International Business
Machines Corporation

East Fishkill Facility
Hopewell Junction, New York

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION 6 NYCRR PART 373 PERMIT RENEWAL APPLICATION

VOLUME 1
PERMIT MODULES

JUNE 2011

Prepared By

William F. Cosulich Associates, P.C.
ENVIRONMENTAL ENGINEERS AND SCIENTISTS

Hudson Valley Research Park
2070 Route 52
Hopewell Junction, NY 12533-3507
Attn: S.C. Hawkins, Zip 325

June 27, 2011

Mr. Stu Fox, Permit Administrator
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233-1750

Re: International Business Machines Corporation
East Fishkill Facility
Part 373 Permit Renewal Application
EPA ID No. NYD000707901

Dear Mr. Fox:

The International Business Machines Corporation (IBM) is pleased to submit for your review the revised 6 NYCRR Part 373 Permit Renewal Application for the IBM East Fishkill Facility located in Hopewell Junction, New York.

The 6 NYCRR Part 373 Permit Renewal Application is also being submitted to the following in either hard copy, electronic format on compact disc or both:

Name	Affiliation	Hard Copy	Electronic Copy
Tom Killeen	NYSDEC – Albany	–	✓
Peter Pettit	NYSDEC – Albany	✓	✓
Michael Ryan	NYSDEC – Albany	✓	✓
Henry Wilkie	NYSDEC – Albany	–	✓
Alex Czuhanich	NYSDEC – Albany	–	✓
Edward Moore	NYSDEC - New Paltz	✓	✓
Chief, RCRA Programs Branch	EPA – Region 2	–	✓

If you have any questions and/or comments, please do not hesitate to contact me at (845) 894-1039.

Sincerely,

INTERNATIONAL BUSINESS MACHINES CORPORATION

Steven C. Hawkins, Manager
Environmental Engineering and Operations

Enclosure
cc: T. Killeen (NYSDEC – Albany)
P. Pettit (NYSDEC – Albany)
M. Ryan (NYSDEC – Albany)
H. Wilkie (NYSDEC – Albany)
A. Czuhanich (NYSDEC – Albany)
E. Moore (NYSDEC - New Paltz)
Chief, RCRA Programs Branch (EPA – Region 2)

INTERNATIONAL BUSINESS MACHINES CORPORATION

EAST FISHKILL FACILITY

HOPEWELL JUNCTION, NEW YORK

6 NYCRR PART 373 PERMIT RENEWAL APPLICATION

VOLUME 1

PERMIT MODULES

Prepared for:

INTERNATIONAL BUSINESS MACHINES CORPORATION

2070 ROUTE 52

HOPEWELL JUNCTION, NEW YORK

Prepared by:

WILLIAM F. COSULICH ASSOCIATES, P.C.

330 CROSSWAYS PARK DRIVE

WOODBURY, NEW YORK

JUNE 2011

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL REMEDIATION
6 NYCRR PART 373 PERMIT
MODULE I - GENERAL PROVISIONS

IBM Corporation East Fishkill Facility
Hudson Valley Research Park
2070 Route 52
Hopewell Junction, New York 12533
EPA ID# NYD 000 707 901

This permit authorizes only the hazardous waste units identified in this permit as permitted units. **This permit does not authorize other units to operate.**

If this Permit conflicts with Regulations which are in effect on the date of final issuance of this Permit, the more stringent requirement applies.

A. EFFECT OF PART 373 PERMIT

The Permittee must comply with all terms and conditions of this Permit. This Permit consists of: the conditions contained herein, sections of the Permit Application referenced herein, including any subsequent Department approved changes to the referenced sections of that Application, and the applicable regulations contained in 6 NYCRR Parts 370 through 374, 376, 621 and 624. The applicable regulations or requirements are those which are in effect on the date of final issuance of this Permit. However, the Permittee must comply with the following requirements, as applicable:

1. Requirements which become effective by statute, including amendments thereto;

2. Requirements of 6 NYCRR Part 376, as modified (Land Disposal Restrictions);

3. Requirements of 6 NYCRR 373-3.27, 373-3.28, and 373-3.29, as modified (air emission standards); and

4. Other requirements of 6 NYCRR 373-1.6(e).

The Permittee is authorized to store hazardous waste in containers and is required to conduct corrective action in accordance with the conditions of this Permit. Any storage, treatment, or disposal of hazardous waste not authorized in this Permit is prohibited unless exempt from 6 NYCRR Part 373. Issuance of this Permit does not authorize any injury to persons or property, any invasion of other private rights, or any infringement of Federal, State or local laws or regulations.

The hazardous waste management units, activities and types and quantities of hazardous waste to be managed which are authorized by this Permit are listed in the Modules referenced below:

Unit/Activity	Location	Waste Type	Waste Codes	Quantity
Storage of Hazardous Waste in Containers	B/309 Rooms 2,7 and 8	See Table 4-1 in Permit Renewal Application	See Table 4-1 in Permit Renewal Application	150,700 gal.

The Permittee is authorized to accept and manage hazardous wastes from on-site and off-site IBM operations, and from on-site non-IBM tenant operations at the East Fishkill Facility / Hudson Valley Research Park pursuant to the terms of this permit.

IBM is currently conducting a Corrective Measures Program to monitor, collect, and treat contaminated groundwater at the East Fishkill Facility. The current Corrective Measures Program is addressing remedial work in the following Areas of Concern (AOCs): Area A, Area B, Area D, Area C Landfill Area, Building 322 (B/322) Area, Building 330 (B/330) Area, the Southeast Quadrant (SEQ) and the deeper bedrock.

All plans, reports, specifications and schedules required by the terms of this Permit and all subsequent amendments to those documents are incorporated by reference into this Permit, upon approval, when required, or acceptance by the Department. Upon incorporation, the provisions of each such document will be binding upon the Permittee and have the same legal force and effect as the requirements of this Permit.

B. PERMIT APPLICATION

The Permittee's Hazardous Waste **Part A** Permit Application is attached to and incorporated by reference into this Permit. The Permit Application documents listed below are also incorporated by reference into this Permit. These documents are made part of this Permit, are binding upon the Permittee and have the same legal force and effect as the requirements of this Permit.

Application Document
New York State Department of Environmental Conservation 6 NYCRR Part 373 Permit Renewal Application – Volume 1 – Permit Modules
New York State Department of Environmental Conservation 6 NYCRR Part 373 Permit Renewal Application – Volume 2 – Permit Renewal Application

Section	New York State Department of Environmental Conservation 6 NYCRR Part 373 Permit Renewal Application - Volume 2 - Permit Renewal Application
	Part A Permit Application
1	Introduction
2	Facility Description (Site Map, Topographic Map, Flood Insurance Rate Map)
3	Waste Characteristics (Chemical and Physical Analysis Waste Analysis Plan)
4	Process Information
5	Corrective Action Program

Section	New York State Department of Environmental Conservation 6 NYCRR Part 373 Permit Renewal Application - Volume 2 - Permit Renewal Application
6	Procedures to Prevent Hazards (Security, Facility Inspections, Preparedness and Prevention; General Requirements for Ignitable, Reactive, Incompatible Wastes)
7	Hazardous Waste Contingency Plan
8	Personnel Training
9	Closure Plan and Financial Requirements
10	Other State and Federal Laws (Manifest Requirements, Operating Record, Availability, Retention and Disposition of Records, Annual Report, Hazardous Waste Reduction Plans)
11	Certification

Future modifications to this Permit, including modifications to the Permit Application documents incorporated into this Permit, shall be addressed according to 6 NYCRR 373-1.7. The Permittee must submit copies to the Regional Permit Administrator and as required in Section H of this Module, of the replacement: pages, sections, and/or attachments to the permit application along with the application request for a permit modification. The Permittee shall place a revision date on all pages submitted as part of the proposed permit modification application.

The Permittee must provide and maintain a log of all modifications made to this Permit, including modifications made to the Permit Application documents that are made part of this Permit. The log shall contain at a minimum the following information regarding an approved modification: (1) the name of the specific documents being modified (e.g., contingency plan, security requirements, hazardous waste unit operations, etc.); (2) the pertinent page, section, and/or attachment of this Permit and Permit Application documents subject to modification; (3) the revision date of the modifications; (4) a brief statement regarding the nature of the modifications; and (5) the effective date of the modification to this Permit. The Permittee shall place the log at the beginning of this Permit along with a copy of the Department's approval letters, when applicable.

Upon receipt of a permit modification issued by the Department, the Permittee must update the log and replace the pages, sections, and/or attachments in the Permit and Permit Application with the modified pages, sections, and/or attachments in the permit copy maintained by the Permittee.

C. GENERAL REQUIREMENTS FOR THIS PART 373 PERMIT

The Permittee must comply with 6 NYCRR Subpart 373-1 as follows:

1. General 6 NYCRR 373-1.1

    a. 6 NYCRR 373-1.1(b) - Applicability;

    b. 6 NYCRR 373-1.1(c) - Safeguarding Information;

    c. 6 NYCRR 373-1.1(f) - Uniform Procedures;

    d. 6 NYCRR 373-1.1(g) - Enforcement;

e. 6 NYCRR 373-1.1(h) - Severability; and

f. 6 NYCRR 373-1.1(i) - Terms Used.

2. Requirement for Permit 6 NYCRR 373-1.2

6 NYCRR 373-1.2(d) requires owners and operators of hazardous waste management facilities to have a Part 373 permit during the active life of a unit(s), including the closure period and during the post-closure care period, with few exceptions. See Section D.7 of this permit below.

3. Signatories to Permit Applications and Reports 6 NYCRR 373-1.4(a)(5)

a. 6 NYCRR 373-1.4(a)(5)(i) - Applications;

b. 6 NYCRR 373-1.4(a)(5)(ii) - Reports;

c. 6 NYCRR 373-1.4(a)(5)(iii) - Changes to Authorization; and

d. 6 NYCRR 373-1.4(a)(5)(iv) - Certification.

4. Recordkeeping 6 NYCRR 373-1.4(g)

5. Permit Conditions 6 NYCRR 373-1.6

a. 6 NYCRR 373-1.6(a) - Conditions Applicable to All Permits;

b. 6 NYCRR 373-1.6(a)(1) - Duty to Comply;

c. 6 NYCRR 373-1.6(a)(2) - Duty to Reapply;

d. 6 NYCRR 373-1.6(a)(3) - Need to Halt or Reduce Activity not a Defense;

e. 6 NYCRR 373-1.6(a)(4) - Duty to Mitigate;

f. 6 NYCRR 373-1.6(a)(5) - Proper Operation and Maintenance;

g. 6 NYCRR 373-1.6(a)(6) - Permit Actions;

h. 6 NYCRR 373-1.6(a)(7) - Property Rights;

i. 6 NYCRR 373-1.6(a)(8) - Duty to Provide Information;

j. 6 NYCRR 373-1.6(a)(9)(i) through (iv) - Inspection and Entry;

k. 6 NYCRR 373-1.6(a)(10)(i) through (iii) - Monitoring and Records;

l. 6 NYCRR 373-1.6(a)(11) - Signatory Requirements;

m. 6 NYCRR 373-1.6(a)(12)(i) through (xi) - Reporting Requirements;

n. 6 NYCRR 373-1.6(c) - Any conditions of this permit established pursuant to 6 NYCRR 373-1.6(c);

o. 6 NYCRR 373-1.6(d)(1)(i) through (iii) - Schedules of Compliance;

The Permittee must comply with the compliance schedules listed in Module - II Corrective Action Requirements and the special conditions of this permit.

p. 6 NYCRR 373-1.6(d)(2)(i) through (iv) - Alternative Schedules of Compliance.

q. 6 NYCRR 373-1.10(a) - Pre-application public meeting and public notice;

6 NYCRR 373-1.10(a) requires the Permittee to hold and report upon a Pre-application public meeting, which has been conducted and publicly noticed per 6 NYCRR 373-1.10(a), for any subsequent application for a major permit modification or a renewal application which either seeks the permitting of hazardous a waste management unit not previously permitted or where the major modification or renewal application is proposing significant changes in facility operations.

6. Requirements for Recording and Reporting of Monitoring Results 6 NYCRR 373-1.6(b)

The Permittee must comply with the recording, reporting and monitoring requirements listed in this permit.

The Permittee must use, maintain and install monitoring equipment and methods and report monitoring results as specified in this Permit (including the permit application) and 6 NYCRR Subpart 373-2. The Permittee must conduct required monitoring with the type, intervals and frequency sufficient to yield data which are representative of the monitoring activity including, when appropriate, continuous monitoring.

7. Permit Modifications 6 NYCRR 373-1.7

a. 6 NYCRR 373-1.7(a) - Transfer of Permits;

b. 6 NYCRR 373-1.7(b) - Modification of Permits;

c. 6 NYCRR 373-1.7(c) - Minor Modifications of RCRA Delegated Permits;

d. 6 NYCRR 373-1.7(d) - Major Modifications;

e. 6 NYCRR 373-1.7(e) - Announcement of Determinations;

f. 6 NYCRR 373-1.7(f) - Temporary Authorizations; and

g. 6 NYCRR 373-1.7(g) - Newly Regulated Wastes and Units.

8. Expiration and Continuation of Permits 6 NYCRR 373-1.8

The permit shall be in effect for a fixed term not to exceed ten years. Complete applications for permit renewal must be submitted at least 180 days before the expiration date of this Permit pursuant to 6 NYCRR 373-1.8(b). Renewal applications with a significant change (as defined in paragraph 373-1.10(a)(1) of this Subpart) are subject to 373-1.10 of this Subpart.

Prior to processing the renewal application the Department will determine whether the application is complete. In order for the renewal application to be complete the Permittee must:

a. Satisfy the general requirements for a complete application contained in 6 NYCRR Part 621 (Uniform Procedure Regulations)

b. Include all information required, both general and specific to the type of the facility in accordance with the laws, regulations and analytical requirements in effect at the time.

At any time during the review of the renewal application the Department may request in writing any additional information which is necessary for determining the completeness of the application. Failure to provide such information by the date specified in the request may be grounds for denial of the application and the extension allowed pursuant Section 401.2. of the State Administrative Procedures Act.

Should the Permittee cease the hazardous waste management activities allowed by this Permit prior to the expiration of this Permit, then, pursuant to 6 NYCRR Subpart 373-1.6(d), the Permittee must continue to comply with the applicable corrective action conditions and requirements stipulated in this Permit (refer to Module II Corrective Action). In addition, the Permittee shall submit a renewal application pursuant to 6 NYCRR Subpart 373-1.8(b) prior to this Permit's expiration unless and until all the Permittee's corrective action obligations have been completed. In the alternative, the Permittee may execute an order on consent for corrective action pursuant to Environmental Conservation Law (ECL) Section 71-2727(3) with the Commissioner at least 180 days prior to the expiration date of this Permit.

9. Information Repository

The permittee shall establish and maintain an Information Repository at the East Fishkill Public Library. The permittee will continue to maintain the information repository for the life of the Permit or until otherwise notified by the Department.

The information repository shall contain all documents, reports, data, and information

deemed necessary by the commissioner to fulfill the purposes for which the repository is established. The commissioner shall have the discretion to limit the contents of the repository.

The permittee shall provide a written notice of the availability of the information repository to all individuals on the facility mailing list within one month from the effective date of this Permit (except to those previously notified within 1 year prior to the effective date of the Permit) and to all individuals on the facility mailing list one year before the expiration date of this Permit.

D. FINAL STATUS STANDARDS FOR THIS PART 373 PERMIT

The Permittee must comply with 6 NYCRR Subpart 373-2, and the referenced sections of the Permit Application, as follows:

1. General 6 NYCRR 373-2.1

   a. 6 NYCRR 373-2.1(a) - Purpose, Scope and Applicability; and

   b. 6 NYCRR 373-2.1(c) - Imminent Hazard Action.

2. General Facility Standards 6 NYCRR 373-2.2

   a. 6 NYCRR 373-2.2(a) - Applicability;

   b. 6 NYCRR 373-2.2(b) - Facility Ownership Transfer;

   c. 6 NYCRR 373-2.2(d) - Required Notices;

   d. 6 NYCRR 373-2.2(e) - General Waste Analysis (Section 3.0 of the Permit Application);

   e. 6 NYCRR 373-2.2(f) - Security (Section 6.1 of the Permit Application);

   f. 6 NYCRR 373-2.2(g) - General Inspection Requirements (Section 6.2 of the Permit Application);

   g. 6 NYCRR 373-2.2(h) - Personnel Training (Section 8.0 of the Permit Application);

   h. 6 NYCRR 373-2.2(i) - General Requirements for Ignitable, Reactive, or Incompatible Wastes (Section 6.5 of the Permit Application);

3. Preparedness and Prevention 6 NYCRR 373-2.3

   The Permittee must comply with Section 6.3 of the Permit Application and 6 NYCRR 373-2.3 as follows:

   a. 6 NYCRR 373-2.3(a) - Applicability;

b. 6 NYCRR 373-2.3(b) - Design and Operation of Facility;

c. 6 NYCRR 373-2.3(c) - Required Equipment;

d. 6 NYCRR 373-2.3(d) - Testing and Maintenance of Equipment;

e. 6 NYCRR 373-2.3(e) - Access to Communications or Alarm System;

f. 6 NYCRR 373-2.3(f) - Required Aisle Space; and

g. 6 NYCRR 373-2.3(g) - Arrangements with Local Authorities.

4. Contingency Plan and Emergency Procedures 6 NYCRR 373-2.4

The Permittee must comply with Section 7.0 of the Permit Application and 6 NYCRR 373-2.4 as follows:

a. 6 NYCRR 373-2.4(a) - Applicability;

b. 6 NYCRR 373-2.4(b) - Purpose and Implementation of Contingency Plan;

c. 6 NYCRR 373-2.4(c) - Content of Contingency Plan;

d. 6 NYCRR 373-2.4(d) - Copies of Contingency Plan;

e. 6 NYCRR 373-2.4(e) - Amendment of Contingency Plan;

f. 6 NYCRR 373-2.4(f) - Emergency Coordinator; and

g. 6 NYCRR 373-2.4(g) - Emergency Procedures.

5. Manifest System, Recordkeeping and Reporting 6 NYCRR 373-2.5

a. 6 NYCRR 373-2.5(a) - Applicability;

b. 6 NYCRR 373-2.5(b) - Manifest Requirements;

c. 6 NYCRR 373-2.5(c) - Operating Record;

d. 6 NYCRR 373-2.5(d) - Availability, Retention, and Disposition of Records;

e. 6 NYCRR 373-2.5(e) - Annual Report;

f. 6 NYCRR 373-2.5(f) - Unmanifested Waste Report; and

g. 6 NYCRR 373-2.5(g) - Additional Reports.

The Permittee must retain for inspection by the Department the permit modification log required by Section B, the operating record, documentation to demonstrate

compliance with the financial requirements of this Permit, the referenced sections of the Permit Application that are made part of this Permit, and any subsequent Department approved changes to the contents of that Application.

These documents include, but are not limited to, the most recent Department approved: waste analysis plan; contingency plan; closure plan(s); groundwater monitoring plan(s); security, inspection, and personnel training requirements; and final engineering documents for all hazardous waste treatment, storage, and disposal units subject to this Permit and for all ongoing corrective action remedies pertinent to solid waste management units and areas of concern either remediated or being remediated pursuant to this Permit.

6. Releases from Solid Waste Management Units 6 NYCRR 373-2.6

The Permittee must comply with all the applicable provisions stipulated in 6 NYCRR 373-2.6(a) through (k) for regulated units and with 6 NYCRR 373-2.6 (l) for corrective action at solid waste management units; comply with the conditions stipulated in **Module II - Corrective Action Requirements for Solid Waste Management Units and Areas of Concern**; and comply with the groundwater monitoring plan approved by the Department, including all subsequent revisions approved by the Department that address the means to implement and achieve compliance with the aforementioned conditions for site-wide contaminated groundwater.

7. Closure and Post-Closure 6 NYCRR 373-2.7

The Permittee must comply with Section 9.0 of the Permit Application and 6 NYCRR 373-2.7 for the closure and post-closure care of the hazardous waste management unit(s) (i.e., container storage), as follows:

a. 6 NYCRR 373-2.7(a) - Applicability;

b. 6 NYCRR 373-2.7(b) - Closure Performance Standard;

c. 6 NYCRR 373-2.7(c) - Closure Plan; Amendment to Plan;

d. 6 NYCRR 373-2.7(d) - Closure; Time Allowed for Closure;

e. 6 NYCRR 373-2.7(e) - Disposal or Decontamination of Equipment, Structures and Soils;

f. 6 NYCRR 373-2.7(f) - Certification of Closure and Survey Plat;

g. 6 NYCRR 373-2.7(g) - Post-Closure Care and Use of Property;

h. 6 NYCRR 373-2.7(h) - Post-Closure Plan; Amendment of Plan;

i. 6 NYCRR 373-2.7(i) - Post-Closure Notices; and

j. 6 NYCRR 373-2.7(j) - Certification of Completion of Post-Closure Care.

The final and specific choice of sampling points, number of samples, type of sampling to be performed and analysis for verification of the effectiveness of decontamination will be determined at the time of closure by NYSDEC. These determinations will be based upon the past history of operating practices and types of wastes handled at the facility. The operating record, the record of spills, the types of waste released, location of spills in the facility and the condition of secondary containment systems will also provide data to be used in these determinations. The flexibility afforded by this approach will allow compliance with closure regulations and requirements that will be in effect at the time of closure. Different sampling procedures may be considered at closure and the locations and the total number of samples required will be determined based on the information gathered at the time of closure. The verification of decontamination will be based on NYSDEC's regulatory clean up standards at the time of closure.

8. Financial Requirements 6 NYCRR 373-2.8

The Permittee must comply with Section 9.0 of the Permit Application and 6 NYCRR Subpart 373-2.8 for meeting the financial requirements for the hazardous waste management unit(s) (i.e., container storage) and for corrective action when required, as follows:

a. 6 NYCRR 373-2.8(a) - Applicability;

b. 6 NYCRR 373-2.8(b) - Definition of Terms as Used in this Section;

c. 6 NYCRR 373-2.8(c) - Cost Estimates for Closure;

The Permittee must update closure cost estimates annually, update financial assurance for same, record the changes in the operating record and submit to the Department in writing a summary of the changes on or before the anniversary of the Permit issuance.

d. 6 NYCRR 373-2.8(d) - Financial Assurance for Closure;

The financial assurance mechanism used by the Permittee to assure sufficient resources for closure is the financial test specified in 6 NYCRR 373-2. Documentation of this mechanism is updated annually and includes a letter from the Chief Financial Officer using the wording specified in 6 NYCRR 373-2, as well as an auditors report confirming the results of the test. The current closure cost is $1,276,700.00 and an additional $51,602,100.00 for Corrective Action. See Section 9.0, Exhibits 9A and 9B.

e. 6 NYCRR 373-2.8(g) - Use of a Mechanism for Financial Assurance of Both Closure and Post-Closure Care;

f. 6 NYCRR 373-2.8(h) - Liability Requirements;

g. 6 NYCRR 373-2.8(i) - Incapacity of Owners or Operators, Guarantors, or Financial Institutions;

h. 6 NYCRR 373-2.8(j) - Wording of the Instruments;

The Permittee must obtain approval in writing from the Department prior to the change, for any changes to the instruments and/or mechanisms; e.g., type of instruments and/or mechanisms, the issuing company/institutions and/or a reduction in the dollar amounts.

i. 6 NYCRR 373-2.6(l) - Required Corrective Action for Solid Waste Management Units;

j. 6 NYCRR 373-2.8(e) - Cost Estimate for Post-Closure Care; and

k. 6 NYCRR 373-2.8(f) - Financial Assurance for Post-Closure Care.

9. Air Emission Standards 6 NYCRR 373-2.27, 373-2.28 and 373-2.29

The Permittee must comply with Section 4.0 of the Permit Application and all applicable requirements of 6 NYCRR 373-2.27, 373-2.28 and 373-2.29 as follows:

a. 6 NYCRR 373-2.27 Air Emission Standards for Process Vents; and

b. 6 NYCRR 373-2.28 Air Emission Standards for Equipment Leaks.

c. 6 NYCRR 373-2.29 Air Emission Standards for Tanks, Surface Impoundments, and Containers.

E. LAND DISPOSAL RESTRICTIONS

The Permittee must comply with all applicable provisions in the current 6 NYCRR Part 376 for the land disposal of hazardous waste except for hazardous waste generated by remediation or corrective action activities for placement in an on-site corrective action management unit (CAMU) approved by the Commissioner.

F. WASTE ANALYSIS AND QUALITY ASSURANCE

The Permittee must obtain representative samples of wastes and other materials to be analyzed pursuant to this Permit. The Permittee must perform the sampling and analysis required by this Permit in accordance with Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846 Third Edition (November 1986), as amended by Updates I (July 1992), II (September 1994), IIA (August 1993), IIB (January 1995) and III (December 1996) and later approved revisions, hereinafter referred to as SW-846; Appendix 19 of 6 NYCRR Part 371; or an equivalent method approved by the Department.

The Permittee shall conduct a quality assurance program to ensure that the sampling, analysis and monitoring data are technically accurate and statistically valid. The quality assurance program must be in accordance with Chapter One and the requirements of applicable method(s) of SW-846, or an equivalent method approved by the Department.

As required by ECL 03-0119, any laboratory used by the Permittee to perform analysis pursuant to this Permit must be certified by the New York State Department of Health Environmental Laboratory Approval Program (ELAP) in the appropriate categories of analysis, if ELAP issues certifications in such categories. If the Permittee uses a contract laboratory to perform analysis required by this Permit, then the Permittee shall inform the laboratory in writing that it must operate under the waste analysis and quality assurance provisions of this Permit.

G. ORAL REPORTS

The oral reports required by 6 NYCRR 373-1.6(a)(12)(vi) and 373-2.4(g)(4)(ii) must be made to both the Department using the New York State 24-hour oil and hazardous material spill notification number (800) 457-7362 and the National Response Center using its 24-hour number (800) 424-8802, or any designated telephone numbers which may subsequently replace those listed above.

H. PLANS, REPORTS, SPECIFICATIONS, IMPLEMENTATION SCHEDULES AND OTHER SUBMITTALS

1. All submittals required by the Permit must be submitted to the addresses listed below.

   a. One (1) electronic copy of all submittals to:

      i) Regional Remediation Engineer
         New York State Department of Environmental Conservation
         Region 3 Office
         21 South Putt Corners Road
         New Paltz, NY 12561

      ii) Supervisor, RCRA Permitting Section
         Division of Environmental Remediation
         New York State Department of Environmental Conservation
         625 Broadway
         Albany, NY 12233-7017

      iii) Chief, RCRA Programs Branch
         Division of Environmental Planning and Protection
         U.S. Environmental Protection Agency, Region II
         290 Broadway [22nd floor]
         New York, NY 10007-1866

b. One (1) hard copy and one (1) electronic copy of all submittals pertaining to the waste reduction requirements of Section I to:

i) Director, Bureau of Waste Reduction and Recycling
Division of Materials Management
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233-7253

This includes all submittals pertaining to the permitted hazardous waste management units and/or for submittals pertaining to the waste reduction requirements of Section I, the submittal of two (2) copies to the above address is required.

c. One (1) hard copy and one (1) electronic copy of all submittals including corrective action documents and groundwater monitoring plans to:

i) Director, Remedial Bureau C
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233-7014

d. One (1) hard copy of Permit Application to renew or modify this Permit must be submitted to the following, in addition to the above addresses:

i) Permit Administrator
Division of Environmental Permits
New York State Department of Environmental Conservation
Region 3 Office
21 South Putt Corners Road
New Paltz, NY 12561

2. The Permittee shall submit plans, reports, specifications, implementation schedules and any subsequent amendments required by this Permit to the Department for review and comment. If the Department determines that any plan, report, specification, schedule or respective amendment required by this Permit is deficient either in whole or in part, the Permittee shall either promptly respond to the comments or make revisions to the submission consistent with the Department's comments. Within a reasonable time frame specified by the Department, a final plan, report, specification, schedule or respective amendment shall be submitted to the Department for approval. An extension of the due date for any submittal may be granted by the Department based on the Permittee's documentation that sufficient justification for the extension exists.

I. CONFIDENTIAL INFORMATION

The permittee may claim confidential any information required to be submitted by this permit in accordance with 6 NYCRR 370.1(b). All documentation which the Permittee believes justifies its claim of confidentiality must be submitted in accordance with 6 NYCRR Part 616 with any such claim of confidentiality.

J. WASTE REDUCTION REQUIREMENTS

The Permittee shall comply with the requirements of Article 27, Title 9, Section 27-0908 of the New York State Environmental Conservation Law (ECL). All reports and submittals required by Section 27-0908 to be submitted to the Commissioner shall be sent to the addresses specified in Section H above.

K. DEFINITIONS

For the purpose of this Permit, terms used herein shall have the same meaning as those in 6 NYCRR 370 through 374 and 376 and the terms defined in this Permit, unless this Permit specifically states otherwise. Where terms are not otherwise defined, the meaning associated with such terms shall be as defined by a standard dictionary reference or the generally accepted scientific or industrial meaning of the term.

1. Action Levels. For purposes of this Permit, action levels are hazardous constituent concentrations for a specific environmental medium which if exceeded indicate a potential threat to human health or the environment. The exceedance of action levels may trigger further investigations, studies, and corrective measures. Where available, action levels are based on appropriate promulgated standards established for a specific environmental medium. When promulgated standards are not available, action levels can be media-specific hazardous constituent concentrations derived from non-promulgated human health risk data or environmental risk data with the latter levels being protective of aquatic life or wildlife. An action level may be set at the background level for a hazardous constituent for which data are inadequate to set a human health or environmental health-based level.

2. Areas of Concern (AOC). Pursuant to the authority granted by 6 NYCRR 373-1.6(c)(2), an area of concern has been defined for purposes of this Permit to mean an area at the facility, or an off-site area, which is not at this time known to be a solid waste management unit (SWMU), where hazardous waste and/or hazardous constituents are present, or are suspected to be present, as a result of a release from the facility. The term shall include areas of potential or suspected contamination as well as actual contamination. Such area(s) may require study and a determination of what, if any, corrective action may be necessary. All permit references to and conditions for SWMUs shall apply to areas of concern.

3. Environment. Pursuant to ECL Article 27, Title 9, Section 27-0901, environment means any water, water vapor, any land including land surface or subsurface, air, fish, wildlife, biota and all other natural resources.

4. Release. For purposes of this Permit, release includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping or disposing into the environment of any hazardous waste, including hazardous constituents, unless expressly authorized under the terms of this Permit or otherwise permitted under law (e.g., SPDES permitted discharges).

5. Solid Waste Management Unit (SWMU). For purposes of this Permit, SWMU includes any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of hazardous or solid wastes. Such units include any area at the facility at which solid wastes have been routinely and systematically released.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL REMEDIATION
6 NYCRR PART 373 PERMIT
MODULE II - CORRECTIVE ACTION REQUIREMENTS
FOR SOLID WASTE MANAGEMENT UNITS AND
AREAS OF CONCERN

IBM Corporation East Fishkill Facility
Hudson Valley Research Park
2070 Route 52
Hopewell Junction, New York 12533
EPA ID# NYD 000 707 901

A. APPLICABILITY

1. **Statute and Regulations.** ECL Article 27, Title 9, Section 27-0913, and 6 NYCRR 373-2.6(l) requires Corrective Action, including Corrective Action beyond the facility boundary where necessary to protect human health and the environment, for all releases of hazardous wastes, including hazardous constituents, from any solid waste management unit ("SWMU") at a storage, treatment or disposal facility seeking a 6 NYCRR Part 373 permit, regardless of the time at which waste was placed in such unit. Pursuant to 6 NYCRR 373-1.6(c)(2) the Commissioner may impose permit conditions, as the Commissioner determines necessary, to protect human health and the environment (e.g., Areas of Concern [AOCs]).

2. **Solid Waste Management Units and Areas of Concern.** The conditions of this Module apply to:

   a. All the SWMUs and AOCs listed in this Module individually or in combinations;

   b. Any additional SWMUs and AOCs identified during the course of groundwater monitoring, field investigations, environmental audits or other means as described in Module Condition C. below;

   c. SWMUs and AOCs located on-site and/or off-site as identified in Table II-1;

   d. The Permittee need not undertake corrective action at any aforementioned SWMUs and/or AOCs identified in Table II-1 as No Further Action provided there is no evidence of the release(s) of hazardous waste(s) or constituent(s) from the SWMUs and/or AOCs threatening human health or the environment; and

   e. A determination of No Further Action shall not preclude the Commissioner from modifying this Permit at a later date to require further investigations, studies, monitoring, or corrective measures, if new information or subsequent analysis indicates the release(s) or likelihood of release(s) that could pose a significant and immediate threat to human health or the environment.

