OPERATION AND MAINTENANCE MANUAL

SAGINAW-BUFFALO SITE
NYSDEC SITE NO. 915152

Prepared For:

General Motors Corporation
Worldwide Facilities Group
Environmental Services Group - Remediation

Prepared By:

Conestoga-Rovers & Associates

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1.0 INTRODUCTION

This Operation and Maintenance (O&M) Manual has been completed for General Motors Corporation (GM) for the Saginaw-Buffalo site in Buffalo, New York. The Site has been listed in the Registry of Inactive Hazardous Waste Disposal Sites in New York State as Site No. 915152. This manual has been prepared in accordance with the Order on Consent between GM and the New York State Department of Environmental Conservation (NYSDEC) which became effective on August 13, 1998 (the "RD/RA Order, attached as Appendix A). The manual will serve as a work plan for site monitoring and maintenance in response to remediation activities conducted between July 1998 and March 2000

1.1 SITE LOCATION AND BACKGROUND

The Site, a portion of a former GM-Saginaw facility, is located at 1001 East Delavan Avenue in Buffalo, New York. The property and facility are currently owned and operated by American Axle & Manufacturing, Inc. (AAM), which purchased the property and facility from GM on February 28, 1994. The area of investigation (the "Site") consists of seven acres of Parking Lot No. 4, located east of the main facility and separated from the main facility by a Conrail right-of-way (ROW). The original NYSDEC Registry listing was for a one-acre area contaminated with polychlorinated biphenyls (PCBs) around the Wastewater Treatment Plant (WWTP). This area is referred to as Operable Unit 1 (OU1). OU2 addresses the elevated lead concentrations in the fill materials found throughout the seven-acre parking lot.

GM and NYSDEC entered into an Order on Consent (Index #B9-0410-92-09), effective February 2, 1995, pursuant to which GM performed an Interim Remedial Measure (IRM) at OU1 and conducted a Site Investigation and Engineering Evaluation of Alternatives at both of the operable units. Based upon the Engineering Evaluation of Alternatives Report prepared by Wehran-New York, Inc. (EMCON), NYSDEC prepared a Proposed Remedial Action Plan, which it submitted for public comment in February of 1998.

Following a period of public comment, NYSDEC selected a final remedial alternative for the Site in a Record of Decision (ROD) that was issued in March of 1998. A Remedial Design (RD) Report was prepared by EMCON to implement the ROD-selected remedial alternatives at the two operable units at the Site. The RD Report (issued July 2, 1998 and revised July 21, 1998) was approved by the NYSDEC and attached as Appendix B to the RD/RA Order.

In summary, the remedial activities performed for this Site included:

- dewatering the OU1 area and on-site water treatment, confirmatory effluent sampling and analysis, and batch discharge to the Buffalo Sewer Authority sanitary sewer system;
- excavating fill/soil containing greater than the site cleanup goal of 10 ppm PCBs in the OU1 area, and confirmatory sampling;
- transporting excavated materials off-site for treatment and disposal at Chemical Waste Management's Model City, New York facility;
- backfilling of the OU1 area excavation with clay soil; and
- paving the excavation area (OU1) and repaving of the OU2 area (the remainder of Parking Lot No. 4).

This manual has been prepared as a work plan for site monitoring and maintenance in response to the above remediation activities.

2.0 PAVEMENT INSPECTION AND MAINTENANCE

Pavement inspection will be conducted on an annual basis to ensure that the integrity of the asphalt surface has been maintained. Pavement inspection will be coordinated with facility personnel at least one week prior to visiting the site to ensure that most, if not all, of the paved area will be accessible for inspection. Arrangements will be made to re-visit the site to inspect those areas that were inaccessible at the time of the original inspection. Arrangements to repair those areas requiring maintenance, if any, will be made immediately upon completion of the inspection.

2.1 INSPECTION

To facilitate pavement inspection, a thorough walk-over will be completed in the approximately 7-acre parking lot (Lot #4). The paved areas of Lot #4 will be visually inspected for cracks and deterioration. Those areas exhibiting cracks and/or deterioration will be noted on a field form. Low areas or areas exhibiting poor drainage also will be noted as well as a description of the general condition of the paved areas. A copy of the field form to be used during pavement inspection is presented in Appendix B.

Additionally during pavement inspection, storm sewer manhole covers will be removed and the manhole risers will be inspected for structural damage. If an uncharacteristically large amount of sediment is contained in the storm sewer, sediment samples will be collected and analyzed for the presence of lead and PCBs. If laboratory results indicate the concentration of lead or PCBs exceeds the appropriate cleanup criteria, the sediment will be removed and properly disposed of. The storm sewers will be visually inspected on a semi-annual basis that will coincide with the semi-annual sampling events discussed in Section 3.

2.2 MAINTENANCE

Cracked areas of the pavement noted during inspection will be sealed with CMC #102, a "hot-pour" crack and joint sealant, to prevent infiltration of precipitation that could contribute to further deterioration. The product specification for CMC #102 is presented in Appendix C. More severely damaged areas (e.g., potholes) will be sawcut to remove damaged asphalt, repaved, and sealed. Repair to severely damaged areas will be completed in accordance with the parking area repair, paving and striping specification provided in Appendix D.

3.0 GROUNDWATER AND SEWER MONITORING

The groundwater and sewer monitoring program is designed to provide data that will facilitate determining the effectiveness of the remedial program. The data also will facilitate determining whether contaminants potentially are migrating offsite.

The monitoring wells included in the groundwater monitoring program will consist of the following existing wells that were installed prior to, and as part of, the Site Investigation, and three newly installed monitoring wells at the southern property line:

Upgradient Wells	*Downgradient Wells*
MW-1	MW-5
MW-201	MW-202
MW-204	MW-203
MW-206	MW-205
	MW-208
	MW-209
	MW-210
	MW-211

Well locations are shown on Figure 1.

3.1 GROUNDWATER GAUGING

Prior to groundwater sampling, each monitoring well listed above will be gauged using a groundwater interface probe. The depth of each well and the depth to groundwater will be measured from the top of the well casing. One well-volume of groundwater will be calculated from the depth to bottom and depth to groundwater data. The well volume and gauging data will be recorded on field forms. A copy of the gauging data field form is presented in Appendix E.

During groundwater gauging, the monitoring well will be inspected for structural damage to the well cap, seal, protective pad and visible portion of the well casing. The presence and condition of J-plugs and locks also will be noted. Well maintenance and/or repairs will be completed, as necessary and to the extent practical. Any structural damage or repairs made will be noted on the well gauging forms.

Additionally, prior to purging, one sample of well water will be collected using a clear disposable bailer. The bailer will be carefully lowered through the surface of the water and filled approximately halfway. This sample will be observed to identify if an oily sheen or immiscible layer is present on the water surface. The results of this observation will be noted on the inspection form.

3.2 MONITORING WELL PURGING

Subsequent to well gauging and prior to well sampling, each monitoring well listed above will be purged in accordance with the standard operating procedure presented in Appendix F. Three well volumes of groundwater will be purged from each well using either a peristaltic pump equipped with disposable lengths of vinyl tubing, or a disposable high density polyethylene (HDPE) bailer.

Upon retrieval of each well volume of groundwater, a sample will be collected for field analyses of pH, temperature, conductivity, and turbidity. The well will be considered purged after removal of three well volumes, or the well has been purged to dryness, whichever is encountered first.

3.3 GROUNDWATER SAMPLING

The objectives of groundwater sampling are to:

- track the remedial action progress;
- document groundwater quality at the designated monitoring wells; and
- determine whether contaminants are potentially migrating offsite.

Groundwater samples will be collected semi-annually (e.g., October and April) from the monitoring wells listed above. Groundwater sample collection will be facilitated using a disposable high density polyethylene (HDPE) bailer.

Samples will be collected into the appropriate, pre-cleaned, laboratory-supplied sample bottle. Samples will be transported to the laboratory under chain-of-custody protocol for the following analyses:

- PCBs by USEPA Method 8082
- Total and Soluble Lead

Groundwater samples collected for soluble lead analysis will be field-filtered using a 0.45-micron filter.

The groundwater sampling standard operating procedure to be followed is provided in Appendix F. Sample collection procedures and analyses will adhere to the guidelines included in the site Quality Assurance Project Plan (QAPP), which is presented in Appendix G.

3.4 SEWER SAMPLING

In addition to groundwater sampling, one water sample will be collected semi-annually from storm sewer Manhole #2, at the southern portion of Lot #4. Storm sewer samples will be analyzed for:

- PCBs by USEPA Method 608
- Total Lead

Storm sewer sampling will be facilitated by lowering a disposable dipper bottle into the manhole to retrieve sewer water.

As discussed in Section 2.2, visual inspection of the storm sewer will be conducted concurrently with semi-annual sampling.

3.5 DURATION OF MONITORING PROGRAM

Semi-annual groundwater and sewer monitoring will be conducted for a minimum of four consecutive events, at which time the need for or frequency of continued monitoring will be evaluated.

