



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

September 2, 1999

By E-mail and
Express Mail

John G. Haggard, Manager
Hudson River PCBs Program
General Electric Company
320 Great Oaks Office Park, Suite 323
Albany, NY 12203

Re: Hudson River PCBs Reassessment

Dear Mr. Haggard:

This letter is in response to your August 31, 1999 letter requesting supplemental information pertaining to the Upper Hudson River Human Health Risk Assessment (HHRA) released by the U.S. Environmental Protection Agency (EPA) on August 4, 1999. Other issues raised in your letter may be addressed at a later date. Specifically, in your August 31, 1999 letter you requested the following information:

- an electronic copy of the Monte Carlo model with instructions for running the model;
- a paper copy of the Monte Carlo model;
- paper and electronic copy of the inputs into the 72 runs of the Monte Carlo model;
- the raw data from the Connelly et al. (1992) study including start ages, current ages, species preferences, and consumption rates; and
- a clear description of how the Connelly et al. (1992) data were analyzed to derive the distribution of consumption rates, including:
 - the specific bodies of water considered to be rivers;
 - the specific bodies of water considered to be non-rivers; and
 - any angler records eliminated and the reason for the elimination.

The information you requested is enclosed. EPA notes that much of the information you requested is described in the text, tables and figures of the HHRA. The enclosure to this letter references these discussions in the HHRA. The raw data from the Connelly et al. (1992) study provided herein, while not reproduced in the HHRA, are also available directly from Dr. Connelly of Cornell University.

PCB Concentration in Fish (3 Combinations)

The modeled PCB concentration in the Upper Hudson River fish species used in the HHRA are plotted in Figure 2-10. The input files for the base case, high end, and low end scenarios are FISHCONB.TXT, FISHCONH.TXT, and FISHCONL.TXT. As described in the HHRA, these three scenarios represent either the average of all model locations (base case), the Thompson Island Pool modeled values (high end), or the Waterford/Troy modeled values (low end).

In addition, the species ingestion fractions, as defined by the PCT_f term described on page 48 of the HHRA, are given in the file SPECPRP.TXT. The SAS code that was used to determine the species ingestion fractions from the Connelly et al. (1992) data set is SPECIESD.SAS.

PCB Cooking Loss (3 Combinations)

The input constants for cooking loss in the Monte Carlo analysis are defined on page 49 of the HHRA, as follows:

RME Exposure	0%
Central Tendency	20%
Low End Exposure	40%

The Monte Carlo program reads these constants in the files COOKLSB.TXT, COOKLSH.TXT, and COOKLSL.TXT.

Exposure Duration (2 Combinations)

As described in Section 3.2.4 of the HHRA, the probability distribution for exposure duration for the base case analysis is conditioned on when an individual stops fishing or the individual moves out of one of the five counties bordering the Upper Hudson River study area. Based on the analysis of the current age and starting age of the anglers from the Connelly et al. (1992) data described in Section 3.2.4.1, EPA determined the probability for the time (in years) until an angler stops fishing. These probabilities by age groups are tabulated in Table 3-7 of the HHRA. The data files used in the Monte Carlo simulation are SACA_ALL.TXT and FTDIST.TXT.

The probability of moving out of the Upper Hudson region is tabulated in Table 3-15. The Monte Carlo simulation samples from these two probability distributions to determine the fishing duration (exposure duration) for the base case analysis. The data file for the residence time for the base case is RTDISTB.TXT.

For the alternative analysis, the exposure duration was based only on the probability distribution of residence duration, as defined by the probabilities in Table 3-15. The data file for this case is RTDISTH.TXT.

Raw Data from 1991 New York Angler Survey (Bullet 4)

The enclosed electronic file, FISH91.SAS, contains the Connelly et al. (1992) data that were provided by Dr. Nancy Connelly of Cornell University. Frequency distribution plots summarizing the age distribution variables from this survey are provided in Figures 3-4a through 3-4d of the HHRA. Further tabulations of the age distribution information are found in Tables 3-6 and 3-7 of the HHRA.

Description of Connelly Data Analysis (Bullet 5)

Section 3.2.1.2 of the HHRA describes the criteria for using the Connelly et al. (1992) survey results. As described therein, the survey results were used for responses:

- responses indicating greater than zero, but 1000 or fewer, meals per year, and
- responses for fish caught from flowing water bodies.

Responses for unknown water bodies were included according to the algorithm presented on page 42 of the HHRA. The "data dictionary" for the data file provided by Dr. Connelly is enclosed, as well as a listing of the specific water body codes corresponding to the flowing water bodies that were used in the analysis.

The basis for, and derivation of, the input parameters and probability distributions for the 72 Monte Carlo runs are described in the Phase 2 Report Volume 2F - Human Health Risk Assessment, Hudson River PCBs Reassessment RI/FS, dated August 4, 1999 (HHRA). Specifically, page 59 of the HHRA presents a matrix that summarizes the 72 Monte Carlo simulation scenarios. The four variables that comprise the 72 combinations run, and relevant sections of the HHRA in which these variables are presented, are discussed below.