Table II-1
Solid Waste Management Units

UNIT ID #	DESCRIPTION	LOCATION	STATUS	GW REMEDIATION AREA?*	RCRA STATUS
TRANSFER STATIONS AND CONTAINER STORAGE AREAS (CSA'S)					
TS Area B/303	Tank Trailer Storage Area	B/303 W	Active	Area A	No Further Action *
B/309 Room #2	Drum Storage Room	B/309	Active	Area A	No Further Action *
B/309 Room #5	Drum Storage Room	B/309	Active	Area A	No Further Action *
B/309 Room #7	Drum Storage/Consolidation Room	B/309	Active	Area A	No Further Action *
B/309 Room #8	Drum Storage Room	B/309	Active	Area A	No Further Action *
B/309 Room #9	Drum Storage Room	B/309	Closed	Area A	No Further Action *
B/309 Room #11	Drum Loading/Unloading Dock	B/309	Active	Area A	No Further Action *
B/309 Room #23	Drum Storage Room	B/309	Closed	Area A	No Further Action *
B/309 LW Dock	Drum Loading/Unloading Dock	B/309 Link	Active	Area A	No Further Action *
B/385 DB & FL	Sludge Dumpster Bay	B/385	Closed	Area A	No Further Action *
TC 385 DS	Sludge Dumpster Storage Area	B/385	Closed	Area A	No Further Action *
B/386 DB Area	Sludge Dumpster Bay	B/386	Active	Area A	No Further Action *
B/386 DS Area	Tank Truck Loading/Unloading Area & Sludge Dumpster Storage Area	B/386	Active	Area A	No Further Action *
L/UL Area #5	Tank Truck Loading/Unloading Area	B/320B	Inactive	B/322 AOC	No Further Action *
L/UL Area #6	Tank Truck Loading/Unloading Area	B/309 NW	Active	Area A	No Further Action *
L/UL Area #7	Tank Truck Loading/Unloading Area	B/309 N	Active	Area A	No Further Action *
L/UL Area #11	Tank Truck Loading/Unloading Area	B/300 N	Active	No	No Further Action *
L/UL Area #12	Tank Truck Loading/Unloading Area	B/330C NE	Active	B/330 AOC	No Further Action *
L/UL Area #13	Tank Truck Loading/Unloading Area	B/330D NE	Active	B/330 AOC	No Further Action *
L/UL Area #15	Tank Truck Loading/Unloading Area	B/335 NE	Active	B/330 AOC	No Further Action *
L/UL Area #16	Tank Truck Loading/Unloading Area	B/320B E	Inactive	No	No Further Action *
L/UL Area #21	Tank Truck Loading/Unloading Area	B/334 NW	Active	No	No Further Action *
L/UL Area #23	Tank Truck Loading/Unloading Area	B/303	Active	Area A	No Further Action *
L/UL Area #24	Tank Truck Loading/Unloading Area	B/338 SW	Active	B/330 AOC	No Further Action *
L/UL Area #25	Tank Truck Loading/Unloading Area	B/322 E	Active	B/322 AOC	No Further Action *
L/UL Area #26	Tank Truck Loading/Unloading Area	B/325 N	Active	No	No Further Action *

UNIT ID #	DESCRIPTION	LOCATION	STATUS	GW REMEDIATION AREA?*	RCRA STATUS
L/UL Area #31	Tank Truck Loading/Unloading Area	B/330D E	Inactive	B/330 AOC	No Further Action *
CW L/UL 300	Container Waste Loading/Unloading Area	B/300	Active	No	No Further Action *
CW L/UL 320B (2)	Container Waste Loading/Unloading Area	B/320 B	Active	No	No Further Action *
CW L/UL 322	Container Waste Loading/Unloading Area	B/322	Active	B/322 AOC	No Further Action *
CW L/UL 323	Container Waste Loading/Unloading Area	B/323	Active	No	No Further Action *
CW L/UL 323A	Container Waste Loading/Unloading Area	B/323Annex	Active	No	No Further Action *
CW L/UL 330F	Container Waste Loading/Unloading Area	B/330 F	Active	B/330 AOC	No Further Action *
CW L/UL 330 OMF	Container Waste Loading/Unloading Area	B/330 C	Active	B/330 AOC	No Further Action *
CW L/UL 330C	Container Waste Loading/Unloading Area	B/330 C	Active	B/330 AOC	No Further Action *
CW L/UL 330D	Container Waste Loading/Unloading Area	B/330 D	Active	B/330 AOC	No Further Action *
CW L/UL 334	Container Waste Loading/Unloading Area	B/334	Active	No	No Further Action *
CW L/UL 316	Container Waste Loading/Unloading Area	B/316 W	Active	Area A	No Further Action *
CW L/UL 338	Container Waste Loading/Unloading Area	B/338	Active	B/330 AOC	No Further Action *
CW L/UL 315	Container Waste Loading/Unloading Area	B/315	Active	No	No Further Action *
CW L/UL 335	Container Waste Loading/Unloading Area	B/335	Active	B/330 AOC	No Further Action *
LANDFILLS, SURFACE IMPOUNDMENTS AND/OR WASTE PILES					
81	Sanitary/Treated Ind. Wastewater	B/325 N	Active	No	No Further Action *
97	Sanitary/Treated Ind. Wastewater	B/325 N	Removed	No	No Further Action *
LF-1	Construction Debris Landfill	B/330C E	Inactive, Closed	B/330 AOC	No Further Action *
LF-2	Construction Debris Landfill	B/334 E	Inactive, Closed	No	No Further Action *
WASTEWATER TREATMENT AND WASTE RECYCLING UNITS (Treatment Facilities as a Whole)					
Building 312	Industrial Wastewater Neutralization Treatment	B/312	Active	No	No Further Action *
Building 316	Industrial Waste Treatment	B/316	Active	Area A	No Further Action *
Building 317	Ammonia Treatment Plant	B/317	Active	Area A	No Further Action *
Building 325	Water Pollution Control Plant (Sanitary)	B/325	Active	No	No Further Action *

UNIT ID #	DESCRIPTION	LOCATION	STATUS	GW REMEDIATION AREA?*	RCRA STATUS
Building 335	Perchloroethylene Recycling/Recovery Plant	B/335	Closed	B/330 AOC	No Further Action *
Building 385	Fluoride/Heavy Metals Wastewater Treatment	B/385	Inactive	Area A	No Further Action *
Building 386	Fluoride/Heavy Metals Wastewater Treatment	B/386	Active	Area A	No Further Action *
STORAGE/TREATMENT TANKS					
5	Solvent Waste-Mixed	B/309 NW	Removed	Area A	No Further Action *
14	Perchloroethylene Sludge	B/310	Removed	Area A	No Further Action *
15	Solvent Waste-Mixed	B/320B E	Removed	No	No Further Action *
16	Perchloroethylene Waste	B/310 E	Removed	Area A	No Further Action *
17	Perchloroethylene Waste	B/310 E	Removed	Area A	No Further Action *
18	Fluoride/Heavy Metals Wastewater	B/385 S	Inactive	Area A	No Further Action *
23	Solvent Waste-Mixed	B/308 W	Removed	Area A	No Further Action *
24	Solvent Waste-Mixed	B/308 W	Removed	Area A	No Further Action *
25	Fluoroboric Acid Waste	B/308 SW	Removed	Area A	No Further Action *
26	Fluoride/Heavy Metals Wastewater	B/385 E	Removed	Area A	No Further Action *
27	Fluoride/Heavy Metals Wastewater	B/385 E	Removed	Area A	No Further Action *
28	Fluoride/Heavy Metals Wastewater	B/385 E	Removed	Area A	No Further Action *
29	Industrial Waste	B/385 SW	Inactive	Area A	No Further Action *
35	Fluoride/Heavy Metals Wastewater	B/385 S	Inactive	Area A	No Further Action *
37	Industrial Waste	B/385 S	Inactive	Area A	No Further Action *
40	Fluoride/Heavy Metals Wastewater	B/385 S	Inactive	Area A	No Further Action *
42	Fluoride/Heavy Metals Wastewater	B/385 N	Closed	Area A	No Further Action *
43	Fluoride/Heavy Metals Wastewater	B/385 N	Closed	Area A	No Further Action *
50	Fluoride/Heavy Metals Wastewater	B/312 S	Inactive	No	No Further Action *
51	Fluoride/Heavy Metals Wastewater	B/312 S	Inactive	No	No Further Action *
52	Fluoride Wastewater	B/320D	Removed	No	No Further Action *
53B	Solvent Waste-Mixed	B/320B S	Closed	B/322 AOC	No Further Action *
53	Solvent Waste-Mixed	B/320B S	Removed	B/322 AOC	No Further Action *
54	Fluoride/Heavy Metals Wastewater	B/312 S	Inactive	No	No Further Action *
58	Fluoride/Heavy Metals Wastewater	B/300B S	Inactive	No	No Further Action *

UNIT ID #	DESCRIPTION	LOCATION	STATUS	GW REMEDIATION AREA?*	RCRA STATUS
60	Solvent Waste-Mixed	B/300 NW	Removed	No	No Further Action *
79	Fluoride/Heavy Metals Wastewater	B/308 W	Removed	Area A	No Further Action *
80	Fluoride/Heavy Metals Wastewater	B/300B S	Inactive	No	No Further Action *
86	Solvent Waste-Mixed	B/330C S.Link	Closed	B/330 AOC	No Further Action *
87	Fluoride/Heavy Metals Wastewater	B/330C S.Link	Inactive	B/330 AOC	No Further Action *
88	Solvent Waste-Mixed	B/330D E	Removed	B/330 AOC	No Further Action *
89	Fluoride/Heavy Metals Wastewater	B/330D E	Removed	B/330 AOC	No Further Action *
90	Industrial Wastewater	B/315 E	Removed	No	No Further Action *
91	Fluoride/Heavy Metals Wastewater	B/330D W	Closed	B/330 AOC	No Further Action *
92	Fluoride/Heavy Metals Wastewater	B/330D W	Closed	B/330 AOC	No Further Action *
93	Fluoride/Heavy Metals Wastewater	B/330D W	Closed	B/330 AOC	No Further Action *
103	Corrosive Spill Waste	B/309 N	Inactive	Area A	No Further Action *
104	Spill Tank, Can Wash	B/309 N	Inactive	Area A	No Further Action *
105	Organic Solvents (waste)	B/309 N	Closed	Area A	No Further Action *
106	Organic Solvents (waste)	B/309 N	Closed	Area A	No Further Action *
107	Solvent Waste-Mixed	B/330C E	Closed	B/330 AOC	No Further Action *
117	Solvent Waste-Mixed (Spill Tank)	B/304 N	Active	No	No Further Action *
118	Solvent Waste-Mixed (Spill Tank)	B/304 S	Active	No	No Further Action *
121	Sanitary Wastewater	B/325 E	Removed	No	No Further Action *
122	Sanitary Wastewater	B/325 E	Removed	No	No Further Action *
123	N-Butyl Acetate Waste	B/320B N	Closed	No	No Further Action *
124	Isopropyl Alcohol	B/320B N	Closed	No	No Further Action *
125	Freon Waste	B/320B N	Closed	No	No Further Action *
127	Solvent Waste-Mixed	B/309 NW	Closed	Area A	No Further Action *
134	Methylene Chloride Waste	B/309 NW	Closed	Area A	No Further Action *
135	N-Butyl Acetate	B/309 NW	Closed	Area A	No Further Action *
136	Freon TP 35 Waste	B/309 NW	Closed	Area A	No Further Action *
137	Perchloroethylene Waste	B/309 NW	Closed	Area A	No Further Action *
138	Isopropyl Alcohol Waste	B/309 NW	Closed	Area A	No Further Action *
139	Solvent Waste-Mixed	B/309 NW	Closed	Area A	No Further Action *
140	N-Butyl Acetate Waste	B/309 NW	Closed	Area A	No Further Action *
141	Xylene Waste	B/309 NW	Closed	Area A	No Further Action *

UNIT ID #	DESCRIPTION	LOCATION	STATUS	GW REMEDIATION AREA?*	RCRA STATUS
142	Freon TF Waste	B/309 NW	Closed	Area A	No Further Action *
143	Isopropyl Alcohol Waste	B/309 NW	Closed	Area A	No Further Action *
144	Industrial Waste	B/312 E	Active	No	No Further Action *
145	Industrial Waste	B/312 E	Active	No	No Further Action *
146	Industrial Waste	B/312 E	Active	No	No Further Action *
147	Industrial Waste	B/312 E	Active	No	No Further Action *
154	Industrial Wastewater	B/315 E	Removed	No	No Further Action *
157	Solvent Waste-Mixed	B/320B S	Removed	B/322 AOC	No Further Action *
157B	Solvent Waste-Mixed	B/320B S	Closed	B/322 AOC	No Further Action *
157C	Solvent Waste-Mixed	B/320B S	Closed	B/322 AOC	No Further Action *
158	Perchloroethylene Waste	B/335	Removed	B/330 AOC	No Further Action *
159	Perchloroethylene Waste	B/335	Removed	B/330 AOC	No Further Action *
162	Fluoride/Heavy Metals Wastewater	B/330C Link	Inactive	B/330 AOC	No Further Action *
165	Fluoride/Heavy Metals Wastewater	B/320B S (Vault)	Active	B/322 AOC	No Further Action *
168	Solvent Waste-Mixed	B/330D	Closed	B/330 AOC	No Further Action *
169	Solvent Waste-Mixed	B/330C E	Closed	B/330 AOC	No Further Action *
171	Sanitary/Treated Industrial Waste	B/325 NE	Removed	No	No Further Action *
173	Solvent Waste-Mixed	B/330C E	Closed	B/330 AOC	No Further Action *
178	Recycled Perchloroethylene	B/335	Removed	B/330 AOC	No Further Action *
179	Recycled Perchloroethylene	B/335	Removed	B/330 AOC	No Further Action *
181	IW Clarifier	B/335 E	Removed	B/330 AOC	No Further Action *
182	Sanitary/Treated Industrial Waste	B/325 E	Removed	No	No Further Action *
183	Sanitary/Treated Industrial Waste	B/325 N	Abandoned, Inactive	No	No Further Action *
184	Mixed Waste Solvent	B/330C E	Removed	B/330 AOC	No Further Action *
185	Mixed Waste Solvent	B/330C E	Removed	B/330 AOC	No Further Action *
186	Industrial Waste	B/303 A-1	Active	Area A	No Further Action *
187	Industrial Waste	B/309N	Active	Area A	No Further Action *
188	Sanitary/Treated Industrial Waste	B/325 W	Active	No	No Further Action *
189	Sanitary/Treated Industrial Waste	B/325 W	Active	No	No Further Action *
193	Fluoride/Heavy Metals Wastewater	B/300 E	Removed	No	No Further Action *
196	Sanitary/Treated Industrial Waste	B/325 NW	Active	No	No Further Action *

UNIT ID #	DESCRIPTION	LOCATION	STATUS	GW REMEDIATION AREA?*	RCRA STATUS
197	Sanitary/Treated Industrial Waste	B/325 NW	Active	No	No Further Action *
200	VAC Rotary Filter #1 Waste	B/385	Removed	Area A	No Further Action *
201	VAC Rotary Filter #2 Waste	B/385	Removed	Area A	No Further Action *
202	Industrial Wastewater	B/385	Removed	Area A	No Further Action *
204	Solvent Waste-Mixed	B/322 E	Inactive	No	No Further Action *
205	NBA Waste	B/322 E	Inactive	No	No Further Action *
206	Isopropyl Alcohol Waste	B/322 E	Inactive	No	No Further Action *
207	N-Methyl-2-Pyrrolidone Waste	B/322 E	Inactive	No	No Further Action *
208	Solvent Waste-Mixed (Spill Tank)	B/322 W	Inactive	B/322 AOC	No Further Action *
214	Contaminated Groundwater	B/384 S Link	Active	Area A	No Further Action *
215	Sanitary/Treated Industrial Waste	B/325 N	Inactive	No	No Further Action *
219	Solvent Waste-Mixed (Spill Tank)	B/303 D-5	Active	Area A	No Further Action *
220	Solvent Waste-Mixed	B/303 D-5	Active	Area A	No Further Action *
221	Solvent Waste-Mixed	B/303 D-5	Active	Area A	No Further Action *
222	Photoresist Waste	B/303 D-4	Active	Area A	No Further Action *
223	N-Methyl-2-Pyrrolidone Waste	B/303 D-6	Active	Area A	No Further Action *
224	Az Strip Waste	B/303 D-6	Active	Area A	No Further Action *
225	Solvent Waste-Mixed	B/303 E-6	Active	Area A	No Further Action *
231	Treated Groundwater	B/384	Active	Area A	No Further Action *
248	Fluoride/Heavy Metals Wastewater	B/334 D-1	Removed	No	No Further Action *
249	Fluoride/Heavy Metals Wastewater	B/334 D-2	Removed	No	No Further Action *
250	Industrial Waste	B/334 D-2	Active	No	No Further Action *
251	Solvent Waste-Mixed	B/334 D-2 Tk Pit	Inactive	No	No Further Action *
252	Solvent Waste-Mixed	B/334 D-2 Tk Pit	Inactive	No	No Further Action *
253	Industrial Waste	B/333 NW	Active	No	No Further Action *
257	Solvent Waste-Mixed	B/330C S	Removed	B/330 AOC	No Further Action *
263	Industrial Waste	B/323 K-14	Removed	No	No Further Action *
264	Industrial Waste	B/323 K-14	Removed	No	No Further Action *
265	Fluoride/Heavy Metals Wastewater	B/323 K-13	Removed	No	No Further Action *
266	Fluoride/Heavy Metals Wastewater	B/323 K-14	Removed	No	No Further Action *
267	Fluoride/Heavy Metals Wastewater	B/323 L-13	Removed	No	No Further Action *
268	Fluoride/Heavy Metals Wastewater	B/323 L-14	Removed	No	No Further Action *

UNIT ID #	DESCRIPTION	LOCATION	STATUS	GW REMEDIATION AREA?*	RCRA STATUS
270	Sanitary Wastewater	B/323 D-12	Active	No	No Further Action *
272	Mixed Solvent Waste	B/323 BF-1 Tk Rm	Active	B/322 AOC	No Further Action *
273	Photoresist Waste	B/323 BF-1 Tk Rm	Active	B/322 AOC	No Further Action *
274	Mixed Solvent Waste	B/323 BF-1 Tk Rm	Active	B/322 AOC	No Further Action *
275	Mixed Solvent Waste	B/323 BF-1 Tk Rm	Active	B/322 AOC	No Further Action *
276	NMP Waste	B/323 BF-1 Tk Rm	Active	B/322 AOC	No Further Action *
277	Solvent Waste-Mixed	B/323 BF-1 Tk Rm	Closed	B/322 AOC	No Further Action *
278	Solvent Waste-Mixed	B/323 BF-1 Tk Rm	Closed	B/322 AOC	No Further Action *
281	Industrial Waste Effluent	B/315 E	Removed	No	No Further Action *
282	Industrial Waste Effluent	B/315 E	Removed	No	No Further Action *
285	Solvent Waste-Mixed	B/309 NW	Inactive	Area A	No Further Action *
286	Industrial Wastewater	B/338 W (Outside)	Active	B/330 AOC	No Further Action *
287	Industrial Wastewater	B/338 W (Outside)	Active	B/330 AOC	No Further Action *
293	Fluoride/Heavy Metals Wastewater	B/334 MER	Active	No	No Further Action *
294	Industrial Waste	B/334 MER	Active	No	No Further Action *
295	Industrial Waste	B/334 MER	Active	No	No Further Action *
296	Perchloroethylene	B/334 C17	Removed	No	No Further Action *
297	Perchloroethylene	B/334 D17	Removed	No	No Further Action *
300	Fluoride/Heavy Metals Wastewater	B/385 1st Fl.	Removed	Area A	No Further Action *
301	Fluoride/Heavy Metals Wastewater	B/385 1st Fl.	Removed	Area A	No Further Action *
302	Fluoride/Heavy Metals Wastewater	B/385 1st Fl.	Removed	Area A	No Further Action *
303	Fluoride/Heavy Metals Wastewater	B/385 1st Fl.	Removed	Area A	No Further Action *
304	Fluoride/Heavy Metals Wastewater	B/385 1st Fl.	Removed	Area A	No Further Action *
334	Perchloroethylene Waste	B/330D AX-37	Removed	B/330 AOC	No Further Action *
335	Perchloroethylene Waste	B/330D AX-37	Removed	B/330 AOC	No Further Action *
345	Mixed Solvent Waste, DI Water and 10% HCL, Photo Active Compounds	B/330C D-28	Removed	B/330 AOC	No Further Action *
350	Industrial Wastewater	B/310 C-24	Removed	Area A	No Further Action *
396	Perchloroethylene Waste	B/330D BB-30	Removed	B/330 AOC	No Further Action *
397	Perchloroethylene Waste	B/330D AT-35	Removed	B/330 AOC	No Further Action *
427	Fluoride/Heavy Metals Wastewater	B/385	Removed	Area A	No Further Action *
428	Industrial Wastewater	B/330D BB-38	Removed	B/330 AOC	No Further Action *

UNIT ID #	DESCRIPTION	LOCATION	STATUS	GW REMEDIATION AREA?*	RCRA STATUS
429	Nickel Boron Waste	B/330D BB-38	Removed	B/330 AOC	No Further Action *
430	Immersion Gold Waste	B/330D BB-38	Removed	B/330 AOC	No Further Action *
431	Potassium Ferricyanide Waste	B/330D BB-38	Removed	B/330 AOC	No Further Action *
432	Neutra Clean Wastewater	B/330D BB-38	Removed	B/330 AOC	No Further Action *
433	Palladium Chloride Waste	B/330D BB-38	Removed	B/330 AOC	No Further Action *
448	Fluoride/Heavy Metals Wastewater	B/308 M-8	Inactive	Area A	No Further Action *
455	Perchloroethylene Waste	B/335	Removed	B/330 AOC	No Further Action *
456	Recycled Perchloroethylene	B/335	Removed	B/330 AOC	No Further Action *
457	Recycled Perchloroethylene	B/335	Removed	B/330 AOC	No Further Action *
458	Perchloroethylene Waste	B/335	Removed	B/330 AOC	No Further Action *
459	Perchloroethylene Waste	B/335	Removed	B/330 AOC	No Further Action *
460	Perchloroethylene Waste	B/335	Removed	B/330 AOC	No Further Action *
Old 461	Perchloroethylene Waste	B/335	Removed	B/330 AOC	No Further Action *
461	Perchloroethylene Waste	B/335	Removed	B/330 AOC	No Further Action *
462	Perchloroethylene Waste	B/335	Removed	B/330 AOC	No Further Action *
465	Perchloroethylene Waste	B/335	Removed	B/330 AOC	No Further Action *
466	Perchloroethylene Waste	B/335	Removed	B/330 AOC	No Further Action *
467	Recycled Perchloroethylene	B/335	Removed	B/330 AOC	No Further Action *
473	Perchloroethylene Waste	B/330D BD-30	Removed	B/330 AOC	No Further Action *
474	Perchloroethylene Waste	B/330D BD-31	Removed	B/330 AOC	No Further Action *
475	Perchloroethylene Waste	B/330D BD-32	Removed	B/330 AOC	No Further Action *
476	Perchloroethylene Waste	B/330D BD-33	Removed	B/330 AOC	No Further Action *
477	Perchloroethylene Waste	B/330D BD-34	Removed	B/330 AOC	No Further Action *
501	Perchloroethylene Carbon Bed	B/335	Removed	B/330 AOC	No Further Action *
502	Perchloroethylene Carbon Bed	B/335	Removed	B/330 AOC	No Further Action *
503	Perchloroethylene Carbon Bed	B/335	Removed	B/330 AOC	No Further Action *
504	Activated Carbon and Contaminated Groundwater	B/316	Active	Area A	No Further Action *
505	Activated Carbon and Contaminated Groundwater	B/316	Active	Area A	No Further Action *
506	Activated Carbon and Contaminated Groundwater	B/316	Active	Area A	No Further Action *

UNIT ID #	DESCRIPTION	LOCATION	STATUS	GW REMEDIATION AREA?*	RCRA STATUS
507	Activated Carbon and Contaminated Groundwater	B/316	Active	Area A	No Further Action *
508	Activated Carbon and Contaminated Groundwater	B/316	Active	Area A	No Further Action *
509	Activated Carbon and Contaminated Groundwater	B/316	Active	Area A	No Further Action *
510	Activated Carbon and Contaminated Groundwater	B/316	Active	Area A	No Further Action *
511	Activated Carbon and Contaminated Groundwater	B/316	Active	Area A	No Further Action *
512	Activated Carbon and Contaminated Groundwater	B/316	Active	Area A	No Further Action *
513	Activated Carbon and Contaminated Groundwater	B/316	Active	Area A	No Further Action *
529	Industrial Wastewater	B/316 L-2	Active	Area A	No Further Action *
555	Industrial Waste Treatment	B/316 L-2	Active	Area A	No Further Action *
569	Sodium Hydroxide, DI Water, Hydrochloric Acid	B/330C OMF	Removed	B/330 AOC	No Further Action *
570	Mixed Solvent Waste	B/330C OMF	Removed	B/330 AOC	No Further Action *
577	Industrial Waste Sludge	B/312 E	Active	No	No Further Action *
578	Industrial Waste Sludge	B/316 D-3	Active	Area A	No Further Action *
579	Base Slurry	B/316 C-1	Active	Area A	No Further Action *
580	Industrial Waste Sludge	B/312 E	Active	No	No Further Action *
581	Industrial Waste Treatment	B/316 B-1	Active	Area A	No Further Action *
582	Industrial Waste	B/316 C-2	Active	Area A	No Further Action *
584	Industrial Wastewater	B/316 E Pumphouse	Active	Area A	No Further Action *
588	Industrial Wastewater	B/316 E Pumphouse	Active	Area A	No Further Action *
589	Industrial Waste	B/316 N/W	Active	Area A	No Further Action *
590	Industrial Waste	B/385	Removed	Area A	No Further Action *
591	Fluoride Waste	B/385	Removed	Area A	No Further Action *
592	Solvent Waste	B/330C	Removed	B/330 AOC	No Further Action *
593	Solvent Waste-Mixed	B/330C	Removed	B/330 AOC	No Further Action *
3002	Fluoride/Heavy Metals Wastewater	B/386 W	Active	Area A	No Further Action *
3003	Fluoride/Heavy Metals Wastewater	B/386 W	Active	Area A	No Further Action *

UNIT ID #	DESCRIPTION	LOCATION	STATUS	GW REMEDIATION AREA?*	RCRA STATUS
3004	Fluoride/Heavy Metals Wastewater	B/386 W	Active	Area A	No Further Action *
3005	Fluoride/Heavy Metals Wastewater	B/386 W	Active	Area A	No Further Action *
3006	Mixed Waste Solvent	B/328	Removed	No	No Further Action *
3017	Sanitary/Treated Industrial Waste	B/325 NW	Removed	No	No Further Action *
3018	Sanitary/Treated Industrial Wastewater	B/325 NW	Active	No	No Further Action *
3019	Old Trickling Filter Splitter	B/325 NE	Abandoned, Inactive	No	No Further Action *
3020	Sanitary/Treated Industrial Wastewater	B/325 NE	Active	No	No Further Action *
3021	Sanitary/Treated Industrial Wastewater	B/325 NE	Active	No	No Further Action *
3022	Sanitary/Treated Industrial Wastewater	B/325 NE	Active	No	No Further Action *
3023	Sanitary/Treated Industrial Wastewater	B/325 N	Active	No	No Further Action *
3024	Sanitary/Treated Industrial Wastewater	B/325 NW	Active	No	No Further Action *
3025	Sanitary/Treated Industrial Wastewater	B/325 N	Active	No	No Further Action *
3029	Sanitary/Treated Industrial Wastewater	B/325 W	Active	No	No Further Action *
3030	Sanitary/Treated Industrial Wastewater	B/325 W	Active	No	No Further Action *
3031	Sanitary/Treated Industrial Wastewater	B/325 W	Active	No	No Further Action *
3033	Sanitary/Treated Industrial Wastewater	B/325 E	Active	No	No Further Action *
3034	Sanitary/Treated Industrial Wastewater	B/325 NW	Active	No	No Further Action *
3035	Sanitary/Treated Industrial Wastewater	B/325 E	Active	No	No Further Action *
3036	Sanitary/Treated Industrial Wastewater	B/325 NE	Active	No	No Further Action *
3037	Sanitary/Treated Industrial Wastewater	B/325 NW	Active	Area D	No Further Action *
3038	Sanitary/Treated Industrial Wastewater	B/325 NW	Removed	No	No Further Action *
3039	Sanitary/Treated Industrial Wastewater	B/325 N	Inactive	No	No Further Action *
3040	Sanitary/Treated Industrial Wastewater	B/325 E	Removed	No	No Further Action *
3041	Sanitary/Treated Industrial Wastewater	B/325 NW	Removed	No	No Further Action *
3042	Sanitary/Treated Industrial Wastewater	B/325 N	Active	No	No Further Action *
3044	Fluoride/Heavy Metals Wastewater	B/386 E-4	Active	Area A	No Further Action *
3045	Fluoride/Heavy Metals Wastewater	B/386 E-5	Active	Area A	No Further Action *
3046	Industrial Waste	B/386 F-4	Active	Area A	No Further Action *
3047	Industrial Waste	B/386 F-4	Active	Area A	No Further Action *
3048	Industrial Waste	B/386 F-4	Active	Area A	No Further Action *
3049	Industrial Waste	B/386 F-4	Active	Area A	No Further Action *

UNIT ID #	DESCRIPTION	LOCATION	STATUS	GW REMEDIATION AREA?*	RCRA STATUS
3050	Industrial Waste	B/386 N	Active	Area A	No Further Action *
3051	Industrial Waste	B/386 N	Active	Area A	No Further Action *
3052	Industrial Waste	B/386 N	Active	Area A	No Further Action *
3053	Industrial Waste (original); Fluoride/Heavy Metals Waste (current)	B/386 N	Active	Area A	No Further Action *
3054	Industrial Waste	B/386 N	Active	Area A	No Further Action *
3055	Industrial Waste	B/386 N	Active	Area A	No Further Action *
3056	Industrial Waste Treatment	B/386 N	Active	Area A	No Further Action *
3057	Fluoride/Heavy Metals Wastewater	B/386 N	Active	Area A	No Further Action *
3059	Heavy Metal Waste	B/386 W	Removed	Area A	No Further Action *
3063	Industrial Waste	B/386 G-4	Active	Area A	No Further Action *
3064	Industrial Waste Treatment	B/386 F-5	Active	Area A	No Further Action *
3065	Industrial Waste Treatment	B/386 F-5	Active	Area A	No Further Action *
3069	Industrial Waste Treatment	B/386 D-3	Active	Area A	No Further Action *
3070	Industrial Waste Treatment	B/386 PMP HSE B	Removed	Area A	No Further Action *
3071	Industrial Waste Treatment	B/386 D-3	Active	Area A	No Further Action *
3072	Industrial Waste	B/316 C-2	Active	Area A	No Further Action *
3073	Industrial Waste Treatment	B/316 NW	Active	Area A	No Further Action *
3074	Industrial Waste Treatment	B/316 B-2	Active	Area A	No Further Action *
3077	Perchloroethylene Waste	B/335	Removed	B/330 AOC	No Further Action *
3079	Perchloroethylene Waste	B/335	Removed	B/330 AOC	No Further Action *
3083	Sanitary/Treated Industrial Wastewater	B/325 NW	Removed	No	No Further Action *
3084	Sanitary/Treated Industrial Wastewater	B/325 NW	Removed	No	No Further Action *
3085	Sanitary/Treated Industrial Wastewater	B/325 NW	Removed	No	No Further Action *
3087	Sanitary/Treated Industrial Wastewater	B/325 NW	Active	No	No Further Action *
3088	Sanitary/Treated Industrial Wastewater	B/325 NW	Active	No	No Further Action *
3089	Sanitary/Treated Industrial Wastewater	B/325 NW	Active	No	No Further Action *
3090	Sanitary/Treated Industrial Wastewater	B/325 NW	Active	No	No Further Action *
3091	Sanitary/Treated Industrial Wastewater	B/325 NW	Active	No	No Further Action *
3092	Industrial Wastewater	B/316 Recycle Tank Farm	Removed	Area A	No Further Action *
3093	Freon TF Waste	B/322 K21	Removed	B/322 AOC	No Further Action *
3094	Industrial Wastewater	B/316 E-1	Active	Area A	No Further Action *

