Fw: LCP OU1 HHRA - Revised Appendix B

Galo Jackson to: Debbie Jourdan 08/18/2011 04:04 PM

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Subject: LCP OU1 HHRA - Revised Appendix B

Galo,

Per the discussions at our meeting last week, I've revised the Appendix B text and table that addresses the derivation of the fish ingestion rate for the Subsistence Fisher receptor. Please forward this on the EPA and EPD risk assessment folks for their review and comment.

The comment pertaining to Appendix B that resulted in this revision suggested that the text and table of this Appendix should be moved into the body of the text. To facilitate the review of this revision we have left the text and table as a stand alone write-up as Appendix B. Our preference would be to leave details of the derivation of the subsistence fish ingestion rate as an Appendix in order to avoid wholesale changes to the text and tables associated with the body of the document (i.e., all tables subsequent to Table 10 would shift by one number and all table references in the text would require adjustment). Please let us know if you are agreeable to leaving this material as Appendix B.

Please let me know if you have any questions.

Best Regards,

Chris Revised APPENDIX B.doc

APPENDIX B

DEVELOPMENT OF FISH CONSUMPTION RATES FOR SUBSISTENCE FISH CONSUMERS

Subsistence fishing generally refers to the harvest of fish for personal consumption as a major source of dietary protein. The USEPA's *Exposure Factors Handbook* (EFH) provides estimates of fish consumption by subsistence fishermen, but these estimates are specific to Native American populations primarily in the Pacific Northwest (USEPA, 1997). For this risk assessment, fish ingestion rates for potential subsistence consumers of finfish were derived using a Monte Carlo simulation based on data from several different sources, including locally relevant information from the Brunswick area obtained by the Glynn County Health Department (GCHD) and the Agency for Toxic Substances and Disease Registry (ATSDR) (DHHS, 1999). This Appendix describes the derivation of these values.

The GCHD/ATSDR study produced information on the frequency of consumption of local fish and game from a target group of 211 individuals. The target group in Brunswick was limited to individuals who lived in Glynn County for at least two consecutive years, had consumed or caught fish from the Turtle River or its tributaries in Glynn County, and had not been employed in an industry associated with occupational mercury exposure (DHHS, 1999). The frequency of consuming fish or game was assessed using both an interviewer-administered questionnaire and a dietary diary. 36% of the target population reported consuming seafood or wild game less than once per week, 38% reported consumption about once per week, 18% reported consumption more than once per week, and 8% did not provide consumption frequency information.

For the Monte Carlo simulation, RiskAmp software[1] was used to generate a random selection of meal frequencies from the GCHD/ATSDR data based on Poisson distributions with lambda (i.e., expected) values of 2 meals/month, 4 meals per month and 7 meals per month (corresponding to the three groupings listed above). The proportions of survey responders associated with each of these groupings (i.e., 38%, 41%, and 21%)[2] were used to weight the selection of meal frequency distributions.

Because the GCHD/ATSDR study only provided information on the frequency of seafood consumption by the local population, additional information on the portion size of fish consumed by individuals was also needed. The arithmetic mean and standard deviation of fish meal sizes, in units of grams, for children, adolescents, and adults were

[1] RiskAmp is a commercially available Monte Carlo "add in" program for Microsoft Excel.
[2] The missing fish consumption rate information for 8% of the survey responders was assumed to be equally distributed among the other rate classes.

obtained from the U.S. Department of Agriculture's Continuing Survey of Food Intake by Individuals (CSFII) 1994-1996, 1998 (USDA, 2000). Using RiskAmp, lognormal distributions were fit to the age-specific fish meal size values obtained from the CSFII.

Using RiskAmp, values from the meal frequency distributions and values from the meal size distributions were multiplied to obtain a monthly fish ingestion rate distribution. These values were divided by 30.46 (the average number of days in a month) to yield distributions of daily fish ingestion rates, in units of grams/day, for children, adolescents, and adults. The 50^{th} and 90^{th} percentiles of these distributions were then adjusted by weighting factors for seasonal fish availability obtained from the Marine Recreational Fisheries Statistics Survey (MRFSS) data described in Section 4.5. The final daily fish ingestion rate for a given age group was assumed to be the average of the fish ingestion rates in these MRFSS intervals. For adults, adolescents and children, the RME and CTE fish ingestion rate values were assumed to be the 50^{th} and 90^{th} percentiles, respectively, of the resulting distributions. These values are presented in Table B-1. This table also provides the input distributions and weighting factors required for the Monte Carlo simulation.

Table B-1. Derivation of Ingestion Rates for Subsistence Fish Consumers

Meal Sizes (grams)[1]		
Age	**Arithmetic Mean**	**Standard Deviation**
0-6 years (Child)	54.5 g	42.7 g
7-16 years (Adolescent)	94.9 g	78.8 g
17-30 years (Adult)	134.6 g	111.9 g

[1] Data obtained from the USDA's Continuing Survey of Food Intake by Individuals 1994-1995, 1998 (USDA, 2000).

Meal Frequency[2]			
Survey Response	**<1/week**	**~ 1/week**	**>1/week**
Poisson Parameter[3]	2	4	7
Weighting Factor	38%	41%	21%

[2] Data obtained from GCHD/ATSDR seafood survey (DHHS, 1999).

[3] Value corresponds to the approximate number of meals per month based on GCHD/ATSDR survey responses.

Fish Availability Weighting Factor (unitless)[4]	
January – February	0.1
March – April – May	0.52
June – July – August	1
September – October	0.76
November – December	0.6

[4] Data for 2001-2005 harvest for Georgia obtained from the Marine Recreational Fisheries Statistics Survey online database (NMFS, 2007).

Subsistence Fish Ingestion Rates (grams/day)		
Age	**RME (90th %tile)**	**CTE (50th %tile)**
0-6 years (Child)	10	3
7-16 years (Adolescent)	18	11
17-30 years (Adult)	27	13