dark River Watershed Seepage Collection and Return System must be operational by the end of 2017.

The SDS Compliance Schedule establishes four sequential actions that will lead to implementation of the determined final solution(s).

The first activity is an "Investigation Work Plan," due 30 days after permit issuance. The purpose of Investigation Work Plan is to identify/refine current impacts to waters of the state, and the sources and routes of pollutants leading to those impacts. The Permittee has already conducted significant work to identify and model basin impacts over the past decade, and the MPCA has communicated to the Permittee where data gaps exist. As a result, the MPCA is requiring that the work performed under the Deep Seepage Investigation Work Plan be completed within a year of permit issuance (although some studies or monitoring may continue past that time). The permit requires the Permittee to submit a report documenting the findings of the implemented Deep Seepage Investigation Work Plan within 13 months of permit issuance.

The second activity is the submittal of a Basin Treatment Methods Study Plan within 13 months of permit issuance. The purpose of the Basin Treatment Methods Study Plan is to identify feasible technologies for non-mechanical or mechanical treatment to reduce the concentration of sulfate (as the pollutant of greatest concern and as a surrogate for other dissolved solids) within the tailings basin to 800 mg/L within 5 years of permit issuance, and 357 mg/L within 10 years from permit issuance, or in the shortest reasonable period of time. Under the Basin Treatment Methods Study Plan, the Permittee will develop a plan to evaluate the treatment methods to determine which will best reduce water quality impacts from the tailings basin, taking into consideration the time that will be needed to achieve compliance, the reliability of the treatment methods, the cost to install and to operate the treatment methods, compatibility with DNR closure requirements, and the secondary environmental impacts of the treatment methods, if any. The 800 mg/L concentration is derived from the "Dry Controls Effectiveness Report" required by Part 7.qqq of the 2011 SOC and submitted by USS on January 5, 2012. In this report, USS provided a prediction of tailings basin sulfate concentration that would result from replacement of existing wet scrubbers with dry emissions controls and utilization of sump #6 as a makeup water source. The predicted sulfate concentration provided with the report indicates that sulfate concentrations in the basin would reach 800 mg/L within 5 years after the switch to sump #6 water and a phased installation of dry controls. The sulfate limit of 357 mg/L in 10 years is the concentration determined in a modeling study that would allow the tailings-impacted groundwater to meet the 250 mg/L sulfate drinking water standard at the northeastern site property boundary. While the Dry Controls Effectiveness Report indicated that this target concentration could not be met with the implementation of the dry controls and sump #6 makeup water alone, the Permittee could install and operate other available treatment technologies to meet the target concentration within 10 years of permit issuance. Additionally, because the 357 mg/L target concentration is based on preliminary modeling, the Permittee may submit revised estimates of the tailings basin water quality that more accurately reflects the basin sulfate concentration that will lead to compliance with groundwater standards. If this concentration should differ from the interim limit of 357 mg/L and MPCA agrees with this finding, then the permit will be modified to reflect that change.

The third activity brings together the results of the Investigation Work Plan and Basin Treatment Methods Study Plan. Under this activity, the permit requires the Permittee to submit a "Deep Seepage Final Compliance Plan" within 25 months of permit issuance. This plan will identify the specific treatment systems and/or mitigation, including those measures that may be necessary in addition to the basin sulfate reduction measures that the Permittee has chosen to implement to meet final compliance limits in surface water and groundwater in the shortest reasonable period of time.

The fourth activity under the Compliance Plan is the submission of detailed plans for any construction that may be required, along with a timeline for implementing the final solution(s), including permitting and construction, if necessary, and a means to monitor progress towards compliance with final limits. The Compliance Schedule requires

that the Permittee begin to implement the mitigation plan and/or initiate construction within 49 months of permit issuance.

MPCA believes that this schedule is achievable by the Permittee and that its implementation will achieve compliance in the shortest reasonable period of time, as required by law. The Compliance Schedule provides three years for the Permittee to evaluate, choose and pilot a remedy. The Permittee has already conducted significant site investigation and research into treatment and remedial technologies under a series of SOCs since 2001. It is difficult to schedule a timeframe for implementation of a remedy when the nature and scale is unknown. Therefore, it is reasonable that the timeline for those activities remains to be determined. Additionally, due to the varying time of travel between waters of the state and possible remedial locations, it is currently impossible to predict the time to compliance for a specific water body.

To ensure timely submittal of plans fulfilling all specified requirements, the permit requires the Permittee to meet with MPCA three months prior to each plan submittal deadline to present a progress report and draft plan. The MPCA hopes by this provision to avoid disputes with the Permittee that slow implementation of the schedule.

