COLUMBIA GENERATING STATION
NPDES PERMIT NO. WA-002515-1

RESPONSE TO COMMENTS

The Energy Facility Site Evaluation Council received comments on the draft permit from three entities. They are: the Columbia Riverkeeper (Riverkeeper), the Nez Perce Tribe, and the Department of Ecology's (Ecology) Richland office. Comments from the Columbia Riverkeeper and the Nez Perce Tribe are similar in tone and substance, with both offering opening narrative statements followed by specific questions. The Tribe provided more detailed and comprehensive information about the effects of high temperatures in streams on aquatic species. Therefore, comments from these two entities are addressed together. Ecology's comments are addressed separately, afterwards.

Nez Perce Tribe Narrative Statement

The Nez Perce Tribe is a federally recognized Indian Tribe whose aboriginal territory extends through north-central Idaho, northeastern Oregon, southeastern Washington, and southwestern Montana. The Nez Perce Tribe's 1855 Treaty with the United States acknowledged and guaranteed a variety of retained off-reservation fishing, hunting and gathering rights. Treaty of June 9, 1855, 12 Stat. 957 (1859). Because of the retained off-reservation fishing rights, the Tribe has continually harvested fish for subsistence, cultural, spiritual and economic purposes throughout much of the Columbia Basin, including in a great number of streams and rivers in Washington. Because of this, the Tribe has a vested interest in protecting the water quality upon which these fish rely.

The discharge from the Columbia Generating Station has the potential to impact the already threatened and endangered fish runs that the Tribe relies upon, such as fall, spring and summer chinook salmon, coho salmon, steelhead, lamprey and sturgeon; as well as the lesser species upon which these fish utilize for sustenance. Because the discharge is into the critical Hanford reach of the Columbia River, the last free flowing stretch of the Columbia upstream of Bonneville dam, the stakes are all the higher.

Lack of Data

One of the biggest concerns the Tribe has with the permit is lack of specific information and data about the contents of the effluent, and the impact on the river ecosystem. The fact sheet states that temperature data has not been collected since 1995. Fact Sheet, pg. 21. The last modeling to be applied to the temperature impact to the river was in the 1985 Thermal Plume study, despite the fact that technology and computer modeling has advanced significantly in the last twenty years. Additionally, almost every other important piece of information was left off for analysis until the completion of the effluent mixing study, e.g. human health impacts, turbidity, toxics, and copper. This is all information that the Council should have before engaging in the permit rewriting process. As such, the Tribe requests that the Council obtain this information, and analyze the impacts of the effluent mixing study, and then reinitiate the permit

writing process; rather than issuing a relatively baseless permit with the potential to reopen the provisions pending the completion of the effluent mixing study.

Part of the additional analysis that needs to be included is a study of the groundwater releases, and potential impact to the river corridor from the relatively shallow aquifer and the close hydrological connectivity that has been demonstrated between this aquifer and the river. As indicated by the monitoring results presented in various parts of the fact sheet, the groundwater standards are being exceeded for a number of contaminants. This is a cause for concern for the Tribe as the groundwater is already heavily degraded from releases from the Hanford Nuclear Reservation.

Temperature

Background Temperature Impacts on Columbia River Salmonids

There has been concern about elevated stream temperatures in the Columbia River Basin for over 25 years. In 1971, EPA, in cooperation with the Atomic Energy Commission, and NMFS, published the "Columbia River Thermal Effects Study." Today, 29 years later, it is clear that temperature control on the mainstem and tributaries of the Columbia River is of even greater concern. Indeed, elevated water temperature is probably the single most significant water quality factor limiting salmon survival. Elevated stream temperatures pose a risk of irreparable harm to salmon and steelhead populations in the Columbia River. Elevated temperatures affect all life stages of salmonids, and cause direct and indirect mortality. Because Blue Heron's current discharges add hot water to the already too warm Columbia River, these discharges may adversely affect salmon and steelhead and harm their habitat in a variety of ways.

Elevated water temperatures can lead to direct fish mortality by two means. First, if temperatures become extremely hot (i.e., greater than 28° C), fish can perish within minutes. Second, temperatures in the mid to high 20° C range (24 –28°) can cause death in cold-water species within hours to days.

At slightly lower temperatures (i.e., between approximately 16 - 22° C), salmon begin to be negatively affected by means of reduced growth rates (juveniles), increased mortality from diseases (any life stage), reduced ability to compete for food and space (juveniles), reduced swimming and jumping ability (juveniles to adults), inability to migrate (smolts or adults), reversal of the smoltification process, reduced gamete viability, and continuous reduction in juvenile densities with temperature increases within this range. This temperature range can result in reduction in fish health and an increase in mortality from indirect causes. The magnitude of the effects increases with temperature.

Elevated water temperatures can increase the predation rate on smolts by warmwater-tolerant fish. This effect can be caused by a combination of factors. Salmon juveniles, that are otherwise healthy, cannot swim effectively at high temperatures or at low dissolved oxygen concentrations. The combined effect of high temperature and low DO makes predator avoidance by juvenile salmon even weaker and increases the toxicity of many chemical substances. Prolonged periods of high temperatures typical of summertime conditions can reduce fish vitality

and introduce them to warmwater diseases. This impairs the ability of salmon to avoid predators. The Columbia River and especially the Hanford Reach (home to critically important salmon habitat as well as one of the most contaminated Superfund sites in the country) contain excessive amounts of toxic substances in their sediments that can become even more toxic to salmon under elevated water temperatures.

Juveniles passing downriver past the Columbia Generating Station's facilities as smolts or pre-smolt migrants can be either killed outright in heated effluent plumes in the river, killed in the production facilities by entrainment in the cooling water intake pipe (we believe that the intake pipe is unscreened), or can be injured, impaired, or killed directly or indirectly by means outlined above. A thermal effluent plume can result in mortality by direct exposure to hot water. The lethal effect of a given exposure temperature increases when fish are previously acclimated to lower rather than higher water temperatures. That is, mortalities in a plume can be even worse provided that fish were acclimated to lower temperatures. In addition to direct mortality in the plume itself, the thermal shocks involved in entering and leaving the plume area can easily leave juveniles stunned and unable to swim or avoid predators. Thermal shock effects can be produced with abrupt temperature changes of as little as 10°C, and even smaller changes would produce a thermal shock when ambient conditions are >20°C.

General Biotic Effects

Growth

The capacity of fish to grow is influenced by the effect of temperature on metabolic rates, their appetite for feeding, efficiency of assimilating food, and their ability to compete for food with other species. At moderate temperatures, fish can channel much of the energy in food into growth. As temperatures increase beyond optimum levels, fish growth declines toward zero as they must invest more energy into simply staying alive. Indeed, at the upper limits of temperature tolerance, fish do not have enough energy to digest food and will cease all activity, including feeding, and eventually starve to death.

Disease

Most fish pathogens that can produce major epidemics in cold-water salmonids become more virulent at temperatures ranging from 16 - 22° C. For chinook, sockeye, and coho salmon, the incidence of disease and mortality from columnaris (a deadly bacterial disease) increases dramatically with temperature increases above 15.5 - 16.7° C (60 - 62° F). Such diseases associated with warm waters can produce mortality in all salmon species and life stages.

