

US EPA ARCHIVE DOCUMENT

ATTACHMENT 4

**CLARIFICATION LETTER FROM IBM TO EPA
DATED MARCH 8, 2000**



International Business Machines Corporation

East Fishkill Facility
1580 Route 52
Hopewell Junction, NY 12533-6531
914 / 894-2121

March 8, 2000

George C. Meyer, P.E.
Chief, RCRA Compliance Branch
Division of Enforcement and Compliance Assistance
United States Environmental Protection Agency
Region 2
290 Broadway
New York, NY 10007-1866

Re: International Business Machines Corporation
East Fishkill Facility
Project XL F006 Sludge Recycling Project
Cement Plant Feedstock Sample Results

Dear Mr. Meyer:

The purpose of this letter is to provide you with a comparison of the analytical results for the International Business Machines Corporation (IBM) East Fishkill Facility's F006 sludge with that of the cement feedstock which was forwarded to IBM by your office. In addition, we offer our interpretation of the comparison with regard to the proposed F006 Sludge Recycling Project.

In December 1999 the U.S. Environmental Protection Agency (EPA) collected samples of cement feedstock material at five different cement manufacturing plants located in the northeast. Samples were collected and analyzed at the EPA analytical laboratory located in Edison, New Jersey, for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs) and metals. Based on our review of the data package, it appears that the samples were composited from three feedstock locations at each plant with the exception of VOCs analyses where the individual grab samples were analyzed. The analytical results of the samples are summarized on Tables 1 through 4 provided as Attachment 1. The last one or two columns on each table presents analytical results of IBM sludge samples collected on February 8 and November 1, 1999, from the Building 690 fluoride/heavy metal waste treatment facility for comparison purposes.

As shown on Table 1, VOCs were not detected above the detection limit in any cement feedstock sample. Low concentrations of methylene chloride, toluene, m-xylene and p-xylene and o-xylene were detected in the IBM sludge sample. However, it is important to note that the samples analyzed by EPA were run at a higher detection level than those analyzed by IBM (708 to 1080 ug/kg versus

2.5 ug/kg). For this reason, it is not possible to determine whether the low concentrations of the above listed compounds detected in the IBM sludge sample are present in the cement feedstock samples because the high detection limit misses detecting low concentrations.

As shown on Table 2, SVOCs were not detected above the detection limit in any cement feedstock sample or the IBM sludge sample.

As shown on Table 3, pesticides and PCBs were not detected above the detection limit in any cement feedstock sample. The IBM sludge sample was not analyzed for these compounds. The reason for this is that during the early discussion phases of this project, IBM and EPA agreed that since these compounds are not utilized in the manufacturing process operations at the East Fishkill facility, it would not be necessary to continue laboratory analysis of these constituents.

As shown on Table 4, a number of metal constituents were detected in both the cement feedstock samples as well as the IBM sludge samples. Table 5 presents a statistical summary of the analytical results of the cement feedstock samples and compares it to the IBM sludge samples.

Based upon a review of Table 5, the following can be concluded:

- Arsenic was detected at a concentration of 2.2 mg/kg in the IBM sludge sample collected on February 8, 1999, which is below the maximum value (11 mg/kg), the mean (4.1 mg/kg) and the upper limit of the 95% confidence interval (14 mg/kg) for the cement feedstock samples. The IBM sludge sample collected on November 1, 1999, was not analyzed for arsenic since it is not a listed constituent of F006 sludge.
- Beryllium was detected at a concentration of 0.21 mg/kg in the IBM sludge sample collected on February 8, 1999, which is below the maximum value (0.55 mg/kg), the mean (0.23 mg/kg) and the upper limit of the 95% confidence interval (0.85 mg/kg) for the cement feedstock samples. The IBM sludge sample collected on November 1, 1999, was not analyzed for beryllium since it is not a listed constituent of F006 sludge.
- Cadmium was detected at a concentration of 0.77 mg/kg in the IBM sludge sample collected on February 8, 1999, which is above the maximum value (0.65 mg/kg) and the mean (0.46 mg/kg) but below the upper limit of the 95% confidence interval (0.96 mg/kg) for the cement feedstock samples. Cadmium was detected at a concentration of 0.26 mg/kg in the IBM sludge sample collected on November 1, 1999, which is below the maximum value, mean and upper limit of the 95% confidence interval for the cement feedstock samples.