UNIT ID #	DESCRIPTION	LOCATION	STATUS	GW REMEDIATION AREA?*	RCRA STATUS
3095	Industrial Wastewater	B/316 E-1	Active	Area A	No Further Action *
3096	Industrial Wastewater	B/316 E-1	Active	Area A	No Further Action *
3098	Industrial Wastewater	B/335	Active	B/330 AOC	No Further Action *
3100	Freon TF Waste	B/322 J-20	Removed	B/322 AOC	No Further Action *
3102	Solvent Waste - Mixed	B/330C OMF	Removed	B/330 AOC	No Further Action *
3109	MIBK	B/330C OMF	Removed	B/330 AOC	No Further Action *
3110	Solvent Waste - Mixed	B/330D WST PERC	Active	B/330 AOC	No Further Action *
3111	Fluoride Wastewater	B/334 E-9	Active	No	No Further Action *
3121	Mixed Solvent Waste	B/330C Pumphouse (B/330 G)	Active, 1987	B/330 AOC	No Further Action *
3122	Fluoride/Heavy Metals Wastewater	B/330C Pumphouse (B/330 G)	Active, 1987	B/330 AOC	No Further Action *
3123	Fluoride/Heavy Metals Wastewater	B/330C Pumphouse (B/330G)	Active, 1987	B/330 AOC	No Further Action *
3124	Fluoride/Heavy Metals Wastewater	B/312 Lift Station	Active, 1988	No	No Further Action *
3125	Fluoride/Heavy Metals Wastewater	B/312 Lift Station	Active, 1988	No	No Further Action *
3126	Fluoride/Heavy Metals Wastewater	B/312 Lift Station	Active, 1988	No	No Further Action *
3127	Fluoride/Heavy Metals Wastewater	B/330D Lift Station	Active, 1987	B/330 AOC	No Further Action *
3128	Fluoride/Heavy Metals Wastewater	B/330D Lift Station	Active, 1987	B/330 AOC	No Further Action *
3129	Industrial Wastewater	B/310 CRTYD PMP	Active	Area A	No Further Action *
3131	Industrial Wastewater	B/325 Basement	Active	No	No Further Action *
3132	Industrial Wastewater	B/330C Pumphouse (B/330 G)	Active, 1987	B/330 AOC	No Further Action *
3133	Industrial Wastewater	B/330C Pumphouse (B/330 G)	Active, 1987	B/330 AOC	No Further Action *
3134	Industrial Wastewater	B/310 CRTYD PMP	Active	Area A	No Further Action *
3135	Fluoride/Heavy Metals Wastewater	B/310 B-24	Active	Area A	No Further Action *
3158	Solvent Waste - Mixed	B/310 J-14	Removed	Area A	No Further Action *
3166	Industrial Wastewater	B/338 P-41	Active	B/330 AOC	No Further Action *
3167	Industrial Wastewater	B/330C D-26	Active	B/330 AOC	No Further Action *
3168	Industrial Wastewater	B/330C D-26	Active	B/330 AOC	No Further Action *
3198	Contaminated Groundwater	B/384	Active	Area A	No Further Action *
3200	Perchloroethylene Waste	B/330D BE-33	Removed	B/330 AOC	No Further Action *

UNIT ID #	DESCRIPTION	LOCATION	STATUS	GW REMEDIATION AREA?*	RCRA STATUS
3201	Perchloroethylene Waste	B/330D BE-33	Removed	B/330 AOC	No Further Action *
3202	Perchloroethylene Waste	B/330D	Removed	B/330 AOC	No Further Action *
3226	Mixed Solvent Wastes	B/309 NW (Room 3)	Active	Area A	No Further Action *
3229	Perchloroethylene Waste	B/335	Removed	B/330 AOC	No Further Action *
3236	Perchloroethylene Waste	B/335	Removed	B/330 AOC	No Further Action *
3237	Perchloroethylene Waste	B/335	Removed	B/330 AOC	No Further Action *
3238	Industrial Wastewater, Cooling Tower Blowdown/Overflow	B/335 Between 1	Active	B/330 AOC	No Further Action *
3239	Perchloroethylene Waste	B/335	Removed	B/330 AOC	No Further Action *
3240	Perchloroethylene Waste	B/335	Removed	B/330 AOC	No Further Action *
3241	Contaminated Groundwater, Solvent Waste-Mixed	B/384 S Link	Active	Area A	No Further Action *
3242	Contaminated Groundwater, Solvent Waste-Mixed	B/384 S Link	Active	Area A	No Further Action *
3243	Fluoride/Heavy Metals Waste	B/300 BJ-203,Shelter Basement	Active, 1990	No	No Further Action *
3244	Fluoride/Heavy Metals Waste	B/300 BJ-203,Shelter Basement	Active, 1990	No	No Further Action *
3245	Industrial Wastewater	B/312 SE	Active	No	No Further Action *
3246	Industrial Wastewater	B/300 N	Removed	No	No Further Action *
3248	Heavy Metal Wastewater	B/334 D-2 TK Pl	Active	No	No Further Action *
3249	B/328 NMP Waste Reprocessor	B/328	Removed	No	No Further Action *
3250	B/328 IPA Waste Reprocessor	B/328	Removed	No	No Further Action *
3254	B/328 Acetone Waste Reprocessor	B/328	Removed	No	No Further Action *
3262	Industrial Wastewater	B/320D	Active	No	No Further Action *
3263	Industrial Wastewater	B/320D	Active	No	No further Action *
3264	Acid Waste	B/320D	Active	No	No Further Action *
3293	B/323 FREON TF Reprocessor Input	B/323 Col B-12	Removed	No	No Further Action *
3294	PCE Waste	B/330C	Removed	B/330 AOC	No Further Action *
3295	PCE Waste	B/330D	Removed	B/330 AOC	No Further Action *
3309	F/HM Waste	B/312 Transfer	Active	No	No Further Action *
3352	Waste TMAH	B/330C	Active	B/330 AOC	No Further Action *
3353	Waste TMAH	B/338 Q43	Active	B/330 AOC	No Further Action *

UNIT ID #	DESCRIPTION	LOCATION	STATUS	GW REMEDIATION AREA?*	RCRA STATUS
3354	Waste TMAH	B/338 P41	Active	B/330 AOC	No Further Action *
3355	Waste TMAH	B/338 N42	Active	B/330 AOC	No Further Action *
3356	Waste TMAH	B/338 Q44	Active	B/330 AOC	No Further Action *
3357	Waste TMAH	B/338 Q45	Active	B/330 AOC	No Further Action *
3358	Waste TMAH	B/338 Q45	Active	B/330 AOC	No Further Action *
3359	Industrial Waste	B/338 S43	Active	B/330 AOC	No Further Action *
3360	TMAH Wastewater	B/338 S42	Active	B/330 AOC	No Further Action *
3361	Waste TMAH	B/338 S43	Active	B/330 AOC	No Further Action *
3362	Waste TMAH	B/338 S43	Active	B/330 AOC	No Further Action *
3363	TMAH Wastewater	B/338 V44	Active	B/330 AOC	No Further Action *
3365	Waste TMAH	B/338 Q41	Active	B/330 AOC	No Further Action *
3366	TMACl Wastewater	B/338 T42	Active	B/330 AOC	No Further Action *
3375	Waste TMAH	B/338 S42	Active	B/330 AOC	No Further Action *
3378	Sanitary/Industrial Waste	B/325 W	Active	Area D	No Further Action *
3379	Sanitary/Industrial Waste	B/325 W	Active	Area D	No Further Action *
3380	Industrial/Sanitary Waste Treated	B/325 NW	Active	No	No Further Action *
3381	Industrial/Sanitary Waste Treated	B/325 NW	Active	No	No Further Action *
3384	Waste TMAH	B/330D	Active	B/330 AOC	No Further Action *
3386	TMACl Wastewater	B/338 T42	Active	B/330 AOC	No Further Action *
3388	Waste TMAH	B/338 Q41	Active	B/330 AOC	No Further Action *
3389	Heavy Metal Waste	B/386 W	Active	Area A	No Further Action *
3390	Heavy Metal Waste	B/386 Q4	Active	Area A	No Further Action *
3391	Heavy Metal Waste	B/386 Q4.8	Active	Area A	No Further Action *
3393	Heavy Metal Waste	B/386 Q3.3	Active	Area A	No Further Action *
3394	Heavy Metal Waste	B/386 O5	Active	Area A	No Further Action *
3401	F/HM Influent Storage	B/386 Outside Pump A	Active	Area A	No Further Action *
3403	F/HM Clarifier	B/386 North Side	Active	Area A	No Further Action *
3404	F/HM Clarifier	B/386 North Side	Active	Area A	No Further Action *
3405	Phosphoric Clarifier	B/386 North Side	Active	Area A	No Further Action *
3406	Phosphoric Clarifier	B/386 North Outside	Active	Area A	No Further Action *
3409	Phosphoric Mix	B/386 Pump B	Active	Area A	No Further Action *
3410	Phosphoric Mix	B/386 Pump B	Active	Area A	No Further Action *

UNIT ID #	DESCRIPTION	LOCATION	STATUS	GW REMEDIATION AREA?*	RCRA STATUS
3411	Heavy Metal Sludge	B/386 1-C8 Outside	Active	Area A	No Further Action *
3421	Industrial Waste	B/316	Active	Area A	No Further Action *
3423	Acid Slurry	B/316	Active	Area A	No Further Action *
3424	Lime Slurry	B/316	Active	Area A	No Further Action *
3428	Industrial Waste	B/317 Outside E5	Inactive	Area A	No Further Action *
3429	Industrial Waste	B/317 C4	Inactive	Area A	No Further Action *
3430	Industrial Waste	B/317 C4	Inactive	Area A	No Further Action *
3431	Industrial Waste	B/317 C3	Inactive	Area A	No Further Action *
3432	Industrial Waste	B/317 C2	Inactive	Area A	No Further Action *
3433	Industrial Waste	B/317 C4	Active	Area A	No Further Action *
3434	Industrial Waste	B/317 D4	Active	Area A	No Further Action *
3495	Industrial Waste	B/320C Lift Station	Active	B/322 AOC	No Further Action *
3496	Industrial Waste	B/320C Lift Station	Active	B/322 AOC	No Further Action *
3497	Industrial Waste	B/320C Lift Station	Active	B/322 AOC	No Further Action *
3498	Fluoride/Heavy Metal Waste	B/320C Lift Station	Active	B/322 AOC	No Further Action *
3499	Fluoride/Heavy Metal Waste	B/320C Lift Station	Active	B/322 AOC	No Further Action *
3503	TMAH Wastewater	B/339 Pumphouse	Active	B/330 AOC	No Further Action *
3504	TMAH Wastewater	B/338 N43	Active	B/330 AOC	No Further Action *
3505	TMACI Wastewater	B/338 K42	Active	B/330 AOC	No Further Action *
3507	Treated TMAH Wastewater	B/338 M42	Active	B/330 AOC	No Further Action *
3508	TMACI Wastewater	B/338 M43	Active	B/330 AOC	No Further Action *
3512	TMAH Wastewater	B/338	Active	B/330 AOC	No Further Action *
3514	TMAH Wastewater	B/338 S43	Active	B/330 AOC	No Further Action *
3516	Sanitary Waste	B/326	Active	No	No Further Action *
3521	Industrial Waste	B/323 F27	Active	No	No Further Action *
3522	Industrial Waste	B/323 F29	Active	No	No Further Action *
3523	Industrial Waste	B/323 G27	Active	No	No Further Action *
3524	Industrial Waste	B/323 G29	Active	No	No Further Action *
3525	Industrial Waste	B/323 H27	Active	No	No Further Action *
3526	Industrial Waste	B/323 H29	Active	No	No Further Action *
3527	Industrial Waste	B/323 K27	Active	No	No Further Action *
3528	Industrial Waste	B/323 H29	Active	No	No Further Action *

UNIT ID #	DESCRIPTION	LOCATION	STATUS	GW REMEDIATION AREA?*	RCRA STATUS
3529	Heavy Metal Waste (original); Ammonia Waste (current)	B/323 L27	Active	No	No Further Action *
3530	Heavy Metal Waste (original); Ammonia Waste (current)	B/323 L29	Active	No	No Further Action *
3531	Fluoride Waste	B/323 M27	Active	No	No Further Action *
3532	Fluoride Waste	B/323 M29	Active	No	No Further Action *
3537	Industrial Waste	B/323 G7	Active	No	No Further Action *
3538	Industrial Waste	B/323 G7	Active	No	No Further Action *
3539	Industrial Waste	B/323 G7	Active	No	No Further Action *
3540	Industrial Waste	B/323 G7	Active	No	No Further Action *
3856	Industrial Waste	B/386 2-E6	Active	Area A	No Further Action *
3857	Industrial Waste	B/386 2-E6	Active	Area A	No Further Action *
3858	Industrial Waste	B/386 2-F6	Active	Area A	No Further Action *
3860	Industrial Waste	B/386 2-E8	Active	Area A	No Further Action *
3861	Industrial Waste	B/386 2-F8	Active	Area A	No Further Action *
3913	TMAH Wastewater	B/338 L43	Active	B/330 AOC	No Further Action *
3914	TMAH Wastewater	B/338 L43	Active	B/330 AOC	No Further Action *
3915	Industrial Waste	B/317 B2	Active	Area A	No Further Action *
3916	Industrial Waste	B/317 B2	Active	Area A	No Further Action *
3917	Industrial Waste	B/317 B2	Active	Area A	No Further Action *
3922	Sanitary Waste	B/323 C2	Active	B/322 AOC	No Further Action *
3923	Sanitary Waste	B/323 G25	Active	No	No Further Action *
3929	Industrial Waste	B/385 South End	Active	Area A	No Further Action *
3930	Fluoride/Heavy Metal Waste	B/385 South End	Active	Area A	No Further Action *
3933	<1% TMAH Wastewater	B/330D BC-35	Active	B/330 AOC	No Further Action *
3937	Sanitary/Treated Industrial Wastewater	B/325 NW	Active	No	No Further Action *
3938 (Note 1)	Treated Industrial Wastewater	B/325 Outside, NE	Active	No	No Further Action *
3939 (Note 2)	Treated Industrial Wastewater	B/325 Outside, NE	Active	No	No Further Action *
3941	Ammonia Wastewater	B/317	Active	Area A	No Further Action *
3945	Ammonia/Hydrogen Peroxide Wastewater	B/317 Outside, E	Active	Area A	No Further Action *
3947	Ammonia/Hydrogen Peroxide Wastewater	B/317 Outside, E	Active	Area A	No Further Action *
3972	Industrial Waste	B/386 PHB, 2nd Floor	Active	Area A	No Further Action *
3988	Industrial Wastewater	B/323 H1Inside	Active	B/322 AOC	No Further Action *

UNIT ID #	DESCRIPTION	LOCATION	STATUS	GW REMEDIATION AREA?*	RCRA STATUS
3989	Industrial Wastewater	B/323 J25Inside	Active	B/322 AOC	No Further Action *
3995	Industrial Wastewater	B/323 G35 Annex Inside	Active	No	No Further Action *
3996	Industrial Wastewater	B/323 G35 Annex Inside	Active	No	No Further Action *
3997	Industrial Wastewater	B/323 G35 Annex Inside	Active	No	No Further Action *
3998	Industrial Wastewater	B/323 G35 Annex Inside	Active	No	No Further Action *
4007	Industrial Wastewater	B/316 OE5.3 Inside	Active	Area A	No Further Action *
4009	Activated Carbon and Contaminated Groundwater	Area B Building	Active	Area B	No Further Action *
4010	Activated Carbon and Contaminated Groundwater	Area B Building	Active	Area B	No Further Action *
4011	Contaminated Groundwater - Vapor Liquid Separator	B/330D Outside, NW	Active	B/330 AOC	No Further Action *
4012	Contaminated Groundwater - Condensate Trap	B/330D Outside, NW	Active	B/330C AOC	No further Action *
4013	Fluoride/Heavy Metals Wastewater	B/320 D	Active	No	No Further Action*
4014	Fluoride/Heavy Metals Wastewater	B/320 D	Active	No	No Further Action*
5021	Sanitary/Treated Industrial Wastewater	B/344 N	Inactive	No	No Further Action *
TANK A	Solvent Waste-Mixed, Corrosive Wastewater	B/330C E	Removed	B/330 AOC	No Further Action *
TANK B	Solvent Waste-Mixed, Corrosive Wastewater	B/330C E	Removed	B/330 AOC	No Further Action *
B/323 N Sump	Groundwater Sump	B/323 N	Active	B/322 AOC	No Further Action *
OTHER					
B/310 LS FL	Fluoride/Heavy Metals Lift Stations	B/310	Active	Area A	No Further Action *
B/310 LS IW	Industrial Wastewater Lift Stations	B/310	Active	Area A	No Further Action *
B/310 LS SO	Solvent Waste Lift Stations	B/310	Active	Area A	No Further Action *
B/320B LS FL	Fluoride/Heavy Metals Lift Stations	B/320B	Inactive	No	No Further Action *
B/320B LS IW	Industrial Wastewater Lift Stations	B/320B	Inactive	No	No Further Action *
B/320B LS SO	Solvent Waste Lift Stations	B/320B	Active	No	No Further Action *
B/323 LS IW	Industrial Wastewater Lift Stations	B/323	Active	No	No Further Action *
B/323A LS FL	Fluoride/Heavy Metals Lift Stations	B/323 Annex	Active	No	No Further Action *
B/323A LS IW	Industrial Wastewater Lift Stations	B/323 Annex	Active	No	No Further Action *

UNIT ID #	DESCRIPTION	LOCATION	STATUS	GW REMEDIATION AREA?*	RCRA STATUS
B/323A LS SO	Solvent Waste Lift Stations	B/323 Annex	Active	No	No Further Action *
B/330C LS FL	Fluoride/Heavy Metals Lift Stations	B/330C	Active	B/330 AOC	No Further Action *
B/330C LS IW	Industrial Wastewater Lift Stations	B/330C	Active	B/330 AOC	No Further Action *
B/330C LS SO	Solvent Waste Lift Stations	B/330C	Active	B/330 AOC	No Further Action *
B/330D LS FL	Fluoride/Heavy Metals Lift Stations	B/330D	Active	B/330 AOC	No Further Action *
B/330D LS IW	Industrial Wastewater Lift Stations	B/330D	Active	B/330 AOC	No Further Action *
B/330D LS SO	Solvent Waste Lift Stations	B/330D	Active	B/330 AOC	No Further Action *
B/386 FP-1	Fluoride/Heavy Metals Filter Press	B/386	Active	Area A	No Further Action *
B/386 FP-2	Fluoride/Heavy Metals and IW Filter Press	B/386	Active	Area A	No Further Action *
B330-SO	Solvent Waste Transfer Piping	B/330	Inactive, Abandoned	B/330 AOC	Inaccessible SWMU
B330-FL	Fluoride/Heavy Metals Wastewater Transfer Piping	B/330	Inactive, Abandoned	B/330 AOC	Inaccessible SWMU
B330-IW	Industrial Wastewater Transfer Piping	B/330	Inactive	B/330 AOC	Inaccessible SWMU
B330 - SO (2)	Solvent Waste Transfer Piping	B/330	Active	B/330 AOC	No Further Action *
B330 - FL (2)	Fluoride/Heavy Metals Wastewater Transfer Piping	B/330	Active	B/330 AOC	No Further Action *
B330 - IW (2)	Industrial Wastewater Transfer Piping	B/330	Active	B/330 AOC	No Further Action *
B320-SO	Solvent Waste Transfer Piping	B/320	Inactive, Abandoned	No	Inaccessible SWMU
B320-FL	Fluoride/Heavy Metals Wastewater Transfer Piping	B/320	Inactive	No	Inaccessible SWMU
B320-IW	Industrial Wastewater Transfer Piping	B/320	Inactive	No	Inaccessible SWMU
B320- SO (2)	Solvent Waste Transfer Piping	B/320	Active	No	No Further Action *
B320-FL (2)	Fluoride/Heavy Metals Wastewater Transfer Piping	B/320	Active	No	No Further Action *
B320-IW (2)	Industrial Wastewater Transfer Piping	B/320	Active	No	No Further Action *
B310-SO	Solvent Waste Transfer Piping	B/310	Closed	Area A	Inaccessible SWMU
B310-FL	Fluoride/Heavy Metals Wastewater Transfer Piping	B/310	Inactive, Closed	Area A	Inaccessible SWMU
B310-IW	Industrial Wastewater Transfer Piping	B/310	Inactive	Area A	Inaccessible SWMU
B310-SO (2)	Solvent Waste Transfer Piping	B/310	Active	Area A	No Further Action *

UNIT ID #	DESCRIPTION	LOCATION	STATUS	GW REMEDIATION AREA?*	RCRA STATUS
B310-FL (2)	Fluoride/Heavy Metals Wastewater Transfer Piping	B/310	Active	Area A	No Further Action *
B310-IW (2)	Industrial Wastewater Transfer Piping	B/310	Active	Area A	No Further Action *
B300-SO	Solvent Waste Transfer Piping	B/300	Inactive, Abandoned	No	Inaccessible SWMU
B300-FL	Fluoride/Heavy Metals Wastewater Transfer Piping	B/300	Active	No	No Further Action *
B300-IW	Industrial Wastewater Transfer Piping	B/300	Active	No	No Further Action *
B322-SO	Solvent Waste Transfer Piping	B/322	Active	B/322 AOC	No Further Action *
B322-FL	Fluoride/Heavy Metals Wastewater Transfer Piping	B/322	Active	B/322 AOC	No Further Action *
B322-IW	Industrial Wastewater Transfer Piping	B/322	Active	B/322 AOC	No Further Action *
B308-IW	Industrial Wastewater Transfer Piping	B/308	Active	Area A	Inaccessible SWMU
B309-SO	Solvent Waste Transfer Piping	B/309	Inactive	Area A	Inaccessible SWMU
B309-SO (2)	Solvent Waste Transfer Piping	B/309	Active	Area A	No Further Action *
FL Transfer Systems	Fluoride/Heavy Metals Wastewater Transfer Piping	Site	Active	Yes	No Further Action *
IW Transfer Systems	Industrial Wastewater Transfer Piping	Site	Active	Yes	No Further Action *
B323-IW	Industrial Wastewater Transfer Piping	B/323	Active	No	No Further Action *
B323-FL	Fluoride/Heavy Metals Wastewater Transfer Piping	B/323	Active	No	No Further Action *
B323-SO	Solvent Waste Transfer Piping	B/323	Active	No	No Further Action *
B323A-IW	Industrial Wastewater Transfer Piping	B/323Annex	Active	No	No Further Action *
B323A-FL	Fluoride/Heavy Metals Wastewater Transfer Piping	B/323Annex	Active	No	No Further Action *
B323A-SO	Solvent Waste Transfer Piping	B/323Annex	Active	No	No Further Action *
B334-IW	Industrial Wastewater Transfer Piping	B/334	Active	No	No Further Action *
B334-FL	Fluoride/Heavy Metals Wastewater Transfer Piping	B/334	Active	No	No Further Action *
B334-SO	Solvent Waste Transfer Piping	B/334	Active	No	No Further Action *
B/335-SO	PCE Waste Transfer Piping	B/335	Inactive	B/330 AOC	No Further Action *
B335-SO (2)	PCE Waste Transfer Piping	B/335	Closed	B/330 AOC	No Further Action *
B335-IW	Industrial Wastewater Transfer Piping	B/335	Inactive	B/330 AOC	No Further Action *

UNIT ID #	DESCRIPTION	LOCATION	STATUS	GW REMEDIATION AREA?*	RCRA STATUS
B335-IW (2)	Industrial Wastewater Transfer Piping	B/335	Removed	B/330 AOC	No Further Action *
B/303-SO	Mixed Solvents, Freon, IPA, NMP, NBA Waste Transfer Piping	B/303	Active	Area A	No Further Action *
B/330-TMAH	Waste TMAH Transfer Piping	B/330C and B/330D	Active	B/330 AOC	No Further Action *
B/338-TMAH	Waste TMAH Transfer Piping	B/338 and B/339	Active	B/330 AOC	No Further Action *
B315-IW	Industrial Wastewater Transfer Piping	B/315	Active	Area A	No Further Action *
B316-IW	Industrial Wastewater Transfer Piping	B/316	Active	Area A	No Further Action *
HDWRKS	Headworks Building	B/325 NE	Active	No	No Further Action *
PW-6	Production Well PW-6	West Drive, B/330D W	Active	No	No Further Action *
Areas of Concern					
Area A	B/308, B/309 and B/310 Vicinity			Area A	Soil: No Further Action; GW: Corrective Measures Implemented. See Below.
Area B	Fire Brigade Training #1 and leachfield and Silica Slurry Lagoon			Area B	Soil: No Further Action; GW: Corrective Measures Implemented. See Below.
Area C	LF-1			Area C	Soil: No Further Action; GW: Corrective Measures Implemented. See Below.
Area D	Fire Brigade Training #2			Area D	Soil: No Further Action; GW: Corrective Measures Implemented. See Below.
B/322 AOC	B/322 Vicinity			B/322	Soil: No Further Action; GW: Corrective Measures Implemented. See Below.
B/330 AOC	B/330 Vicinity			B/330	Soil: No Further Action; GW: Corrective Measures Implemented. See Below.
SEQ	Contractors' Staging Area			SEQ	Soil: No Further Action; GW: Corrective Measures Implemented. See Below.
B/315 Catch Basin	B/315 Catch Basin	B/315	Removed	B/315 Catch Basin	No Further Action. See Below

Notes:

* The solid waste management units have been categorized by Areas of Concern (Area A, Area B, etc.) due to the physical location of the units within known areas of soil and/or groundwater contamination irregardless of whether the individual units had releases to the environment. Some SWMUs have not been identified with any area as there is no evidence of groundwater or soil contamination. See Appendix II-Ea for the SWMU Location Map. In addition, some SWMUs have been categorized as inaccessible since they are located beneath buildings and structures. See Module II Condition E.1.b. Table II-2.

The investigation of soil and groundwater contamination has been implemented in the Areas of Concern. These investigations have taken into consideration the location, unit construction and release history of individual SWMUs. A summary of the investigations, the remediation implemented, and NYSDEC determinations are discussed below.

The Areas of Concern are listed above and the locations are provided on the Figures in Appendix II-Eb. In addition to these AOCs, the bedrock aquifer has been identified as having been impacted by some of the identified AOCs.

1 Tank #3935 removed from Table II-1; redundant with Tank #3938.
2 Tank #3936 removed from Table II-1; redundant with Tank #3939.

Area A Area of Concern

Area A is located beneath and adjacent to B/308, B/309 and B/310. There are two distinct source areas associated with Area A. The first source area is associated with a closed tank farm, which contained both virgin and waste solvents located north of B/309, adjacent to the east side of B/310. The second source area is located adjacent to both sides of the linkway connecting B/308 with B/310. Tetrachloroethene (PCE) and its related breakdown products (Trichloroethene [TCE], cis-1,2-Dichloroethene [cis-1,2-DCE], and Vinyl Chloride [VC]), Freon TF (FTF), and Freon 123A (F123A) and to a lesser extent chromium and fluoride have been identified as contaminants which exceed the 6 NYCRR Part 703 Groundwater Quality Standards.

Remediation efforts in Area A consist of pump and treat. The Area A Treatment Facility (B/384) is located adjacent to and south of the B/308-B/310 linkway. Contaminated groundwater, extracted from a large diameter sump and two associated well points that are installed within the sump, is processed through an air stripper prior to discharge to the Industrial Wastewater Treatment Plant (IWTP). The Area A plume has also impacted the fractured dolomite bedrock aquifer. Pumping of Production Well 2 (PW-2), in the bedrock, in conjunction with operation of the sites other production wells, contains this plume.

The NYSDEC has approved IBM's groundwater investigations in Area A as meeting the requirements of an RFI and its pump and treat systems (Area A Treatment Facility and Deep Bedrock System) as Interim Corrective Measures.[1] NYSDEC has made a No Further Action determination for soils in Area A with the provision that some of the inactive, below ground, waste transfer systems beneath B/308, B/309 and B/310 are classified as inaccessible. These units are identified in Module Condition E.1.b. Table II-2. These inaccessible units must be investigated when these units become accessible.[2]

Area B Area of Concern

Area B is a former fire training area located near the eastern perimeter of the facility. To address this AOC, IBM operates a pump and treat facility to contain low levels of PCE. The pumped water is treated through activated carbon and is discharged to a septic leach field.

NYSDEC has approved IBM's groundwater investigations in Area B as meeting the requirements of an RFI and Interim Corrective Measures[3] and that there is No Further Action required for remediation of soils in this area.[4]

1 S. Kaminski, New York State Department of Environmental Conservation to W. Rudloff, IBM, *Groundwater Investigation/Treatment Documents*, March 10, 1993.
2 V. Valaitis, New York State Department of Environmental Conservation to J. Hogan, IBM, *IBM East Fishkill: Final Report*, August 13, 1998.
3 S. Kaminski, New York State Department of Environmental Conservation to W. Rudloff, IBM, *Groundwater Investigation/Treatment Documents*, March 10, 1993.
4 S. Kaminski, New York State Department of Environmental Conservation to W. Rudloff, IBM, *RCRA Corrective Action, Soil/Waste Investigation Documents*, September 29, 1993.

Area C Landfill

The Area C Landfill is located just east of B/330C. The area was used primarily as a construction debris landfill and when investigated was found to contain hazardous constituents, including PCE, FTF and their breakdown products. In 1982, 20,000 cubic yards were excavated and sent off-site to a permitted, secure landfill. The excavation went to bedrock and the area was subsequently back-filled and clay capped. Residual chemical contamination remains in the bedrock. Pumping of the on-site production wells contains migration of the residual contaminants from the landfill.

NYSDEC has approved IBM's groundwater investigation (RFI) and Corrective Measures Study for the landfill.[5]

Area D Area of Concern

Area D is a former fire training area located on the western boundary of the East Fishkill Facility within the Water Pollution Control Facility (WPCF). Low concentrations of PCE and TCE are currently detected in this area. IBM operates a pump and treat system, which discharges directly to the WPCF where groundwater is combined with sanitary wastewater and treated industrial wastewater prior to treatment and discharge under a SPDES permit to the Gildersleeve Brook. There is no known contamination in the bedrock associated with Area D.

NYSDEC has approved IBM's groundwater investigations in Area D as meeting the requirements of an RFI and Interim Corrective Measures[6] and that there is No Further Action required for remediation of soils in this Area[7].

Southeast Quadrant Area of Concern

The Southeast Quadrant (SEQ) Area of Concern is a former contractors' staging area located in a filled area adjacent to a New York State Freshwater Wetland (HJ-52) in the southeast corner of the East Fishkill Facility. The groundwater contamination from this area is located in the fill, native soil and very shallow, fractured bedrock. PCE and its breakdown products are the principal chemicals of concern.

In 1993, NYSDEC approved IBM's groundwater investigations in the SEQ as meeting the requirements of an RFI[8] and in 2000 approved the design of a groundwater extraction system as meeting the requirements of a Focused Corrective Measures Study and an Interim Corrective Measures Design.[9] The system, including Production Well 23 (PW-

5 S. Kaminski, New York State Department of Environmental Conservation to W. Rudloff, IBM, *RCRA Corrective Action: Soil/Waste Investigation Documents*, September 29, 1993.
6 S. Kaminski, New York State Department of Environmental Conservation to W. Rudloff, IBM, *Groundwater Investigation/Treatment Documents*, March 10, 1993.
7 S. Kaminski, New York State Department of Environmental Conservation to W. Rudloff, IBM, *RCRA Corrective Action: Soil/Waste Investigation Documents*, September 28, 1993.
8 S. Kaminski, New York State Department of Environmental Conservation to W. Rudloff, IBM, *Groundwater Investigation/Treatment Documents*, March 10, 1993.
9 H. Wilkie, New York State Department of Environmental Conservation to S. Tranchina, IBM, *Focused CMS-SEQ Groundwater Extraction System*, January 24, 2000.

23), was installed in 2000 and startup occurred in early 2001. The extracted water is treated at the B/316 Centralized Carbon facility and then used for process systems. An RFA and RFI for soil contamination were completed for this area. NYSDEC determined that No Further Action is required for soils in the SEQ.[10]

B/322 Area of Concern

The groundwater plume referred to as the B/322 Area of Concern is believed to emanate from largely two areas; one in the area of the B/320B-B/322 linkway in the vicinity of a closed waste solvent tank farm and second, within B/322 along the western side of the building, near monitoring well GW-766.

The B/322 plume is located primarily in the shallow soil aquifer. Identified constituents are PCE, FTF and their associated breakdown products. To a lesser extent, arsenic, chromium, nickel and fluoride have been identified as chemicals of concern related to the B/322 plume.