Disease surveys have not been conducted as frequently in recent years in the Columbia and Snake Rivers, but infection and mortality from disease effects is a constant concern in a warmed river. In mid-July 1998, there were three consecutive days of high fall chinook mortality detected at McNary Dam due to high water temperatures. Of 25 fish sampled from the Juvenile Fish Facility at McNary Dam that were distressed (swimming on their sides) during this high water temperature period, it was determined that 88% had columnaris infection. Although the fish were near death, there were no visible external signs of disease.

Prolonged temperatures exceeding 15°C have often been linked to outbreak of warmwater diseases. Incidence of these diseases and percent mortality both increase as temperatures increase. Temperatures of 20°C were reported to result in 100% mortality of chinook during columnaris outbreaks (Ordal and Pacha 1963). These authors considered temperature-induced columnaris as a major factor responsible for declines of Columbia River chinook. The system of reservoirs has been credited with a major increase in incidence of columnaris (Snieszko 1964).

Columnaris infections have been found throughout the mainstem Columbia River and in numerous tributaries. It is carried by all species of Pacific salmon, and also in carp, sucker, chub, bass, northern pikeminnow, chiselmouth, and catfish (Colgrove and Wood 1966). Many strains are of high virulence and can kill within 12-24 hours. Contagion of the disease has been suspected during passage of salmon through fish ladders (Pacha 1961) and increased incidence may be a result of creation of the slow moving reservoirs (Snieszko 1964). Warm sloughs may also harbor the disease organism in coarsefish that can then infect salmonids migrating in warmed reservoirs (Fujihara et al. 1970).

Food

As temperature and metabolic rates increase, oxygen and food requirements increase as well. If food is limited (the normal condition in a river), growth rates will be even lower than they would otherwise be at a given temperature. Additionally, higher temperatures generally result in lower dissolved oxygen amounts in the river and the combination of low dissolved oxygen and high temperature can synergistically cause increased metabolic stress. Fall chinook downstream forced to reside in water temperatures far above their growth optimum and in a warmed river producing inadequate food supplies can experience starvation conditions (Coutant 1999). Thermal impacts are more serious under food limitation conditions.

Predators

Competition, predation, and other species interactions with cool- and warm-water species (both native and exotic) can be significantly moderated by reducing water temperature. In the Pacific Northwest, non-native warm-water tolerant fishes, such as smallmouth bass, have colonized most large river basins, creating predatory and competitive interactions with native cold-water salmonids. In years with low flows and high water temperatures, predation rates on subyearling chinook in Lower Granite Reservoir are higher than normal (Bennett et al. 1996, as cited by NMFS 1999). This predation effect would likely increase with temperature and as the ability of salmon to avoid predation declines.

Thermal shock is a significant biologic impact to salmon in thermal plumes. In studies conducted by Coutant (1973), chinook juveniles acclimated at 15°C and shocked by instantaneous transfer to constant temperature baths in the range 26 to 30°C for exposure times equivalent to 10% of the median time to loss of equilibrium (LE) for those temperatures were subject to a significantly greater predation rate than were unshocked controls.

Stress

When salmon are forced to inhabit waters with high average or maximum temperatures (i.e., temperatures between the level resulting in low growth and those that begin to kill fish directly), loading stresses accumulate. As more energy is diverted to respiration at higher temperatures, less is available for growth and other necessary functions (gamete development, swimming, predator avoidance, disease resistance, recovery, and healing). When insufficient energy is available for important body processes, mortality can occur from accumulated stress or else poor gamete production and viability can translate to the next generation in terms of poor reproduction success.

Increased Temperatures Affect Every Salmonid Life Stage:

Salmonids go through several distinct life stages. *Eggs* are laid in the river bottom in a *redd* -- a spawning nest dug into gravel in a stream bed by a female adult salmon. *Alevin* are newly hatched young salmon that are still attached to the yolk sac of the egg. At the next stage, the young fish, now called *fry*, emerge from the gravel. A *juvenile* is a young fish, usually one to two years of age; the period that a juvenile remains in freshwater before migrating to the ocean is the freshwater *rearing* life stage. A *smolt* is a juvenile salmon migrating to the ocean and undergoing physiological changes (known as *smoltification*) to adapt its body from a freshwater to a saltwater environment. Depending on the species, salmon spend one to four years in the ocean before returning to their natal streams to spawn and die. An adult *spawner* is a mature fish that produces eggs or sperm.

Water temperature affects every salmonid life stage. A broad survey of the literature on temperature effects on numerous salmonid species reveals a high degree of similarity in response to temperature for any given life stage. Among the salmonids, bull trout require the lowest range of temperatures for spawning and rearing while redband trout can tolerate rearing at the high end of the range for salmonids. What is good, in terms of temperature, for one salmon species is generally good for the others. Migration temperatures might provide one apparent exception, but the differences for spring and fall chinook could merely reflect temperatures available during their migration rather than what they require.

Adult Migration

The temperature ranges under which migration is generally considered to be feasible for summer and fall chinook are 13.9-20.0 and 10.6-19.4° C, respectively. However, a migration threshold exists at a temperature of 21-22° C that is documented by numerous studies across all major migratory salmonid species in the Columbia River.

The 23-26° C UUILT range for salmonids applies to the juvenile life stage. Although much less information is available for salmon adults, that which does exist indicates that this life stage is much more sensitive to high temperatures. Becker (1973) identified the thermal tolerance of chinook jacks to be 21-22° C based on a 168 hr TLM (median tolerance limit) test. Coutant (1970) identified the incipient lethal temperature for chinook jacks as 22° C with prior acclimation to 19° C (estimated from ambient river temperatures). Columbia River steelhead,

acclimated to river temperature of 19° C had a lethal threshold of 21° C (Coutant 1970). These lethal limits are 5.5° C lower than for juvenile rainbow acclimated to 18° C (Alabaster and Welcomme 1962, as cited by Coutant 1972).

Pre-Spawning

Certain salmon species (e.g., spring chinook) enter freshwater during relatively cool-water seasons, but must enter natal streams and hold throughout the warm summertime (known as a holding adult). Warm temperatures increase the susceptibility of holding adult fish to mortality from thermal effects. When ripe adult female chinook are exposed to temperatures above 13 - 15.5° C (56 - 60° F), pre-spawning adult mortality becomes pronounced. In addition, the subsequent survival of eggs decreases and alevin development is inhibited due to the exposure of the female to warm temperatures, even if subsequent stream temperatures during the egg and alevin development are cooler.

Hatchery managers have long known that highest survival of chinook adults occurs when water temperatures do not exceed 14°C (Leitritz and Lewis 1976, Piper et al. (1982). When adults hold in water temperatures greater than these levels, egg survival increasingly declines (Hinze 1959, Hinze et al. 1956, as cited by Marine 1992). Migration of coho in waters with temperatures exceeding 20°C caused deformation of eggs and poor egg viability compared with coho that migrated in cooler waters. A reduction in egg quality within the body of females after ovulation has been reported in rainbow trout held at temperatures of 13-15°C. Fish (1944) reported very high holding survival of sockeye when temperatures were <15.6°C, but survival was only 51% under a fluctuating temperature regime of 9.4-23.3°C.