- Chromium was detected at a concentration of 20.0 mg/kg in the IBM sludge sample collected on February 8, 1999, which is above the mean (18 mg/kg) but below the maximum value (29 mg/kg) and the upper limit of the 95% confidence interval (41 mg/kg) for the cement feedstock samples. Cadmium was detected at a concentration of 9.8 mg/kg in the IBM sludge sample collected on November 1, 1999, which is below the maximum value, mean and upper limit of the 95% confidence interval for the cement feedstock samples.
- Lead was detected at a concentration of 16.8 mg/kg in the IBM sludge sample collected on February 8, 1999, which is above the maximum value (6.3 mg/kg), the mean (3.0 mg/kg) and the upper limit of the 95% confidence interval (8.3 mg/kg) for the cement feedstock samples. Lead was detected at a concentration of 1.9 mg/kg in the IBM sludge sample collected on November 1, 1999, which is below the maximum value, mean and upper limit of the 95% confidence interval for the cement feedstock samples.
- Mercury was not detected above the detection limit in the IBM sludge sample collected on February 8, 1999. The IBM sludge sample collected on November 1, 1999, was not analyzed for mercury since it is not a listed constituent of F006 sludge.
- Nickel was detected at a concentration of 8.0 mg/kg in the IBM sludge sample collected on February 8, 1999, which is below the maximum value (42 mg/kg), the mean (19 mg/kg) and the upper limit of the 95% confidence interval (54 mg/kg) for the cement feedstock samples. Nickel was detected at a concentration of 8.3 mg/kg in the IBM sludge sample collected on November 1, 1999, which is also below the maximum value, mean and upper limit of the 95% confidence interval for the cement feedstock samples.
- Silver was detected at a concentration of 1.4 mg/kg in the IBM sludge sample collected on February 8, 1999, which is above the mean (0.51 mg/kg) but below the maximum value (1.6 mg/kg) and the upper limit of the 95% confidence interval (2.0 mg/kg) for the cement feedstock samples. Silver was detected at a concentration of 0.12 mg/kg in the IBM sludge sample collected on November 1, 1999, which is below the maximum value, mean and upper limit of the 95% confidence interval for the cement feedstock samples.
- Cyanide was not detected above the detection limit in the IBM sludge samples collected on February 8, 1999, and November 1, 2000, or in the EPA cement feedstock samples.

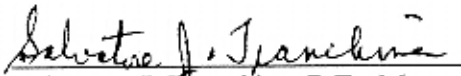
In summary, the concentrations of cadmium, chromium, lead and silver detected in the February 8, 1999, sludge sample exceeded the mean concentration of the cement feedstock samples. However, the concentrations of these four constituents detected in the November 1, 1999, sludge sample were

George C. Meyer, P.E.
Chief, RCRA Compliance Branch
Division of Enforcement and Compliance Assistance
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March 8, 2000

below the mean concentration of the cement feedstock samples. As a result, based upon comparison of the IBM sludge and cement feedstock sample results, it is evident that the composition of the two are very similar and that addition of the IBM sludge to the cement feedstock will not have a measurable effect on the composition of the feedstock, cement or cement kiln dust.

Please contact me at (914) 892-1629 if you have any questions or require further information.

Sincerely,


Salvatore J. Tranchina, P.E., Manager
Environmental Engineering and Operations

SJT/RMW/MRH/cmc
Attachment

cc: W. Muszynski (EPA - Region 2)
P. Flax (EPA - Region 2)
L. Nadler (NYSDEC - Albany)
N. Ayengar (IBM)
R. Walka (WFC)

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ATTACHMENT 1
ANALYTICAL RESULTS

**TABLE 1
INTERNATIONAL BUSINESS MACHINES CORPORATION
EAST FISHKILL - PROJECT XL
CEMENT PLANT FEEDSTOCK SAMPLING ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS**