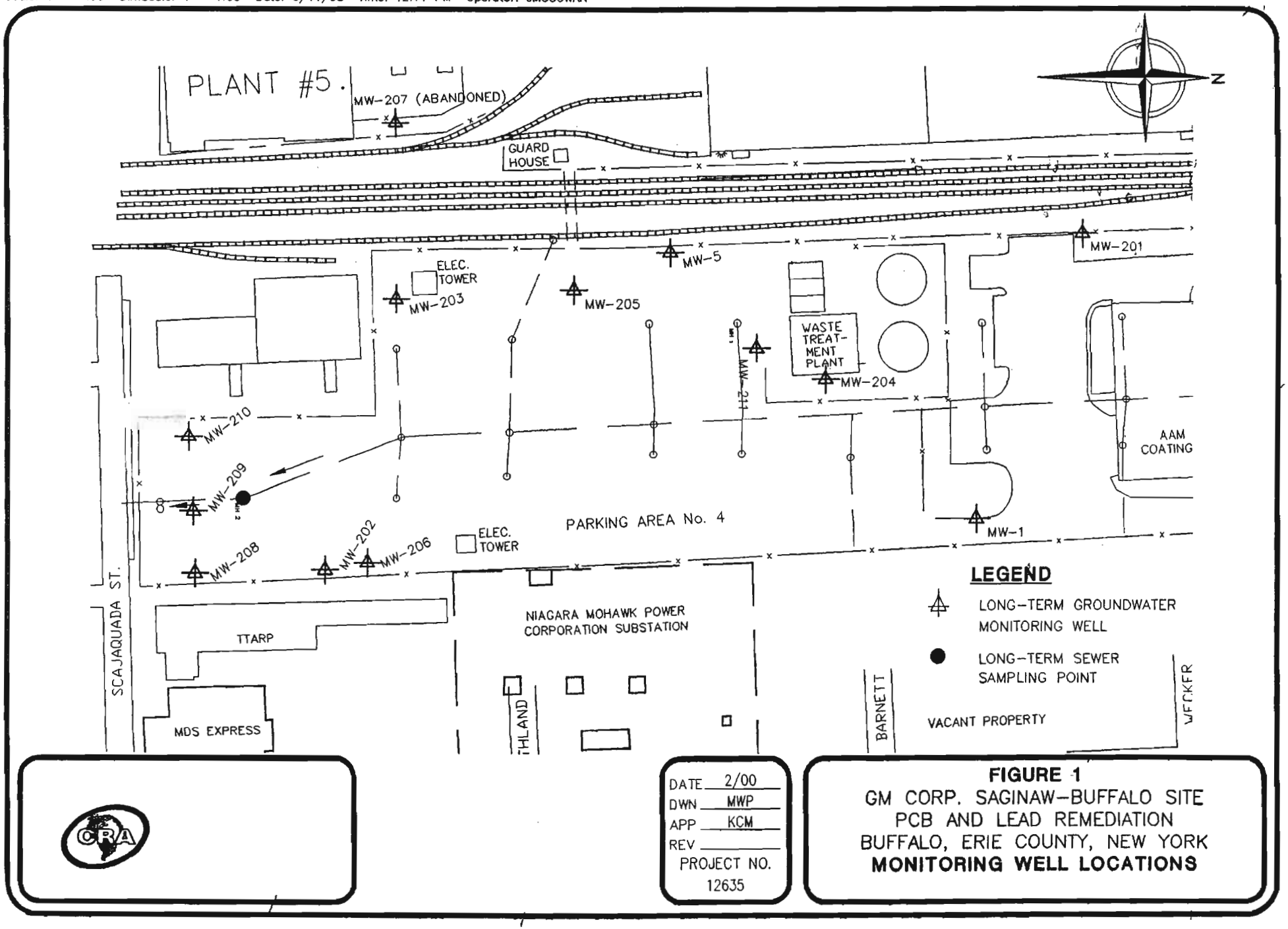
4.0 REPORTING

The NYSDEC will be notified one week prior to planned inspections and sampling activities. Reports summarizing the semi-annual groundwater and sewer monitoring data will be submitted to the NYSDEC Region 9 within 30 days of receipt of the analytical data from the laboratory. The report will include a summary of analytical results and field activities, an interpretation of the results, and conclusions and recommendations.

An annual report summarizing pavement and sewer inspection data will be prepared and submitted with the respective semi-annual monitoring report. The report will include completed field inspection forms and a summary of field activities, as well as recommendations for repair or rehabilitation.

FIGURES

ene-GI1/data: N:\DWG\85740000.000\GI029810.dwg Xrefs: NEWSITE
Scale: 1 = 1.00 DimScale: 1 = 1.00 Date: 6/11/98 Time: 12:11 PM Operator: JMCGOWAN



CRA

DATE 2/00
DWN MWP
APP KCM
REV
PROJECT NO. 12635

FIGURE 1
GM CORP. SAGINAW-BUFFALO SITE
PCB AND LEAD REMEDIATION
BUFFALO, ERIE COUNTY, NEW YORK
MONITORING WELL LOCATIONS

APPENDIX A

ORDER ON CONSENT

New York State Department of Environmental Conservation
Division of Environmental Enforcement, Western Field Unit
270 Michigan Avenue, Buffalo, New York, 14203-2999
Phone: (716) 851-7050 FAX: (716) 851-7067

John P. Cahill
Commissioner

August 18, 1998

Barry R. Kogut, Esq.
Bond, Schoeneck & King, LLP
One Lincoln Center
Syracuse, New York 13202

Re: Saginaw - Buffalo, New York State Inactive Hazardous Waste Disposal Site No. 915152

Dear Mr. Kogut:

Enclosed find one fully executed original consent order for the remedial program at the Saginaw site.

Thank you for your assistance in resolving this matter.

Very truly yours,

Maura C. Desmond
Senior Attorney

MCD:d:k
A:D1041.12
Enc.

cc: M.Doster

STATE OF NEW YORK: DEPARTMENT OF ENVIRONMENTAL CONSERVATION

In the Matter of the
Development and Implementation
of a Remedial Program for an
Inactive Hazardous Waste Disposal
Site, Under Article 27, Title 13,
and Article 71, Title 27 of the
Environmental Conservation Law
of the State of New York by

General Motors Corporation
Delphi Saginaw Steering Systems Division
Respondent.

ORDER
ON
CONSENT
INDEX # B9-0410-92-09

Site Code #915152

WHEREAS,

1. The New York State Department of Environmental Conservation (the "Department") is responsible for enforcement of Article 27, Title 13 of the Environmental Conservation Law of the State of New York ("ECL"), entitled "Inactive Hazardous Waste Disposal Sites." This Order is issued pursuant to the Department's authority under, inter alia, ECL Article 27, Title 13 and ECL 3-0301.

2. General Motors Corporation ("Respondent"), a corporation organized and existing under the laws of the State of Delaware, is doing business in the State of New York. Respondent owned a facility operated by its former Saginaw Division (now Delphi Saginaw Steering Systems Division) at 1001 East Delavan Avenue, Buffalo, New York (the "Facility") until it was conveyed to American Axle & Manufacturing, Inc. ("AAM") on March 1, 1994.

3. An investigation of a spill of reclaimed industrial oil at an area near the Facility's oily wastewater treatment plant ("WWTP") detected polychlorinated biphenyls ("PCBs") in subsurface soil and groundwater below existing pavement, as well as elevated levels of lead in soil. Further investigation revealed an abandoned clay tile sewer pipe containing PCB-contaminated oil which Respondent believes was used prior to Respondent's purchase of the property in 1965. The April 1997 Registry of Inactive Hazardous Waste Disposal Sites ("Registry") describes the site as an area of PCB and lead contamination found at the Facility in an approximately seven-acre portion of an employee parking lot adjacent to the WWTP (the "Site"). The presence of lead contamination has also been confirmed in soils inside the seven-acre area described in the Registry.

4. The Site is divided into two operable units. The first Operable Unit is for PCBs ("OU-1"). The second Operable Unit ("OU-2") is for the lead and the apparent source of the lead is

the "ash-like" fill materials found in the area studied inside Parking Lot No. 4.

5. The Department has designated the Site as an inactive hazardous waste disposal site, as that term is defined at ECL Section 27-1301.2 and has listed it in the Registry as Site Number 915152. The Department has classified the Site as a Classification "3" pursuant to ECL Section 27-1305.4.b. A Classification "3" is assigned by the Department to sites which do not present a significant threat to the public health or the environment and at which action may be deferred.

6. The Department has the power, inter alia, to provide for the prevention and abatement of all water, land, and air pollution. ECL Section 3-0301.1.i.

7. Respondent and the Department entered into an Order on Consent (Index #B9-0410-92-09), effective February 2, 1995, pursuant to which Respondent performed an Interim Remedial Measure at OU-1 and conducted a Site Investigation and Engineering Evaluation of Alternatives at both of the operable units (the "IRM Order"). Based upon Respondent's Engineering Evaluation of Alternatives Report, the Department prepared a Proposed Remedial Action Plan which it submitted for public comment in February of 1998.

8. Following a period of public comment, in March 1998, the Department selected a final remedial alternative for the Site in a Record of Decision ("ROD"). The ROD, attached to this Order as Appendix "A," is incorporated as an enforceable part of this Order.

9. The Department and Respondent agree that the goals of this Order are for Respondent to (i) develop and implement an inactive hazardous waste disposal site remedial program for the Site in accordance with the ROD and the Department-approved Remedial Design set forth in the report prepared by EMCON (Issued July 2, 1998 and Revised July 21, 1998) (the "Remedial Design Report") which is attached to and is incorporated into this Order as Appendix "B" (the "Remedial Program"), and (ii) reimburse the State's administrative costs in accordance with Paragraph VII of this Order.

10. Respondent, without making any admission of law or fact, hereby waives its right to a hearing herein as provided by law, consents to the issuance and entry of this Order, and agrees to be bound by its terms. Respondent consents to and agrees not to contest the authority or jurisdiction of the Department to issue or enforce this Order, and agrees not to contest the validity of this Order or its terms.

NOW, having considered this matter and being duly advised, IT IS ORDERED THAT:

I. Remedial Construction

A. Within thirty (30) days after the effective date of this Order, Respondent shall

commence construction of the Department-approved Remedial Design.

B. Respondent shall implement the Remedial Design in accordance with the Remedial Design Report (See Appendix "B".)

C. During implementation of all construction activities identified in the Remedial Design Report, Respondent shall have on-Site a full-time representative who is qualified to supervise the work done.