NPDES Compliance Schedule - for Eliminating Discharge(NPDES) to the Dark River
This compliance schedule incorporates the remaining activities from the 2011 SOC related to the construction of a Seepage Collection and Return System (SCRS) for the Dark River Watershed. As discussed above, MPCA has historically regulated seepage that emerges either from the side of the basin dam, or within the vicinity of the toe of the dam, under federal NPDES guidelines. Consequently, this NPDES Compliance Schedule is intended to meet the definition and implementing guidelines for a schedule of compliance as described in 40 CFR §§ 122.2 and 122.47. The remedy for the impacts to the Dark River from this seepage is to eliminate the discharge(NPDES). Therefore, final compliance with the conditions of the NPDES Compliance Schedule contained within this permit occurs upon implementation of the SCRS and cessation of discharge from identifiable seeps. This shall occur as soon as possible, and in no case later than December 31, 2017. This date is reasonable because the SCRS is in the final stages of receiving state and federal wetlands permits; therefore, construction should begin in 2017.

Monitoring was required under the previous permit at the SD001 sampling station due to its position at the headwaters of the Dark River. Analysis of samples from this location has demonstrated that this discharge(NPDES) has reasonable potential to cause or contribute to exceedances of water quality standards in the Dark River for the pollutants bicarbonate, hardness, specific conductance, sulfate and total dissolved solids (TDS).

Construction of a Seepage Collection and Return System to eliminate the discharge of surface seepage to the Dark River Watershed is required under the June 9, 2011 Schedule of Compliance between MPCA and USS. Collection of surface seepage from the west side of the Minntac tailings basin for return to the recirculating process water system would eliminate the remaining surface discharge (NPDES) to waters of the United States.

NPDES and SDS Compliance Schedules
The Compliance Schedule for the SDS and NPDES discharges, as detailed in the draft permit, is as follows:

Chapter 1. Compliance Schedule
1. Compliance Schedule
Background

1.1 For the tailings basin discharge (as defined in Minn. Stat. 115.01) to groundwater, the Permittee shall meet the terms of the SDS compliance schedule detailed below to mitigate impacts to waters of the state (surface and groundwater), and to attain compliance with permit limits described as follows:

a. Interim limits on sulfate concentration in the recirculated tailings basin pool water. This schedule establishes interim limits of 800 mg/L within five years of permit issuance, and 357 mg/L within ten years of permit issuance, or the shortest reasonable period of time in accordance with Minn. R. 7001.0150, subp. 2(A). Preliminary flow modeling indicates the 357 mg/L concentration would result in groundwater meeting the sulfate standard at the east property boundary. One goal of this compliance schedule is to determine what basin water sulfate concentration would protect applicable uses in downstream surface waters and in groundwater at all property boundary locations;
b. final compliance limits in surface waters impacted by deep seepage that are based on the water quality pollutant standards for applicable uses of the water body. This schedule requires compliance with final limits for these locations to be attained in the shortest reasonable period of time; and,
c. final compliance limits for groundwater at the property boundary to protect its use as a potential drinking water source. This schedule requires compliance with the 250 mg/L sulfate limit in groundwater in the shortest reasonable period of time.

1.2 Under all SDS Compliance Schedule requirements, the term "final compliance limits" shall refer to final limits for both surface water and groundwater.

1.3 The MPCA recognizes that basin-impacted groundwater is currently reaching surface waters and having an impact on those surface waters. In addition to requiring reductions in sulfate within the tailings basin, the SDS compliance schedule requires the permittee to specify by month 37, based on studies required under the permit, the dates by which final compliance limits will be met for all pollutants and how those limits will be met, which may be a combination of further lowering basin pollutants and remedial actions, such as permeable reactive barriers.

1.4 For as long as this compliance schedule is in effect, the Permittee shall take all actions necessary to make progress towards attainment of the final compliance limits until compliance is attained. The requirements in conditions 1.6 through 3.2 cease to apply if the Permittee achieves compliance with final compliance limits and receives written confirmation of compliance from MPCA

1.5 For the discharge to surface water from seepage along the tailings basin dam perimeter, the Permittee shall meet the terms of the NPDES compliance schedule (detailed below in 1.22-1.27) as soon as possible, and for all such seepage along the west and northwest dam boundary, no later than December 31, 2017.

SDS Schedule for Deep Seepage - Investigation Work Plan

1.6 Within 30 days after permit issuance, the Permittee must submit a plan (Investigation Work Plan) that describes how the Permittee proposes to investigate and evaluate site conditions critical to the selection and implementation of treatment, mitigation efforts and/or other activities that could be taken to meet final compliance limits for the identified parameters of concern, including bicarbonate, hardness, sulfate, specific conductance and total dissolved solids.