CEMENT COMPANY	CEMENT PLANT FEEDSTOCK						IBM SLUDGE
	Glen Falls			Blue Circle			NA
SAMPLE IDENTIFICATION	GRAB #1	GRAB #2	GRAB #3	GRAB #1	GRAB #2	GRAB #3	CA-F Grab
DATE OF COLLECTION	12/22/99	12/22/99	12/22/99	12/21/99	12/21/99	12/21/99	2/08/99
UNITS	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Chloromethane	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
Bromomethane	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
Vinyl Chloride	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
Chloroethane	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
Methylene Chloride	955 U	975 U	942 U	778 U	708 U	808 U	3.6
Acetone	955 U	975 U	942 U	778 U	708 U	808 U	N/A
Carbon Disulfide	955 U	975 U	942 U	778 U	708 U	808 U	N/A
1,1-Dichloroethene	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
1,1-Dichloroethane	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
Chloroform	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
1,2-Dichloroethane	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
2-Butanone	955 U	975 U	942 U	778 U	708 U	808 U	N/A
1,1,1-Trichloroethane	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
Carbon Tetrachloride	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
Bromodichloromethane	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
1,2-Dichloropropane	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
1,3-Z-Dichloropropene	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
Trichloroethene	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
Dibromochloromethane	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
1,1,2-Trichloroethane	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
Benzene	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
1,3-E-Dichloropropene	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
Bromoform	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
4-Methyl-2-pentanone	955 U	975 U	942 U	778 U	708 U	808 U	N/A
2-Hexanone	955 U	975 U	942 U	778 U	708 U	808 U	N/A
Tetrachloroethene	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
1,1,2,2-Tetrachloroethane	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
Toluene	955 U	975 U	942 U	778 U	708 U	808 U	1.6 J
Chlorobenzene	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
Ethylbenzene	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
Styrene	955 U	975 U	942 U	778 U	708 U	808 U	2.5 U
m + p-Xylene	955 U	975 U	942 U	778 U	708 U	808 U	4.2
o-Xylene	955 U	975 U	942 U	778 U	708 U	808 U	2.1 J
VOA Total Xylenes Solid	955 U	975 U	942 U	778 U	708 U	808 U	N/A

Qualifiers:

U: Compound analyzed for but not detected.

J: Compound found at a concentration below the detection limit.

Notes:

N/A : Compound not analyzed for.

TABLE 1 (continued)
 INTERNATIONAL BUSINESS MACHINES CORPORATION
 EAST FISHKILL - PROJECT XL
 CEMENT PLANT FEEDSTOCK SAMPLING ANALYTICAL RESULTS
 VOLATILE ORGANIC COMPOUNDS

CEMENT COMPANY	CEMENT PLANT FEEDSTOCK						IBM SLUDGE
	Hercules			St. Lawrence			NA
SAMPLE IDENTIFICATION	GRAB #1	GRAB #2	GRAB #3	GRAB #1	GRAB #2	GRAB #3	CA-F Grab
DATE OF COLLECTION	12/03/99	12/03/99	12/03/99	12/21/99	12/21/99	12/21/99	2/08/99
UNITS	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Chloromethane	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
Bromomethane	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
Vinyl Chloride	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
Chloroethane	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
Methylene Chloride	954 U	937 U	997 U	841 U	900 U	870 U	3.6
Acetone	954 U	937 U	997 U	841 U	900 U	870 U	N/A
Carbon Disulfide	954 U	937 U	997 U	841 U	900 U	870 U	N/A
1,1-Dichloroethene	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
1,1-Dichloroethane	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
Chloroform	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
1,2-Dichloroethane	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
2-Butanone	954 U	937 U	997 U	841 U	900 U	870 U	N/A
1,1,1-Trichloroethane	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
Carbon Tetrachloride	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
Bromodichloromethane	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
1,2-Dichloropropane	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
1,3-Z-Dichloropropene	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
Trichloroethene	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
Dibromochloromethane	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
1,1,2-Trichloroethane	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
Benzene	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
1,3-E-Dichloropropene	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
Bromoform	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
4-Methyl-2-pentanone	954 U	937 U	997 U	841 U	900 U	870 U	N/A
2-Hexanone	954 U	937 U	997 U	841 U	900 U	870 U	N/A
Tetrachloroethene	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
1,1,2,2-Tetrachloroethane	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
Toluene	954 U	937 U	997 U	841 U	900 U	870 U	1.6 J
Chlorobenzene	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
Ethylbenzene	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
Styrene	954 U	937 U	997 U	841 U	900 U	870 U	2.5 U
m + p-Xylene	954 U	937 U	997 U	841 U	900 U	870 U	4.2
o-Xylene	954 U	937 U	997 U	841 U	900 U	870 U	2.1 J
VOA Total Xylenes Solid	954 U	937 U	997 U	841 U	900 U	870 U	N/A

Qualifiers:

U: Compound analyzed for but not detected.
 J: Compound found at a concentration below the detection limit.

