STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

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Dirk Kempthorne, Governor
C. Stephen Allred, Director

January 2, 2001

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U.S. EPA REGION 10
OFFICE OF WATER

Patty McGrath
Environmental Protection Agency, Region 10
Office of Water
1200 Sixth Avenue
Seattle, WA 98101

RE: Certification of discharges, mixing zone determination, and authorization for new discharges into special resource waters, Thompson Creek Mine, NPDES No. ID 002540-2

Dear Ms. McGrath:

The Idaho Department of Environmental Quality (DEQ) has reviewed the proposed final NPDES permit for the Thompson Creek Mine, No. 002540-2 and has reviewed and considered the comments received regarding the draft permit and DEQ's proposed certification. This letter provides certification, pursuant to Section 401 of the Federal Water Pollution Control Act (Clean Water Act), that, if the conditions described herein are met, there is a reasonable assurance that the activities allowed under the above referenced permit will comply with applicable requirements of sections 301, 302, 303, 306 and 307 of the Clean Water Act and the Idaho Water Quality Standards and Wastewater Treatment Requirements ("Water Quality Standards"). This certification is supported by the enclosed report entitled "Evaluation of Proposed New Point Source Discharges to a Special Resource Water and Mixing Zone Determinations: Thompson Creek Mine facility, Upper Salmon River Subbasin, Idaho" ("the Report"). The analyses in the Report also support the conclusion that the discharges allowed by the permit are unlikely to jeopardize the continued existence of any threatened or endangered aquatic species or bald eagles and are unlikely to result in the disturbance or adverse modification of any critical habitat.

Conditions necessary to assure compliance with Water Quality Standards

Based upon a biological, chemical and physical appraisal of the receiving waters and proposed discharges, the following conditions are necessary to assure compliance with the Idaho Water Quality Standards. Please refer to the accompanying Report for supporting information. Citations to Tables, Figures and references are to the accompanying Report.

Condition 1: Special resource water (SRW) The Salmon River is designated in the Idaho Water Quality Standards as a SRW. Therefore, pursuant to the Water Quality Standards, IDAPA 58.01.02.400.01.b, the permit must contain a provision that prohibits the discharge from resulting in a reduction of the ambient water quality of the Salmon River as measured below the applicable mixing zone. The proposed final permit contains monitoring provisions to determine whether there has been a reduction in the ambient water quality. These monitoring provisions are based upon DEQ's interpretation of the Water Quality Standards as set forth in the Report at pages 11-17. The monitoring provisions must be retained in the final permit to assure compliance with the SRW provisions in the Water Quality Standards.

Condition 2: Follow up sampling if criteria concentrations exceeded (for all receiving water monitoring) - The following described sampling requirements are reflected in the proposed final permit and must be retained in the final permit to assure compliance with the Water Quality Standards: Numeric toxics criteria are defined by concentrations, and duration and frequencies of exceedances. Acute criteria are considered the highest concentration of a pollutant to which aquatic life can be exposed for a short period of time (1-hour average) without deleterious effects. Chronic criteria are considered the highest concentration of a pollutant to which aquatic life can be exposed for an extended period of time (4-day average) without deleterious effects. DEQ considers single graph samples to adequately represent 1-hour average concentrations for criteria exceedance purposes. However, a single grab sample may not always represent the 4-day average concentrations applicable to chronic criteria.

If monitoring results show that any chronic criteria concentrations are exceeded, then at the next scheduled monitoring, sampling and analysis for at least those pollutants at that station, shall be expanded to include 4-day average concentrations. The 4-day average concentrations shall include at least one grab sample per day for 4 consecutive days. If the 4-day average concentration also exceeds criteria, then all further monitoring at that station for those pollutants shall include 4-consecutive day samples instead of single-time grab samples, until otherwise notified by DEQ. If the original criteria concentration exceedance occurred on the last scheduled hydrograph based sampling date of the year, then the station should be re-sampled as soon as practicable, which we assume will be no later than one week after TCM receives the sampling results. For example, if the mine is on an April, June, August and October sampling rotation, if the October results exceed criteria, then the station should be promptly re-sampled, rather than waiting until the following April.