D. Within 60 days after completion of the construction activities identified in the Remedial Design Report, Respondent shall submit to the Department a final engineering report which contains "as built drawings" (including all changes made to the Remedial Design during construction); and a certification that the Remedial Design was implemented and that all construction activities were completed in accordance with the Department-approved Remedial Design and were personally witnessed by him or her or by a person under his or her direct supervision ("Remedial Construction Certification Report"). The Remedial Construction Certification Report must be prepared, signed, and sealed by a professional engineer.

E. After receipt of the Remedial Construction Certification Report, the Department shall notify Respondent in writing whether the Department is satisfied that all construction activities have been completed in compliance with the Department-approved Remedial Design and the ROD. The date of the Department's letter, notifying Respondent that all construction activities have been completed in compliance with the Department-approved Remedial Design shall be the "date of completion of Remedial Construction."

F. Within thirty (30) days after the Department's approval of the Remedial Construction Certification Report, Respondent shall implement the monitoring activities specified in the Remedial Design Report. The date of completion of Remedial Construction shall mark the beginning of the first year of Respondent's annual obligation to verify the integrity of the reconstructed pavement at the Site.

G. After the date of completion of Remedial Construction, if the Department determines that any element of the Department-approved Remedial Program is failing to achieve the remediation goals set forth in the Remedial Design Report, or otherwise fails to protect human health and/or the environment, it shall advise Respondent in a writing, which sets forth the determination and the scope of the additional work which the Department wants to have performed. Respondent may challenge the Department's determination, pursuant to the Dispute Resolution provisions of Paragraph IV of this Order, within 30 days after its receipt of the Department's written determination, by submission of a statement setting forth the basis of its disagreement.

H. In the event Respondent is required to modify the Remedial Design and Construction in accordance with the terms of this Order, it shall perform the work in

accordance with a reasonable time schedule which the Department, after consultation with Respondent, shall prescribe. The Department's review of Respondent's submittals shall be subject to the provisions of Paragraph III of this Order.

II. Progress Reports

A. Respondent shall submit to the parties identified in Subparagraph XI.A.1 in the numbers specified therein copies of written monthly progress reports that:

1. describe the actions which have been taken toward achieving compliance with this Order during the previous month;

2. include all results of sampling and tests and all other data received or generated by Respondent or Respondent's contractors or agents in the previous month, including quality assurance/quality control information, whether conducted pursuant to this Order or conducted independently by Respondent;

3. identify all work plans, reports, and other deliverables required by this Order that were completed and submitted during the previous month;

4. describe all actions, including, but not limited to, data collection and implementation of work plans, that are scheduled for the next month and provide other information relating to the progress at the Site;

5. include information regarding percentage of completion, unresolved delays encountered or anticipated that may affect the future schedule for implementation of Respondent's obligations under the Order, and efforts made to mitigate those delays or anticipated delays;

6. include any modifications to any work plans that Respondent has proposed to the Department or that the Department has approved; and

7. describe all activities undertaken in support of the Citizen Participation Plan during the previous month and those to be undertaken in the next month.

B. Respondent shall submit these progress reports to the Department by the tenth day of every month beginning with the first full month after the effective date of this Consent Order and continuing until the date of completion of Remedial Construction.

C. Respondent also shall allow the Department to attend, and shall provide the Department at least seven days advance notice of, any of the following relating to the Remedial Construction: prebid meetings, job progress meetings, substantial completion meeting and inspection, and final inspection and meeting.

III. Review of Submittals

A. 1. The Department shall review each of the submittals Respondent makes pursuant to this Order to determine whether it was prepared, and whether the work done to generate the data and other information in the submittal was done, in accordance with this Order and generally accepted technical and scientific principles. The Department shall notify Respondent in writing of its approval or disapproval of the submittal. The Department shall make reasonable efforts to provide such notification as soon as practicable after receipt of the submittal. The Department's approval of a submittal provided that Respondent make certain changes to the document ("approval with conditions") or with stated reservations ("approval with reservations") shall constitute a disapproval of the submittal for purposes of this Order. All Department-approved submittals shall be incorporated into and become an enforceable part of this Order.

2. a. If the Department disapproves a submittal, it shall so notify Respondent in writing and shall specify the reasons for its disapproval. Within 30 days after receiving written notice that Respondent's submittal has been disapproved, Respondent shall make a revised submittal to the Department that addresses the Department's stated reasons for disapproving the first submittal.

b. After receipt of the revised submittal, the Department shall notify Respondent in writing of its approval or disapproval. If the Department disapproves the revised submittal, and the Department and Respondent are unable to resolve their differences, Respondent shall be in violation of this Order and the Department may take any action or pursue whatever rights it has pursuant to any provision of statutory or common law unless Respondent has invoked the dispute resolution procedures set forth in Paragraph IV within thirty (30) business days of receipt of the Department's notice of disapproval. If the Department approves the revised submittal, it shall be incorporated into and become an enforceable part of this Order.

B. Prior to the date of completion of Remedial Construction, the Department may require Respondent to modify and/or amplify and expand a submittal if the Department determines, as a result of reviewing data generated by an activity required under this Order or as a result of reviewing any other data or facts, that further work is necessary to satisfy the goals of this Order. The Department will set forth the basis of its determination in writing. Upon written receipt of the Department's demand for modification, and/or amplification or expansion of a submittal, Respondent shall proceed with such work unless, within thirty (30) business days of receipt of the Department's demand, Respondent objects in writing to the Department and invokes the dispute resolution procedures set forth in Paragraph IV.

IV. Dispute Resolution Procedure

A. 1. If the Department disapproves a revised submittal pursuant to subparagraph III.A.2.b, or if Respondent fails to modify and/or amplify and expand a submittal pursuant to Subparagraph III.B., or if Respondent fails to perform the additional work demanded by the Department pursuant to Subparagraph I.G., or if Respondent fails to reimburse the State's expenses pursuant to Paragraph VII, Respondent shall be in violation of this Order unless, within the respective time periods set forth in the above-referenced provisions specifically allowing invocation of the dispute resolution procedure of this Paragraph IV, Respondent serves on the Department's Director of the Division of Environmental Remediation ("the Director") a written statement of the issues in dispute, the relevant facts upon which the dispute is based, and factual data, analysis or opinion supporting its position, and all supporting documentation on which Respondent relies (hereinafter called the "Statement of Position"). Respondent shall also submit a copy of its Statement of Position on the Department staff identified in Subparagraph XI.A of this Order. The Department shall serve its Statement of Position, including supporting documentation, no later than thirty (30) business days after receipt of Respondent's Statement of Position. The time periods for service of Statements of Position may be shortened or extended upon and in accordance with written notice by the Department as agreed to in writing by Respondent.

2. Respondent shall be available to meet with the Director and the Department at a mutually agreed upon date and time within the 30 day period following Respondent's receipt of the Department's Statement of Position (the "meeting").

3. An administrative record of any dispute under this paragraph shall be maintained by the Department. The record shall include the Statement of Position of each party served pursuant to Subparagraph IV.A.1, and any relevant information, including any relevant documentation submitted by either party up to and including the date of the meeting called for in Subparagraph IV.A.2. The record shall be available for review by all parties and the public.

4. Upon review of the administrative record as developed pursuant to this Paragraph IV, the Director shall issue a final decision and order resolving the dispute. With respect to the final determination of the Director, Respondent shall have those rights granted pursuant to Article 78 of the Civil Practice Law and Rules of New York ("CPLR"), provided that a Petition is filed within forty-five (45) days of Respondent's receipt of the Director's final decision and order.

5. Respondent shall revise the submittal, or modify and/or amplify and expand the submittal, or undertake the additional work, or reimburse the State's expenses, in accordance with the Director's final decision and order, except as that decision may be modified upon court review. The period of time within which Respondent must comply with the Director's final decision and order shall be as specified in the Director's final decision and

order.

6. After receipt of a revised submittal or modified and/or amplified and expanded submittal, the Department shall notify Respondent in writing of its approval or disapproval of the submittal. If the submittal fails to comply with the Director's final decision and order and the Department disapproves the revised submittal for this reason, Respondent shall be in violation of this Order and the ECL.

7. If Respondent fails to comply with a final decision and order of the Director requiring Respondent to reimburse the State's expenses, Respondent shall be in violation of this Order and the ECL.

B. 1. The invocation of formal dispute resolution procedures under this Paragraph IV shall suspend and toll only those obligations of Respondent under this Order which are in dispute or necessarily dependent on resolution of the matter or matters in dispute. Respondent's filing of a Petition for review under Article 78 of the CPLR shall not stay or excuse performance of work or timely transmission of submittals with respect to the disputed issues, except by agreement of the Department or by order of the court upon Respondent's application. Respondent shall have the burden of establishing before the court the necessity or appropriateness of such stay or excuse.

2. The invocation of the procedures stated in this paragraph shall constitute an election of remedies by Respondent, and such election of this remedy shall constitute a waiver of any and all other remedies which may otherwise be available to Respondent regarding the issue in dispute.

V. Force Majeure

A. Respondent's failure to comply with any term of this Order constitutes a violation of this Order and the ECL.

B. Notwithstanding any provision in this Order or the ECL to the contrary, Respondent shall not suffer any penalty under this Order or the ECL or be subject to any proceeding or action if it cannot comply with any requirement hereof because of war, riot, labor dispute, adverse weather conditions, or any fact or circumstance beyond Respondent's reasonable control ("force majeure event"), provided, however, that Respondent shall, within five (5) business days of when it obtains knowledge of any such condition, notify the Department in writing. Respondent shall include in such notice the measures taken and to be taken by Respondent to prevent or minimize any delays and shall request an appropriate extension or modification of this Order. Failure to give such notice within such five-business day period constitutes a waiver of any claim that a delay is not subject to penalties. Respondent shall have the burden of proving that an event is a defense to compliance with this Order pursuant to this Subparagraph V.B.