In 2000, IBM implemented a pump and treat system for the B/322 plume. Water is pumped from three extraction wells (with one backup available), which limit migration of volatile organic compounds (VOCs) toward the Gildersleeve Brook. The water is combined with sanitary and treated industrial wastewater and treated at the WPCF prior to discharge.

NYSDEC approved the groundwater RFI[11], the design[12], the technical specifications and record drawings for B/322 system and has determined that the system is acceptable as an Interim Corrective Measure.[13] NYSDEC has made a No Further Action determination for soils in the B/322 AOC provided that SWMUs identified as inaccessible will be addressed when the units become accessible.[14] To date, no SWMUs associated with B/322 have been identified as inaccessible SWMUs.

In 2009, elevated levels of fluoride were detected in monitoring well GW-580 on the southeast side of B/322. The source of the fluoride was a compromised wastewater pipeline and associated containment which have been taken out of service. The fluoride impacted groundwater is and will be contained within the site's existing groundwater flow and remediation systems.

B/330 Area of Concern

The B/330 AOC is located beneath and adjacent to B/330C and B/330D. The sources of this plume are associated with historical waste solvent tank farms, one located on the

10 V. Valaitis, New York State Department of Environmental Conservation to J. Hogan, IBM, *IBM East Fishkill: Final Report*, August 13, 1998.
11 K. Gronwald, New York State Department of Environmental Conservation to M. West, IBM, *IBM East Fishkill Building 322 Area of Concern RFI Report*, September 30, 1997.
12 H. Wilkie, New York State Department of Environmental Conservation to S. Tranchina, IBM, *Final Design Report – Groundwater Migration Control System for Building 322*, September 22, 1999.
13 H. Wilkie, New York State Department of Environmental Conservation to S. Tranchina, IBM, *Technical Specifications and Record Drawings-B/322 RCRA Groundwater Containment System*, April 14, 2000.
14 V. Valaitis, New York State Department of Environmental Conservation to J. Hogan, IBM, *IBM East Fishkill: Final Report*, August 13, 1998.

south side of B/330C and the other located to the east of B/330C, and underground waste piping within the buildings. The primary contaminants of concern are PCE and FTF. Separate phase PCE has been detected under B/330D and the bedrock aquifer has been impacted. In 2002, a pump and treat system, including Production Well 25 (PW-25), was constructed in order to contain the B/330 AOC plume near the source. The extracted water is treated at the B/316 Centralized Carbon facility and then used for process purposes.

The NYSDEC has approved IBM's RCRA Facilities Investigation for groundwater investigations for the B/330 Area of Concern.[15] IBM completed a Corrective Measures Study (CMS) for this Area of Concern and recommended near source extraction of contaminated groundwater to contain the contamination close to B/330 and to enhance mass removal. NYSDEC has approved the CMS.[16] The design of the B/330 AOC pump and treat system was approved as a Focused CMS and an Interim Corrective Measure Design.[17] The B/330 AOC pump and treat system was put online in January 2003. NYSDEC approved the system as an Interim Corrective Measure.[18]

In addition, NYSDEC approved and granted IBM a No Further Action determination for contaminated soils for B/330 with the provision that underground waste pipelines beneath the buildings that are classified as inaccessible must be addressed when these units become accessible.[19]

B/315 Catch Basin Area of Concern

During the course of construction in 2002, a storm sewer catch basin located on the north side of B/315 was determined to have sediment with PCE in the bottom of a catch basin. The area was sampled and approximately 32 cubic yards of soil were excavated and the catch basin was removed. Post excavation sampling indicated that no VOCs remained in the soil above TAGM 4046 soil cleanup objectives. The NYSDEC approved the remediation of this area as an Interim Corrective Measure and No Further Action is required.[20]

Bedrock Remediation Area

The Bedrock Remediation Area results primarily from sources within Area A and the B/330 Areas of Concern migrating vertically through the soil and till into the bedrock. The bedrock plume is contained to the IBM East Fishkill Facility through the continuous

15 K. Gronwald, New York State Department of Environmental Conservation to M. West, IBM, *IBM East Fishkill B/330 AOC RFI Report*, September 30, 1997.
16 K. Gronwald, New York State Department of Environmental Conservation to S. Tranchina, IBM, *RCRA CMS Task IV Final Report*, March 27, 2001.
17 H. Wilkie, New York State Department of Environmental Conservation to S. Tranchina, IBM, *Design Report, Groundwater Containment System, B/330 AOC*, October 28, 2002.
18 H. Wilkie, New York State Department of Environmental Conservation to S. Tranchina, IBM, *Groundwater Containment System, PW-25, B/330 AOC, Construction Quality Assurance Report*, July 21, 2003.
19 H. Wilkie, New York State Department of Environmental Conservation to S. Tranchina, IBM, *Newly Identified Area of Concern E (AOC-E) Report, B/315 Catch Basin*, July 31, 2002.
20 V. Valaitis, New York State Department of Environmental Conservation to J. Hogan, IBM, *IBM East Fishkill: Final Report*, August 13, 1998.

pumping of on-site production wells. This pumping, at approximately 1 million gallons per day, has created strong onto site gradients thus containing contaminated groundwater in the bedrock to the IBM East Fishkill facility.

Eight on-site production wells (PW-1, PW-2, PW-4, PW-5/5A, PW-6, PW-7, PW-23 and PW-25) generally operated continuously until October 2007 when a wellfield rebalancing plan was implemented. Termination of pumping at PW-4, PW-5/5A, PW-6 and PW-7 was proposed to provide more efficient and targeted contaminant containment and recovery at the site. The first step in this plan was termination of pumping at PW-5/5A, PW-6 and PW-7 for a one year trial period. The wells will be maintained in an operational condition until completion of the test plan, associated data analysis and NYSDEC approval of a permanent modification to the wellfield operation. After completion of the wellfield rebalancing, it is anticipated that PW-1, PW-2, PW-23 and PW-25 will be pumped continuously and the remaining on-site production wells will be pumped as necessary for plume containment and water supply. PW-9 is pumped for water supply emergencies only.

Water from the on-site production wells is pumped to B/316 and treated with granular activated carbon. Carbon treated water from the pumping production wells is discharged to the head end of the deionized water plant or to the raw water storage tanks which feed the various process water systems. Treated water from all on-site production wells also may be discharged directly to the tributary to the Gildersleeve Brook (Central Drainage) or the IWTP after carbon treatment.

Beginning in August 2007, the production well water supply has been supplemented with municipal water from the Poughkeepsies' Water Treatment Facility via the Central Dutchess Water Transmission Line. Municipal water provides all of the site's potable water and is blended with well water for process uses.

NYSDEC has approved IBM's groundwater investigations in the bedrock and approved the wells and the carbon system as Interim Corrective Measures.[21] The well field rebalancing work plan was approved by NYSDEC.[22]

B. STANDARD CONDITIONS FOR CORRECTIVE ACTION

1. <u>Work Plans</u>. All work plans submitted pursuant to this Module shall include:

a. Quality Assurance/Quality Control protocols to ensure that data generated is valid and supported by documented procedures;

b. Other plans, specifications and protocols, as applicable;

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21 S. Kaminski, New York State Department of Environmental Conservation to W. Rudloff, IBM, *Groundwater Investigation/Treatment Documents*, March 10, 1993.

22 K. Gronwald, New York State Department of Environmental Conservation to D. Speed, IBM, *Work Plan, Field Observation of Alternate Groundwater Extraction Operations*, August 17, 2007.

c. A schedule for starting specific tasks, completing the work and submitting progress and final reports; and

d. Plans for the treatment, storage, discharge or disposal of wastes to be generated by activities described therein.

2. <u>Quality Assurance/Quality Control</u>

a. Any laboratory to be used pursuant to such work plans required by this Module must be approved by the Commissioner prior to work plan implementation. Certification by the New York State Department of Health Environmental Laboratory Approval Program in the relevant analytical services is required.

b. The Quality Assurance/Quality Control data and information, that shall be delivered with all sample analyses required by this Module, is described in Appendix II-A of this Permit Module.

3. <u>Health/Safety Plans</u>. The Permittee shall develop, according to applicable Federal, State and local requirements, and submit to the Commissioner, health and safety plans that will be implemented to ensure that the health and safety of project personnel, plant personnel and the general public are protected. These plans are not subject to approval by the Commissioner.

4. <u>Guidance Documents</u>. When preparing the submissions described in this Permit Module, the Permittee shall take account of appropriate and applicable guidance documents issued by the U.S. Environmental Protection Agency and the New York State Department of Environmental Conservation in a manner reflecting reasonable technical considerations.

5. <u>Prior Submissions</u>. The Permittee may have already submitted portions of information, plans, or reports required by this Permit Module and its Appendices (Appendix II-A and Appendix II-D) to the Commissioner pursuant to the terms of previous applications, consent orders, or plans. For those items the Permittee contends were submitted to the Commissioner, the Permittee may cite the specific document(s) it believes adequately addresses each of the individual items requested by this Permit Module, Appendix II-A or Appendix II-D. The references, by document(s), shall be placed in the appropriate sections of the submissions that require the referenced information and data. If the Commissioner determines that it does not possess any of the referenced information, plans, or reports that the Permittee claims were previously submitted, the Commissioner will notify the Permittee and the Permittee shall submit the referenced documents within the time frame specified within the notification.

6. <u>Compliance Schedule for Interim Corrective Measures (ICMs)</u>

a. If at any time it is determined by the Commissioner that a release or, based on site-specific circumstances, a threatened release of hazardous wastes, including

hazardous constituents from a SWMU, an AOC or a combination of SWMUs and/or AOCs poses a significant and immediate threat to human health or the environment, or that such condition jeopardizes the Permittee's ability to comply with any governmental permit, a focused interim corrective measures study shall be submitted to the Commissioner for approval within 30 calendar days of notice of such a determination. This study shall consider, among other relevant factors, the character, the extent, direction, the rate of release, the proximity to population, the exposure pathways, the effects of delayed action, and the evaluations of appropriate ICM(s) or the selection of a pragmatic and presumptive ICM. Upon approval of the study by the Commissioner, the Permittee shall implement the required ICM as specified by the Commissioner. Should a selected ICM involve an engineered action (e.g., pump and treat), then its design, implementation schedule and subsequent construction completion certification shall require approvals by the Commissioner. Nothing herein precludes the Permittee from taking immediate action to address the conditions described herein and promptly notifying the Commissioner.

b. In the event the Permittee discovers a release or, based on site-specific circumstances, a threatened release of hazardous waste, including hazardous constituents, from a SWMU, an AOC, or a combination of SWMUs and/or AOCs, that poses a significant and immediate threat to human health or the environment, the Permittee shall identify interim corrective measures to mitigate this threat. The Permittee shall immediately summarize the nature and magnitude of the actual or potential threat and the nature of the ICM being considered and notify the Commissioner. Within 30 calendar days of notifying the Commissioner, the Permittee shall submit to the Commissioner, for approval, a focused CMS and follow the progression of events identified in Module Condition B.6.a. above.

c. The following factors may be considered by the Commissioner or the Permittee in determining the need for interim corrective measures:

   i) Time required to develop and implement a final corrective measure;

   ii) Actual and potential exposure of human and environmental receptors;

   iii) Actual and potential contamination of groundwater and sensitive ecosystems;

   iv) Concentration of hazardous constituents in soils that have the potential to migrate to the air, groundwater or surface water; and

   v) Other situations that may pose threats to human health and the environment.

7. <u>Determination of No Further Action</u>

a. Based on the results of an RFI for a particular SWMU, an AOC, or combination of SWMUs and/or AOCs, and other relevant information, the Permittee may submit an application to the Commissioner for a major permit modification in

accordance with 6 NYCRR Part 373 permit modification regulations identified in Module I of this Permit to terminate the subsequent corrective action requirements of this Module. This permit modification application must contain information demonstrating no release(s) of hazardous wastes, including hazardous constituents, from the SWMUs and/or AOCs pose a threat to human health or the environment.

b. If, based upon review of the Permittee's request for a permit modification, the results of the RFI, and other information, including comments received during the 45 calendar day public comment period required for permit modifications, the Commissioner determines that the release(s) or the suspected release(s) investigated either are non-existent or do not pose a threat to human health or the environment, the Commissioner may grant the requested modification.

c. A determination of No Further Action shall not preclude the Commissioner from implementing the following actions:

   i) Modifying this Permit at a later date to require the Permittee to perform such investigations as necessary to comply with the requirements of this Permit Module (guidance on such investigations is provided in Appendix II-B) if new information or subsequent analysis indicates that there are, or are likely to be, releases from SWMUs/AOCs that may pose a significant and immediate threat to human health or the environment; and

   ii) Requiring continual or periodic monitoring of air, soil, groundwater, or surface water/sediment or subsurface gas, if necessary, to protect human health and the environment, when site-specific circumstances indicate the release(s) of hazardous waste, including hazardous constituents, are likely to occur from any SWMUs and/or AOCs.

8. <u>Compliance Schedule for Reporting and Submissions</u>

a. The Permittee shall submit, to the Commissioner, signed progress reports, as specified in approved work plans pursuant to this Permit, of all activities (i.e., SWMU Assessment, Interim Measures, RCRA Facility Investigation, Corrective Measures Study) conducted pursuant to the provisions of the Corrective Action Compliance Schedules of this Permit Module, beginning no later than 30 calendar days after the Permittee is first required to begin implementation of any requirement herein. These reports shall contain:

   i) A description of the work completed during the reporting periods;

   ii) Summaries of all findings made during the reporting period;

   iii) Summaries of all changes made during the reporting period;

iv) Summaries of all contacts made with representatives of the local community and public interest groups during the reporting period;

v) Summaries of all problems or potential problems encountered during the reporting period and actions taken to rectify problems;

vi) Changes in personnel conducting or managing the corrective action activities during the reporting period;

vii) Projected work for the next reporting period; and

viii) Copies of daily reports, inspection reports, laboratory/monitoring data, etc., generated during the reporting period.

b. Upon request, copies of other relevant reports and data not identified in Module Condition B.8.a. shall be made available to the Commissioner.

c. The Commissioner may require the Permittee to conduct new or more extensive assessments, investigations, or studies, based upon information provided in the progress reports referred to in Module Condition B.8.a. above, or upon new information indicating that the assessments, investigations or studies already conducted or underway are insufficient.

d. All work plans, reports, studies, designs and schedules required by the conditions of this Permit Module and Appendix II-D are, upon approval of the Commissioner, incorporated into this Permit by reference and become an enforceable part of this Permit. Any noncompliance with such approved work plans, reports, studies, designs and schedules shall constitute noncompliance with this Permit. Extensions of the specified final compliance dates as specified as such in Appendix II-D for submissions may be granted by the Commissioner in accordance with the major permit modification procedures stipulated in Module I of this Permit.

9. <u>Compliance with Governmental Requirements</u>. During investigative activities, interim corrective measures, and final corrective measures, (including, but not limited to, equipment decommissioning, excavation and unit demolition) required under this Module, the Permittee shall ensure that the transportation, treatment, storage, discharge, and disposal of all contaminated materials generated as a result of such activities (including, but not limited to, soils, sediments, liquids, tanks, pipes, pumps, rubble, debris, and structural materials) are performed pursuant to all applicable Federal, State and local requirements. Nothing in this Module shall be construed to require the Permittee to proceed in a manner which is in violation of any such requirements.

10. Notifications

a. *Notification of Groundwater Contamination.* If at any time the Permittee discovers and confirms based upon the approved monitoring system contained in the Groundwater Monitoring Plan or as modified in the future that hazardous constituents in groundwater that may have been released from a SWMU or AOC at the facility have migrated beyond the facility boundary in concentrations that exceed action levels, the Permittee shall provide written notice to the Commissioner within 30 calendar days of confirmation that the facility releases of hazardous constituents in groundwater have migrated off-site. A written notice to the Commissioner shall include a proposed plan to notify any person who owns or resides on the land which overlies the contaminated groundwater.

b. *Notification of Air Contamination***.** If at any time the Permittee discovers that hazardous constituents in air that may have been released from a SWMU or AOC at the facility have or are migrating to areas beyond the facility boundary in concentrations that exceed action levels, and that residences or other places at which continuous, long-term exposure to such constituents might occur are located within such areas, the Permittee shall, within 15 calendar days of such discovery:

i) Provide written notification to the Commissioner; and

ii) Initiate any actions that may be necessary to provide notice to all individuals who have or may have been subject to such exposure.

c. *Notification of Residual Contamination.* If hazardous wastes or hazardous constituents in solid waste management units or areas of concern, or which have been released from a SWMU or AOC, will remain in or on the land, including groundwater, after the term of the permit has expired, the Commissioner may require the Permittee to record a notation in the deed to the facility property or in some other instrument which is normally examined during title search that will, in perpetuity, notify any potential purchaser of the property of the types, concentrations, and locations of such hazardous wastes or hazardous constituents. The Commissioner may require such notice as part of the corrective measures selection process.

C. COMPLIANCE SCHEDULE FOR ASSESSMENT OF NEWLY IDENTIFIED SWMUS AND AOCS

1. **Notification of Assessment.** The Permittee shall notify the Commissioner, in writing annually, of any additional, newly identified SWMUs which were constructed prior to the issuance of this Permit and which are located within an Area of Concern listed in this Module. The Permittee shall also notify the Commissioner, in writing annually, of any newly constructed SWMUs not listed in this Module.

In the annual report, the Permittee shall submit a SWMU Assessment set forth in Module Condition C.2. for units which were constructed prior to the issuance of this Permit and which are located within Areas of Concern listed in this Module. Based upon the information provided in the notification, the Commissioner shall determine the need for a further assessment. If the Commissioner determines that such assessments are necessary, the Commissioner shall, by written notification, require the Permittee to prepare and execute a SWMU/AOC Sampling and Analysis Plan in accordance with Module Conditions C.3., C.4., C.5. and C.6. For newly constructed SWMUs or AOCs not listed in this Module, the Permittee shall provide information pertaining to Module Conditions C.2.a.-e. in the annual report.

The Permittee shall notify the Commissioner, in writing within 15 calendar days of identifying existing units constructed prior to the issuance of this Permit and which are located outside of the Areas of Concern listed in this Module.

2. **SWMU/AOC Assessment Report.** Within 30 calendar days after notifying the Commissioner of a unit existing prior to this Permit and located outside of an Area of Concern, the Permittee shall submit a SWMU/AOC Assessment Report. Based upon the information provided in this assessment, the Commissioner shall determine the need for a further assessment. If the Commissioner determines that additional evaluation is necessary, the Commissioner shall notify the Permittee in writing to prepare and execute a SWMU/AOC Sampling and Analysis Plan in accordance with Module Conditions C.3., C.4., C.5. and C.6. This Report must provide, at a minimum, the following information for each newly identified SWMU/AOC:

   a. Type and function of unit/area;

   b. Location of each unit/area on a topographic map of appropriate scale;

   c. Dimensions, capacities, and structural descriptions of the unit/area;

   d. Dates that the unit/area was operated;

   e. Description of the wastes that were placed in or spilled at the unit/area;

   f. Description of any known releases from the unit/area (to include groundwater data, soil analyses, air monitoring data, and/or surface water/sediment data);

   g. The results of any sampling and analysis required for the purpose of determining whether releases of hazardous wastes, including hazardous constituents, have occurred, are occurring, or are likely to occur from the unit/area; and

   h. Whether these units/areas, individually or in combination with other units/areas described in Module Condition A.2., are a significant source of contaminant release.

3. **SWMU/AOC Sampling and Analysis Plan.** Within 30 calendar days after notification by the Commissioner that a SWMU/AOC Sampling and Analysis Plan is required as set forth in Module Condition C.2., the Permittee shall submit to the Commissioner for approval a Plan, in accordance with the most recent version of the NYS RCRA Quality Assurance Project Plan Guidance, for any sampling and analysis of groundwater, land surface and subsurface strata, surface water/sediment or air, as necessary to determine whether a release of hazardous waste, including hazardous constituents, from such unit(s) and/or area(s) has occurred, is likely to have occurred, or is likely to occur. The SWMU/AOC Sampling and Analysis Plan must demonstrate that the sampling and analyses program, if applicable, is capable of yielding representative samples and must include parameters sufficient to identify migration of hazardous waste, including hazardous constituents, from the newly-discovered SWMUs and/or AOCs to the environment.

4. **Subsequent Assessment Actions.** Following submission of the SWMU/AOC Sampling and Analysis Plan set forth in Module Condition C.3., subsequent activities for the Plan shall proceed in accordance with the following schedule:

   a. Meeting between the Permittee, and the New York State Department of Environmental Conservation to discuss Plan comments, as appropriate;

   b. Submission of a revised Plan to the Commissioner for approval within 30 calendar days of the above-described meeting. If the above referenced meeting is determined not to be necessary, the Permittee shall submit a revised Plan to the Commissioner, according to a schedule specified by the Department, not to exceed 45 calendar days after Permittee's receipt of Plan comments from the Commissioner; and

   c. Begin implementation of the SWMU/AOC Sampling and Analysis Plan within 30 calendar days following written approval from the Commissioner for the Plan.

5. **SWMU/AOC Sampling and Analysis Report.** Within 30 calendar days of receipt by the Permittee of complete, validated analytical data generated under the approved SWMU/AOC Sampling and Analysis Plan, the Permittee shall follow reporting requirements in the approved Plan and submit a SWMU/AOC Sampling and Analysis Report to the Commissioner. The Report shall describe all results obtained from the implementation of the approved Plan.

6. **Assessment Conclusions.** Based on the results of the SWMU/AOC Sampling and Analysis Report, the Commissioner shall determine the need for further investigations at the specific unit(s) covered in the SWMU/AOC Assessment Report. If the Commissioner determines that such investigations are needed, the Commissioner shall, by written notification, require the Permittee to prepare and submit for approval a RCRA Facility Investigation Work Plan, including an implementation schedule. Following the implementation of the RFI Work Plan, the Permittee shall submit for approval the RFI Report. If the Commissioner, after reviewing the RFI Report, determines that a Corrective Measures Study (CMS) or an Interim Corrective

Measures (ICM) is required, the Commissioner shall, by written notification, require the Permittee to prepare and submit for approval the CMS and/or ICM, including implementation schedules. All approved submissions submitted pursuant to this Permit condition shall be made part of this Permit.

D. COMPLIANCE SCHEDULE AND NOTIFICATION REQUIREMENTS FOR NEWLY-DISCOVERED RELEASES AT SWMUS AND AOCS.

The Permittee shall notify the Commissioner, in writing, of any release(s) of hazardous wastes, including hazardous constituents, discovered during the course of groundwater monitoring, field investigation, environmental auditing, or other activities no later than 15 calendar days after discovery. Such newly-discovered release(s) may be from the newly-identified unit(s)/area(s), from the unit(s)/area(s) for which, based on the findings of the RFA, the Commissioner had previously determined that no further investigation was necessary, or from the unit(s)/area(s) investigated as part of an RFI. Based on the information provided in the notification, the Commissioner shall determine the need for further investigation of the release(s). If the Commissioner determines that such investigations are needed, the Commissioner shall, by written notification, require the Permittee to prepare a RCRA Facility Investigation Work Plan, including an implementation schedule. Following the implementation of the RFI Work Plan, the Permittee shall submit for approval the RFI Report. If the Commissioner, after reviewing the RFI Report, determines that a Corrective Measures Study (CMS) or Interim Corrective Measures (ICM) is required, the Commissioner shall, by written notification, require the Permittee to prepare and submit for approval the CMS and/or ICM, including implementation schedules. All approved submissions submitted pursuant to this Permit condition shall be made part of this Permit.

Releases from hazardous waste treatment, storage, and disposal (TSD) units subject to regulation by this Permit shall be initially addressed by the procedures contained in the Permittee's approved Hazardous Waste Contingency Plan appended to this Permit. Should the release and the environmental media affected by the release not be adequately addressed by the procedures stipulated in the Hazardous Waste Contingency Plan, then remediation shall be pursued in accordance with this Permit Module.

E. CORRECTIVE ACTION REQUIREMENTS

1. <u>Compliance Schedule for RCRA Facility Investigation (RFI) Work Plans, Including RFI Work Plans at Inaccessible SWMUs and/or AOCs</u>

a. No later than 90 calendar days after written notification by the Commissioner that an RFI is required pursuant to Module II Condition C.6. and/or D., the Permittee shall submit for approval an RFI Work Plan

b. On the basis of the RCRA Facility Assessment-Preliminary Review dated October 1, 1992, as revised and a letter from V. Valaitis, New York State Department of Environmental Conservation to J. Hogan, IBM, *IBM East Fishkill:*

Final Report, August 13, 1998, the Commissioner has determined that there has been a release of hazardous waste and/or constituents from the inaccessible SWMUs and/or AOCs identified in Module Condition A.2. and Table II-2.

Table II-2
INACCESSIBLE SWMUs

UNIT ID #	DESCRIPTION	LOCATION	STATUS	GW Remediation Area?
B300-SO	Solvent Waste	B/300	Inactive, Abandoned	No
B308-IW	Industrial Wastewater	B/308	Active	Area A
B309-SO	Solvent Waste	B/309	Inactive	Area A
B310-IW	Industrial Wastewater	B/310	Inactive	Area A
B310-FL	Fluoride/Heavy Metals Wastewater	B/310	Inactive, Closed	Area A
B310-SO	Solvent Waste	B/310	Closed	Area A
B320-SO	Solvent Waste	B/320	Inactive, Abandoned	No
B320-IW	Industrial Wastewater	B/320	Inactive	No
B320-FL	Fluoride/Heavy Metals Wastewater	B/320	Inactive	No
B330-SO	Solvent Waste	B/330	Inactive, Abandoned	B/330 AOC
B330-IW	Industrial Wastewater	B/330	Inactive	B/330 AOC
B330-FL	Fluoride/Heavy Metals Wastewater	B/330	Inactive, Abandoned	B/330 AOC

c. The Permittee shall submit to the Commissioner for approval a RCRA Facility Investigation Work Plan that includes a Report on Current Conditions for the inaccessible SWMUs and/or AOCs identified in Module Condition E.1.b. and Table II-2 no later than 180 calendar days after the date when the SWMUs and/or AOCs become accessible for such an investigation. Accessibility to the SWMUs and/or AOCs shall be considered achievable when the impediment to the RFI (e.g., building, utilities) is demolished, abandoned, or to be altered in a manner that would allow access to the SWMUs and/or AOCs.

d. Following submission of the RFI Work Plan, subsequent activities for the Plan shall proceed in accordance with the following schedule:

i) Meeting between the Permittee and the Department to discuss the Work Plan comments, as appropriate; and

ii) Submission of a revised Work Plan to the Commissioner for approval within 30 calendar days of the above-described meeting. If the above-referenced meeting is determined not to be necessary, the Permittee shall submit a revised Plan to the Commissioner, according to a schedule specified by the Department, not to exceed 45 calendar days after Permittee's receipt of Work Plan comments from the Commissioner.

2. <u>Compliance Schedule for RCRA Facility Investigation (RFI) Work Plan Implementation, RFI Report and Summary Report Submissions</u>

a. No later than 30 calendar days after written notification by the Commissioner approving the RFI Work Plan, the Permittee shall begin implementation of the Plan according to the schedules made part of the approved RFI Work Plan.

b. Within 60 calendar days of receipt by the Permittee of complete, validated analytical data generated under the approved RFI Work Plan, the Permittee shall submit to the Commissioner for approval the RFI Final Report and Summary Report. The RFI Final Report must contain adequate information to support further corrective action decisions at the facility and/or off-site, should such actions be necessary. The RFI Final Report shall describe the procedures, methods, and results of all facility investigations of SWMUs and AOCs and their releases, including information on the type and extent of contamination at the facility and/or off-site, sources and migration pathways, and actual or potential receptors. It shall present all information gathered under the approved RFI Work Plan. The Summary Report shall describe more briefly the procedures, methods, and results of the RFI.

c. Following submission of the RFI Reports and the Summary Reports set forth in Module Condition E.2.b., subsequent activities for the Reports shall proceed in accordance with the following schedule:

i) Meeting between the Permittee and the Department to discuss Report comments, as appropriate; and

ii) Submission of revised Reports to the Commissioner for approval within 45 calendar days of the above-described meeting. (If the above-referenced meeting is determined not to be necessary, the Permittee shall submit revised Reports to the Commissioner, according to a schedule specified by the Department, not to exceed 45 calendar days after Permittee's receipt of Report comments from the Commissioner.)

d. After the Commissioner approves the RFI Final Reports, the Permittee shall mail the approved Summary Reports to all individuals on the facility mailing list,

developed and maintained by the Commissioner, within 30 calendar days of receipt of approval.

e. IBM is conducting a VOC Source Assessment pursuant to an April 2008 request from NYSDEC and NYSDOH.[23] Reports related to the study have been and will be submitted to the agencies on an "as-needed" basis.

3. <u>Requirements for a Corrective Measures Study (CMS)</u>

a. Should a CMS that evaluates alternative remedies be required, the Commissioner shall notify the Permittee in writing when the CMS shall be submitted. The submission time will take into consideration the extent of the remediation that needs to be implemented. This notice shall identify the hazardous constituent(s) which have exceeded action level(s) that are considered a threat to human health and the environment given site specific exposure conditions or due to additive exposure risk. The notification shall specify the action level(s) for hazardous constituents detected in each medium of concern, and may also specify corrective measure alternatives to be evaluated by the Permittee during the CMS. The CMS shall:

i) Summarize the results of the investigations and, if applicable, of any bench-scale or pilot tests conducted;

ii) Provide a detailed description of the corrective measures evaluated and include an evaluation of how each corrective measure alternative meets the standards set forth in Module Condition E.4.a.; and

iii) Contain any additional information to support the Commissioner in the corrective measure selection decision-making process, described under Module Condition E.4.

b. The Permittee will not need to prepare and submit for approval a CMS that evaluates remedial alternatives when the Department and the Permittee agree on a pragmatic and presumptive remedy. The Permittee shall instead submit a focused CMS that includes a conceptual design for this presumptive remedy and explain how it meets the pertinent requirements of Condition E.4., within 60 calendar days following notification by the Department.

4. <u>Corrective Measure(s) Selection</u>

a. Based on the information presented in the CMS, and any further evaluations of additional corrective measures under this study, the Commissioner shall select the corrective measure(s) that at a minimum will meet the following standards:

i) Be protective of human health and the environment;

23 E. Dassatti, NYSDEC, and G. Litwin, NYSDOH, to D. Speed, IBM, received April 7, 2008.

ii) Attain media cleanup standards consistent with 6NYCRR Part 703 standards and applicable guidance in effect at the time;

iii) Control the source(s) of release(s) so as to reduce or eliminate, to the maximum extent practicable, further releases of hazardous waste, including hazardous constituents, that might pose a threat to human health and the environment; and

iv) Meet all applicable waste management requirements.

b. In selecting the corrective measure(s) which meets the standards for corrective measures established under Module Condition E.4.a., the Commissioner shall consider the following evaluation factors, as appropriate:

i) Long-term reliability and effectiveness. Any potential corrective measure(s) may be assessed for the long-term reliability and effectiveness it affords, along with the degree of certainty that the corrective measure(s) will prove successful. Factors that shall be considered in this evaluation include:

1) Magnitude of residual risks in terms of amounts and concentrations of hazardous waste, including hazardous constituents, remaining following implementation of the corrective measure(s), considering the persistence, toxicity, mobility and propensity to bioaccumulate of such hazardous wastes, including hazardous constituents;

2) The type and degree of long-term management required, including monitoring and operation and maintenance;

3) Potential for exposure of humans and environmental receptors to remaining hazardous wastes, including hazardous constituents, considering the potential threat to human health and the environment associated with excavation, transportation, re-disposal or containment;

4) Long-term reliability of the engineering and institutional controls, including uncertainties associated with land disposal of untreated hazardous wastes, including hazardous constituents, and their residuals; and

5) Potential need for replacement of the corrective measure(s).

ii) Reduction of toxicity, mobility or volume. A potential corrective measure(s) may be assessed as to the degree to which it employs treatment that reduces the toxicity, mobility or volume of hazardous wastes, including hazardous constituents. Factors that shall be considered in such assessments include:

1) The treatment processes the corrective measure(s) employs and materials it would treat;

2) The amount of hazardous wastes, including hazardous constituents, that would be destroyed or treated;

3) The degree to which the treatment is irreversible;

4) The residuals that will remain following treatment, considering the persistence, toxicity, mobility and propensity to bioaccumulate of such hazardous wastes, including hazardous constituents; and

5) All concentrations of hazardous waste, including hazardous constituents, in each medium that the corrective measure(s) must achieve to be protective of human health and the environment.

iii) The short-term effectiveness of a potential corrective measure(s) may be assessed considering the following:

1) Magnitude of reduction of existing risks;

2) Short-term risks that might be posed to the community, workers, or the environment during implementation of such a corrective measure(s), including potential threats to human health and the environment associated with excavation, transportation, and re-disposal or containment; and

3) Time until full protection is achieved.

iv) Implementability. The ease or difficulty of implementing a potential corrective measure(s) may be assessed by considering the following types of factors:

1) Degree of difficulty associated with constructing the technology;

2) Expected operational reliability of the technologies;

3) Need to coordinate with and obtain necessary approvals and permits from other agencies;

4) Availability of necessary equipment and specialists;

5) Available capacity and location of needed treatment, storage and disposal services; and

6) Requirements for removal, decontamination, closure, or post-closure of units, equipment, devices or structures that will be used to implement the corrective measure(s).

v) Cost. The types of costs that may be assessed include the following:

1) Capital costs;

2) Operation and maintenance costs;

3) Net present value of capital and operation and maintenance costs; and

4) Potential future corrective measure costs.