Condition 3: Accurate Salmon River flow information is required in order to apply the flow-based limits for new and increased discharges to the Salmon River which are certified here. More specific recommendations are given in the Report.

Condition 4: The following described requirements regarding field bioassessments are reflected in the proposed final permit and must be retained in the final permit to assure compliance with Water Quality Standards. The permittee shall conduct field bioassessments of benthic

macroinvertebrate, fish assemblages, and periphyton assemblages, with a goal of annual trends monitoring. The specifics of the field bioassessments should be established through the existing interagency task force (IATF) established by memorandum of understanding between the agencies with regulatory responsibilities for the facility. The permittee shall submit a proposed revision to their Consolidated Environmental Monitoring Program plan (TCMC) to IATF participating agencies for approval within six (6) months after the permit is issued. The permittee shall consider the DEQ recommendations in the accompanying Report in preparing their monitoring plan. The recommendations are based upon the analyses in this Report, and experiences from extensive state-wide bioassessment activities.

Condition 5: The following described requirements regarding a selenium bioaccumulation study are reflected in the proposed final permit and must be retained in the final permit to assure compliance with Water Quality Standards. The discharger shall complete a selenium bioaccumulation study. Available information indicates that bioaccumulation of potential pollutants at levels harmful to aquatic life are unlikely (e.g. sediment chemistry, absence of apparent fish population effects). However, to definitively resolve whether selenium from TCMC discharges results in risk to aquatic life in Thompson Creek, a focused field assessment to assess whether exposure to selenium through the food chain poses a risk of adverse effects to aquatic life. The goal of the bioaccumulation study includes establishing a threshold for preventing risk to Thompson Creek fish populations from selenosis. While the thresholds could be developed for various media, they should be able to be related to a waterborne concentration. The bioaccumulation threshold should account for aqueous selenium concentrations low enough to prevent accumulation in fish food organisms, which in turn would result in the accumulation of selenium to high enough levels in parental fish to cause reproductive impairment, or other adverse effects. Adverse effects are those toxicological endpoints with clear relevance to population effects such as reproduction, survival, growth, and teratogenesis.

The accompanying Report includes considerations for completing the study. The TCMC shall submit a work plan for the bioaccumulation study to IDEQ within ninety (90) days of final permit issuance. The work plan must be approved by IDEQ.

Certification of Mixing Zones

This certification authorizes mixing zones as analyzed and described on pages 18-101 of the Report, pursuant to the Water Quality Standards, IDAPA 58.01.02.060. After review of comments by the TCMC on the mixing zones proposed in IDEQ (2000b), revised dilution ratios for Outfalls 001 and 002 to Thompson Creek, and a high flow tier for Outfall 005 to the Salmon River were added. These new mixing zones are shown on Tables 20 and 21 of the Report.

Certification of Compliance Schedule

Discharge permits for point sources may incorporate compliance schedules which allow a discharger to phase in, over time, compliance with water quality-based effluent limitations only

when new limitations are in the permit for the first time (WQS §400.03). Prospective selenium limits are the only limits for which a compliance schedule would be necessary and appropriate. Selenium concentrations from existing discharges approach the chronic water quality criteria for protection of aquatic life; excursions above the criteria were not documented, but are considered possible. No adverse effects to fish populations or the aquatic ecosystem were apparent from extensive monitoring data obtained over the life of the operation. Pursuant to the Water Quality Standards, IDAPA 58.01.02.400.03, this certification authorizes a compliance schedule of up to 5 years, including the following interim milestones, during which time further analyses and practicable measures to identify and reduce discharges shall be undertaken. In comments on the draft certification, TCMC requested that annual reports be due on March 31. This is acceptable to DEQ. Thus, for the purposes of the compliance schedule, the due dates for the interim tasks and progress reports are annually by March 31 beginning with the year following permit issuance. Until compliance with the selenium limits is achieved, the permittee shall submit an annual report summarizing efforts during the year to achieve compliance. The report shall include design documents and construction completion reports for actions taken during the year. Tasks scheduled past year 2 are listed in anticipation of potential unknown conditions. There is no need to complete later tasks if compliance is achieved sooner; also, should it be practical for the mine to complete these tasks sooner than scheduled, they should do so.