1.7 The Investigation Work Plan shall include a field data collection and analysis plan sufficient to accomplish the following:
a. identify the significant surface and subsurface flow paths from the tailings basin to surrounding surface waters and groundwater under existing and foreseeable hydrologic conditions at the tailings basin;
b. evaluate water quality with respect to all applicable uses likely to be impacted by the tailings basin along the identified flow paths;
c. determine potential aggregate acute and chronic toxic effects to aquatic organisms at compliance locations (identified in this permit) in the Sand River and Dark River watersheds;
d. develop an understanding of the fate and transport of tailings basin-derived chemical constituents at a level sufficient to assess the effectiveness of considered mitigation technologies and strategies, including

calculated estimates of the recirculated tailings basin pool water sulfate concentration necessary to meet final compliance limits in surface water and groundwater;

e. determine sources and potential quantities of pollutants released from each source in the basin, including sources such as coarse tails, fine tails, recirculating process water, air emissions control contributions, and tailings lock-up water (pore water); and,

f. identify and quantify any other pollutants the Permittee could reasonably expect to be released from the tailings basin, taking into account contributions from tailings lock-up water and continued oxidation of emplaced tails, and estimate the timeframe over which the tailings basin will continue to release pollutants.

1.8 The Investigation Work Plan shall also include a field data collection and analysis plan sufficient to develop and validate a site conceptual model that describes sources, fate, and transport of tailings basin pollutants sufficiently for the purpose of predicting future hydrogeological and water quality conditions at the tailings basin and along the flowpaths identified for 1.7.a during basin operation, and post closure, and which will allow the Permittee to evaluate the effectiveness of potential passive and/or active treatment technologies, mitigation alternatives or combinations of actions, with regard to final compliance limits. The conceptual model shall provide a system mass balance that accounts for the transport or transformation of parameters of concern to within plus or minus ten percent of the mass calculated to be emanating from the tailings basin, as well as estimates for pollutant travel times along identified flow paths.

1.9 The Investigation Work Plan shall also include a schedule demonstrating that all actions described in the Plan will be completed within 13 months of permit issuance.

1.10 Upon submittal of the Investigation Work Plan and schedule, the Permittee shall, within 14 days, initiate the plan of action identified in the Plan in accordance with the schedule contained therein and provide written notice to the MPCA that it has commenced work. The Investigation Work Plan and schedule are enforceable under this permit upon submittal.

1.11 A report documenting the findings of the fully implemented Investigation Work Plan shall be submitted within 13 months of permit issuance. The report shall include all of the information and analyses described in Parts 1.7 and 1.8. Failure to complete the Investigation Work Plan within 13 months of permit issuance will not extend the deadline for the Basin Treatment Methods Study Plan.

SDS Schedule for Deep Seepage - Basin Treatment Methods Study Plan

1.12 Within 13 months of permit issuance, the Permittee shall submit a Basin Treatment Methods Study Plan that identifies feasible technologies (including nano-filtration, reverse osmosis, ion exchange, and dry emissions controls), for non-mechanical or mechanical treatment\mitigation to reduce the concentration of sulfate (as the pollutant of greatest concern and as a surrogate for other dissolved solids) within the tailings basin to 800 mg/L within 5 years of permit issuance, and 357 mg/L within 10 years from permit issuance, or in the shortest reasonable period of time. An alternative to the 357 mg/L interim limit may be established if additional site investigation and modeling demonstrates that the alternative concentration will achieve compliance with all applicable groundwater and surface water quality standards, and MPCA has reviewed and approved this alternative concentration. This Plan shall identify how the Permittee will evaluate the treatment methods to determine which will reduce surface water and groundwater quality impacts from the tailings basin in the shortest reasonable period of time, considering the reliability of the treatment methods, the cost to install and to operate the treatment methods, compatibility with MDNR closure requirements, and the secondary environmental impacts of the treatment methods, if any.

