



DUE CARE PLAN

GENERAL MOTORS POWER TRAIN SAGINAW METAL CASTING OPERATIONS

GENERAL MOTORS CORPORATION
1629 N. WASHINGTON AVENUE
SAGINAW, MICHIGAN 48605-5073

**Prepared by:
Conestoga-Rovers
& Associates**

651 Colby Drive
Waterloo, Ontario
Canada N2V 1C2

Office: (519) 884-0510
Fax: (519) 884-0525

web: <http://www.CRAworld.com>

OCTOBER 2003
REF. NO. 17075 (13)

TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	1
1.1 SITE DESCRIPTION	1
1.2 OPERATIONAL HISTORY	2
1.3 GEOLOGY	2
1.4 HYDROGEOLOGY	2
1.5 LAND USE	3
1.6 BARRIERS	3
1.7 POTENTIAL RECEPTORS.....	3
1.8 POTENTIAL PATHWAYS.....	3
1.8.1 GROUNDWATER PATHWAY	3
1.8.2 SURFACE WATER PATHWAY.....	4
1.8.3 SOIL PATHWAY	4
1.8.4 SEDIMENT PATHWAY	4
2.0 INVESTIGATIVE UNITS.....	5
2.1 INVESTIGATIVE UNIT A - FORMER SLUICE SAND SETTLING AREA	5
2.2 INVESTIGATIVE UNIT B - FORMER CHEVROLET PARTS PLANT	9
2.3 INVESTIGATIVE UNIT C - INLET RESERVOIR	14
2.4 INVESTIGATIVE UNIT D - SMC0 PLANT.....	18
2.5 INVESTIGATIVE UNIT E - THE RIVER DOCK AREA	23
2.6 INVESTIGATIVE UNIT F - AMDC AND FORMER ADMINISTRATION BUILDING	29
2.7 INVESTIGATIVE UNIT G - FORMER NODULAR IRON PLANT	32
2.8 INVESTIGATIVE UNIT H - WASTEWATER TREATMENT SYSTEM	35
2.9 INVESTIGATIVE UNIT I - CLASSIFIED SAND STAGING AREA.....	39
2.10 INVESTIGATIVE UNIT J - ON-SITE LANDFILL	42

LIST OF FIGURES
(Following Text)

FIGURE 1.1	SITE LOCATION
FIGURE 1.2	SITE PLAN
FIGURE 1.3	GROUNDWATER CONTOURS - UPPER WATER BEARING ZONE
FIGURE 1.4	GROUNDWATER CONTOURS - BEDROCK AQUIFER
FIGURE 2.1	INVESTIGATIVE UNIT A - GROUNDWATER SAMPLE LOCATIONS
FIGURE 2.2	INVESTIGATIVE UNIT A - SOIL SAMPLE LOCATIONS
FIGURE 2.3	INVESTIGATIVE UNIT B - GROUNDWATER SAMPLE LOCATIONS
FIGURE 2.4	INVESTIGATIVE UNIT B - SOIL SAMPLE LOCATIONS
FIGURE 2.5	INVESTIGATIVE UNIT C - SURFACE WATER SAMPLE LOCATIONS
FIGURE 2.6	INVESTIGATIVE UNIT C - SEDIMENT SAMPLE LOCATIONS
FIGURE 2.7	INVESTIGATIVE UNIT D - GROUNDWATER SAMPLE LOCATIONS
FIGURE 2.8	INVESTIGATIVE UNIT D - SOIL SAMPLE LOCATIONS
FIGURE 2.9	INVESTIGATIVE UNIT E - GROUNDWATER SAMPLE LOCATIONS
FIGURE 2.10	INVESTIGATIVE UNIT E - SOIL SAMPLE LOCATIONS
FIGURE 2.11	INVESTIGATIVE UNIT F - GROUNDWATER SAMPLE LOCATIONS
FIGURE 2.12	INVESTIGATIVE UNIT F - SOIL SAMPLE LOCATIONS
FIGURE 2.13	INVESTIGATIVE UNIT G - GROUNDWATER SAMPLE LOCATIONS
FIGURE 2.14	INVESTIGATIVE UNIT G - SOIL SAMPLE LOCATIONS
FIGURE 2.15	INVESTIGATIVE UNIT H - GROUNDWATER AND SURFACE WATER SAMPLE LOCATIONS

LIST OF FIGURES
(Following Text)

- FIGURE 2.16 INVESTIGATIVE UNIT H - SOIL AND SEDIMENT SAMPLE LOCATIONS
- FIGURE 2.17 INVESTIGATIVE UNIT I - GROUNDWATER SAMPLE LOCATIONS
- FIGURE 2.18 INVESTIGATIVE UNIT I - SOIL SAMPLE LOCATIONS
- FIGURE 2.19 INVESTIGATIVE UNIT J - GROUNDWATER SAMPLE LOCATIONS
- FIGURE 2.20 INVESTIGATIVE UNIT J - SOIL SAMPLE LOCATIONS

LIST OF APPENDICES

- APPENDIX A ENVIRON MEMORANDUM

Confidential under FOIA
Frank Postma
LFR
Aug 06, 2009 16:58

1.0 INTRODUCTION

1.1 SITE DESCRIPTION

The Saginaw Metal Casting Operations (SMCO) Facility is located at N. Washington Avenue and Veterans Memorial Parkway, in the City of Saginaw and in Buena Vista Township in Sections 5, 7, 8, 9, 17, and 18, Township 12 North, Range 4 East, Saginaw County, Michigan (Site). It is an operating industrial site located on approximately 700 acres (Figures 1.1 and 1.2). It is bounded on the west/northwest by the Saginaw River, the City of Saginaw Wastewater Treatment Plant and the closed City of Saginaw Landfill, the Buena Vista Wastewater Treatment Plant to the north and east, agricultural areas to the east, a recycling facility and bulk petroleum transfer facility to the south and east, some residential areas to the southeast, and general small businesses to the south. There is a Consumers Power Easement on the south side of the eastern half. The site also contains the Chesapeake and Ohio Railroad Company easement, the Veterans Memorial Highway right-of-way, the City of Saginaw Stormwater Ditch and a parcel owned by Larry Fairchild/Tri-County Refuse Company.

Buildings include the SMCO Manufacturing Buildings, the Advanced Materials Development Center, the Wastewater Treatment Building, and the Advanced Development Laboratory. The Chevrolet Parts Plant, the Nodular Iron Plant and the Administration Buildings have been demolished.

Surface water bodies on Site include the City of Saginaw stormwater ditch, the north ditch, the Deikmann Drain, the wastewater settling ponds, the recycle water reservoir, and an unnamed stormwater ditch.

The topography is generally flat and lies partially in the 100-year floodplain.

The current plant area is approximately 1.8 million square feet and consists of the main manufacturing building and a few ancillary buildings.

Generic residential criteria are exceeded in one or more locations on this property, therefore, those portions of the property are defined as Facilities under Act 451, Part 201.

1.2 OPERATIONAL HISTORY

SMCO Plant activities consist of casting iron and aluminum for automotive engines and cylinder heads, including core-making, melting, molten metal pouring, and cleaning/roughing, and involves, aluminum, scrap iron, lake sand, sea coal, bentonite clay, and phenolic resin, with hydraulic oils used in the equipment. Foundry activities have taken place on the property since the turn of the 20th century. There was another foundry on this property, the former Nodular Iron Plant, which produced nodular iron automotive parts and the process was similar to that of Grey Iron with the addition of calcium carbide to the molten iron to reduce the sulfur content in the iron. The Chevrolet parts plant did machining of parts and storage of engine blocks and other metal products. Other activities on this property include the handling and storage of process foundry sand, including core butts, washed classified sand, and a pile of sand where metals reclamation takes place. There is a wastewater treatment facility for the SMCO Plant, which treats process water and recycles the water through a closed loop system of ponds back to the plant.

1.3 GEOLOGY

The ground surface typically consists of a layer of fill of varying thickness, over fluvial/marsh deposits composed of silty sand and silty clay, which in turn overlies glaciolacustrine deposits composed of clay with thin discontinuous sand lenses overlying subglacial sand/gravel deposits. Bedrock in this area is encountered approximately 84 to 106 feet below the surface on the property and is composed of hard fine sandstone, part of the Pennsylvanian Saginaw Formation.

1.4 HYDROGEOLOGY

Groundwater is present unconfined in the more permeable surface fill and sand units. There is a confined water-bearing unit in the subglacial sand/gravel deposits, which are connected to the underlying sandstone. The two water bearing units are separated by the silty clay confining layer, which varies in thickness from 15 feet near the River to 80 feet on the eastern side and which can have limited quantities of water in discontinuous sand units. Figure 1.3 shows the general flow pattern in the upper water bearing zone across the Site. Flow in the water table groundwater is generally west/northwest toward the River, although the SMCO Plant locally affects flow, by

pumping drains around the buildings. The deeper or bedrock water bearing unit flows generally north toward Saginaw Bay, as presented on Figure 1.4.

Groundwater is not of good quality in the bedrock unit because of high dissolved solids. Drinking water is obtained through the City of Saginaw from Lake Huron.

1.5 LAND USE

The Site land use is as an operating plant and is zoned industrial. There are no plans to change ownership of the property or the current land use.

1.6 BARRIERS

Barriers include fencing around the Facility, 24-hour security on the property, and paving and building foundation in many areas.

1.7 POTENTIAL RECEPTORS

There are no residential receptors on the Facility as the property is and is anticipated to remain industrial. There will be routine workers in the plant operations, maintenance personnel in the equipment yards, and utility workers in underground utility work. Trespassers are possible but would not be common due to security on the plant site.

The property is currently used for routine plant activities. Maintenance personnel work outside the plant buildings. There are also utility workers who periodically work on the plant's underground utilities and investigation and remediation personnel who could be exposed through sampling and remedial activities. These workers are present only during specified times of year. Therefore, industrial criteria are appropriate for this site.

1.8 POTENTIAL PATHWAYS

1.8.1 GROUNDWATER PATHWAY

- **Groundwater Volatilization to Indoor Air Inhalation** - This is a pathway in areas covered by the plant buildings.

- **Groundwater Contact** - This is a potential pathway if excavation occurs to the water table and when groundwater monitoring wells are sampled.

The most recent groundwater data collected from each monitoring well was evaluated. There are a number of exceedances of industrial drinking water criteria in the groundwater at this Site.

Groundwater is not currently utilized on Site or in the vicinity of the Site for drinking water. There will be deed restrictions as part of the RAP for this Site, which will prevent the future use of this water for drinking. Until the RAP is completed, SMCO environmental personnel (Ray Ilkka) will ensure that no potable wells will be installed. All subsurface work must be cleared through Environmental Engineering before activities take place and there is a work authorization form, which must be filled out. No potable wells will be allowed on Site.

1.8.2 SURFACE WATER PATHWAY

- **Groundwater Contact** - This is a potential pathway if work occurs in the ponds, reservoirs, or ditches.

1.8.3 SOIL PATHWAY

- **Direct Contact** - Surface soils are a potential pathway for workers in the lawn areas, and the unpaved areas and subsurface soils if excavation occurred on the property or other activities occur on the soil surface.
- **Ambient Air 5 m Source Volatile Soil Inhalation** - This is a potential pathway.
- **Ambient Air Particulate Soil Inhalation** - This is a potential pathway, although much of the site is vegetated and unlikely to yield high levels of particulates.
- **Soil Volatilization to Indoor Air Inhalation** - This is a potential pathway within the plant buildings.

1.8.4 SEDIMENT PATHWAY

- **Direct Contact** - Sediment are a potential pathway for maintenance workers in the ponds, reservoirs, or ditches.

2.0 INVESTIGATIVE UNITS

Sampling on this Site has been done in conjunction with a RCRA RFI and included selected Appendix IX list of parameters, Target Compound Lists for VOCs, SVOCs, PCBs, and site-specific metals. There have also been individual investigations conducted by the Plant and this data has also been included. The Plan is set up to discuss each investigative unit (IU) in the RFI.

2.1 INVESTIGATIVE UNIT A - FORMER SLUICE SAND SETTLING AREA

This area is currently mostly vacant as sluice sand settling was discontinued in 1983. It is currently leased to an asphalt plant for their operations.

Groundwater Pathway

There are no exceedances of relevant criteria.

Surface Water Pathway

There is no surface water present in this area.

