

70002

(2)

Facility Name: Hudson River PCB Problem

Location: Hudson River, New York

EPA Region: II

Person(s) in Charge of the Facility: Robin Rohn

Name of Reviewer: Raymond Basso

Date: 9/16/82

General Description of the Facility:

(For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility; contamination route of major concern; types of information needed for rating; agency action, etc.)

Contamination of the Hudson River with PCB's from two General

Electric capacitor manufacturing plants in Fort Edward and Hudson

Falls. Much of the contaminated material had accumulated behind

the Fort Edward Dam and was released when the dam was removed

forming "hotspots" of PCB contaminated sediments for 30 miles

downstream. Segments of the river have been closed to commercial

and recreational fishing. PCB's have been detected in several
public water supply intakes as well as in ambient air near remnant sites.

Scores: $S_M = 54.66$ ($S_{gw} = 76.92$ $S_a = 55.00$)

$S_{FE} =$

$S_{DC} =$

GROUND WATER ROUTE WORK SHEET

N/A

Rating Factor	Assigned Value (Circle One)	Multi- plier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 45	1		45	3.1
If observed release is given a score of 45, proceed to line 4 . If observed release is given a score of 0, proceed to line 2 .					
2 Route Characteristics					3.2
Depth to Aquifer of Concern	0 1 2 3	2		6	
Net Precipitation	0 1 2 3	1		3	
Permeability of the Unsaturated Zone	0 1 2 3	1		3	
Physical State	0 1 2 3	1		3	
Total Route Characteristics Score				15	
3 Containment	0 1 2 3	1		3	3.3
4 Waste Characteristics					3.4
Toxicity/Persistence	0 3 6 9 12 15 18	1		18	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
Total Waste Characteristics Score				26	
5 Targets					3.5
Ground Water Use	0 1 2 3	3		9	
Distance to Nearest Well/Population Served	0 4 8 10 12 16 18 20 24 30 32 35 40	1		40	
Total Targets Score				49	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5				57,330	
7 Divide line 6 by 57,330 and multiply by 100 $S_{gw} =$					

SURFACE WATER ROUTE WORK SHEET

Rating Factor	Assigned Value (Circle One)	Multi- plier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 (45)	1	45	45	4.1
If observed release is given a value of 45, proceed to line 4 . If observed release is given a value of 0, proceed to line 2 .					
2 Route Characteristics					4.2
Facility Slope and Intervening Terrain	0 1 2 3	1		3	
1-yr. 24-hr. Rainfall	0 1 2 3	1		3	
Distance to Nearest Surface Water	0 1 2 3	2		6	
Physical State	0 1 2 3	1		3	
Total Route Characteristics Score				15	
3 Containment	0 1 2 3	1		3	4.3
4 Waste Characteristics					4.4
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18	
Hazardous Waste Quantity	0 1 2 3 (4) 5 6 7 8	1	4	8	
Total Waste Characteristics Score			22	26	
5 Targets					4.5
Surface Water Use	0 1 2 (3)	3	9	9	
Distance to a Sensitive Environment	0 1 2 (3)	2	6	6	
Population Served/Distance to Water Intake Downstream	0 4 6 8 10 12 16 18 20 24 30 32 (35) 40	1	35	40	
Total Targets Score			50	55	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			49,500	64,350	
7 Divide line 6 by 64,350 and multiply by 100			S _{sw} = 76.92		

AIR ROUTE WORK SHEET					
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 (45)	1	45	45	5.1
Date and Location:					
Sampling Protocol:					
If line 1 is 0, the S = 0. Enter on line 5 . If line 1 is 45, then proceed to line 2 .					
2 Waste Characteristics					5.2
Reactivity and Incompatibility	0 1 2 3	1	0	3	
Toxicity	0 1 2 (3)	3	9	9	
Hazardous Waste Quantity	0 1 2 3 (4) 5 6 7 8	1	4	8	
Total Waste Characteristics Score			13	20	
3 Targets					5.3
Population Within 4-Mile Radius	0 9 12 15 18 21 (24) 27 30	1	24	30	
Distance to Sensitive Environment	0 1 2 (3)	2	6	6	
Land Use	0 1 2 (3)	1	3	3	
Total Targets Score			33	39	
4 Multiply 1 x 2 x 3			19,35	35,100	
5 Divide line 4 by 35,100 and multiply by 100 $S_a = 55.00$					

	s	s ²
Groundwater Route Score (S _{gw})	—	—
Surface Water Route Score (S _{sw})	76.92	5917
Air Route Score (S _a)	55.00	3025
$S_{gw}^2 + S_{sw}^2 + S_a^2$		8942
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		94.56
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73$		S _M = 54.66