5. <u>Permit Modification for Corrective Measure(s)</u>

a. Based on information the Permittee submits in the RFI Report, the CMS and other information, the Commissioner will propose the final corrective measure(s) and public notice of a major permit modification in accordance with 6 NYCRR Part 373 permit modification regulations identified in Module I of this Permit. The major permit modification and a Statement of Basis (SB) discussing the proposed final corrective measure(s) will be public noticed together.

b. The Permittee shall demonstrate in writing to the Commissioner financial assurance for completing the approved final corrective measures in accordance with Module Condition E.9.

6. <u>Modification of the Compliance Schedules</u>

a. If at any time the Permittee determines that modification of any Compliance Schedule of this Permit Module, including Appendix II-D, is necessary because such schedules cannot be met, the Permittee must:

i) Notify the Commissioner in writing within 15 calendar days of such determination; and

ii) Provide an explanation why the current schedule cannot be met.

b. The Commissioner shall notify the Permittee in writing of the final decision regarding the Permittee's proposed modification to the Compliance Schedule.

c. Modifications to the Compliance Schedule for non-specific final compliance dates pursuant to this procedure do not constitute a re-issuance of this Permit. However, any modification to extend a specific final compliance date will be considered a major permit modification and will be processed in accordance with 6 NYCRR Part 373 permit modification regulations identified in Module I of this Permit.

d. All other modifications to this Permit Module must be made in accordance with Module I of this Permit.

7. <u>Corrective Measures Implementation</u>

a. <u>*Corrective Measures Program*</u>: The Permittee is currently conducting an Interim Corrective Measures Program to monitor, collect, and treat contaminated groundwater. The current Corrective Measures Program is addressing

groundwater remediation in the following Areas of Concern (AOCs): Area A, Area B, Area C Landfill, Area D, B/322 AOC, B/330 AOC, the SEQ, and the deep bedrock. A location map containing the Areas of Concern is included in Appendix II-Eb of this Permit Module.

The Corrective Measures Program involves the operation of seven (7) groundwater collection and treatment systems and the monitoring of a previously remediated landfill (Area C). The GW collection and treatment systems are referred to as the Central Carbon, Area A, Area B, Area D, B/322 AOC, B/330 AOC (PW-25) and SEQ (PW-23) treatment systems and are described below.

Chemicals detected and confirmed are listed in Appendix II-F of this Permit Module. The chemicals which have been detected, confirmed and which exceed the Groundwater Cleanup Standard are listed in Module Condition E.7.c.(ii) Table II-3. The "Key Compounds" are compounds with the highest concentrations and the greatest areal distribution. The "Key Compounds" will be used to determine plume boundaries. The "Key Compounds" are PCE, TCE, cis-1,2-DCE, VC, and FTF.

Bedrock Containment and Treatment System

The purpose of the on-site bedrock production well system and the associated B/316 Centralized Carbon Treatment Systems (CCTS) is to control and contain contaminated groundwater in the bedrock, thus preventing off-site migration, and to treat this groundwater for process water use. Beginning in August 2007, the production well water supply has been supplemented with municipal water from the Poughkeepsies' Water Treatment Facility via the Central Dutchess Water Transmission Line. Municipal water provides all of the site's potable water and is blended with well water for process uses.

The contamination, primarily PCE, TCE, cis-1,2-DCE, and FTF, is located in the bedrock underlying the central portion of the facility (B/308, B/309, B/310, B/316, B/320B, B/322, B/323, B/330 and B/334). The bedrock formation is the Stockbridge or Wappinger Limestone (Dolostone) formation with a thickness of approximately 1,000 feet. The contamination of the bedrock aquifer is primarily associated with chemical handling in Area A, Area C (landfill), and the B/330 AOC. Contamination found in the bedrock has migrated through the sediment and till into the bedrock.

This treatment system/containment system consists of production wells (PW) which collectively create a large cone of depression within the bedrock aquifer. The result is a controlled influence over the flow of contaminated groundwater in the bedrock toward the production wells. Eight on-site production wells (PW-1, PW-2, PW-4, PW-5/5A, PW-6, PW-7, PW-23 and PW-25) generally operated continuously until October 22, 2007 when a wellfield rebalancing plan was implemented.

Termination of pumping at PW-4, PW-5/5A, PW-6 and PW-7 was proposed to provide more efficient and targeted contaminant containment and recovery at the site. The first step in this plan was termination of pumping at PW-5/5A, PW-6 and PW-7 for a minimum one year trial period. The wells will be maintained in an operational condition until completion of the test plan, associated data analysis and NYSDEC approval of a permanent modification to the wellfield operation. After completion of the wellfield rebalancing, it is anticipated that PW-1, PW-2, PW-23 and PW-25 will be pumped continuously and the remaining on-site production wells will be pumped as necessary for water supply and to maintain on-site gradients. PW-9 is only pumped during water supply emergencies.

Discharge from each of the production wells is pumped through underground piping to the B/316 Centralized Carbon Treatment Systems (CCTS). The CCTS consist of five (5) trains of activated carbon. Each granular activated carbon (GAC) train consists of two (2) 20,000 pound activated carbon units (down flow type) which are operated in series.

Presently, groundwater pumped from PW-1, PW-4, PW-5/5A, PW-6, PW-7, PW-9 and PW-23 is blended and piped to three of the Central Carbon GAC trains (Trains #1, 2 and 3). The treated groundwater is then delivered to the head end of the deionized water system (DI system) and to the raw water storage facilities for process use.

Discharge from PW-2 is treated in a separate GAC train in the CCTS (PW-2 carbon system). Similarly, the discharge from PW-25 is plumbed to a segregated carbon train in the CCTS (Train #4). After treatment, water from PW-2 and PW-25 is piped together to a storage tank at the head of the deionized water process and to the raw water storage facilities for process use.

Currently all water from the production wells is being used for process systems. The treated water from all on-site production wells also may be discharged to the IWTP and/or to a tributary of the Gildersleeve Brook (central Drainage) (SPDES Permit #NY0005096, Outfall #004).

The spent carbon from the carbon treatment systems is transported off-site to a reactivation plant where the contaminants are removed and the carbon is recycled.

Area A - Treatment Facility

The objective of the Area A treatment facility is to contain and treat groundwater contaminated with VOCs, primarily PCE, located throughout a glaciolacustrine/till layer in the vicinity of B/308, B/309 and B/310. Contamination in this area resulted from the handling of hazardous constituents from the mid-1960s to the mid-1970s. To a lesser extent, chromium and fluoride have been identified as chemicals of concern as well. Within this area,

groundwater is extracted from a 6-foot diameter sump and two associated well points which have been installed through the sump. Water is pumped from the sump wells to an influent storage tank. The contaminated groundwater is pumped and batch treated through a permitted air stripping tower for treatment. The water is then blended with industrial wastewater at the IWTP prior to discharge to the Water Pollution Control Facility (WPCF). The treated water from the WPCF is discharged to Gildersleeve Brook (SPDES Permit # NY0005096, Outfall #1).

The Area A treatment plant is located within Building 384. In 2010, the facility processed an average rate of 1.7 gpm and the median influent chemical concentration to the treatment plant was approximately 26,000 ug/L (>95% of total is PCE). The average effluent concentration from the Area A Treatment Plant was less than 10 ug/L of VOCs.

Area B - Treatment Facility

The purpose of the Area B treatment facility is to contain and treat groundwater contaminated with PCE in the shallow bedrock adjacent to IBM's Gate 4. Contamination in this area is associated with fire training operations from the late 1960s.

The Area B treatment facility consists of a 1 horsepower submersible pump installed in GW-628 which replaced GW-863. Water is pumped from GW-628 through a particulate filter then through two 11.4 cubic feet activated carbon cylinders. The treated water is then discharged to an upgradient leachfield. The Area B treatment facility was completely rebuilt in 2003.

In 2010, the contaminant concentration levels in GW-628 were less than 4 ug/L of PCE and the average flow rate was 8.1 gpm. PCE was not detected in the treated effluent. The well is controlled via level control. The Area B system is designed for remote monitoring.

Area D - Treatment Facility

The objective of the Area D treatment facility is to contain and treat contaminated groundwater in the shallow unconsolidated sediments adjacent to the WPCF. Contamination found in Area D resulted from fire training operations which occurred during the mid-1970s.

The contaminated groundwater in Area D (GW-32A) is pumped to a sanitary waste manhole and fed into the WPCF. Here the groundwater is combined with sanitary waste and treated industrial wastewater. Water is then treated prior to discharge to Gildersleeve Brook under the IBM East Fishkill SPDES permit, outfall number 001.

Existing well GW-32A has developed a siltation problem and will be replaced by a new remediation well (GW-32B). The new well is scheduled to be completed in third quarter 2011.

In 2010, the contamination levels in the pumped well, MW-32A, were cis-1,2-DCE and PCE <2 ug/L, and TCE <4 ug/L and the average flow rate was 2.6 gpm.

Area C - Remediation Area (Landfill)

Remediation of Area C involved the removal of a construction debris landfill which had been determined to contain hazardous chemicals, primarily chlorinated hydrocarbons and FTF. In 1982, twenty-thousand cubic yards of material was removed and sent off-site to an approved landfill. The excavation was backfilled with clean soil and capped with clay. Contamination from the landfill has penetrated into the bedrock. Drawdown from pumping the on-site production wells contains the remnant contaminants in the bedrock to the East Fishkill Facility.

Southeast Quadrant (SEQ) Area of Concern

This AOC is the former IBM East Fishkill contractor storage area. The primary contaminants in this area are PCE, TCE, and cis-1,2-DCE. In 2001, IBM constructed a pump and treat system to contain and treat contaminated groundwater in the shallow bedrock. PW-23 was installed and plumbed to the B/316 Centralized Carbon Treatment System. After carbon treatment, the water is further treated for process purposes. This system is described above in the *Bedrock Containment and Treatment System* section**.**

In 2010, the contamination levels in PW-23 were PCE $\leq$3 ug/L, TCE not detected and cis-1,2-DCE not detected. The average flow rate was approximately 16 gpm.

B/322 - Area of Concern

This AOC is a result of chemical handling within and adjacent to B/322. The shallow soil aquifer is contaminated primarily with PCE and FTF and their respective breakdown products. To a lesser extent, arsenic, chromium, nickel and fluoride have also been identified as chemicals of concern. In 2000, IBM implemented a pump and treat system for the B/322 plume. Water is pumped from three extraction wells (GW-612, -617 and -618), with one backup available (GW-613), which limit migration of VOCs toward the Gildersleeve Brook. The water is combined with sanitary and treated industrial wastewater and further treated at the WPCF prior to discharge.

In 2010, the contaminant concentration level in the combined pumping wells was < 1 ug/L of VOCs and the combined average pumping rate was 11.3 gpm.

B/330 - Area of Concern

The B/330 AOC is located beneath and adjacent to B/330C and B/330D. The sources of this plume are associated with historical waste solvent tank farms and underground waste piping within the buildings. The primary contaminants of concern are PCE, the breakdown products of PCE and FTF. The bedrock aquifer has been impacted. In 2002, a pump and treat system (PW-25) was constructed in order to contain the B/330 AOC plume near the source. PW-25 was installed and plumbed to the facility's B/316 Centralized Carbon Treatment System. After carbon treatment the water is further treated for process purposes. Further discussion of this system can be found above in the *Bedrock Containment and Treatment System* section**.**

In 2010, the median contamination levels in PW-25 were PCE 590 ug/L, TCE 170 ug/L, cis-1,2-DCE 50 ug/L and FTF 20 ug/L. The average flow rate was approximately 205 gpm.

On-Site Migration Detection Monitoring

The objective of this groundwater detection monitoring program is to detect the presence of hazardous constituents which potentially could flow on-site from off-site as a result of IBM East Fishkill's production wells.

b. *Duration of Corrective Measures Program*

The Groundwater Monitoring Program and the Corrective Measures Program as defined in this Permit Module, shall continue until sampling of the groundwater monitoring wells demonstrates that for a period of three (3) consecutive years of Post-Termination Monitoring in Module Condition E.7.d.(iv), the concentrations of hazardous constituents have not exceeded the Termination Criteria stipulated as Groundwater Cleanup Standards in Module Condition E.7.c.(ii) Table II-3 or groundwater background concentrations established pursuant to Module Condition E.7.d.(ii)(3).

The Corrective Measures Program shall be continued for at least the duration of this Permit. The Permittee may request a review of the Programs on or about the anniversary date of the effective date of this Permit:

i) The Permittee may make adjustments to the corrective measures systems installed at this facility that will facilitate or improve groundwater control or cleanup without the prior consent of the Commissioner. The Commissioner must be notified about any adjustments within 45 days of its implementation;

ii) Reductions or changes in monitoring wells, parameters, sampling protocols and frequency may only be implemented with the Commissioner's written approval in accordance with Module IX, Condition C.6. of this Permit; and

iii) Any other request for modification must be made in accordance with Permit Module I.

c. *Groundwater Monitoring Program*

i) Description of Wells

The Corrective Action Performance Monitoring Network shall consist of monitoring wells with uses listed in Sections E.7.c.(i)(1) through E.7.c.(i)(7) below. A listing of monitoring wells and sample frequencies along with a location map shall be submitted as part of the Groundwater Monitoring Plan required by Module IX, Condition C. of this Permit.

1) Corrective Action Monitoring (CAM) Wells, Monitoring and Reporting Frequency

The CAM wells will be sampled at a minimum annually for those analytes listed in Module Condition E.7.c.(ii) Table II-3. Data from the CAM wells shall be used to evaluate the status of the contaminant source and plume with respect to contaminant migration. The Permittee will use the data from these wells to construct maps showing an estimate of the limits of each of the contamination plumes. The approximate limit of each plume is defined as the concentration equal to 5 ug/L of one key compound or sum of key compounds. The Key Compounds are Tetrachloroethene, Trichloroethene, cis-1,2-Dichloroethene, Vinyl Chloride and Freon TF.

In addition, the Permittee will determine whether there has been a significant change in water quality for each well and its key compounds or combination of key compounds. This analysis will be provided in the Annual Report. Any additional compounds associated with a SWMU or AOC and detected and confirmed above the 6 NYCRR Part 703 Groundwater Quality Standard will be reported in the annual report.

2) Process Control for Treatment (PCT) Wells, Monitoring and Reporting Frequency

The PCT wells will be used to detect significant changes in water quality (new compounds detected and/or significant change in concentration) in order to insure the adequacy of the treatment facilities. The Permittee will notify the Commissioner within 7 days of detection and confirmation of a significant change in input concentration or chemical composition which jeopardizes the treatability of groundwater. Monitoring requirements for the PCT Wells will be satisfied by sampling monthly for those analytes in Module Condition E.7.c.(ii) Table II-3.

3) Contaminant Reduction Monitoring (CRM) Wells, Monitoring and Reporting Frequency

Analytical results from the CRM wells shall be used for evaluating the effectiveness of the remedial system with respect to contaminant reductions in the groundwater. The CRM wells shall be monitored at a minimum annually for those analytes in Module Condition E.7.c.(ii) Table II-3. Groundwater quality data obtained from these wells shall be used to compile concentration versus time plots of each well for selected constituents. In addition, these wells will be used to determine the mass of contaminants removed for each area of remediation and to provide a qualitative assessment of the source areas. The Permittee will report in writing annually to the Commissioner on the effectiveness of the corrective action program.

4) Point of Compliance (POC) Wells, Monitoring and Reporting Frequency

The POC wells will be used to measure the water quality downgradient of an AOC where groundwater has been determined to flow across the compliance point. Monitoring requirements for the POC Wells will be satisfied by:

a) Sampling the POC wells at a minimum quarterly for those constituents defined in Module Condition E.7.c.(ii) Table II-3.

b) The Permittee will determine whether there is any statistically significant evidence of increased contamination at the compliance point. This analysis will be provided in the annual report.

5) Background Monitoring (BGM) Wells, Monitoring and Reporting Frequency.

The objective of the Background Monitoring Wells is to provide a qualitative basis of comparison for determining Termination pursuant to Module Condition E.7.d.(ii). Monitoring requirements for the Background Monitoring Wells will be satisfied by a monitoring program at the time that Termination is proposed.

6) Hydraulic Effectiveness Monitoring (HEM) Wells, Monitoring and Frequency.

Water level (elevation) data at all hydraulic effectiveness monitor wells will be collected quarterly. This data will be used to determine the hydraulic effectiveness of remediation. Water level data shall be reported

annually. An interpretation of hydraulic effectiveness shall be provided in the annual report.

7) Detection Monitoring (DM) Wells, Monitoring and Reporting Frequency.

The objective of the Detection Monitoring wells is to detect contamination which potentially may be coming from off-site onto the facility. The Detection Monitoring Wells will be sampled for those analytes in E.7.c.(ii) Table II-3.

Sampling for the Detection Monitoring Wells will be satisfied by collecting a sample and reporting the results from each well annually.

ii) Routine Monitoring Parameters

Table II-3

GROUNDWATER MONITORING PARAMETERS

Constituents	**Concentration Limit (ug/L)[5]**
Acetone	50
Chlorobenzene	5
1,2-Dichlorobenzene	3
Dichlorodifluoromethane (Freon 12)	5
cis-1,2-Dichloroethene	5
1,2-Dichloro-1,2,2-trifluoroethane (Freon 123A)	5
Ethylbenzene	5
1,1,2,2-Tetrachloroethene	5
1,1,1,-Trichloroethane	5
1,1,2-Trichloroethene	5
Trichlorofluoromethane (Freon 11)	5
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon TF, Freon 113)	5
Vinyl Chloride	2
m-Xylene	5
o-Xylene	5
p-Xylene	5

Constituents	Concentration Limit (ug/L)[5]
Fluoride[1]	1,500
Arsenic[2]	25
Chromium[3]	50
Nickel[4]	100

[1] Monitoring Parameter for Area A, B/322 AOC
[2] Monitoring Parameter for B/322 AOC
[3] Monitoring Parameter for Area A, B/322 AOC
[4] Monitoring Parameter for B/322 AOC
[5] 6 NYCRR Part 703 Groundwater Quality Standards Except Concentration Limit for Acetone is from TAGM 4046.

Each time groundwater samples are obtained from each monitoring well listed in Module Condition E.7.c.(i)(1-5, 7), the samples shall at a minimum be analyzed for the hazardous constituents listed in Table II-3 by the methods and with the associated method detection limits described in Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA SW-846, Third Ed., USEPA, 1986, an approved revision of SW-846 or other procedures approved by the Commissioner.

The Commissioner shall review the monitoring parameter(s) established in Module Condition E.7.c.(ii) annually to determine if there is a need to revise, add, or delete a monitoring parameter.

iii) Additional Monitoring Parameters

If any additional hazardous constituents, as defined in 6 NYCRR Part 373-2 Appendix 33, from a SWMU or AOC are identified to be present at concentrations at or above the 6 NYCRR Part 703 Groundwater Quality Standards at the point of compliance wells as described by E.7.c.(i)(4) of this Module, the following procedures shall be undertaken:

1) The pertinent well(s) shall be resampled to confirm the presence of the additional hazardous constituent(s);

2) The pertinent constituent(s), concentration(s) and well(s) shall be reported to the Commissioner within 7 days of such confirmation;

3) If the presence of additional hazardous constituents are confirmed pursuant to Module Condition E.7.c.(iii)(1), the Permittee shall continue to monitor and report on the constituents for a period of at least two

consecutive groundwater samples in the well(s) where detected and confirmed, and

4) Any additional hazardous constituent(s) confirmed to be present in the groundwater shall be subject to Termination Criteria established pursuant to Module condition E.7.d.(ii), and may be subject to routine monitoring pursuant to Module Condition E.7.c.(ii).

d. *Evaluation of The Corrective Measures Program*

The Corrective Measures Program has been implemented in order to reduce the concentrations of hazardous constituents to their respective Termination Criteria as stipulated in Module Condition E.7.d.(ii). The Permittee shall report to the Commissioner on the effectiveness of the Corrective Measures Program annually. Groundwater monitoring results, piezometric levels, plume limit plots, pumping rates and volumes, contaminant recovery levels and treatment efficiency data shall be provided in reports pursuant to Module Condition E.7.e. Monitoring data will be evaluated annually to determine whether the monitoring parameters continue to exceed the Termination Criteria. The hydraulic effectiveness monitoring will be submitted annually. An evaluation and interpretation will be provided in the annual report. The following programs and procedures will be used to assess the data:

i) Effectiveness Monitoring

Effectiveness Monitoring is designed to determine the rate at which groundwater cleanup is occurring and to verify that all contaminated groundwater is controlled and contained on site. This monitoring will continue as described in Module Condition E.7.c. et. seq. until Termination Monitoring begins. The Commissioner may require additional monitoring, well installations and corrective measures to be implemented as necessary to protect human health and the environment.

1) Monitoring Contaminant Reduction Effectiveness

The Permittee shall assess the effectiveness of the Corrective Measures Program to achieve Termination Criteria. The data from CRM wells shall be compiled, reported, analyzed and interpreted on an annual basis.

2) Monitoring Hydraulic Effectiveness

The present corrective measures are designed to create a cone of depression capable of controlling and thereby capturing all contaminated groundwater associated with IBM East Fishkill. The first step of a wellfield rebalancing plan was implemented in October 2007. After completion of the wellfield rebalancing, this control will incorporate the pumping of on-site production wells PW-1, PW-2, PW-23 and PW-25

continuously and the remaining on-site production wells (PW-4, PW-5/5A, PW-6, PW-7 and PW-9) as needed.

Hydraulic effectiveness monitoring shall involve measuring water levels in monitoring wells stipulated in Module Condition E.7.c.(i)(6) to evaluate the containment of contaminated groundwater to the IBM East Fishkill site. If the water level data (i.e., potentiometric maps) indicates that the cone of depression is insufficient to meet the remedial objectives of this Permit, the Commissioner may require the Permittee to adjust the Corrective Measures Program.

ii) Termination Criteria

Termination Criteria shall be defined in terms of the concentration limits that are provided as Groundwater Cleanup Standards in Module Condition E.7.d.(ii)(1) or background concentrations established pursuant to Module Condition E.7.d.(ii)(3).

1) Groundwater Cleanup Standards for Corrective Measures

The 373 Module II E.7.c.(ii) Table II-3 contains those hazardous constituents that have been identified and confirmed (median values) in the Permittee's groundwater at or above the 6 NYCRR Part 703 Groundwater Quality Standard (Groundwater Cleanup Standard). In addition to the constituents are the corresponding concentrations which have been established as Groundwater Cleanup Standards to serve as Termination Criteria.

2) Annual Review

The Commissioner shall review the Groundwater Cleanup Standards established in Module Condition E.7.d.(ii)(1) annually to determine if there is a need to revise, add, or delete a constituent and its associated protection concentration.

3) Background Concentrations

Background concentrations will be used in the Termination Criteria where natural, non-anthropogenic concentrations of hazardous constituents (i.e., trace metals such as iron) naturally exceed the Groundwater Cleanup Standard.

However, if pursuant to Module Condition E.7.d.(ii), background concentrations or any additional hazardous constituent concentration(s) are to be used as Groundwater Cleanup Standards in the Termination Criteria, the following methods for determination shall be used:

a) If analytical data exists for the constituent(s) of concern from at least two (2) previous semi-annual sampling events at the upgradient well(s) in Module Condition E.7.c.(i)(3), then this data shall be used as initial background; or

b) When data as described in Module Condition E.7.c(i)(3) does not already exist, the Permittee shall sample the upgradient well(s) in Module Condition E.7.c.(i)(3) for at least two (2) consecutive semi-annual sampling rounds. Monitoring the upgradient well(s) shall occur at the same point-in-time as the sampling for the Corrective Action Monitoring Wells in Module Condition E.7.c.(i)(1).

4) Comparison To Background Concentrations

Background concentration(s) determined pursuant to Module Condition E.7.d.(ii)(3) and compared to concentrations of hazardous constituents determined in Module Conditions E.7.c.(i)(1 – 5, 7) will comply with one of the following statistical methods which will be protective of human health and the environment and will comply with performance standards set forth in Module Condition E.7.d.(ii)(5):

a) A parametric analysis of variance followed by multiple comparisons procedures to identify statistically significant evidence of contamination;

b) An analysis of variance based on ranks followed by multiple comparisons procedures to identify statistically significant evidence of contamination;

c) A tolerance of prediction interval procedure in which an interval for each constituent is established from the distribution of the background data, and the level of each constituent in each downgradient contaminant monitoring well is compared to the upper tolerance or prediction interval; or

d) Another statistical method proposed by the Permittee and approved by the Commissioner.

5) Statistical Method Performance Standards

The statistical method selected by the Permittee and approved by the Commissioner shall comply with the following relevant performance standards:

a) Statistical methods shall be appropriate for the distribution of hazardous constituents detected in the monitoring wells. If inappropriate for a normal theory test, data should be transformed or a distribution-free theory test should be used;

b) A Type I error of no less than 0.01 for individual well comparison procedures must be maintained when used to compare an individual compliance well constituent concentration with background constituent concentrations or a Groundwater Cleanup Standard. A Type I experiment-wise error rate for each testing period shall be no less than 0.05 if a multiple comparisons procedure shall be used. However, the Type I error of no less than 0.01 for individual well comparisons must be maintained. This performance standard does not apply to tolerance intervals, prediction intervals or control charts;

c) Permittee shall propose for approval by the Commissioner any tolerance interval or prediction interval considered by the Permittee for evaluating groundwater monitoring data. The proposal shall present the levels of confidence and, for tolerance intervals, the percentage of the population that the interval must contain. These parameters shall be determined after considering the number of samples in the background data base, the data distribution, and the range of the concentration values for each hazardous constituent of concern;

d) The statistical method selected by the Permittee shall account for data below the limit of detection; and

e) The statistical method selected by the Permittee shall include procedures to control or correct for seasonal and spatial variability as well as temporal correlation of data.

6) Comparison To Groundwater Cleanup Standards

Comparison of groundwater data, collected in accordance with Module Conditions E.7.c.(i)(1 – 5, 7), to Groundwater Cleanup Standards, shall be made in accordance with statistical methods proposed by the Permittee in the Termination Plan submitted pursuant to Module Condition E.7.d.(iii)(1).

iii) Termination Monitoring

Termination Monitoring may be proposed whenever the Permittee determines that the quality of the groundwater being monitored is approaching the Groundwater Cleanup Standards specified in Module Condition E.7.c.(ii) Table II-3.

1) Termination Plan

The Permittee shall submit, to the Commissioner for approval, a Termination Monitoring Plan prior to implementing such a Plan. That Plan shall describe the wells for which Termination Monitoring is proposed, the monitoring program which shall be used to determine whether the Groundwater Cleanup Standards pursuant to this Permit have been achieved for all hazardous constituents throughout the groundwater plume of contamination, and proposed statistical methods to be used for making comparisons between downgradient monitoring data and Groundwater Cleanup Standards.

2) Termination Petition

A petition to terminate operation of the Groundwater Corrective Measures system may be submitted to the Commissioner when the Groundwater Cleanup Standards, established pursuant to Module Condition E.7.d.(ii)(1), are met by the procedures set forth in Module Condition E.7.d.(ii)(6) from 12 consecutive quarterly monitoring results for the wells specified in the Termination Monitoring Plan, submitted pursuant to Module Condition E.7.d.(iii)(1). As part of the Termination Petition the Permittee shall submit a Post-Termination Monitoring Plan which contains details of a Post-Termination Monitoring Program as described under Module Condition E.7.d.(iv). Operation of the Groundwater Corrective Measures Program shall be terminated only after the Commissioner accepts and approves the Termination Petition.

iv) Post-Termination Monitoring

Post-termination monitoring shall demonstrate that groundwater quality continues to meet Groundwater Cleanup Standards. Post-termination monitoring shall begin after the Commissioner's approval of the Termination Petition submitted pursuant to Module Condition E.7.d.(iii)(2). Post-termination monitoring shall follow the program established in the approved Post-Termination Monitoring Plan and that program shall continue for a minimum of three (3) consecutive years following the termination of corrective measures.

e. *Corrective Measures Reporting Requirements*

The Permittee shall report all monitoring results in accordance with the conditions provided in Permit Module IX, General Groundwater Monitoring Conditions.

8. Corrective Measures Program Shut-Down Notification

The Permittee shall provide written notification to the Commissioner whenever the Groundwater Corrective Measures Program is inoperable (i.e., shut-down) for a period of time that exceeds 15 consecutive days when the shutdown jeopardizes the containment of contaminated groundwater to the site. The Permittee shall also provide written notification to the Commissioner whenever the Groundwater Corrective Measures Program is inoperable for more than 15 days in any given 30-day time period. Normal pump cycling between high and low water level triggers will not be included as Program down time for notification purposes. Such cycling shall be considered normal operation for the Program.

Written notifications shall address the reason(s) for the Program shut-down and, if appropriate, shall include planned or implemented remedies for restarting and continuing the Groundwater Corrective Measures Program.

9. Corrective Measures Cost Estimate and Financial Assurance

Article 27, Title 9, 6 NYCRR 373-2.6(1) requires assurance of financial responsibility for completing corrective action. Appendix II-G contains the estimated costs for the Corrective Measures Program and a letter from IBM's chief financial officer on the financial test and corporate guarantee selected as the financial assurance mechanism. This statement will be updated and provided by IBM Corporate Headquarters by April 1st of each year.

10. Corrective Measures Program Operation and Maintenance

The Permittee shall provide the Corrective Measures Program with necessary preventative maintenance and replacement parts that ensures the design effectiveness of the program and that minimizes the program downtime. The Permittee shall minimize program downtime due to equipment failure by providing replacement parts within 15 days after equipment failure occurs. The Permittee may petition the Commissioner for an extension of the time to provide replacement parts within the specified time frame.

373 Appendix II-A

Components Required for RCRA Analytical Data Submitted to New York State Department of Environmental Conservation

IBM Corporation East Fishkill Facility
Hudson Valley Research Park
2070 Route 52
Hopewell Junction, New York 12533
EPA ID# NYD 000 707 901

A data deliverables package is to be supplied with all analytical data, as specified in the approved Quality Assurance Project Plan (QAPP) or work plan. Category B or CLP data deliverables, as specified in the latest version of the NYSDEC Analytical Services Protocol (ASP), are required unless otherwise specified in an approved QAPP or work plan. The category B and CLP data deliverables packages are specified in Exhibit B of the NYSDEC ASP. Copies of the ASP, on CD, are available from the Standards and Analytical Support Section in the Bureau of Water Assessment and Management in the Division of Water. The data package shall be provided to the Department on a CD in ASP format as a PDF or other read only document. In addition, the laboratory must be certified by NYSDOH ELAP for the category and parameters of interest as per 6 NYCRR 370.1(f). A list of commercial laboratories can be found at http://www.wadsworth.org/labcert/elap/comm.html.

Category B or CLP data deliverables are generally expected for corrective action sampling, characterization groundwater monitoring and closures. For long term groundwater monitoring, an abbreviated data package may suffice, with prior Department quality assurance approval, since the variability of the data with time can be used as a quality control check. The required data deliverables will be defined in the current version of the "Groundwater Monitoring Plan." A facility may request a change to the data deliverables package, and may propose modifications to the QAPP accordingly. Modifications to the data deliverables criteria must be approved by the Department prior to implementation.

373 Appendix II-B

Guidance for an RCRA Facility Investigation

IBM Corporation East Fishkill Facility
Hudson Valley Research Park
2070 Route 52
Hopewell Junction, New York 12533
EPA ID# NYD 000 707 901

I. INTRODUCTION

The Permittee shall undertake a RCRA Facility Investigation (RFI) that should include the development of several component plans and supporting reports relevant to the specific investigations to be undertaken pursuant to this Permit. Component plans and reports must be prepared and submitted in accordance with the Compliance Schedules in Module Condition II-E and Appendix II-D of this Permit Module.