Soil Pathway

The concentration of chromium in one RFI sample (B10029^{0^1^RFI}) at boring MW-00821 exceeds the Part 201 generic particulate soil inhalation criterion (PSIC) of 240 mg/kg with a concentration of 292 mg/kg. Sample B10029 is a surface sample located in an area that does not have routine vehicle traffic (currently, industrial activities occur in IU A only on an intermittent basis) as assumed in MDEQ's derivation of the PSIC. Therefore the appropriate PSIC, based on wind erosion, is 2,500 mg/kg, as explained in ENVIRON's Discussion Paper on the MDEQ Part 201 PSIC (ENVIRON, 2000). This alternate PSIC is still highly conservative because it assumes that Cr is present entirely as hexavalent chromium. Data from soil samples at other locations at the facility show that most chromium is actually in the less toxic trivalent form. This sample is one of eight surface soil samples collected in IU A for chromium. All other samples have chromium concentrations lower than 240 mg/kg. The 95 percent (%) upper confidence limit on the mean (UCL¹) of these samples is

¹ The UCLs on the mean concentrations are calculated using a nonparametric bootstrap method known as the "BCa" (bias-corrected and accelerated) method (Efron and Tibshirani, 1998) with

181 mg/kg which is below the generic PSIC for chromium. Therefore, worker exposure to chromium concentrations in IU A surface soil is not significant.

The concentration of formaldehyde in one RFI sample (B50152-200301) at boring SB-00516 exceeds the Part 201 generic industrial soil volatilization to indoor air inhalation criteria of 65 mg/kg and the industrial soil volatilization to ambient air inhalation criteria of 69 mg/kg with a concentration of 79 mg/kg. The industrial soil volatilization to indoor air criteria is not relevant for evaluating formaldehyde in this sample as no buildings are located in the area of this sample. This sample is also 1 of 21 soil samples collected in IU A from all depths. All the other samples have formaldehyde concentrations lower than 65 mg/kg; the 95% UCL of these samples is 23.4 mg/kg which is well below the generic industrial soil volatilization to ambient air inhalation criteria for formaldehyde. Therefore worker exposure to formaldehyde in soil at IU A is not significant.

The concentrations of manganese in 11 RFI samples from borings MW-00821, SB-00718, SB-00718D, SB-00718E, SB-00820, SB-00821A, and SB-00822, exceed the Part 201 generic PSIC of 1,500 mg/kg.

- Six of the samples are located at a depth below ground surface (bgs) greater than 2 feet. Because these samples are not at ground surface, the PSIC is not relevant.
- Five of the samples are surface samples from borings MW-00821, SB-00820, SB-00821A, and SB-00822. The manganese concentrations in these samples range from 2,350 mg/kg to 12,600 mg/kg. These surface soil samples are located in an area that does not have routine vehicle traffic (currently, industrial activities occur in IU A only on an intermittent basis). Therefore the appropriate PSIC is 22,300 mg/kg and is based solely on wind erosion as explained in the Discussion Paper on the MDEQ Part 201 PSIC (ENVIRON, 2000). Therefore worker exposure to manganese particulate emissions in IU A is not significant.

Sediment Pathway

There are no sediments present in this area.

See Figures 2.1 and 2.2 for sample locations.

4,000 bootstrap replications to ensure adequate accuracy. UCLs on the mean were calculated using data from surface soil (0 to 2 feet bgs) and soil data from all sampling depths. The UCLs used to further evaluate significance of potential exposures are the higher of these two values.

Procedures For Maintenance of Due Care

Generic criteria were exceeded in soil samples in this area. Any subsurface work in this area will require prior review of the activity and its location in relation to known exceedances of appropriate criteria for those activities and authorization by Plant Environmental Engineering (Ray Ilkka). All workers will be shown the analytical data pertinent to this area prior to work and asked to confirm their understanding of the risks in this area by signature below. All removed soils will be managed appropriately.

This Due Care Plan is enforced by Mr. Ray Ilkka.

Contacts

SMCO Environmental Engineering

Mr. Ray Ilkka (989) 757-1473

Mr. Joe Toth (989) 757-2686

Remediation

Ms. Cheryl Hiatt (248) 680-5219

Ms. Jean Caufield (248) 680-5025

GM Legal

Mr. Tony Thrubis (313) 974-1398

Confidential under FOIA
Frank Postma
LFR
Aug 06, 2009 16:58

2.2 INVESTIGATIVE UNIT B - FORMER CHEVROLET PARTS PLANT

This area is currently a vacant field. It was formerly used for machining and storage of engine blocks.

Groundwater Pathway

The concentrations of benzo(a)pyrene in three RFI samples (M20237, H10019, and H10022) at MW-00309, SB-00307c and SB-00408a exceed the Part 201 generic groundwater contact criterion of 0.002 mg/L with concentrations of 0.003 mg/L.

The concentrations of benzo(b)fluoranthene in three RFI samples (M20252, M20237, and H10022) at MW-00306, MW-00309, and SB-00408a exceed the Part 201 generic groundwater contact criterion of 0.002 mg/L with concentrations of 0.003 mg/L.

The concentration of chrysene in one RFI sample (H10022) at SB-00408a exceeds the Part 201 generic groundwater contact criterion of 0.005 mg/L with a concentration of 0.01 mg/L.

The concentration of indeno(1,2,3-cd)pyrene in one RFI sample (H10022) at SB-00408a exceeds the Part 201 generic groundwater contact criterion of 0.002 mg/L with a concentration of 0.003 mg/L.

The concentrations of vinyl chloride in three RFI samples (M10002^0^1^RFI, M10216, and H70012) at MW-00509, and VAP00208 exceed the Part 201 generic groundwater contact criterion of 1 mg/L with concentrations ranging from 1.3 mg/L to 3.0 mg/L.

Because the depth to groundwater in IU B is approximately 3 feet bgs, potential exposure to construction workers is possible during excavations activities which take place at depths below the water table. There are no active operations in IU B that would likely require excavation work. However, if excavation work is conducted, GM will implement standard Health and Safety (H&S) protocols to mitigate groundwater contact exposures to the constituents discussed above during such excavations.

Surface Water Pathway

There is no surface water present in this area.

Soil Pathway

The concentrations of benzo(a)pyrene in two RFI samples (B50031, B20238) at borings SB-00308 and SB-00508 exceed the Part 201 generic soil direct contact criterion of 8 mg/kg with concentrations of 44 mg/kg and 16 mg/kg, respectively. These samples were collected beneath the surface gravel in an inactive area (and their extents have been delineated) so direct contact exposure is limited. These samples are 2 of 76 soil samples in IU B from all depths that have been analyzed for benzo(a)pyrene. The 95% UCL for benzo(a)pyrene in samples from IU B is 3.98 mg/kg which is below the generic criterion. Therefore worker exposure to benzo(a)pyrene in soil at IU B is not significant.

The concentration of dibenz(a,h)anthracene in one RFI sample (B50031) at borings SB-00308 exceeds the Part 201 generic soil direct contact criterion of 8 mg/kg with a concentration of 11 mg/kg. This sample was collected beneath the surface gravel in an inactive area so direct contact exposure is limited. This sample is 1 of 76 soil samples in IU B from all depths that have been analyzed for dibenz(a,h)anthracene. The 95% UCL of dibenz(a,h)anthracene in samples from IU B is 1.69 mg/kg which is below the generic criterion. Therefore worker exposure to dibenz(a,h)anthracene in soil at IU B is not significant.

The concentrations of lead in six RFI samples from borings SB-00104B, SB-00105, SB-00106, SB-00205, SB-00205, and SB-00508 and two non-RFI samples from borings B-15~B, B-7~B exceed the Part 201 generic soil direct contact criteria of 900 mg/kg; the lead concentrations in all eight samples range from 1,300 mg/kg to 5,490 mg/kg. Six of these samples are surface samples from borings B-15~B, B-7~B, SB-00105, SB-00205, SB-00205, and SB-00508. These eight samples are among 78 soil samples in IU B that have been analyzed for lead. The arithmetic mean concentration of these samples in IU B is 449 mg/kg which is the appropriate exposure point concentration for evaluating potential exposures to lead in soil. This exposure concentration is below the generic criterion, and therefore, worker exposure to lead in soil at IU B is not significant.

The concentrations of manganese in five RFI samples at borings SB-00307a, SB-00508, and VAP-00209/SB-00308A exceed the Part 201 generic PSIC of 1,500 mg/kg.

- Two of the samples (B40122Q and B40123) from boring SB-00308A are located at a depth bgs greater than 2 feet. Because these samples are not at ground surface, the PSIC is not relevant.
- The other three samples exhibited detected concentrations ranging from 2,020 mg/kg to 6,350 mg/kg. These three surface samples were among 12 other

surface soil samples in IU B that have been analyzed for manganese and were collected beneath the surface gravel cover in an inactive area so particulate emissions will be limited. These surface soil samples are located in an area that does not have routine vehicle traffic. Therefore, the appropriate PSIC is 22,300 mg/kg and is based solely on wind erosion as explained in the Discussion Paper on the MDEQ Part 201 PSIC (ENVIRON, 2000). The 95% UCL among these samples is approximately 2,820 mg/kg. Therefore worker exposure to manganese particulate emissions in IU B is not significant.

The concentration of PCBs (total) in one RFI sample (B40119) at boring MW-00709 exceeds the Part 201 generic direct contact criteria of 16 mg/kg with a concentration of 43.5 mg/kg. This sample was not collected at ground surface (the sample was collected from 2 to 4 feet bgs), so the direct contact with these deeper soils by routine workers is not reasonably expected under current conditions. This sample is 1 of 46 soil samples for PCBs (total) located in the northeastern portion of IU B and adjacent northwestern portion of IU D. The 95% UCL on the mean for these samples is 4.97 mg/kg which is below the generic criteria. Therefore worker exposure to PCBs in soil at IU B is not significant.

Sediment Pathway

There are no sediments present in this area.

See Figures 2.3 and 2.4 for sample locations.

Procedures for Maintenance of Due Care

Generic criteria were exceeded in soil and groundwater samples in this area. Any subsurface work in this area will require prior review of the activity and its location in relation to known exceedances of appropriate criteria for those activities and authorization by Plant Environmental Engineering (Ray Ilkka). All workers will be shown the analytical data pertinent to this area prior to work and asked to confirm their understanding of the risks in this area by signature below. All removed soils will be managed appropriately.

This Due Care Plan is enforced by Mr. Ray Ilkka.

Contacts

SMCO Environmental Engineering

Mr. Ray Ilkka (989) 757-1473

Mr. Joe Toth (989) 757-2686

Remediation

Ms. Cheryl Hiatt (248) 680-5219

Ms. Jean Caufield (248) 680-5023

GM Legal

Mr. Tony Thrubis (313) 974-1398

Confidential under FOIA
Frank Postma
LFR
Aug 06, 2009 16:58

2.3 INVESTIGATIVE UNIT C - INLET RESERVOIR

This pond stages water for the Grey Iron Plant re-use after wastewater treatment and is part of a closed loop system.

Groundwater Pathway

No groundwater samples have been collected in this area.

Surface Water Pathway

There are no exceedances of relevant criteria.

Soil Pathway

No soil samples have been collected in this area.

Sediment Pathway

The concentration of arsenic in one RFI sample (S00014^0^1^RFI) at sediment sampling location C1 exceeds the Part 201 generic soil direct contact criteria of 37 mg/kg with a concentration of 65 mg/kg. This sample is 1 of 2 sediment samples collected that were analyzed for arsenic in IU C. The other sample exhibited an arsenic concentration of 25 mg/kg, which is lower than 37 mg/kg. The arithmetic mean arsenic concentration of the two samples is 35 mg/kg which is lower than the generic criteria. Further, potential exposures of maintenance workers to these concentrations are unlikely to result in significant risks as the exposure frequency and exposure duration of typical maintenance activities at these locations are expected to be much lower than those assumed by MDEQ in deriving the generic soil direct contact criteria. Therefore worker exposure to arsenic in sediment in IU C is not significant under current conditions. However, in the event that maintenance activities are required in IU C, GM will implement worker protection to mitigate direct contact exposures to lead in IU C sediment.

The concentrations of lead in two RFI samples (S00014^0^1^RFI and S00015^0^1^RFI) at sediment sampling locations C1 and C3 exceed the Part 201 generic soil direct contact criteria of 900 mg/kg with concentrations ranging from 1,150 mg/kg to 1,550 mg/kg. Two methods, SW6010M and SW7421, were used to analyze for lead in these two samples. The results from the two methods showed good agreement. Potential exposures of maintenance workers to these concentrations are unlikely to result in

significant risks as the exposure frequency and exposure duration of typical maintenance activities at these locations are expected to be much lower than those assumed by MDEQ in deriving the generic soil direct contact criteria. In the event that maintenance activities are required in IU C, GM will implement worker protection to mitigate direct contact exposures to lead in IU C sediment.