Notes:

N/A : Compound not analyzed for.

TABLE 1 (continued)
 INTERNATIONAL BUSINESS MACHINES CORPORATION
 EAST FISHKILL - PROJECT XL
 CEMENT PLANT FEEDSTOCK SAMPLING ANALYTICAL RESULTS
 VOLATILE ORGANIC COMPOUNDS

CEMENT COMPANY	CEMENT PLANT FEEDSTOCK			IBM SLUDGE
	Keystone			NA
SAMPLE IDENTIFICATION	GRAB #1	GRAB #2	GRAB #3	CA-F Grab
DATE OF COLLECTION	12/03/99	12/03/99	12/03/99	2/08/99
UNITS	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Chloromethane	1070 U	1080 U	980 U	2.5 U
Bromomethane	1070 U	1080 U	980 U	2.5 U
Vinyl Chloride	1070 U	1080 U	980 U	2.5 U
Chloroethane	1070 U	1080 U	980 U	2.5 U
Methylene Chloride	1070 U	1080 U	980 U	3.6
Acetone	1070 U	1080 U	980 U	N/A
Carbon Disulfide	1070 U	1080 U	980 U	N/A
1,1-Dichloroethene	1070 U	1080 U	980 U	2.5 U
1,1-Dichloroethane	1070 U	1080 U	980 U	2.5 U
Chloroform	1070 U	1080 U	980 U	2.5 U
1,2-Dichloroethane	1070 U	1080 U	980 U	2.5 U
2-Butanone	1070 U	1080 U	980 U	N/A
1,1,1-Trichloroethane	1070 U	1080 U	980 U	2.5 U
Carbon Tetrachloride	1070 U	1080 U	980 U	2.5 U
Bromodichloromethane	1070 U	1080 U	980 U	2.5 U
1,2-Dichloropropane	1070 U	1080 U	980 U	2.5 U
1,3-Z-Dichloropropene	1070 U	1080 U	980 U	2.5 U
Trichloroethene	1070 U	1080 U	980 U	2.5 U
Dibromochloromethane	1070 U	1080 U	980 U	2.5 U
1,1,2-Trichloroethane	1070 U	1080 U	980 U	2.5 U
Benzene	1070 U	1080 U	980 U	2.5 U
1,3-E-Dichloropropene	1070 U	1080 U	980 U	2.5 U
Bromoform	1070 U	1080 U	980 U	2.5 U
4-Methyl-2-pentanone	1070 U	1080 U	980 U	N/A
2-Hexanone	1070 U	1080 U	980 U	N/A
Tetrachloroethene	1070 U	1080 U	980 U	2.5 U
1,1,2,2-Tetrachloroethane	1070 U	1080 U	980 U	2.5 U
Toluene	1070 U	1080 U	980 U	1.6 J
Chlorobenzene	1070 U	1080 U	980 U	2.5 U
Ethylbenzene	1070 U	1080 U	980 U	2.5 U
Styrene	1070 U	1080 U	980 U	2.5 U
m + p-Xylene	1070 U	1080 U	980 U	4.2
o-Xylene	1070 U	1080 U	980 U	2.1 J
VOA Total Xylenes Solid	1070 U	1080 U	980 U	N/A

Qualifiers:

U: Compound analyzed for but not detected.

J: Compound found at a concentration below the detection limit.

Notes:

N/A : Compound not analyzed for.

