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MEMORANDUM

TO: Dr. Craig McCormack,Toxics Cleanup Program
WA Department of Ecology

FROM: Dr. F. E. Kirschner, Senior Scientist

DATE: January 18, 2012

SUBJECT: Spokane Tribe Of Indians' review of :
(1) Fish Consumption Rates, Technical Support Document A Review of Data and Information About Fish Consumption in Washington, WADOE September 2011 and
(2) Statistical Evaluation of Pacific NW Dietary Fish Information, WADOE August 2011

CC: BJ Kiefer, Director STI-DNR
Randall Connolly, Superfund Coordinator
Brian Crossley, STI-DNR Fish and Water Program
Ted Knight, TSWQS Counsel
Shannon Work, Special Environmental Counsel
Dr. Harper

The Spokane have been requested to provide a rapid review the aforementioned documents. I am an author of the Spokane's Tribal Water Quality Standards (2003), Spokane's Tribal Water Quality Standards (2010), and Spokane Hazardous Substances Control Act 2004. I am also an author of the Spokane Tribe's Integrated Resource Management Plan (IRMP) for the Spokane Indian Reservation (2008) and The Spokane Tribe's Multipathway Subsistence Exposure Scenario and Screening Level RME (2002).

The Executive Order of President Hayes in 1881 (I Kappler 924) confirmed that the Spokane Indian Reservation was reserved for the Spokane Tribe of Indians for the purpose of providing a permanent homeland for the Spokane people, providing for self governance as well as all the necessary sustenance for current (1881) and future generations**.** The Tribal Council governs to protect its citizens who consume at the traditional consumption rate and will continue to consume at these rates in the future. In

summary, the Spokane has never relinquished any rights to self-governance or use of its natural resources.

Prior to developing any of these standards, it was realized that in order to protect these Executive Order rights, traditional exposure to natural resources via traditional uses at the time of the executive order had to be reconstructed in order to estimate exposure factors for risk calculations—not current consumption rates. Employing an engineering approach commonly employed in risk assessment[1] we determined that the upper bound fish consumption rate of approximately 1,000 g/d for someone whose lifetime dietary protein intake was comprised of fish alone[2]. Today Harper et al. (2002) is the backbone of all of the Spokane's environmental regulations. Its use in this capacity is required by law.

Since our time-frame for review has been compressed over the holiday season, we have focused on issues pertinent to current estimates of Tribal FCR estimated by the state or federal regulators. The Spokanes as well as others have long understood the problems endemic to such estimations as well as concomitant fundamental flaws in the logic of attempting to use such information to prospectively regulate resource use in Indian Country. However, I'd like to point-out that these fundamental flaws in logic are not mutually exclusive to Indian Country—employing current or post facto FCRs to regulate future resource use indicates that the quality of resources will never recover beyond current conditions.

[1] For example, employing the "Precautionary Principle" to bound a situation in which a receptor could receive a dose from either surface water or groundwater, the risk assessor allocates all of the consumption of water to the pathway that causes the greatest risk. The Spokanes initially bounded the protein portion of the traditional diet to all fish or all deer. The final consumption rate determined from historical recounts of FCR (865 g/d) is far less than the bounding consumption rates (approximately 1,000 g/d).

[2] Based on a 70 kg individual consuming lifetime average of 2,500 kcal/day.

General Comments

1. Page 48; Entire Section "Pacific Northwest Native American fish consumption data" Paragraph 3.

> *As of the writing of this report, results of three tribal-specific fish/shellfish dietary surveys of tribes along the Columbia River basin and in the Puget Sound area of Washington were available for review.*
>
> *In addition, several technical publications provide tribal fish consumption related information. These publications have been used to define a tribal reasonable maximum exposure for various regulatory decisions.*[87,88,89]
>
> *Although these technical publications provide useful information for specific regulatory decisions, the published tribal fish consumption* ***surveys provide the best information on fish consumption.*** *Furthermore, these surveys employed a well-defined standardized dietary survey methodology, data analysis, and reporting of results.* [Emphasis added].

For reasons described above, we cannot more strongly disagree with this conclusion identified in bold text, above.. This entire thesis is inappropriately developed in that the FCR one measures are post facto—they are the consequence of regulation—a consequence that is relied upon to protect human health. Momentarily disregarding all of the problems associated with canvassing/polling, modern fish consumptions surveys have little utility in that they attempt to measure modern fish consumption rates—all of which are suppressed rates since nearly all waterways in Washington are associated with fish consumption advisories, and all have bag-limits for the general public enforced by WDF&G. We have briefly reviewed the statistical analyses of such surveys attached to this document and there is absolutely no attempt to "back-out" the effects of fish advisories, bag-limits, or other suppressing factors on the polls. In summary all of this work is irrelevant and technically invalid for prospective regulations where one needs to determine the FCR for groups in the absence of advisories/limits.[3,4,5]

[3] The design and subsequent use of modern polls to regulate pre-contaminated conditions contain fallacies of logic. Regulatory standards are risk-based. (in the absence of excessive contamination) at risk-levels defined by law. Current FCRs only measure the amount of risk, an individual is knowingly or unknowingly "willing" to take.

