Appendix E

Supporting Information and
Methodology Used for the Floodplain Assessment

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The following text provides background on the types of information and methodology used and the assumptions made during the initial floodplain assessment of the final candidate sites (FCSs).

Methodology

Methods followed were in accordance with Section 3.7 of the *Hudson River PCBs Facility Siting Work Plans* (Ecology and Environment, Inc. August 2003)*.* Flood Hazard Boundary Maps and Flood Insurance Studies from the Federal Emergency Management Agency (FEMA), the U.S. Geological Survey (USGS) Hudson River gauge station data, the National Oceanic and Atmospheric Administration (NOAA) Advanced Hydrologic Prediction Service data, and historic water level elevation data provided by the New York State Canal Corporation (NYSCC) were used for this analysis.

The latest Hudson River Flood Hazard Boundary Maps for the area identified as the facility siting study area were acquired from FEMA. Some of the mapping was available in geographic information system (GIS) format. The remainder was provided in hard copy (i.e., paper maps) that were subsequently scanned and incorporated into the facility siting GIS database. Depending on the location, FEMA last updated these maps between 1979 and 1995. The 100-year and 500-year floodplain areas were mapped within the boundaries of the sites. As noted in the FEMA flood insurance studies, small areas within the flood boundaries may lie above the flood elevations and, therefore, may not be subject to flooding. General statistics for mapped floodplains were calculated from these resources using GIS.

Peak stream flow data and gauge station information were obtained from the USGS water web site (http://waterdata.usgs.gov/nwis) in November 2003. Four gauge stations have stream flow data applicable to this area of the Hudson River, including Fort Edward (1977 to the present), Stillwater (1977 to the present), Waterford (1982 to the present), and Green Island (1946 to the present). Flood magnitudes were calculated using statistical methods from the available peak stream flow data at each of the four gauge stations. The values of 10-year, 20-year, 25-year, 50-year, 75-year, and 100-year storms were calculated based on the mean and standard deviation of the annual maximum flow.

$$Q_{100} = Q_{avg} + Ks$$

Where:

Q_{100} = Discharge of 100-year flood;
Q_{avg} = Mean of annual peak discharge over period of x years; and
  K = Extreme value frequency factor (obtained from a table based on sample size and recurrence interval).
  S = Standard deviation of annual peak discharge over period of x years.

The NOAA Advanced Hydrologic Prediction Service data for gauge station crest history and impacts were obtained from the NOAA website (http://ahps.erh.noaa.gov/cgi-bin).

Historic peak water level elevation data was provided by the NYSCC for Locks 2, 3, 5, 6, and 7, with data used from Locks 2, 3, 5, and 7. The annual peak water levels were summarized in a table and compared to the 100-year flood stage elevation and the ground surface elevations within the sites (where applicable).

Assumptions

¦ The 100-year and 500-year floodplains have not changed significantly since the last FEMA update of the Flood Hazard Boundary Maps. There have been no changes to the Hudson River flow regime and shoreline in the vicinity of the FCSs since the publication of the FEMA maps. The list below shows the last date of publication of FEMA maps for each of the FCS:

Energy Park/Longe/NYSCC - 1982, 1984
Old Moreau Dredge Spoils Area/NYSCC - 1995
Georgia Pacific/NYSCC – 1992
Bruno/Brickyard Associates/Alonzo –1984
NYSCC/Allco/Leyerle – 1995
State of New York/First Rensselaer/Marine Management – 1980
OG Real Estate - 1982

¦ The topography of the FCSs has not changed significantly since the last FEMA update of the Flood Hazard Boundary Maps.

¦ The potential for Hudson River flooding is lessened to some extent by Great Sacandaga Lake and Indian Lake, although this protection is not accounted for in flood profiles and calculations.

Probability of 100-year Flood
The anticipated operational life for a sediment processing/transfer facility for the remedial dredging is 10 years. The probability of a 100-year storm occurring in that time, at any of the FCSs, is 9.6%. The probability of a 500-year storm occurring in that time at any site is 2.0%. These calculations are based on the formula:

$$P = 1 - (1 - 1/F)^n$$

Where:

P = Probability of a x-year flood will occur in n years;
F = Frequency of event (100 or 500 year storm); and
n = Interval (years).

The probability of a 100-year or 500-year flood actually occurring on the Hudson River is likely less because of the ability to manage the river levels through various reservoirs, locks, and dams. Each of the FCSs is located in highly managed areas of the Hudson River.

Local Flooding

A cursory examination of the potential for local flooding at each site was performed where possible. The 10-year flood stage heights from the FEMA Flood Insurance Studies were included for the FCSs. The difference between spot elevations surveyed along the FCSs river boundaries and the contour information provided as a component of 2002 site aerial photographs were compared to the average of the annual peak elevations from the nearest lock (where applicable). General discussion of local flooding in the Flood Insurance Studies is also included for each of the final candidate sites, where available.