The purpose of this RFI is to characterize the nature, extent, direction, rate, movement and concentration of releases of hazardous waste and/or constituents from Solid Waste Management Units and Areas of Concern at the facility, including areas off-site impacted by the release(s) from the facility and to gather all necessary data to support the Corrective Measures Study. This Appendix is to serve as guidance for conducting an RFI. Therefore, all of the material addressed in this Appendix may not apply to the units or areas to be investigated by the Permittee. The Permittee should consult with Department representatives before beginning the RFI process regarding which Appendix items need to be addressed during the investigations. The Permittee shall furnish all personnel, materials, and services necessary for, or incidental to, performing the RCRA Facility Investigation.

The RFI Scope of Work includes several tasks:

Task I: A report on the Description of Current Conditions.

Task II: A report on the Pre-Investigation Evaluation of Corrective Measures.

Task III: RFI Management Plans, including:

A. The Project Management Plan,
B. The Data Management Plan,
C. The Quality Assurance Project Plan,
D. The Health and Safety Plan, and
E. The Community Relations Plan.

Task IV: The Facility Investigation.

Task V: Investigative Analysis.

Task VI: Laboratory and Bench Scale Studies.

Task VII: Reports.

The report on Description of Current Conditions should comprise all available and relevant information and data on the facility's background, SWMUs and AOCs characterization, nature and extent of contamination, potential receptors, and prevailing corrective action implementation. Data and information gathered during any previous investigations, remediations, or inspections and other relevant data should be included in the submittal. That information and data may then be used to focus subsequent field investigations and development of the respective work plans for the SWMUs and AOCs to be investigated as part of this Permit. If the Permittee maintains that relevant information and data has been submitted, the Permittee should cite such submittal(s). The Permittee shall refer to Module Condition II.B.5 on addressing prior submittals.

The report on Pre-Investigation Evaluation of Corrective Measures will identify potential technologies that may be considered by the Permittee for subsequent implementation. These alternative technologies will focus the RFI to collect the necessary data for their proper evaluation.

The RFI Management Plans shall provide the necessary information that will assure that the following objectives are met:

- Proper management of all aspects of the RFI project, including tracking of project milestones. Schedules and tracking methods shall be established for RFI tasks and report submittals (Project Management Plan);

- Satisfactory presentation of data and results developed by the RFI. Data management procedures shall be established to effectively process data such that relevant data descriptions are readily accessible and accurately maintained (Data Management Plan);

- Generation of valid data during the RFI investigation. QA/QC procedures shall be established to describe and document data quality (Quality Assurance Project Plan);

- Implementation of appropriate health and safety measures during the RFI. Health and safety procedures shall be established to ensure the health and safety of the investigative team(s) and the general public during the RFI (Health and Safety Plan); and

- Provision for informing the community of the results of the RFI (Community Relations Plan).

The Facility Investigation shall focus on procedures and techniques that will be utilized during field investigations to characterize the environmental setting and the contaminant release(s) from the SWMUs and AOCs. Characterization of the environmental setting will be necessary to determine monitoring locations and to aid in defining the boundaries of the contaminated unit(s) and area(s). The Permittee shall characterize each environmental media, as deemed necessary by the Department, to provide information that can be used to determine the rate and extent of the contaminant release(s). Characterization of the contaminant release(s) from the SWMUs and AOCs will be necessary to determine the nature, extent, direction, rate, movement and concentration of the contaminant plume(s).

Since a potentially broad spectrum of situations involving information on a specific release(s) may exist at the beginning of the RFI, a flexible, phased approach for the release investigation may be necessary. The Permittee may begin with an evaluation of existing data and propose the collection of additional data as necessary to characterize the release. The Permittee may consider incorporating appropriate screening techniques, i.e., soil gas, geophysical methods, as the initial phase of field investigation for the RFI.

Based on existing data and/or data collected by appropriate screening techniques, the Permittee may develop a conceptual model of the release. This model may then be used to plan and develop subsequent investigations. The Permittee shall then develop work plans for the subsequent investigative program(s), as deemed necessary by the Department, utilizing conventional monitoring techniques capable of release(s) verification and/or characterization.

An Investigative Analysis shall be carried-out on the data generated by the Facility Investigation. The analysis shall focus on the quality of data generated and on establishing the nature, extent, direction, rate, movement and concentration of contamination.

Laboratory and/or Bench Scale Studies shall be performed to assess corrective measure technologies that may be applicable for remediating the SWMUs, the AOCs, and the environmental contamination investigated by the Permittee. The information gathered from such studies will assist the Permittee in selecting the alternative technologies for evaluation during the Corrective Measures Study.

Progress reports on the Facility Investigation and Laboratory Bench Scale Studies shall be submitted quarterly in addition to a final RFI Report and Summary Report.

II. TASK I: DESCRIPTION OF CURRENT CONDITIONS

The Permittee shall submit a report for Task I containing available and relevant information and data on the facility's background, SWMUs, AOCs, contamination, receptors, and remediation undertaken pertinent to the specific SWMUs and AOCs to be investigated as part of this Permit.

A. Facility Background

The Permittee shall summarize the regional location, pertinent boundary features, general facility physiography, geology, hydrogeology, and historical use of the facility for the treatment, storage or disposal of solid and hazardous waste. The information shall include:

1. Map(s) depicting the following:

   a. General geographic location;

   b. Property lines, with the owners of all adjacent property clearly indicated;

   c. Topography and surface drainage depicting all waterways, wetlands, floodplains, water features, drainage patterns, and surface-water containment areas;

   d. All above and underground tanks, buildings, utilities, paved areas, easements, rights-of-way, and other features;

   e. All known past and present solid or hazardous waste treatment, storage or disposal areas;

   f. All process sewers;

   g. Surrounding land uses (residential, commercial, agricultural, recreational); and

   h. The locations of all production, withdrawal, and groundwater monitoring wells at the facility and within the vicinity of the facility. These wells shall be clearly labeled and ground and top of casing elevations and construction details included (these elevations and details may be included as an attachment).

   All maps shall be consistent with the requirements set forth in 6 NYCRR Subpart 373-1.5(a)(2)(xix) and be of sufficient detail and accuracy to locate and report all current and future work performed at the site.

2. A history and description of ownership and operation, solid and hazardous waste generation, treatment, storage and disposal activities at the facility.

3. Approximate dates or periods and description of past product, raw material, and waste spills; identification of the materials spilled; the amount spilled; the location where spilled; and a description of the response actions conducted (local, state, or federal response units or private parties), including any inspection reports or technical reports generated as a result of the response.

B. SWMU and AOC Characterization

The Permittee shall submit available and relevant information that will characterize the wastes, the SWMUs and the AOCs where wastes have been placed, collected or removed including: type; quantity; physical state; disposition (containment or nature of deposits); and facility characteristics affecting the release(s) (e.g., facility security, and engineered barriers). The information should include:

1. SWMU and AOC Characteristics:

   a. Location of unit/area (located on facility map);
   b. Type of unit/area;
   c. Design features;
   d. Operating practices (past and present);
   e. Period of operation;
   f. Age of unit/area; and
   g. General physical conditions.

2. Waste Characteristics:

   a. Type of waste placed in the unit/area:

      i) Hazardous classification (e.g., flammable, reactive, corrosive, oxidizing or reducing agent);

      ii) Quantity; and

      iii) Chemical composition (e.g., Appendix 23 hazardous constituents).

   b. Physical and chemical characteristics of waste and its constituents:

      i) Physical state (solid, liquid, gas);
      ii) Physical description (e.g., powder, oily sludge);
      iii) Temperature;
      iv) pH;
      v) General chemical class (e.g., acid, base, solvent);
      vi) Molecular weight;
      vii) Density;
      viii) Boiling point;

ix) Viscosity;

x) Solubility in water;

xi) Cohesiveness of the waste;

xii) Vapor pressure;

xiii) Flash point; and

xiv) Other relevant properties.

c. Migration and dispersal characteristics of the waste constituents and procedures used in making the determination:

i) Sorption;

ii) Biodegradability, bioconcentration, biotransformation;

iii) Photodegradation rates;

iv) Hydrolysis rates;

v) Chemical transformations; and

vi) Volatilization rates.

C. Nature, Extent, Direction, Rate, Movement and Concentration of Contamination

The Permittee shall submit available and relevant information on the nature, extent, direction, rate, movement and concentration of the release(s) from the SWMUs and the AOCs. This information and data should include:

1. Summary of available monitoring data and qualitative information on locations and levels of contamination at the facility and within the vicinity of the facility if contamination has migrated off-site.

2. Summary of all potential contaminant migration pathways including available information on geology, hydrogeology, physiography, hydrology, water quality, meteorology, and air quality.

D. Potential Receptors

The Permittee shall submit available and relevant information describing the human populations and environmental systems that are susceptible to exposure by the contaminant release(s) from the SWMUs and the AOCs. Data on observable effects or bioassays for ecosystems should accompany this submittal if available. The information shall include:

1. Local uses and possible future uses of groundwater:

    a. Type of use (e.g., drinking water source: municipal or residential, agricultural, domestic/non-potable, and industrial);

    b. Location of groundwater users including wells and discharge areas (identify on a map); and

    c. The well(s) pump rate(s) and the well(s) depth(s).

2. Local uses and possible future uses of surface waters draining from the facility:

    a. Domestic and municipal (e.g., potable and lawn/gardening watering);

    b. Recreational (e.g., swimming, fishing);

    c. Agricultural;

    d. Industrial; and

    e. Environmental (e.g., fish and wildlife propagation).

3. Human use of or access to the facility and adjacent lands, including, but not limited to:

    a. Recreation;

    b. Hunting;

    c. Residential;

    d. Commercial;

    e. Zoning; and

    f. Relationship between population locations and prevailing wind direction.

4. A description of the biota in surface water bodies on, adjacent to, or affected by the facility.

5. A description of the ecology overlying and adjacent to the facility.

6. A demographic profile of the people who use or have access to the facility and adjacent land, including, but not limited to: age; sex; and sensitive subgroups.

7. A description of any endangered or threatened species near the facility.

E. Corrective Action Implementation

The Permittee shall submit documentation on corrective measures (remedial measures) undertaken on-site or off-site at the facility. Remedial actions should include any interim corrective measures, RCRA closures, State or Federal Superfund activities. This documentation shall include:

1. Objectives of the remediation and how it is mitigating a potential threat to human health and the environment and/or is consistent with and integrated into any long-term solution at the facility;

2. Design, construction, operation, and maintenance requirements;

3. Schedules for design, construction and monitoring; and

4. Schedule for progress reports.

III. TASK II: PRE-INVESTIGATION EVALUATION OF CORRECTIVE MEASURES

The Permittee shall submit a report for Task II that identifies the potential corrective measure technologies that may be used on-site or off-site for the containment, treatment, remediation, and/or disposal of contamination. This report shall also identify any field data that needs to be collected in the facility investigation to facilitate the evaluation and selection of the final corrective measure or measures (e.g., compatibility of waste and construction materials, information to evaluate effectiveness, treatability of wastes, etc.).

IV. TASK III: RFI MANAGEMENT PLANS

The Permittee shall submit RFI Management Plans as part of the RFI Work Plan. The Plans shall address the methods and procedures necessary to manage the RFI, to describe data developed by the RFI, to gather and ensure valid RFI data, to protect the health and safety of investigators and the general public, and to keep the community informed about the RFI.

A. Project Management Plan

The Permittee shall prepare a Project Management Plan that shall include a discussion of the management approach, schedules, and personnel utilized during the RFI. That Plan shall include a description of qualifications of personnel performing or directing the RFI, including contractor personnel. This Plan shall also document the overall management approach to the RCRA Facility Investigation that will assure adherence to tasks and reporting schedules. The schedule for completing the RFI should reflect the schedules set forth in Module Condition II-E and Appendix II-D. The schedule shall reflect dates for submittal of various RFI Work Plan components, dates for

starting and accomplishing specific tasks associated with the RFI, and dates for reporting information from specific tasks to the Department.

B. Data Management Plan

The Permittee shall prepare a Data Management Plan to document and track investigation data and results. This Plan shall identify and set up data documentation materials and procedures, project file requirements, and project-related progress reporting procedures and documents. The Plan shall also provide the format to be used to present the raw data and conclusions of the investigation.

1. Data Record

The data record shall include, but not be limited to, the following:

a. Unique sample or field measurement code;

b. Sampling or field measurement location and sample or measurement type;

c. Sampling or field measurement raw data;

d. Laboratory analysis ID number;

e. Property or component measured; and

f. Result of analysis (e.g., concentration).

2. Tabular Displays

The following data shall be presented in tabular displays:

a. Unsorted (raw) data;

b. Results for each medium, or for each constituent monitored;

c. Data reduction for statistical analysis;

d. Sorting of data by potential stratification factors (e.g., location, soil layer, topography); and

e. Summary data.

3. Graphical Displays

The following data shall be presented in graphical formats (e.g., bar graphs, line graphs, area or plan maps, isopleth plots, cross-sectional plots or transects, three dimensional graphs, etc.):

a. Display sampling location and sampling grid;

b. Indicated boundaries of sampling area, and areas where more data are required;

c. Display levels of contamination at each sampling location;

d. Display geographical extent of contamination;

e. Display contamination levels, averages, and maxima;

f. Illustrate changes in concentration in relation to distance from the source, time, depth or other parameters; and

g. Indicate features affecting intramedia transport and show potential receptors.

C. Quality Assurance Project Plan (QAPP)

The Permittee shall prepare a QAPP to document each phase of investigative work and all sampling and monitoring procedures to be implemented during the RFI. The following activities shall be covered in the QAPP: sampling, field measurements and sample analysis performed during the investigations. This Plan shall ensure that all information, data, and resulting decisions are technically sound, statistically valid, and properly documented. The QAPPs shall be developed in accordance with the following guidance documents, "RCRA Quality Assurance Project Plan Guidance," "SW-846," and "Technical Enforcement Guidance Document." The Plan shall address all of the 16 essential QA/QC elements stipulated in the "RCRA Quality Assurance Project Plan Guidance." A summary of the QA/QC elements that shall be in the Plan is found in the subsequent paragraphs.

1. Data Quality Objectives

The QAPP shall include, but not be limited to, the following:

a. Description of the intended uses for the data, and the necessary level of precision and accuracy for these intended uses;

b. Description of methods and procedures to be used to assess the precision, accuracy and completeness of the measurement data;

c. Description of the rational used to assure that the data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition or an environmental condition; and

d. Description of the measures to be taken to assure that data sets can be compared to each other.

2. Sampling and Field Measurements

The QAPP shall include, but not be limited to, the following:

a. Sampling and field measurement locations, depths, etc.;

b. Collecting all necessary ancillary data;

c. Conditions under which sampling and field measurements should be conducted;

d. Media to be sampled and addressed by field measurements (e.g., groundwater, air, soil, sediment, etc.);

e. Parameters to be measured and where;

f. The frequency of sampling and field measurements and length of sampling period;

g. The types of sample (e.g., composites vs. grabs) and number of samples to be collected;

h. Measures to be taken to prevent contamination of the sampling equipment and cross contamination between sampling points;

i. Documenting field sampling and measurement operations and procedures, including;

i) Documentation of procedures for preparation of reagents or supplies which become an integral part of the sample (e.g., filters, and adsorbing reagents);

ii) Procedures and forms for recording raw data and the exact location, time, and specific considerations associated with sample and data acquisition;

iii) Documentation of specific sample preservation method;

iv) Calibration of field devices;

v) Collection of replicate samples and measurements;

vi) Submission of field-biased blanks, where appropriate;

vii) Potential interferences present at the facility;

viii) Construction materials and techniques, associated with monitoring wells and piezometers;

ix) Field equipment listing and sample containers;

x) Sampling and field measurement order; and

xi) Decontamination procedures.

j. Selecting appropriate sample containers;

k. Sample preservation; and

l. Chain-of-Custody, including:

i) Standardized field tracking reporting forms to establish sample custody in the field prior to and during shipment; and

ii) Pre-prepared sample labels containing all information necessary for effective sample tracking.

3. Sample Analysis

The QAPP shall include, but not be limited to, the following:

a. Chain-of-custody procedures, including:

i) Identification of a responsible party to act as sample custodian at the laboratory facility authorized to sign for incoming field samples, obtain documents of shipment, and verify the data entered onto the sample custody records;

ii) Provision for a laboratory sample custody log consisting of serially numbered standard lab-tracking report sheets; and

iii) Specification of laboratory sample custody procedures for sample handling, storage, and disbursement for analysis.

b. Sample storage procedures and storage times;

c. Sample preparation methods;

d. Analytical procedures, including:

   i) Scope and application of the procedure;

   ii) Sample matrix,

   iii) Potential interferences,

   iv) Precision and accuracy of the methodology, and

   v) Method detection limits.

e. Calibration procedures and frequency;

f. Data reduction, validation and reporting;

g. Internal quality control checks, laboratory performance and systems audits and frequency, including:

   i) Method blank(s),

   ii) Laboratory control sample(s),

   iii) Calibration check sample(s),

   iv) Replicate sample(s),

   v) Matrix-spikes sample(s),

   vi) “Blind” quality control sample(s),

   vii) Control charts,

   viii) Surrogate samples,

   ix) Zero and span gases, and

   x) Reagent quality control checks.

h. Preventive maintenance procedures and schedules;

i. Corrective action (for laboratory problems); and

j. Turnaround time.

D. Health and Safety Plan

The Permittee shall prepare a Health and Safety Plan for the protection of the investigative team(s), workers, and general public which may be exposed to hazards.

1. The Health and Safety Plan shall include, but not be limited to, the following:

    a. Facility description including availability of resources such as roads, water supply, electricity and telephone service;

    b. Describe the known hazards and evaluate the risks associated with the incident and with each activity conducted;

    c. List key personnel and alternates responsible for site safety, response operations, and for protection of public health;

    d. Delineate work areas;

    e. Describe levels of protection to be worn by personnel in work areas;

    f. Establish procedures to control site access;

    g. Describe decontamination procedures for personnel and equipment;

    h. Establish site emergency procedures;

    i. Address emergency medical care for injuries and toxicological problems;

    j. Describe requirements for an environmental surveillance program;

    k. Specify any routine and special training required for responders; and

    l. Establish procedures for protecting workers from weather-related problems.

2. The Facility Health and Safety Plan shall be consistent with:

    a. NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);

    b. EPA Order 1440.1 - Respiratory Protection;

    c. EPA Order 1440.3 - Health and Safety Requirements for Employees engaged in Field Activities;

    d. Facility Contingency Plan;

e. EPA Standard Operating Safety Guide (1984);

f. OSHA regulations particularly in 29 CFR 1910 and 1926;

g. State, local, and other federal agency (e.g., DOD, DOE) regulations; and

h. Other EPA guidance as provided.

E. Community Relations Plan

The Permittee shall prepare a plan on disseminating information to the public regarding investigation activities and results. The plan should identify who will be notified and will receive summary RFI reports.

V. TASK IV: THE FACILITY INVESTIGATION

The Permittee shall submit a work plan that shall address the techniques and procedures necessary to characterize the environmental setting at and within the vicinity of the facility and the media-specific contamination resulting from the release(s) by the SWMUs and the AOCs. The part of the work plan that addresses field sampling and measurement activities shall meet the sampling plan requirements stipulated in the "RCRA Quality Assurance Project Plan Guidance."

A. Environmental Setting

The Permittee shall submit an appropriate plan on collecting information to supplement existing information on the environmental setting at the facility and in the vicinity of the facility. Sufficient information shall be collected by the Permittee to characterize only those environmental media impacted by the release(s) from the SWMUs and the AOCs:

1. Hydrogeology

The Permittee shall conduct a program to characterize the hydrogeologic conditions at the facility and the off-site areas where contamination has migrated. The program shall provide relevant information on geology and hydrogeology that should include, but not be limited to, the following facts:

a. A description of the regional and facility specific geologic and hydrogeologic characteristics which affect groundwater flow both beneath and within the vicinity of the facility, including:

i) Regional and facility specific geomorphology and stratigraphy: description of strata, including strike and dip, identification of stratigraphic contacts;

ii) Structural geology: description of local and regional structural features (e.g., folds, faults, joints, and fractures);

iii) Identification and characterization of areas and amounts of recharge and discharge;

iv) Regional and facility specific groundwater flow patterns; and

v) Characterize seasonal variations in the groundwater flow regime.

b. An analysis of any topographic features that might influence the groundwater flow system.

c. Based on field data, tests, and cores, a representative and accurate classification and description of the hydrogeologic units which may be part of the migration pathways (i.e., the aquifers and any intervening saturated and unsaturated units), including:

i) Hydraulic conductivity and porosity (total and effective);

ii) Lithology, grain size, sorting, degree of cementation;

iii) An interpretation of hydraulic interconnections between saturated zones; and

iv) The attenuation capacity and mechanisms of the natural earth materials (e.g., ion exchange capacity, organic carbon content, mineral content etc.).

d. Based on field studies and cores, structural geology and hydrogeologic cross sections, a description of the extent (depth, thickness, lateral extent) of hydrogeologic units which may be part of the migration pathways, including:

i) Sand and gravel deposits in unconsolidated deposits;

ii) Zones of fracturing or channeling in consolidated or unconsolidated deposits;

iii) Zones of higher permeability or low permeability that might direct and restrict the flow of contaminants;

iv) The uppermost aquifer: geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs; and

v) Water-bearing zones above the first confining layer that may serve as a pathway for contaminant migration including perched zones of saturation.

e. Based on data obtained from groundwater monitoring wells and piezometers installed upgradient and downgradient of the potential contaminant source, a representative description of water level or fluid pressure monitoring including:

i) Water-level contour and/or potentiometric maps;

ii) Hydrologic cross sections showing vertical gradients;

iii) The flow system, including the vertical and horizontal components of flow; and

iv) Any temporal changes in hydraulic gradients, for example, due to tidal or seasonal influences.

f. A description of man-made influences that may affect the hydrogeology, identifying:

i) Active and inactive local water-supply and production wells with an approximate schedule of pumping; and

ii) Man-made hydraulic structures (sewers, pipelines, French drains, ditches, unlined ponds, septic tanks, outfalls, retention areas, etc.).

2. Soils

The Permittee shall conduct a program to characterize the soil and rock units above the water table in the vicinity of the contaminant release(s). The program shall provide relevant information on soil characterization that should include, but not be limited to, the following facts:

a. SCS soil classification;

b. Surface soil distribution;

c. Soil profile, including ASTM classification of soils;

d. Transects of soil stratigraphy;

e. Hydraulic conductivity (saturated and unsaturated);

f. Relative permeability;

g. Bulk density;

h. Porosity;

i. Soil sorptive capacity;

j. Cation exchange capacity (CEC);

k. Soil organic content;

l. Soil pH;

m. Particle size distribution;

n. Depth of water table;

o. Moisture content;

p. Effect of stratification on unsaturated flow;

q. Infiltration;

r. Evapotranspiration;

s. Storage capacity; and

t. Mineral content.

3. Surface Water and Sediment

The Permittee shall conduct a program to characterize the surface-water bodies in the vicinity of the contaminant release(s). The program shall provide relevant information on surface water and sediment characterization that should include, but not be limited to, the following facts:

a. Description of the temporal and permanent surface-water bodies including:

i) For lakes and estuaries: location, elevation, surface area, inflow-outflow characteristics, depth, temperature stratification, and volume;

ii) For impoundments: location, elevation, surface area, depth, volume, inflow-outflow characteristics, freeboard, and purpose of impoundment;

iii) For rivers, streams, ditches, drains, swamps and channels: location, elevation, flow, velocity, depth, width, inflow-outflow characteristics, seasonal fluctuations, and flooding tendencies (i.e., 100-year event);

iv) Drainage patterns; and

v) Evapotranspiration.

b. Description of the chemistry of the surface water. This includes determining the pH, total dissolved solids, total suspended solids, biological oxygen demand, alkalinity, conductivity, dissolved oxygen profiles, nutrients (NH_3, NO_3^-/NO_2, PO_4^{-3}), chemical oxygen demand, total organic carbon, and specific contaminant concentrations.

c. Description of sediment characteristics, including:

i) Deposition area;

ii) Thickness profile; and

iii) Physical and chemical parameters (e.g., grain size, density, organic carbon content, ion exchange capacity, and pH).

4. Air

The Permittee shall conduct a program to characterize the climate at the facility and in the vicinity of the facility when contamination migrates off-site. The program shall provide relevant information on climatic conditions that should include, but not be limited to, the following facts:

a. A description of the following parameters:

i) Annual and monthly rainfall averages;

ii) Monthly temperature averages and extremes;

iii) Wind speed and direction;

iv) Relative humidity/dew point;

v) Atmospheric pressure;

vi) Evaporation data;

vii) Development of inversions; and

viii) Climate extremes that have been known to occur in the vicinity of the facility, including frequency of occurrence.

b. A description of topographic and man-made features which affect air flow and emission patterns, including:

i) Ridges, hills or mountain areas;

ii) Canyons or valleys;

iii) Surface-water bodies (e.g., rivers, lakes, bays, etc.);

iv) Wind breaks and forests;

v) Buildings; and

vi) Existing man-made air emission sources (e.g., industrial processes, residences, etc.).

B. Contamination Characterization Plan

The Permittee shall submit a work plan on collecting analytical data to supplement existing data on groundwater, soils, surface water, sediment, air and subsurface gas contamination. This data shall be sufficient to define the nature, extent, origin, direction, and rate of movement of contaminant plume(s) in the environmental medium impacted by the release(s) from the SWMUs and AOCs.

1. Groundwater Contamination

The Permittee shall conduct a program to characterize any plume(s) of contamination at the facility and any plume(s) that have migrated off-site. The program shall provide relevant information on groundwater contamination that should include, but not be limited to, the following facts:

a. A description of the horizontal and vertical extent of any immiscible or dissolved plume(s);

b. The horizontal and vertical direction of contamination movement;

c. The velocity of contaminant movement;

d. The horizontal and vertical concentration profiles of contaminant constituents in the plume(s);

e. An evaluation of factors influencing the plume movement, specific contaminant movement, and specific contaminant transformation (e.g., physical, chemical, biological, etc.); and

f. An extrapolation of future contaminant movement.

2. Soil Contamination

The Permittee shall conduct a program to characterize the contamination of the soil and rock units above the water table in the vicinity of the contaminant release(s). The program shall provide relevant information on soil contamination that should include, but not be limited to, the following facts:

a. A description of the vertical and horizontal extent of contamination.

b. A description of relevant contaminant chemical properties within the contaminant source area and plume. This includes contaminant solubility, speciation, adsorption, leachability, exchange capacity, biodegradability, hydrolysis, photolysis, oxidation and other factors that might affect contaminant migration and transformation.

c. Specific contaminant concentrations.

d. The velocity and direction of contaminant movement.

e. An extrapolation of future contaminant movement.

3. Surface-Water and Sediment Contamination

The Permittee shall conduct a program to characterize the contamination in surface-water bodies resulting from the contaminant release(s) at the facility. The program shall provide relevant information on surface water and sediment contamination that shall include, but not be limited to, the following facts:

a. A description of the horizontal and vertical extent of any immiscible or dissolved plume(s) originating from the facility, and the extent of contamination in underlying sediments;

b. The horizontal and vertical direction of contaminant movement;

c. The contaminant velocity;

d. An evaluation of the physical, biological and chemical factors influencing contaminant movement;

e. An extrapolation of future contaminant movement; and

f. The toxicity of the sediment and adjacent water column to aquatic life.

4. Air Contamination

The Permittee shall conduct a program to characterize the particulate and gaseous contaminants released into the atmosphere. The program shall provide relevant information on air emissions that should include, but not be limited to, the following facts:

a. A description of the horizontal and vertical direction and velocity of contaminant movement;

b. The rate and amount of the release; and

c. The chemical and physical composition of the contaminant(s) released, including horizontal and vertical concentration profiles.

5. Subsurface Gas Contamination

The Permittee shall conduct a program to characterize subsurface gas contamination in the soil. The program shall provide relevant information on subsurface gas contamination that should include, but not be limited to, the following facts:

a. A description of the horizontal and vertical extent of subsurface gas migration;

b. The chemical composition of the gases being emitted;

c. The rate, amount, and density of the gases being emitted; and

d. Horizontal and vertical concentration profiles of the subsurface gases emitted.

VI. TASK V: INVESTIGATIVE ANALYSIS

The Permittee shall prepare an analysis and summary of all facility investigations and their results. The objective of this task shall be to ensure that the investigation data are sufficient in quality (e.g., quality assurance procedures have been followed) and quantity to describe the nature, rate, and extent of contamination, potential threat to human health and/or the environment, and to support the Corrective Measures Study.

A. Data Analysis

The Permittee shall analyze all facility investigation data outlined in Task IV and prepare a report on the nature, rate, and extent of contamination at the facility including sources and migration pathways. The report shall describe the nature and extent of contamination (qualitative/ quantitative) in relation to background levels indicative for the area.

B. Protection Standards

The Permittee shall identify all relevant and applicable standards and action levels (e.g., health based guidance values) for the protection of human health and the environment.

VII. TASK VI: LABORATORY AND BENCH SCALE STUDIES

The Permittee shall conduct laboratory and/or bench scale studies to determine the applicability of a corrective measure technology or technologies to facility conditions.

The Permittee shall analyze the technologies, based on literature review, vendor contracts, and past experience to determine the testing requirements.

The Permittee shall develop a testing plan identifying the type(s) and goal(s) of the study(s), the level of effort needed, and the procedures to be used for data management and interpretation.

Upon completion of the testing, the Permittee shall evaluate the testing results to assess the technology or technologies with respect to the site-specific questions identified in the test plan.

The Permittee shall prepare a report summarizing the testing program and its results, both positive and negative.

VIII. TASK VII: REPORTS

A. Progress Reports

The Permittee shall provide signed progress reports as required by Condition B.8.a. of Module II of this Permit.

B. Draft and Final Reports

The Permittee shall prepare a RCRA Facility Investigation (RFI) Report as required by Condition E.2 of Module II of this Permit. The RFI Report shall present all information gathered under the approved RFI Work Plan.

373 Appendix II-C

Guidance for a Corrective Measure Study

IBM Corporation East Fishkill Facility
Hudson Valley Research Park
2070 Route 52
Hopewell Junction, New York 12533
EPA ID# NYD 000 707 901

I. PURPOSE

The purpose of this Corrective Measure Study (CMS) is to develop and evaluate the corrective action alternative or alternatives and to recommend the corrective measure or measures to be taken. This Appendix serves as guidance for developing a CMS and much of its content may not be applicable, especially when developing a focused CMS addressing a presumptive remedy. Permittee should consult with Department representatives before beginning the CMS process regarding which items need to be addressed during the study. The Permittee will furnish the personnel, materials, and services necessary to prepare the corrective measure study, except as otherwise specified.

II. SCOPE

The Corrective Measure Study consists of four tasks:

Task I: Identification and Development of the Corrective Measure Alternative or Alternatives

A. Description of Current Situation
B. Establishment of Corrective Action Objectives
C. Screening of Corrective Measures Technologies
D. Identification of the Corrective Measure Alternative or Alternatives

Task II: Evaluation of the Corrective Measure Alternative or Alternatives

A. Technical/Environmental/Human Health/Institutional
B. Cost Estimate

Task III: Justification and Recommendation of the Corrective Measure or Measures

A. Technical
B. Human Health
C. Environmental

Task IV: Reports

A. Progress
B. Final

III. TASK I: IDENTIFICATION AND DEVELOPMENT OF THE CORRECTIVE ACTION ALTERNATIVE OR ALTERNATIVES

Based on the results of the RCRA Facility Investigation and consideration of the identified Preliminary Corrective Measure Technologies (Task II of Appendix II-B), the Permittee shall identify, screen, and develop the alternative or alternatives for removal, containment, treatment and/or other remediation of the contamination based on the objectives established for the corrective action.

A. Description of Current Situation

The Permittee shall submit an update to the information describing the current situation at the facility and the known nature and extent of the contamination as documented by the RCRA Facility Investigation Report. The Permittee shall provide an update to information presented in Task I of the RFI to the Commissioner regarding previous response activities and any interim measures which have or are being implemented at the facility. The Permittee shall also make a facility-specific statement of the purpose for the response, based on the results of the RCRA Facility Investigation (RFI). The statement of purpose should identify the actual or potential exposure pathways that should be addressed by corrective measures.

B. Establishment of Corrective Action Objectives

The Permittee, in conjunction with the Department, shall establish site specific objectives for the corrective action. These objectives shall be based on public health and environmental criteria, information gathered during the RFI, EPA and New York State guidance, and the requirements of any applicable federal and state statutes. At a minimum, all corrective actions concerning groundwater releases from regulated units must be consistent with, and as stringent as, those required under 6 NYCRR 373-2.6.