See Figures 2.5 and 2.6 for sample locations.

Confidential under FOIA
Frank Postma
LFR
Aug 06, 2009 16:58

Procedures for Maintenance of Due Care

Generic criteria were exceeded in sediment samples in this area. Any subsurface work in this area will require prior review of the activity and its location in relation to known exceedances of appropriate criteria for those activities and authorization by Plant Environmental Engineering (Ray Ilkka). All workers will be shown the analytical data pertinent to this area prior to work and asked to confirm their understanding of the risks in this area by signature below. All removed soils will be managed appropriately.

This Due Care Plan is enforced by Mr. Ray Ilkka.

Contacts

SMCO Environmental Engineering

Mr. Ray Ilkka (989) 757-1473

Mr. Joe Toth (989) 757-2686

Remediation

Ms. Cheryl Hiatt (248) 680-5219

Ms. Jean Caufield (248) 680-5025

GM Legal

Mr. Tony Thrubis (313) 974-1398

Confidential under FOIA
Frank Postma
LFR
Aug 06, 2009 16:58

2.4 INVESTIGATIVE UNIT D - SMCO PLANT

This includes the plant foundry and storage activities.

Groundwater Pathway

There are no exceedances of relevant criteria.

Surface Water Pathway

There is no surface water in this area.

Soil Pathway

The concentration of antimony in one RFI surface soil sample (B10357) at boring SB-00710 exceeds the Part 201 generic soil direct contact criteria of 670 mg/kg with a concentration of 946 mg/kg. This sample is in an inactive area that is currently gravel covered so direct contact exposure of routine workers is not expected. This sample is 1 of 62 soil samples in IU D from all depths that have been analyzed for antimony. The 95% UCL Sb among samples from IU D is 177 mg/kg which is below the generic criterion. Therefore worker exposure to antimony in soil at IU D is not significant.

The concentration of benzo(a)pyrene in one RFI surface soil sample (B10318) at boring SB-00911 exceeds the Part 201 generic soil direct contact criterion of 8 mg/kg with a concentration of 30 mg/kg. This sample is in an inactive area that is currently gravel covered so direct contact exposure of routine workers is not expected. This sample is also one of 75 other surface soil samples collected in IU D, all having benzo(a)pyrene concentrations lower than 8 mg/kg; the 95% UCL for benzo(a)pyrene among these samples is 2.92 mg/kg which is much lower than the generic criterion. Therefore worker exposure to benzo(a)pyrene in soil at IU D is not significant.

The concentrations of chromium in seven RFI samples from borings MW-00812, MW-02410 and SB-02510, SB-198, and SB-298, exceed the Part 201 generic PSIC of 240 mg/kg. Four of these samples are surface samples and located within an inactive areas that is currently gravel (at MW-00812, SB-198, SB-298) and asphalt covered (at SB-02510) so particulate emissions is not expected. Two of the samples from the east side of the plant (at MW-02410 and SB-02510) were collected beneath the existing pavement and therefore, the PSIC is not relevant. The other three samples are subsurface samples, and therefore, the PSIC is not relevant. Further, this PSIC is highly

conservative because it assumes that chromium is present entirely as hexavalent chromium. Data from soil samples at other locations at the Site show that most chromium is actually in the less toxic trivalent form. Therefore under current conditions, worker exposure to chromium concentrations in IU D surface soil is not significant.

The concentration of formaldehyde in one sample (B10256) at boring SB-02510 exceeds the Part 201 generic soil volatilization to indoor air criterion of 65 mg/kg and soil volatilization to ambient air criterion of 69 mg/kg with a concentration of 84 mg/kg. Because there is no building at this location, the soil volatilization to indoor air criterion is not relevant under current conditions. This sample was collected beneath existing pavement and therefore, the volatilization to ambient air criterion is also not relevant. In addition, this sample is 1 of 21 soil samples from all depths collected in IU D. All the other samples have formaldehyde concentrations lower than 65 mg/kg. The 95% UCL for formaldehyde among these samples is 19 mg/kg which is well below the generic soil volatilization to indoor air and ambient air criteria. Therefore worker exposure to formaldehyde in soil at IU D is not significant.

The concentrations of manganese in 23 RFI soil samples at borings MW-00812, MW-01214, MW-02410, MW-02418, SB-00710, SB-00910, SB-01012, SB-02407, SB-02411, SB-02505, SB-02509, SB-02510, SB-02512, SB-02514, SB-198, and SB-298 and one non-RFI soil sample at boring MW-02418 exceed the Part 201 generic PSIC of 1,500 mg/kg.

- Twelve of the samples are surface soil samples with manganese concentrations ranging from 2,390 mg/kg to 11,400 mg/kg. They are located in an area that either does not have routine vehicle traffic and is currently gravel or asphalt covered (at MW-01214, MW-00812, SB-00710, SB-00711, SB-00910, SB-01012, SB-02407, SB-02505, SB-02510, SB-02514, SB-198, and SB-298). For the samples that are under pavement, the PSIC is not relevant as the potential for particulate emissions in this area is or will be prevented. For the samples in unpaved areas with no routine vehicle traffic, the appropriate PSIC, is 22,300 mg/kg and is based solely on wind erosion as explained in the ENVIRON's Discussion Paper on the MDEQ Part 201 PSIC (ENVIRON, 2000).
- The other 12 samples are located at a depth bgs greater than 2 feet. Because the samples are not at ground surface, the PSIC is not relevant.

Therefore worker exposure to manganese in soil at IU D is not significant.

The concentrations of PCBs (total) in two RFI samples and 107 non-RFI samples the MDEQ direct contact criterion of 16 mg/kg. All of these samples, except one, are under the paved basement floor of the Grey Iron Plant building in the #8 Mold Line area. This one sample (B00141) at boring SB-298 is in an area that is currently gravel covered, so direct contact exposure of routine workers is not expected. Because these concentrations of PCBs (total) are either under the building or under gravel cover, potential direct contact exposure of routine workers is not expected. There are no current plans for excavations or building renovations in this area, and such activities in the future would be conducted under SMCO's site health and safety procedures to ensure that appropriate precautions are taken to avoid unacceptable exposures to PCBs in this area. Therefore, potential worker exposure to PCBs in IU D soil is not significant.

Sediment Pathway

There are no sediments in this area.

See Figures 2.7 and 2.8 for sample locations.

Confidential under FOIA
Frank Postma
LFR
Aug 06, 2009 16:58

Procedures for Maintenance of Due Care

Generic criteria were exceeded in soil samples in this area. Any subsurface work in this area will require prior review of the activity and its location in relation to known exceedances of appropriate criteria for those activities and authorization by Plant Environmental Engineering (Ray Ilkka). All workers will be shown the analytical data pertinent to this area prior to work and asked to confirm their understanding of the risks in this area by signature below. All removed soils will be managed appropriately.

This Due Care Plan is enforced by Mr. Ray Ilkka.

Contacts

SMCO Environmental Engineering

Mr. Ray Ilkka (989) 757-1473

Mr. Joe Toth (989) 757-2686

Remediation

Ms. Cheryl Hiatt (248) 680-5219

Ms. Jean Caufield (248) 680-5025

GM Legal

Mr. Tony Thrubis (313) 974-1398

Confidential under FOIA
Frank Postma
LFR
Aug 06, 2009 16:58

2.5 INVESTIGATIVE UNIT E - THE RIVER DOCK AREA

This area includes a receiving dock, railroad sidings, bulk materials storage, the Advanced Development Laboratory, and the current Powerhouse.

Groundwater Pathway

The concentrations of benzo(a)pyrene in one RFI sample and its duplicate (M20211 and M20230Q) at MW-01119 exceed the Part 201 generic groundwater contact criterion of 0.002 mg/L with concentrations of 0.005 mg/L and 0.007 mg/L, respectively.

The concentrations of benzo(b)fluoranthene in one RFI sample and its duplicate (M20211 and M20230Q) at MW-01119 exceed the Part 201 generic groundwater contact criterion of 0.002 mg/L with concentrations of 0.004 mg/L and 0.006 mg/L, respectively.

The concentration of benzo(k)fluoranthene in one RFI sample (M20230Q) at MW-01119 exceeds the Part 201 generic groundwater contact criterion of 0.005 mg/L with a concentration of 0.006 mg/L. This sample is a duplicate of M20211 which had a benzo(k)fluoranthene concentration of 0.005 mg/L.

The concentration of chrysene in one RFI sample (M20230Q) at MW-01119 exceeds the Part 201 generic groundwater contact criterion of 0.005 mg/L with a concentration of 0.006 mg/L. This sample is a duplicate of M20211, which had a chrysene concentration of 0.005 mg/L.

The concentrations of indeno(1,2,3-cd)pyrene in one RFI sample and its duplicate (M20211 and M20230Q) at MW-01119 exceed the Part 201 generic groundwater contact criterion of 0.002 mg/L with concentrations of 0.003 mg/L and 0.004 mg/L, respectively.

Because the depth to groundwater in IU E is approximately 4 feet bgs, potential exposure to construction workers is possible during excavations activities which take place at depths below the water table. In the event that excavation work is required in IU E, GM will implement worker protection to mitigate groundwater contact exposures to the constituents discussed above during such excavations.

Surface Water Pathway

There is no surface water in this area.

Soil Pathway

The concentrations of chromium in six RFI samples (B10022^1^1^RFI, B10023^2^1^RFI, B10013^0^1^RFI, B10014^1^1^RFI, B10015^2^1^RFI, and B00072^0^1^RFI) exceed the Part 201 generic PSIC of 240 mg/kg.

- One of the samples is a surface soil sample (B10013^0^1^RFI) at boring MW-02320 and is the only surface soil sample among 11 collected in IU E which exceeds the Part 201 generic PSIC criteria with a concentration of 291 mg/kg. The 95% UCL for chromium among the 11 surface samples is 164 mg/kg, which is below the generic criterion. In addition, boring MW-02320 is in an area that does not have routine vehicle traffic. Therefore the appropriate PSIC is 2,500 mg/kg and is based solely on wind erosion as explained in the ENVIRON's Discussion Paper on the Michigan Part 201 PSIC (ENVIRON, 2000). This alternate PSIC is still highly conservative because it assumes that Cr is present entirely as hexavalent chromium. Data from soil samples at other locations at the facility show that most chromium is actually in the less toxic trivalent form.
- The other five samples are subsurface samples (B10022^1^1^RFI, B10023^2^1^RFI, B10014^1^1^RFI, B10015^2^1^RFI, and B00072^0^1^RFI) and are located at a depth bgs greater than 2 feet. Because these samples are not at ground surface, the PSIC is not relevant.

Therefore, worker exposure to chromium in IU E soil is not significant.

The concentration of lead in one sample (B00081^0^1^RFI) at boring MW-03235 exceeds the Part 201 generic direct contact criterion of 900 mg/kg with a concentration of 2,030 mg/kg. Samples collected around this boring show that the lead concentrations in the surrounding soil are much lower. This sample is among 25 surface soil samples collected in the eastern portion of IU E (east of the storm water ditch) that have been analyzed for Pb. The arithmetic mean concentration among the 25 samples is approximately 117 mg/kg, which is well below the Part 201 generic direct contact criterion of 900 mg/kg. Therefore worker exposure to lead in soil at IU E is not significant.

The concentrations of manganese in 30 samples exceed the generic PSIC.

- Twenty-two surface samples among 48 surface soil samples for manganese collected in IU E exceed the generic PSIC of 1,500 mg/kg with concentrations ranging from

Aug 06, 2009 16:58

2,090 mg/kg to 8,190 mg/kg. The 95% UCL for manganese among the 48 surface samples is 3,290 mg/kg (the average is 2,640 mg/kg). Nineteen surface soil samples collected in the west portion of IU E (west of the storm water ditch) have been analyzed for manganese, and the 95% UCL for manganese among these samples is 3,410 mg/kg (the average is 2,250). Twenty-nine surface soil samples collected in the east portion of IU E (east of the storm water ditch) have been analyzed for manganese, and the 95% UCL for manganese among these samples is 3,770 mg/kg (the arithmetic mean is 2,880 mg/kg). Currently activities in the eastern half of IU E involve routine vehicle traffic while activities in the western half of IU E do not. As indicated in ENVIRON's March 10, 2000 site-specific evaluation of the soil particulate inhalation exposure for IU E and ENVIRON's Discussion Paper on the Michigan Part 201 PSIC (ENVIRON, 2000), a conservative site-specific PSIC for IU E where activities involve routine vehicle traffic over unpaved areas is approximately 3,100 mg/kg. Also as explained in ENVIRON's Discussion Paper on the MDEQ Part 201 PSIC (ENVIRON, 2000), for the samples in unpaved areas with no routine vehicle traffic, the appropriate PSIC is 22,300 mg/kg and is based solely on wind erosion. The 95% UCL for manganese in the eastern portion of IU E solely exceeds conservative site-specific PSIC. The 95% UCL for manganese in the western portion of IU E does not exceed conservative site-specific PSIC.