VI. Entry upon Site

Respondent hereby consents to the entry upon the Site or areas in the vicinity of the Site which may be under the control of Respondent by any duly designated employee, consultant, contractor, or agent of the Department or any State agency for purposes of inspection, sampling, and testing and to ensure Respondent's compliance with this Order. Such employee, consultant, contractor, or agent shall comply with all applicable and reasonable security and safety programs and protocols that apply to the Site or areas in the vicinity of the Site which may be under the control of Respondent.

VII. Payment of State Costs

A. Within 45 days after receipt of an itemized invoice from the Department, Respondent shall pay to the Department a sum of money which shall represent reimbursement for the State's expenses for the period beginning June 1, 1994 including, but not limited to, direct labor, fringe benefits, indirect costs, travel, analytical costs, and contractor costs incurred by the State of New York for work related to the Site as well as for reviewing and revising submittals made pursuant to this Order, overseeing activities conducted pursuant to this Order, collecting and analyzing samples, and administrative costs associated with this Order. Such payment shall be made by check payable to the Department of Environmental Conservation and shall be sent to:

Bureau of Program Management
Division of Environmental Remediation
New York State Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233-7010.

B. The first invoice to be rendered by the Department pursuant to this Paragraph shall reflect Respondent's prior payment of $17,000 for the State's expenses incurred after June 1, 1994.

C. Personal service costs shall be documented by reports of Direct Personal Service, which shall identify the employee name, title, biweekly salary, and time spent (in hours) on the project during the billing period, as identified by an assigned time and activity code. Approved agency fringe benefit and indirect cost rates shall be applied. Non-personal service costs shall be summarized by category of expense (e.g., supplies, materials, travel, contractual) and shall be documented by expenditure reports.

D. Within thirty (30) days of receipt of an invoice pursuant to Subparagraph VII.A., Respondent may object, in writing, to the accuracy of that invoice. If Respondent's objections cannot be resolved by informal discussions within twenty (20) days of the Department's receipt of Respondent's written objections, Respondent shall pay the undisputed

amount no later than thirty (30) days after the Department's receipt of the written objections. Thereafter, Respondent may invoke the dispute resolution procedure pursuant to Paragraph IV of this Order to resolve the disputed amounts still owing. Unless the dispute resolution procedure is invoked within ten (10) business days of the Department's receipt of the undisputed amounts, Respondent shall be in violation of this Order for failure to pay any amount still owing.

VIII. Department Reservation of Rights

A. Except as otherwise provided in this Order, nothing contained in this Order shall be construed as barring, diminishing, adjudicating, or in any way affecting any of the Department's civil, criminal, or administrative rights (including, but not limited to, nor exemplified by, the right to recover natural resource damages) or authorities.

B. Nothing contained in this Order shall be construed to prohibit the Commissioner or his duly authorized representative from exercising any summary abatement powers.

IX. Indemnification

Respondent shall indemnify and hold the Department, the State of New York, and their representatives and employees harmless for all claims, suits, actions, damages, and costs of every name and description arising out of or resulting from the fulfillment or attempted fulfillment of this Order by Respondent and/or any of Respondent's directors, officers, employees, servants, agents, successors, and assigns. Said indemnification shall not include indemnification in any form for unlawful, willful or malicious acts or omissions on the part of the Department or the State of New York or their representatives and employees.

X. Public Notice

Within 30 days after the effective date of this Order, Respondent shall file a Declaration of Covenants and Restrictions in the form attached to this Order as Appendix C with the Erie County Clerk and provide the Department with a copy of such instrument certified by the Erie County Clerk to be a true and faithful copy of the instrument as recorded in the Office of the Erie County Clerk to give all parties who may acquire any interest in the Site notice of this Order.

XI. Communications

A. All written communications required by this Order shall be transmitted by United States Postal Service, by private courier service, or hand delivered as follows:

1. Communication from Respondent shall be sent to:

Environmental Remediation Engineer
Division of Environmental Remediation
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, New York 14203

with copies to:

Division of Environmental Remediation
New York State Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233-7010

Director, Bureau of Environmental Exposure Investigation
New York State Department of Health
2 University Place
Albany, New York 12203

Department of Environmental Conservation
Division of Environmental Enforcement
Field Unit Leader
270 Michigan Avenue
Buffalo, New York 14203

Cameron O'Connor
New York State Department of Health
584 Delaware Avenue
Buffalo, New York 14202

2. Communication to be made from the Department to Respondent shall be sent to:

Mark Napolitan
General Motors Corporation
Worldwide Facilities Group - Remediation
Mail Code #482-310-004
485 W. Milwaukee
Detroit, Michigan 48202

Anthony P. Thrubis, Esq.
General Motors Corporation
Legal Staff
Mail Code #482-112-149
3044 West Grand Blvd.
Detroit, Michigan 48202

Barry R. Kogut, Esq.
Bond, Schoeneck & King, LLP
One Lincoln Center
Syracuse, New York 13202

B. Copies of work plans and reports shall be submitted as follows:

Three copies (one unbound) to Environmental Remediation Engineer.

Two copies to the Director, Bureau of Environmental Exposure Investigation.

One copy to Cameron O'Connor.

One copy to Division of Environmental Enforcement, Field Unit Leader.

C. Within 30 days after its approval of the Remedial Construction Certification Report, Respondent shall submit one microfilm copy (16 millimeter roll film M type cartridge) of any drawings included in that Report.

D. The Department and Respondent reserve the right to designate additional or different addressees for communication or written notice to the other.

XII. Miscellaneous

A. All activities Respondent is required to undertake under this Order are ordinary and necessary expenses for the continued operation of Respondent.

B. Respondent shall retain professional consultants, contractors, laboratories, quality assurance/quality control personnel, and third party data validators acceptable to the Department to perform the technical, engineering, and analytical obligations (the "technical work") required by this Order. Respondent has retained EMCON to perform some of the technical work required by this Order. The foregoing arrangement is acceptable to the Department. For any other firm retained to perform work under this Order, or if Respondent chooses to replace EMCON, prior to the start of any activities for which that firm shall be responsible, Respondent shall submit the experience, capabilities, and qualifications of the firm

for Department approval, which approval shall not be unreasonably withheld or delayed. The responsibility for the performance of the professionals retained by Respondent shall rest solely with Respondent.

C. With respect to the work to be performed under this Order, the parties shall have the right to obtain split samples, duplicate samples, or both, of all substances and materials sampled by one another and they shall also make available to one another the results of all such sampling and testing. Tests or other data generated by Respondent with respect to the Remedial Construction shall be submitted in the progress reports required by this Order.

D. Respondent has submitted to the Department information within Respondent's possession or control regarding environmental conditions at the Site. Respondent, within 15 days after receipt of a written request of the Department, will provide in accordance with ECL Section 27-1307, additional information, if any, within Respondent's possession or control.

E. Respondent shall notify the Department at least 5 business days in advance of any field activities to be conducted pursuant to this Order.

F. 1. Respondent shall obtain all permits, easements, rights-of-way, rights-of-entry, approvals, or authorizations necessary to perform Respondent's obligations under this Order. In the event that Respondent is unable to obtain the necessary authorizations required to perform its obligations under this Order, the Department shall, consistent with its legal authority, assist in obtaining such authorizations which Respondent was unable to obtain despite its best efforts. If any necessary authorization cannot be obtained on a timely basis, the time for performance of any obligation which the Department determines is dependent upon such authorization shall be appropriately extended upon written request.

2. Notwithstanding anything in this Subparagraph XII. F. to the contrary, Respondent shall not be required to obtain State or local permits for certain work conducted under this Order consistent with the criteria set forth in 6 NYCRR §375-1.7.

G. Respondent and Respondent's successors and assigns shall be bound by this Order. Respondent's officers, directors, employees, servants, and agents shall be obliged to comply with the relevant provisions of this Order in the performance of their designated duties on behalf of the Respondent. Any change in ownership or corporate status of Respondent including, but not limited to, any transfer of assets or real or personal property shall in no way alter Respondent's responsibilities under this Order.

H. Respondent shall provide a copy of this Order to each contractor hired to perform work required by this Order and to each person representing Respondent with respect to the Site and shall condition all contracts entered into in order to carry out the obligations identified in this Order upon performance in conformity with the terms of this Order. Respondent or Respondent's contractors shall provide written notice of this Order to all

subcontractors hired to perform any portion of the work required by this Order. Respondent shall nonetheless be responsible for ensuring that Respondent's contractors and subcontractors perform the work in satisfaction of the requirements of this Order.

I. All references to "professional engineer" in this Order are to an individual registered as a professional engineer in accordance with Article 145 of the New York State Education Law. If such individual is a member of a firm, that firm must be authorized to offer professional engineering services in the State of New York in accordance with Article 145 of the New York State Education Law.

J. All references to "days" in this Order are to calendar days unless otherwise specified.

K. The paragraph headings set forth in this Order are included for convenience of reference only and shall be disregarded in the construction and interpretation of any of the provisions of this Order.

L. 1. No term, condition, understanding, or agreement purporting to modify or vary any term of this Order shall be binding unless made in writing and subscribed by the party to be bound. No informal advice, guidance, suggestion, or comment by the Department regarding any report, proposal, plan, specification, schedule, or any other submittal shall be construed as relieving Respondent of Respondent's obligation to obtain such formal approvals as may be required by this Order.

2. If Respondent desires that any provision of this Order be changed, Respondent shall make timely written application, signed by Respondent, to the Commissioner setting forth reasonable grounds for the relief sought. Copies of such written application shall be delivered or mailed to the Field Unit Leader, Division of Environmental Enforcement and the Environmental Remediation Engineer.