1.13 The Basin Treatment Methods Study Plan must include:

a. a description of each possible treatment method that the Permittee has identified, an analysis of the technical feasibility of each method, and the estimated cost to install or implement each method;
b. an estimate of the length of time that each technology/treatment method would require to attain and maintain compliance with a basin sulfate concentration of 357 mg/L, or an alternative concentration approved by MPCA;
c. an estimate of operation and maintenance costs associated with each treatment method and the reliability of that method;
d. analysis of how each identified potential passive and/or active treatment method may impact site closure in accordance with MDNR requirements, which include a dry basin;
e. identification of secondary environmental impacts and costs for each method;
f. whether mitigation adjacent to the basin will be necessary, in addition to basin water treatment, to meet final compliance limits in the shortest reasonable period of time; and
g. a detailed schedule that includes adequate justification for the time period proposed to complete the technical feasibility analysis. All tasks described under the Treatment Methods Study Plan must be completed within 25 months of permit issuance as required below. The plan provides the basis for the Permittee to submit the Deep Seepage Final Compliance Plan described in Parts 1.16 and 1.17 below.

1.14 Upon submittal of the Basin Treatment Methods Study Plan and schedule, the Permittee shall initiate the plan of action identified in the Plan in accordance with the schedule contained therein, and provide written notice to the MPCA that it has done so within 14 days. The Basin Treatment Methods Study Plan and schedule are enforceable under this permit upon submittal.

SDS Schedule for Deep Seepage - Final Compliance Plan

1.15 Within 25 months of permit issuance, the Permittee shall submit a Final Compliance Plan. Failure to complete the Treatment Study Methods Plan within 25 months of permit issuance will not extend the deadline for the Deep Seepage Final Compliance Plan.

1.16 The Final Compliance Plan shall include the following:
a. the findings of the Treatment Methods Study, including an estimate of how quickly the identified potential passive and/or active treatment technologies, mitigation alternatives or combinations of actions will reduce the basin sulfate concentration to 800 mg/L and 357 mg/L, or an alternate concentration that has been approved by MPCA;
b. an explanation of why the technology/treatment method(s) selected represent the best means of meeting final compliance limits. To be considered the best, the technology/treatment method(s) must achieve the fastest reduction of sulfate concentrations in the basin to the specified limit, must be reliable and feasible, and must not conflict with the approved basin closure plan or create undue secondary environmental impacts;
c. an estimate of operation and maintenance costs associated with treatment/mitigation to maintain compliance with final compliance limits;
d. an estimate of the length of time that active treatment or maintenance of passive systems would be required to maintain compliance with final compliance limits (pre and post closure);
e. a calculated estimate of the tailings basin process water sulfate concentration necessary to meet final compliance limits at each compliance monitoring location; and
f. analysis of how the identified potential passive and/or active treatment technologies, mitigation alternatives or combinations of actions may impact site closure in accordance with MDNR requirements, which include a dry basin.

1.17 The Final Compliance Plan shall also include the following:

a. a detailed proposal identifying the specific treatment systems and/or mitigation that will be implemented to achieve compliance with permit limits, including basin sulfate concentration interim and final limits, in the shortest reasonable period of time;
b. the design, site plan, process schematic(s), preliminary design and specifications for major components of the specific treatment systems, and/or mitigation to be implemented;
c. a schedule that will incorporate any pilot testing, (which must be completed by month 37), if necessary, to finalize the design process; and
d. a schedule for attaining any necessary permits in the shortest reasonable period of time.

1.18 Upon submittal of the Final Compliance Plan and schedule, the Permittee shall initiate the plan of action identified in the Plan in accordance with the schedule contained therein, and provide written notice to the MPCA that it has done so within 14 days. The Final Compliance Plan and schedule are enforceable under this permit upon submittal.

SDS Schedule for Deep Seepage - Final Plans and Specifications

1.19 Within 37 months of permit issuance, the Permittee shall submit to MPCA:

a. a final design package, which includes plans and specifications for treatment or mitigation system components, including specifications based on any pilot testing conducted that are sufficient to submit complete and accurate applications for any permits that may be required;
b. a monitoring plan that will allow quantifiable biannual assessment of the performance of the treatment system and/or mitigation relative to its ability to achieve compliance with interim and final limits by the specified date;
c. a predicted timeline, based on information collected under the Investigation Work Plan, for when the reduction of pollutant load to the watershed will be first observed at the monitoring stations;
d. a detailed schedule of milestones, occurring at intervals of annually or less, which include, at a minimum, start of construction, completion of construction, start-up, and initiation of operation, with adequate justification for the timeline described in the schedule meeting the shortest reasonable period of time requirement. Upon submittal, the milestone deadlines will become fully enforceable commitments of this compliance schedule, and failure to achieve these commitments will constitute a permit violation enforceable by MPCA; and
e. predictions of the dates final compliance limits will be met at each surface water monitoring station as a result of proposed mitigation efforts.

1.20 Failure to complete the Deep Seepage Final Compliance Plan within 37 months of permit issuance will not extend the deadline for the Deep Seepage System implementation or construction.