WORKSHEET FOR COMPUTING S_M

FIRE AND EXPLOSION WORK SHEET						
Rating Factor	Assigned Value (Circle One)		Multi-plier	Score	Max. Score	Ref. (Section)
1 Containment	1	3	1		3	7.1
2 Waste Characteristics						7.2
Direct Evidence	0	3	1		3	
Ignitability	0	1 2 3	1		3	
Reactivity	0	1 2 3	1		3	
Incompatibility	0	1 2 3	1		3	
Hazardous Waste Quantity	0	1 2 3 4 5 6 7 8	1		8	
Total Waste Characteristics Score					20	
3 Targets						7.3
Distance to Nearest Population	0	1 2 3 4 5	1		5	
Distance to Nearest Building	0	1 2 3	1		3	
Distance to Sensitive Environment	0	1 2 3	1		3	
Land Use	0	1 2 3	1		3	
Population Within 2-Mile Radius	0	1 2 3 4 5	1		5	
Buildings Within 2-Mile Radius	0	1 2 3 4 5	1		5	
Total Targets Score					24	
4 Multiply 1 x 2 x 3					1,440	
5 Divide line 5 by 1,440 and multiply by 100 SFE ←						

DIRECT CONTACT WORK SHEET						
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)	
1 Observed Incident	0 45	1		45	8.1	
If line 1 is 45, proceed to line 4 If line 1 is 0, proceed to line 2						
2 Accessibility	0 1 2 3	1		3	8.2	
3 Containment	0 15	1		15	8.3	
4 Waste Characteristics Toxicity	0 1 2 3	5		15	8.4	
5 Targets					8.5	
Population Within a 1-Mile Radius	0 1 2 3 4 5	4		20		
Distance to a Critical Habitat	0 1 2 3	4		12		
Total Targets Score				32		
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5				21,600		
7 Divide line 6 by 21,600 and multiply by 100 SOC =						

DOCUMENTATION RECORDS
FOR
HAZARD RANKING SYSTEM

INSTRUCTIONS: The purpose of these records is to provide a convenient way to prepare an auditable record of the data and documentation used to apply the Hazard Ranking System to a given facility. As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference that will make the document used for a given data point easier to find. Include the location of the document and consider appending a copy of the relevant page(s) for ease in review.

FACILITY NAME: HUDSON RIVER PCB PROBLEM

LOCATION: HUDSON RIVER, NEW YORK

GROUND WATER ROUTE

N/A

1 OBSERVED RELEASE

Contaminants detected (5 maximum):

Rationale for attributing the contaminants to the facility:

* * *

2. ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifers(s) of concern:

Depth(s) from the ground surface to the highest seasonal level of the saturated zone [water table(s)] of the aquifer of concern:

Depth from the ground surface to the lowest point of waste disposal/storage:

Net Precipitation

Mean annual or seasonal precipitation (list months for seasonal):

Mean annual lake or seasonal evaporation (list months for seasonal):

Net precipitation (subtract the above figures):

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

Permeability associated with soil type:

Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

Method with highest score:

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

Compound with highest score:

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

Basis of estimating and/or computing waste quantity:

* * *

5 TARGETS

Ground Water Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

Distance to above well or building:

Population Served by Ground Water Wells Within a 3-Mile Radius

Identified water-supply well(s) drawing from aquifer(s) of concern within a 3-mile radius and populations served by each:

Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

Total population served by ground water within a 3-mile radius:

Use

aquifer(s) of concern within a 3-mile radius of the facility:

Nearest Well

nearest well drawing from aquifer of concern or occupied
not served by a public water supply:

above well or building:

Served by Ground Water Wells Within a 3-Mile Radius

water-supply well(s) drawing from aquifer(s) of concern
3-mile radius and populations served by each:

on of land area irrigated by supply well(s) drawing from
) of concern within a 3-mile radius, and conversion to
a (1.5 people per acre):

ulation served by ground water within a 3-mile radius:

SURFACE WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum):

PCBS - detected in water column and sediments downstream of General Electric discharge points.

