FACT SHEET

NPDES Permit Number: WA0026841
Date: April 20, 2017
Public Notice Expiration Date: June 5, 2017
Technical Contact: Cindi Godsey (206) 553-1676
godsey.cindi@epa.gov

The U.S. Environmental Protection Agency (EPA) Plans To Re-issue A Wastewater Discharge Permit To:

Dawn Mining Company
Midnite Mine
near
Wellpinit, Washington

and the

Spokane Tribe of Indians proposes to Certify the Permit

EPA Proposes NPDES Permit Issuance.

EPA proposes to issue a National Pollutant Discharge Elimination System (NPDES) permit to Dawn Mining Co., for the Midnite Mine facility. The draft permit sets conditions on the discharge of pollutants from the mine to the Spokane Arm of Lake Roosevelt. In order to ensure protection of water quality and human health, the permit places limits on the type and amount of pollutants that can be discharged.

This Fact Sheet includes:

- information on public comment, public hearing, and appeal procedures
- a description of the current discharge
- a description of the discharge locations and a map, and
- technical material supporting the conditions in the permit

Clean Water Act (CWA) § 401 Certification.

EPA requests that the Spokane Tribe of Indians (STI) certify the NPDES permit for Midnite Mine under CWA section 401 (CWA § 401). EPA may not issue the NPDES permit until STI has granted, denied, or waived certification. STI has provided a draft certification for review

with the draft permit (See Appendix B). For more information concerning this review, please contact Chairman, Spokane Tribe Water Control Board, PO Box 480, Wellpinit, WA, Attn: Brian Crossley, or by email to crossley@spokanetribe.com.

Public Comment

EPA will consider all comments before issuing the final permit. Those wishing to comment on the draft permit may do so in writing by the expiration date of the Public Notice. All comments should include name, address, phone number, a concise statement of the basis for a comment and relevant facts upon which it is based. All written comments should be addressed to the Office of Water & Watersheds Director at U.S. EPA, Region 10, 1200 Sixth Avenue Suite 900, OWW-191, Seattle, WA 98101; submitted by facsimile to (206) 553-1280; or comments on the draft permit may be submitted via e-mail to godsey.cindi@epa.gov

A Public Hearing will be held on May 23, 2017, at the Spokane Tribe Senior Center, 6403 B Sherwood Loop Addition, Wellpinit WA 99040. A workshop explaining the permit conditions will begin at 1:30 pm and will be followed by a Q&A session. The formal hearing to take comments will begin at 2:30 pm and go until all comments are heard or 4:00 pm, whichever is earlier.

After the Public Notice expires and all substantive comments have been considered, EPA's regional Director for the Office of Water & Watersheds will make a final decision regarding permit re-issuance. If no comments requesting a change to the draft permit are received, the tentative conditions in the draft permit will become final, and the permit will become effective upon issuance. If substantive comments are received, EPA will address the comments and issue the permit along with a response to comments. The permit will become effective no less than 33 days after the issuance date, unless the permit is appealed to the Environmental Appeals Board (EAB) within 30 days.

Persons wishing to comment on the CWA § 401 Certification should submit written comments by the public notice expiration date to the STI Department of Natural Resources (DNR), PO Box 480, Wellpinit, WA 99040.

Documents are Available for Review.

The Administrative Record for this Permit primarily consists of the permit application, draft Permit, Fact Sheet and the documents referenced in this Fact Sheet. These are available upon request by contacting Cindi Godsey at (206) 553-1676 or godsey.cindi@epa.gov or at the above Seattle address. The draft NPDES permit and related documents can be reviewed or obtained by visiting or contacting EPA's Regional Office in Seattle between 8:30 a.m. and 4:00 p.m., Monday through Friday.

EPA
Region 10
1200 Sixth Avenue, Suite 900 OWW-191
Seattle, Washington 98101
(206) 553-0523 or
1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The draft permit and Fact Sheet can also be found by visiting the Region 10 website at https://yosemite.epa.gov/r10/water.nsf/NPDES+Permits/DraftPermitsORWA

The Fact Sheet and draft permit are also available at:

STI DNR
6290B Ford-Wellpinit Road
Wellpinit, WA 99040

For technical questions regarding the draft permit or Fact Sheet, contact Cindi Godsey at (206) 553-1676 or godsey.cindi@epa.gov. Services can be made available to persons with disabilities by contacting Audrey Washington at washington.audrey@epa.gov or (206) 553-0523.

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ACRONYMS

30Q5	30 day low flow over a 5 year period
7Q10	7 day low flow over a 10 year period
AML	Average Monthly Limitations
BA	Biological Assessment
BAF	Bioaccumulation Factor
BAT	Best Available Technology, Economically Feasible
BMP	Best Management Practice
BPA	Backfilled Pits Area
BPJ	Best Professional Judgement
BPT	Best Practicable Technology
CF	Conversion Factor
CFS	Cubic feet per second
COD	Chemical Oxygen Demand
CV	Coefficient of Variation
CWA	Clean Water Act
DF	Dilution Factor
DMC	Dawn Mining Company
DMR	Discharge Monitoring Report
EAB	Environmental Appeals Board
EFH	Essential Fish Habitat
EPA	Environmental Protection Agency
ESA	Endangered Species Act
L/kg	Liters per kilogram
LTA	Long Term Average
MDL	Maximum Daily Limitation
MEC	Maximum Expected Concentration
mg/kg	Milligram per kilogram
mg/L	Milligram per liter
ML	Minimum Level
ng/L	Nanogram per liter
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
pCi/L	Picocurries per liter
PCP	Pollution Control Pond
QAPP	Quality Assurance Project Plan
ROD	Record of Decision
RP	Reasonable Potential
RPM	Reasonable Potential Multiplier
RWC	Receiving Water Concentration
s.u.	Standard Units
STI	Spokane Tribe of Indians
TBEL	Technology-based Effluent Limitation
TDS	Total Dissolved Solids
TR	Total Recoverable
TRC	Fish Tissue Criterion
TSD	Technical Support Document
TSS	Total Suspended Solids
ug/L	Micrograms per liter
USFWS	United States Fish & Wildlife Service
WET	Whole Effluent Toxicity
WLA	Wasteload Allocation
WQBEL	Water quality- based Effluent Limitation
WQS	Water Quality Standards
WTP	Water Treatment Plant

TECHNICAL INFORMATION

I. APPLICANT

Dawn Mining Company, LLC
PO Box 250
Ford, WA 99013

Facility Contact: William S. Lyle (509) 258-4511
Facility Location: near Wellpinit, WA

II. FACILITY ACTIVITY

The Midnite Mine Superfund Site (Site) is located on the Spokane Indian Reservation in eastern Washington State (Appendix A). The Site includes a former open pit uranium mine, associated waste rock piles, seep collection and pumpback facilities and water treatment plant (WTP). The mine ceased operation in September 1981 and from that time, water has collected in the two open pits on the site. The mine pit lake waters and existing seeps from the waste rock piles are collected and conveyed back to the WTP. The WTP currently discharges treated mine influenced water and excess precipitation to Blue Creek under an administratively extended NPDES permit. A new WTP will be constructed and, similar to the existing plant, will consist of barium chloride addition, lime precipitation, clarification and filtration. The discharge will occur through a new outfall line to the Spokane Arm of Lake Roosevelt. An ion exchange component is also being considered which would selectively remove uranium to facilitate sludge disposal. The resultant slurry is settled and filtered to reduce solids in the discharge.

The effective date of the new permit will be set close to the anticipated completion date of the new treatment plant and outfall line. Once the permittee is discharging from the new WTP, EPA will terminate the existing permit (WA0025721).

III. BACKGROUND

A. FACILITY BACKGROUND

Uranium ore deposits were discovered at the mine site in 1954. Open pit mining began in 1955 after Dawn Mining Company (DMC) was organized. This company is jointly owned by Newton Mining Company (51%) and Midnite Mines Inc. (49%). Since 1955, the Midnite Mine produced approximately 3 million tons of ore at 0.20 percent U_3O_8, 2.4 million tons of protore, and 32.9 million tons of waste rock.

Six pits were developed over the period of operations. Pits 1 and 2 were backfilled with waste rock and the remaining pits were incorporated into the active pits. Presently there are two large open pit areas, Pit 3 and Pit 4. Water removed during excavation of active pits was discharged into the abandoned pits which placed substantial amounts of water in contact with waste rock and incidental ores.

In 1987, DMC and EPA entered into a Compliance Order under the CWA that required the elimination of discharges of pollutants to waters of the United States. DMC constructed a seep collection and pump back system to collect water from the Western and Central drainages and pump it to the pollution control pond and Pit 3. In 1988, DMC constructed a WTP to treat growing quantities of water in the pits. The WTP also used barium chloride and hydrated lime to precipitate radium, heavy metals and uranium with a final clarification step to reduce suspended solids.

In May 2000, the Midnite Mine was included on the National Priorities List (NPL). The Midnite Mine Superfund Site Record of Decision (ROD) was signed by EPA on September 29, 2006, and required the facility to construct a new WTP and obtain an NPDES permit. The new WTP is described above.

B. PERMIT HISTORY

The most recent NPDES permit for Midnite Mine, WA0025721, was issued on September 28, 1995, became effective October 30, 1995, and expired on October 30, 2000. An NPDES application for permit issuance was submitted by the permittee on May 1, 2000. The EPA determined that the application was timely and complete. Therefore, pursuant to 40 CFR 122.6., the permit has been administratively extended and remains fully effective and enforceable for the current discharge to Blue Creek. The new draft permit, WA0026841, described in this Fact Sheet, covers the discharge from the new WTP to the Spokane Arm of Lake Roosevelt.

IV. RECEIVING WATERS

A. Outfall Location.

The facility proposes to discharge to the Spokane Arm of Lake Roosevelt through Outfall 001. Outfall 001, the discharge point for treated mine influenced water and excess precipitation, will be located at latitude 47º 53' 13" N, and longitude 118º 08' 56" W.

B. Water Quality Standards.

The current STI WQS are found in Resolution 2010-173 adopted on February 25, 2010. EPA acted on the standards in December 2012, approving in part and disapproving in part. In 2014, STI amended the WQS but these amendments did not require EPA action to approve or disapprove. The WQS used in this permitting action are those currently approved by EPA.

The STI Water Quality Standards (WQS) include use classifications, numeric and/or narrative water quality criteria, and an antidegradation policy. The use classification system designates the beneficial uses that each water body is expected to achieve (such as contact recreation, growth and propagation of fish, etc.). The criteria for each parameter are those deemed necessary by STI to support the beneficial use classification of each water body.

The Spokane Arm of Lake Roosevelt is specifically classified in the WQS as a Class A waterbody. The designated uses of Class A waterbodies include, but may not be limited to:

Primary contact ceremonial and spiritual;
Cultural;
Water supply (domestic, industrial, agricultural;
Stock watering;
Fish and shellfish, including:
Salmonid migration, rearing, spawning and harvesting.
Other fish migration, rearing, spawning and harvesting.
Mollusks, crustaceans and other shellfish rearing, spawning and harvesting.
Primary contact recreation, and
Commerce and navigation.

The water quality parameters that could be affected by the discharge from the facility include metals, solids, radionuclides and pH. These are common potential water quality parameters of concern in treated water from this type of facility.

C. Receiving Water Sampling

DMC conducted monthly monitoring of the receiving water in three locations at three different depths during a one year period from 2011 - 2012. The data contained some values that were below the detection level of the laboratory analysis. Where this occurred, the data was assigned a value of one-half the detection level. The analysis of the data from this sampling did not show that any one station was significantly different from the others nor were samples taken at depth different from samples closer to the surface. As such, all of the data was used to characterize the quality of the receiving water.

D. Restrictions on Permitting New Dischargers

The new WTP is a new discharger as defined in 40 CFR 122.2 because the WTP and outfall line are new and will be discharging into a different waterbody than the existing WTP discharges to now. 40 CFR 122.4(i) places restrictions on the issuance of NPDES permits to new sources or new dischargers. Specifically, it states that:

> …no NPDES permit may be issued to a new source or a new discharger if the discharge from its construction or operation will cause or contribute to the violation of water quality standards.

The EPA has determined that the proposed discharge has the reasonable potential to cause or contribute to violations of water quality standards for the parameters found in Table C-5. However, the draft permit proposes water quality-based effluent limits for all of these pollutants, which will ensure that the level of water quality to be achieved by these effluent limits is derived from and complies with applicable water quality standards. Therefore, this permit complies with 40 CFR 122.4(i).

V. DESCRIPTION OF DISCHARGE

The sources of water to be treated are changing at the Midnite Mine but the inflow to the new WTP will continue to be collected mine influenced water and excess precipitation. The new WTP will be constructed after the following phased work is completed. The conditions of the final permit will apply to the discharges from the new WTP.