M. The effective date of this Order is the date the Commissioner or his designee signs it. Upon the effective date of this Order, Respondent's obligations to provide a Remedial Design Report and Remedial Alternative Certification Report under Subparagraphs I.B.1.c. & d of the IRM Order shall terminate.

DATED: 8/13/98

JOHN P. CAHILL
Commissioner
New York State Department
of Environmental Conservation

By: _____
Michael J. O'Toole, Jr.

CONSENT BY RESPONDENT

Respondent hereby consents to the issuing and entering of this Order, waives Respondent's right to a hearing herein as provided by law, and agrees to be bound by this Order.

GENERAL MOTORS CORPORATION

By: Anthony P. Thrubis
(TYPE NAME OF SIGNER)

Title: ATTORNEY

Date: AUGUST 4, 1998

STATE OF NEW YORK)
) s.s.:
COUNTY OF)

On this 4th day of August, 1998, before me personally came Anthony P. Thrubis, to me known, who being duly sworn, did depose and say that he resides in Farmington Hills, MI; that he is the Attorney of General Motors, the corporation described in and which executed the above instrument; and that he has the authority to execute this instrument on behalf of General Motors Corporation.

Carolyn E. Stoehr
Notary Public
CAROLYN E. STOEHR
Notary Public, Wayne County, MI
My Commission Expires July 9, 2000

APPENDICES

Appendix A	Record of Decision (March, 1998)
Appendix B	Department-approval Remedial Design Report
Appendix C	Declaration of Covenants and Restrictions

Appendix A

Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision

Saginaw - Buffalo
Erie County
Site Number 915152

March 1998

New York State Department of Environmental Conservation
GEORGE E. PATAKI, *Governor* JOHN CAHILL, Commissioner

TABLE OF CONTENTS

Appendix B

REMEDIAL DESIGN REPORT

SAGINAW-BUFFALO SITE

NYSDEC SITE NO 915152

Prepared for

General Motors Corporation
Worldwide Facilities Group
Environmental Remediation and International Environmental Support

Issued July 2, 1998
Revised July 21, 1998

Prepared by

EMCON
1775 Baseline Road, Suite 220
Grand Island, New York 14072

Project 85740-100.000

Appendix C

DECLARATION OF
COVENANTS AND RESTRICTIONS

TO WHOM IT MAY CONCERN:

GENERAL MOTORS CORPORATION (Delphi Saginaw Steering Systems Division) ("GM") entered into an Order on Consent (Index # B9-0410-92-09)(the "Remedial Program Order") with the New York State Department of Environmental Conservation ("Department") for the Development and Implementation of a Remedial Program at the site of its former Saginaw Division facility located at 1001 East Delavan Avenue, Buffalo, New York (the "Facility"). The Facility is currently owned by American Axle & Manufacturing, Inc. ("AAM") which purchased the Facility as of March 1, 1994.

The Facility is included within the property conveyed to AAM which is described in a Bargain and Sale Deed, made as of February 26, 1994 and filed in the Erie County Clerk's Office at page 4548 & c. The legal description of the property is attached hereto as Exhibit A.

The Deed restricts AAM's use of the property to industrial use as follows:

> 3. . . . Grantee further acknowledges that from and after the date of this Deed, the use of the Premises shall be restricted in perpetuity (or, if not permitted in perpetuity under law, then, for such shorter period of time as shall be the maximum period of time permitted under law), except as provided below, to industrial use and without access by members of the general public; provided, however, that customary office and other uses ancillary to the principal use of the Premises for industrial use shall not be deemed prohibited hereby and further provided, however, that such restriction may be eliminated as an encumbrance upon the Premises only with the written consent of Grantor.

Bargain and Sale Deed at page 2.

Background

An investigation of a spill of reclaimed industrial oil at an area near the Facility's oily wastewater treatment plant ("WWTP") detected polychlorinated biphenyls ("PCBs") in subsurface soil and groundwater below existing pavement, as well as elevated levels of lead in soil. Further investigation revealed an abandoned clay tile sewer pipe containing PCB-contaminated oil which GM believes was used prior to GM's purchase of the property in 1965. The April 1997 Registry of Inactive Hazardous Waste Disposal Sites ("Registry") describes the site as an area of PCB and lead contamination found at the Facility in an approximately seven-acre portion of an employee parking lot adjacent to the WWTP (the "Site"). The presence of lead

contamination has also been confirmed in soils inside the seven-acre area described in the Registry.

The Site is divided into two operable units. The first Operable Unit is for PCBs ("OU-1"). The second Operable Unit is for the lead ("OU-2") and the apparent source of the lead is the "ash-like" fill materials found in the area studied inside Parking Lot No. 4.

The Department has designated the Site as an inactive hazardous waste disposal site, as that term is defined at ECL Section 27-1301.2 and has listed it in the Registry as Site Number 915152. The Department has classified the Site as a Classification "3" pursuant to ECL Section 27-1305.4.b. A Classification "3" is assigned by the Department to sites which do not present a significant threat to the public health or the environment and at which action may be deferred.

GM and the Department entered into an Order on Consent, effective February 2, 1995, pursuant to which GM performed an Interim Remedial Measure at OU-1 and conducted a Site Investigation and Engineering Evaluation of Alternatives at both of the operable units (the "IRM Order"). A Declaration of Covenants and Restrictions was filed in accordance with the IRM Order in the Erie County Clerk's Office in Book of Deeds 10883 at page 6612 to provide notice to any parties who may acquire any interest in the Site.

Based upon GM's Engineering Evaluation of Alternatives Report, the Department prepared a Proposed Remedial Action Plan, which was submitted for public comment in February of 1998. On March 31, 1998, the Department selected a final remedial alternative for the Site in a Record of Decision ("ROD").

GM's Obligations under the Order

GM and the Department entered into the Remedial Program Order to implement the ROD-approved remedial alternative at the Site in **[To be inserted]** of 1998. A copy of this Order can be reviewed at the Department's Region 9 offices at 270 Michigan Avenue, Buffalo, New York by contacting Jaspal Walia of the Department's Division of Environmental Remediation or by contacting Maura Desmond of the Department's Division of Environmental Enforcement at the Department's Region 9 address.

This Declaration of Covenants and Restrictions is being filed in accordance with paragraph X of the Remedial Program Order to give all parties who may acquire any interest in the Site notice of the Order. AAM, the owner of the Site, has consented to the filing of this Declaration.

WHEREFORE, the undersigned has signed this Declaration of Covenants and Restrictions to comply with the Remedial Program Order.

GENERAL MOTORS CORPORATION

By:_____
Title:
Date:

STATE OF)
COUNTY OF)

On the _____ day of _____ before me, the undersigned, a notary public in and for said state, personally appeared _____, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he/she executed the same in his/her capacity, and that by his/her signature on the instrument the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public

APPENDIX B

PAVEMENT, SEWER, AND MONITORING WELL INSPECTION FORM

ANNUAL INSPECTION FORM
SAGINAW-BUFFALO SITE

PAVEMENT (Identify any damaged areas on site sketch)

1. Cracked Areas Yes _____ No _____
2. Settled Areas Yes _____ No _____
3. Potholes Yes _____ No _____
4. Heaving Yes _____ No _____
5. Plow Damage Yes _____ No _____
6. Drainage Good _____ Poor _____ Explain _____

_____

7. Condition of Surface Sealing Good _____ Poor _____ Explain _____

_____

STORM SEWERS

1. Condition of Manhole Risers Good _____ Poor _____ Explain _____

_____

2. Sediment in Main None _____ Avg (1-4") _____ High (>4") _____

   Comments _____

MONITORING WELLS

	MW-1	MW-5	MW-201	MW-202	MW-203	MW-204	MW-205	MW-206	MW-208	MW-209	MW-210	MW-211
Is protective casing in good condition?												
Is flush mount casing in good condition?												
Are casings labeled?												
Is concrete surface seal in good condition?												
Is protective pad in good condition?												
Are locks present?												
Are locks in good condition?												
Is riser in good condition?												
Are J-plugs present?												

Comments: _____

_____

_____

APPENDIX C

PRODUCT SPECIFICATION – CMC #102

PRODUCT DATA SHEET — CRACK & JOINT SEALANTS

CMC #102
New York

REQUIREMENTS
Single component hot applied crack sealant. Exceeds the requirements of ASTM D-3405. Typical uses are for roads and highways. ***Contains a minimum of 10% crumb rubber.***

GENERAL COMPOSITION
Ingredients include a mixture of virgin synthetic rubber or a combination of the two with asphalt and other modifiers as required to meet the specification. Reclaimed materials are utilized as needed except when prohibited by specifying agency or if use would adversely affect product quality or compliance to specification.

USE
CMC 102 is a pre-reacted sealant and can be applied immediately after application temperature is reached. Specifications require melting in an indirect, jacketed vesel.

APPLICATION
Heating and application in accordance with manufacturer's detailed instructions.

PHYSICAL PROPERTIES & SPECIFICATION COMPLIANCE

TEST	SPECIFICATION	TYPICAL CMC 102 RESULTS
Cone pen @ 77°F (25°C) ASTM D-3407	90 max	75-85
Resilience ASTM D-3407	60% min	65%
Bond @ 0°F (-18°C), 100% ext. ASTM D-3407	Pass 3 cycles	Pass 3 cycles
Bond @ -20°F (-29°C), 50% ext. ASTM D-3407	Pass 3 cycles	Pass 3 cycles
Flow @ 140°F (60°C) ASTM D-3407	3 mm max	1-2 mm
Asphalt compatibility ASTM D-3407	Complete	Pass
Recommended application temperature		380°F (195°C)
Maximum application temperature		390°F (200°C)**

** *Temperature of sealant measured at pavement surface. Use Maximum application temperature in cool weather.*

PACKAGING
Available in 60 lb. (27 kg) boxes containing two 30 lb. (13.6 kg) bags of sealant. Alternate packaging is available.