- The other eight samples are located at a depth bgs greater than 2 feet. Because the samples are not at ground surface, the PSIC is not relevant.

Given that surface soil manganese concentrations exceed both the MDEQ PSIC and a conservative site-specific PSIC in the eastern portion of IU E, dust suppression activities will continue during active vehicle traffic in order to limit exposure of workers to surface soil manganese concentrations.

The concentrations of PCBs (total) in two RFI samples (B00071⁰1¹RFI and B80117) exceed the Part 201 generic soil direct contact criterion of 16 mg/kg with concentrations of 52.2 mg/kg and 18.3 mg/kg, respectively. These two samples are surface soil samples and are located at borings MW-03734 and SB-03737A. RFI samples around this boring show that the PCBs concentrations in the surrounding soil are much lower. The 95% UCL for PCBs among the 56 surface soil samples in IU E is approximately 5.38 mg/kg, which is below the generic criterion of 16 mg/kg. Nineteen surface soil samples collected in the west portion of IU E (west of the storm water ditch) have been analyzed for PCBs, and the 95% UCL for PCBs among these samples is 1.42 mg/kg. Thirty-seven surface soil samples collected in the east portion of IU E (east of the storm water ditch) have been analyzed for PCBs, and the 95% UCL for PCBs among these

samples is 8.22 mg/kg. The 95% UCLs in both portions of IU E are below the Part 201 generic direct contact criteria. Therefore, worker exposure to PCBs (total) in soil at IU E is not significant.

Sediment Pathway

There are no sediments in this area.

See Figures 2.9 and 2.10 for sample locations.

Confidential under FOIA
Frank Postma
LFR
Aug 06, 2009 16:58

Procedures for Maintenance of Due Care

Generic criteria were exceeded in soil and groundwater samples in this area. Any subsurface work in this area will require prior review of the activity and its location in relation to known exceedances of appropriate criteria for those activities and authorization by Plant Environmental Engineering (Ray Ilkka). All workers will be shown the analytical data pertinent to this area prior to work and asked to confirm their understanding of the risks in this area by signature below. All removed soils will be managed appropriately.

This Due Care Plan is enforced by Mr. Ray Ilkka.

Contacts

SMCO Environmental Engineering

Mr. Ray Ilkka (989) 757-1473

Mr. Joe Toth (989) 757-2686

Remediation

Ms. Cheryl Hiatt (248) 680-5219

Ms. Jean Caufield (248) 680-5025

GM Legal

Mr. Tony Thrubis (313) 974-1398

Confidential under FOIA
Frank Postma
LFR
Aug 06, 2009 16:58

2.6 INVESTIGATIVE UNIT F - AMDC AND FORMER ADMINISTRATION BUILDING

This area includes the former Administration Building and two former gas stations.

Groundwater Pathway

There are no exceedances of relevant criteria.

Surface Water Pathway

There is no surface water present in this area.

Soil Pathway

The concentration of benzo(a)pyrene from one RFI surface soil sample (B00068^2^1^RFI) at boring MW 02728 exceeds the Part 201 generic soil direct contact criteria of 8 mg/kg with a concentration of 10 mg/kg. This sample is a field duplicate of sample B00067^1^1^RFI. Averaging the benzo(a)pyrene concentrations in these two duplicate samples yields a benzo(a)pyrene concentration of 5 mg/kg, which is below the direct contact criteria. Therefore worker exposure to benzo(a)pyrene in soil at IU F is not significant.

Sediment Pathway

There are no sediments present in this area.

See Figures 2.11 and 2.12 for sample locations.

Procedures for Maintenance of Due Care

Generic criteria were exceeded in soil samples in this area. Any subsurface work in this area will require prior review of the activity and its location in relation to known exceedances of appropriate criteria for those activities and authorization by Plant Environmental Engineering (Ray Ilkka). All workers will be shown the analytical data pertinent to this area prior to work and asked to confirm their understanding of the risks in this area by signature below. All removed soils will be managed appropriately.

This Due Care Plan is enforced by Mr. Ray Ilkka.

Contacts

SMCO Environmental Engineering

Mr. Ray Ilkka (989) 757-1473

Mr. Joe Toth (989) 757-2686

Remediation

Ms. Cheryl Hiatt (248) 680-5219

Ms. Jean Caufield (248) 680-5025

GM Legal

Mr. Tony Thrubis (313) 974-1398

Confidential under FOIA
Frank Postma
LFR
Aug 06, 2009 16:58

2.7 INVESTIGATIVE UNIT G - FORMER NODULAR IRON PLANT

Groundwater Pathway

There are no exceedances of relevant criteria.

Surface Water Pathway

There is no surface water present in this area.

Soil Pathway

The concentration of arsenic from one non-RFI sample (EB-114b-(4-5.5)9187) at boring EB-114 exceeds the Part 201 generic soil direct contact criteria of 37 mg/kg. This sample was collected 4 feet bgs, and therefore worker contact with soil exhibiting this concentration is not expected. This sample is one of 128 arsenic samples collected from IU G. The 95% UCL for arsenic among these samples is 5.44 mg/kg which is below the generic criterion. Therefore worker exposure to arsenic in soil at IU G is not significant.

The concentrations of chromium from three RFI samples (B11⁰¹^{NOR}, B12⁰¹^{NOR}, B00023⁰¹^{RFI}) at borings B-11, B-12 and MW-04250 and one non-RFI sample (B80211) at boring MW-04635 exceed the Part 201 generic PSIC of 240 mg/kg. The RFI samples are from sampling depths greater than 2 feet bgs. Because the samples are not at ground surface, the PSIC is not relevant. The non-RFI sample, with a concentration of 309 mg/kg, was collected at the surface but is located in an active area of the Site that does not have routine vehicle traffic. Therefore the appropriate PSIC is 2,500 mg/kg and is based solely on wind erosion as explained in ENVIRON's Discussion Paper on the Michigan Part 201 PSIC (ENVIRON, 2000). This alternate PSIC is still highly conservative because it assumes that chromium is present entirely as hexavalent chromium. Data from soil samples at other locations at the Site show that most chromium is actually in the less toxic trivalent form. Therefore worker exposure to chromium in soil at IU G is not significant.

The concentrations of manganese from four RFI samples (B11⁰¹^{NOR}, B12⁰¹^{NOR}, B00023⁰¹^{RFI}, and SB-1⁰¹^{NOR}) at borings B-11, b-12, MW-04250, and SB-1 exceed the Part 201 generic PSIC of 1,500 mg/kg. All four of these samples are from greater than 2 feet bgs. Because the samples are not at ground surface, the PSIC is not relevant. Therefore worker exposure to manganese in soil at IU G is not significant.

Sediment Pathway

There are no sediments present in this area.

See Figures 2.13 and 2.14 for sample locations.

Procedures for Maintenance of Due Care

Generic criteria were exceeded in soil samples in this area. Any subsurface work in this area will require prior review of the activity and its location in relation to known exceedances of appropriate criteria for those activities and authorization by Plant Environmental Engineering (Ray Ilkka). All workers will be shown the analytical data pertinent to this area prior to work and asked to confirm their understanding of the risks in this area by signature below. All removed soils will be managed appropriately.

This Due Care Plan is enforced by Mr. Ray Ilkka.

Contacts

SMCO Environmental Engineering

Mr. Ray Ilkka (989) 757-1473

Mr. Joe Toth (989) 757-2686

Remediation

Ms. Cheryl Hiatt (248) 680-5219

Ms. Jean Caufield (248) 680-5025

GM Legal

Mr. Tony Thrubis (313) 974-1398

Confidential under FOIA
Frank Postma
LFR
Aug 06, 2009 16:58

2.8 INVESTIGATIVE UNIT H - WASTEWATER TREATMENT SYSTEM

Groundwater Pathway

There are no exceedances of relevant criteria.

Surface Water Pathway

There are no exceedances of relevant criteria.

Soil Pathway

The concentrations of manganese from three RFI surface soil samples (B00054⁰¹RFI, B00100⁰¹RFI, and B10300) at borings MW-06656, MW-17661 and SB-05542 exceed the Part 201 generic PSIC of 1,500 mg/kg. The manganese concentrations in these samples range from 2,790 to 3,380 mg/kg. These surface soil samples are located in an area that does not have routine vehicle traffic. Therefore the appropriate PSIC is 22,300 mg/kg which is based solely on wind erosion as explained in ENVIRON's Discussion Paper on the Michigan Part 201 PSIC (ENVIRON, 2000). Therefore worker exposure to manganese in soil at IU H is not significant.

Sediment Pathway

The concentration of arsenic in one RFI sample (S00006⁰¹RFI) at sediment sampling location H4 exceeds the Part 201 generic soil direct contact criteria of 37 mg/kg with a concentration of 47 mg/kg. This sample is 1 of 9 sediment samples collected that were analyzed for arsenic in IU H. All the other samples have arsenic concentrations lower than 37 mg/kg. The 95% UCL for arsenic among these samples is 32.7 mg/kg which is below the generic criteria. Therefore worker exposure to arsenic in sediment in IU H is not significant.

The concentrations of lead in four RFI samples (S00003¹¹RFI, S00004²¹RFI, S00005⁰¹RFI, and S00006⁰¹RFI) at sediment sampling locations H1, H2 and H4 exceed the Part 201 generic soil direct contact criteria of 900 mg/kg with concentrations ranging from 1,580 mg/kg to 2,490 mg/kg. Two methods, SW6010M and SW6010M, were used to analyze lead for these four samples. The results from the two methods showed good agreement. Eighteen sediment samples were collected and analyzed for lead in IU H. The arithmetic mean lead concentration is 1,160 mg/kg, which is higher

than the generic criteria. Potential exposures of maintenance workers to these concentrations are unlikely to result in significant risks as the exposure frequency and exposure duration of typical maintenance activities at these locations are expected to be much lower than those assumed by MDEQ in deriving the generic soil direct contact criteria. However, in the event that prolonged maintenance activities are required in IU H, GM will implement worker protection to mitigate direct contact exposures to lead in IU H sediment.

See Figures 2.15 and 2.16 for sample locations.

Confidential under FOIA
Frank Postma
LFR
Aug 06, 2009 16:58

Procedures for Maintenance of Due Care

Generic criteria were exceeded in soil and sediment samples in this area. Any subsurface work in this area will require prior review of the activity and its location in relation to known exceedances of appropriate criteria for those activities and authorization by Plant Environmental Engineering (Ray Ilkka). All workers will be shown the analytical data pertinent to this area prior to work and asked to confirm their understanding of the risks in this area by signature below. All removed soils will be managed appropriately.

This Due Care Plan is enforced by Mr. Ray Ilkka.

Contacts

SMCO Environmental Engineering

Mr. Ray Ilkka (989) 757-1473

Mr. Joe Toth (989) 757-2686

Remediation

Ms. Cheryl Hiatt (248) 680-5219

Ms. Jean Caufield (248) 680-5025

GM Legal

Mr. Tony Thrubis (313) 974-1398

Confidential under FOIA
Frank Postma
LFR
Aug 06, 2009 16:58

2.9 INVESTIGATIVE UNIT I - CLASSIFIED SAND STAGING AREA

Groundwater Pathway

There are no exceedances of relevant criteria.

Surface Water Pathway

There is no surface water present in this area.

Soil Pathway

The concentration of formaldehyde in one sample (B00065^0^1^RFI) at boring MW-06951 exceeds the Part 201 generic volatilization to indoor air criterion of 65 mg/kg and the volatilization to ambient air criterion of 69 mg/kg with a concentration of 78 mg/kg. Because there is no building at IU I the volatilization to indoor air criteria are not relevant. This sample is also 1 of 55 other soil samples collected in IU I from all depths. All the other samples have formaldehyde concentrations lower than 65 mg/kg. The 95% UCL for formaldehyde among these samples is 18.6 mg/kg which is well below the generic industrial soil volatilization to indoor air and ambient air inhalation criteria for formaldehyde. Therefore, worker exposure to formaldehyde in soil at IU I is not significant.

The concentrations of manganese in three RFI samples exceed the Part 201 generic PSIC of 1500 mg/kg.