First, construction and mine wastes will be consolidated in Pit 4 and impacted water from the Site will be collected and stored in the Pollution Control Pond (PCP) and Pit 3. The major change from the current configuration is that Pit 4 will no longer be used as a storage pond and will be backfilled with mine waste. The South Pond will be constructed to store water during the second phase.

The second phase will commence with the backfilling of Pit 3, at which time it will not be available for water storage. Impacted water will then be stored in the PCP and the South Pond. Upon completion, the only significant volume of mine waste requiring excavation and consolidation will be located in the Central Drainage portion of the South Waste Rock Pile in the vicinity of the South Pond and the PCP. As a result, necessary water-storage volumes will be significantly reduced because much of the Site surface water runoff can be shed from the remediated areas as clean water. The West Pond will be constructed after completion of cleanup of the upper and central portions the Western Drainage so that it is available to store water during the third phase.

At the beginning of the third phase, the South Pond will be removed so underlying and adjacent wastes can be excavated and backfilled into Pit 3. The PCP and associated mine wastes underlying and in the vicinity will also be removed and consolidated in Pit 3. At this time, all the mine-impacted water will be stored in the West Pond.

The only mine-impacted water requiring storage prior to treatment will be from the Alluvial Groundwater Controls and from the dewatering wells installed in the consolidated wastes in Pit 3, Pit 4, and the Backfilled Pits Area (BPA). It is anticipated that these flows will gradually decrease as steady-state base flow (groundwater inflow) levels are reached in the pit dewatering systems. The West Pond will remain operational until the volumes of mine impacted water have reduced to the point where the equalization ponds at the new WTP are sufficient for water storage prior to treatment. Once flows have decreased to where the West Pond is no longer necessary, it will be decommissioned.

The new WTP is currently in the design phase. The draft permit is necessary at this point in the project so DMC will know the required quality of the effluent and the design can be completed. Further studies on treatment of arsenic and aluminum occurred during the 2016 discharge season. The treatment steps for the study included pH adjustment and the analysis of dissolved samples to mimic the inclusion of a filtration step at the end of the process. The results, shown in Table 1, indicate that with pH adjustment and filtration the requirements of the permit can be met.

Table 1 - 2016 Sample Study Results (ug/L)

Sample Date*	Arsenic, dissolved	Aluminum, dissolved	pH (s.u.)
5/24/16	<0.20	48.0	6.39

Table 1 - 2016 Sample Study Results (ug/L)			
Sample Date*	Arsenic, dissolved	Aluminum, dissolved	pH (s.u.)
6/2/16	<0.20	49.4	6.34
6/15/16	0.25	45.4	7.19
6/29/16	<0.20	35.1	7.35
7/13/16	<0.20	31.0	7.14
7/27/16	0.21	28.5	7.44
8/17/16	0.21	30.5	7.59
8/31/16	0.24	37.4	7.5
10/4/16	0.29	46.9	7.56
10/19/16	0.43	23.5	7.55
11/3/16	0.29	29.8	7.5
11/17/16	<0.20	31.4	7.53
Proposed Compliance Level	0.64	50	
*Treatment and discharge were temporarily suspended in September so no samples were available for analysis.			

VI. PERMIT REQUIREMENTS

A. Applicable Laws and Regulations

The CWA requires that the effluent limits for a particular pollutant be the more stringent of either technology-based effluent limits or water quality-based limits. A technology-based effluent limit requires a minimum level of treatment for industrial point sources based on currently available treatment technologies. A water quality-based effluent limit is designed to ensure that the WQS of a waterbody are being met. For more information on deriving water quality-based effluent limits, see Appendix C.

B. Effluent Limitations

1. Outfall 001

An evaluation was done comparing the technology-based limitations in 40 CFR Part 440 Subpart C, plus other parameters of concern, with the WQ-based limitations discussed in Appendix C. For most parameters, the WQ-based limitations are more restrictive.

a. The following table summarizes the effluent limitations that are in the draft permit.

TABLE 2 – Proposed Effluent Limitations and Monitoring Requirements Outfall 001				
Parameter (in ug/L unless otherwise noted)	Daily Maximum	Monthly Average	Sample Frequency	Sample Type[1]
Volume, gallons	---	---	Recording	Meter
Aluminum[2]	93.5	50.0	1/month	Grab

TABLE 2 – Proposed Effluent Limitations and Monitoring Requirements Outfall 001				
Parameter (in ug/L unless otherwise noted)	Daily Maximum	Monthly Average	Sample Frequency	Sample Type[1]
Arsenic, ng/L[3]	1.5	0.095	1/month	Grab
Gross Alpha, pCi/L	---	---	1/quarter[3]	Grab
Iron[2]	---	---	1/quarter[4]	Grab
Lead 210, pCi/L	---	---	1/quarter[4]	Grab
Lead 212, pCi/L	---	---	1/quarter[4]	Grab
Lead[2]	---	---	1/quarter[4]	Grab
Manganese[2]	---	---	1/quarter[4]	Grab
Mercury, total	0.020	0.010	1/week	Grab
Polonium 210, pCi/L	---	---	1/quarter[4]	Grab
Radium 226, dissolved, pCi/L	10.0	3.0	1/month	Grab
Radium 226, total, pCi/L	30.0	10.0	1/month	Grab
Radium 228, pCi/L	---	---	1/quarter[4]	Grab
Sulfate, mg/L	---	---	1/quarter[4]	Grab
Thallium	24.2	7.2	1/month	Grab
Thorium 232, pCi/L	---	---	1/quarter[4]	Grab
Thorium 234, pCi/L	---	---	1/quarter[4]	Grab
Total Dissolved Solids (TDS), mg/L	---	---	1/quarter[4]	Grab
Uranium 234, pCi/L	76.0	41.6	1/month	Grab
Uranium 235, pCi/L	---	---	1/quarter[4]	Grab
Uranium 238, pCi/L	---	---	1/quarter[4]	Grab
Uranium, dissolved	---	---	1/quarter[4]	Grab
Uranium, total	73.2	54.8	1/month	Grab
Zinc[2]	498.6	341.8	1/month	Grab
Total Suspended Solids (TSS), mg/L	30.0	20.0	1/month	Grab
Chemical Oxygen Demand (COD), mg/L	200.0	100.0	1/quarter[4]	Grab
Temperature, ºC	---	---	1/month	Grab
Whole Effluent Toxicity, TUc	---	---	2/year[5]	Grab
Whole Effluent Toxicity, TUa	---	---	2/year[5]	Grab
pH, standard units (s.u.)	within the range 6.5 to 8.5		1/month	Grab
PCB Congeners[6] (pg/L)[3]	---		Once	Grab

TABLE 2 – Proposed Effluent Limitations and Monitoring Requirements Outfall 001				
Parameter (in ug/L unless otherwise noted)	Daily Maximum	Monthly Average	Sample Frequency	Sample Type[1]

1. Effluent samples collected shall be representative of the effluent discharged without dilution from or contact with any outside sources. Results of analyses conducted under Permit Part I.A.1. shall be submitted monthly on the Discharge Monitoring Report (DMR).
2. All metals shall be analyzed as total recoverable unless otherwise indicated.
3. ng/L means nanograms per liter (parts per trillion) and pg/L means picograms per liter (parts per quadrillion)
4. Quarterly samples shall be taken at least once during each calendar quarter (Jan - Mar, Apr - Jun, Jul - Sept, Oct - Dec) with results submitted with the DMR for the last month of the quarter.
5. See subsection 2, below.
6. An effluent grab sample shall be collected for PCB congener analysis using EPA Method 1668a and the results will be submitted with the reapplication due 180 days prior to the expiration date of the permit.

2. Whole Effluent Toxicity (WET) Requirements

Acute and Chronic WET testing are included in the draft permit with sampling required twice per year in conjunction with the Surface Water Monitoring, see below. Reporting will be required for first or second quarter samples with the July DMR (due August 20th) and for third or fourth quarter samples with the January DMR (due February 20th). The testing will occur at Outfall 001 so that the full effects of the discharge into the Spokane Arm of Lake Roosevelt will be determined.

Trigger levels for accelerated testing and increased investigations are included based on the dilution factors utilized for the effluent limitations. See Appendix C for further information.

The data collected will inform the decision in the next permit cycle as to whether an effluent limitation for WET is necessary.

3. Receiving Water (Ambient) Monitoring

The following ambient monitoring shall be conducted:

Table 3 – Surface Water Monitoring			
Parameter[1]	Units	Timing[2]	
		Upstream[3]	Downstream[4]
Aluminum	ug/L	2/year	2/year
Arsenic	ug/L	2/year	2/year
Iron	ug/L	2/year	2/year
Lead 210	pCi/L	2/year	2/year
Lead	ug/L	2/year	2/year
Manganese	ug/L	2/year	2/year
Mercury, total	ug/L	2/year	2/year
Polonium 210	pCi/L	2/year	2/year

Table 3 – Surface Water Monitoring			
Parameter[1]	Units	Timing[2]	
		Upstream[3]	Downstream[4]
Radium 226	pCi/L	2/year	2/year
Sulfate	mg/L	2/year	2/year
Thallium	ug/L	2/year	2/year
TDS	mg/L	2/year	2/year
Uranium 234	pCi/L	2/year	2/year
Uranium 238	pCi/L	2/year	2/year
Uranium, total	ug/L	2/year	2/year
Zinc	ug/L	2/year	2/year
WET	TU_C	2/year	2/year
Temperature	ºC	2/year	2/year
pH	s.u.	2/year	2/year
Hardness	mg/L of $CaCO_3$	2/year	2/year

1 – all metals shall be reported in total recoverable with dissolved analysis also required for lead and zinc

2 – Timing of the samples should alternate calendar quarters (1Q/3Q, 2Q/4Q) to give an even number of seasonal samples throughout the permit term

3 – Upstream location should be above any influence of the discharge on the receiving water

4 – Downstream location should be at the edge of the authorized mixing zone

The data from the ambient monitoring will be compiled into a spreadsheet and submitted annually with the December DMR (due January 20th of the following year). At the time the re-application package is due (180 days prior to the expiration date of the permit), all available ambient data will be complied into a spreadsheet which will be included in a report explaining the results. This report will be submitted with the re-application package.

4. Methylmercury Sampling and Analysis

EPA is requiring that WQS include a fish tissue criterion for mercury (Hg) rather than a water column number. STI has not adopted a fish tissue criterion yet but it is expected that one will be adopted within the term of this permit. In order to simplify the requirements for the next NPDES permit, this permit requires a Study Plan be designed and implemented to collect the data necessary to develop a site-specific bioaccumulation factor (BAF) and from that, a fish tissue criterion to water column criterion translator. The required formulas:

$$BAF = C_t/C_w$$

Where BAF is the bioaccumulation factor

C_t = concentration of methylmercury in fish tissue (mg/kg, wet weight)

C_w = concentration of methylmercury in water (mg/L)

and

WQC = TRC/BAF

Where WQC = water column criterion (mg/L)
TRC = fish tissue criterion (mg/kg)
BAF = bioaccumulation factor (L/kg)

The concentration of methylmercury in water (C_w) should be determined from an area where the fish being analyzed live and where they are harvested even if this includes the mixing zone for the facility. The level of methylmercury in the receiving water could vary seasonally so water sampling will be done twice a year changing the season each year (e.g. first year: spring/fall, second year: summer/winter, third year: fall/winter, fourth year: spring/summer) but establishing a schedule that will allow for at least two samples from each season to be considered in the Translator Report which is required with the permit reapplication, 180 days prior to the expiration date.

Seasonal fluctuations are not expected in fish mercury levels so sampling of fish tissue will occur every 2 years. Fish need to be collected from the geographic area that represents an average exposure to those who eat fish from the waterbody. The sampling should target tropic level 4 fish (larger, carnivorous fish) and be a commonly consumed [by humans] aquatic organism with a preference for resident over migratory species. The fish should be relatively the same size with the smallest being at least 75% the length of the largest. Size in this case is used as an indicator of age.

Sampling must occur when the target species is most frequently harvested. The most desirable time is late summer to early fall IF that timeframe is within the legal harvest season. Evaluation of the best method of tissue collection should be done for the Study Plan. Whole fish could be collected and fillets used (skin could remain part of the sample if this is the way the fish are consumed). Plugs or biopsy methods could be utilized which make whole fish unnecessary. If either of these are investigated, it may be possible to partner with the STI to collect these small samples from fish caught by tribal members during the harvest season.

C. Monitoring Requirements

40 CFR 122.48(b) requires that the permit contain monitoring requirements. CWA § 308 requires self-monitoring of effluent parameters to demonstrate compliance with effluent limitations, to assure that WQS are met, and to provide information for future permitting actions. Monitoring frequencies are based on the Agency's determination of the minimum sampling frequency required to adequately monitor the facility's performance. Required sample types are based on the Agency's determination of the potential for effluent variability. These determinations take into consideration several factors, of which the most important are the type of pollutants of concern and the type of treatment system. Table 1, above, includes the monitoring frequency and sample type proposed in the draft permit.