TABLE 2
INTERNATIONAL BUSINESS MACHINES CORPORATION
EAST FISHKILL - PROJECT XL
CEMENT PLANT FEEDSTOCK SAMPLING ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

CEMENT COMPANY	CEMENT PLANT FEEDSTOCK					IBM SLUDGE
	Glens Falls	Blue Circle	Hercules	St. Lawrence	Keystone	NA
SAMPLE IDENTIFICATION	Composite	Composite	Composite	Composite	Composite	CA-F Grab
DATE OF COLLECTION	12/22/99	12/21/99	12/03/99	12/21/99	12/03/99	2/08/99
UNITS	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Phenol	500 U	355 U	473 U	337 U	366 U	930 U
bis(2-Chloroethyl)ether	500 U	355 U	473 U	337 U	366 U	930 U
2-Chlorophenol	500 U	355 U	473 U	337 U	366 U	930 U
1,3-Dichlorobenzene	500 U	355 U	473 U	337 U	366 U	930 U
1,4-Dichlorobenzene	500 U	355 U	473 U	337 U	366 U	930 U
1,2-Dichlorobenzene	500 U	355 U	473 U	337 U	366 U	930 U
2-Methylphenol	500 U	355 U	473 U	337 U	366 U	930 U
bis(2-Chloroisopropyl)ether	500 U	355 U	473 U	337 U	366 U	930 U
4-Methylphenol	500 U	355 U	473 U	337 U	366 U	930 U
N-Nitroso-di-n-propylamine	500 U	355 U	473 U	337 U	366 U	930 U
Hexachloroethane	500 U	355 U	473 U	337 U	366 U	930 U
Nitrobenzene	500 U	355 U	473 U	337 U	366 U	930 U
Isophorone	500 U	355 U	473 U	337 U	366 U	930 U
2-Nitrophenol	500 U	355 U	473 U	337 U	366 U	930 U
2,4-Dimethylphenol	500 U	355 U	473 U	337 U	366 U	930 U
bis(2-Chloroethoxy)methane	500 U	355 U	473 U	337 U	366 U	930 U
2,4-Dichlorophenol	500 U	355 U	473 U	337 U	366 U	930 U
1,2,4-Trichlorobenzene	500 U	355 U	473 U	337 U	366 U	930 U
Naphthalene	500 U	355 U	473 U	337 U	366 U	930 U
4-Chloroaniline	500 U	355 U	473 U	337 U	366 U	930 U
Hexachlorobutadiene	500 U	355 U	473 U	337 U	366 U	930 U
4-Chloro-3-methylphenol	500 U	355 U	473 U	337 U	366 U	930 U
2-Methylnaphthalene	500 U	355 U	473 U	337 U	366 U	930 U
Hexachlorocyclopentadiene	500 U	355 U	473 U	337 U	366 U	930 U
2,4,6-Trichlorophenol	500 U	355 U	473 U	337 U	366 U	930 U
2,4,5-Trichlorophenol	500 U	355 U	473 U	337 U	366 U	930 U
2-Chloronaphthalene	500 U	355 U	473 U	337 U	366 U	930 U
2-Nitroaniline	500 U	355 U	473 U	337 U	366 U	2300 U
Dimethylphthalate	500 U	355 U	473 U	337 U	366 U	930 U
Acenaphthylene	500 U	355 U	473 U	337 U	366 U	930 U
2,6-Dinitrotoluene	500 U	355 U	473 U	337 U	366 U	930 U
3-Nitroaniline	500 U	355 U	473 U	337 U	366 U	2300 U
Acenaphthene	500 U	355 U	473 U	337 U	366 U	930 U
2,4-Dinitrophenol	3000 U	2130 U	2840 U	2030 U	366 U	2300 U
4-Nitrophenol	500 U	355 U	473 U	337 U	366 U	2300 U

TABLE 2 (continued)
INTERNATIONAL BUSINESS MACHINES CORPORATION
EAST FISHKILL - PROJECT XL
CEMENT PLANT FEEDSTOCK SAMPLING ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