Spawning

NMFS and EPA recommend a maximum spawning temperature of 12.8° C (55° F) for Chinook. With the Hanford Reach begin a critically important spawning ground for Chinook, any increase in temperature from the facility to the already warm Columbia is a problem.

Eggs, Fry, and Juveniles

Although spawning occurs over a broad range of temperatures, the requirements for normal egg development are much narrower. Numerous authors cite poor egg survival when incubation temperatures fall within the range of 13 - 17° C (56 - 63° F). Moderate temperatures are required during fry emergence so that the fry can properly begin feeding and growth. An optimum temperature range for chinook juvenile growth occurs from approximately 10 - 15.6° C (50 - 60° F). As temperatures increase, individual growth rates reach zero at approximately 21° C (70° F). However, if food is limited (i.e., not abundant so as to permit feeding to satiation), growth can be zero at even lower temperatures.

Smoltification

The transformation of juvenile salmon from freshwater to saltwater-tolerant form involves physiological changes. It is recommended for all anadromous salmonids that temperature not

exceed 12.2° C (54° F) to ensure proper smoltification (see review by McCullough 1999). Temperatures of 18 - 21° C (65 - 70° F) place smolts under either lethal or loading stresses that can impair metabolic activity. If the fish arrive at the ocean not properly smolted (physiologically ready), they will die from exposure to salt water.

The Cumulative Effects of Elevated Stream Temperature Harm Fish.

When discussing temperature impacts to salmonids, it is important to remember how temperature affects entire aquatic ecosystems in addition to a particular stream segment. First, the influence of elevated temperatures can continue downstream, as the water in the stream does not immediately cool down. Therefore, if several activities occur along the stream, their effects on temperature will accumulate.

Second, increased stream temperatures decrease available habitat within a river basin. Salmonids use habitat in a stream system from the cold headwaters (assuming channel gradients are low enough) downstream to the upper temperature distribution limit. As land management actions (e.g., riparian canopy removal, channel widening, sedimentation, water diversion) cumulatively increase water temperature, the distribution limit shifts upstream thereby decreasing total available habitat. The reduction in thermal suitability in low gradient habitats in mainstem rivers is a particularly serious loss to the productive capacity of spring and fall chinook.

Columbia Riverkeeper Narrative Statement

I am writing on behalf of Columbia Riverkeeper, the Northwest Environmental Defense Center and the Rosemere Neighborhood Association to comment on the proposed NPDES permit renewal for the Columbia Generating Station (CGS). We have serious concerns about the proposed permit since the CGS generates over 664 million gallons of discharges a year into the Columbia and contains a number of toxics that present a direct threat to both aquatic life and human health. Our concerns are increased by the fact that the fundamental assumptions that underlie the permit are based on dilution rates which were calculated by the applicant and which Ecology acknowledges are both outdated and unreliable. In the face of such questionable data Ecology should have had the applicant gather the necessary data over the previous year to two years instead of approving a permit absent sufficient information.

Our more specific concerns include:

1. **Lack of accurate or current data**

   Ecology admits throughout the Fact Sheet that the PLUMES study conducted by the applicant over ten years ago to evaluate dilution ratios from the CGS are outdated and need to be updated. Fact Sheet (FS at 20). Ecology, nonetheless, did not require the applicant to prepare even an updated computer modeling of the discharge using newer CORMIX modeling nor require an actual mixing zone study before proposing to issue the draft permit. As a result, Ecology lacks a reasonable basis for determining that the discharges into the

Columbia do not have a reasonable potential to violate state water quality standards and protect beneficial uses.

Ecology has an affirmative duty to ensure that pollution discharges do not further degrade a portion of the Columbia which not only has serious toxicity issues related to contamination on the Hanford reservation, but is also one of the last free flowing stretches of the Columbia and therefore a key spawning and rearing area for salmonids.

Similarly, the draft permit would require "reassessment of the impacts, if any, of the discharges to ground water." FS 28. Again, while we agree with the need to assess how discharges of contaminates such as lead, which is being discharged to the ground at 1,920% above state groundwater standards (Table 10), is affecting groundwater, the time for such analysis is before the permit is re-issued. Under the proposed compliance schedule Ecology would not be able to determine that either the discharges to the river or the ground at issue would meet water quality standards until five years from permit issuance. State and federal law place an affirmative duty on Ecology to be able to make that determination at the time of permit issuance. WAC 173-201A 030; WAC 173-201A 130.

2. Planned mixing zone fails to protect beneficial uses

The proposed mixing zone would allow water quality standards to be exceeded in 101,500 square feet of the Columbia River. Permit at 9. There are multiple problems with the proposed mixing zone. First, the mixing zone applies broadly to toxics, temperature, and other conventional parameters. The requirements under WAC 173-201A 100, however, were not specific to any parameter and cannot be reasonably met by a broad non-pollutant specific evaluation.

Additionally, there is no indication as to how the "size of the mixing zone and the concentrations of pollutants shall be minimized" under the proposed permit. In fact, the proposed mixing zone is essentially the maximum size allowed under the WAC. WAC 173-201A 100(7)(a).

The fact sheet fails to describe any new treatment measures that were considered by the discharger as a means to decrease the concentrations of pollutants in the applicant's outfall and therefore decrease the size of the allowed mixing zone. Additionally, there is not any data that shows that the size of the mixing zone could not be made smaller by the use of newer technology, such as electro-coagulation treatments. Use of electro-coagulation treatment, for example, would significantly reduce concentrations of toxic pollutants, as well as turbidity and other pollutants in the applicant's outfall and would not present an unreasonable costs given the revenue generated from the facility.

Technologically a number of these systems are in current operation in Washington and the state has approved use of these systems for the control of toxic metals and other pollutants discharged by the applicant.

We have attached information about electro-coagulation systems to these comments and also would refer DEQ to environmental consultant Neil Alongi who has designed a number of electro-coagulation systems for industrial facilities in southwest Washington.

In failing to consider treatment systems like electro-coagulation Ecology also cannot show that it is applying AKART as required by WAC 173-201A 100(2). Given the age of EPA's

BAT technical standards it is not reasonable to merely assume that BAT constitutes AKART especially when technologies like electro-coagulation not only exist but are being currently used in Washington with impressive results.

WAC 173-201A 100(4) states that, "No mixing zone shall be granted unless the supporting information clearly indicates the mixing zone would not have a reasonable potential to cause a loss of sensitive or important habitat, substantially interfere with the existing or characteristic uses of the water body, result in damage to the ecosystem, or adversely affect public health as determined by the department." (emphasis added).

In the instant case, however, Ecology acknowledges that the dilution modeling used by the discharger is not current and needs to be updated. Additionally, Ecology nor the discharger has not conducted any sediment, fish or shellfish toxicity studies in the area of the outfall to assess whether the applicant's toxic discharges are having an adverse effect on biota or sediment. While toxicity to species was found in WET testing, WET testing fails to represent the type of long-term cumulative impacts that species living and using the area around the applicant's outfall pipe actually experience.