The draft permit requires that the permittee submit DMR data electronically using NetDMR. NetDMR is a national web-based tool that allows DMR data to be submitted electronically via a secure Internet application.

The EPA currently conducts free training on the use of NetDMR. Further information about NetDMR, including upcoming trainings and contacts, is provided on the following website: https://netdmr.com. The permittee may use NetDMR after requesting and receiving permission from EPA Region 10.

D. Best Management Practices

CWA § 304(e) requires EPA to include conditions in an NPDES permit that require the permittee to develop a Best Management Practices (BMP) Plan to control potential discharges such as runoff, spillage, and leaks.

The BMP Plan should recognize the hazardous nature of various substances used by the facility and the way such substances may be accidentally dispersed. The intent of the BMP Plan is to cover the facility and any ancillary activities that would need to control storm water or other discharges. The BMP Plan should incorporate elements of pollution prevention as set forth in the Pollution Prevention Act of 1990, 42 USC 13101.

The BMP Plan must be certified annually and be amended whenever there is a change in the facility or in the operation of the facility which materially increases the potential for a discharge of pollutants.

E. Quality Assurance Plan

The permit requires the permittee to review and modify the existing Quality Assurance Plan (QAP), as necessary, then implement the Plan. The purpose of the QAP is to establish appropriate sampling, handling and analytical procedures for all effluent and ambient water samples taken.

F. Sufficiently Sensitive Methods

A Minimum Level (ML) is the level at which a laboratory knows with certainty that a parameter is present in a sample at the level reported. For effluent monitoring, the draft permit requires the ML be below the effluent limitation for limited parameters. All proposed MLs are below the effluent limitations in the draft permit except for arsenic.

The permittee's contract analytical laboratory conducted a Method Detection (MDL) study for arsenic. EPA has reviewed the results of this study and determined that the findings comply with the methodology in 40 CFR 136 Appendix B. The MDL is 0.2 ug/L and is multiplied by 10/π to determine an ML of 0.64 ug/L which is the proposed compliance level in the draft permit. This means the permittee would be in compliance with the effluent limit if the detected concentration of arsenic in the effluent is at or below 0.64 µg/L.

Most of the parameters without limits do not have MLs therefore, the draft permit proposes the following Method Detection Limits (MDLs) with which to assess compliance with the applicable WQS. The proposed MDLs found in Table 4 were utilized in the Quality Assurance Project Plan for the Pre-Design Data Needs Investigation Work Plans for the Phase I RD/RA: Interim Water Management data collection and analysis.

Table 4 – Method Detection Limits

Parameter	(in pCi/L unless noted)
Gross Alpha	1.0
Iron[1], ug/L	20.0
Lead 210	1.0
Lead 212	50.0
Polonium 210	1.0
Radium 228	1.0
Thorium 232	1.0
Thorium 234	50.0
Uranium 235	0.2
Uranium 238	0.2

[1] Measured in total recoverable.

G. Additional Permit Provisions

Permit Parts II, III, and IV contain standard regulatory language that must be included in all NPDES permits. The standard regulatory language covers requirements such as monitoring, recording, reporting requirements, compliance responsibilities, and other general requirements.

VII. OTHER LEGAL REQUIREMENTS

A. Endangered Species Act

Section 7 of the Endangered Species Act (ESA § 7) requires federal agencies to consult with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) if an action may have potential effects on listed endangered species.

On September 29, 2014, the EPA Region 10 Office of Environmental Cleanup transmitted a Biological Assessment (BA) to the USFWS to consider in informal consultation under ESA § 7. Table 5, below, shows the species that were considered in the BA.

Table 5
Summary of Federally Listed Species for Stevens County, Washington*

Species	Federal Status	Habitat Requirements	Likelihood of Occurrence	Critical Habitat
Bull trout (*Salvelinus confluentus*)	Threatened	Streams, lakes, and ocean with coldest water, cleanest substrate, complex (e.g., riffles, deep pools, undercut banks and large logs, and connected habitats with connection to headwaters for spawning.	Low. No suitable spawning habitat occurs in Lake Roosevelt.	No
Canada lynx (*Lynx canadensis*)	Threatened	High elevation coniferous or mixed forest adjacent to tundra with abundant prey	No suitable habitat is present in the Project Action Area.	No
Grizzly bear (*Ursus arctos horribilis*)	Threatened	Large contiguous tract of undisturbed land across a wide variety of habitats with concentrated food sources such as salmon runs and calving grounds.	No suitable habitat is present in the Project Action Area.	No
Ute ladies'-tresses (*Spiranthes diluvialis*)	Threatened	Broad low elevation inter-montane valley with sub-irrigated calcareous wetlands wet meadows	No suitable habitat is present in the Project Action Area.	No

* From Table 1 of the BA

EPA determined that the actions described in the BA, including the effluent discharge planned to be authorized under a reissued NPDES permit, may affect, but are not likely to adversely affect bull trout. EPA also determined that there would be no effect on Grizzly Bear, Canada Lynx or Ute Ladies' tresses (listed species that are not likely to be present in the action area).

In a June 26, 2015, letter from Eric V. Rickerson, State Supervisor, Washington Fish and Wildlife Office to Karen Keeley, EPA Remedial Project Manager, the USFWS stated "Effluent released from the discharge pipe into the Columbia River/Lake Roosevelt has the potential to impair bull trout behavior and water quality within 190 feet of the discharge. The rarity of bull trout in Lake Roosevelt/Columbia River makes it extremely unlikely that bull trout will experience effects from the release of effluent into Lake Roosevelt. In addition, treatment of effluent prior to release will further minimize the potential for effects to bull trout by reducing the area affected. Therefore, due to low likelihood of presence and lack of measureable effects, all project impacts are expected to be insignificant and discountable." The letter also stated, "The Service concurs that the proposed project is "not likely to adversely affect" the bull trout."

The species list prepared for the BA contained no species under the jurisdiction of the NMFS. Even so, EPA consulted the ESA map on the NMFS website at:

> http://www.westcoast.fisheries.noaa.gov/publications/protected_species/salmon_steelhead/status_of_esa_salmon_listings_and_ch_designations_map.pdf (updated 10/31/12, accessed 12/2/15)

From this map, EPA determined that there are no ESA species under the jurisdiction of NMFS in the area of the discharge being permitted. Therefore, EPA is making a no effects determination.

EPA has transmitted this Fact Sheet and the draft Permit to the USFWS to determine whether there have been changes since the determinations were made or whether the concurrence is still applicable. There is no requirement for concurrence on a "no effect" determination. Therefore, the determination rests with the EPA.

B. Essential Fish Habitat

Section 305(b) of the Magnuson-Stevens Act [16 USC 1855(b)] requires federal agencies to determine whether any activity proposed to be permitted, funded, or undertaken by a federal agency may have an adverse effect on designated Essential Fish Habitat (EFH) as defined by the Act. The EFH regulations define an adverse effect as any impact which reduces quality and/or quantity of EFH and may include direct (e.g. contamination or physical disruption), indirect (e.g. loss of prey, reduction in species' fecundity), site-specific, or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

There are no managed fisheries in the Spokane Arm of Lake Roosevelt subject to the protections under the Magnuson-Stevens Act so no EFH will be impacted.

C. CWA § 401 Certification and Downstream States

CWA § 401 requires EPA to seek certification from STI before issuing a final permit. As a result of the certification, STI may require more stringent permit conditions to ensure that the permit complies with WQS. The certification may also require additional monitoring requirements and authorize a mixing zone. A draft CWA § 401 Certification is included as Appendix B of this Fact Sheet.

EPA shared the preliminary Draft Permit and draft Fact Sheet with the Washington Department of Ecology and the Confederated Tribes of the Colville Reservation in July 2016. This provided them advance notification that this permit action would require their input under CWA § 401(a)(2). EPA also solicited comments on any issues of concern. Ecology expressed concern about PCBs and sediment toxicity.

An effluent grab sample was collected for PCB analysis on November 17, 2016. The sample along with field QC samples (field duplicate and field blank) was sent to ALS Environmental for PCB congener analysis using EPA Method 1668a. The data were validated according to the QAPP Third Addendum (WME 2016). The PCB congener results generated by ALS, Houston show little, if any, PCB congeners

present in the effluent samples that can be distinguished from either the field or laboratory blanks. In addition, the lab's internal standard recoveries for all samples and the laboratory control standard (blank spike) were good. The limited number of detectable PCB values were also barely detected within the pg/L (parts per quadrillion) range. Overall the report indicates a barely detectable amount of PCBs along with adequate quality control. Based on this information, another PCB congener sample will only be required with the reapplication for this permit.

The Washington Department of Ecology has aquatic sediment standards (chapter 173-204 WAC) to protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400). A screening-level evaluation of the potential for a discharge to cause sediment impact is conducted and if it indicates that it is unlikely that the discharge would adversely impact the receiving sediments, the permit is issued or renewed without sediment monitoring. A narrative evaluation may be used to identify facilities that have a low potential for sediment impacts, based on the general characteristics of the facility and the nature of the discharge.

There are several ways in which an excessive concentration of finely divided solid matter might be harmful to a fishery in a river or a lake (European Inland Fisheries Advisory Commission as cited in NAS 1973). These include:

- acting directly on fish swimming in water in which solids are suspended, either killing them or reducing their growth rate and resistance to disease;
- preventing the successful development of fish eggs and larvae; modifying natural movements and migrations of fish;
- reducing the food available to fish;
- affecting efficiency in catching the fish.

Suggested limits for suspended sediment have been developed by the European Inland Fisheries Advisory Commission and the National Academy of Sciences. In these studies, a limit of 25 mg/L of suspended sediment provides a high level of protection of aquatic organisms; 80 mg/L moderate protection; 400 mg/L low protection; and over 400 mg/L very low protection (NAS 1973).

While a discharge is generally considered to have a risk for causing adverse sediment impacts if the facility discharges radionuclides, the low levels of TSS in the discharge coupled with the dilution provided in the mixing zone prior to the discharge reaching the waters of the state of Washington, results in a less than measurable change in sediment levels between upstream and downstream measurements.

The TSS effluent limits are based on the ELG at 40 CFR 440 Subpart C. The permit requires an average of 20 mg/L and maximum of 30 mg/L. Utilizing Equation C-6 from Appendix C with the 90th percentile background level of 18 mg/L TSS, the edge of the mixing zone value is calculated to be:

$$C_d = \frac{30 + (18 * 160)}{1 + 160} = 18.07 \text{ mg/L}$$

The calculation using the maximum background concentration measured in the receiving water of 31 mg/L would result in a less than measurable decrease in downstream TSS.

$$C_d = \frac{30 + (31 * 160)}{1 + 160} = 30.99 \text{ mg/L}$$

The maximum effluent value measured between 2012 and 2016 was 9 mg/L. The facility is constructing a new treatment plant that will include additional filtration to enable the removal of arsenic and aluminum (see FS Part V.) so TSS in future discharges is expected to be lower than current discharges.

Through a review of the discharger characteristics and the effluent characteristics, EPA determined that this discharge has no reasonable potential to violate the Washington sediment management standards due to pollutant removal efficiency, stream velocity and a lack of particulates in the river and effluent on which pollutants can absorb. Therefore, additional conditions to address sediment toxicity are not set forth in the permit.

EPA is providing the Draft Permit and this Fact Sheet to the Washington Department of Ecology and the Confederated Tribes of the Colville Reservation to initiate their 60 day opportunity to determine whether the discharge described in this Fact Sheet will violate any of their WQS as provided for in CWA § 401(a)(2).

D. Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, directs each federal agency to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities." EPA is striving to enhance the ability of overburdened communities to participate fully and meaningfully in the permitting process for EPA-issued permits, including NPDES permits. "Overburdened" communities can include minority, low-income, tribal, and indigenous populations or communities that potentially experience disproportionate environmental harms and risks. As part of an agency-wide effort, EPA Region 10 will consider prioritizing enhanced public involvement opportunities for EPA-issued permits that may involve activities with significant public health or environmental impacts on already overburdened communities. For more information, please visit http://www.epa.gov/compliance/ej/plan-ej

As part of the permit development process, EPA Region 10 conducted an EJ Screen to determine whether a permit action could affect overburdened communities. EJSCREEN is a nationally consistent geospatial tool that contains demographic and environmental data for the United States at the census block group level. As a pre-

decisional tool, EJSCREEN is used to highlight permit candidates for additional review where enhanced outreach may be warranted.