- Sample B20231 from MW-96939 is surface soil sample having manganese concentration of 2,370 mg/kg. This sample is located in an area that does not have routine vehicle traffic. Therefore the appropriate calculated PSIC is 22,300 mg/kg which is based solely on wind erosion as explained in ENVIRON's Discussion Paper on the Michigan Part 201 PSIC (ENVIRON, 2000).
- The other samples (B10044^0^1^RFI at MW-07959 and B20264 at SB-07043) are from below 4 feet bgs. Because these samples are not at ground surface, the PSIC is not relevant.

Therefore worker exposure to manganese in soil at IU I is not significant.

Sediment Pathway

There are no sediments present in this area.

See Figures 2.17 and 2.18 for sample locations.

Procedures for Maintenance of Due Care

Generic criteria were exceeded in soil samples in this area. Any subsurface work in this area will require prior review of the activity and its location in relation to known exceedances of appropriate criteria for those activities and authorization by Plant Environmental Engineering (Ray Ilkka). All workers will be shown the analytical data pertinent to this area prior to work and asked to confirm their understanding of the risks in this area by signature below. All removed soils will be managed appropriately.

This Due Care Plan is enforced by Mr. Ray Ilkka.

Contacts

SMCO Environmental Engineering

Mr. Ray Ilkka (989) 757-1473

Mr. Joe Toth (989) 757-2686

Remediation

Ms. Cheryl Hiatt (248) 680-5219

Ms. Jean Caufield (248) 680-5025

GM Legal

Mr. Tony Thrubis (313) 974-1398

Confidential under FOIA
Frank Postma
LFR
Aug 06, 2009 16:58

2.10 INVESTIGATIVE UNIT J - ON-SITE LANDFILL

Groundwater Pathway

There are no exceedances of relevant criteria.

Surface Water Pathway

There is no surface water present in this area.

Soil Pathway

There are no exceedances of relevant criteria.

Sediment Pathway

There are no sediments present in this area.

See Figures 2.19 and 2.20 for sample locations.

Confidential under FOIA
Frank Postma
LFR
Aug 06, 2009 16:58

Procedures for Maintenance of Due Care

Generic criteria were exceeded in soil samples in this area. Any subsurface work in this area will require prior review of the activity and its location in relation to known exceedances of appropriate criteria for those activities and authorization by Plant Environmental Engineering (Ray Ilkka). All workers will be shown the analytical data pertinent to this area prior to work and asked to confirm their understanding of the risks in this area by signature below. All removed soils will be managed appropriately.

This Due Care Plan is enforced by Mr. Ray Ilkka.

Contacts

SMCO Environmental Engineering

Mr. Ray Ilkka (989) 757-1473

Mr. Joe Toth (989) 757-2686

Remediation

Ms. Cheryl Hiatt (248) 680-5219

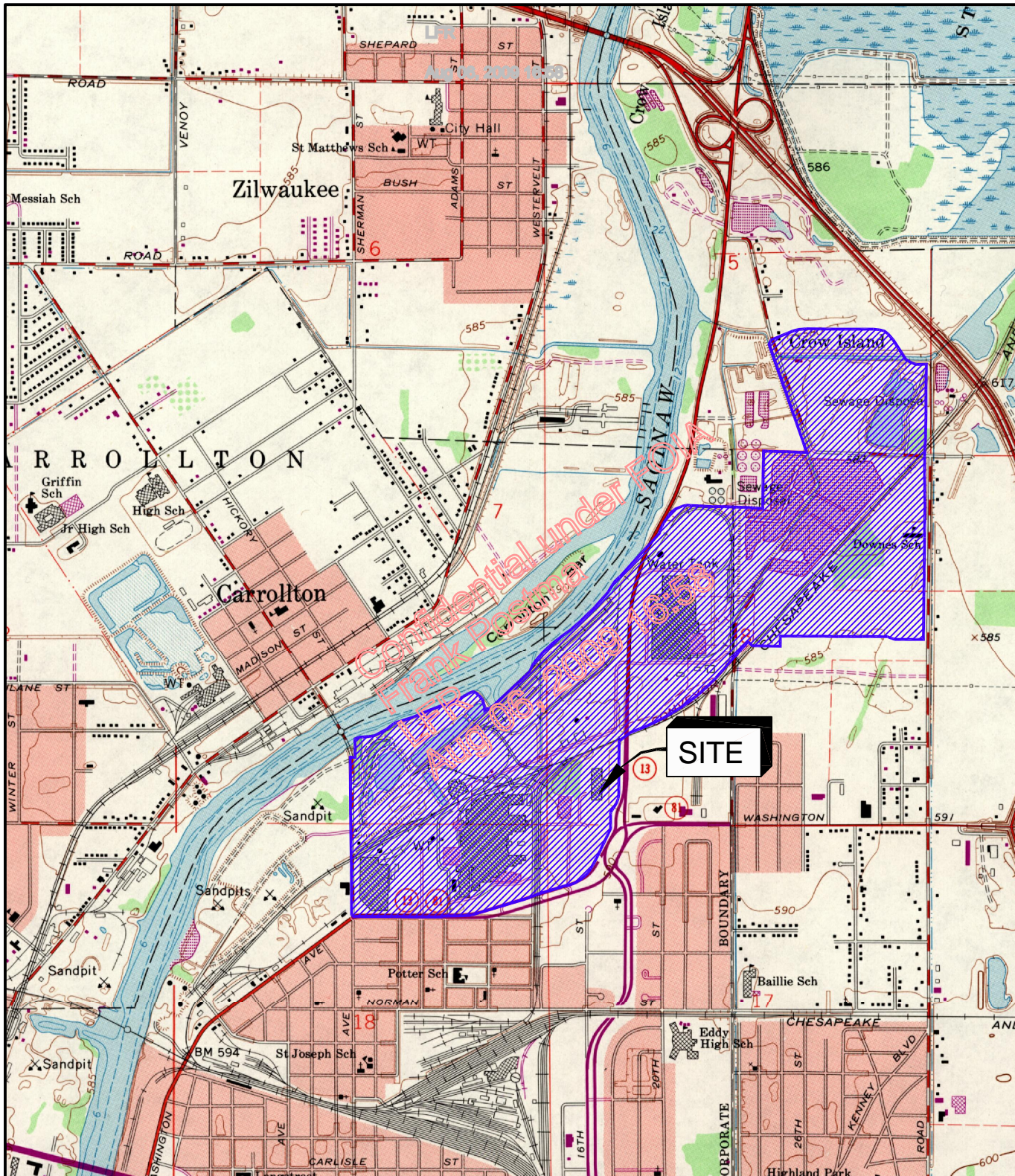
Ms. Jean Caufield (248) 680-5025

GM Legal

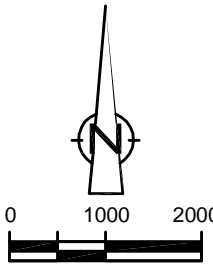
Mr. Tony Thrubis (313) 974-1398

Confidential under FOIA
Frank Postma
LFR
Aug 06, 2009 16:58

Frank Postma



BASE SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE; SAGINAW, MICHIGAN 1967



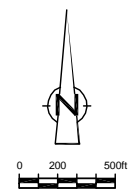
Confidential under FOIA

Frank Postma

figure 1.1
 SITE LOCATION
 SAGINAW METAL CASTING OPERATIONS
 Saginaw, Michigan



NO	Revision	Date	Initial



SCALE VERIFICATION
THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN
SITE PLAN

CRA CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88

Project Manager: I.R.	Reviewed By: D.D.	Date: OCTOBER 2003
Scale: 1" = 500'	Project N°: 17075-22	Report N°: 013 Drawing N°: 1.2

Frank Postma

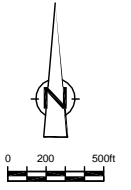
LFR

Aug 06, 2009 16:58

Frank Postma

LFR

Aug 06, 2009 16:58



- LEGEND**
- GROUNDWATER ELEVATION FT. AMSL (NAVD 88)
 - EXISTING MONITORING WELLS WITH ELEVATIONS (JANUARY 2003)
 - EXISTING MONITORING WELLS SCREENED IN DIFFERENT ZONE
 - EXISTING SOIL BORING LOCATION
 - AREA WITH NO SHALLOW GROUNDWATER

SCALE VERIFICATION
 THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

**GENERAL MOTORS CORPORATION
 SAGINAW METAL CASTING OPERATIONS**

SAGINAW, MICHIGAN

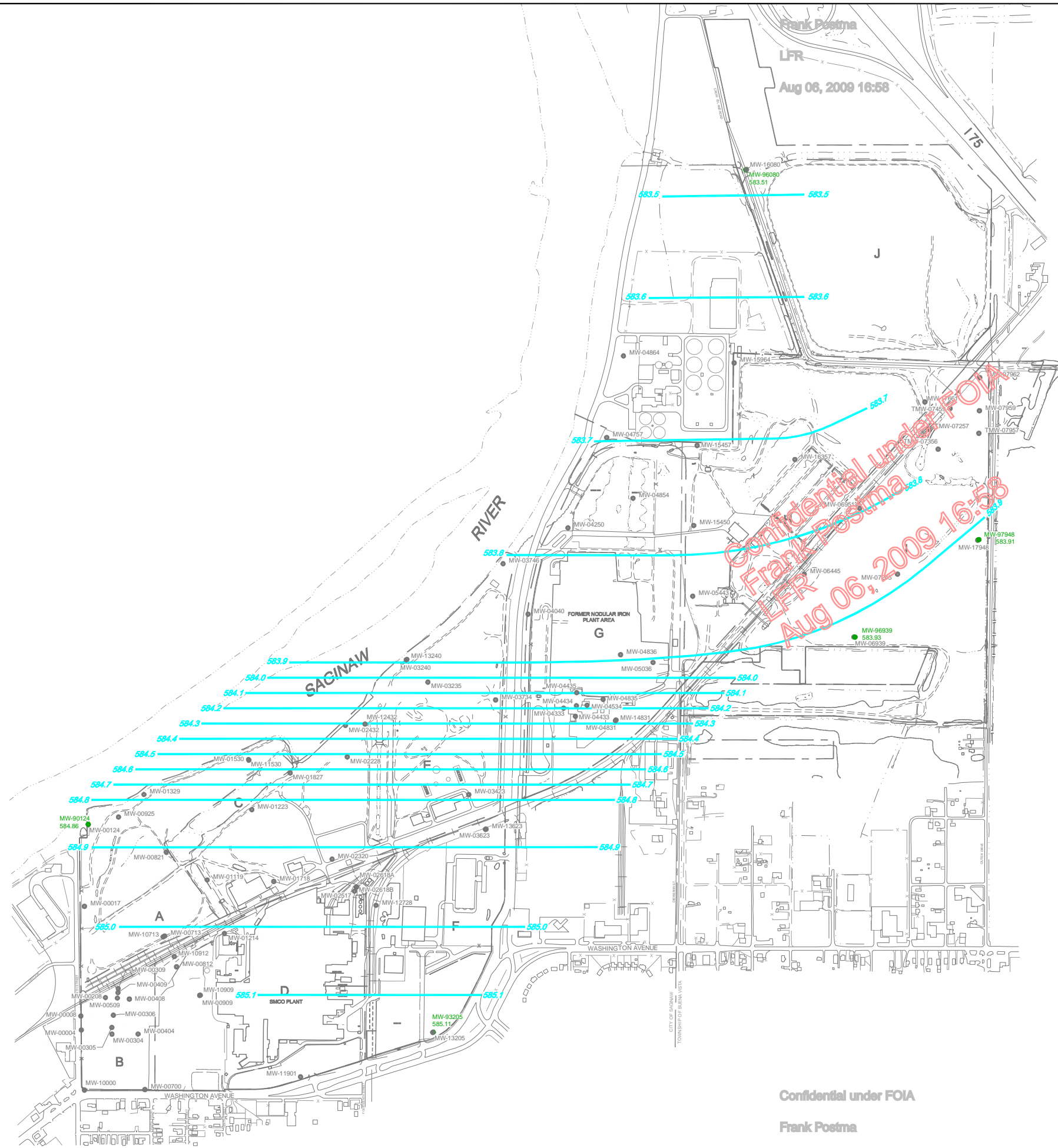
**GROUNDWATER CONTOUR MAP
 UPPER SATURATED ZONE
 JANUARY 2003**



Source Reference:
 MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88

Project Manager: I.R.	Reviewed By: D.D.	Date: OCTOBER 2003
Scale: 1" = 500'	Project N°: 17075-22	Report N°: 013
		Drawing N°: 1.3