Additionally, the permit fails to consider the effect of the effluent's temperature on migrating or resident salmonids. The end of pipe effluent temperatures were not disclosed in the permit and no evaluation was included that evaluated how the proposed temperature effluent limit ensured the protection of water quality standards and beneficial uses. The Columbia is listed as water quality limited for temperature in the area of the discharge and as a result there is no capacity for the river to assimilative thermal discharges. Even at the outside of the proposed mixing zone the Columbia will not meet the 20 degree C water quality standards and at times when the Columbia is just on the threshold of exceeding the 20 degree C standard the applicant's discharge will cause a violation of the standard outside the mixing zone. This would violate the requirement that, "Water quality criteria shall not be violated outside of the boundary of a mixing zone as a result of the discharge for which the mixing zone was authorized." WAC 173-201A-100 (5).

Similarly, there is no analysis to show that setting the acute mixing zone at 10% of the chronic mixing zone is as near to the point of discharge as is "practically attainable." Again, setting the acute toxicity zone at 10% of the mixing zone represents essentially the largest sized acute mixing zone potentially allowed under the WAC. WAC 173-201A 100(8). The lack of evaluation of any technical controls that could further reduce the pollutant concentrations combined with absence of any evaluation of how the mixing zone sizes could be reduced undermines the permits ability to comply with WAC 173-201A 100.

A careful assessment of the local temperature and toxicity effects of the applicant discharge is particularly important in light of findings by the USGS and that there is a significant level of salmon sex reversals occurring in the Hanford reach. We have attached a study by Nagel et al. that was funded through the USFS that found 84% of female salmon had sex chromosomes of males and had experienced a sex reversal.[1] The study explains that the most likely causes of the sex reversals included the effects of temperature changes during embryonic development and exposure to environmental estorgens. Ecology needs to review this study, recognize the serious problem that is facing salmon in the Hanford Reach, and ensure that changes to the proposed

[1] Nagler et al. (2001), High Incidence of a Male-Specific Genetic Marker in Phenotypic Female Chinook Salmon from the Columbia River. Environmental Health Perspectives, Vol. 109, No. 1.

permit are made to reduce the chance that the facility is adding to or creating the observed sex reversals in salmonids.

Specific Concerns and Questions

In this section, comments and responses are grouped by issue of concern.

The underlying theme of many of the comments submitted by the Columbia Riverkeeper and the Nez Perce Tribe challenge the legality of provisions in the permit that are in accordance with State and Federal law and regulations. These comments address such permit provisions as the legality of mixing zones, schedules of compliance, and the bioaccumulative effects and environmental fate of pollutants, are beyond the scope of this permit. Responses to these larger policy issues are contained in the section Response to Comments Concerning Legality of Permit Provisions, after specific issues are addressed.

1. Temperature

Comment: **Nez Perce Tribe**

[I]ncremental increases in river temperatures will have a negative effect on survival and reproduction of chinook, steelhead, and sockeye via several different mechanisms: (1) direct lethality under high temperature conditions to adults and smolts, (2) delay in migration and spawning, (3) bioenergetic depletion of energy stores by heightened respiration rates, and (4) deformation of eggs and decreased viability of gametes, and (5) increased rates of infection and mortality from salmonid diseases of warm water.

Because it is difficult to ascertain what the effluent standard for temperature is, the Tribe is assuming that the NPDES is pushing the edge of the allowable discharge limit. The ambiguity rises from footnote three in the draft permit:

> "The temperature of the circulating cooling water blowdown shall not exceed, at any time, the lowest temperature of the circulating cooling water, prior to the addition of makeup water, except that the temperature of the blowdown may be less than the temperature of the river." Pg. 8

This appears to create a floating standard based on the lowest temperature of the circulating cooling water, which not stated in any form anywhere in the permit or the fact sheet. As such, the only concrete standard identifiable in either the permit or the fact sheet is the Washington water quality standard of 20º C. This standard was administratively set at 20º C, rather than the standard 18º C, and rests upon what can only be described as shaky legal footing, as the Tribe does not believe this departure from the 18º C standard to be justified in any way. Because the permit allows for the use of a mixing zone, the Tribe does not believe the effluent limits for temperature are protective of cold-water aquatic species.

Additionally, the Tribe does not agree with the statement in the draft fact sheet that because much of the temperature problem in the Columbia is attributable to non-point sources, point source dischargers are not always warranted. The Tribe maintains that where a waterbody is degraded due to temperature concerns, all available steps must be taken to reduce the thermal loading into the waterbody. Reliance on the effluent mixing study to determine the need for a temperature standard is putting the cart before the horse, as the permitting authority should have this information in hand before reissuing a permit. *See comments on Lack of Data*, supra.

The Tribe respectfully requests that the Energy Facility Site Evaluation Council clarify the temperature standard to be used in the permit. In order to do this, the Council will need to delay the reissuance of the permit until the effluent mixing study is completed. Issuing a permit before gathering the requisite information is simply not an acceptable manner of regulating water pollution. In the future this type of information needs to be gathered by the applicant before the new permit begins. Additionally, the Tribe requests that the Council uses the standard Class A waters 18º C standard rather than the administratively altered 20º C standard. The 18º C will serve to more adequately protect rearing and migrating juvenile and adult salmon and steelhead in the Columbia River.

Response: The Nez Perce Tribe contends that an improper water quality criterion of 20°C, rather than the usual Class A criterion of 18°C, was used in the evaluation. However, WAC 173-201A-130(21) (1997 version) establishes a "special condition" of 20ºC in the vicinity of the outfall for the Columbia River. The special condition states: "temperature shall not exceed 20.0ºC due to human activities.

In 2003, the State of Washington adopted revised water quality standards, but retained the special condition of 20ºC. At this time (May 2006), the U. S. Environmental Protection Agency (EPA) has not approved the revised standards, primarily due to disagreement with the State over the temperature criteria. Until different standards are adopted by the State and approved by EPA, the 1997 standards are in effect, and the appropriate criterion is 20ºC.

Concerning the narrative effluent limit cited in the Tribe's comment, the limit was established by the Nuclear Regulatory Commission for nuclear generating stations discharging to surface waters. The permit will be modified to require evaluation of the adequacy of this narrative limit to compliance with the State's suface water quality standards. The narrative limit was retained from the previous permit pending a new assessment of existing dilution factors to determine if changes are necessary to achieve compliance with water quality-based effluent limits.

Comments: **Columbia Riverkeeper**

How has Ecology considered the effects of [the Nagel study on the effects of temperature on salmonid species] and evaluated the proposed permit in light of it? What basis does Ecology have for believing that the pollutants discharged from the applicant's facility is not contributing to the problems [of gender reversal] observed?

The proposed effluent limits to not ensure protection of beneficial uses or compliance with water quality standards.

Temperature: The failure to require any water quality based maximum and average discharge temperatures for the facility is inexcusable. With serious temperature problems not only on the Columbia, but specifically within the area of the applicant's outfall and the presence of one of the most important salmon spawning areas in the State of Washington Ecology should require temperature effluent limits to protect water quality. Ecology failed to consider the potential impacts of high temperature discharges on spawning salmon, juvenile salmon, or migrating salmon, such as the effects due to thermal shock. No information about how the applicant's discharges were currently affecting salmonid use in the area was evaluated. EPA's preparation of a TMDL for the Columbia does nothing to undermine Ecology's duty under the CWA and state law to ensure that every permitted discharge protects beneficial uses such as salmon.