SOURCE: USGS/NYSDEC SAMPLING DATA

Rationale for attributing the contaminants to the facility:

PCB levels in the water column at the USGS Glens Falls monitoring station, upstream of the GE discharge points, are routinely below the detection limit (0.1 ug/l). Ambient levels show an immediate increase downstream from the former discharge point and subsequently decline with distance downstream.

1976-1979 Ranges — Schuylerville & Stillwater — 0.1 → 5 ug/l
Waterford — 0.1 → 3 ug/l

2 ROUTE CHARACTERISTICS

(USGS sampling stations)

Facility Slope and Intervening Terrain

SOURCE: NYSDC PCB HOTSPOT DETECTION PROGRAM, UPPER HUDSON RIVER, NEW YORK, DEIS, SEPT.

Average slope of facility in percent:

Name/description of nearest downslope surface water:

Average slope of terrain between facility and above-cited surface water body in percent:

Is the facility located either totally or partially in surface water?

Is the facility completely surrounded by areas of higher elevation?

1-Year 24-Hour Rainfall in Inches

Distance to Nearest Downslope Surface Water

Physical State of Waste

* * *

3. CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

Method with highest score:

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated

PCB^s

Compound with highest score:

PCB^s

TOXICITY

3

PERSISTENCE

3

SOURCE: MITRE MODEL RANKING SYSTEM

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

+ 500,000 lbs

Basis of estimating and/or computing waste quantity:

General Electric discharged over 500,000 lbs of PCB^s into the HUDSON River from two capacitor manufacturing plants at Fort Edward and Hudson Falls, New York.

*** Source: NYSDOC DEIS Sept 19

5 TARGETS

Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance:

- Public Water Supply i.e. drinking water
- Recreation - boating, fishing
- Commercial fishing

Since 1976 commercial and recreational fishing has been prohibited in the Upper Hudson River between Fort Edward and the Troy Dam due to high PCB

Is there tidal influence?

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

Zero Distance - NYSDEC has identified PCB contaminated ("hotspot") wetlands along the Hudson River. These wetland areas serve as valuable wildlife habitats.

Source: Koechlein, NYSDEC, 1980

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

Population Served by Surface Water

Location(s) of water-supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake:

Village of Waterford - located on the western bank of the Hudson River at the north end of the village limits.

Population Served - 3,000

Private intakes - i.e. infiltration galleries along river.

Computation of land area irrigated by above-cited intake(s) and conversion to population (1.5 people per acre):

Total population served:

3,000 + number of residents served
by private infiltration galleries.

EPA Region II - water supply Data

Name/description of nearest of above water bodies:

Hudson River

Distance to above-cited intakes, measured in stream miles.

Zero Distance. → PCB's have been
detected in water column at the
USGS station in Waterford (RM 156.5)

Range of concentrations detected
between .1 — 3 ug/l. (NYSDEC DEIS - 198

Source: Chuck Barnes - USGS
Intake Location Albany

FTS - 562-2823

AIR ROUTE

1. OBSERVED RELEASE

Contaminants detected:

PCBs

100 - 600 ng/m³

Date and location of detection of contaminants

Remnant areas of PCB contaminated sediments
#s 3, 4, 5

Dates: August 1981

Methods used to detect the contaminants:

- Polyurathane foam adsorbant → 12-14 hrs for 2 days
- Soxhlet extraction GC

Rationale for attributing the contaminants to the site:

When dam at Fort Edward was removed, river level dropped leaving PCB sediments, which had accumulated behind dam, deposited on river banks. Readings were taken 1 meter above remnant areas #s 3, 4, 5.

2. WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

Most incompatible pair of compounds:

Toxicity

Most toxic compound:

PCB^s

Hazardous Waste Quantity

Total quantity of hazardous waste:

500,000 lbs

Basis of estimating and/or computing waste quantity:

Same as surface water

3 TARGETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how determined:

0 to 4 mi

0 to 1 mi

0 to 1/2 mi

0 to 1/4 mi

> 3,000. QUAD MAP

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

N/A

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

Same as surface water
zero distance

Distance to critical habitat of an endangered species, if 1 mile or less:

Land Use

Distance to commercial/industrial area, if 1 mile or less:

< 1/4 mile

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

Distance to residential area, if 2 miles or less:

< 1/4 mile

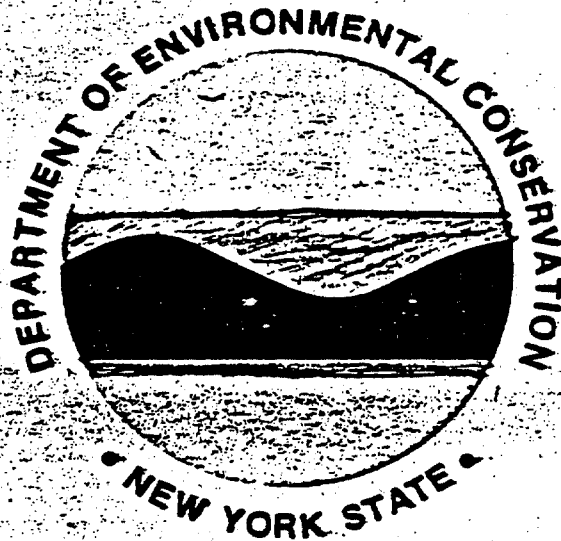
Distance to agricultural land in production within past 5 years, if 1 mile or less:

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?

**Draft Environmental Impact Statement
New York State Environmental Quality Review**

**PCB Hot Spot Dredging Program
Upper Hudson River, New York**



September 1980



MALCOLM PIRNIE, INC.
CONSULTING ENVIRONMENTAL ENGINEERS.

Water Column Levels of PCB - Since 1977 the U.S. Geological Survey has operated five PCB monitoring stations in the Upper Hudson River. These stations, located at Glens Falls, Rogers Island, Schuylerville, Stillwater and Waterford, provide the basic information about PCB transport in the Upper Hudson and its contribution to the lower reaches and estuary. In addition, these data provide the necessary information for calibration of the models used in studies of the PCB problem in the Hudson.

At the Glens Falls monitoring station, located upstream of the GE discharge points and therefore above any contaminated sediments, PCB levels in the water column are routinely below the detection limit (0.1 ug/l). Ambient levels show an increase immediately downstream from the former discharge point, then a subsequent decline with distance downstream. At Schuylerville (RM 181.5) and Stillwater (RM 168), water column PCB values measured from October 1976 to October 1979 ranged between 0.1 and 5 ug/l. The concentrations for both stations are plotted against flow in Figure 2-4. At Waterford (RM 156.5) the PCB concentrations are generally between 0.1 and 3 ug/l. In the estuarine portion of the Hudson River, the ambient total PCB concentrations further decline to a range of 0.1 and 0.4 ug/l (DEC 1980).

PCB concentrations in the Upper Hudson appear to be flow-dependent. As shown in Figure 2-3, relatively high ambient PCB concentrations occur at low flows of less than 7,000 cfs. The concentrations are reduced in the moderate flow range, 7,000 to 20,000 cfs, and then increase again in the high flow range, greater than 20,000 cfs (DEC 1980). These data are summarized in Table 2-8.

TABLE 2-8

**AVERAGE PCB IN THE RIVER WATER COLUMN (ug/l)
October 1976 through October 1979**

<u>Station Location</u>	Flow Less Than	Flow	Flow Greater Than
	<u>7,000 cfs</u>	<u>7,000-20,000 cfs</u>	<u>20,000 cfs</u>
Schuylerville (RM 181.5)	0.67	0.21	1.17
Stillwater (RM 168)	0.59	0.21	1.08
Waterford (RM 156.5)	0.38	0.23	0.69

Source: DEC 1980 (USGS Data)

Note: Data from stations at Glens Falls and Rogers Island are not sufficiently complete to permit this type of analysis.

This behavior is indicative of a relatively constant pool of PCB being transported, probably by desorption, except during storm events when the sediment-carrying capacity of the river increases. The constant low-flow PCB transport in the Upper Hudson is between 9 to 11 lbs/day at the lower limit of the project area, at the Troy Dam.