[4] On the other hand, the polling work provided herein is very useful: (1) in determining how well local Native Americans and others adhere to fish advisories and bag limits (The results published herein indicate that institutional controls should not be relied upon to protect human health, as required by federal laws such as CERCLA); (2) in gauging how well WADOE/WADOH has been and is currently regulating resources, and (3) as measure of the degree to which a given Tribe has been assimilated.

[5] The same statement applies to post-contamination water consumption rate surveys or any other behavioral survey in which the behavior has been modified as a consequence of known or perceived contamination.

2. We realize that the document focuses on current FCR, but we believe that the document would be more useful to the public if it qualifies and guides the use of the proposed FCRs in risk assessment. For example, for situations where surface water or sediments exceed natural conditions, it is quite likely that other dietary media (e.g. game, roots, leaves, etc.) also are contaminated. In such instances, dietary pathways other than fish usurp a portion of the allowable risk allocation and surface water or sediment numerical standards based on the FCRs are not protective. Similarly, if mixtures of contaminants are present in a single (or mixed) exposure pathway, tabled numerical standards are not protective and arguably are technically irrelevant. [6]

   Absent of guidance on their uses, the Tribe is concerned that freshman risk assessors could misuse this information, much like that which has been done with the EPA 2002 (FCRs have been misused by PRPs as well as EPA). The Tribe believes, the more that these concepts are brought forth and contemplated in regulations and supporting documents, the less likely their misuse will occur. The Tribe plans on promoting these concerns in our review of the Draft WADOE Surface Water Quality Standards and Draft WADOE Sediment Quality Standards.

Specific Comments

1. Page 3; Section: Problem Statement; Paragraph 3:

> ***One issue being considered is how fish and shellfish consumption should be taken into account when making regulatory decisions.*** *Ecology currently considers the risks associated with eating contaminated fish and shellfish when making regulatory decisions under the Clean Water Act and the MTCA. The regulations implementing these two statutes include fish consumption rates based on information about the general population and recreational anglers. However, based on recent available scientific information,* ***Ecology has concluded that a significant number of Washington residents likely consume fish and shellfish at rates higher than the rates used in these two regulations****.* [Emphasis added].

Correct estimation of human health risk always take into account consumption of fish/shellfish if those pathways are considered complete. The problem, as correctly pointed-out in the last sentence, is that the exposure factors employed by WADOE risk assessors underestimate these consumption rates and consequently underestimate risk to those who consume at rates higher than the current WADOE default. In such instances, only those who consume less than the default rate are protected.

[6] Both Spokane Tribe of Indians Hazardous Substances Control Act December, 2003 (Amended November, 2004) and Spokane's Tribal Water Quality Standards February 25, 2010 Resolution 2010-173 provide guidance for situations where mixtures of contaminants are present in singular or mixed exposure pathways.

2. Page 4; Section: Problem Statement; Entire "Regulatory" Subsection:

This entire section does not consider (omits) that Fish Consumption Advisories (FCAs) and daily bag/creel limits placed on all waterbodies already exist and were in place when the studies, designed to estimate FCR, were conducted.

3. Page 5; Section: Problem Statement; Entire "Purpose of this technical support document" Subsection:

> *This Technical Support Document provides useful background information for discussions related to fish and shellfish consumption rates. A number of questions are considered:*
>
> *• Among the general population, how many people in Washington can be identified as "high fish consumers?"*

Why is this question important? Are you charged with calculating the cost per life saved by a given regulation? Is WADOE considering to employ disproportionate protection measures?

> *• What is currently known about the fish consumption habits and rates for different population groups in Washington? That is, how much fish do people in various population groups eat, what kinds of fish do they eat, and where do they obtain the fish?*

See General Comment 1, above.

4. Page 6; Section: Problem Statement; Entire "Purpose of this technical support document" Subsection:

> *Ecology concluded that these surveys should be considered when establishing a statewide default fish consumption rate:*
>
> *1. A Fish Consumption Survey of the Umatilla, Nez Perce, Yakama, and Warm Springs Tribes of the Columbia River Basin (Columbia River Inter-Tribal Fish Commission, 1994).*
>
> *2. A Fish Consumption Survey of the Tulalip and Squaxin Island Tribes of the Puget Sound Region (Toy et al., 1996).*

3. *Fish Consumption Survey of the Suquamish Indian Tribe of the Port Madison Indian Reservations, Puget Sound Region (Suquamish Tribe, 2000).*

4. *Asian and Pacific Islander Seafood Consumption Study (Sechena et al., 1999).*

> *These surveys were well designed and well conducted. They are directly applicable to Washington population groups.* ***Fish consumption rates based on these four surveys are unlikely to underestimate fish consumption rates for recreational anglers or the general Washington population.*** [Emphasis added]

Again, all of these studies suffer from the problem described in General Comment No. 1. Although these FCR may protect some groups within the General Public, as described above, they definitely do not protect anyone who consumes or has the right to consume at greater rates. Therefore, managing all waterways based on these FCR means that WADOE will disproportionately protect those that consume at lower rates. Also, all of the listed reports were designed to estimate current FCR for Natives—not ***for recreational anglers or the general Washington population.*** Therefore, these results also are not germane to your quest.