The EPA also encourages permittees to review (and to consider adopting, where appropriate) Promising Practices for Permit Applicants Seeking EPA-issued Permits: Ways to Engage Neighboring Communities (see https://www.federalregister.gov/articles/2013/05/09/2013-10945/epa-activities-to-promote-environmental-justice-in-the-permit-application-process#h-13). Examples of promising practices include: thinking ahead about community's characteristics and the effects of the permit on the community, engaging the right community leaders. Providing progress or status reports, inviting members of the community for tours of the facility, providing informational materials translated into different languages, setting up a hotline for community members to voice concerns or request information, follow up, etc.

EPA's EJSCREEN tool identified the STI Reservation as a potentially overburdened community because the Midnite Mine is located within the boundaries of the Reservation and the discharge will be to tribal waters. EPA plans to hold a public meeting during the public comment period on the STI Reservation. Since the Mine is an active Superfund site, much community outreach has occurred, as documented in the current Community Involvement Plan, and will continue to occur as the remedy is enacted. As such, EPA concluded that there is no indication that the issuance of this permit would require enhanced outreach.

Separate from the EJ screening effort, EPA coordinated the inclusion of the draft CWA § 401 Certification into the Fact Sheet (see Appendix B) and has also offered tribal consultation to STI.

E. Permit Expiration

This permit will expire five years from the effective date of the permit. Permits may be administratively extended under 40 CFR 122.6 if all the requirements of that regulation are met.

VIII. REFERENCES

Application package dated March 20, 2013.

Midnite Mine Superfund Site Spokane Indian Reservation, Washington, Record of Decision. Prepared by Office of Environmental Cleanup, EPA Region 10. September 2006.

NPDES Permit Writer's Manual. EPA, Office of Water, Office of Wastewater Management, Permits Division. Washington, DC. 20460; EPA-833-K-10-001, September 2010, 269pp.

Technical Support Document for Water Quality-based Toxics Control. Office of Water Enforcement and Permits, Office of Water Regulations and Standards. Washington, DC., March 1991. EPA/505/2-90-001.

Guidance Manual for Developing Best Management Practices (BMP). 833-B-93-004. October 1993.

40 CFR 122 – EPA administered permit programs: the National Pollutants Discharge Elimination System.

40 CFR 124 – Procedures for Decisionmaking

40 CFR 136 – Guidelines establishing test procedures for the analysis of pollutants

40 CFR 440, Subpart C - Uranium, Radium and Vanadium Ores Subcategory

Letter to Rudy Peone, Chairman STI, from Daniel D. Opalski, EPA Region 10 Director of Water and Watersheds. Dated December 19, 2013. EPA's Action on the Spokane Tribe of Indians 2010 Revision to Their Surface Water Quality Standards.

Letter to Daniel D. Opalski (EPA) from Brian Crossley, STI Water and Fish Program Manager. Dated September 19, 2014. Modification of STI 2010 WQS through Resolution 2014-341.

Spokane Tribe of Indians, Surface Water Quality Standards, September 19, 2014, Resolution 2014-341.

Cizdziel, James V., Thomas A. Hinners, and Edward M. Heithmar. *Determination of Total Mercury in Fish Tissues Using Combustion Atomic Absorption Spectrometry with Gold Amalgamation*. Water, Air, and Soil Pollution 135: 355-370, 2002.

Pearson, Eric. *The Analysis of Mercury in Fish Tissue Plugs for the Purpose of Evaluation a Potentially Non-lethal Sampling Method*. North Dakota Department of Health, November 2000.

Baker, R. F., P.J. Blanchfield, M.J. Patterson, R.J. Flett, L. Wesson. *Evaluation of Nonlethal Methods for the Analysis of Mercury in Fish Tissue*. Transactions of the American Fisheries Society 133:568-576, 2004.

http://www.westcoast.fisheries.noaa.gov/publications/protected_species/salmon_steelhead/status_of_esa_salmon_listings_and_ch_designations_map.pdf (updated 10/31/12, accessed 12/2/15)

Midnite Mine Superfund Site, Wellpinit, WA. U.S. Environmental Protection Agency. Community Involvement Plan. November 2015.

Washington Department of Ecology 2011. Water Quality Program Permit Writer's Manual. September 2011. Publication no. 92-109. Mixing Zone procedures referenced by STI WQS.

Washington Department of Ecology 2012. Water Quality Standards for Surface Waters of the State of Washington. Chapter 173-201A WAC. Revised January 2012. Publication no. 06-10-091.

Fernald Preserve 2010 Site Environmental Report. US Department of Energy. Doc. No. S07409. May 2011. Excerpt of Unit Conversion Table.

Memorandum to Cindi Godsey (EPA) from Lou Miller (Worthington Miller Environmental, LLC). Dated May 14, 2015. Midnite Mine NPDES Permit Application – Laboratory Arsenic MDL Study.

Memorandum to Cindi Godsey (EPA) from Lou Miller (Worthington Miller Environmental, LLC). Dated April 11, 2014. Midnite Mine NPDES Permit Application Work Plan and QAPP Addendum (Revision 1): Lake Roosevelt Additional Sampling and Analysis for Total Thallium.

Lake Roosevelt and WTP Effluent Low-Level Thallium Sampling.

Effluent Discharge Mixing Evaluation for the Midnite Mine Water Treatment Plant. December 6, 2013. Prepared by MWH Americas Inc. for Dawn Mining Company.

Work Plan for Bench-Scale Testing of Midnite Mine Water for Al Removal. April 2015. Prepared by MWH Americas, Inc. for Newmont USA Limited, Dawn Mining Company.

Work Plan for Bench-Scale Treatability Testing of Midnite Mine Water for Arsenic Removal. May 2015. Prepared by MWH Americas, Inc. for Newmont USA Limited, Dawn Mining Company.

Biological Evaluation (with letter) transmitted from the EPA Region 10 Office of Environmental Cleanup to USFWS on September 29, 2014.

Letter from Eric V. Rickerson, State Supervisor, Washington Fish and Wildlife Office to Karen Keeley, EPA Remedial Project Manager. Dated June 26, 2015. USFWS determination on ESA.

Letter to Bill Lyle (Dawn Mining) from Michael J. Lidgard, NPDES Permits Unit Manager, EPA. Dated March 16, 2015. Treatability testing required for aluminum and arsenic.

Quality Assurance Project Plan for the Pre-Design Data Needs Investigation Work Plans. Version 5. Phase I RD/RA: Interim Water Management for the Midnite Mine. December 2010. Prepared by: Tetra Tech for Dawn Mining Company and Newmont USA Limited.

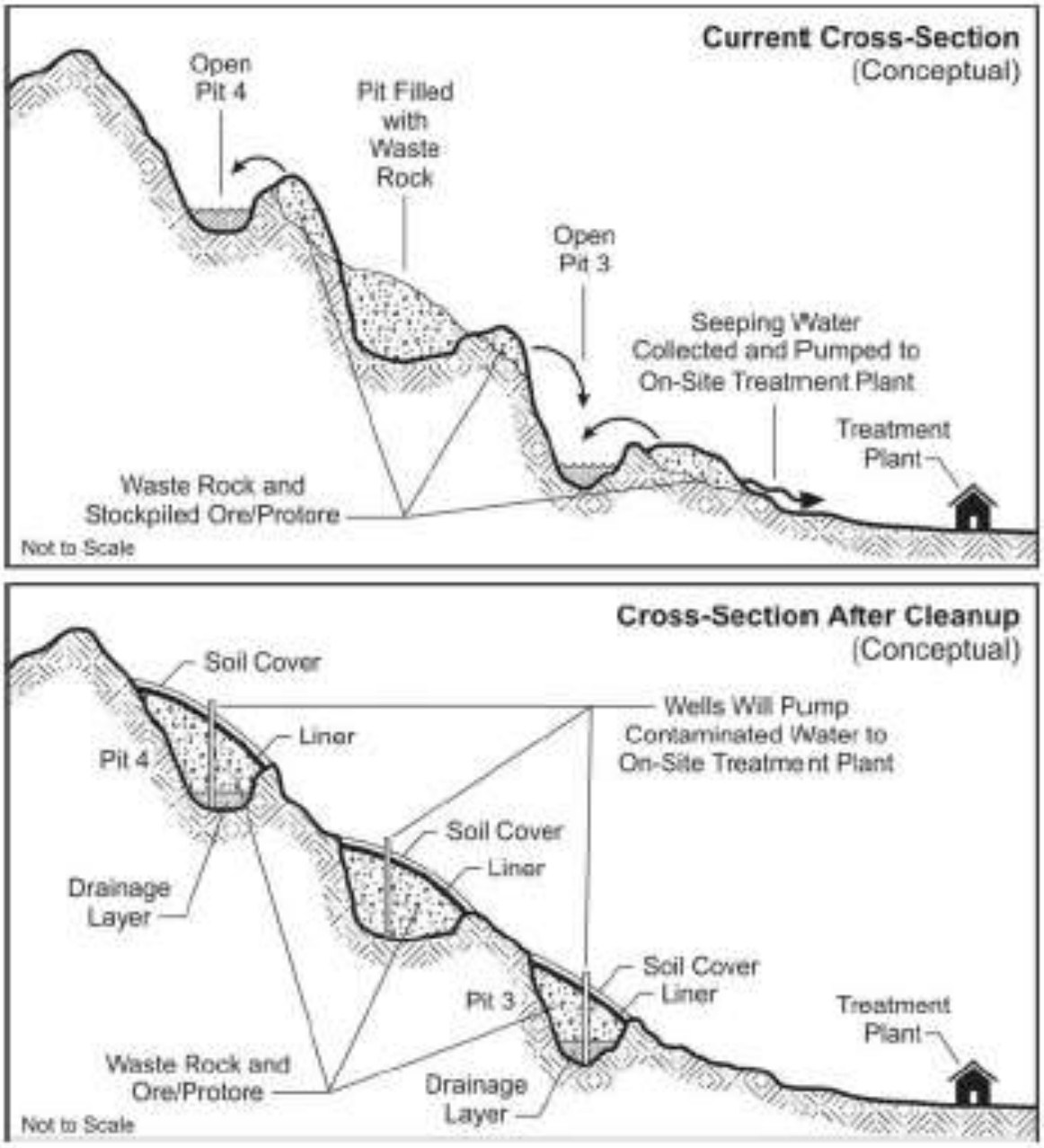
Memorandum to Cindi Godsey (EPA) from Jill Richards (Worthington Miller Environmental, LLC). Dated January 19, 2017. Midnite Mine NPDES Permit Application Analysis Results: Arsenic and Aluminum Analysis (Revision 1).

Memorandum to Cindi Godsey (EPA) from Jill Richards (Worthington Miller Environmental, LLC). Dated January 13, 2017. Midnite Mine NPDES Permit Application Additional Analysis Results: PCB Congener Analysis on Effluent.

APPENDIX A-1: Midnite Mine Location

Midnite Mine
Site Location

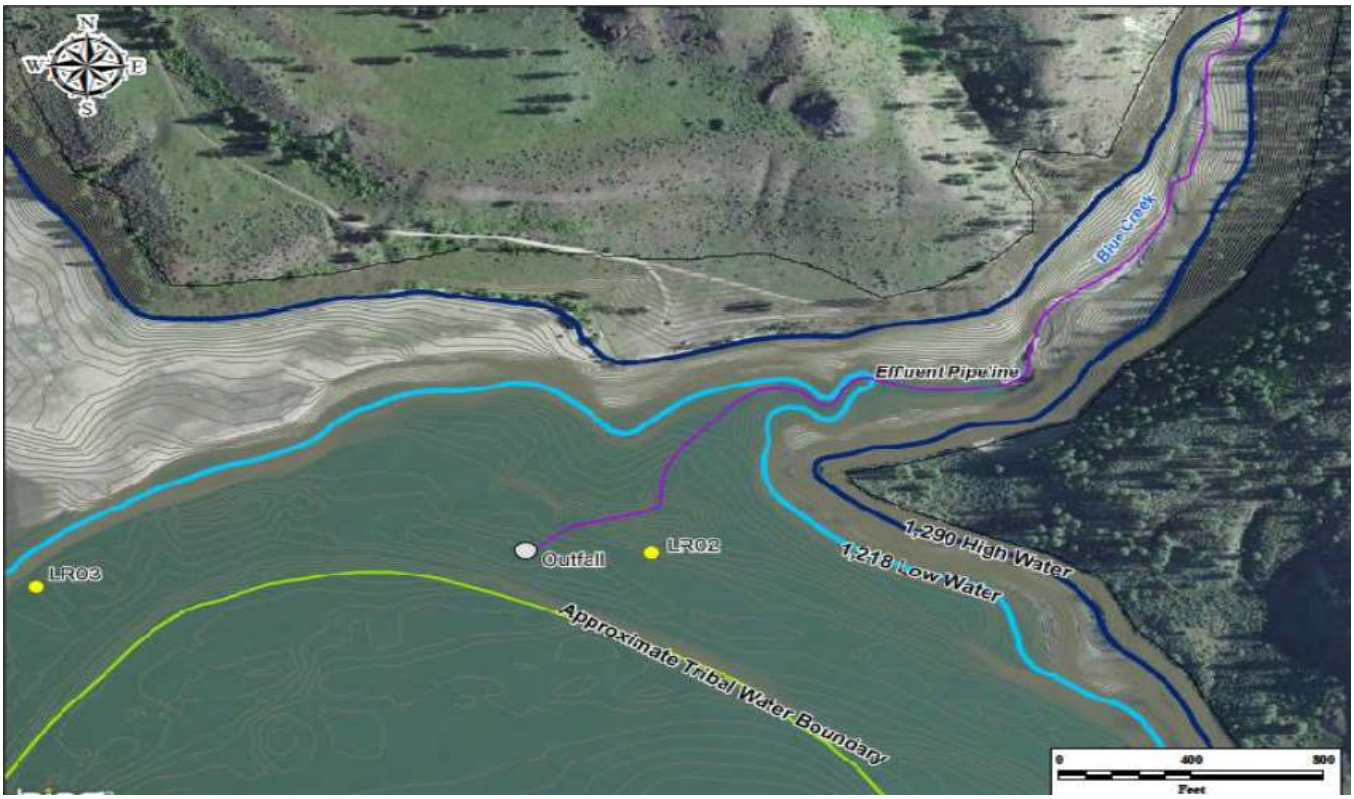
APPENDIX A-2: Midnite Mine Proposed Plan