Changes in ambient PCB levels over time are apparent at the Fort Edward station, immediately below the former discharge point. In 1974 and 1975, when the discharge averaged 40 pounds of PCB per day, the average total PCB in the water column (12 data points) was 1.5 ug/l. The discharge was limited to 1 pound per day by the summer of 1976 and to 1 gram per day by 1977. The average ambient total PCB monitored between October 1978 and October 1979 was reduced to 0.2 ug/l (USGS 1979), most likely as a result of the elimination of direct discharge.

Analysis performed on data from three downstream stations, Schuylerville, Stillwater, and Waterford, during the summer months of 1976 through 1979 showed no significant change over



AIR DATA

Table 3-13

Summary Tabulation of Air PCB Data by NYSDEC Division of Air Resources

Data taken at Temperature of 18 to 29 ° (65 to 85 °F)

Site	Comment	Air PCB ug/cu m	Sediment ug/g (ppm)
Caputo Dump	Max	300	10,000-50,000
Caputo	Avg	130	10,000-50,000
Fort Miller Dump	Max	35	5,000-15,000
	Avg	24	5,000-15,000
Remnant Area	Max	10	1,000-2,000
	Avg	9	1,000-2,000
Moreau site with excavated 3A material	Max	15	600-1,000
	Avg	5.6	600-1,000
Buoy 212 site Summer 1979	One Sample 29° (85° F)	0.7	50-100
Old Moreau Site Summer 1979	Avg	0.3	20-50

Table 3-11

PCB Air Sampling by the New York State Department of Health

nanogram/cu m

Date	Stations				
	Glens Falls 5601-4	Warrensburg 5660-02	Hudson Falls 5726-01	Fort Edward I 5755-01	Fort Edward II 5755-02
1/1/77	R	R	R	R	<30
1/7/77	R	LA	40	R	R
1/13/77	R	R	<or=190	1020	<or=60
1/19/77	LA	<30	LA	530	<20
1/25/77	R	<40	R	1800	R
1/31/77	<20	<20	R	1000	<30
2/6/77	<20	<20	50	STB	<20
2/12/77	<20	<20	80	500	20
2/18/77	<20	<20	130	360	40
2/24/77	R	<20	<20	870	280
3/2/77	<50	<30	<20	<or=600	80
3/14/77	<20	<20	190	<or=60 ¹	560 ¹
3/20/77	R	<20	<20	<or=320	<or=70
3/26/77	<20	<20	<20	140	240
4/1/77	<20	<20	<20	100	130
4/7/77	<20	NR	100	1250	<20
4/13/77	<20	<20	120	1180	160
4/19/77	<20	<20	160	740	200
4/28/77	<20	<20	260	3060	<20
5/3/77	<20	<20	30	330	210
5/13/77	<20	<20	<20	850	120
5/19/77	<20	<20	<20	580	100
5/25/77	R	<20	200	1140	130
5/31/77	<20	<20	100	970	<20
6/6/77	<20	<20	30	R	320
6/12/77	<20	<20	20	130	30
6/18/77	R	R	R	90	R

Table 3-11 (continued)

Date	Stations				
	Glens Falls 5601-4	Warrensburg 5660-02	Hudson Falls 5726-01	Fort Edward I 5755-01	Fort Edward II 5755-02
6/24/77	R	<20	R	R	30
6/30/77	<20	<20	110	3260 ₂	<20
7/6/77	<20	<20	140 ₂	150 ₂	70
7/12/77	<20	<20	50	290	<20
7/18/77	<20	<20	50	350	<20
7/24/77	<20	<20	100	520	<20
7/30/77	<20	<20	30	590	<20
8/5/77	R	<20	120	R	<20
8/11/77	R	<20	R	R	R
8/17/77	<20	<20	R	480	<20

5601-04 = Continuous Air Monitoring Station, Glens Falls

5660-02 = DEC Region 5 Suboffice, Warrensburg

5726-01 = Main Street School, Hudson Falls

5755-01 = Washington County Office Building, Fort Edward

5755-02 = Fort Hudson Nursing Home, Fort Edward

1 nanogram = 1,000 micrograms

R = Reject

LA = Lab Accident

STB = Sampling Train Broken

NR = Not Run

Notes: 1. = Appear to have been switched but cannot be verified.

2. = Results are inconsistent with each other: 5726-01 is usually ten percent of 5755-01.

Source: NYSDEC, 1977 b.