SDS Schedule for Deep Seepage - System Implementation or Construction

1.21 The Permittee shall initiate construction or begin implementation of the chosen treatment system and/or mitigation within the shortest reasonable period of time, but no later than 49 months after permit issuance,

NPDES Schedule - Dark River Seepage Collection and Return System (SCRS)

1.22 The Permittee shall submit, for MPCA review and approval, final SCRS Plans and Specifications within 10 days of permit issuance or within 10 days of receipt of US Corps of Engineers /Wetland Conservation Act permit authorization to construct the project, whichever occurs later. If MPCA approves Plans and Specifications during the period April 15 through September 30, then initiation of construction of the SCRS within 30 days is required, otherwise initiation of construction may be delayed until the next construction season. A construction season is defined as April 15 through December 15.

1.23 The Permittee shall notify the MPCA of SCRS construction commencement within 10 days of construction initiation.

1.24 The Permittee shall complete construction of the SCRS within eight consecutive construction-season months during one or more construction season(s).

1.25 The Permittee must initiate operation of the SCRS within 30 days of completion of the SCRS and notify the MPCA of SCRS initiation within 10 days of initiation.

1.26 The SCRS shall be constructed and operational as soon as possible and in no case later than December 31, 2017.

1.27 To assess possible changes in pollution attenuation in the Dark River, the Permittee must collect and analyze samples monthly from CR668 and CR65 for 12 consecutive months after the Dark River SCRS is operational. Samples shall be analyzed for the parameters specified in the limits and monitoring requirements section of this permit for station SW003. If results indicate that the mathematical relationship has changed by more than 5%, or if there is no longer a consistent correlation, the Permittee must submit an application for a permit modification within 90 days after the 12 month sampling period.

2. Compliance Schedule Special Requirements
Special Requirements (Applicable to NPDES and SDS Schedules of Compliance)

2.1 To ensure timely submittal of complete and accurate plans fulfilling all specified requirements, the Permittee shall meet with MPCA three months prior to each plan submittal deadline. At the meeting, the Permittee must present a progress report and draft plan that includes all the components of the plan as described in this permit and attains compliance with permit limits in the shortest reasonable period of time.

2.2 Compliance with permit limits at surface water, groundwater, and effluent discharge monitoring stations shall be deemed to have occurred when all monitoring results at that station are less than or equal to the stated limit for one year of monitoring, and remain at less than or equal to the limit thereafter.

2.3 Compliance with permit limits for the basin sulfate concentration shall be deemed to have occurred when all monitoring results for that station, or other representative basin sampling location, are less than or equal to the stated limit for 6 months of monitoring, and remain at less than or equal to the limit thereafter.

2.4 If any of the submitted Plan(s) described herein propose actions requiring permits and/or approvals, the Permittee shall submit complete and accurate applications in the shortest reasonable period of time and comply completely and accurately with any requests for additional information in the timeframes specified in the requests. Delays in permit issuance due to incomplete or inaccurate applications will not excuse failure to meet permit deadlines.

2.5 As new information becomes available during the course of the Compliance Schedule that results in material changes to a plan that has been submitted under the Compliance Schedule, the Permittee shall submit revisions to the affected plan consistent with the requirements for plan contents under the terms of this permit. Upon submittal, such revisions shall be incorporated as enforceable provisions into the respective plans, and are enforceable under this permit.

2.6 If rulemaking designates any water body downstream from the tailings basin as a water to which the wild rice beneficial use applies, the Permittee shall submit an application for permit modification to conduct a reasonable potential analysis and incorporate any necessary effluent limit(s) to protect wild rice within 90 days of the rule being filed with the Secretary of State.

3. Reporting
Reporting (Applicable to NPDES and SDS Schedules of Compliance)

3.1 Written notification shall be submitted to the MPCA within 14 days of the final compliance plan or of each portion of a multi-component compliance plan becoming operational.

3.2 After the chosen compliance plan or mitigation method(s) is operational, the Permittee shall submit to the MPCA Biannual Compliance Schedule Progress Reports. The Compliance Schedule Progress Reports shall include, but are not limited to:

1. a description of the improvements in water quality observed at the monitoring stations. If the observed reductions in pollutant load and concentration in the receiving waters and in the basin are less than anticipated the Permittee will include an explanation as to why the observations are not in line with expectations.
2. a description of the activities that have occurred in the previous 6 months to advance completion of the actions required in the approved Plans;
3. a summary of ongoing monitoring data and the progression toward attaining compliance with interim basin sulfate limits and final compliance limits; and
4. anticipated activities to be completed in the next 6 months relating to completion of the actions required in the approved Plans and relative to any adaptive management necessary to improve pollutant load reduction to meet interim basin sulfate limits and final compliance limits.