Response: Evaluation of the impacts of temperature in the Permittee's discharge to receiving water quality was not possible due to the lack of end-of-pipe discharge data and the Council's determination to reassess the validity of the dilution factors. End-of-pipe discharge data was not available because the existing permit required monitoring at the facility, before the discharge entered the 3½ mile long outfall pipe, rather than at the discharge point. The Council considered requiring the Permittee to monitor the discharge during the permit development process, but the timing required to reassess the validity of the dilution factors would have precluded an accurate reasonable potential analysis.

However, the Permittee conducted a comprehensive thermal plume study in 1985 to verify compliance with the water quality standards for temperature. In-river sampling events occurred in March, April, August and November, 1985. Sensors were positioned in the river at various depths in the water column, and at 50-foot intervals from the outfall, out to 300 feet. During the worst-case scenario sampling event conducted in August, with a low river flow volume and at maximum discharge volume, the study documented a maximum increase over background temperature of no more than a 0.2°C (Thermal Plume Report, p. 10-3). The current (1997) water quality standards allow up to a 0.3°C increase over background temperature. The facility has not significantly modified its operating procedures since the study was conducted, so there is no reason to assume the discharge is violating the water quality standards for temperature at this time.

Concerning the Council's failure to consider the potential impacts of high temperature discharges on spawning salmon, juvenile salmon, or migrating salmon, such as the effects due to thermal shock, the State's surface water quality standards are intended to protect aquatic life. As was stated above, EPA is reviewing the State's revised, use-based temperature standards. The review is focused specifically on protection of endangered species, including salmon. However, until the revised standards are established and approved by EPA, the existing standards will be used, in accordance with State and Federal regulations.

The Council determined it is premature to establish numerical effluent limits for temperature at this time. This decision is in line with EPA's policy for temperature-impaired surface

waters. As the fact sheet stated (p. 20), the Columbia River is considered water quality-impaired for temperature. The EPA and Ecology are currently conducting a joint TMDL study to correct the impairment. The EPA issued a guidance document for implementing the temperature water quality standards in April 2003. (EPA, 2003) The document states that, due to the non-conservative nature of heat loading in a water body and the agency's finding that impairment of the river is caused primarily by non-point sources, numeric effluent limits for point sources discharges are not always warranted (p. 42). In lieu of numeric limitations, the EPA recommends that a study be conducted to determine a discharger's impact to the receiving water, followed by establishment of limits, if necessary (p. 43). As part of the effluent mixing study required by this permit, the Permittee is required to assess compliance of temperature in the discharge with the state's water quality standards. The existing narrative limit will be retained in the permit during the Schedule of Compliance. The necessity for a numerical final temperature limit will be determined in the effluent mixing study.

When considering the need for numerical effluent limits in the draft permit, the Council also took into account the routine monitoring and extensive studies conducted by the Permitee in the Columbia River from 1970 to 1995 (See Appendix D). The Permittee conducted routine monitoring of a comprehensive suite of parameters near the outfall from 1983 to 1995. In addition, the Permittee studied the effects of the discharge on the benthic and periphyton communities in the vicinity of the outfall. These studies found the discharge created no significant impacts to the aquatic environment.

2. Copper

The permit fact sheet failed to include copper in the reasonable potential analysis and relies instead on the permit's existing copper limits and the proposed schedule of compliance. The permit cannot merely rely on the previous copper limit but must instead ensure that the proposed permit clearly meets the state water quality standard for copper. The CWA requires that dischargers comply with existing water quality standards and does not allow a schedule of compliance that would allow the applicant to continue exceeding the applicable standard. 33 U.S.C. Sect. 301(b)(2)(E).

What is the water hardness adjusted water quality limit for copper? Would the proposed permit ensure compliance with this limit? If not, what is the legal basis for such an exceedance? What data supports that the hardness of the Columbia at Hanford is as high as 50 mg/l?

The Fact Sheet explains that, "As a part of the effluent mixing zone study in the Schedule of Compliance, the Permittee is required to assess the compliance of the technology-based limits with the water quality standards for chromium and zinc." FS 16.

Again, deferring the determination regarding whether the discharge of toxics in the applicant's permits meets water quality standards until after the time of permit issuance violates both state and federal law and Ecology needs to have this information before it re-authorizes the applicant's discharges.

Response: A reasonable potential analysis was not conducted on copper in the discharge because the existing effluent limits were determined through the water effects ratio methodology, rather than using the established numerical water quality criteria in Chapter 173-201A WAC. The Council determined that the proper method to address copper in the discharge is to require the Permittee to conduct an effluent mixing study. In the event the study finds that copper in the discharge exceeds the water quality standards, the Permittee has the option of conducting a water effects ratio study to determine site-specific water quality criteria. If, after conducting the water effects ratio study, the discharge is found to cause an exceedance of the water quality standards using the revised dilution factors, the next permit may require treatment to reduce copper levels. In any case, the need for effluent limits for copper, and all the pollutants in the discharge, will be evaluated at the next permit renewal with the data generated during the upcoming permit cycle.

The river hardness value of 50 mg/L was taken from a previous NPDES Permit for the City of Kennewick written by the permit writer in 2003. The documentation for the basis of this value has been lost. However, a casual review of hardness data from Ecology's ambient monitoring station on the Columbia River at Umatilla shows hardness values ranging from 47.0 mg/L to 82.9 mg/L, as $CaCO_3$, during the 2003 water year. In addition, sampling conducted in 1997-1998 as part of the water effects ratio study revealed values ranging from 52 mg/L to 68 mg/L, as $CaCO_3$. A hardness of 50 mg/L appears reasonable, and perhaps conservative, given these data.

The commentor's question of whether the proposed permit will ensure compliance with the water quality criteria for copper will be answered with the results of the effluent mixing study.

3. Whole Effluent Toxicity (WET) Testing

Columbia Riverkeeper Comment

The proposed permit fails to include any requirement for regular WET testing despite information that the applicant's effluent was causing both chronic and acute toxicity. P. 24. The permit's allowance that WET testing not be completed until 2009 is difficult to understand given that Ecology should regularly require the data be gathered. Additionally, the permit should require that the data be gathered at times when critical discharges exist, such as irregular blow down, since there is no current requirement in the permit.

Given that the permit's water quality based effluent limits – or lack thereof- are based on dilution assumptions that even Ecology admits are inadequate, including regular (at least bi-annually) WET testing in the permits is particularly important.

Response: WET Testing takes place in a laboratory and requires exposure of the discharger's effluent to live test species at various dilutions. Two of those dilutions are a reflection of the acute and chronic dilution factors. The Permittee will determine these dilution factors as part of the required effluent mixing study. The study will also determine compliance with the

numeric, chemical-specific water quality criteria, which is a precursor for WET Testing. In other words, if the discharge is not in compliance with the numeric water quality criteria, WET Testing will only confirm what's already known. The Permittee will submit the results of the effluent mixing study to the Council for review and approval. The Council feels it would not be a prudent use of the Permittee's resources to conduct WET Testing before the dilution factors are approved and compliance with the numerical water quality criteria has been assessed.