Table 1.

Task No.	Due at End of Year	Activity
1	1	*Source Investigation.* Investigate the sources, extent, transport, and fate of selenium in Pat Hughes and Buckskin Creeks. Investigation shall include 1) determining the origin and host rock of the selenium; 2) investigating mechanisms liberating the selenium from the source rock and introducing it into the effluents of Outfalls 001 and 002; and 3) using EPA MINTEQA2 model, or other suitable aqueous geochemical speciation model, predict selenium speciation in water. The deliverable is a progress report of findings, and recommendations for further actions to reduce selenium concentrations in the runoff.
2	1	*Bioaccumulation study.* Receiving water bioaccumulation study. Deliverable is a report of findings and, if warranted, recommendations for further investigation.
3	2	*Feasibility study.* Investigate the feasibility of measures to reduce selenium in Outfalls 001 and 002 to meet effluent limits. Measures considered should include, but are not necessarily limited to evaluation of 1) water management such as diversions and drainage ditches; 2) isolation of source areas by encapsulation; 3) waste rock management, and 4) improving the existing sedimentation pond or adding additional treatment. "Feasibility" is defined to include effectiveness, implementability, and cost. Evaluations should consider short- and long-term aspects of i) effectiveness of the measures (e.g. reduction of toxicity or mobility, affords long-term protection, minimizes short term environmental impacts, and complies with effluent limits; ii) implementability of the measures (e.g. technical feasibility); and iii) costs. Costs of construction and long-term maintenance should be considered. Costs that are grossly excessive compared to the overall effectiveness of the measure may be reason to eliminate consideration of that measure. Readily implementable measures should be designed and constructed as soon as feasible. Measures that are more technically difficult or have more unknowns may need further investigation. Deliverables: 1) Report of findings on feasibility of measures; 2) Design documents and/or construction completion reports for those measures that could be readily implemented.
4	3	*Design and construction.* Construction of feasible measures to reduce anthropogenic selenium discharges to Pat Hughes and Buckskin creeks. Deliverables are construction completion reports, and/or progress reports if more technically difficult or unknown conditions prevent completion
5	4	Continued design and construction of feasible measures
6	5	Construction completion of feasible measures

Recommendations Regarding Toxicity Testing

Idaho waters are to be free from toxic or deleterious substances in concentrations that impair beneficial uses (WQS §200). EPA has advanced an approach of using the whole effluent toxicity testing and field assessments as means to overcome limits to the numeric chemical criteria approach for predicting toxic and non-toxic waters. Unmeasured effluent constituents, additive effects or negative interactions between constituents may make effluents more or less toxic than would be predicted from chemical measurements. Several sections of Idaho's Water Quality Standards (WQS) give guidance on relating whole effluent toxicity testing (WET) procedures to existing and new discharges. These include complying with narrative criteria that the mixing zone be free from toxic substances in toxic amounts significant to beneficial uses, parameters for determining a healthy, balanced, biological community, and principles to be considered in the application of mixing zones (WQS §003.105; §053.02, §60.t, §60.h; §200). In general, this requires that waters within the mixing zone be free from acute effects (lethality), and waters at the edge of the mixing zone be free from acute and chronic effects (lethality and sublethal effects).