C. Screening of Corrective Measure Technologies

The Permittee shall review the results of the RFI and reassess the technologies specified in Task II and identify additional technologies which are applicable at the facility. The Permittee shall screen the preliminary corrective measure technologies identified in Task II of the RFI and any supplemental technologies to eliminate those that may prove infeasible to implement, that rely on technologies unlikely to perform satisfactorily or reliably, or that do not achieve the corrective measure objective within a reasonable time period. This screening process focuses on eliminating those technologies which have severe limitations for a given set of waste and site-specific conditions. The screening step may also eliminate technologies based on inherent

technology limitations. Site, waste, and technology characteristics which are used to screen inapplicable technologies are described in more detail below:

1. Site Characteristics

   Site data should be reviewed to identify conditions that may limit or promote the use of certain technologies. Technologies whose use is clearly precluded by site characteristics should be eliminated from further consideration;

2. Waste Characteristics

   Identification of waste characteristics that limit the effectiveness or feasibility of technologies is an important part of the screening process. Technologies clearly limited by these waste characteristics should be eliminated from consideration. Waste characteristics particularly affect the feasibility of in-situ methods, direct treatment methods, and land disposal (on/off-site); and

3. Technology Limitations

   During the screening process, the level of technology development, performance record, and inherent construction, operation, and maintenance problems should be identified for each technology considered. Technologies that are unreliable, perform poorly, or are not fully demonstrated may be eliminated in the screening process. For example, certain treatment methods have been developed to a point where they can be implemented in the field without extensive technology transfer or development.

D. Identification of the Corrective Measure Alternative or Alternatives

The Permittee shall develop the corrective measure alternative or alternatives based on the corrective action objectives and analysis of the Preliminary Corrective Measure Technologies, as presented in Task II of the RFI and as supplemented following the preparation of the RFI Final Report. The Permittee shall rely on engineering practice to determine which of the previously identified technologies appear most suitable. Technologies can be combined to form the overall corrective action alternative or alternatives. The alternative or alternatives developed should represent a workable number of option(s) that each appears to adequately address all problems and corrective action objectives. Each alternative may consist of an individual technology or a combination of technologies. The Permittee shall document the reasons for excluding technologies, identified in Task II, as supplemented in the development of the alternative or alternatives.

IV. TASK II: EVALUATION OF THE CORRECTIVE MEASURE ALTERNATIVE OR ALTERNATIVES

The Permittee shall describe each corrective measure alternative that passes through the Initial Screening in Task I of Appendix II-C and evaluate each corrective measure alternative and its components. The evaluation shall be based on technical, environmental, human health and institutional concerns. The Permittee shall also develop cost estimates of each corrective measure.

A. Technical/Environmental/Human Health/Institutional

The Permittee shall provide a description of each corrective measure alternative which includes, but is not limited to the following: preliminary process flow sheets; preliminary sizing and type of construction for buildings and structures; and rough quantities of utilities required. The Permittee shall evaluate each alternative in the four following areas:

1. Technical

The Permittee shall evaluate each corrective measure alternative based on performance, reliability, implementability and safety.

a. The Permittee shall evaluate performance based on the effectiveness and useful life of the corrective measure:

i) Effectiveness shall be evaluated in terms of the ability to perform intended functions, such as containment, diversion, removal, destruction, or treatment. The effectiveness of each corrective measure shall be determined either through design specifications or by performance evaluation. Any specific waste or site characteristics which could potentially impede effectiveness shall be considered. The evaluation should also consider the effectiveness of combinations of technologies; and

ii) Useful life is defined as the length of time the level of effectiveness can be maintained. Most corrective measure technologies, with the exception of destruction, deteriorate with time. Often, deterioration can be slowed through proper system operation and maintenance, but the technology eventually may require replacement. Each corrective measure shall be evaluated in terms of the projected service lives of its component technologies. Resource availability in the future life of the technology, as well as appropriateness of the technologies, must be considered in estimating the useful life of the project.

b. The Permittee shall provide information on the reliability of each corrective measure, including their operation and maintenance requirements and their demonstrated reliability:

   i) Operation and maintenance requirements include the frequency and complexity of necessary operation and maintenance. Technologies requiring frequent or complex operation and maintenance activities should be regarded as less reliable than technologies requiring little or straight forward operation and maintenance. The availability of labor and materials to meet these requirements shall also be considered; and

   ii) Demonstrated and expected reliability is a way of measuring the risk and effect of failure. The Permittee should evaluate whether the technologies have been used effectively under analogous conditions; whether the combination of technologies have been used together effectively; whether failure of any one technology has an immediate impact on receptors; and whether the corrective measure has the flexibility to deal with uncontrollable changes.

c. The Permittee shall describe the implementability of each corrective measure including the relative ease of installation (constructability) and the time required to achieve a given level of response:

   i) Constructability is determined by conditions both internal and external to the facility conditions and includes such items as location of underground utilities, depth of water table, heterogeneity of subsurface materials, and location of the facility (i.e., remote location vs. a congested urban area). The Permittee shall evaluate what measures can be taken to facilitate construction under these conditions. External factors which affect implementation include the need for special permits or agreements, equipment availability, and the location of suitable off-site treatment or disposal facilities; and

   ii) Time has two components that shall be addressed: (1) the time it takes to implement a corrective measure; and (2) the time it takes to actually see beneficial results. Beneficial results are defined as the reduction of contaminants to some acceptable, pre-established level.

d. The Permittee shall evaluate each corrective measure alternative with regard to safety. This evaluation shall include threats to the safety of nearby communities and environments as well as those to workers during implementation. Among the factors to consider are fire, explosion, and exposure to hazardous substances.

2. Environmental

The Permittee shall perform an Environmental Assessment for each alternative. The Environmental Assessment shall focus on the facility conditions and pathways of contamination actually addressed by each alternative. The Environmental Assessment for each alternative will include, at a minimum, an evaluation of: the short and long term beneficial and adverse effects of the response alternative; any adverse effects on environmentally sensitive areas; and an analysis of measures to mitigate adverse effects.

3. Human Health

The Permittee shall assess each alternative in terms of the extent to which it mitigates short and long term potential exposure to any residual contamination and protects human health both during and after implementation of the corrective measure. The assessment will describe the levels and characterizations of contaminants on-site, potential exposure routes, and potentially affected populations. Each alternative will be evaluated to determine the level of exposure to contaminants and the reduction over time. For management of mitigation measures, the relative reduction of impact will be determined by comparing residual levels of each alternative with existing criteria, standards, or guidelines.

4. Institutional

The Permittee shall assess relevant institutional needs for each alternative. Specifically, the effects of Federal, State, and local environmental and public health standards, regulations, guidance, advisories, ordinances, or community relations on the design, operation, and timing of each alternative.

B. Cost Estimate

The Permittee shall develop an estimate of the cost of each corrective measure alternative (and for each phase or segment of the alternative). The cost estimate shall include capital, operation and maintenance costs.

1. Capital costs consist of direct (construction) and indirect (non-construction and overhead) costs.

   a. Direct capital costs include:

      i) Construction costs: Costs of materials, labor (including fringe benefits and worker's compensation), and equipment required to install the corrective measure;

ii) Equipment costs: Costs of treatment, containment, disposal and/or service equipment necessary to implement the action; these materials remain until the corrective action is complete;

iii) Land and site-development costs: Expenses associated with purchase of land and development of existing property; and

iv) Buildings and services costs: Costs of process and nonprocess buildings, utility connections, purchased services, and disposal costs.

b. Indirect capital costs include:

i) Engineering expenses: Costs of administration, design, construction supervision, drafting, and testing of corrective measure alternatives;

ii) Legal fees and license or permit costs: Administrative and technical costs necessary to obtain licenses and permits for installation and operation;

iii) Startup and shakedown costs: Costs incurred during corrective measure startup; and

iv) Contingency allowances: Funds to cover costs resulting from unforeseen circumstances, such as adverse weather conditions, strikes, and inadequate facility characterization.

2. Operation and maintenance costs are post-construction costs necessary to ensure continued effectiveness of a corrective measure. The Permittee shall consider the following operation and maintenance cost components;

a. Operating labor costs: Wages, salaries, training, overhead, and fringe benefits associated with the labor needed for post-construction operations;

b. Maintenance materials and labor costs: Costs for labor, parts, and other resources required for routine maintenance of facilities and equipment;

c. Auxiliary materials and energy: Costs of such items as chemicals and electricity for treatment plant operations, water and sewer service, and fuel;

d. Purchased services: Sampling costs, laboratory fees, and professional fees for which the need can be predicted;

e. Disposal and treatment costs: Costs of transporting, treating, and disposing of waste materials, such as treatment plant residues generated during operations;

f. Administrative costs: Costs associated with administration of corrective measure operation and maintenance not included under other categories;

g. Insurance, taxes, and licensing costs: Costs of such items as liability and sudden accidental insurance; real estate taxes on purchased land or rights-of-way; licensing fees for certain technologies; and permit renewal and reporting costs;

h. Maintenance reserve and contingency funds: Annual payments into escrow funds to cover (1) costs of anticipated replacement or rebuilding of equipment and (2) any large unanticipated operation and maintenance costs; and

i. Other costs: Items that do not fit any of the above categories.

V. TASK III: JUSTIFICATION AND RECOMMENDATION OF THE CORRECTIVE MEASURE OR MEASURES

The Permittee shall justify and recommend a corrective measure alternative using technical, human health, and environmental criteria. This recommendation shall include summary tables which allow the alternative or alternatives to be understood easily. Tradeoffs among health risks, environmental effects, and other pertinent factors shall be highlighted. The Commissioner will select the corrective measure alternative or alternatives to be implemented based on the results of Tasks II and III of Appendix II-C. At a minimum, the following criteria will be used to justify the final corrective measure or measures.

A. Technical

1. Performance - corrective measure or measures which are most effective at performing their intended functions and maintaining the performance over extended periods of time will be given preference;

2. Reliability - corrective measure or measures which do not require frequent or complex operation and maintenance activities and that have proven effective under waste and facility conditions similar to those anticipated will be given preference;

3. Implementability - corrective measure or measures which can be constructed and operated to reduce levels of contamination to attain or exceed applicable standards in the shortest period of time will be preferred; and

4. Safety - corrective measure or measures which pose the least threat to the safety of nearby residents and environments as well as workers during implementation will be preferred.

B. Human Health

The corrective measure or measures must comply with existing EPA and/or State criteria, standards, or guidelines for the protection of human health. Corrective measures which provide the minimum level of exposure to contaminants and the maximum reduction in exposure with time are preferred.

C. Environmental

The corrective measure or measures posing the least adverse impact (or greatest improvement) over the shortest period of time on the environment will be favored.

VI. TASK IV: REPORTS

A. Progress Reports

The Permittee shall provide the Commissioner with signed progress reports as required by Condition B.8.a. of Module II of this Permit.

B. Corrective Measures Study (CMS) Final Report

The Permittee shall prepare a CMS Final Report as required by Condition E.3. of Module II of this Permit. The CMS Final Report shall include all information gathered under the approved CMS Work Plan. The CMS Final Report shall at a minimum include:

1. A description of the facility:

    a. Site topographic map and preliminary layouts;

2. A summary of the corrective measure or measures:

    a. Description of the corrective measure or measures and rationale for selection;

    b. Performance expectations;

    c. Preliminary design criteria and rationale;

    d. General operation and maintenance requirements; and

    e. Long-term monitoring requirements.

3. A summary of the RCRA Facility Investigation and impact on the selected corrective measure or measures:

    a. Field studies (groundwater, surface-water, soil, air); and

b. Laboratory studies (bench scale, pilot scale).

4. Design and Implementation Precautions:

   a. Special technical problems;

   b. Additional engineering data required;

   c. Permits and regulatory requirements;

   d. Access, easements, right-of-way;

   e. Health and safety requirements; and

   f. Community relations activities.

5. Cost Estimates and Schedules:

   a. Capital cost estimate;

   b. Operation and maintenance cost estimate; and

   c. Project schedule (design, construction, operation).

373 Appendix II-D

Compliance Schedule

IBM Corporation East Fishkill Facility
Hudson Valley Research Park
2070 Route 52
Hopewell Junction, New York 12533
EPA ID# NYD 000 707 901

I. COMPLIANCE SCHEDULE FOR INTERIM CORRECTIVE MEASURES

A. Pursuant to Module II Condition B.6.a., Permittee shall submit for approval a focused interim corrective measures study within 30 calendar days following the date of the notification by the Commissioner requiring implementation of interim corrective measures.

B. Pursuant to Module II Condition B.6.b., Permittee shall submit for approval a focused interim corrective measures study within 30 calendar days after notifying the Commissioner that a release or threatened release of hazardous waste, including hazardous constituents from a SWMU or AOC possesses a significant and immediate threat to human health or the environment.

II. COMPLIANCE SCHEDULE FOR REPORTING

A. Pursuant to Module II Condition B.8.a., Permittee shall submit signed progress reports as specified in approved work plans of all activities conducted in accordance with the provisions of the Corrective Action Compliance Schedules of Permit Module II, beginning no later than 30 calendar days after the Permittee is first required to begin implementation of any such requirement.

III. COMPLIANCE SCHEDULE FOR NOTIFICATION

A. Pursuant to Module II Condition B.10.a., Permittee within 30 calendar days after discovering and confirming facility releases from a SWMU or AOC of hazardous constituents in groundwater have migrated off-site in concentrations that exceed action levels, shall notify the Commissioner. The written notice shall include a proposed plan to notify any off-site owners or residents on land overlying such contamination.

B. Pursuant to Module II Condition B.10.b., Permittee within 15 calendar days after discovering facility releases of hazardous constituents in air have or are migrating off-site, in concentrations exceeding action levels in areas where residences or places at which continuous, long-term exposure to the constituents are located, shall notify the

Commissioner in writing and shall initiate any actions that may be necessary to provide notice to off-site individuals subject to such exposure.

IV. COMPLIANCE SCHEDULE FOR ASSESSMENT OF NEWLY IDENTIFIED SWMUs AND AOCs

A. Pursuant to Module II Condition C.1., Permittee shall notify the Commissioner, in writing, of any additional SWMUs and/or AOCs constructed prior to the issuance of this Permit and which are located outside of the Areas of Concern listed in the Permit Module within 15 calendar days after discovery. In addition, pursuant to Module II Condition C.1., Permittee shall notify the Commissioner, in writing annually, of any additional, newly identified SWMUs which were constructed prior to the issuance of this Permit and which are located within an Area of Concern listed in the Module.

B. Pursuant to Module II Condition C.2., Permittee shall submit a SWMU/AOC Assessment Report within 30 calendar days after notifying the Commissioner of any additional SWMUs and/or AOCs which existed prior to this Permit and which are located outside of an Area of Concern. In addition, pursuant to Module II Condition C.1., the Permittee shall submit a SWMU/AOC Assessment annually for units constructed prior to this Permit and which are located within Areas of Concern.

C. Pursuant to Module II Condition C.3., Permittee shall submit for approval a SWMU/AOC Sampling and Analysis Plan within 30 calendar days after written notification by the Commissioner that a SWMU/AOC Sampling and Analysis Plan is necessary.

D. Pursuant to Module II Condition C.4.b., Permittee shall submit for approval revisions of the SWMU/AOC Sampling and Analysis Plan within 30 calendar days after meeting with the Department to discuss Plan comments or within 45 calendar days after Permittee's receipt of Plan comments when no meeting is scheduled.

E. Pursuant to Module II Condition C.4.c., Permittee shall begin to implement the SWMU/AOC Sampling and Analysis Plan within 30 calendar days following written approval of the Plan.

F. Pursuant to Module II Condition C.5., Permittee shall submit a SWMU/AOC Sampling and Analysis Report within 30 calendar days of receipt by the Permittee of complete, validated analytical data generated under in the approved SWMU/AOC Sampling and Analysis Plan.

V. COMPLIANCE SCHEDULE AND NOTIFICATION REQUIREMENTS FOR NEWLY-DISCOVERED RELEASES AT SWMUs AND AOCs

A. Pursuant to Module II Condition D., Permittee shall notify the Commissioner, in writing, of any newly-discovered releases at SWMUs and/or AOCs, no later than 15 calendar days after such discovery.

VI. COMPLIANCE SCHEDULE FOR RFA-SAMPLING VISIT (SV) WORK PLAN

Not Applicable.

VII. COMPLIANCE SCHEDULE FOR RFA-SV WORK PLAN IMPLEMENTATION

Not Applicable.

VIII. COMPLIANCE SCHEDULE FOR RFA-SV REPORT

Not Applicable.

IX. COMPLIANCE SCHEDULE FOR RCRA FACILITY INVESTIGATION (RFI) WORK PLANS, INCLUDING WORK PLANS AT INACCESSIBLE SWMUs AND/OR AOCs

A. Pursuant to Module II Condition E.1.a., within 90 days after written notification by the Commissioner that an RFI is required pursuant to Module II Condition C.6., and/or D., the Permittee shall submit for approval an RFI Work Plan.

B. Pursuant to Module II Condition E.1.c., Permittee shall submit for approval an RFI Work Plan for the inaccessible SWMUs identified in Module II Condition E.1.b. no later than 180 calendar days after the date when the SWMUs and/or AOCs become accessible for such an investigation.

C. Pursuant to Module II Condition E.1.d., Permittee shall submit for approval revisions to the RFI Work Plan within 30 calendar days after meeting with the Department to discuss Plan comments, or within 45 calendar days after Permittee's receipt of Plan comments when no meeting is scheduled.

X. COMPLIANCE SCHEDULE FOR RFI WORK PLAN IMPLEMENTATION

A. Pursuant to Module II Condition E.2.a., Permittee shall begin to implement the RFI Work Plan within 30 calendar days following written approval of the Plan.

XI. COMPLIANCE SCHEDULE FOR RFI FINAL REPORT AND SUMMARY REPORT

A. Pursuant to Module II Condition E.2.b., Permittee shall submit for approval the RFI Final and Summary Reports within 60 calendar days after receipt by the Permittee complete, validated analytical data generated under the approved work plan.

B. Pursuant to Module II Condition E.2.c., Permittee shall submit for approval revisions to the RFI Final and Summary Reports within 45 calendar days after meeting with the Department to discuss Report comments, or within 45 calendar days of Permittee's receipt of comments when no meeting is scheduled.

C. Pursuant to Module II Condition E.2.d., Permittee shall mail the approved Summary Report to all individuals on the facility mailing list within 30 calendar days of receipt of Report approval.

XII. COMPLIANCE SCHEDULE FOR CURRENT INTERIM CORRECTIVE MEASURES

Not Applicable.

XIII. COMPLIANCE SCHEDULE FOR CORRECTIVE MEASURES STUDY (CMS) SCOPE OF WORK

A. Pursuant to Module II Condition E.3.a., the Permittee shall submit a CMS in accordance with the written notification by the Commissioner that such a CMS is required.

B. Pursuant to Module II Condition E.3.b., the Permittee shall submit a focused CMS when the Department and Permittee agree on a pragmatic and presumptive remedy within 60 calendar days following written notification by the Commissioner.

XIV. COMPLIANCE SCHEDULE FOR CMS IMPLEMENTATION

Not Applicable.

XV. COMPLIANCE SCHEDULE FOR CMS FINAL REPORT

Not Applicable

XVI. MODIFICATION OF THE COMPLIANCE SCHEDULES

A. Pursuant to Module II Condition E.6.a., Permittee shall submit proposed modification of any Compliance Schedule within 15 calendar days of determining that a schedule cannot be met.

XVII. COMPLIANCE SCHEDULE FOR CORRECTIVE MEASURE(S) COST ESTIMATE AND FINANCIAL ASSURANCE

A. Pursuant to Module II Condition E.9., Permittee shall demonstrate financial assurance for completing the approved corrective measure(s) by April 1st of each year.

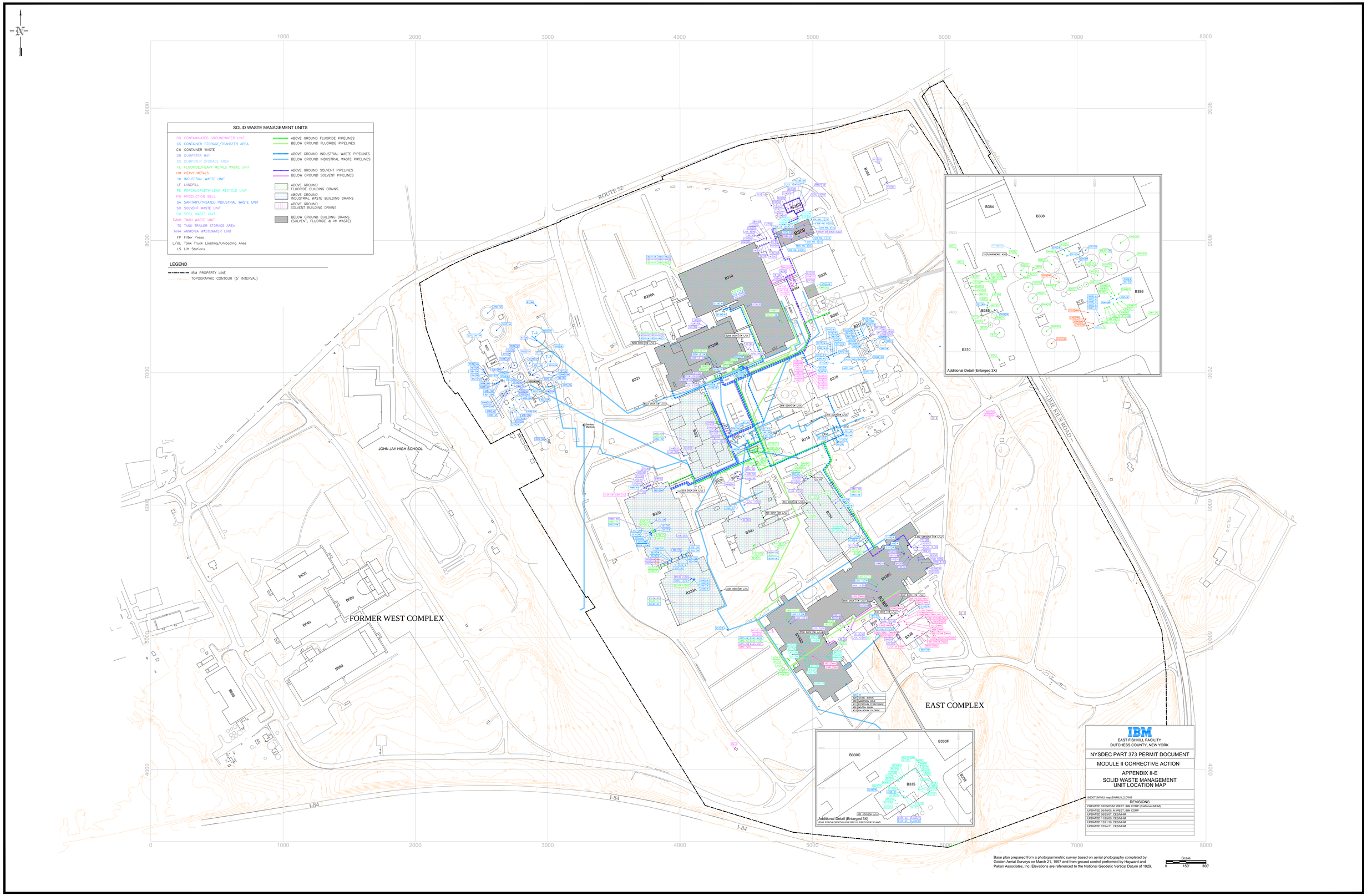
373 Appendix II-E

Solid Waste Management Unit Location Map and Area of Concern Location Maps

The following maps are provided in this Appendix:

II-Ea – Solid Waste Management Unit Location Map

II-Eb – Areas of Concern


SOLID WASTE MANAGEMENT UNITS
CG CONTAMINATED GROUNDWATER UNIT
CS CONTAINER STORAGE/TRANSFER AREA
C# CONTAINER WASTE
DB DUMPSTER BAY
DS DUMPSTER STORAGE AREA
FL FLUORIDE/HEAVY METALS WASTE UNIT
HM HEAVY METALS
IW INDUSTRIAL WASTE UNIT
LF LANDFILL
PE PERCHLORDETHYLENE RECYCLE UNIT
P# PRODUCTION WELL
SA SANITARY/TREATED INDUSTRIAL WASTE UNIT
SO SOLVENT WASTE UNIT
SW SPILL WASTE UNIT
TNAH TNAH WASTE UNIT
TS TANK TRAILER STORAGE AREA
NH4 AMMONIA WASTEWATER UNIT
FP Filter Press
L/UL Tank Truck Loading/Unloading Area
LS Lift Stations
ABOVE GROUND FLUORIDE PIPELINES
BELOW GROUND FLUORIDE PIPELINES
ABOVE GROUND INDUSTRIAL WASTE PIPELINES
BELOW GROUND INDUSTRIAL WASTE PIPELINES
ABOVE GROUND SOLVENT PIPELINES
BELOW GROUND SOLVENT PIPELINES
ABOVE GROUND FLUORIDE BUILDING DRAINS
ABOVE GROUND INDUSTRIAL WASTE BUILDING DRAINS
ABOVE GROUND SOLVENT BUILDING DRAINS
BELOW GROUND BUILDING DRAINS (SOLVENT, FLUORIDE & IW WASTE)
LEGEND
IBM PROPERTY LINE
TOPOGRAPHIC CONTOUR (5' INTERVAL)
ROUTE 52
JOHN JAY HIGH SCHOOL
FORMER WEST COMPLEX
EAST COMPLEX
LIME KILN ROAD
I-84
B309
B310
B320A
B320B
B321
B322
B323
B324
B325A
B330C
B330F
B330D
B330E
B335
B386
B385
B384
B308
B316
B315
B317
B318
B341
B630
B640
B650
B660
B680
Additional Detail (Enlarged 3X)
B330C
B330F
B335
B318
(B335: PERCHLORDETHYLENE RECYCLE/RECOVERY PLANT)
IBM
EAST FISHKILL FACILITY
DUTCHESS COUNTY, NEW YORK
NYSDEC PART 373 PERMIT DOCUMENT
MODULE II CORRECTIVE ACTION
APPENDIX II-E
SOLID WASTE MANAGEMENT UNIT LOCATION MAP
REVISIONS
CREATED 03/06/05 M. WEST, IBM CORP (drafteman MHM)
UPDATED 05/18/05, M.WEST, IBM CORP
UPDATED 05/23/07, CES/MHM
UPDATED 11/29/06, CES/MHM
UPDATED 12/21/10, CES/MHM
UPDATED 02/24/11, CES/MHM
Base plan prepared from a photogrammetric survey based on aerial photography completed by Golden Aerial Surveys on March 21, 1997 and from ground control performed by Hayward and Pakan Associates, Inc. Elevations are referenced to the National Geodetic Vertical Datum of 1929.
Scale
0 150' 300'

LEGEND

- Former Structure
- ▲ – GMP Soil Monitoring Well
- ● – GMP Soil/Bedrock Monitoring Well
- ★ – Bedrock Extraction Well
- ★ – Inactive Bedrock Extraction Well (Production Well Shutdown Test)
- ☆ – Inactive Bedrock Extraction Well (as of mid-January 2003)
- ✱ – Shallow Extraction Well
- 10 – PCE-Series Concentration Contour (ug/l)
- 5 – Approximate Limit of Plume as Defined by Annual Median Concentration Equal to 5 ug/l of PCE-Series Compounds
- 6.2 – PCE-Series Concentration ug/l
- (6/10) – May or June 2010 Sampling Date
- * – All Former IBM West Complex Wells Sampled May 11 to June 16
- **Extent of Clay Mapping**
- **Extent of Glaciolacustrine Clay** (East Complex only)
- Inferred Areas of No Saturated Soil (Approximate)

Note: All concentrations have been rounded to a maximum of two signficant figures.

Concentrations greater than the MDL but less than the RL, which is 1.0 ug/l x DF for most compounds, are also reported by the laboratory (MDL=Method Detection Limit, RL=Reporting Limit, and DF=Dilution Factor). The MDL varies by compound but is less than the RL for the 23 key compounds at the site. Values greater than the MDL but less than the RL should be considered estimates that would typically be flagged with a "J" qualifier.

The PCE-series concentration is a calculated concentration that uses the weighted sum of four constituent VOC concentrations. In performing this calculation, compounds that were "not detected" are treated as zeroes, and the resulting PCE-series concentration is shown as "0" on the Plates 4 and 6 if none of the four PCE-series constituents was detected. However, the Freon TF concentration is not a calculated concentration; therefore, the concentrations posted on Plates 5 and 7 are shown as less than the RL, which is <1.0 ug/l times the DF where Freon TF was not detected.

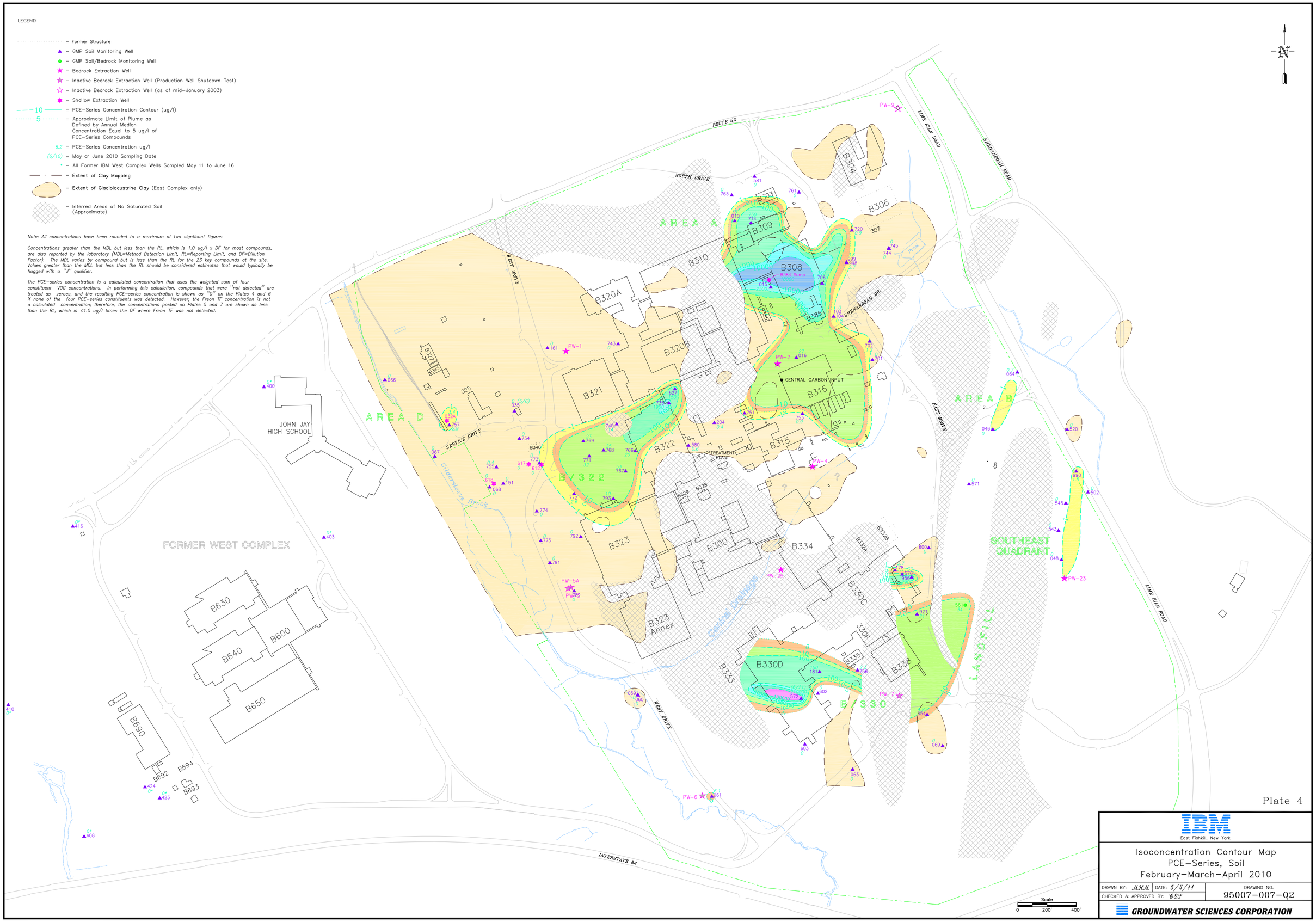


Plate 4

IBM
East Fishkill, New York

Isoconcentration Contour Map
PCE-Series, Soil
February-March-April 2010

DRAWN BY: MJM DATE: 5/4/11	DRAWING NO. 95007-007-Q2
CHECKED & APPROVED BY: CBJ	

GROUNDWATER SCIENCES CORPORATION

LEGEND

- IBM Main Site Property Line
- Former Structure
- GMP Bedrock Monitoring Well
- Bedrock Extraction Well
- Inactive Bedrock Extraction Well (Production Well Shutdown Test)
- Inactive Bedrock Extraction Well as of mid-January 2003
- Shallow Bedrock Extraction Well
- 10 – PCE-Series Concentration Contour ug/l
- 41 – PCE-Series Concentration ug/l
- (6/10) – May or June 2010 Sampling Date
- * – All IBM Former West Complex Wells Sampled May 11 to June 16
- 5 – Approximate Limit of Plume as Defined by Annual Median Concentration Equal to 5 ug/l of PCE-Series Compounds

Note: All concentrations have been rounded to a maximum of two signficant figures. "0" means not detected.