APPENDIX A-3
Location of USGS Station 12433000 SPOKANE RIVER AT LONG LAKE, WA

Approximate outfall location

APPENDIX A-4
Location of Receiving Water Stations LR-1, LR-2, and LR-3



APPENDIX B: Draft CWA § 401 Certification

Spokane Tribal Natural Resources
P.O. Box 480 ● Wellpinit, WA 99040 ● (509) 626 - 4400 ● fax 258 - 9600

April 10, 2017

Christine Psyk, Acting Director
Office of Water & Watersheds
U.S. EPA, Region 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140
Attn: OWW-191

Re: EPA's February 10th request for preliminary draft CWA 401 Certification of EPA's preliminary draft NPDES Permit, Midnite Mine.

Dear Ms. Psyk:

The Spokane Tribe of Indians (STI), Department of Natural Resources, has reviewed the U.S. Environmental Protection Agency's (EPA) revised preliminary draft NPDES permit plus a draft fact sheet for the Midnite Mine new WTP discharge outfall, which were enclosed with your February 10th letter to the STI's Business Council Chairwoman, Carol Evans. In that letter, EPA requested the Tribe to review the Agency's proposed permit action and to provide a preliminary draft Clean Water Act (CWA) 401 Certification (Certification), to identify the Tribe's key point of contact to coordinate with on the Certification, and to address several issues in the Certification that EPA and STI previously discussed and needed to resolve.

The Tribe's preliminary draft Certification is enclosed. Brian Crossley and I are the Tribe's key contact points regarding this enclosure. My telephone is (509) 626-4427, and email is bjk@spokanetribe.com. Brian Crossley's telephone is (509) 626-4409, and email is crossley@spokanetribe.com. Please copy correspondence on this matter to our attorney, Brian Cleary (brian@clearylawgroup.com) and our consultant, Dr. Fred Kirschner (fredk@aeseinc.com).

Sincerely,

B.J. Kieffer
Director

encl: STI-DNR Preliminary Draft CWA 401 Cert. & Conds.

cc: C. Evans (STI Business Council Chairwoman) (via email)
B. Crossley (STI Water & Fish Program Manager) (via email)
Cleary (STI Special Legal Counsel) (via email)
Dr. F. Kirschner (STI Technical Consultant) (via email)
Godsey (EPA R.10 NPDES Permit Program) (via email)
K. Keeley (EPA R.10, RPM Midnite Mine) (via email)

SPOKANE INDIAN TRIBE'S
PRELIMINARY DRAFT
CLEAN WATER ACT SECTION 401
WATER QUALITY CERTIFICATION & CONDITIIONS

April 10, 2017

NPDES Applicant, Site, Permit Number – Dawn Mining Company, Midnite Mine, WA0026841-Outfall 001.

Authority - Pursuant to the provisions of Section 401 (a)(1) of the Federal Water Pollution Control Act (Clean Water Act), as amended, 33 U.S.C. Section 1341 (a)(1), the Spokane Tribe of Indians (STI), Water Control Board (WCB), has authority to review National Pollution Discharge Elimination System (NPDES) permits and to issue water quality certification decisions thereon.

Preliminary Draft Certification – STI's WCB certifies that if the Applicant complies with the terms and conditions imposed by NPDES Permit Number WA0026841 on Outfall 001 (Permit) and complies with all the conditions described in this water quality certification and conditions (Certification), then there is reasonable assurance that Outfall 001 discharges will comply with the applicable requirements of Sections 301 – 307 of the Clean Water Act, including the federally-approved Spokane Tribe of Indians Water Quality Standards (STI-WQS). Specifically, this Certification:

1. Authorizes a mixing zone consistent with STI-WQS for the parameters Gross Alpha, Iron, Lead 210, Lead 212, Lead (dissolved), Manganese, Polonium 210, Radium 226 (dissolved), Radium 228, Sulfates, Thallium, Thorium 232, Thorium 234, TDS, Uranium 234, Uranium 235, Uranium 238, Uranium (dissolved), Uranium, but not for Aluminum, Arsenic, Iron, Mercury and Zinc;

2. Authorizes the use of the 95th percentile for background values of radionuclides;

3. Authorizes the use of the 5th percentile of the consolidated hardness data from all 3 receiving water stations at all depths (only affects lead and zinc);

4. Approves the adequacy of Whole Effluent Toxicity (WET) Permit requirements; and

5. Concludes that the Permit requirements meet the Antidegradation policy of the STI-WQS in that the Permit requirements are expected to maintain and protect the existing instream beneficial uses of the receiving waterbody. Additionally, relative to the discharge requirements under the facility's existing NPDES permit (WA 0025721), this Permit's discharge requirements are more protective of the instream beneficial uses and meet those uses in a shorter distance and will expose a smaller area to humans and organisms before it meets STI-WQS.

Preliminary Draft Conditions – This Certification is subject to Applicant's compliance with all the following conditions necessary to assure that Permit discharges comply with the STI-WQS:

1. Applicant shall obtain prior STI-DNR written authorization of the proposed ambient (receiving water) monitoring locations;

2. Applicant shall measure and record the temperature of effluent as close to point of discharge as possible using a continuous temperature monitoring probe or similar device and shall report those measurements in its Discharge Monitoring Reports to EPA as specified in the Permit;

3. Applicant shall report all results of monitoring receiving waters in total recoverable. Additionally, results for Lead and Zinc shall be reported in dissolved form;

4. Applicant shall confer and coordinate with STI Department of Natural Resources (STI-DNR) in developing and executing the Study Plan for the Methylmercury Translator Study under the Permit. Data obtained during each calendar year of this study and a summary of that year's data shall be submitted in usable electronic format to the STI-DNR by no later than April 1st of the year immediately following the year in which the data is collected.

5. Absent prior written approval from the STI-DNR, Applicant shall submit all data/information contained in its Discharge Monitoring Reports to EPA (DMRs) in electronic format to the STI-DNR concurrent with submitting that data/information to EPA. Applicant shall also cooperate with STIDNR to facilitate access to and interpretation of that data/information. Applicant's data/information shall be submitted to STI-DNR on an electronic storage medium (e.g., CD/DVD) if its total size exceeds 3MB, or by email if its total size is 3MB or less. Submissions by electronic storage medium shall be addressed to Spokane Tribe of Indians, Department of Natural Resources, P.O. Box 480, Wellpinit, WA 99040, Attn: Water & Fish Program Manager. Email submissions shall be sent to crossley@spokanetribe.com, unless otherwise specified in writing by STI-DNR. Applicant's submission of DMRs to EPA using its internet based system shall not constitute compliance with this condition absent Applicant obtaining prior written approval from STI-DNR.

6. Applicant shall submit a copy of any application to EPA for reissuance of this Permit and/or application or request for material modification(s) to this Permit or Permitted activities concurrently to the STI-WCB for review to determine compliance with the STI's WQS and, if necessary, to provide additional certification pursuant to Clean Water Act Section 401.

7. This Certification is not intended as, nor shall not it be construed as, an irreversible and irretrievable commitment of natural resources in an environmental impact statement, or other comparable environment analysis, nor is it intended as, and shall not be construed as, a decision granting a permit or license authorizing such commitment of natural resources.

Contact Information - Questions or comments about this Certification can be submitted in writing addressed to the Chairman, Spokane Tribe Water Control Board, P.O. Box 480, Wellpinit, WA, 99040 Attn: Brian Crossley, or by email to crossley@spokanetribe.com.

DRAFT

_____, Chairman
Water Control Board

APPENDIX C: Development of Effluent Limitations

This section discusses the basis for and the development of metals, radionuclides, pH, total dissolved solids, and total suspended solids limitations in the draft permit. The discussions include the development of technology-based effluent limitations (TBELs - Section A) and water quality-based effluents limitations (WQBELs - Section B) and a summary of the effluent limitations developed for the draft permit.

A. Technology-based Evaluation

CWA § 301(b) requires technology-based controls on effluents. Midnite Mine is considered an existing source. On December 3, 1982, EPA published effluent limitation guidelines (ELGs) for the mining industry which are found in 40 CFR Part 440. These ELGs include Subpart C, titled *Uranium, Radium and Vanadium Ores Subcategory.* While this ELG applies directly to discharges from active mines, EPA has determined that the constituents in the wastestream and the treatment technology for these discharges would be the same as for active mining. Therefore, EPA is proposing to use the regulations applicable to mine drainage discharges at 40 CFR 440.32(a) – Best Practicable Control Technology currently available (BPT) and 40 CFR 440.33(a) Best Available Technology economically achievable (BAT) as the Best Professional Judgment (BPJ) technology-based limitation), at the Midnite Mine.

Table C-1 combines the requirements of both 40 CFR 440.32(a) and 33(a). The concentration of pollutants discharged in mine drainage from mines, either open pit or underground, that produce uranium ore shall not exceed:

Table C-1
Technology-based Effluent Limitation Guidelines

Parameter (in mg/L unless otherwise noted)	Average Daily	Daily Maximum
TSS	20	30
COD	100	200
Zinc	0.5	1.00
Radium 226, pCi/L* (dissolved)	3.0	10.0
Radium 226, pCi/L (total)	10.0	30.0
Uranium	2.0	4.0
pH, standard units	Within the range of 6.0 to 9.0	

*pCi/L means picocuries per liter

B. Water Quality-based Evaluation

CWA § 301(b)(1)(C) requires the development of limitations in permits necessary to meet WQS. The NPDES regulation [40 CFR 122.44(d)(1)] implementing CWA § 301(b)(1)(C) requires that permits include limits for all pollutants or parameters which "are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality."

The regulations require that this evaluation be made using procedures which account for existing controls on point and non-point sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water. The limits must be stringent enough to ensure that WQS are met, and must be consistent with any available wasteload allocation.

When evaluating the effluent to determine if WQBELs are needed based on chemical-specific numeric criteria, a projection of the effluent water concentration for each pollutant of concern is made. If a mixing zone is authorized, then dilution is considered. The chemical-specific concentration of the effluent and ambient water and, if appropriate, the dilution available from the ambient water are factors used to project the receiving water concentration. If the projected concentration of the effluent exceeds the numeric criterion for a specific chemical, then there is a reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality standard, and a WQBEL is required.

The water quality parameters that may be affected by the discharge include metals, solids, radionuclides and pH. Temperature will be measured in the effluent and receiving water to gather data for a limit determination in the next permit cycle.

WQBELs for toxics were developed based upon guidance in EPA's Technical Support Document for Water Quality-based Toxics Control (TSD). The water quality-based analysis consists of four steps:

- ► Determine the appropriate WQS,
- ► Determine if there is "reasonable potential" for the discharge to exceed the standard in the receiving water,
- ► If there is "reasonable potential", develop a wasteload allocation (WLA), and a long term average (LTA), then
- ► Develop effluent limitations based on the LTA.

The following sections provide a detailed discussion of each step. Appendix D provides an example calculation to illustrate how these steps are implemented.

1. Water Quality Standards

   The first step in developing water quality-based limitations is to determine the applicable water quality standard. The applicable WQS are based on the designated uses of the receiving water, the Spokane Arm of Lake Roosevelt, which is protected for the uses described in Section IV.B. of this Fact Sheet. The applicable WQS are used to calculate WQBELs. EPA has calculated effluent limitations utilizing the criterion based on the various uses of the waterbody and has included the most stringent limitation in the Draft Permit.