Total Facility Requirements

All NPDES/SDS permits issued in the state of Minnesota contain certain conditions that remain the same regardless of the size, location or type of discharge. The standard conditions satisfy the requirements outlined in 40 CFR § 122.41, Minn. R. 7001.0150, and Minn. R. 7001.1090. These conditions are listed in the Total Facility Requirements chapter of an NPDES/SDS permit. These requirements cover a wide range of areas, including recordkeeping, sampling, equipment calibrations, equipment maintenance, reporting, facility upsets, bypass, solids handling, and changes in operation, facility inspections and permit reissuance.

Nondegradation and Anti-Backsliding

All instances of the word discharge in this section refer to the CWA definition of a point source discharge.
In accordance with Minnesota Pollution Control Agency rules regarding nondegradation for all waters (that are not Outstanding Resource Value Waters), nondegradation review is required for any new or expanded significant discharge (Minn. R. 7050.0185). A significant discharge is: (1) a new discharge (not in existence before January 1, 1988) that is greater than 200,000 gallons per day (gpd) or (2) an expanded discharge that expands by greater than 200,000 gpd that discharges to any non-ORVW water other than a Class 7 water or (3) a new or expanded discharge containing any toxic pollutant at a mass loading rate likely to increase the concentration of the toxicant in the receiving water by greater than one percent over the baseline quality.

The discharge from the Minntac Tailings basin existed before January 1, 1988, and therefore is not a new discharge. In determining whether it is an expanded discharge, the earliest available Discharge Monitoring Reports for the facility are from 1991, so those records were used. The average discharge rates from SD001 and SD002 during the 1991 calendar year were 84,000 gpd and 365,000 gpd, respectively. Discharge from those same points over the past 3 years were 130,000 gpd and 0 gpd. There are also other seepage points along the basin perimeter, but these have not been monitored comprehensively enough to assess changes in gross discharge from the basin. There is no evidence of an increase above the threshold of 200,000 gpd. With the installation of the Sand River SCRS, the MPCA finds that the current total discharge is less than it was in 1988. Given this, and the fact that the Permittee will install a comparable SCRS for discharges to the Dark River Watershed under this permit, there is not a new or expanded discharge at the facility, therefore, a nondegradation review is not necessary.

This Permit also complies with Minn. R. 7053.0275 regarding anti-backsliding. Any point source discharger of sewage, industrial, or other wastes for which a national pollutant discharge elimination system permit has been issued by the agency that contains effluent limits more stringent than those that would be established by parts 7053.0215 to 7053.0265 shall continue to meet the effluent limits established by the permit, unless the permittee establishes that less stringent effluent limits are allowable pursuant to federal law, under section 402(o) of the Clean Water Act, United States Code, title 33, section 1342.