CEMENT COMPANY	CEMENT PLANT FEEDSTOCK					IBM SLUDGE
	Glens Falls	Blue Circle	Hercules	St. Lawrence	Keystone	NA
SAMPLE IDENTIFICATION	Composite	Composite	Composite	Composite	Composite	CA-F Grab
DATE OF COLLECTION	12/22/99	12/21/99	12/03/99	12/21/99	12/03/99	2/08/99
UNITS	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Dibenzofuran	500 U	355 U	473 U	337 U	366 U	930 U
2,4-Dinitrotoluene	500 U	355 U	473 U	337 U	366 U	930 U
Fluorene	500 U	355 U	473 U	337 U	366 U	930 U
4-Nitroaniline	500 U	355 U	473 U	337 U	366 U	2300 U
4,6-Dinitro-2-methylphenol	3000 U	2130 U	2840 U	2030 U	366 U	2300 U
N-Nitrosodiphenylamine	500 U	355 U	473 U	337 U	366 U	930 U
4-Bromophenyl-phenylether	500 U	355 U	473 U	337 U	366 U	930 U
Hexachlorobenzene	500 U	355 U	473 U	337 U	366 U	930 U
Pentachlorophenol	500 U	355 U	473 U	337 U	366 U	2300 U
Phenanthrene	500 U	355 U	473 U	337 U	366 U	930 U
Anthracene	500 U	355 U	473 U	337 U	366 U	930 U
Di-n-butylphthalate	500 U	355 U	473 U	337 U	366 U	930 U
Fluoranthene	500 U	355 U	473 U	337 U	366 U	930 U
Pyrene	500 U	355 U	473 U	337 U	366 U	930 U
Butylbenzylphthalate	500 U	355 U	473 U	337 U	366 U	930 U
Benzo(a)anthracene	500 U	355 U	473 U	337 U	366 U	930 U
Chrysene	500 U	355 U	473 U	337 U	366 U	930 U
bis(2-Ethylhexyl)phthalate	500 U	355 U	473 U	337 U	366 U	140 J
Di-n-octylphthalate	500 U	355 U	473 U	337 U	366 U	930 U
Benzo(b)fluoranthene	500 U	355 U	473 U	337 U	366 U	930 U
Benzo(k)fluoranthene	500 U	355 U	473 U	337 U	366 U	930 U
Benzo(a)pyrene	500 U	355 U	473 U	337 U	366 U	930 U
Indeno(1,2,3-cd)pyrene	500 U	355 U	473 U	337 U	366 U	930 U
Dibenzo(a,h)anthracene	500 U	355 U	473 U	337 U	366 U	930 U
Benzo(g,h,i)perylene	500 U	355 U	473 U	337 U	366 U	930 U
Benzyl Alcohol	500 U	355 U	473 U	337 U	366 U	930 U
Benzoic Acid	1000 U	710 U	2840 U	675 U	366 U	N/A
Diethylphthalate	500 U	355 U	473 U	337 U	366 U	930 U
4-Chlorophenyl-phenylether	500 U	355 U	473 U	337 U	366 U	930 U
Diazene,Diphenyl	500 U	355 U	473 U	337 U	366 U	N/A

Qualifiers:

U: Compound analyzed for but not detected.
 J: Compound found at a concentration below the detection limit.

Notes:

N/A : Compound not analyzed for.

**TABLE 3
INTERNATIONAL BUSINESS MACHINES CORPORATION
EAST FISHKILL - PROJECT XL
CEMENT PLANT FEEDSTOCK SAMPLING ANALYTICAL RESULTS
PESTICIDES AND PCBs**