4. Toxics

Columbia Riverkeeper Comment

The proposed permit fails to comply with Ecology's toxics criteria. WAC 173-201A-040 states that "(1) Toxic substances shall not be introduced above natural background levels in waters of the state which have the potential either singularly or cumulatively to adversely affect characteristic water uses, cause acute or chronic toxicity to the most sensitive biota dependent upon those waters, or adversely affect public health, as determined by the department."

The permit, however, fails to ensure that this standard is met since it is not based on accurate information about the discharge's actual dilution and no evaluation was made about the potential for toxics such as chromium, zinc and lead to bioaccumulate in downstream biota. No evaluation was made of the total mass toxic load that could be discharged under the proposed permits and even though chromium concentrations being discharged from outfall 001 exceed the chronic toxicity standard at the end of pipe by almost 300% the permit does not even require regular monitoring for chromium.

By preparing a Reasonable Potential Analysis from the perspective of the outside of the very mixing zone which was sized to prevent an exceedance of water quality standards Ecology all but ensures there will not be a reasonable potential for toxics to exceed the state standard. As a result, however, Ecology has no other analysis that evaluates the bioaccumulative effect of toxics like chromium on fish or shellfish which are currently consumed by Native Americans and others.

What information, if any, does Ecology have regarding the fate of toxics being discharged by the applicant?

Response: The first paragraph of the comment refers to the antidegradation portion of the State's surface water quality standards, as described in WAC 173-201A, Part III (2003 version). The Council has no evidence that the Permittee's discharge violates the antidegradation rule. Modeling studies and receiving water monitoring conducted in the past have consistently verified that the Permittee's discharge is in compliance with the State's surface water quality standards.

The Riverkeeper comment that the proposed permit authorizes the discharge of chromium at almost 300% of the chronic water quality criterion is not supported by the data. This issue is addressed on pages 21 and 22 of the fact sheet. The fact sheet states:

> Regarding chromium, the [reasonable potential] analysis was inexact because the federal NPDES permit application requires chromium be characterized as total recoverable, while the state's surface water quality criteria specify trivalent and hexavalent chromium. Criteria for both trivalent and hexavalent chromium are presented in the table. Criteria for hexavalent chromium are more stringent because this species of the metal is more reactive, resulting in greater toxicity to aquatic life. The reasonable potential analysis for chromium was conducted using the more stringent hexavalent chromium criteria and the maximum effluent concentration reported in the application, and no reasonable potential was found. However, the proposed permit requires the Permittee to assess all toxics in the discharge for compliance with the applicable water quality standards as part of the effluent mixing study.

During the characterization period, the maximum concentration of *total* chromium discharged by the Permittee's facility was 29 µg/L. The chronic water quality criterion for *dissolved* hexavalent chromium is 10 µg/L. The reasonable potential analysis (see Appendix C of the fact sheet) shows the expected concentration of hexavalent chromium at the edge of the chronic mixing zone to be 0.64 µg/L, less than a tenth of the criterion. Furthermore, it's possible some or all of the chromium in the discharge is trivalent chromium, a less reactive and less toxic species of the metal, as reflected in the much higher numeric criteria. Special Condition S8.B of the permit requires the Permittee to characterize chromium in the discharge in the trivalent and hexavalent species of the metal and assess compliance with all water quality criteria and narrative standards.

The tone and substance of the comments assume that the Permittee's discharge is out of compliance with the applicable water quality standards. However, there is no evidence to support this assumption. To the contrary, the Permittee conducted monitoring of the receiving water within the mixing zone from 1983 to 1995, and submitted empirical data verifying compliance with the water quality standards. Furthermore, the Permittee conducted numerous investigations of the streambed in the vicinity of the outfall that also verified the discharge was not creating any discernible impacts to aquatic life.

Concerning the environmental fate and bioaccumulative effects of the discharge on aquatic life, and the Native Americans who consume fish and shellfish, see the **Response to Comments Concerning Legality of Permit Provisions.**

5. Human Health

Columbia Riverkeeper Comment

The fact sheet explains that the "Permittee is required to evaluate the discharge for compliance with the human health criteria as a part of the effluent mixing study." P 25. Ecology,

however, cannot approve the proposed permit unless it has the information to support that the discharges will in fact comply with applicable human health criteria.

The discharge of ß radioactivity, arsenic, chromium, copper, asbestos, aluminum and a host of other toxics creates direct threats to the public health and particularly to tribal members and others that consume high levels of Columbia River fish and shellfish.

Given existing contamination from historic operations at Hanford, did Ecology evaluate whether water quality is currently protecting existing uses in the Hanford Reach, such as the collection and harvest of fish and shellfish? If not, how can Ecology determine that the permit would not exacerbate impacts to beneficial uses?

Again, given the massive level of contamination that has occurred at Hanford and the availability of technologies like electro-coagulation that could significantly reduce the pollutant discharges from the CGS, we believe that Ecology should seriously reconsider eliminating the planned mixing zone or only allow it to the extent that available technology cannot reduce the applicant's discharges.

Response: At this time, there is no evidence that the Permittee's discharge violates the State's human health criteria; however, Special Condition S8.B of the permit requires the Permittee to verify compliance with the human health criteria. The schedule of compliance is the regulatorily appropriate vehicle to provide the Permittee with the opportunity to verify compliance with the human health criteria.

The Permittee's facility has not discharged any radioactivity into the Columbia River since 1998. The Permittee's discharge of the other pollutants mentioned by the commentor has been found to be in compliance with the applicable water quality standards, and within the established effluent limits in the existing and previous permits.

Regarding the protection of beneficial uses, development of the State's Water Quality Standards, Chapter 173-201A WAC, is an on-going process of balancing restrictions and preserving beneficial uses of the State's waters, consistent with direction of the federal Clean Water Act. This permit, which includes authorization of a mixing zone, conforms to the State's Water Quality Standards and agency policy for implementing that regulation.

The Council feels it's premature to require installation of treatment technologies or revise the mixing zone authorization until such time as the required studies identify if there are instances of non-compliance with the water quality standards. In the event the Council determines the discharge is not in compliance with one or more parts of the surface water quality standards, the Council will take steps to prescribe specific solutions to the problem(s).

It is questionable whether the Council has regulatory authority to prescribe treatment processes because the State's AKART standard for industrial operations is pollutant- and facility-specific. An AKART analysis first considers pollution prevention measures available to the Permittee before incurring the capital costs of treatment. Reasonable and effective pollution prevention measures are identified as a result of a detailed assessment of the

Permittee's facility. After the possibilities of pollution prevention are exhausted, State regulations require consideration of treatment processes that are *all known, available and reasonable methods of prevention, control and treatment.* An AKART analysis requires a comprehensive and thorough engineering analysis of the most effective solutions to the problem and an economic analysis of the affordability of those solutions. The Council does not have the resources to conduct engineering and economic analyses for dischargers, and prescribing such treatment processes as electrocoagulation before such analyses are conducted would be considered arbitrary and capricious.