EPA has specified acceptable test protocols for measuring acute toxicity and estimating chronic toxicity of effluents (Weber 1993, Lewis et al 1994, EPA 1995a). The selection of which of the available tests to use, interpretation of test results, and determining whether whole effluent toxicity permit limits are needed is based upon site-specific factors, state Water Quality Standards, and EPA guidance. EPA's draft NPDES permit for the facility is generally consistent with our conditions and recommendations from our April 26, 2000 draft analysis (EPA 2000a, IDEQ 2000b). Exceptions are noted.

The following table and list include specific recommendations, and their rationale for characterizing whole effluent toxicity to ensure that receiving waters are free from toxic substances in concentrations that impair beneficial uses. Receiving water chemical sampling should coincide with sample collection for WET to help predict receiving water effects from WET.

Table 2. Recommended whole effluent toxicity endpoints to comply with Idaho narrative Water Quality Standards (if a "reasonable potential" for toxicity is present).

Objective	Recommended Test	Target Endpoint	Initial Test Frequency
In the mixing zone: Prevention of short-term lethality to biota significant to beneficial uses within the zone of initial dilution where acute numeric criteria may be exceeded	Salmonid 96-hour early life stage test[a]	No toxicity of 100% effluent at 48-hours; no toxicity of 33% effluent at 96-hours (upper range of concentrations typically occurring within zones of initial dilution).	Annually, during April-June, concurrent with ambient chemical sampling
Below the mixing zones: Prevention of acute and chronic toxicity to biota significant to beneficial uses at the edge of the mixing zone	Fathead minnow and/or *Ceriodaphnia* 7-day "chronic" tests[b]	NOEC and IC_{25} at 7d less than dilution ratios given in Table 20. Actual instream waste concentrations at the time of testing should also be reported to help interpret test results. Initially, tests with proposed effluents should use a proportional blend of water sources that will make up the effluent	Annually between April-June for outfalls 001 and 002. For 004 and 005, 4x annually when discharging.

[a] Weber 1993; [b]Lewis et al. 1994

Rationale

Exception from proposed final permit and IDEQ 2000b. The measurement endpoints for acute salmonid tests should include a 48-hour NOEC of 100% effluent, and a 96-hour NOEC of ≥33% effluent. These endpoints meet the requirement to prevent short-term lethality to biota significant to beneficial uses in the zone of initial dilution. Because at the point the effluent first enters the receiving water, in that (albeit tiny) area fish could be exposed to undiluted effluent, the short-term toxicity of undiluted effluent to trout should be tested. While a fish would be highly unlikely to stay in undiluted effluent for anything close to 48-hours, that time may account for any delayed toxicity that might occur from a more likely field exposure (ignoring for the moment the likely avoidance of fish, which would make the scenario of a salmonid swimming into and staying in 100% effluent unlikely). Effluents are predicted to be diluted to <33% effluent within a few meters of the outfall. The 96-hour NOEC at ≥33% dilution protects against longer-term acute exposures of salmonids in the mixing zone beyond the edge of the zone of initial dilution. LC50s should also be calculated and reported to allow comparison between acute and chronic test results.

To help interpret test results, flows should be collected at the time of sampling in order to report actual instream waste concentrations. The WET test reports must include this information, and include summary statistics showing whether measured toxicity is above or below actual dilution occurring at the time of the test. Test reports should also include a summary plot or table of actual dilution ratios measured between WET tests. Comparison of actual dilution ratios, target dilution ratios, and WET results will help evaluate compliance with narrative "free from toxic substances in toxic amounts" requirements.

The testing programs are to include a geometric dilution series with at least 6 dilutions ranging from 100% to 0% effluent, where one dilution approximates the target concentration. Generally, this target dilution value should not be the lowest value, i.e. it should be bracketed by other dilutions in the series (not including the 0% effluent control). This bracketing is desirable to determine whether a consistent concentration-response effect is present. If no effects occur at target dilution concentrations, then this bracketing could provide an estimate of what concentrations could cause effects. The target concentration for WET limits it to be consistent with the dilution ratio used for determining other permit limits (Table 20). Since information separately reviewed indicates WET tests (other than *Selanastrum*) are reasonably accurate predictors of instream toxicity, the test conditions should mimic actual conditions. Thus, use of the target receiving water volume is appropriate for testing without further manipulation (i.e. 100% of receiving water flow, or 100% "mixing zone").