CEMENT COMPANY	CEMENT PLANT FEEDSTOCK					IBM SLUDGE
	Glens Falls	Blue Circle	Hercules	St. Lawrence	Keystone	NA
SAMPLE IDENTIFICATION	Composite	Composite	Composite	Composite	Composite	CA-F Grab
DATE OF COLLECTION	12/22/99	12/21/99	12/03/99	12/21/99	12/03/99	2/08/99
UNITS	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
<u>PESTICIDES</u>						
alpha-BHC	0.25 U	0.17 U	0.23 U	0.16 U	0.18 U	N/A
beta-BHC	0.25 U	0.17 U	0.23 U	0.16 U	0.18 U	N/A
delta-BHC	0.25 U	0.17 U	0.23 U	0.16 U	0.18 U	N/A
gamma-BHC (Lindane)	0.25 U	0.17 U	0.23 U	0.16 U	0.18 U	N/A
Heptachlor	0.25 U	0.17 U	0.23 U	0.16 U	0.18 U	N/A
Aldrin	0.25 U	0.17 U	0.23 U	0.16 U	0.18 U	N/A
Heptachlor Epoxide	0.25 U	0.17 U	0.23 U	0.16 U	0.18 U	N/A
Endosulfan I	0.25 U	0.17 U	0.23 U	0.16 U	0.18 U	N/A
Dieldrin	0.5 U	0.35 U	0.47 U	0.33 U	0.36 U	N/A
4,4'-DDE	0.5 U	0.35 U	0.47 U	0.33 U	0.36 U	N/A
Endrin	0.5 U	0.35 U	0.47 U	0.33 U	0.36 U	N/A
Endosulfan II	0.5 U	0.35 U	0.47 U	0.33 U	0.36 U	N/A
4,4'-DDD	0.5 U	0.35 U	0.47 U	0.33 U	0.36 U	N/A
Endosulfan Sulfate	0.5 U	0.35 U	0.47 U	0.33 U	0.36 U	N/A
4,4'-DDT	0.5 U	0.35 U	0.47 U	0.33 U	0.36 U	N/A
Methoxychlor	2.5 U	0.35 U	0.47 U	0.33 U	0.36 U	N/A
Endrin Ketone	0.5 U	0.35 U	0.47 U	0.33 U	0.36 U	N/A
Endrin Aldehyde	0.5 U	0.35 U	0.47 U	0.33 U	0.36 U	N/A
alpha-Chlordane	0.25 U	0.17 U	0.23 U	0.16 U	0.18 U	N/A
gamma-Chlordane	0.25 U	0.17 U	0.23 U	0.16 U	0.18 U	N/A
T-Chlordane	6.25 U	4.44 U	5.94 U	4.19 U	4.56 U	N/A
Toxaphene	6.25 U	4.44 U	5.94 U	4.19 U	4.56 U	N/A
Hexachlorobenzene	0.25 U	0.17 U	0.23 U	0.16 U	0.18 U	N/A
<u>PCBs</u>						
Aroclor-1016	6.25 U	4.44 U	5.94 U	4.19 U	4.56 U	N/A
Aroclor-1221	6.25 U	4.44 U	5.94 U	4.19 U	4.56 U	N/A
Aroclor-1232	6.25 U	4.44 U	5.94 U	4.19 U	4.56 U	N/A
Aroclor-1242	6.25 U	4.44 U	5.94 U	4.19 U	4.56 U	N/A
Aroclor-1248	6.25 U	4.44 U	5.94 U	4.19 U	4.56 U	N/A
Aroclor-1254	6.25 U	4.44 U	5.94 U	4.19 U	4.56 U	N/A
Aroclor-1260	6.25 U	4.44 U	5.94 U	4.19 U	4.56 U	N/A
Aroclor-1262	6.25 U	4.44 U	5.94 U	4.19 U	4.56 U	N/A

Qualifiers:
U: Compound analyzed for but not detected.

Notes:
N/A : Compound not analyzed for.

TABLE 4
INTERNATIONAL BUSINESS MACHINES CORPORATION
EAST FISHKILL - PROJECT XL
CEMENT PLANT FEEDSTOCK SAMPLING ANALYTICAL RESULTS
INORGANIC CONSTITUENTS AND CYANIDE

CEMENT COMPANY	CEMENT PLANT FEEDSTOCK					IBM SLUDGE	
	Glens Falls	Blue Circle	Hercules	St. Lawrence	Keystone	NA	
SAMPLE IDENTIFICATION	Composite	Composite	Composite	Composite	Composite	CA-F COMP	B/690 HAZ FL
DATE OF COLLECTION	12/22/99	12/21/99	12/03/99	12/21/99	12/03/99	2/08/99	11/01/99
UNITS	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Aluminum	9680	4820	2890	8990	4220	N/A	N/A
Antimony	1.00 U	1.00 U	2.01	1.91	1.00 U	N/A	N/A
Arsenic	1.59	10.81	2.14	4.43	1.45	2.2 B	N/A
Barium	423	52.55	17.40	37.52	9.65	N/A	N/A
Beryllium	0.55	0.45	0.10 U	0.10 U	0.10 U	0.21 B	N/A
Cadmium	0.50 U	0.62	0.65	0.55	0.50 U	0.77 B	0.26
Calcium	245200	259100	264200	247400	254100	N/A	N/A
Chromium	11.30	12.21	26.90	29.01	9.77	20.0	9.80
Cobalt	3.15	3.03	3.93	2.09	3.11	N/A	N/A
Copper	5.18	9.15	52.11	8.70	9.51	N/A	N/A
Iron	6990	14200	14300	12200	9000	N/A	N/A
Lead	4.09	3.00 U	6.27	3.00 U	3.00 U	16.8	1.91
Magnesium	8800	5150	12500	12400	9200	N/A	N/A
Manganese	265	200	849	144	403	N/A	N/A
Mercury	3.15	0.1 U	0.91	0.1 U	0.1 U	0.25 U	N/A
Nickel	7.88	7.81	41.7	16.20	21.50	8.0	8.33
Potassium	4820	1710	858	1700	513	N/A	N/A
Selenium	0.64	1.00 U	0.54	1.00 U	1.00 U	N/A	N/A
Silver	0.50 U	0.50 U	1.56	0.50 U	0.50 U	1.4 B	0.12
Sodium	121	133	22.00	62.23	100 U	N/A	N/A
Thallium	16.7	1.00 U	14.60	1.00 U	1.00 U	N/A	N/A
Vanadium	9.90	24.32	7.42	12.90	2.84	N/A	N/A
Zinc	17.60	24.12	77.91	28.51	18.20	N/A	N/A
Cyanide	1.43	1.27	1.0 U	2.24	0.66 U	2.5 U	0.39 U