Table 7 – DMR summary report – 2015

Station	Parameter	Type	Limit	Units	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15
GW 003	Amines, Organic Total	SingleVal		mg/L				0.25			0.25			0.25		
	GW Elevation	SingleVal		ft				1,460.80			1,460.80			1,460.80		
	pH, Field	SingleVal		SU				6.9			6.9			6.8		
	Specific Conductance, Field	SingleVal		umhos/cm				2,075			2,098			2,109		
	Sulfate, Total (as SO4)	SingleVal		mg/L				736			763			754		
	Temperature, Water (C)	SingleVal		degrees C				7.1			9.7			11.6		
GW 004	Amines, Organic Total	SingleVal		mg/L				0.25			0.25			0.25		
	GW Elevation	SingleVal		ft				1,469.90			1,469.40			1,469.50		
	pH, Field	SingleVal		SU				6.4			6.2			6.3		
	Specific Conductance, Field	SingleVal		umhos/cm				1,458			1,436			1,464		
	Sulfate, Total (as SO4)	SingleVal		mg/L				476			516			504		
	Temperature, Water (C)	SingleVal		degrees C				4.1			11.5			10.4		
GW 006	Amines, Organic Total	SingleVal		mg/L				0.25			0.25			0.25		
	GW Elevation	SingleVal		ft				1,461.20			1,461.20			1,461.20		
	pH, Field	SingleVal		SU				6.7			6.6			6.6		
	Specific Conductance, Field	SingleVal		umhos/cm				2,110			2,153			2,167		
	Sulfate, Total (as SO4)	SingleVal		mg/L				862			885			858		
	Temperature, Water (C)	SingleVal		degrees C				7.2			15.8			11.9		
GW 007	Amines, Organic Total	SingleVal		mg/L				0.25			0.25			0.25		
	GW Elevation	SingleVal		ft				1,451.40			1,451.30			1,451.40		
	pH, Field	SingleVal		SU				7			7.2			6.9		
	Specific Conductance, Field	SingleVal		umhos/cm				1,993			1,993			2,183		
	Sulfate, Total (as SO4)	SingleVal		mg/L				595			818			767		
	Temperature, Water (C)	SingleVal		degrees C				6.9			11.7			8.5		
GW 008	Amines, Organic Total	SingleVal		mg/L				0.25			0.25			0.25		
	GW Elevation	SingleVal		ft				1,481			1,480.70			1,480.80		
	pH, Field	SingleVal		SU				6.7			7.3			6.7		
	Specific Conductance, Field	SingleVal		umhos/cm				1,582			1,411			1,813		
	Sulfate, Total (as SO4)	SingleVal		mg/L				210			440			471		
	Temperature, Water (C)	SingleVal		degrees C				5.5			20.3			11.8		
GW 009	Amines, Organic Total	SingleVal		mg/L				0.25			0.25			0.25		
	GW Elevation	SingleVal		ft				1,431.50			1,432.10			1,432		
	pH, Field	SingleVal		SU				5.9			6.1			6		
	Specific Conductance, Field	SingleVal		umhos/cm				92			78			68		
	Sulfate, Total (as SO4)	SingleVal		mg/L				2			2			2		
	Temperature, Water (C)	SingleVal		degrees C				4.4			11.3			12		
GW 010	Amines, Organic Total	SingleVal		mg/L				0.25			0.25			0.25		
	GW Elevation	SingleVal		ft				1,529.60			1,530.70			1,529.90		
	pH, Field	SingleVal		SU				6.4			6.3			6.3		
	Specific Conductance, Field	SingleVal		umhos/cm				173			148			142		
	Sulfate, Total (as SO4)	SingleVal		mg/L				20			18.8			21.9		
	Temperature, Water (C)	SingleVal		degrees C				5.5			11.4			11.3		
GW 012	GW Elevation	SingleVal		ft				1454.5			1454.1			1454.1		
	pH, Field	SingleVal		SU				6.7			6.3			6.7		
	Specific Conductance, Field	SingleVal		umhos/cm				1400			1360			1334		
	Sulfate, Total (as SO4)	SingleVal		mg/L				239			417			433		
	Temperature, Water (C)	SingleVal		degrees C				5			8.2			8.7		
	Total Dissolved Solids	SingleVal		mg/L				576			905			1040		
	Chloride	SingleVal		mg/L				53.7			95.4			98.4		
GW 013	GW Elevation	SingleVal		ft				1462.2			1464.9			1464.8		
	pH, Field	SingleVal		SU				6.4			6.3			6.3		
	Specific Conductance, Field	SingleVal		umhos/cm				940			970			886		
	Sulfate, Total (as SO4)	SingleVal		mg/L				265			285			311		
	Temperature, Water (C)	SingleVal		degrees C				5.1			7.4			10.1		
	Total Dissolved Solids	SingleVal		mg/L				514			581			580		
	Chloride	SingleVal		mg/L				30.3			34			36.6		
GW 014	GW Elevation	SingleVal		ft					1472.9		1472.6			1472.6		
	pH, Field	SingleVal		SU					7.3		7.1			7.2		
	Specific Conductance, Field	SingleVal		umhos/cm					608		591			612		
	Sulfate, Total (as SO4)	SingleVal		mg/L					7.1		12.4			16.2		
	Temperature, Water (C)	SingleVal		degrees C					3.7		14.3			9.2		
	Total Dissolved Solids	SingleVal		mg/L					393		366			372		
	Chloride	SingleVal		mg/L					2.6		2.6			2.9		

Table 7 – DMR summary report – 2015 (Continued)