Since the chronic tests for outfalls 001 and 002 are only proposed to be required annually (EPA 2000) the tests should include both *Ceriodaphnia* and the fathead minnows since it is conceivable the effluent characteristics could change over time. Fathead minnow chronic tests for outfalls 001 and 002 should include the abnormality endpoint (Lewis 1994). Annual monitoring should be done between April-June to correspond with the season that early life-stage fishes would be present in Thompson Creek. April is suggested since the outfalls would likely be carrying snow melt runoff from the waste rock dumps at that time. In some mining-disturbed watersheds, spring melt-off of waste rock dumps releases minerals and is a season of increased risk to aquatic life (Nelson et al. 1991). The TCMC monitoring date showed no clear seasonal trends, but absent a reason for testing at another time, April is suggested.

Actions if WET toxicity triggers are exceeded - The draft permit proposes that if acute or chronic toxicity is detected above the trigger values, the permittee must conduct four (4) more bi-weekly tests (EPA 2000a, p. 13). In DEQ (2000b) we recommend that if a single test fails, the permittee should initiate accelerated testing for the failed test (bi-weekly assuming test organisms are available); and if the next two consecutive tests are passed, or if the next three out of four more tests are passed, then the first test would be considered a "pass." Because effluent characteristics can be transitory, further testing beyond two rounds would be unlikely to add additional information to estimate if conditions at the time of the original test failure indicated a violation of

Water Quality Standards. Typically, overall test failure rates >20% would trigger toxicity identification and reduction procedures (EPA 1991a).
The measurement endpoints for "chronic tests" for comparison to trigger dilutions should be both no observed effect concentration (NOEC), which should be higher than the RWC, and the inhibition concentration (IC_{25}), which should be higher than the RWC. The statistical tests should confirm one another; otherwise the test should be repeated, or considered a "fail" at the permittee's discretion.

Dilution waters for testing should have similar physical and chemical characteristics to receiving waters. Preferably upstream receiving waters would be used for dilution. If logistics, or failure to meet acceptance criteria, prevent the use of receiving waters for dilution, then tests for outfalls 001 and 005 should use soft synthetic dilution water, and 002 and 004 should use moderately-hard synthetic dilution water, prepared following recipes from Weber (1993) or Lewis (1994).

Variances and Site Specific Criteria

TCMC commented on the draft of this certification and the draft Report that, since a possible outcome of investigations of selenium sources may be that their elimiation is infeasible, the certification should provide that a variance or site-specific criteria may be appropriate. DEQ acknowledges that TCMC may request a variance or site-specific criteria be developed. DEQ will consider and respond to the request as required by the Water Quality Standards. If a variance or site-specific criteria were to be adopted by DEQ in the Water Quality Standards during the term of this permit, the permit should be modified accordingly.

Appeal of the Certification

Please be aware that this Section 401 water quality certification may be appealed by submitting a request in writing within 35 days for a hearing, pursuant to Title 67, Chapter 52, Idaho Code and the Rules Governing Contested Case Proceedings and Declaratory Rulings, Title 5, Chapter 3, IDAPA 16.05.03.000 to 16.05.03.999. The request for a hearing must be filed with the hearing coordinator at the following address: Paula Gradwohl, 1410 N Hilton, Department of Environmental Quality, Boise, Idaho 83706-1255.

Please contact Chris Mebane at (208) 373-0173 or me if you have any questions about this matter.

Sincerely,

James S. Johnston
Regional Administrator

Enclosure
cc: David Mabe, IDEQ
Bert Doughty, TCM
Dale Brege, NMFS
Susan Burch, USFWS
Tom Montoya, SCNF