Qualifiers:

U: Compound analyzed for but not detected.

B: Compound detected at a concentration below the CRDL, but greater than the IDL.

Notes:

N/A: Constituent not analyzed for.

TABLE 5
INTERNATIONAL BUSINESS MACHINES CORPORATION
EAST FISHKILL - PROJECT XL
CEMENT PLANT FEEDSTOCK SAMPLING ANALYTICAL RESULTS
INORGANIC CONSTITUENTS AND CYANIDE
STATISTICAL ANALYSIS

Analyte	Units	Number of Samples	CEMENT PLANT FEEDSTOCK						IBM Sludge	
			Range		Mean	Standard Deviation	95% Confidence Interval		2/08/99	11/01/99
			Min	Max			Lower Limit	Upper Limit		
Aluminum	mg/kg	5	2890	9,680	6,120	2,707	ND	13,635	N/A	N/A
Antimony	mg/kg	5	ND	2.0	1.1	0.72	ND	3.1	N/A	N/A
Arsenic	mg/kg	5	1.5	11	4.1	3.5	ND	14	2.2	N/A
Barium	mg/kg	5	9.7	423	108	158	ND	547	N/A	N/A
Beryllium	mg/kg	5	ND	0.55	0.23	0.22	ND	0.85	0.21	N/A
Cadmium	mg/kg	5	ND	0.65	0.46	0.18	ND	0.96	0.77	0.26
Calcium	mg/kg	5	245,200	264,200	254,000	7,086	234,329	273,671	N/A	N/A
Chromium	mg/kg	5	9.8	29	18	8.3	ND	41	20.0	9.80
Cobalt	mg/kg	5	2.1	3.9	3.1	0.58	1.4	4.7	N/A	N/A
Copper	mg/kg	5	5.2	52	17	18	ND	66	N/A	N/A
Iron	mg/kg	5	6,990	14,300	11,338	2,901	3,285	19,391	N/A	N/A
Lead	mg/kg	5	ND	6.3	3.0	1.9	ND	8.3	16.8	1.91
Magnesium	mg/kg	5	5,150	12,500	9,610	2,715	2,074	17,146	N/A	N/A
Manganese	mg/kg	5	144	849	372	254	ND	1,076	N/A	N/A
Mercury	mg/kg	5	ND	3.2	0.84	1.2	ND	4.2	ND	N/A
Nickel	mg/kg	5	7.8	42	19	12	ND	54	8.0	8.33
Potassium	mg/kg	5	513	4,820	1920	1524	ND	6,150	N/A	N/A
Selenium	mg/kg	5	ND	1	0.54	0.05	0.39	0.69	N/A	N/A
Silver	mg/kg	5	ND	1.6	0.51	0.52	ND	2.0	1.4	0.12
Sodium	mg/kg	5	ND	133	78	43	ND	196	N/A	N/A
Thallium	mg/kg	5	ND	17	6.6	7.5	ND	27	N/A	N/A
Vanadium	mg/kg	5	2.8	24	11	7.2	ND	32	N/A	N/A
Zinc	mg/kg	5	18	78	33	23	ND	96	N/A	N/A
Cyanide	mg/kg	5	ND	2.2	1.1	0.72	ND	3.1	ND	ND

Notes:

Statistical summary assumes values less than the IDL to be equal to half the IDL. Therefore, 0.5 x IDL was substituted for all "U" values.

ND: Not detected.