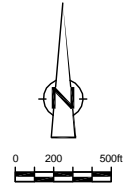
Frank Postma
LFR
Aug 06, 2009 16:58



Frank Postma

LFR

Aug 06, 2009 16:58



- LEGEND**
- 585.0 GROUNDWATER ELEVATION FT. AMSL (NAVD 88)
 - MW-17661 (582.59) EXISTING MONITORING WELLS WITH ELEVATIONS (JANUARY 2003)
 - MW-17661 EXISTING MONITORING WELLS

SCALE VERIFICATION
THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

**GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS**
SAGINAW, MICHIGAN
**GROUNDWATER CONTOUR MAP
BEDROCK AQUIFER
JANUARY 2003**



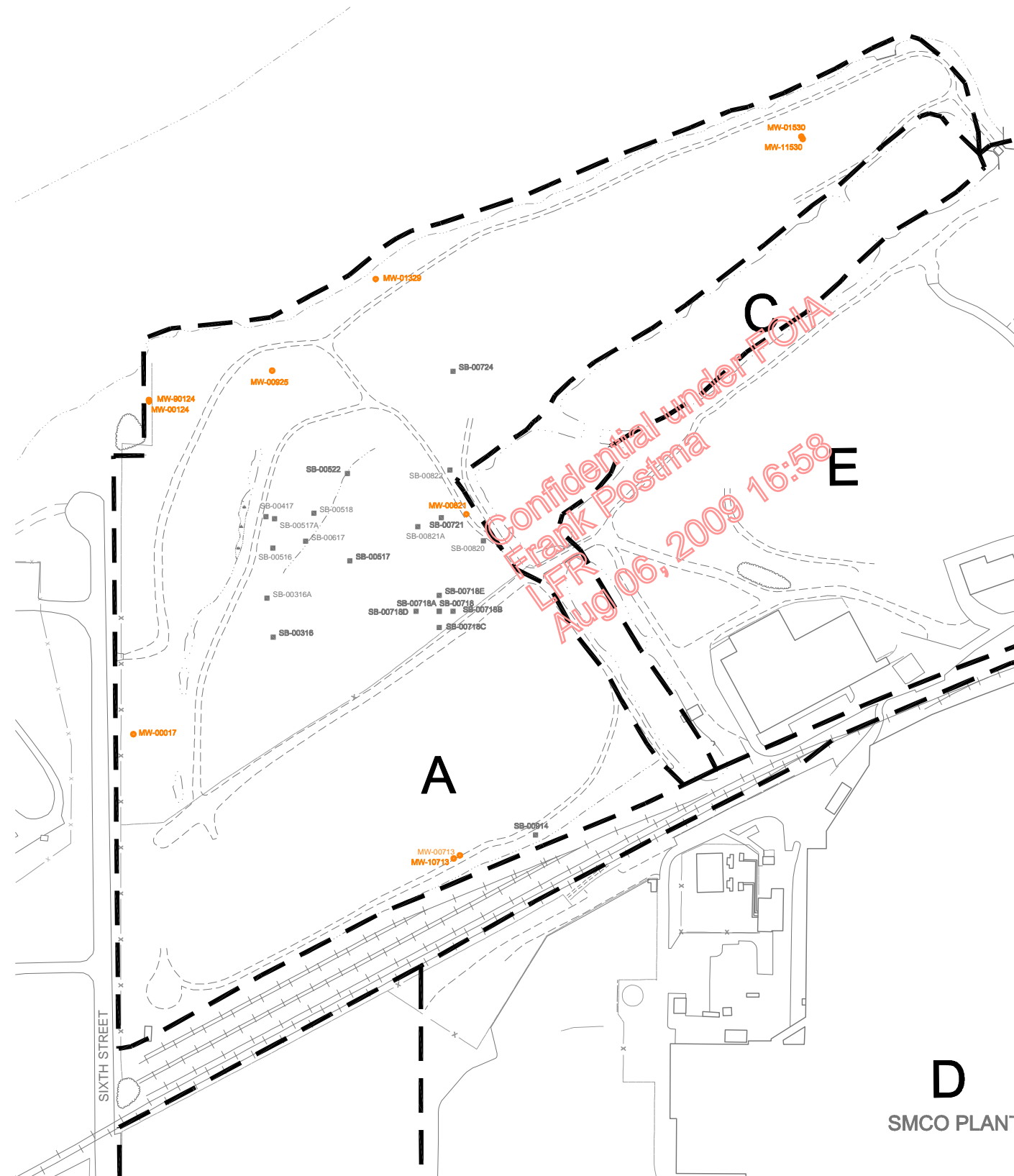
Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88

Project Manager: I.R.	Reviewed By: D.D.	Date: OCTOBER 2003
Scale: 1" = 500'	Project N°: 17075-22	Report N°: 013
		Drawing N°: 1.4

Frank Postma

LFR

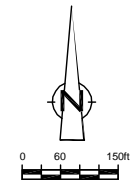
Aug 06, 2009 16:58



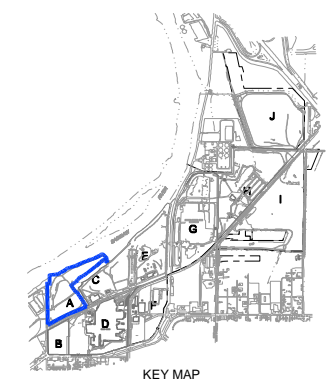
Frank Postma

LFR

Aug 06, 2009 16:58



- LEGEND**
- A- - INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
 - MONITORING WELL LOCATION - EXCEEDED CRITERIA
 - ● SAMPLE LOCATION - NO EXCEEDANCES OF CRITERIA



SCALE VERIFICATION
 THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION
 SAGINAW METAL CASTING OPERATIONS
 SAGINAW, MICHIGAN
 INVESTIGATIVE UNIT A
 GROUNDWATER SAMPLE LOCATIONS



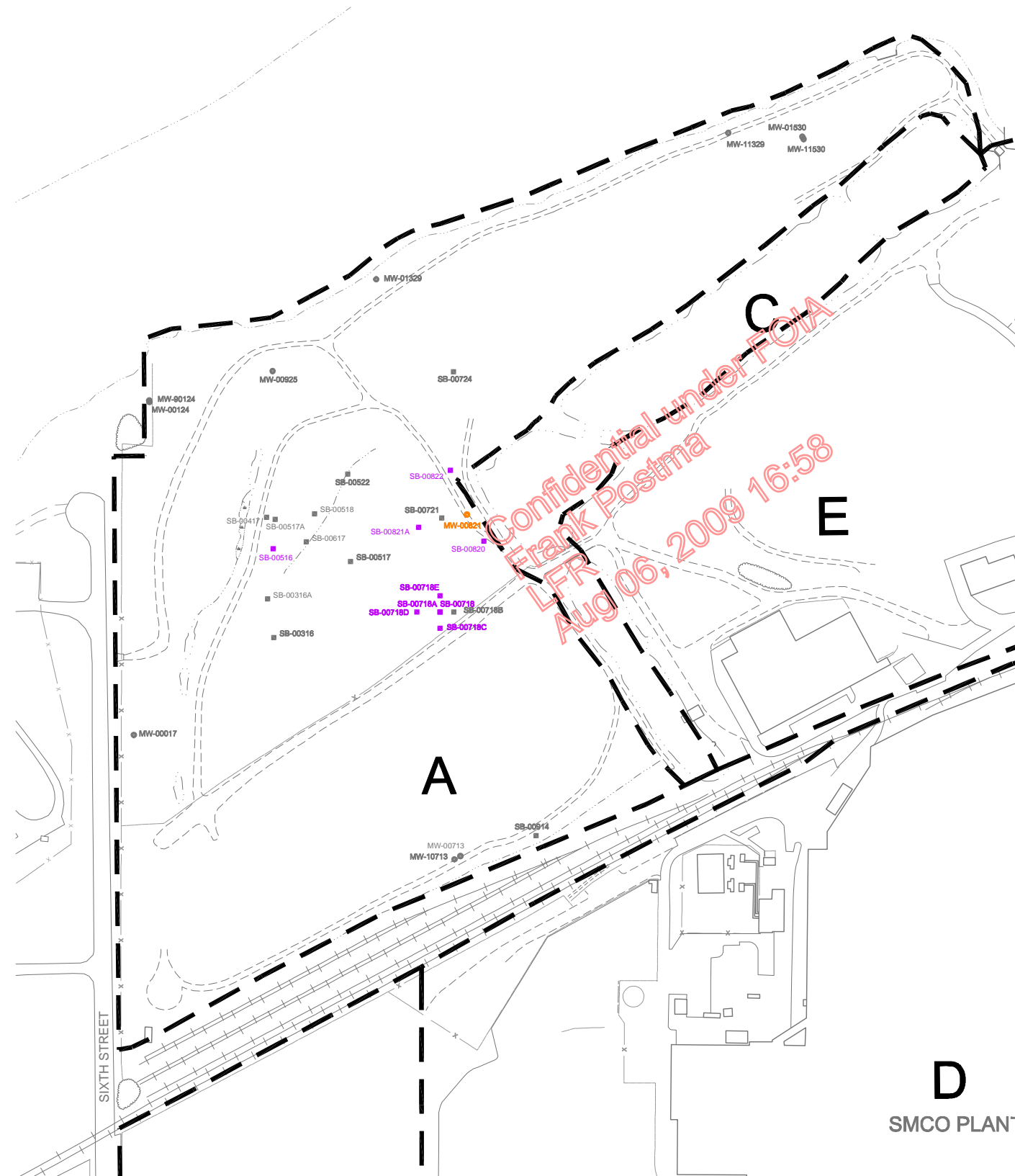
Source Reference:
 MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
 NOTE: TOPO - SANBORN, 1996

Project Manager: I.R.	Reviewed By: M.T.	Date: OCTOBER 2003
Scale: 1" = 150'	Project N°: 17075-22	Report N°: 013
		Drawing N°: figure 2.1

Frank Postma

LFR

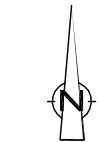
Aug 06, 2009 16:58



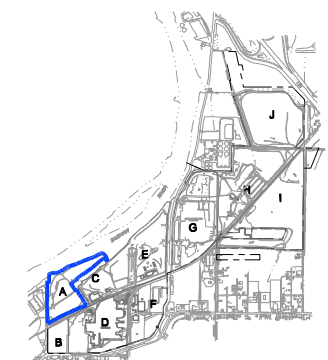
Frank Postma

LFR

Aug 06, 2009 16:58



- LEGEND**
- A--- INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
 - MONITORING WELL LOCATION - EXCEEDED CRITERIA
 - SOIL BORING LOCATION - EXCEEDED CRITERIA
 - ● SAMPLE LOCATION - NO EXCEEDANCES OF CRITERIA



KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.



GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT A
SOIL SAMPLE LOCATIONS



Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

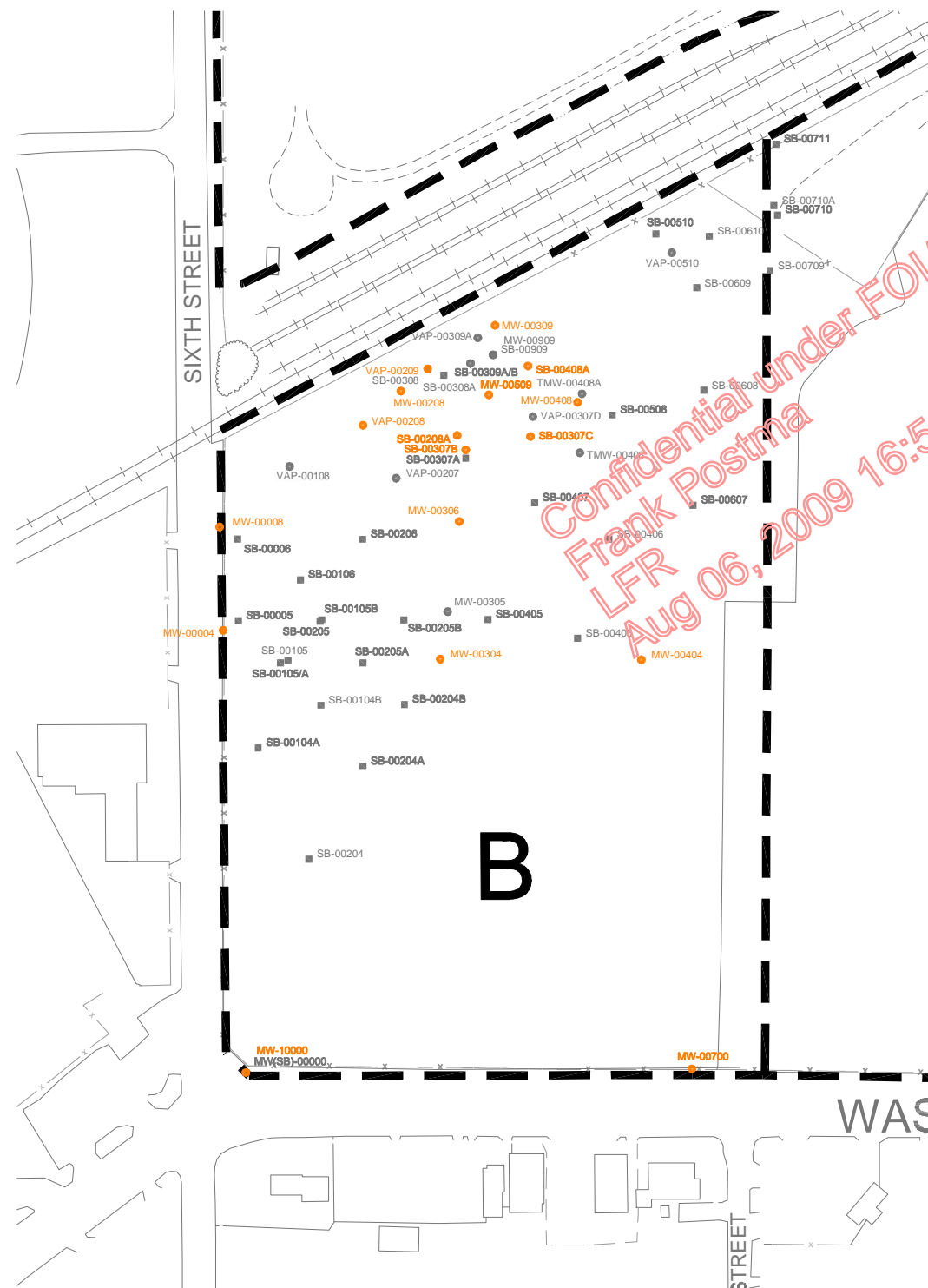
Project Manager: I.R.	Reviewed By: M.T.	Date: OCTOBER 2003
--------------------------	----------------------	-----------------------

Scale: 1" = 150'	Project N°: 17075-22	Report N°: 013	Drawing N°: figure 2.2
---------------------	-------------------------	-------------------	---------------------------

Frank Postma

LFR

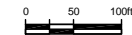
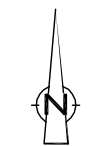
Aug 06, 2009 16:58



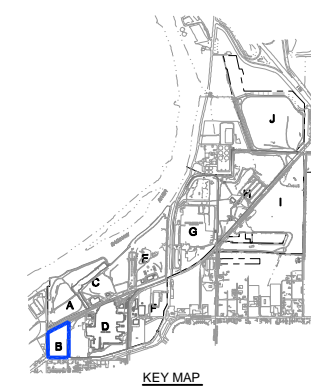
Frank Postma

LFR

Aug 06, 2009 16:58



- LEGEND**
- A--- INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
 - MONITORING WELL LOCATION - EXCEEDED CRITERIA
 - SOIL BORING LOCATION - EXCEEDED CRITERIA
 - ● SAMPLE LOCATION - NO EXCEEDANCES OF CRITERIA



SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.



GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT B
GROUNDWATER SAMPLE LOCATIONS



Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
NOTE: TOPO - SANBORN, 1996

Project Manager: I.R.	Reviewed By: M.T.	Date: OCTOBER 2003
Scale: 1" = 100'	Project No: 17075-22	Report No: 013
		Drawing No: figure 2.3

Frank Postma

LFR

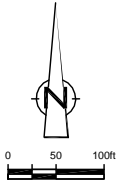
Aug 06, 2009 16:58



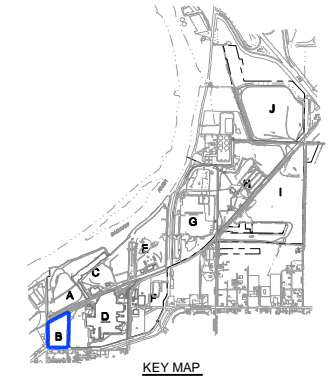
Frank Postma

LFR

Aug 06, 2009 16:58



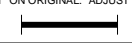
- LEGEND**
- A--- INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
 - MONITORING WELL LOCATION - EXCEEDED CRITERIA
 - SOIL BORING LOCATION - EXCEEDED CRITERIA
 - SAMPLE LOCATION - NO EXCEEDANCES OF CRITERIA



KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.



GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

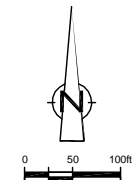
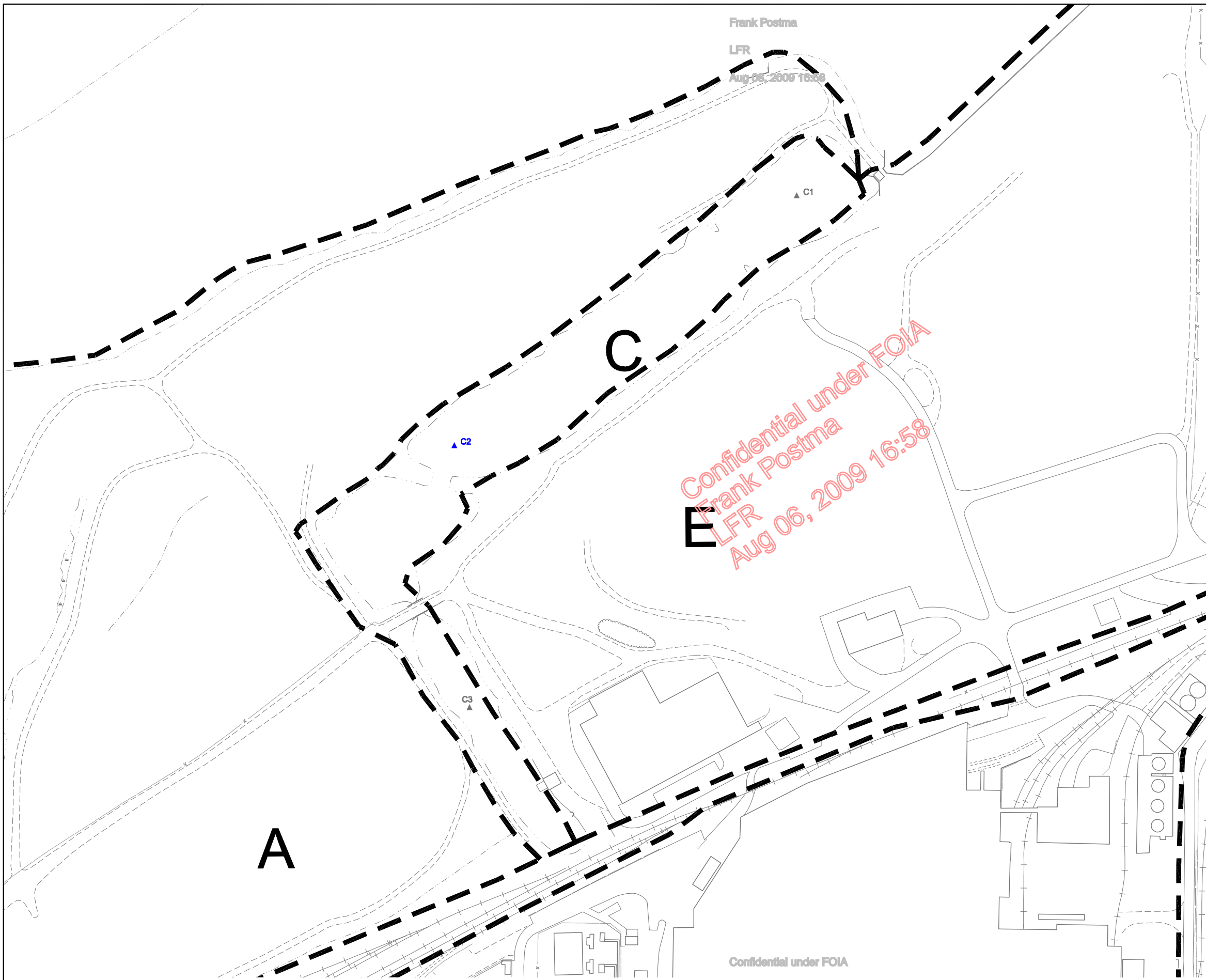
SAGINAW, MICHIGAN

INVESTIGATIVE UNIT B
SOIL SAMPLE LOCATIONS

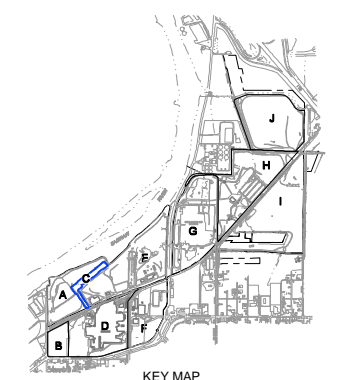


Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
NOTE: TOPO - SANBORN, 1996

Project Manager: I.R.	Reviewed By: M.T.	Date: OCTOBER 2003
Scale: 1" = 100'	Project N°: 17075-22	Report N°: 013
		Drawing N°: figure 2.4

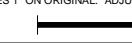


- LEGEND**
- A--- INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
 - ▲ SEDIMENT SAMPLE LOCATION - EXCEEDED CRITERIA
 - SAMPLE LOCATION - NO EXCEEDANCES OF CRITERIA



SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.



GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS
 SAGINAW, MICHIGAN
 INVESTIGATIVE UNIT C
 SURFACE WATER SAMPLE LOCATIONS



Source Reference:
 MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
 TOPO - SANBORN, 1996

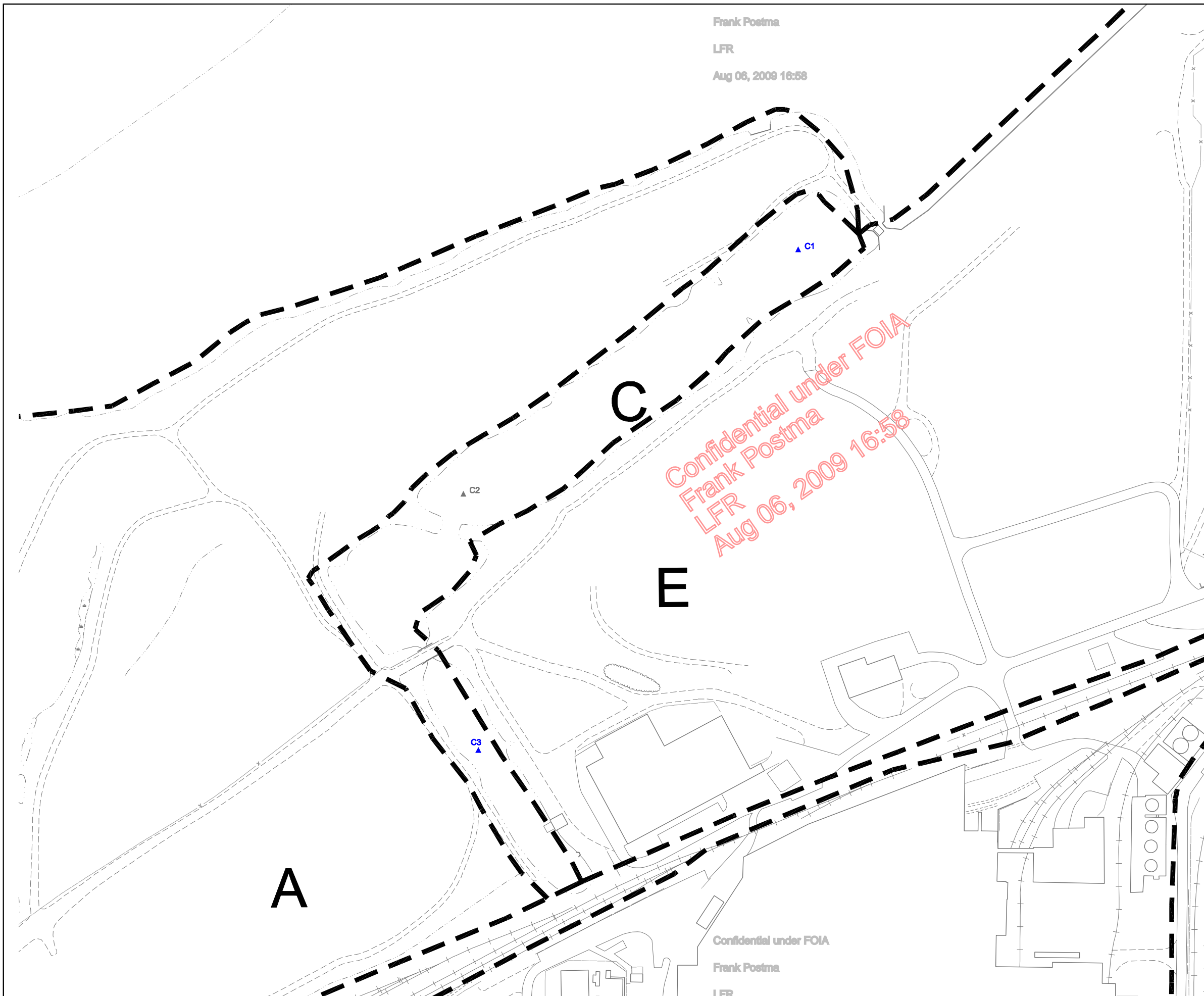
Project Manager: I.R.	Reviewed By: M.T.	Date: OCTOBER 2003
Scale: 1" = 100'	Project N°: 17075-22	Report N°: 013
		Drawing N°: figure 2.5