6. Mixing Zones

Nez Perce Tribe Comment

Beyond the questionable public policy of allowing near unfettered use of mixing zones, the Nez Perce Tribe maintains that the legal validity of mixing zones under the Clean Water Act is still in question. Historically, pollution was dumped into the nation's rivers and streams with the thought that the natural dilution of the flow would eliminate any impacts. Unfortunately, the contrary lesson was learned with disastrous consequences, as rivers caught fire and riverbeds were left to become superfund sites. The passage of the Clean Water Act was a signal that the United States acknowledged that water cannot simply dilute pollution to the point of no impact. As such, the Act sought to impose end of pipe effluent limitations on dischargers. The use of mixing zones to dilute pollution represents a significant step away from the intended purpose, ideals and requirements of the Clean Water Act.

This is a particular problem where a mixing zone for temperature is allowed in a river with as large a volume of water as exists in the Columbia. This is because the t=34/(T+9) equation allows a larger volume of heat input to the river where a mixing zone of the size allowed in this permit is used. The Tribe requests that the Council find alternative pathways to the use of a mixing zone in the permit, as neither the current size, nor the dilution factors are adequate to protect salmonids and other aquatic life upon which they need to survive. This is especially important as the Council has not provided any information that demonstrates that the mixing zones authorized in this permit will "not have a reasonable potential to cause a loss of sensitive or important habitat, substantially interfere with the existing or characteristic uses of the water body, result in damage to the ecosystem, or adversely affect public health," as required by WAC 173-201A 100(4).

Response: The Council evaluated the permit application and assessed the applicant's discharge in the context of the water quality standards published in Chapter 173-201A WAC. The Permittee's discharge meets those standards promulgated to protect human health and environment, based on compliance demonstrated through past modeling and empirical receiving water studies. At this time, there is no evidence that the discharge violates the water quality standards; however, the proposed permit requires the Permittee to verify compliance with the standards by conducting an effluent mixing study, WET Testing and routine monitoring. See the section Response to Comments Concerning Legality of Permit Provisions, below, for further discussion of mixing zones.

7. Monitoring Requirements

Nez Perce Tribe Comment

The monitoring requirements leave much to be desired. None of the monitoring requirements will provide the Council with statistically relevant information upon which to base a valid conclusion about the nature and contents of the facilities discharge. For example, the permittee is required to sample for asbestos blowdown once during the entire permit cycle, and for Chromium and zinc only twice a year. Additionally, the turbidity and copper discharge monitoring is only monthly. The permit, nor the fact sheet states the reasons for this decision. Is it based upon the reasonable potential analysis discussed in the fact sheet? That would be hard to believe for copper, as the fact sheet does not indicate that a reasonable potential analysis was conducted for copper.

The outfall monitoring reports in the fact sheet show the dearth of information on the contents of the facility's effluent. Tellingly, there is again no indication of the temperature of the effluent released. But the tables show that a variety of potentially bioaccumulative toxics are being released to the river. These heavy metals and toxics can accumulate in the fatty tissues of the fish that Tribal members frequently eat as part of their regular diet. The Tribe requests that all of these sampling frequencies be increased, for both the surface water and groundwater discharges (as the groundwater is hydrologically connected to the river as indicated in Fact Sheet pg. 25).

Response: The Council feels the pollutant parameters to be monitored and the associated frequencies in the proposed permit are appropriate. The selection of pollutant parameters to be monitored are determined by whether the pollutant is regulated by the federal categorical effluent standards and results of the reasonable potential analysis for all pollutants found to be present in the discharge. Federal regulations require a pollutant specified in the categorical effluent standards be monitored at least once per year. In addition, any pollutant present in the discharge found to have the potential to exceed the State's water quality standards must also be routinely monitored.

After the Council determines a pollutant must be monitored, the frequency is determined by the magnitude of its concentration, relative to the federal or state standard, and its variability. The monitoring frequency for a pollutant present at ten percent of the specified federal or state standard will be much lower than for a pollutant present at 85 percent of the applicable standard. A historical data set for a pollutant with a low variability of concentrations, in other words more predictable concentrations, would warrant less monitoring than a pollutant with high variability.

Pollutant concentrations in the Permittee's discharge have historically exhibited little variability, probably reflecting the consistent nature of the facility's operational characteristics. The Permittee's facility has not significantly changed its purpose or operational characteristics in the 20 years it has operated. The Permittee is unlikely to significantly change its operations during the upcoming permit cycle. In consideration of the steady-state nature of the

Permittee's operations, its excellent environmental compliance record, and the low variability of the effluent concentrations, the Council feels the monitoring schedule in the proposed permit is appropriate. The Council will reevaluate the need to revise the monitoring program at the next permit renewal, after it assesses the results of the pending studies.

8. Impacts to Groundwater

Columbia Riverkeeper Comment

Given existing contamination from historic operations at Hanford did Ecology evaluate whether water quality is currently protecting existing uses in the Hanford Reach, such as the collection and harvest of fish and shellfish? If not, how can Ecology determine that the permit would not exacerbate impacts to beneficial uses?

Again, given the massive level of contamination that has occurred at Hanford and the availability of technologies like electro-coagulation that could significantly reduce the pollutant discharges from the CGS we believe that Ecology should seriously reconsider eliminating the planned mixing zone or only allow it to the extent that available technology cannot reduce the applicant's discharges.

As stated we are concerned that the proposed discharges to ground do not protect groundwater. The lack of current data makes it impossible for Ecology or the applicant to determine that ground water standards are being met.

The acknowledgement that lead is being discharged at over 1,900 percent above the ground water concerns us and raises the obvious question of what is happening to the lead and other toxics that are concert.

What does Ecology believe is the fate of lead being discharged to ground?

Response: The Council feels it is inappropriate to associate historical contamination of the Hanford site with the Permittee's facility. The Permittee's facility is physically located within the Hanford reservation, but has never been associated with the nuclear weapons-making activities that resulted in the contamination of the subsurface environment.

A hydrogeologic study was conducted to ascertain the impacts of the Permittee's discharges to ground water quality, as required by the 1996 permit (fact sheet, pp. 25 and 26). The study concluded the discharges from Outfalls 002 and 003 did not degrade ground water quality. The proposed permit requires the Permittee to conduct confirmation monitoring during the third year of the permit cycle.

The question of the environmental fate of lead is addressed in the following section of this response to comments.

Response to Comments Concerning Legality of Permit Provisions

Mixing Zones

There is no specific statutory authority for mixing zones in the federal Clean Water Act. Mixing zones are a component of the State's Water Quality Standards, promulgated in accordance with the federal Water Quality Act of 1965, Pub.L. No. 89-234, 79 Stat. 903. EPA guidance to those responsible for designing, publishing, and enforcing State water quality standards acknowledges the use of mixing zones. The EPA is responsible for evaluating and approving States' water quality standards; EPA approved Washington's Standards, which incorporate the allowance for a mixing zone.

Development of the State's Water Quality Standards, Chapter 173-201A WAC, is an on-going process of balancing restrictions and preserving beneficial uses of the State's waters, consistent with direction of the federal Clean Water Act. This permit, which includes authorization of a mixing zone, conforms to the State's Water Quality Standards and agency policy for implementing that regulation.