WARRANTY
CMC warrants that all sealant meets applicable specifications at time of shipment. Remedies against CMC are limited, at CMC's option, to product replacement, or full or partial refund, and does not include installation or any other cost. Claims must be made within three months of the date of purchase.

Effective 1-1-94

Crackfiller Manufacturing Corporation
PO BOX 6738 CHEYENNE, WY 82003 307/778-8610

APPENDIX D

PARKING AREA REPAIR, PAVING, AND STRIPING SPECIFICATION

SECTION 02519

PARKING AREA REPAIR, PAVING AND STRIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The Contractor shall furnish all labor, materials, equipment, tools and appurtenances required to complete the on-site work of repairing, paving and striping the Parking Area.

1.2 RELATED SECTIONS

A. Section 01000 - Scope of Work

1.3 REFERENCES

A. AASHTO M147-65 – Materials for Aggregate and Soil-Aggregate.

B. ASTM C136 – Sieve Analysis of Fine and Coarse Aggregates.

C. ANSI/ASTM D698 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb. Rammer and 12-inch Drop.

D. ANSI/ASTM D1557 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. Rammer and 18-inch Drop.

E. ASTM D4318 – Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

F. New York State Department of Transportation (NYSDOT) – Standard Specifications for Road and Bridge Construction.

1.4 SUBMITTALS

A. Product information on the AC-5 oil, Petromat fabric, sealcoating material, and striping paint proposed to be used.

B. Quality control data for imported subbase material and from asphalt placement.

1.5 DESCRIPTION OF WORK

A. Repairs:

1. Within the existing 7-acre Parking Area, pavement in poor condition shall be repaired. The asphalt shall be removed and disposed.

B. Paving

1. Some areas of the existing 7-acre Parking Area may need to be repaired. Areas in need of repair shall be repaved by applying AC-5 oil and Petromat fabric over the existing asphalt; applying a 2-inch base coat of asphalt; and applying a 1-inch top coat of asphalt

2. Any repaired surface areas in the 7-acre Parking Area shall be sealcoated one year after repaving and repair.

3. If needed, storm sewer manholes/catch basins shall be raised to new grade.

C. Striping

1. If repairs affect the striping, affected areas shall be re-striped to maintain 768 parking stalls, once after repaving and repair, and a second time after sealcoating the surface one year later.

2. If repairs affect any of the Seventeen (17) handicap parking stalls, they shall be re-marked with a painted pavement symbol and/or handicap parking sign once after repaving and repair, and a second time after sealcoating the surface one year later.

1.6 TIME OF CONSTRUCTION

A. If the permanent paving for the roadways and paved areas is damaged before or during repair, it shall not be replaced until the use of heavy equipment is no longer required on the site and until all operations on the site have advanced to a point where no damage to the pavement will result from the Contractor's operations. The use of finished pavement for or during heavy construction operations will not be permitted. Time of construction of permanent paving will be subject to the approval of the Engineer.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Do not place asphalt when base surface temperature is less than 40°F, or surface is wet or frozen.

B. Comply with paint manufacturer's instructions for application conditions for striping paint.

PART 2 PRODUCTS

2.1 SUBBASE

A. Additional subbase material in the repair areas, if required, shall be crushed stone conforming to Section 304 of NYSDOT Standard Specifications. Subbase shall be compacted to no less than 95% maximum dry density.

2.2 BITUMINOUS CONCRETE

A. The bituminous concrete used shall be composed of a 2-inch binder course in the repair areas and 2-inch binder course and 1-inch top course across the entire Parking Area.

B. The materials for bituminous concrete shall conform to the requirements of Section 403 of the NYSDOT Standard Specifications.

2.3 SEALCOATING

A. A coal tar pitch emulsion shall be used.

2.4 STRIPING

A. Yellow acrylic waterborne paint for striping replacement outside parking areas shall be used.

2.5 HANDICAP STALL SIGNS

A. A 12-inch by 18-inch handicap parking sign, reflectorized, OSHA Standard, with post, shall be provided for each repaired handicap stall.

PART 3 EXECUTION

3.1 SITE PREPARATION

A. The Contractor shall perform all grading necessary in the repair areas to bring the subgrade to lines and grades required for these areas to drain properly.

B. On existing pavement in good condition, a thin layer of AC-5 oil shall be sprayed on and Petromat fabric placed on top and allowed to dry to form a water-tight seal to prevent erosion damage created by freeze/thaw cycles.

3.2 BITUMINOUS CONCRETE

A. After the subbase material has been placed in the repair areas and the AC-5 oil/Petromat fabric has dried in the rest of the Parking Area, the bituminous concrete material shall be laid at an accepted placing temperature.

B. Each course shall be evenly spread as to achieve the required compacted thickness of each respective layer.

C. The bituminous concrete paving shall be constructed according to the methods outlined in the applicable sections found in the NYSDOT Standard Specifications.

D. The bituminous concrete shall be thoroughly rolled or compacted in a longitudinal direction. After initial rolling, the surface of the base course shall be dusted with

screenings or sand and re-rolled. The finished top of the bituminous concrete shall be even with the abutting edge of existing pavement.

E. Where manholes are encountered, the bituminous concrete shall be feathered from the top of the manhole rim outward for a distance of four feet in all directions to the level of the bituminous concrete.

F. Should a settlement of less than four inches occur, it shall be replaced by patching with additional bituminous concrete. If excessive (greater than four inches) settlement occurs indicating a failure of the foundation soil, the entire bituminous concrete pavement shall be removed. The foundation shall be recompacted, or removed and replaced if necessary, and the base course shall be replaced.

G. Construct bituminous concrete surface course when atmospheric temperature is above 40°F (4°C), and when base is dry. Base course may be placed when air temperature is above 30°F (1°C) and rising.

H. Place bituminous concrete mixture on prepared surface, spread and strike off. Spread mixture at minimum temperature of 225°F (107°C). Place inaccessible and small areas by hand. Place each course to required grade, cross-section and compacted thickness.

I. Apply joint sealer at the interface between new asphalt or concrete and existing asphalt.

3.3 ROLLING

A. General

1. Begin rolling when mixture will bear roller weight without excessive displacement.

2. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.

B. Breakdown Rolling - Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling and repair displaced areas by loosening and filling, if required, with hot material.

C. Second Rolling - Follow breakdown rolling as soon as possible while mixture is hot. Continue second rolling until mixture has been thoroughly compacted.

D. Finish Rolling - Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained maximum density.

E. Patching - Remove and replace paving areas › ›d with foreign materials and defective areas. Cut out such areas and fill with fresh, l ›phalt concrete. Compact by rolling to maximum surface density and smoothness.

F. Protection - After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

3.4 SEALCOATING

A. Sealcoating shall be done one year after paving.

B. Two coats of a coal tar pitch emulsion shall be applied.

3.5 STRIPING

A. A 4-inch wide yellow stripe shall be used.

B. Striping shall be done after paving and again one year later after sealcoating.

C. Handicap areas will be marked twice like striping.

END OF SECTION

APPENDIX E

MONITORING WELL GAUGING FIELD FORM

GROUNDWATER MONITORING FIELD FORM

Site Name _____ Well Diameter (in.) _____

Client _____ Initial Water Level (ft. from TOC) (a) _____

Job Number _____ Well Depth (ft. from TOC) (b) _____

Well Number _____ Length of Water Column (ft.) (b-a) _____

Date _____ Well Constant (gal/ft) (conversions below) _____

Field Staff _____ Well Volume (gallons) _____

Weather Conditions _____

PURGE DATA:

Start of Purge: Date: _____ Time: _____

Sheen Present: Y / N (circle one) Oil Layer: Y / N (circle one) Thickness: _____

Purge Method: _____ (bailer, pump, etc.)

Purge Observations: _____

Total Volume Purged: _____ # of Well Volumes Purged: _____

SAMPLING DATA:

Sample Depth: _____ Date: _____ Time: _____

Sample Method: _____ (bailer, pump, etc.) Field Filtered: _____ (yes or no)

Sample Observations: _____

Analytical Parameters: _____

FIELD PARAMETERS:

Meter	Parameter	Unit	Reading 1	Reading 2	Reading 3	Reading 4
	pH					
	Conductivity	umhos/cm				
	Temperature	°C				
	Turbidity	ntu				

OBSERVATIONS: _____

CONVERSION FACTORS:

Well Diameter:	Multiply Water Column By:
1"	0.041
1.25"	0.064
2"	0.163
4"	0.653
6"	1.469
8"	2.611

APPENDIX F

STANDARD OPERATING PROCEDURE - GROUNDWATER SAMPLING

GROUNDWATER SAMPLING METHODOLOGY

1.0 Observations

Upon arrival at each well, the sampling tem will make observations as to the conditions of the well and any outside factors which may affect the well in any way. These observations include well labels, locks, surface seal integrity, and other surrounding conditions which may influence sampling. These observations, as well as date, time, weather, and crew members, are noted in the field log book.

2.0 Preparation

The first step in preparation for sampling is well purging, which requires a determination of the volume of standing water within the well. Depth to the bottom of the well is measured by lowering a water level indicator to the well bottom. Once contact has been made, the tape is placed against the side of the inner casing at the marked reference point and the tape is read to the nearest 0.01 foot. If no inner casing is present, the reading will be taken from the top of the protective outer casing. This measurement is recorded in the field log.

Static water level (depth to water) will then be taken with the water level indicator by lowering the probe into the well until contact with water occurs. This contact will be signaled by a buzzer on the take-up reel of the water level indicator. Depth to water will be measured and recorded, taking care to measure to the same reference point on the casing.