   Some of the metals standards are hardness-based. In calculating these standards, an increase in hardness results in higher criteria. This is because at a higher hardness, these metals are less toxic. The draft permit uses a hardness of 42 mg/L $CaCO_3$ to calculate the effluent limitations. This hardness was calculated as the 5^{th}-percentile hardness of the receiving water

measured at the 3 sites shown in Appendix A-4. EPA believes the hardness data from these locations is appropriate for the draft permit calculations.

The standards are provided in Table C-2.

Table C-2: Water Quality Standards

Parameter	Units	Aquatic Life		Human Health		
		Chronic	Acute	Water & Organisms	Organisms Only	Ceremonial
Aluminum[1]	ug/L	87.0	750.0			50.0
Arsenic[1]	ug/L	150.0	340.0	0.00095	0.00105	50.0
Gross Alpha[2, 3]	pCi/L[4]	15.0				
Iron[1]	ug/L	1000.0		300.0		300.0
Lead 210 [3]	pCi/L	0.01				
Lead 212 [3]	pCi/L	2.0				
Lead, TR[5]	ug/L	1.054	27.06			
Manganese	ug/L					50.0
Mercury	ug/L	0.012	1.40	0.0110	0.0110	2.0
Polonium 210 [3]	pCi/L	0.04				
Radium 226, diss [3]	pCi/L	0.06				
Radium 226, tot [3]	pCi/L					
Radium 228 [3]	pCi/L					
Sulfate	mg/L					250.0
Thallium	ug/L			0.0445	0.0462	2.0
Thorium 232 [3]	pCi/L	0.03				
Thorium 234 [3]	pCi/L	5.00				
TDS	mg/L					500.0
Uranium 234 [3]	pCi/L	0.30				
Uranium 235 [3]	pCi/L	0.30				
Uranium 238 [3]	pCi/L	0.30				
Uranium, diss	ug/L					
Uranium, tot (nat) [3]	pCi/L	0.30				
Zinc, TR[5]	ug/L	50.822	56.111	470.0	517.0	5000.0
TSS	mg/L					
COD	mg/L					
pH	std unit	within 6.5 to 8.5				

[1] the ambient condition exceeds the criteria
[2] includes Radium 226 but not radon or uranium
[3] standard is expressed as an above background level
[4] PCi/L means Picocuries per liter
[5] Hardness = 42

The NPDES regulations require that metals limitations in NPDES permits be expressed as total recoverable (TR) metals [40 CFR 122.45(c)]. Changes in water chemistry as the effluent and receiving water mix could cause some particulate metal in the effluent to dissolve and become bioavailable.

Since the proposed WQS are expressed as dissolved, the conversion factor from the WQS is used in the WLA equation to convert the dissolved criteria to total recoverable.

Standard (TR) = Standard (diss)/CF *(Equation C-1)*

Where CF is a conversion factor used to convert between dissolved and total recoverable metal.

This equation was utilized in the determination of the standards in Table C-2 for lead and zinc. The standards shown are in total recoverable.

2. Reasonable Potential Evaluation

A reasonable potential analysis was performed to determine the need for permit limitations. This analysis compares the maximum projected effluent concentration (C_e) to the criteria for that pollutant or, if a mixing zone is authorized, this comparison is between the downstream concentration (edge of the mixing zone) and the criteria. If the projected effluent concentration exceeds the criteria, there is "reasonable potential" (RP) and a limitation must be included in the permit. EPA uses the recommendations in Chapter 3 of the TSD to conduct this analysis.

C_e is defined by the TSD as the 99th percentile of the effluent data. This is calculated by multiplying the maximum reported effluent concentration by a reasonable potential multiplier (RPM). The statistical approach has two parts. The first is a characterization of the highest measured effluent concentration based on the desired confidence level. The relationship that describes this is the following:

$$P_n = (1 - \text{confidence level})^{1/n} \qquad \textit{Equation C-2}$$

Where:

P_n = the percentile represented by the highest concentration in the data
Confidence level is the 99th percentile (0.99)
n = the number of samples

The second part of the statistical approach is a relationship between the percentile described above and the selected upper bound of the lognormal effluent distribution. EPA's effluent data base suggests that the lognormal distribution well characterizes effluent concentrations:

$$RPM = \frac{C_{99}}{C_{Pn}} = \frac{e^{[(z_{99}*\sigma) - (.5*\sigma^2)]}}{e^{[(z_{Pn}*\sigma) - (.5*\sigma^2)]}} \qquad \textit{Equation C-3}$$

Where:

σ^2 = $\ln(CV^2 + 1)$ for acute WLA
The coefficient of variation (CV) = standard deviation/mean

z_{99} = 2.326
z_{Pn} = normal distribution value for the P_n-percentile

The maximum expected concentration (MEC) of the effluent is calculated by multiplying the maximum observed effluent concentration by the RPM:

MEC = (Max Eff) * RPM *Equation C-4*

Table C-3: Determination of Maximum Expected Concentration (MEC)

Parameter	Units	N	CV	Pn	z_{Pn}	RPM	Max Eff	MEC
Aluminum	ug/L	17	0.52	0.763	0.715	2.2	130	284.21
Arsenic	ug/L	17	0.35	0.763	0.715	1.7	1.1	1.9
Gross Alpha	pCi/L	17	0.79	0.763	0.715	3.1	84.2	259.32
Iron	ug/L	6	0.60	0.464	-0.090	3.8	50	190.89
Lead 210	pCi/L	17	0.43	0.763	0.715	1.9	0.625	1.21
Lead 212	pCi/L	17	0.0*	0.763	0.715	1.0	12.5	12.5
Lead, diss	ug/L	6	0.60	0.464	-0.090	3.8	2.5	9.54
Manganese	ug/L	17	0.38	0.763	0.715	1.8	190	343.28
Mercury	ug/L	17	0.59	0.763	0.715	2.4	0.0061	0.015
Polonium 210	pCi/L	6	0.60	0.464	-0.090	3.8	2.3	8.78
Radium 226, diss	pCi/L	17	0.65	0.763	0.715	2.6	0.75	1.95
Radium 226, tot	pCi/L	NO DATA						
Radium 228	pCi/L	6	0.60	0.464	-0.090	3.8	1.2	4.58
Sulfates	mg/L	17	0.13	0.763	0.715	1.2	2200	2712.68
Thallium	ug/L	5	0.60	0.398	-0.258	4.2	0.117	0.49
Thorium 232	pCi/L	17	0.27	0.763	0.715	1.5	0.2	0.31
Thorium 234	pCi/L	17	0.69	0.763	0.715	2.7	694	1891.12
TDS	mg/L	17	0.11	0.763	0.715	1.2	3260	3872.78
Uranium 234	pCi/L	17	0.49	0.763	0.715	2.1	24.4	51.57
Uranium 235	pCi/L	17	0.45	0.763	0.715	2.0	0.8	1.59
Uranium 238	pCi/L	17	0.47	0.763	0.715	2.1	21.7	44.61
Uranium, diss	ug/L	6	0.60	0.464	-0.090	3.8	42.8	163.40
Uranium, tot	ug/L	17	0.44	0.763	0.715	2.0	72.2	143.16
Zinc, diss	ug/L	6	0.60	0.464	-0.090	3.82	9.0	34.4

* All the analytical results for Lead 212 were below detection levels so there was no variation in the data resulting in a CV of zero.

For parameters with technology-based ELGs, the maximum effluent concentration used to determine the RP is the technology-based maximum daily limitation. The technology-based limit is used since WQBELs are only required if discharges at the TBEL has the RP to exceed WQS in the receiving water. The RPM accounts for uncertainty in the effluent data and statistically depends upon the amount and variability of the data as measured by the CV. The RPM decreases as the number of data points increases and

the variability of the data decreases. If the MEC is greater than an applicable WQS then reasonable potential exists and a WQBEL is required.

Sometimes it may be appropriate to allow a small area of the receiving water to provide dilution of the effluent. These areas are called mixing zones. Mixing zone allowances will increase the mass loadings of the pollutant to the water body and decrease treatment requirements. Mixing zones can be used only when there is adequate receiving water flow volume and the concentration of the pollutant in the receiving water is less than the criterion necessary to protect the designated uses of the water body. A Mixing zone may be authorized by the STI under their WQS. The STI's draft certification proposes to authorize a mixing zone with the maximum length of 190 feet and a maximum width of 280 feet as shown below in the Figure C-1:

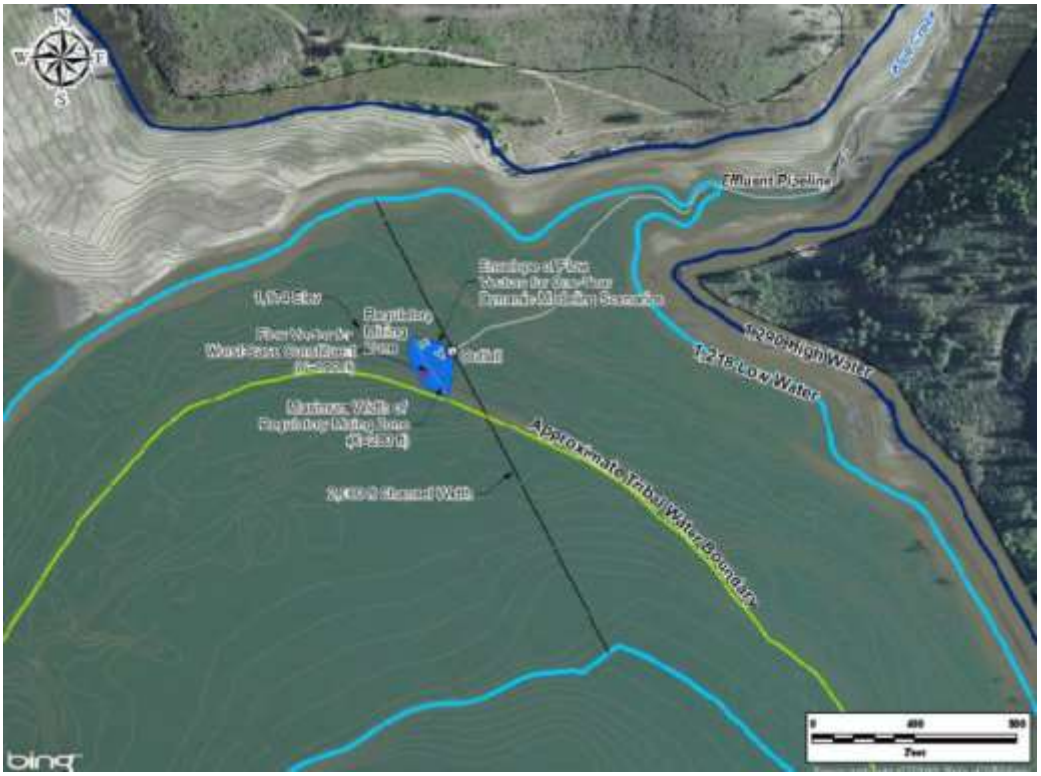


Figure C- 1

The STI WQS use the provisions of the Washington WQS when determining the flows to be used in the mixing zone. The WA WQS say that for the chronic MZ, the maximum flow available is 25% of 7 day average low flow over a 10 year period (7Q10) and that the acute MZ can utilize a maximum of 2.5% of the 7Q10. The MZ dilution available for human health carcinogens is 25% of the harmonic mean flow and for non-carcinogens, 25% of the 30 day average low flow over a 5 year period (30Q5).

The upstream flows were determined using data from Gauge 12433000 on the Spokane River [see map in Appendix A-3 for the location]. The determination used all available data from April 1, 2002 through April 1, 2015. The maximum effluent flow rate was provided in the permit application.

Table C-4 Critical Flows and Dilution Factors			
Criterion Type	Critical Flow (cfs)	Allowed Flow (cfs)	Critical Flow Ratios (Allowed/Max Effluent)
Chronic	1080	270	223
Acute		27	22.3
Human Health - carc.	3650	912.5	754
HH - non-carc.	1310	327.5	271
Max Effluent flow = 0.78 MGD = 1.21 cfs			

The permittee developed a mixing zone analysis to incorporate other regulatory restrictions such as the allowed size and dilution required to meet the WQS in order to minimize the size. A diagram of the mixing zone is shown in Appendix A-4 and its associated dilution is 160:1. Therefore, this dilution is used for all criteria except acute which utilizes 22.3:1.