5. Page 7; Section: Problem Statement; Entire "Purpose of this technical support document" Subsection: Preliminary recommendation:

> *Ecology has concluded that available scientific studies support the use of a default fish consumption rate in the range of 157 to 267 grams per day (g/day). The preliminary recommendation of this report is that default fish consumption rates should be within this range for state regulatory purposes.*

Numerical standards are rarely based on a range of FCRs. How can WADOE conclude that this range is protective, when WADOE knows that other populations consume more than the reported range?

6. Page 10; Section: Problem Statement; Entire "Purpose of this technical support document" Subsection: Purpose of this Document:

This document requires a disclaimer here and within the first paragraph of the introduction that its conclusions/findings do not apply to situations where Native Americans or other high-rate fish consumers are involved.

7. Page 23; Section: "Estimated Fish Consumers in Washington; First open bullet:

> ○ *DOH found that in 2002 and 2004, 78 percent and 74 percent, respectively, of adults in Washington consumed store-bought fish. In 2005, 57 percent of the adults surveyed reported eating fresh fish purchased at a local grocery store or fish market (frozen fish excluded). Among Washington fish consumers, 44 percent consumed salmon, 20 percent consumed halibut, 13 percent consumed cod, and 6 percent consumed tuna.*

This work is dated and fails to discuss the importance of the recent increase in the price of store-bought fish (due to global-wide over consumption) and the recent lack of discretionary funds caused by the recession. Also, exclusion of frozen fish biases the study in a non-constant manner rendering this work of little use to a risk assessor, For example, the risk assessor needs to estimate the FCR of the individual or group could consume now and in the future. The next step, is that the assessor specifies that 100% of the fish came from the exposure area. Exclusion of frozen fish is a fatal flaw in the report.

8. Page 23; Section: "Estimated Fish Consumers in Washington; Second open bullet:

> ○ *Although this data was intended for use by DOH in developing fish consumption advisory programs, Ecology, after consultation with DOH, determined that the information is appropriate for estimating the total number of fish consumers in Washington as needed for this report.*

Again, it is not clear why this information is important (See Specific comment No. 3). What is the technical basis for your conclusion on data adequacy?

9. Page 24; Section: "Estimated number of high fish consumers":

The logic employed in this section raises numerous questions.

> *For purposes of this report, high fish consumers are persons who consume fish at or above the 90th national per capita percentile fish consumption rate, as reported in Estimated Per Capita Fish Consumption in the United States (EPA, 2002).*

This reasoning is circular. How does this work, with all of its identified problems, to further the understanding of high fish consumers? It seems you have reverted to an EPA definition EPA published 10 yrs ago. There are numerous problems with the EPA document one being that fresh fish is not available to the lions share of U.S. citizens. Again, EPA's work as well as this work does not capture the high-end consumers.

> *Ecology estimates that between 146,000 and 384,000 Washington adults are high fish consumers. Based on OFM population projections, this number could increase by 27 percent over the next 20 years*.

What is the basis for this estimate? Fish are diminishing in abundance world-wide.

10. Page 96; Entire Section: "Suppression Effects"

These suppression effects are immense and an integral portion of the causation (10x when comparing STI to EPA subsistence FCR). Therefore they cannot be merely "qualified away" and buried way deep in this document.

> • *Knowledge of fish/shellfish contamination may reduce harvests and consumption.*

99% of suppression likely can be tied to this factor and fish consumption advisories alone. Especially since public trust of governmental agencies is at an all time low.

This section also omits the Spokane FCR described in:

> Barbara L. Harper, Brian Flett, Stuart Harris, Corn Abeyta, and Fred Kirschner. "The Spokane Tribe's Multipathway Subsistence Exposure Scenario and Screening Level RME." *Risk Analysis*, Vol 22, No. 3, 2002, pages 513-526. [Table 11, page 521 notes 885 – 1000 g/day for those with a high fish diet (fish consumers) and 175 g/day for shellfish consumption for fish consumers and nonconsumers of fish].

References Cited

Environmental Impact Statement for the Spokane Tribe's Integrated Resource Management Plan (IRMP) for the Spokane Indian Reservation. May 2008

Harper, B.L. , Flett, B. , Harris, S., Abeyta, C., and Kirschner, F.E., 2002, "The Spokane Tribe's Multipathway Subsistence Exposure Scenario and Screening Level RME." *Risk Analysis*, Vol 22, No. 3, pages 513-526.

Spokane's Tribal Water Quality Standards February 25, 2010 Resolution 2010-173 (02/25/2010--SLOC CH. 30--Res. No. 2010-173)

Spokane's Tribal Water Quality Standards, March 7, 2003 Resolution 2003-259

Spokane Tribe of Indians Hazardous Substances Control Act December, 2003 (Amended November, 2004) law and Order Code of the Spokane Tribe of Indians, Chapter 34.