3.0 Purging

All wells will be purged using a peristaltic pump with dedicated vinyl tubing or a disposable HDPE bailer. At least three standing well volumes will be purged prior to sampling. Field measurements (i.e., pH, temperature, conductivity, turbidity) will be collected after each well volume. Purge water should be collected for appropriate disposal at a later date after analytical results are received.

4.0 Sampling

Sampling must be performed within 24 hours after purging the well. The well should be allowed to recharge until the water level returns to at least 90% of the static water level obtained before purging.

A dedicated disposable HDPE bailer will be used to obtain groundwater samples from each well. The bailer will be lowered into the water column of the well until it has filled completely. The bailer will then be raised to the surface and the appropriate sample

bottles filled. The bailer will be repeatedly lowered into the well until all sample bottles have been filled. The sample bottles will be precleaned and supplied by the laboratory. Sample bottles will be labeled with the appropriate identifying information, including sample identification number, test parameters, preservatives, date and time of sampling, and client name.

Upon completion of sampling, samples will be packed in ice and stored and transported to the laboratory in coolers. The samples are required to be cooled to 4°C. A Chain of Custody form must be completed for each sample group to properly identify the samples. The form includes the sample IDs, time and date of sampling, required analyses, preservatives, and any other pertinent data. The name and signature of the sampler must be included on the form. The chain of custody form is transported in the sample cooler to the laboratory.

The sample coolers must be located within sight of the sampling crew or secured in a locked vehicle when stored in the field. The sample coolers will be affixed with custody seals and transported to the laboratory within six to eight hours of sampling or shipped via overnight carrier. Upon arrival at the laboratory, the custody seals will be checked and samples will be logged into the laboratory sample tracking system.

APPENDIX G

QUALITY ASSURANCE PROJECT PLAN (QAPP)

QUALITY ASSURANCE PROJECT PLAN

SAGINAW-BUFFALO SITE

NYSDEC SITE NO. 915152

Prepared for

General Motors Corporation
Worldwide Facilities Group
Environmental Services Group - Remediation

January 15, 2001

Prepared by

EMCON
1775 Baseline Road, Suite 220
Grand Island, New York 14072

Project 795532/00004000

CONTENTS

1 INTRODUCTION

This Quality Assurance Project Plan (QAPP) describes the quality assurance/quality control (QA/QC) measures that will be taken during the collection and analysis of multi-media samples as outlined in the work plan. Procedures for field and laboratory QA/QC and analysis; data reduction; reporting; sample control; and chain-of-custody are outlined in this plan.

Quality assurance objectives are delineated in Section 2.0 and sampling procedures are discussed in Section 3.0. Activities planned that will acquire information requiring quality controlled generation of analytical data include:

- Subsurface soil sampling and characterization;
- Groundwater sampling and characterization;
- Storm sewer sampling and characterization; and
- Data review, validation, and management.

Soil samples will be analyzed for polychlorinated biphenyls (PCBs). Aqueous samples will be analyzed for PCBs, lead and Buffalo Sewer Authority (BSA) required parameters (refer to Section 2.1.2). Analytical protocol is outlined in Section 5.0 of this report.

2 QUALITY ASSURANCE OBJECTIVES

The primary objective of the QA program for this project is to 1) maintain the evidentiary value of the information produced and 2) insure that field investigations, laboratory analysis, and reports are carried out in accordance with approved protocols. The QA Officer for the project, Kenneth C. Malinowski, Ph.D., is responsible for reviewing data to ensure compliance with protocols and that data is complete, representative, compliant, usable, and comparable. The quality of data generated by sampling, monitoring or analysis is defined in terms of the following:

Precision and Accuracy

The objectives for precision and accuracy are indicated in Section 10.0. Results of field and laboratory quality control samples are evaluated against approved criteria which measures the precision and accuracy of a given measurement system.

Duplicate analyses are conducted at a minimum rate of ten percent for batch analyses of ten or more samples or at least one sample per every batch if batches are less than ten. Statistics are calculated for determinations of analytical precision as described in Section 10.0.

Accuracy is monitored by the analyses of accepted reference samples (either reference control samples, spiked control samples or surrogate spikes). The use of reference samples is fully described in Section 10.0.

Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared with the amount that was expected to be obtained under correct normal conditions. Naturally, the amount of valid data obtained for this study is expected to be virtually complete, based on the use of published sampling and analytical methods. When comparing the amount of valid data obtained to that of a correct, normal condition, deviations may arise that are a result of the sample matrix. For instance, organic analysis requires an extraction and the proposed method may not fully recover the analytes of interest from the matrix. Dilutions may be necessary to reduce the effect of non-target species which extract with the target ones. These dilutions will raise detection limits above those for correct normal conditions. If this in fact occurs, the QA Officer will review the body of data to provide assurance that the data is adequate for the intended use.

Representativeness

Representativeness expresses the degree to which data accurately and precisely represents a characteristic or environmental condition. By way of the approved work plan, the frequency and location of sampling locations and method of sample acquisition have been designed such that data obtained will be considered representative of site conditions.

Comparability

Comparability expresses the confidence with which one data set can be compared to another. The use of published sampling and analytical methods, standard reporting units, and a program executed in accordance with this QAPP will aid in ensuring this comparability.

3 SAMPLE CONTROL PROCEDURES/CHAIN-OF-CUSTODY

Sample control consists of maintaining sample integrity, providing adequate documentation of all sampling procedures, avoiding sample cross-contamination, and ensuring proper sample custody. Sample control and chain-of-custody procedures are described in the following sections.

3.1 Maintenance of Sample Integrity

All sample containers will be pre-cleaned by the analytical laboratory according to the procedures specified in the USEPA's "Specifications Guidance for Obtaining Contaminant-Free Sample Containers" (April, 1990) or certified clean by the manufacturer providing sample containers. The laboratory will provide manufacturer's certificates attesting to same.

3.2 Field Data and Information Acquisition

The sampler's field records will contain sufficient information such that someone can reconstruct the sampling situation without reliance on the collector's memory. Entries in the field records will include the following:

- Name and address of project;
- Name of sampler;
- Name of others present;
- Location of sampling and address;
- Date and time of collection;
- Type of sample;
- Description of sampling point;
- Quantity of sample collected;
- Parameters requested for analysis;
- Type of sample container used;
- Preservative(s) used;
- Filtering;
- Sample collection procedure and equipment;

- Well evacuation procedure and equipment;
- Sample layering;
- Well specifics such as static water level, depth, and volume purged;
- Sample identification number(s);
- Field observations;
- Pertinent weather factors such as temperature, wind direction, and precipitation; and
- Any field measurements made such as pH, etc.

3.3 Equipment Decontamination/Preparation

All sampling equipment that comes in direct contact with samples will be cleaned prior to use and in the field between sample locations to prevent possible sample contamination and cross-contamination. Decontamination and cleaning will be performed using the procedure outlined below:

- Alconox detergent and potable water scrub;
- Potable water rinse;
- Methanol rinse;
- Ten percent nitric acid rinse;
- Deionized water rinse;
- Air dry; and
- Wrap in aluminum foil or store in sealed polyethylene bags.

Large equipment used during field activities will be decontaminated on-site. All wash water from decontamination activities will be collected and treated through granular activated carbon treatment system, with ultimate disposal to the Buffalo Sewer Authority sanitary sewer system.

3.4 Sample Custody

Chain-of-custody records for all samples, beginning with the cleaning and numbering of the sample containers at the laboratory, shall be maintained. A written record of container decontamination procedures shall be kept as well as the source of such containers. A sample shall be considered to be "in the custody" of an individual if said sample is either in direct view of, or

otherwise directly controlled by, the individual in custody. Storage of samples during custody shall be accomplished according to established preservation techniques in appropriately sealed and numbered storage containers. Chain-of-custody shall be accomplished by the exchange of the samples or sealed sample shuttle (e.g., shipping cooler) being directly transferred from one individual to the next with the transferrer witnessing the signature of the recipient upon the chain-of-custody record.

The chain-of-custody records will contain the following information:

- Sample number;
- Signature of collector;
- Date and time of collection;
- Sample type (e.g., groundwater or soil);
- Identification of well or sampling point;
- Number of containers;
- Parameters requested for analysis;
- Signature of person(s) involved in the chain of possession;
- Description of sample bottles and their condition; and
- Problems associated with sample collection (i.e., breakage, no preservatives).

The laboratory chain-of-custody procedures, at a minimum, will include the following:

- Designate a sample custodian/chain-of-custody officer;
- Have set and detailed written procedures for sample tracking through the lab from the time of receipt to final disposition of the sample; and
- Have set procedures to ensure sample holding times are not exceeded.
- All sample containers will be labeled with the sample identification number, the preservative (if any), and the parameter(s) requested for analysis. Labels will be affixed to sample containers prior to or at the time of sampling and should be filled out at the time of collection.

Sample seals are used to detect unauthorized tampering of samples following sample collection. The paper seal will include the following information:

- Name of sample;

- Date and time of sampling; and
- Place of collection.

The seal will be attached in such a way that it is necessary to break it in order to open the sample shipping cooler. These seals will be affixed to the sample shipping containers before the samples leave the custody of the sampling personnel.

4 CALIBRATION PROCEDURES AND FREQUENCY

There are two areas where calibration procedures and frequency are important: 1) for field equipment; and 2) for laboratory analytical equipment. Each of these areas is discussed below.

Field

Field equipment such as a photoionization detector and pH/conductivity meter will require daily calibration. Equipment log forms are maintained for each piece of equipment used in the field. The forms include the following information:

- Instrument identification/serial number;
- Date and time of calibration;
- Identification of calibrant/standard used;
- Personnel performing calibration;
- Calibration results; and
- Corrective action, if necessary.