The edge of the mixing zone values are determined when the effluent is at its MEC. A mass balance equation is used which accounts for the dilution and the amount of a pollutant already present in the receiving water:

$$C_dQ_d = C_eQ_e + C_uQ_u \qquad \textit{(Equation C-5)}$$

Where: C_d is the concentration at the edge of the MZ
Q_d is the flow downstream or $Q_e + Q_u$
C_e is the concentration in the effluent (MEC)
Q_e is the maximum effluent flow
C_u is the upstream receiving water concentration (90th percentile)
Q_u is the upstream flow
Q_u/Q_e is the dilution factor (DF)

When the above equation is rearranged to solve for C_d and appropriate substitutions are made, the equation is:

$$C_d = \frac{C_eQ_e + C_uQ_u}{Q_d} = \frac{C_eQ_e}{Q_e+Q_u} + \frac{C_uQ_u}{Q_e+Q_u}$$

$$C_d = \frac{C_eQ_e}{Q_e+Q_u}\left(\frac{1/Q_e}{1/Q_e}\right) + \frac{C_uQ_u}{Q_e+Q_u}\left(\frac{1/Q_e}{1/Q_e}\right)$$

$$C_d = \frac{C_e}{1+DF} + \frac{C_u*DF}{1+DF} = \frac{MEC + C_u*DF}{1+DF} \qquad \textit{(Equation C-6)}$$

Table C-5 Reasonable Potential (RP) Analysis						
Parameter	Units	MEC	Edge of MZ[1]			RP?
			Chronic	Acute	Ceremonial	
Aluminum[2]	ug/L	417.299	---	---		Yes

Table C-5 Reasonable Potential (RP) Analysis						
Parameter	Units	MEC	Edge of MZ[1]			RP?
			Chronic	Acute	Ceremonial	
Arsenic[3]	ug/L	6.204	---	---		Yes
Gross Alpha	pCi/L	259.323	2.80			No
Iron[4]	ug/L	190.891	---	---		No
Lead 210[6]	pCi/L	1.205	0.91			No
Lead 212[6]	pCi/L	12.500	24.92			No
Lead	ug/L	9.545	0.97	1.29		No
Manganese	ug/L	343.275			33.93	No
Mercury[5]	ug/L	0.015	---	---		Yes
Polonium 210[6]	pCi/L	8.781	0.56			No
Radium 226, diss[6]	pCi/L	1.946	0.21			Yes
Radium 226, tot[6,7]	pCi/L	No Data				Yes
Radium 228[6]	pCi/L	4.581	0.87			No
Sulfates	mg/L	2712.681	26.79			No
Thallium	ug/L	0.49	0.01			Yes
Thorium 232[6]	pCi/L	0.307	0.15			No
Thorium 234[6]	pCi/L	1891.117	518.78			No
TDS	mg/L	3872.785	143.31			No
Uranium 234[6]	pCi/L	51.568	1.02			Yes
Uranium 235[6]	pCi/L	1.587	0.11			No
Uranium 238[6]	pCi/L	44.610	0.87			No
Uranium, diss	ug/L	163.403	2.51			No
Uranium, tot	ug/L	143.156	2.40			Yes
Zinc[8]	ug/L	34.36	---	---		Yes

1 – Any parameter (except Arsenic, see footnote 3) that showed no RP for the aquatic life standards did not have a Human Health criteria so there was no need to further calculate edge of the MZ numbers because all other parameters showed the need for a limit when aquatic life was considered except Manganese which shows no RP.

2 – The receiving water concentration for Al is above the standard so the RP is determined by whether the MEC exceeds any standard without a mixing zone being considered. The MEC exceeds the chronic aquatic life and human health ceremonial use standards.

3 - The receiving water concentration for As is above the standard so the RP is determined by whether the MEC exceeds any standard without a mixing zone being considered. The MEC exceeds the human health water + organisms use and the organisms only use standards.

4 - The receiving water concentration for Fe is above the standard so the RP is determined by whether the MEC exceeds any standard without the mixing zone being considered. The MEC does not exceed any standard.

5 – Although the receiving water concentration for mercury is below the standard, no mixing was needed so the RP is determined by whether the MEC exceeds any standard without a mixing zone. The MEC exceeds the chronic aquatic life use, the human health water + organisms use and the organisms only use standards.

6 – The edge of mixing zone values for the radionuclides were developed using the above background standard plus the 95th percentile in the receiving water as authorized in the STI CWA § 401 Certification.

7 – There is no water quality data or standard but there is a TBEL applicable to this parameter so this parameter is limited.

8 – Although the receiving water concentration for zinc is below the standard, no mixing was needed so the RP is determined by whether the MEC exceeds any standard without a mixing zone. The MEC does not exceed any WQS but there is a TBEL applicable to this parameter so this it is limited.

3. Water Quality-Based Permit Limitation Derivation

Once EPA has determined that a WQBEL is required for a parameter, the first step to a permit limitation is development of a WLA. A WLA is the concentration (or loading) of a pollutant that the permittee may discharge without causing or contributing to an exceedence of WQS in the receiving water. WLAs and permit limitations are derived based on guidance in the TSD.

The acute and chronic WLAs are converted to LTAs and compared. The most stringent LTA concentration for each parameter is statistically converted to effluent limitations. This section describes each of these steps.

Calculations of WLAs:

Three methods were used to calculate the WLA needed to determine effluent limitations. The first uses the criteria as the WLA. This was done for aluminum, arsenic, iron, zinc and mercury for one of two reasons, either the parameter does not need a mixing zone or the concentration of the parameter in the receiving water already exceeds the criteria so no assimilative capacity is available for mixing.

WLA = Standard *Equation C-7*

The second considers a dilution factor when determining the WLA. This was done for lead, manganese, sulfate, and TDS. The mass balance equation is used in order to account for background levels already in the receiving water:

$C_dQ_d = C_eQ_e + C_uQ_u$

Where: C_d is the concentration at the edge of the MZ (standard)
Q_d is the flow downstream or $Q_e + Q_u$
C_e is the concentration in the effluent (WLA)
Q_e is the maximum effluent flow
C_u is the upstream receiving water concentration (90^{th} percentile)
Q_u is the upstream flow
Q_u/Q_e is the dilution factor (DF)

When the above equation is rearranged to solve for C_e and appropriate substitutions are made, the equation is:

$$C_e = \frac{C_dQ_d}{Q_e} - \frac{C_uQ_u}{Q_e} = \frac{Std(Q_e + Q_u)}{Q_e} - DF*C_u$$

$$C_e = Std \left(\frac{Q_e}{Q_e} + \frac{Q_u}{Q_e} \right) - DF* C_u$$

$C_e = Std (1 + DF) - DF*C_u$ *(Equation C-8)*

The third method is used for radionuclides whose criteria are expressed as an above background value. This includes total uranium where the criterion for natural uranium (U_{nat}) in pCi/L was multiplied by 1.48[1] to obtain the criterion in ug/L so the resulting limitations could be compared to the ELG values in Table C-1. The above formula is utilized but the substitutions are slightly altered:

$C_dQ_d = C_eQ_e + C_uQ_u$

Where: C_d is the concentration at the edge of the mixing zone or the concentration upstream plus the standard or $C_u + x$
(where "x" is the numerical value that C_u can be exceeded)
Q_d is the flow downstream or $Q_e + Q_u$
C_e is the concentration in the effluent (WLA)
Q_e is the maximum effluent flow
C_u is the upstream receiving water concentration (95th percentile)
Q_u is the upstream flow
Q_u/Q_e is the dilution factor (DF)

When the above equation is rearranged to solve for C_e and appropriate substitutions are made, the equation is:

$$C_e = \frac{(C_u + x)*Q_d}{Q_e} - \frac{C_uQ_u}{Q_e} = \frac{C_uQ_d}{Q_e} + \frac{xQ_d}{Q_e} - DF*C_u$$

$$C_e = \frac{C_u(Q_e + Q_u)}{Q_e} + \frac{x(Q_e + Q_u)}{Q_e} - DF* C_u$$

$$C_e = \frac{C_uQ_e}{Q_e} + \frac{C_uQ_u}{Q_e} + \frac{xQ_e}{Q_e} + \frac{xQ_u}{Q_e} - DF*C_u$$

$$C_e = C_u + DF *C_u + X + X*DF - DF*C_u$$

$$C_e = C_u + X*(DF +1) \qquad \textit{(Equation C-9)}$$

STI has authorized a Mixing Zone in the draft § 401 Certification (see Appendix B) for all the parameters listed in Table C-2 except aluminum, arsenic, iron, mercury and zinc. The size of the mixing zone is described in the draft § 401 Certification. The critical flows used for developing effluent limitations are discussed in Part B.1.b. of this Appendix and shown in Table C-4.

Appendix D provides an example of how the WLAs for zinc (Zn) and uranium 234 (U_{234}) were developed.

[1] Fernald Preserve 2010 Site Environmental Report. US Department of Energy. Doc. No. S07409. May 2011. Excerpt of Unit Conversion Table.

Calculations of Long-term Average (LTA) Concentrations:

As discussed above, WLAs are calculated for each parameter for each aquatic life standard (acute and chronic). Because standards are based on different criteria which apply over different time frames (acute criteria are applied as a one-hour average and chronic criteria are applied as a four-day average), it is not possible to compare them or the WLAs directly to determine which results in the most stringent limitations. If a parameter only has one criterion, it is treated as a chronic criterion in calculating the LTA.

To allow for comparison, the acute and chronic WLAs are statistically converted to LTA concentrations. The conversion is dependent upon the CV of the effluent data and the probability basis used. The probability basis corresponds to the percentile of the estimated concentration. EPA uses a 99th percentile for calculating the LTA, as recommended in the TSD. The following equations from Chapter 5 of the TSD are used to calculate the LTA concentrations (Table 5-1 of the TSD may also be used).

$$LTA = WLA * \exp[0.5\sigma^2 - z\sigma] \quad \textit{(Equation C-10)}$$

Where:

$\sigma^2 = \ln(CV^2 + 1)$ for acute WLA, and *(Equation C-11)*

$\sigma^2 = \ln(CV^2/4 + 1)$ for chronic WLA *(Equation C-12)*

CV = coefficient of variation (standard deviation/mean)

Z = 2.326 for the 99th percentile probability basis (TSD)

Calculation of Aquatic Life Effluent Limitations:

The LTA concentration is calculated for each WLA and compared. The most stringent LTA concentration is then used to develop the maximum daily limitation (MDL) and the average monthly limitation (AML) to be considered for the permit. The MDL is based on the CV of the data and the probability basis while the AML is dependent upon these two variables and the monitoring frequency. As recommended in the TSD, EPA uses a probability basis of 95 percent for the AML calculation and 99 percent for the MDL calculation. The MDL and AML are calculated using the following equations from the TSD (Table 5-2 of the TSD may also be used).

$$MDL \text{ or } AML = LTA * \exp[z\sigma - 0.5\sigma^2] \quad \textit{(Equation C-13)}$$

Where: $\sigma^2 = \ln(CV^2 + 1)$ *(Equation C-14)*

z = 2.326 for the 99th percentile probability basis

z = 1.645 for the 95th percentile probability basis

But if the AML exceeds the WLA_c then

For the AML: $\sigma^2 = \ln(CV^2/4 + 1)$ *(Equation C-15)*

z = 1.645 for the 95th percentile probability basis

Calculation of Human Health Effluent Limitations

Because aquatic life protection is based on hours or days of exposure while human health protection is based on years, effluent limitations based on Human Health standards are calculated differently than those for aquatic life standards.

$$AML = WLA \qquad \textit{(Equation C-16)}$$

$$MDL = WLA * \frac{e^{[(z_{99}*\sigma) - (.5*\sigma^2)]}}{e^{[(z_{95}*\sigma_4) - (.5*\sigma_4^2)]}} \qquad \textit{(Equation C-17)}$$

Several parameters have multiple human health standards. The following table shows the most stringent limitations for these parameters. Since the human health value for consumption of water & organisms is more stringent than the consumption of organisms only, the former has been calculated to compare with effluent limitations based on ceremonial standards.

The following table compares the effluent limitations developed for each parameter based on the applicable aquatic life standard and the most stringent human health standard. The most stringent WQBELs are also identified and carried forward in the effluent limitation determination.

Table C-6 Water Quality-based Effluent Limitation Determination

Parameter	Units	Aquatic Life							Human Health			
									Water + Organisms		Ceremonial	
		WLAc	WLAa	LTAc	LTAa	LTAmin	AML	MDL	AML	MDL	AML	MDL
Aluminum	ug/L	87.0	750.0	49.8	272.76	49.8	73.2	136.9	---	---	50.0	93.5
Arsenic	ug/L	150.0	340.0	101.75	163.6	101.75	133.3	211.5	0.00095	0.0015	50.0	143.6
Mercury	ug/L	0.012	1.4	0.006	0.454	0.006	0.010	0.020	0.011	0.022	2.0	4.0
Ra 226, diss	pCi/L	9.951		5.02		5.02	8.0	16.7	---	---	---	---
Ra 226, tot	pCi/L	---	---	---	---	---	---	---	---	---	---	---
Thallium	ug/L	---	---	---	---	---	---	---	6.5	13.1	321.4	644.7
Uranium 234	pCi/L	49.00		28.75		28.75	41.6	76.0	---	---	---	---
Uranium, diss	ug/L	---	---	---	---	---	---	---	---	---	---	---
Uranium, tot	ug/L	73.18	---	29.81	---	29.81	54.8	73.2	---	---	---	---
Zinc	ug/L	50.82	56.11	26.8	18.0	18.0	38.5	56.1	69910	140253	799240	1603427
pH	s.u.	Within the range of 6.5 to 8.5										

Appendix D shows examples of the permit limitation calculations for Zn and U_{234}

4. Calculations of WET Triggers and Receiving Water Concentration

The STI WQS do not contain numeric criteria for WET. Although EPA has not published numeric water quality criteria under section 304(a) for whole effluent toxicity, EPA has provided general guidance on appropriate WET limits. The TSD (USEPA 1991a) recommends 0.3 acute toxic unit (TUa) as an acute criterion and 1.0 chronic toxic unit (TUc) as a chronic criterion. The following trigger levels are based on these values.