Concentrations greater than the MDL but less than the RL, which is 1.0 ug/l x DF for most compounds, are also reported by the laboratory (MDL=Method Detection Limit, RL=Reporting Limit, and DF=Dilution Factor). The MDL varies by compound but is typically less than the RL for the 23 key compounds at the site. In general, values greater than the MDL but less than the RL should be considered estimates that would typically be flagged with a "J" qualifier.

The PCE-series concentration is a calculated concentration that uses the weighted sum of four constituent VOC concentrations. In performing this calculation, compounds that were "not detected" are treated as zeroes, and the resulting PCE-series concentration is shown as "0" on the Plates 4 and 6 if none of the four PCE-series constituents was detected. However, the Freon TF concentration is not a calculated concentration; therefore, the concentrations posted on Plates 5 and 7 are shown as less than the RL, which is <1.0 ug/l times the DF where Freon TF was not detected.

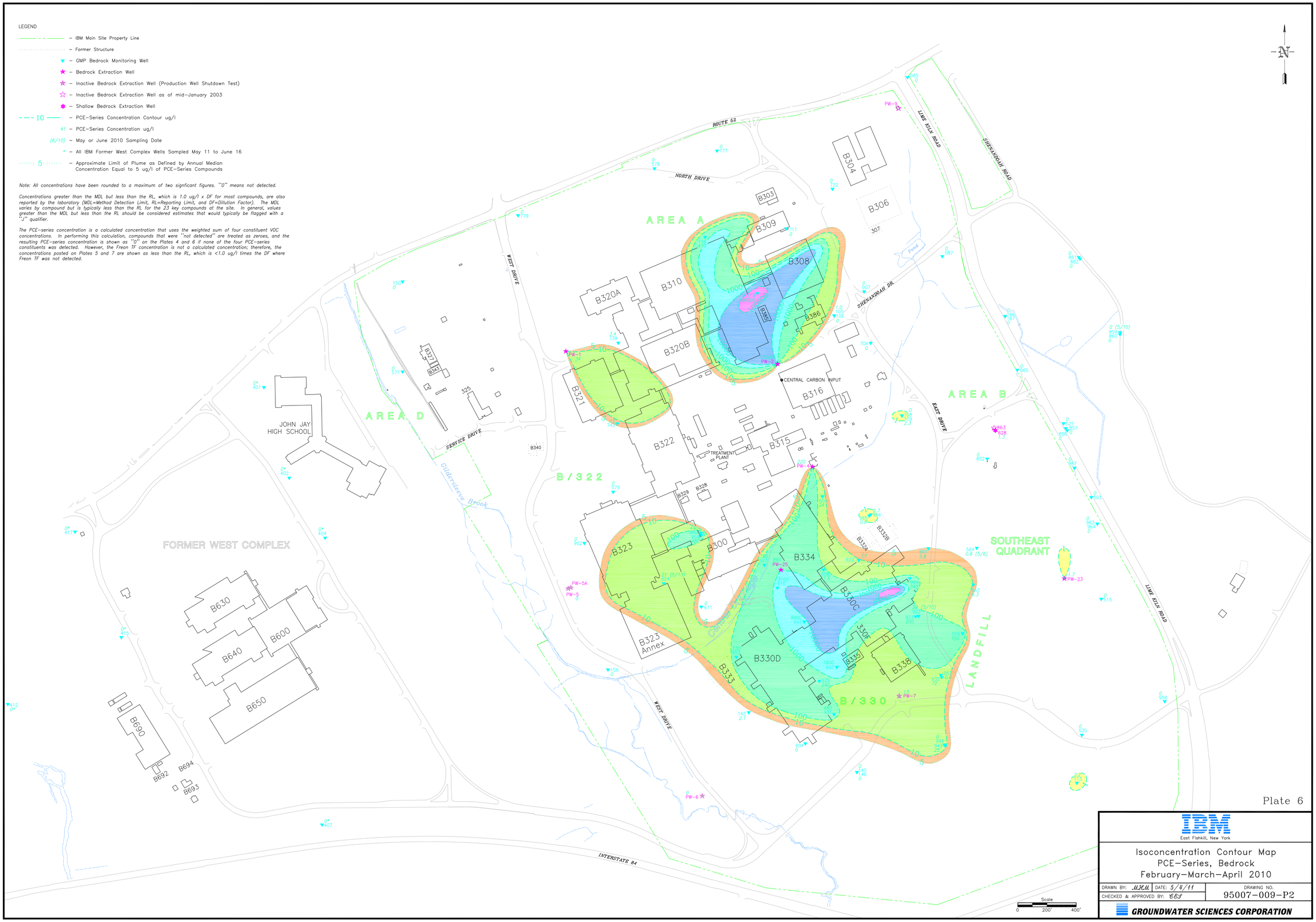


Plate 6

IBM
East Fishkill, New York

Isoconcentration Contour Map
PCE-Series, Bedrock
February-March-April 2010

DRAWN BY: MHM	DATE: 5/4/11	DRAWING NO.
CHECKED & APPROVED BY: CEF		95007-009-P2

GROUNDWATER SCIENCES CORPORATION

373 Appendix II-F

Groundwater Chemical Constituents

IBM Corporation East Fishkill Facility
Hudson Valley Research Park
2070 Route 52
Hopewell Junction, New York 12533
EPA ID# NYD 000 707 901

GROUNDWATER CHEMICAL CONSTITUENTS FOR CORRECTIVE ACTION MONITORING

The following chemical constituents have been detected and confirmed in the groundwater monitored by IBM at its East Fishkill, New York facility. Those compounds[1] which are present and exceed Groundwater Cleanup Standard are also listed in Module II Condition E.7.c.(ii) Table II-3. The corresponding concentrations in Table II-3 have been established as groundwater Cleanup Standards to serve as termination criteria.

Chemicals Identified and Confirmed in Groundwater at the IBM East Fishkill Facility	
Constituents	***CAS #***
Acetone[1]	67-64-1
Benzene	71-43-2
Bromochloromethane	74-97-5
Bromodichloromethane	75-27-4
Bromoform	75-25-2
Bromomethane	74-83-9
Chlorobenzene[1]	108-90-7
Chloroethane	75-00-3
Chloroform	67-66-3
Chloromethane	74-87-3
Dibromochloromethane	124-48-1
1,2-Dibromoethane	106-93-4
1,2-Dichlorobenzene[1]	95-50-1
1,3-Dichlorobenzene	541-73-1
1,4-Dichlorobenzene	106-46-7
Dichlorodifluoromethane (Freon 12)[1]	75-71-8

Chemicals Identified and Confirmed in Groundwater at the IBM East Fishkill Facility	
Constituents	***CAS #***
1,1-Dichloroethene	75-35-4
cis-1,2-Dichloroethene[1]	156-59-2
trans-1,2-Dichloroethene	156-60-5
1,3-Dichloropropane	142-28-9
Ethylbenzene[1]	100-41-4
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113 or Freon TF)[1]	76-13-1
Hexachlorobutadiene	87-68-3
Isopropylbenzene	98-82-8
p-Isopropyltoluene	99-87-6
Methylene Chloride	75-09-2
Methyl-t-Butyl Ether	1634-04-4
Naphthalene	106-44-5
n-Propylbenzene	103-65-1
1,1,2,2-Tetrachloroethene[1]	127-18-4
THF	109-99-9
Toluene	108-88-3
1,2,3-Trichlorobenzene	95-63-6
1,2,4-Trichlorobenzene	96-18-4
1,1,2-Trichloroethene[1]	79-01-6
Trichlorofluoromethane (Freon 11)[1]	75-69-4
1,2,4-Trimethylbenzene	95-63-6
1,3,5-Trimethylbenzene	108-67-8
Vinyl Chloride[1]	75-01-4
m-Xylene[1]	108-38-3
p-Xylene[1]	106-42-3
o-Xylene[1]	95-47-6
1,1,1-Trichloroethane[1]	71-55-6
n-Butylbenzene	104-51-8
sec-Butylbenzene	135-98-8
1,1-Dichloroethane	75-34-3
1,2-Dichloroethane	107-06-2

Chemicals Identified and Confirmed in Groundwater at the IBM East Fishkill Facility	
Constituents	***CAS #***
1,2-Dichloro-1,2,2-trifluoroethane (Freon 123A)[1]	354-23-4
Arsenic (total)[1]	7440-38-2
Chromium (total)[1]	7440-47-3
Fluoride (total)[1]	16984-48-8
Nickel (total)[1]	7440-02-0

[1]Listed in Module Condition E.7.c.(ii) Table II-3.

373 Appendix II-G

Documentation of Financial Assurance

Documentation of Financial Assurance
IBM Corporation East Fishkill Facility
Hudson Valley Research Park
2070 Route 52
Hopewell Junction, New York 12533
EPA ID# NYD 000 707 901

Following is a letter documenting financial assurance of liability, closure and corrective action coverage for hazardous waste facilities submitted by IBM on March 28, 2011 to the New York State Department of Environmental Conservation.

IBM

8976 Wellington Road
Manassas, VA 20109

March 28, 2011

Mr. Dale A. Desnoyers
Director
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233-7011

Subject: RCRA Financial Assurance
IBM East Fishkill NYD000707901
IBM Kingston NYD001359694
IBM Owego NYD986874501
IBM Poughkeepsie NYD080480734
IBM Yorktown NYD084006741

Dear Mr. Desnoyers:

Please find enclosed the following items:

1. An amended Irrevocable Standby Letter of Credit for IBM's facilities in East Fishkill, Kingston, Owego, Poughkeepsie and Yorktown, New York (L/C 093127-793) issued by Intesa SanPaolo, dated March 2011. The value of the Letter of Credit has been increased from one hundred three million, three hundred twenty nine thousand dollars ($103,329,000 USD) to one hundred six million, three hundred seventy five thousand dollars ($106,375,000 USD). This represents an increase in value of three million, forty six thousand dollars ($3,046,000). These values are allocated as follows:

IBM FACILITY	ADDRESS	
East Fishkill	Route 52 Hopewell Junction, NY 12533	Closure - $1,276,700 Corrective Action - $51,602,100
Kingston	Neighborhood Road Kingston, NY 12401	Post Closure - $2,582,900 Corrective Action - $17,240,000
Owego	Route 17C East Owego, NY 13827	Corrective Action - $7,349,000
Poughkeepsie	South Road Poughkeepsie, NY 12602	Closure - $1,184,300 Corrective Action - $24,558,000
Yorktown	Route 134 Yorktown Hgts, NY 10598	Closure - $582,000

2. An amended Schedule A of the Standby Trust Agreement issued by Wells Fargo Bank. The remaining portions of the original Standby Trust Agreement remain valid.

3. A current Hazardous Waste Facility Certificate of Liability Insurance.

If you have any questions regarding IBM's submission, please contact Michael Kominek of my staff at 703-257-2586.

Very truly yours,

Edan Dionne
Director
Corporate Environmental Affairs

Enc.

cc: Mr. Michael Kominek - IBM Manassas

Mr. Michael Galligan - IBM Somers

Ms. Monica Baccari - IBM Armonk

Ms. Jacqueline Braungart - IBM East Fishkill

Mr. Kevin Whalen - IBM Manassas

Mr. Frank Langone - IBM Yorktown

Mr. Dean Chartrand - IBM Manassas

Ms. Angela Chieco
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233-7011

AMENDED SCHEDULE A
MARCH 2011

IBM FACILITY	ADDRESS	
East Fishkill	Route 52 Hopewell Junction, NY 12533	Closure - $1,276,700 Corrective Action - $51,602,100
Kingston	Neighborhood Road Kingston, NY 12401	Post Closure - $2,582,900 Corrective Action - $17,240,000
Owego	Route 17C East Owego, NY 13827	Corrective Action - $7,349,000
Poughkeepsie	South Road Poughkeepsie, NY 12602	Closure - $1,184,300 Corrective Action - $24,558,000
Yorktown	Route 134 Yorktown Hgts, NY 10598	Closure - $582,000

Hazardous Waste Facility Certificate of Liability Insurance

1. **Illinois Union Insurance Company** (the "Insurer"), of **P.O. Box 1000, 436 Walnut Street, Philadelphia, PA 19106**, hereby certifies that it has issued a policy of liability insurance (the "Policy") covering bodily injury and property damage to **IBM Corporation**, (the "insured"), of **1 New Orchard Road, Armonk, New York 10504-1722** in connection with insured's obligation to demonstrate financial responsibility under **6 NYCRR Part 370 et seq.**

The coverage applies at:

EPA ID Number	FACILITY NAME	FACILITY ADDRESS
NYD000707901	IBM Corporation	2070 Route 52, Hopewell Junction, NY 12533
NYD986874501	IBM Corporation	1801 Route 17C East, Owego, NY 13827
NYD080480734	IBM Corporation	2455 South Road, Poughkeepsie, NY 12602
NYD084006741	IBM Corporation	1101 Route 134, Yorktown Hgts, NY 10598

for insert **sudden accidental** occurrences. The limits of liability are **$1,000,000** each occurrence and **$2,000,000** annual aggregate, exclusive of legal defense costs. The coverage is provided under policy number **PPL G24883942 002**, issued on **09 October 2010**.

2. The Insurer further certifies the following with respect to the insurance described in Paragraph 1:

a. Bankruptcy or insolvency of the insured shall not relieve the Insurer of its obligations under the policy

b. The Insurer is liable for the payment of amounts within any deductible applicable to the policy, with the right of reimbursement from the insured for any such payment made by the Insurer. This provision does not apply with respect to the amount of any deductible for which coverage is demonstrated by virtue of the Insured's satisfying the financial test for liability coverage as established by the New York Sate Department of Environmental Conservation (hereinafter "NYSDEC") or by the Commissioner of NYSDEC (hereinafter referred to as the "Commissioner,") as specified in 6 NYCRR Part 370 et seq.

c. Whenever requested by the Commissioner, the Insurer agrees to furnish to the Commissioner a signed duplicate original of the policy and all endorsements.

d. Cancellation of the insurance, whether by the Insurer, the insured, a parent corporation providing insurance coverage for its subsidiary, or by a firm having an insurable interest in and obtaining liability insurance on behalf of the owner or operator of the hazardous waste management facility, will be effective only upon written notice certified mail, return receipt requested, and only after the expiration of 60 days after a copy of such written notice is received by the Commissioner.

e. Any other termination of the insurance will be effective only upon written notice, certified mail, return receipt requested, and only after the expiration of thirty (30) days after a copy of such written notice is received by the Commissioner.

I hereby certify that the wording of this instrument is identical to the wording specified in 6 NYCRR 373-2.8(j) as such regulation was constituted on the date first above written, and that the Insurer is authorized by the Superintendent of the New York State Department of Insurance to conduct the business of an Insurer or is eligible to provide insurance as an excess or surplus lines insurer in the State of New York.

William P. Hazelton
Senior Vice President, ACE Environmental Risk
Authorized Representative of Illinois Union Insurance Company
436 Walnut Street, WA07A
Philadelphia, PA 19106
Date: 09 October 2010

Hazardous Waste Facility Certificate of Liability Insurance

1. **Illinois Union Insurance Company** (the "Insurer"), of **P.O. Box 1000, 436 Walnut Street, Philadelphia, PA 19106**, hereby certifies that it has issued a policy of liability insurance (the "Policy") covering bodily injury and property damage to **IBM Corporation**, (the "insured"), of **1 New Orchard Road, Armonk, New York 10504-1722** in connection with insured's obligation to demonstrate financial responsibility under **6 NYCRR Part 370 et seq.**

The coverage applies at:

EPA ID Number: NYD001359694
FACILITY NAME: IBM Corporation
FACILITY ADDRESS: 300 Enterprise Drive, Kingston, NY 12401

for insert **sudden and non-sudden accidental** occurrences. The limits of liability are **$5,500,000** each occurrence and **$11,000,000** annual aggregate, exclusive of legal defense costs. The coverage is provided under policy number **PPL G24883942 002**, issued on **09 October 2010**.

2. The Insurer further certifies the following with respect to the insurance described in Paragraph 1:

a. Bankruptcy or insolvency of the insured shall not relieve the Insurer of its obligations under the policy.

b. The Insurer is liable for the payment of amounts within any deductible applicable to the policy, with the right of reimbursement from the insured for any such payment made by the Insurer. This provision does not apply with respect to the amount of any deductible for which coverage is demonstrated by virtue of the Insured's satisfying the financial test for liability coverage as established by the New York Sate Department of Environmental Conservation (hereinafter "NYSDEC") or by the Commissioner of NYSDEC (hereinafter referred to as the "Commissioner,") as specified in 6 NYCRR Part 370 et seq.

c. Whenever requested by the Commissioner, the Insurer agrees to furnish to the Commissioner a signed duplicate original of the policy and all endorsements.

d. Cancellation of the insurance, whether by the Insurer, the insured, a parent corporation providing insurance coverage for its subsidiary, or by a firm having an insurable interest in and obtaining liability insurance on behalf of the owner or operator of the hazardous waste management facility, will be effective only upon written notice certified mail, return receipt requested, and only after the expiration of 60 days after a copy of such written notice is received by the Commissioner.

e. Any other termination of the insurance will be effective only upon written notice, certified mail, return receipt requested, and only after the expiration of thirty (30) days after a copy of such written notice is received by the Commissioner.

I hereby certify that the wording of this instrument is identical to the wording specified in 6 NYCRR 373-2.8(j) as such regulation was constituted on the date first above written, and that the Insurer is authorized by the Superintendent of the New York State Department of Insurance to conduct the business of an Insurer or is eligible to provide insurance as an excess or surplus lines insurer in the State of New York

William P. Hazelton
Senior Vice President, ACE Environmental Risk
Authorized Representative of Illinois Union Insurance Company
436 Walnut Street, WA07A
Philadelphia, PA 19106
Date: 09 October 2010

INTESA SANPAOLO

Intesa Sanpaolo S.p.A.
One William Street
New York, NY 10004

Tel (212) 607-3500
Fax (212) 607-3537
SWIFT BCITUS33

Page: 1/1 Place and date of issue: NEW YORK 3/15/2011 Date and place of expiry: 3/25/2012 NEW YORK	Irrevocable Letter of Credit L/C Number: 093127-793
Applicant: INTERNATIONAL BUSINESS MACHINES CORPORATION ONE NEW ORCHARD ROAD ARMONK, NY 10504	Beneficiary: SEE BELOW

BENEFICIARY:
MR. PETER GRANNIS COMMISSIONER
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
625 BROADWAY
ALBANY, NEW YORK 12233-1011
ATTN: DIVISION OF SOLID & HAZARDOUS MATERIALS 625 BROADWAY ALBANY, NEW YORK 12233-7250

WE HEREBY AMEND OUR IRREVOCABLE STANDBY LETTER OF CREDIT NO. 093127-793 IN YOUR FAVOR AS FOLLOWS:

NO.1-CREDIT AMOUNT INCREASED BY US$ 3,046,000.00
BALANCE NOW TO READ AS US$ 106,375,000.00

ALL OTHER TERMS AND CONDITIONS REMAIN UNCHANGED.

KINDLY ACKNOWLEDGE RECEIPT BY MAIL.

KENNETH LEISENRING
ASST. VICE PRESIDENT

DANIEL BRUNO
FIRST VICE PRESIDENT

MARCH 15, 2011

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL REMEDIATION
6 NYCRR PART 373 PERMIT
MODULE III - STORAGE IN CONTAINERS

IBM Corporation East Fishkill Facility
Hudson Valley Research Park
2070 Route 52
Hopewell Junction, New York 12533
EPA ID# NYD 000 707 901

A. AUTHORIZED STORAGE AREA, WASTE TYPES AND STORAGE VOLUME

The Permittee may operate the following container storage areas at the facility and store the following wastes in containers in these areas, subject to the terms of this Permit:

Area	Waste Type	Container Volume	Total Quantity of Waste Containers
B/309 Room 2	See Table 4-1 in Permit Renewal Application	Various UN POP Approved Containers	1,000
B/309 Room 7	See Table 4-1 in Permit Renewal Application	Various UN POP Approved Containers	1,352
B/309 Room 8	See Table 4-1 in Permit Renewal Application	Various UN POP Approved Containers	388

B. REQUIREMENTS FOR CONTAINER STORAGE UNITS 6 NYCRR 373-2.9

The Permittee must comply with the portions of the Permit Application incorporated by reference into this Permit by Module I and with 6 NYCRR 373-2.9 as follows:

1. Condition of Containers 6 NYCRR 373-2.9(b)
2. Compatibility of Waste with Containers 6 NYCRR 373-2.9(c)
3. Management of Containers 6 NYCRR 373-2.9(d)
4. Inspections 6 NYCRR 373-2.9(e)
5. Containment 6 NYCRR 373-2.9(f)
6. Special Requirements for Ignitable or Reactive Waste 6 NYCRR 373-2.9(g)
7. Special Requirements for Incompatible Wastes 6 NYCRR 373-2.9(h)
8. Closure 6 NYCRR 373-2.9(i)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL REMEDIATION
6 NYCRR PART 373 PERMIT
MODULE IX - GENERAL GROUNDWATER MONITORING CONDITIONS

IBM Corporation East Fishkill Facility
Hudson Valley Research Park
2070 Route 52
Hopewell Junction, New York 12533
EPA ID# NYD 000 707 901

A. APPLICABILITY

1. The Permittee shall comply with all applicable groundwater monitoring requirements set forth in 6 NYCRR 373-2.6.

2. The Permittee shall modify the groundwater monitoring program, as necessary, to maintain compliance with any subsequent changes in 6 NYCRR 373-2.6 within 90 days after the effective date of such change.

3. The Permittee shall follow all appropriate Health and Safety Plans (as described in Condition B.3 of Module II of this Permit) when carrying out the Permit's groundwater monitoring activities, unless other requirements govern.

4. All activities specified in this Permit Module shall apply only to the groundwater monitoring program that is required by this Permit.

B. PERMIT MODIFICATION

If the Permittee determines that the monitoring programs required under this Permit no longer satisfy the requirements of the regulations, the Permittee shall, within 90 days of such determination, submit an application for a Permit modification which describes the changes that will be necessary to maintain regulatory compliance at the site. The Commissioner may require the Permittee to perform additional sampling and install additional monitoring wells, as necessary, to maintain full characterization of hydrogeology and groundwater quality at the site.

C. GROUNDWATER MONITORING PLAN

In order to assure consistency in the groundwater monitoring programs, the Permittee shall, maintain and revise, as appropriate , a Groundwater Monitoring Plan for each Area of Concern (AOC) or Solid Waste Management Unit (SWMU) where groundwater monitoring will be performed. The Plan must be prepared in accordance with the "RCRA Quality Assurance Project Plan Guidance," the "RCRA Groundwater Monitoring Technical Enforcement Guidance Document (EPA, November 1992)" and "SW-846." If

appropriate, one plan may address two or more SWMUs. The following information should be addressed within the Plan:

1. **Presampling Procedures**

   a. Procurement, inspection, and calibration of equipment;

   b. Procurement and preparation of sample bottles;

   c. Storage and handling of sampling gear between uses;

   d. Personal protective equipment needed for sampling;

   e. Well purging techniques;

   f. Water level measuring techniques; and

   g. Laboratory notification/verification.

2. **Sampling Procedures**

   a. Use of sampling equipment;

   b. Field measurements and calibration techniques;

   c. Sampling parameters/sample handling techniques, including:

      i) sample containers to be used,

      ii) sample preservation techniques,

      iii) sample filtration techniques,

      iv) order of sample collection,

      v) sample labels,

      vi) sample storage, and

   d. Field QA/QC such as decontamination, blanks, duplicate measurements;

   e. Sample shipping and chain of custody procedures;

   f. Health and safety/personal protection measures; and

   g. Provisions for adequate disposal of purge water.

3. **Laboratory Handling and Analytical Protocols**

   a. Documentation of laboratory processing steps;

   b. Analytical methodologies for each parameter of interest;

   c. QA/QC protocols; and

   d. Reporting format.

4. **Background Information for each Monitoring Well/Piezometer**

   a. Well log;

   b. Water level recovery rate of wells;

   c. Measuring point elevation;

   d. Normal purge volume of the wells;

   e. Background water quality values; and

   f. Development/redevelopment history of the wells.

5. **Data Management**

   Data for each well or piezometer shall be maintained and updated after each sampling or monitoring event. The well record must contain the following information:

   a. Well I.D. number and, if possible, designation as up or downgradient;

   b. Depth of well as installed and as measured in the most recent Annual Well Inventory (for exceptions see Condition E. of Module IX);

   c. Measuring point elevation;

   d. Depth to water;

   e. Purge volume;

   f. Purge time (start/stop);

   g. Sampling time;

   h. Field parameters (temp., pH, S.C.);

i. Physical condition of the well;

j. Important field observations related to sample integrity;

k. Names of sampling personnel;

l. Weather conditions;

m. Purge/sample date;

n. Concentration of required monitoring parameters;

o. Concentration of any other parameters analyzed;

p. Pertinent laboratory information (QA/QC problems, etc.); and

q. Water Elevation (quarterly water level measurements only).

6. <u>Selection of Monitoring Wells and Sampling Frequency</u>

The Plan must include a list of the wells that will be used to monitor each AOC or SWMU and a corresponding schedule, which indicates the frequency at which each well will be monitored. The selected wells and frequencies must be capable of adequately characterizing the nature and extent, both horizontal and vertical, of groundwater contamination. If the groundwater monitoring network is not capable of such characterization, the network must be upgraded until such characterization is complete. On-going monitoring must include:

a. Monitoring, at least annually, at wells which define the horizontal and vertical extent of contamination for AOC within the facility perimeter;

b. Monitoring, at least quarterly, at wells which define the horizontal and vertical extent of contamination for AOC's that are not contained to the facility perimeter; and

c. Monitoring, at least annually, at a sufficient number of wells within the plume so as to be representative of contaminant behavior.

If the Permittee can demonstrate that the above objectives are being met, and that certain wells are providing information that is redundant or information that does not add to the technical understanding of contaminant characterization, the Permittee may submit a proposal for a reduction in the number of monitoring wells, or a reduction in the frequency of monitoring at certain wells. The Department shall review the submission and will determine modifications to be made to the monitoring program. The Permittee shall be notified of the Department's determination. The Permittee

may submit such a proposal annually, beginning one year from the effective date of this Permit.

The Plan must be kept at IBM's East Fishkill facility. The Permittee shall ensure that all appropriate personnel, including outside contractors, have been properly trained in the application of the Groundwater Monitoring Plan and that the Plan is followed whenever groundwater samples are obtained at the site. The Plan shall not be modified without prior approval by the Department.

D. INABILITY TO OBTAIN REPRESENTATIVE SAMPLES

1. If the Permittee knows that a well is damaged or inaccessible, and therefore, the well can not provide representative samples or accurate piezometric values, the Permittee shall, within 21 days of such knowledge notify the Commissioner of the problem and propose a remedy. Within 45 days of such knowledge the Permittee shall attempt to remedy the problem and, when appropriate, sample or resample the well. Within 45 days of such knowledge and if the problem is not corrected, the Permittee shall, through written notice to the Commissioner, provide information which describes the nature of the problem. The notification shall include a description of the problem and a schedule for the rehabilitation or replacement of the well.

   If a problem with the well prevented the Permittee from obtaining a scheduled sample, a sample shall be obtained within 45 days after the rehabilitation or replacement of the well.

2. If the Permittee knows that an error in either sampling or analytical methods has occurred, the samples shall be retaken within 21 days of such knowledge.

3. If the Permittee ascertains that a well does not contain sufficient water for a representative sample due to regional conditions that lower water levels in monitoring wells site-wide (e.g., drought conditions) that well may go unsampled for one sampling event and water level measurements shall be taken monthly until the next scheduled sampling. If water level measurements taken during that period indicate that the well still does not contain sufficient water for a representative sample, then the conditions set forth in D.1 of this section shall apply.

E. WELL MAINTENANCE PLAN

All network monitoring wells shall be maintained in accordance with the Well Maintenance Plan as described below. Each monitoring well shall be inspected for corrosion, damage to the lock, positive drainage (damage to the concrete apron, if applicable) and general integrity each time samples are collected. Total well depths will be measured annually for all wells sampled for water quality under this Permit with the exception of IBM East Fishkill's production wells and GW-628, GW-32A and planned replacement well GW-32B, GW-612, GW-613, GW-617, GW-618 and B/384 sump which will not require total well depth measurements. Any well which is in-filled with

silt in excess of 1-foot or 10 percent of the screened or open interval, whichever is greater, will be redeveloped prior to the next sampling round. Well numbers will be checked for legibility, and relabeled as necessary. Wells which are damaged beyond repair, or which become unusable for some other reason, shall be replaced, or an alternate well will be designated. If it becomes apparent that a well is not capable of providing representative samples, the Permittee shall respond in accordance with Condition D.1 of this Permit Module.

Flush mounted wells will be maintained in accordance with the same requirements listed above. In addition, the inner casing of all flush mounted wells shall be capped with a water tight seal. The integrity of this seal shall be inspected each time the wells are sampled. Damaged or questionable seals shall be replaced as necessary.

F. COLLECTION OF GROUNDWATER SAMPLES BY NYSDEC

At the request of the Department, the Permittee shall allow the Department and/or its authorized representatives to collect samples or splits of any samples collected by the Permittee pursuant to the requirements of this Permit. Similarly, at the request of the Permittee, the Department will allow the Permittee or the Permittee's authorized representatives to take splits or duplicates of any samples collected by the Department. The Permittee shall provide for adequate disposal of purge water whenever samples are collected by the Department.

G. WELL CONSTRUCTION

All groundwater monitoring wells installed after the effective date of this Permit, and pursuant to the requirements of this Permit, shall be constructed in accordance with the most recent RCRA requirements and guidelines. Work plans which include proposed well installations shall include a description of installation procedures, and materials to be used.

H. REPORTING REQUIREMENTS

The Permittee shall submit to the Commissioner, on an annual basis, a Groundwater Monitoring Status Report for each AOC or SWMU where groundwater is being monitored. If appropriate, a Groundwater Monitoring Status Report may address one or more SWMUs. The Report must summarize the previous year of data collected and activities performed with respect to the Groundwater Monitoring Program. Each report must include the following information:

1. A summary of all required analytical results that have become available during the previous year.

2. Supporting QA/QC documentation, in accordance with the approved "Groundwater Monitoring Plan."

3. All information recorded in the well record during the previous year, including the sampling field logs.

4. Quarterly groundwater elevation data, expressed in tabulated form. Potentiometric contour maps must be prepared and reported. The maps must include a delineation of the zone of capture, or a statement expressing why this is not possible. In addition, the Permittee shall determine the groundwater flow rate and direction at least annually.

5. An evaluation of contaminant migration.

    a. An evaluation shall include maps for all significant contaminants that include at a minimum those "Key Compounds" set forth in Module II Condition E.7.c.(i)(1) of this Permit. Isopleth maps shall be prepared annually, which show the limit of each plume as defined Module II Condition E.7.c.(i)(1) of this Permit.

    b. An evaluation of factors influencing the plume movement, specific contaminant movement, and specific contaminant transformation (e.g., physical, biological, chemical, etc.)

    c. A statement regarding future contaminant movement.

6. Trendline plots for the Contaminant Reduction Monitoring Wells, as required by Module II Permit Condition E.7.c.(i)(3).

7. Production or monitoring well maintenance activities planned or performed.

8. Summary of plans for installation of additional wells. Existing work plans may be referenced.

9. Summary of well installation activities performed since the last annual report. Include well logs, construction details, field data collected and surveyed well locations. Existing reports may be referenced.

10. Pumping well rates and volumes.

11. Contaminant recovery levels.

12. Treatment efficiency data.

13. Any other problems or activities planned.

14. An evaluation of the progress of the Corrective Action or Monitoring Program based on information provided above.

The Groundwater Monitoring Status Report shall be due annually on June 1st of each year.