In addition, problems encountered and corrective measures taken with a piece of field equipment will be documented on the log forms.

Laboratory

All laboratory instruments will be calibrated according to the specified methodology in Methods for Chemical Analysis of Water and Wastes (EPA-600/4-79-020; March 1983) and Test Methods for Evaluating Solid Waste, SW-846, Third Edition (USEPA, Office of Solid Waste and Emergency Response).

5 ANALYTICAL PROCEDURES

All laboratory chemical analyses will be performed by a New York State Department of Health (NYSDOH) approved laboratory. Analytical procedures for soil and water matrices will follow the methodologies outlined in Methods for Chemical Analysis of Water and Wastes (EPA 60014-79-020; March 1983), and/or Test Methods for Evaluating Solid Waste (SW-846), Third Edition.

Contract required quantitation limits (CRQLs) for this project are listed below:

		CRQLs	
PCBs	CAS Number	Water (ug/L)	Soil/Sediment[1] (ug/Kg)
AROCLOR-1016	12674-11-2	0.1	33
AROCLOR-1221	11104-28-2	0.1	67
AROCLOR-1232	11141-16-5	0.1	33
AROCLOR-1242	53469-21-9	0.1	33
AROCLOR-1248	12672-29-6	0.1	33
AROCLOR-1254	11097-69-1	0.1	33
AROCLOR-1260	11096-82-5	0.1	33

	CRQL	
	Water ug/L	Soil/Sediment ug/Kg
Lead	3.0	300

[1] Quantitation Limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculate on dry weight basis, as required by the protocol, will be higher.

6 DATA REDUCTION, VALIDATION AND REPORTING

This section addresses the requirements for data reduction, validation and reporting for each major measurement parameter. There are two separate areas where data reduction, validation and reporting apply. These areas are in the field investigation and in the analytical laboratory. Each is discussed separately below.

6.1 Field Procedures

6.1.1 Field Recordkeeping

Field measurements (whether analytical or other) will be recorded in the field team member's logbook. This book will have consecutively numbered pages, will be written only in ink, and will be signed at the bottom of each page. The data recorded in the logbook will be spot-checked frequently by the site manager/project manager to ensure that proper procedures for sampling, analysis, and measuring (detailed in other sections of the QAPP) are being followed.

6.1.2 Field Measurements

Field measurements will include water levels, temperature, pH, specific conductance, and turbidity.

6.2 Laboratory Procedures and Reporting

The appropriate data and reporting forms outlined in the analytical laboratory's QA/QC Plan for sample analyses will be reviewed. Once the entire data package has been reviewed, a narrative report and deliverables summary will be prepared describing data reduction and reporting procedures.

7 INTERNAL QUALITY CONTROL CHECKS

There are two segments to internal QC checks; those initiated in the field and those initiated in the laboratory. The internal QC checks performed by the laboratory will follow the laboratory's QA/QC Plan. Field QC checks will consist of the collection of the following samples:

- **Field Blanks** are collected to check the effectiveness of decontamination procedures for sampling equipment. Following a sampling event, sampling equipment will be decontaminated. Deionized water then will be passed through the sampler into the designated container. The field blank should be transported to the laboratory and analyzed for the appropriate parameters with the other samples. At a minimum, one field blank should be collected for each sampling event or for each different type of sampling equipment used.

- **Duplicates** can provide indications of the precision of the analytical system. A duplicate sample is a second sample collected at the exact same location and depth and time as the original sample. A duplicate sample serves to check accuracy and reliability of laboratory instruments and procedures, and field activities. Duplicates should be collected for each matrix at a frequency of ten percent.

8 PERFORMANCE AND SYSTEM AUDITS

Field audits from NYSDEC when required will be allowed. A review of field notes and discussions with field team members will verify that field activities were performed according to the work plan and QAPP. The field team leader will provide documentation of all work performed in the form of narrative and checklist tasks.

The laboratory QA/QC director or laboratory project manager will observe work being performed during the time that samples from this project are being processed and analyzed. The laboratory QA/QC director will certify in a short narrative report, and by means of signature approval on any QC reports, that the appropriate work has been performed.

The laboratory chosen for this project will be a NYSDOH approved laboratory for environmental analyses. The laboratory QAPP will be provided once the final laboratory selection is made.

The field sampling team will be required to document all field activities in a bound log book. The QA Officer will review the field book to ensure the following information has been recorded:

Groundwater Well Evacuation/Sampling

- Date and time;
- Type of purging equipment used;
- Type of sampling equipment;
- Total depth of the well;
- Volume of water purged;
- Well or sampling point identification number;
- Water level prior to evacuating and prior to sampling for each well;
- Appearance of water and change, if any;
- Odor of water, if any;
- Amount of water removed;
- Presence of more than one phase;
- Time of sampling; and
- Field measurement results: pH, conductance.

Soil Sample Collection

- Date and time;
- Sampling point identification number/sample number;
- Sample depth and surface area;
- Soil description/characteristics; and
- Collection device.

General

- Duplicate sample locations;

- Location of equipment blanks; and
- Equipment decontamination procedures.

The contractor will ensure that the laboratory is informed of any unusual sample characteristics.

9 PREVENTIVE MAINTENANCE

Preventive maintenance is primarily a function performed by the laboratory on their analytical equipment to ensure accurate results and to minimize equipment breakdowns/failure. While this is the case, there are a number of items used in field investigations for which preventive maintenance is an important consideration. Specific considerations for laboratory and field equipment are discussed below.

9.1 Field Equipment

Field monitoring equipment (e.g., photoionization detector, pH/conductivity meter) will be checked and maintained according to the standard maintenance schedule. These instruments are normally under contract to be checked/overhauled once annually or whenever problems arise. Batteries for all the equipment should be charged to full capacity prior to use.

A log which documents problems experienced with the instruments, corrective measures taken, battery replacement dates, and when used and by whom for each field instrument will be maintained. Appropriate new batteries will be purchased and kept with the meters to facilitate immediate replacement, when necessary, in the field.

All equipment to be utilized during the field sampling will be examined to certify that it is in operating condition. This includes checking the manufacturer's operating manuals and the instructions with each instrument to ensure that all maintenance items are being observed. Field notes from previous equipment usage and the maintenance log will be reviewed so that any prior equipment problems are not overlooked and all necessary repairs to equipment have been carried out.

In the field, each field instrument will be visually inspected prior to field activities to detect any damages or operational problems. Instrument responses will be checked against known standards prior to beginning field work. The instrument operation manuals will be referred to for trouble-shooting methods should equipment check-out indicate a problem. Instrumentation problems identified in the field should be relayed to the Project Manager.

9.2 Laboratory

Laboratory equipment is monitored by means of a log book for each instrument recording any maintenance activities and schedule. Daily and weekly tasks serve to maintain instrumentation in proper working order. Validation of optimal instrument performance by acceptable calibration and tuning criteria further support satisfactory data quality. Review of these logs and communication between QA/QC p[illegible]nnel allow for discovery and timely correction of problems. Since most analytical laboratories [illegible] sufficient inventory of supplies and equipment, downtime is not anticipated to occur.

10 DATA MEASUREMENT ASSESSMENT PROCEDURES

Data assessment procedures are employed to ascertain how reliably the concentration reported by the laboratory reflects the actual concentration of a given analyte in the sampled media. Precision and accuracy are two characteristics of data which can be examined to determine the reliability of results.

Precision is a measure of the mutual agreement among individual measurements of the same property. Reference control samples and analytical replicate control samples are used to determine that the results from an analytical batch of samples are within a known range of precision. The acceptance limits for the reference control samples reflect the precision under conditions with no matrix interferences. The acceptance limits for the analytical replicate control samples reflect the precision that can be obtained. Precision is expressed as either relative percent difference (% RPD) or relative standard deviation (% RSD).

Accuracy is the degree of agreement of a measurement with an accepted reference or true value. Reference control samples, spiked control samples, and surrogate spikes are used to determine that the results from an analytical batch of samples are within a known range of accuracy. The means of the reference control samples reflect the accuracy under conditions with no matrix interferences. The mean recoveries for the spiked control samples and surrogate spikes reflect the accuracy that can be obtained where there may be matrix interferences. Accuracy is expressed as percent recovery.

11 CORRECTIVE ACTION

Corrective action is required when field and laboratory generated data are not within the predetermined limits for data acceptability. In most field related instances, data acceptability is determined by, and referenced to, manufacturer specifications during calibration. Once calibrated and operational, data generated by the field instrumentation is assumed to be representative of the field condition measured.

In the event of erratic readings which do not stabilize during the critical usage of the equipment, corrective action will be implemented to identify the problem and its source. Appropriate documentation of this action will be recorded in the field log book and project file.

The laboratory selected to perform the analytical work detailed in the work plan has set protocols for corrective actions. These protocols are the responsibility of the laboratory QA Officer and are specified in the laboratory's QA/QC Plan.

Regardless of whether a problem arises in the laboratory or the field, all proposed corrective actions must be approved by the Project Manager prior to their implementation (unless the problem contains the elements of an emergency).

12 QUALITY ASSURANCE REPORTS TO MANAGEMENT

The QA Officer of the laboratory provides periodic assessments of measurement data accuracy and precision to the Laboratory Director, who distributes them to appropriate laboratory staff. Results of the performance audits and system audits are received by the Laboratory Director and also passed on to the lab staff. Other significant QA problems which may be detected throughout the review process of the analytical data are brought to the attention of the Laboratory Director and other appropriate individuals as they arise. The Laboratory Director will immediately notify the Consultant's Project Manager/QA Officer of problems detected, if any, and a mutual solution to the problem will be developed. A written report detailing problems, solutions taken to resolve the problems and impacts on analytical data will be provided to the Consultant with the actual sample analyses data.