Chronic: 160 * 1 = 160 TUc

Acute: 22.3 * 0.3 = 6.7 TUa

The Receiving Water Concentration (RWC) for chronic testing is calculated based on the following equation:

$$RWC = \frac{Q_e}{Q_u + Q_e}$$

By dividing both the numerator and denominator by Q_e, equivalent to dividing the equation by 1, the equation becomes:

$$RWC = \frac{Q_e/Q_e}{Q_u/Q_e + Q_e/Q_e}$$

As above, Q_u/Q_e is the dilution factor of 160 so the equation becomes:

$$RWC = \frac{1}{160 + 1} = 0.0062$$

So the RWC utilized in the dilution series is 0.62% effluent

C. Summary of Draft Permit Effluent Limitations – Outfall 001

As discussed in Section V.A. of the fact sheet, the draft permit contains the more stringent of TBELS and WQBELs. The WQBELs are more stringent than the TBELs for the metals and have therefore been included in the permit. The draft permit contains those limitations based on EPA-approved WQS.

Table C-7 shows a comparison between the TBELs and the most stringent WQBELs from Table C-6, above, and the limitations included in the draft permit.

Table C-7 Permit Effluent Limitation Determination

Parameter	Units	Most Stringent WQBELs		TBELs		Permit Effluent Limitations	
		AML	MDL	AML	MDL	AML	MDL
Aluminum[1]	ug/L	50.00	93.54			50.0	93.5
Arsenic[1]	ng/L[2]	0.95	1.5			0.95	1.5
Mercury[3]	ug/L	0.010	0.020			0.010	0.020
Radium 226, diss	pCi/L	8.0	16.7	3	10	3	10
Radium 226, tot	pCi/L			10	30	10	30
Thallium	ug/L	6.5	13.1			6.5	13.1
Uranium 234	pCi/L	41.6	76.0			41.6	76.0
Uranium, tot	ug/L	54.8	73.2	2000	4000	54.8	73.2
Zinc[3]	ug/L	38.5	56.1	1000	500	38.5	56.1
TSS, mg/L	mg/L			20	30	20	30
COD, mg/L	mg/L			100	200	100	200
pH	s.u.	within 6.5 to 8.5		within 6.0 to 9.0		within 6.5 to 8.5	

1 - limitations set without dilution since ambient exceeds the criteria
2 – ng/L means nanogram per liter (1/1000th of a microgram)
3 – no dilution necessary

Under the anti-backsliding provisions of the CWA, any limitation in a reissued permit must be at least as stringent as the current limitation unless a change meets one of the exceptions listed in CWA § 402(o)(2) or in CWA § 303(d)(4)(B). Since the draft permit is for a new discharge, backsliding does not apply.

APPENDIX D: Example Water Quality-based Effluent Limitation Calculations

This appendix demonstrates how the water quality-based analysis (reasonable potential determination and development of effluent limitations) was performed using Zn and U_{234} in Outfall 001 as examples.

ZINC

Step 1: *Determine the applicable water quality standard.*

The current WQS for zinc are provided below at a hardness value of 42 mg/L $CaCO_3$.

Table D-1 Zinc dissolved criteria		
Parameter	Acute	Chronic
Zinc, ug/L	54.88	50.11

Since NPDES permit limitations for metals have to be expressed as total recoverable, the dissolved criteria are translated to total recoverable criteria. As explained in Appendix C, the default translator is the reciprocal of the conversion factor (CF) from the WQS. For zinc, the acute CF is 0.978 and the chronic is 0.986. Dividing the dissolved criteria by the appropriate CF, provides the following total recoverable criteria.

Table D-2 Zinc total recoverable criteria		
Parameter	Acute	Chronic
Zinc, ug/L	56.111	50.822

Step 2: *Determine if there is reasonable potential for the discharge to exceed the standard.*

To determine reasonable potential, the maximum projected concentration at the edge of the authorized mixing zone is compared to the applicable WQS. If this exceeds the standard, then a reasonable potential exists and a WQBEL is established.

Since zinc has a TBEL, the following equation applies:

1000 * RPM (reasonable potential multiplier) = 1000 * 1 = 1000

If this had been based on a WQBEL, the statistics discussed in Appendix C would have been applied to determine the RPM as follows:

EPA utilizes the Equations C-1 through C-3 to determine the multiplier for zinc. The maximum effluent measure was 9.0 ug/L, the CV is 0.6, the number of effluent samples is 6.

$P_n = (1 – 0.99)^{1/6} = 0.464$ (from Table C-3)

$$RPM = \frac{C_{99}}{C_{Pn}} = \frac{e^{[(z_{99}*\sigma) - (.5*\sigma^2)]}}{e^{[(z_{Pn}*\sigma) - (.5*\sigma^2)]}} = \frac{e^{(2.326*0.3075) - (0.5*0.5545)}}{e^{(-0.09*0.3075) - (.5*0.5545)}} = 3.8$$

Where:

σ^2 = $\ln((.6)^2 + 1) = 0.3075$ $\sigma = 0.5545$

z_{99} = 2.326

$z_{46.4}$ = -0.090

The MEC of the effluent is calculated by multiplying the maximum observed effluent concentration by the RPM:

MEC = (Max Eff) * RPM = 9 * 3.8 = 34.4 ug/L

The MEC is less than the chronic criteria of 50.11 ug/L. If the RP was determine strictly on a WQ basis, there would be no reasonable potential for zinc to violate the criteria. But when there is a TBEL, that value is compared to the WQS because WQBELs are only necessary if the TBEL will be exceeded.

Based on the above analysis of the TBEL, the effluent from Outfall 001 has the reasonable potential to exceed the zinc aquatic life standard and the human health standard for the consumption of water + organisms. Therefore, WQBELs are required.

Step 3: *Determine the wasteload allocation.*

Although the receiving water concentration for zinc is below the WQS, no mixing zone has been authorized since the MEC does not have the RP to exceed any WQS without a mixing zone.

The WLAs for zinc use *Equation C-6*.

WLA = Std

WLA_a = 56.111

WLA_c = 50.822

Step 4: *Develop long-term average (LTA) concentrations.*

Effluent limitations are developed by converting the aquatic WLAs to LTAs by using *Equations C-9* through *C-11*. The most stringent of the acute or chronic LTA is then used to develop the effluent limitations.

$LTA = WLA * \exp[0.5\sigma^2 - z\sigma]$

Where: z = 2.326 for 99th percentile probability basis (per the TSD)

CV = 0.6

Acute: $\sigma^2 = \ln(CV^2 + 1) = \ln[(0.6)^2 + 1] = 0.3075$ $\sigma = 0.5545$

Chronic: $\sigma^2 = \ln(CV^2/4 + 1) = \ln[(0.6)^2/4) +1] = 0.0862 \quad \sigma = 0.2936$

$$LTA_a = 56.111 * e^{[(0.5*0.3075) - (2.326*0.5545)]} = 18.02$$

$$LTA_c = 50.822 * e^{[(0.5*0.0862) - (2.326*0.2936)]} = 26.8$$

The most stringent LTA is 18.02 ug/L for the acute criteria. It is used to develop the WQBELs for the protection of aquatic life.

Step 5: *Develop effluent limitations*

The LTA concentration is converted to a MDL and an AML using *Equation C-12*.

$MDL, AML = LTA * \exp[z\sigma - 0.5\ \sigma^2]$

Where, $\sigma^2 = \ln(CV^2 + 1) = \ln[(0.6)^2 +1] = 0.3075$
$\sigma = 0.5545$
For the MDL: $z = 2.326$ for 99th percentile probability basis (per the TSD)
For the AML: $z = 1.645$ for the 95th percentile probability basis (per the TSD)

$$MDL = 18.02 * e^{[(2.326*0.5545) - 0.5*0.3075)]} = 56.1$$

$$AML = 18.02 * e^{[(1.645*0.5545) - (0.5*0.3075)]} = 38.5$$

Since the AML does not exceed the chronic wasteload allocation, this limit does not have to be made more stringent using *Equation C-14*.

There is also reasonable potential to exceed the human health criteria for water + organisms and organisms only. Since the standard for water + organisms is more stringent, only the effluent limitations based on it were calculated.

First, the WLA is set to the standard.

WLA = 470 ug/L

Then the AML is set as the WLA (*Equation C-15*).
AML = 470 ug/L

The MDL is determined using *Equation C-16*.

$$MDL = 470 * \frac{e^{(2.326*0.5545) - (0.5*0.3075)}}{e^{(1.645*0.2936) - (.5*0.862)}} = 942.9 \text{ ug/L}$$

The effluent limitations based on the aquatic life criteria are more stringent than those based on the human health criteria so the aquatic life are compared with the TBELs and used as the draft permit effluent limitations.

URANIUM 234 (U_{234})

Step 1: *Determine the applicable water quality standard.*

The current WQS for U_{234} is an above background criterion and is shown below in Table D-3.

Table D-3	
Parameter	
U_{234}, pCi/L	0.30

Step 2: *Determine if there is reasonable potential for the discharge to exceed the standard.*

To determine reasonable potential, the maximum projected concentration at the edge of the authorized mixing zone is compared to the applicable WQS. If this exceeds the standard, then a reasonable potential exists and a WQBEL is established.

EPA utilized *Equations C-1 through C-3* to determine the multiplier for U_{234}. The maximum effluent measured was 24.4 piC/L, the CV is 0.47, the number of effluent samples is 17 and the RPM is 2.1. The maximum projected effluent value is 51.568 piC/L. Using *Equation C-5*, the concentration at the edge of the mixing zone is 2.34 piC/L.

Since 2.34 exceeds the standard (0.3) plus the background level (0.7), the effluent from Outfall 001 has the reasonable potential to exceed the U_{234} aquatic life standard. Therefore, WQBELs are required.

Step 3: *Determine the wasteload allocation.*

The determination of the dilution factors to utilize was discussed in Appendix C. The chronic WLA utilizes 160:1 dilution and the acute utilizes 22:1. As discussed above, when only a single criterion is available, it is treated as chronic.

The WLA for U_{234} uses the mass balance equation *(Equation C-4)* which accounts for the dilution in the mixing zone and the amount of U_{234} already present in the receiving water. *Equation C-7* is used to determine the WLA.

$$WLA = C_u + Std\ (1+DF)$$

$$WLA_c = 0.7 + 0.30(161) = 49$$

Step 4: *Develop long-term average (LTA) concentrations.*

Effluent limitations are developed by converting the aquatic WLA to LTA by using *Equations C-9* and *C-11*.

$LTA = WLA * \exp[0.5\sigma^2 - z\sigma]$

Where: z = 2.326 for 99th percentile probability basis (per the TSD)
CV = 0.4907
Chronic: $\sigma^2 = \ln(CV^2/4 + 1) = \ln[(0.4907)^2/4) +1] = 0.058$ $\sigma = 0.242$

$$LTA_c = 49 * e^{[(0.5*0.058) - (2.326*0.242)]} = 28.75$$

Step 5: *Develop effluent limitations*

The LTA concentration is converted to an MDL and AML using *Equation C-12*.

$MDL, AML = LTA * \exp[z\sigma - 0.5\ \sigma^2]$

Where, $\sigma^2 = \ln(CV^2 + 1) = \ln[(0.4907)^2 +1] = 0.216$
$\sigma = 0.464$
For the MDL: z = 2.326 for 99th percentile probability basis (per the TSD)
For the AML: z = 1.645 for the 95th percentile probability basis (per the TSD)

$$MDL = 28.75 * e^{[(2.326*0.464) - 0.5*0.216)]} = 75.9 \text{ pCi/L}$$

$$AML = 28.75 * e^{[(1.645*0.464) - (0.5*0.216)]} = 55.4 \text{ pCi/L}$$

Since the AML exceeds the chronic WLA, the limitation has to be made more stringent using *Equation C-14* where $\sigma^2 = \ln((0.4907)^2/4 +1)$.

$$AML = 28.75 * e^{[(1.645*0.242) - (0.5*0.058)]} = 41.6 \text{ pCi/L}$$