Station	Parameter	Type	Limit	Units	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15
SD 001	Flow	CalMoAvg		mgd	0.15	0.18	0.17	0.18	0.19	0.19	0.16	0.18	0.17	0.19	0.19	0.19
	Flow	CalMoTot		Mgal	4.56	4.94	5.25	5.3	6	5.66	4.85	5.6	5.1	5.93	5.9	5.83
	Flow	DailyMax		mgd	0.16	0.21	0.21	0.19	0.21	0.21	0.16	0.21	0.17	0.21	0.21	0.21
	Oil & Grease, Total Recov.	CalMoAvg	10	mg/L	1	1.4	1.4	0.62	0.55	0.38	1.1	0.64	5	5	5	5
	Oil & Grease, Total Recov.	DailyMax	15	mg/L	2	1.4	1.4	1	0.6	0.38	1.3	0.9	5	5	5	5
	pH	InstantMax	9	SU	7.3	7.3	7.4	7.3	7.3	7.2	7.1	7.2	7.6	7.5	7.1	7.3
	pH	InstantMin	6	SU	7.3	7.2	7.2	7.3	7.2	7.2	7	7	7.1	7.1	7	7
	Solids, Total Suspended (TSS)	CalMoAvg	30	mg/L	2.4	1.7	2	1.6	2.6	3.6	2.6	2.8	2.3	1.9	1.9	1.7
	Solids, Total Suspended (TSS)	DailyMax	60	mg/L	2.4	2.4	2	2	3.6	3.6	3.2	4	2.8	2.8	2.8	2.4
	Specific Conductance	CalMoMax		umhos/cm	2,739	2,784	2,725	2,748	2,609	2,465	2,522	2,436	2,455	2,546	2,502	2,484
	Sulfate, Total (as SO4)	CalMoMax		mg/L	1,020	1,050	1,090	1,100	1,070	985	1,010	901	880	939	980	951
SD 002	Flow	CalMoAvg		mgd						0.19						
	Flow	CalMoTot		Mgal						0.19						
	Flow	DailyMax		mgd						0.19						
	Oil & Grease, Total Recov.	CalMoAvg	10	mg/L						0.38						
	Oil & Grease, Total Recov.	DailyMax	15	mg/L						0.38						
	pH	InstantMax	9	SU						7.4						
	pH	InstantMin	6	SU						7.4						
	Solids, Total Suspended (TSS)	CalMoAvg	30	mg/L						11.3						
	Solids, Total Suspended (TSS)	DailyMax	60	mg/L						11.3						
	Specific Conductance	CalMoMax		umhos/cm						2,265						
	Sulfate, Total (as SO4)	CalMoMax		mg/L						950						
SW 001	Flow	SingleVal		mgd	1.3	1.23	1.8	4.8	26.4	16	13.1	2.85	9.66	8.96	12.9	13.4
	Sulfate, Total (as SO4)	SingleVal		mg/L	286	393	563	38	183	118	58.9	125	51.6	121	124	131
SW 002	Amines, Organic Total	SingleVal		mg/L												0.25
	Toxicity, Whole Effluent (Acute)	SingleVal		TUa												1
	Flow	CalMoAvg		mgd	0.17	0.18	0.22	0.19				0.18	0.24	0.23	0.3	0.33
	Hardness, Ca & Mg, (as CaCO3)	CalMoAvg		mg/L	1,205	1,203	1,255	1,262				1,006	1,054	1,038	1,080	1,078
	Sulfate, Dissolved (as SO4)	CalMoAvg		ug/L	871	854	903	888				746	767	758	794	775
WS 003	Chloride, Total	CalMoAvg		mg/L	730	435	676	589				664	603	455	333	390
	Flow	CalMoAvg		mgd	0.14	0.14	0.17	0.14				0.14	0.14	0.14	0.27	0.27
	Fluoride, Total (as F)	CalMoAvg		mg/L	4.5	3.2	3.6	4.1				5.6	9.6	6.1	12.5	12
	Hardness, Ca & Mg, (as CaCO3)	CalMoAvg		mg/L	2,885	2,295	2,548	2,654				2,647	2,482	2,078	1,680	2,074
	pH	CalMoMin		SU	9.5	9.7	9.5	9.1				8.2	9.2	9.4	9.2	7.7
	Sulfate, Dissolved (as SO4)	CalMoAvg		mg/L	2,155	1,680	1,883	1,966				1,943	1,816	1,401	1,353	1,354
WS 004	pH	CalMoMax		SU	8.2	8.1	8.1	8.7				8.3	8.2	8.3	8.1	8.1
WS 005	pH	CalMoMax		SU	8.9	8.9	8.6	8.8				8.7	8.8	9	9.1	8.7
WS 006	Amines, Organic Total	SingleVal		mg/L												0.25
	Evaporation, Accumulated	CalMoTot		in												20.83
	Precipitation	CalMoTot		in												28.79
	Toxicity, Whole Effluent (Acute)	SingleVal		TUa												1
WS 007	Amines, Organic Total	SingleVal		mg/L												0.25
	Evaporation, Accumulated	CalMoTot		in												20.83
	Precipitation	CalMoTot		in												28.79
	Toxicity, Whole Effluent (Acute)	SingleVal		TUa												1