Schedule of Compliance

The Columbia Riverkeeper and the Nez Perce Tribe both protested the reissuance of the proposed permit is premature before the necessary studies are completed and compliance with the water quality standards is verified. However, the Council has determined that reissuing the permit with the schedule of compliance is more regulatorily appropriate than requiring the studies through an administrative order. Such an order would essentially be in the form of a permit, but the permit issuance process allows for greater public participation. For example, the fact sheet associated with this proposed permit contains much more background information and data than an administrative order normally allows.

The schedule of compliance contained in Special Condition S11 is intended to allow the Permittee an opportunity to gather data to demonstrate whether the discharge is compliance with the water quality standards. The schedule of compliance is an established regulatory tool provided for in federal and state regulations. As the fact sheet stated, the schedule of compliance contained in this permit is *not a punitive measure*.

The Council feels that the 5-year schedule of compliance contained in the proposed permit is warranted, given the comprehensive and thorough analysis that will be required to verify compliance with the State's surface water quality standards and ground water quality standards. The amount of time required to plan and conduct the outfall evaluation, effluent mixing study, WET Testing, and ground water monitoring will take most of the permit cycle. Furthermore, the first three tasks must be done in the specified order. Costs must be budgeted, consultants contracted, quality assurance plans developed and approved, and the field work done. After these studies are completed at the end of the permit cycle, the Council will definitively know whether the Permittee's discharges are in compliance with the applicable water quality standards.

Bioaccumulative Effects and Environmental Fate of Pollutants

Concerns about bioaccumulative effects and environmental fate of pollutants is perhaps the most difficult of the commentors' issues to address, primarily because the science is still evolving and the regulations have not been revised to effectively address the problem. Both commentors refer to the fact that Native Americans heavily rely on salmon and other aquatic food species for sustenance. Most bioaccumulative toxins aggregate in organs of fish not usually eaten, such as the liver, rather than muscle tissue, but mercury is an exception.

WET Testing addresses the short-term aggregate effects of discharges, but the four-day period associated with the chronic toxicity test is too short an observation period to address the commentors' concerns.

The environmental fate of chemical is difficult to generalize. Environmental fate is pollutant-specific. Pollutants may degrade or break down in sunlight, become entrained in sediments, or volatize.

There is a structural problem with using the NPDES permitting process to address bioaccumulative effects of pollutants because permits address specific pollutants in a local area, but an organism's ailment may be due to factors beyond the Permittee's control. At this time, the best tool available to determine bioaccumulative effects and environmental fate of pollutants is the total maximum daily load (TMDL) process.

At this time, the human health criteria are established at a protective concentration assuming a 70-year exposure to each of the regulated chemical pollutants, but little research has been done on the aggregate impacts of the numerous substances present in our streams. Recent news reports have questioned the adequacy of the existing standards to address such issues as the Native Americans' tendency to eat more fish than the average American, but EPA has not done the research and revised the recommended standards. Until such time as EPA recommends specific revisions of the water quality standards to account for bioaccumulative effects and the environmental fate of pollutants, the Council is required to use the existing standards and regulations to issue NPDES Permits. Using any other standards, without a proper scientific and policy basis, would be considered arbitrary and capricious.

Comments Received from the Department of Ecology—Richland Office

Fact Sheet:

1. Summary page, 3rd bullet – modify to include assess pollutants in the discharge for compliance with the applicable surface **and ground** water quality standards.

2. Summary page, 4th bullet – re-characterize both chronic and acute toxicities utilizing WET testing.

3. Page 4, 3rd paragraph – define acronym EFSEC

4. Page 7, 1st paragraph, 3rd sentence – and there is no discharge of storm water to surface waters, thus according to the storm water industrial permit fact sheet, this facility does not require an Industrial Stormwater Permit. However, as discharge is sent to ground, this effluent must meet Groundwater quality standards according to WAC-173-200. Should this discharge not meet Ground water quality standards, treatment will be required prior to discharge. And delete final sentence in that paragraph.

5. Page 15, 2nd paragraph – To ensure that only cooling tower wastewater does not contain detectable amounts of priority pollutants, is there a sampling location that measures just this component of outfall 001 rather than all of outfall 001?

6. Page 21, 2nd paragraph, 3rd sentence – "it is doubtful the Permittee's discharge exceeds water quality criteria".

7. Page 21, 5th paragraph is incomplete sentence.

8. Page 24, 2nd paragraph under "Ground Water Quality Limitations", 1st sentence – Add "Stormwater and Outfalls 002 and 003…. "

9. Page 24, 4th paragraph under "Ground Water Quality Limitations", 1st sentence – Add "from stormwater and Outfalls 002 and 003…."

10. Page 25, 1st paragraph, 1st sentence – Add "from stormwater and Outfalls 002 and 003…."

11. Page 28, Change Heading from "Best Management Practices (Spill) Plan" to "Best Management Practices (Spill and Operations and Management) Plans".

12. Page 28 - Include an O&M generic paragraph or add sentences to 6th paragraph.

13. Page 28, 6th paragraph - Add a final sentence stating that "Best Management Practices for Spill and O&M concerns should be reviewed at least annually. Upon review of the Plans, a letter should be sent to Ecology stating that either the existing plans and procedures are consistent with current operations or that upgrades have been made to the Plans."

14. Page 30 – Add any relevant storm water references from above.

Response: It is past the regulatory deadline to modify the fact sheet; however, the Council acknowledges Ecology's comments.

Permit

1. Page 6/33, Summary of Permit Report Submittals – Move Ground water sampling the 3rd year, add the final report to be completed the 4th year and pending the findings, have an Engineering Facilities Report required the 5th year with the Permit Application should treatment of the Groundwater streams (stormwater, outfalls 002 and 003) be required.

2. Page 11/33, Under Outfall 002 - Add the stormwater component to the description.

3. Page 16/33, Under S4, A – Add a sentence requiring the Permittee to review O&M plans/procedures and to send a letter to Ecology upon review of the Plans, "stating that either the existing plans and procedures are consistent with current operations or that upgrades have been made to the Plans.

4. Page 18/33, Under S7 - Add a sentence requiring the Permittee to review Spill plans/procedures and to send a letter to Ecology upon review of the Plans, "stating that either the existing plans and procedures are consistent with current operations or that upgrades have been made to the Plans.

5. Page 26/33, S11, B#4 – Change Groundwater monitoring/reporting schedule to 3rd year sample, 4th year final report, and 5th year Engineering Facilities Report to treat groundwater if needed.

Response to Comments 1 and 5: The Council feels the schedule in the proposed permit is reasonable. The proposed permit language will not be modified.

Response to Comment 2: The Council feels the permit language is sufficient, as written, because 1) stormwater does not comprise a significant component of the discharge to Outfalls 002 and 003, except during rare intense storm events, and 2) the required ground water quality study will capture *all* discharges to ground water. The proposed permit language will not be modified.

Response to Comments 3 and 4: The Council feels the submittals requirements in the proposed permit are reasonable. The proposed permit language will not be modified.