Fish Ingestion Rate (4 Combinations)

1991 New York Angler Survey (Connelly et al., 1992). Figures 3-2a through 3-2c of the HHRA provide log-probability plots of the data that were used to determine the fish ingestion rate from this survey. In addition, Figure 3-3a plots a frequency distribution of the empirical data, summarizing the 50th and 90th percentiles of this distribution. As described on page 43 of the HHRA, for the Monte Carlo analysis an empirical sample (N=1000) was developed from the respondent (N=226) and non-respondent (N=55) data sets. This empirical distribution can be found in the file FSHINNY.TXT. The discussion in Section 3.2.1.2 of the HHRA describes how the respondent and non-respondent data were combined.

1992 Maine Angler Survey (Ebert et al., 1993). As described in Section 3.2.1.3 of the HHRA, the Maine Angler Survey data were modeled as a lognormal distribution. The lognormal parameters are summarized on Figure 3-3d. In the Monte Carlo program, 1000 samples from this lognormal distribution were used. The input file of these 1000 samples is FSHINME.TXT.

1989 Michigan Survey (West et al., 1989). As described in Section 3.2.1.3 of the HHRA, the Michigan Angler Survey data were modeled as a lognormal distribution. The lognormal parameters are summarized on Figure 3-3c. In the Monte Carlo program, 1000 samples from this lognormal distribution were used. The input file of these 1000 samples is FSHINMI.TXT.

1992 Lake Ontario Diary Study (Connelly et al., 1996). As described in Section 3.2.1.3 of the HHRA, the Lake Ontario data were modeled as a lognormal distribution. The lognormal parameters are summarized on Figure 3-3b. In the Monte Carlo program, 1000 samples from this lognormal distribution were used. The input file of these 1000 samples is FSHINONT.TXT.

In the Monte Carlo analysis, the fish ingestion rate for simulated anglers younger than 18 years of age was scaled from the adult ingestion rates in the above studies. The scaling factor by age, which is the ratio of body weight at age y (the age of the simulated angler where $y < 18$ years) divided by the body weight at adulthood, is provided in the file AGESCALE.TXT.

Enclosures
September 2, 1999 Letter to John G. Haggard

This enclosure contains information in response to an August 31, 1999 letter from John G. Haggard of the General Electric Company to Richard L. Caspe of the U.S. Environmental Protection Agency (EPA). Specifically, the information requested in the letter was the following:

- An electronic copy of the Monte Carlo model with instructions for running the model.
- A paper copy of the Monte Carlo model.
- Paper and electronic copy of the inputs into the 72 runs of the Monte Carlo model.
- The raw data from the Connelly et al. (1992) study including start ages, current ages, species preferences, and consumption rates.
- A clear description of how the Connelly et al. (1992) data were analyzed to derive the distribution of consumption rates, including:
 - the specific bodies of water considered to be rivers,
 - the specific bodies of water considered to be non-rivers, and
 - any angler records eliminated and the reason for elimination.

Information responsive to this request is summarized below.

Monte Carlo Model (Bullets 1 & 2)

The following SAS files (enclosed) provide the electronic copies of the Monte Carlo simulation code:

AGEDIST.SAS	:code used to develop the probability distribution of angler age
FISHDUR.SAS	:code used to develop the angling duration probability
RES DUR.SAS	:code used to develop residence duration probabilities
INGEST.SAS	:code used to develop fish ingestion rate from Connelly et al. (1992)
SPECIESD.SAS	:code used to assign fish ingestion (species) by angler
SIM.SAS	:code that implements Monte Carlo simulation

Printed copies of all of the above files are enclosed. SAS Version 6.12 (SAS Institute Inc, Cary, NC) was used to perform the Monte Carlo simulations. The SIM.SAS program file is used to perform the Monte Carlo simulation, and the remaining SAS program files are used to derive probability distribution information needed in the SIM.SAS program.

Paper and Electronic Copy of Inputs to 72 Runs (Bullet 3)

All input data files used by SIM.SAS are provided as electronic text files readable by the SIM.SAS program. A listing of these files is attached. Some of these input files are intermediate files that are the output of the various SAS programs described above, and these output files are then read by the SIM.SAS program.

As you know, the public comment period on the HHRA closes on September 7, 1999. Nevertheless, EPA will consider timely any written comments, on the information provided herein only, that are received from General Electric Company within the two-week period requested in your letter (i.e., by close of business on September 17, 1999).

If you have any questions regarding this matter, please contact Alison A. Hess, Project Manager for the Hudson River PCBs Site, at (212) 637-3959.

Sincerely,

for Alison A. Hess

William J. McCabe, Deputy Director
Emergency and Remedial Response Division

Enclosures: as stated