Confidential under FOIA

Frank Postma

LFR

Aug 06, 2009 16:58

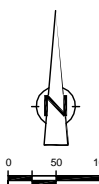


Confidential under FOIA

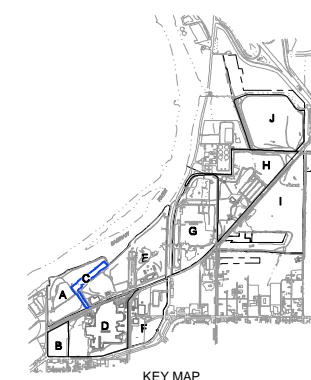
Frank Postma

LFR

Aug 06, 2009 16:58



- LEGEND**
- A--- INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
 - ▲ SEDIMENT SAMPLE LOCATION - EXCEEDED CRITERIA
 - △ SAMPLE LOCATION - NO EXCEEDANCES OF CRITERIA



KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.



GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

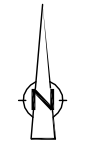
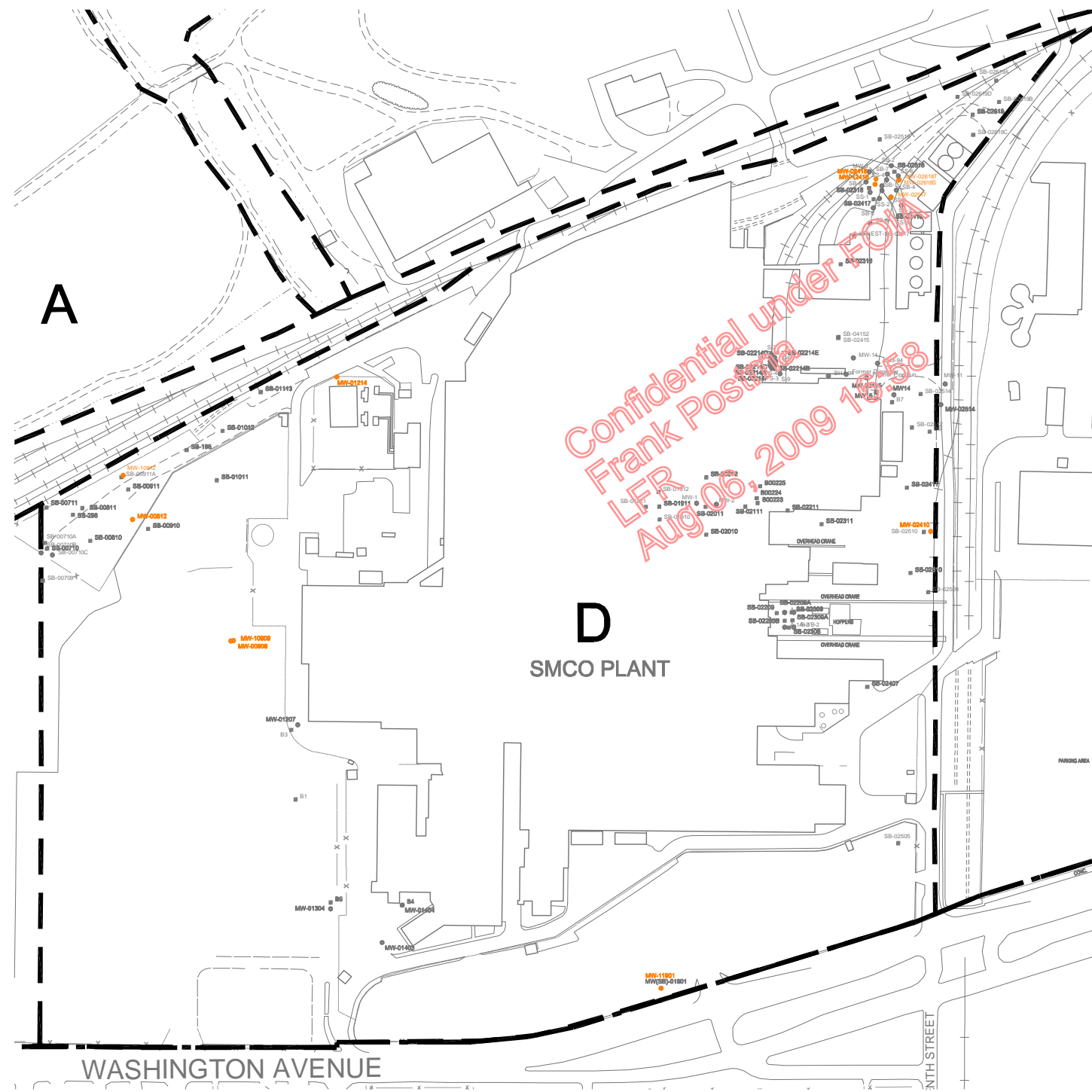
SAGINAW, MICHIGAN

INVESTIGATIVE UNIT C
SEDIMENT SAMPLE LOCATIONS



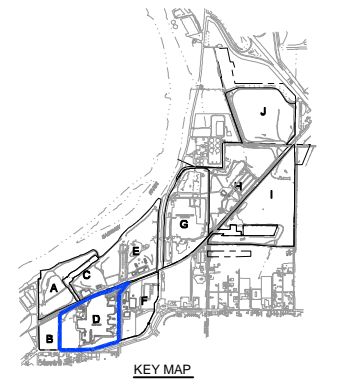
Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

Project Manager: I.R.	Reviewed By: M.T.	Date: OCTOBER 2003
Scale: 1" = 100'	Project N°: 17075-22	Report N°: 013
		Drawing N°: figure 2.6



0 60 150ft

- LEGEND**
- A--- INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
 - MONITORING WELL LOCATION - EXCEEDED CRITERIA
 - SAMPLE LOCATION - NO EXCEEDANCES OF CRITERIA



KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.



GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

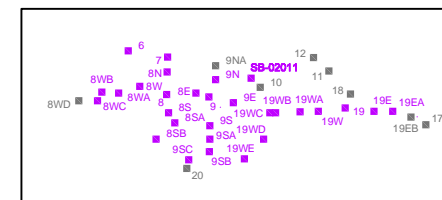
INVESTIGATIVE UNIT D
GROUNDWATER SAMPLE LOCATIONS



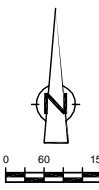
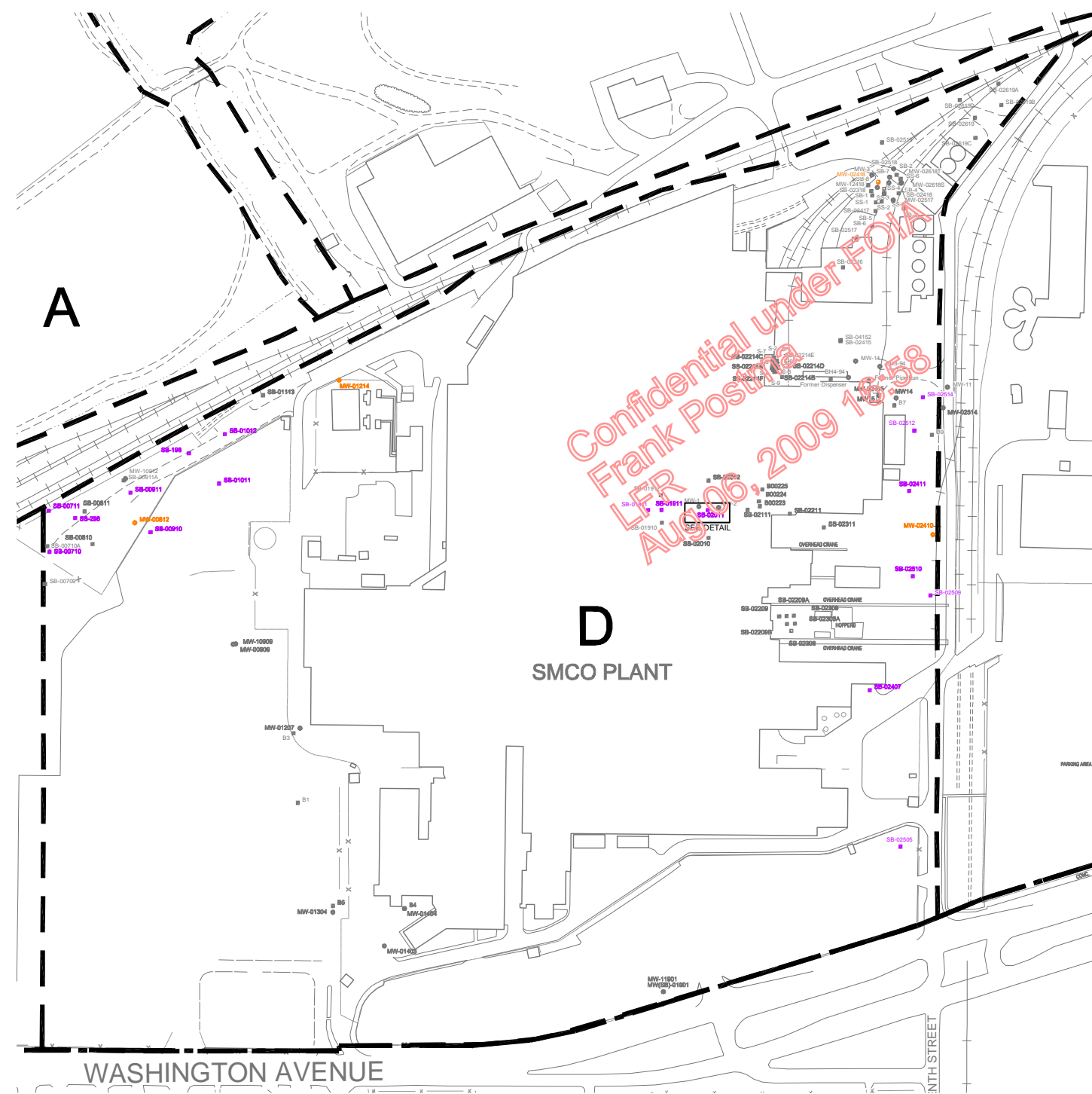
CONESTOGA-ROVERS & ASSOCIATES

Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

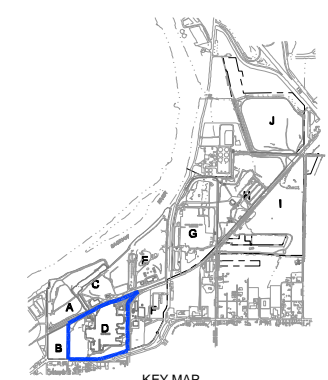
Project Manager: I.R.	Reviewed By: M.T.	Date: OCTOBER 2003
Scale: 1" = 150'	Project N ^o : 17075-22	Report N ^o : 013
		Drawing N ^o : figure 2.7



DETAIL
SCALE: 1"=20'



- LEGEND**
- A-- INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
 - MONITORING WELL LOCATION - EXCEEDED CRITERIA
 - SOIL BORING LOCATION - EXCEEDED CRITERIA
 - ⊙ SAMPLE LOCATION - NO EXCEEDANCES OF CRITERIA



SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.



GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT D
SOIL SAMPLE LOCATIONS



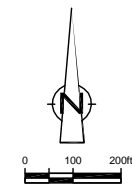
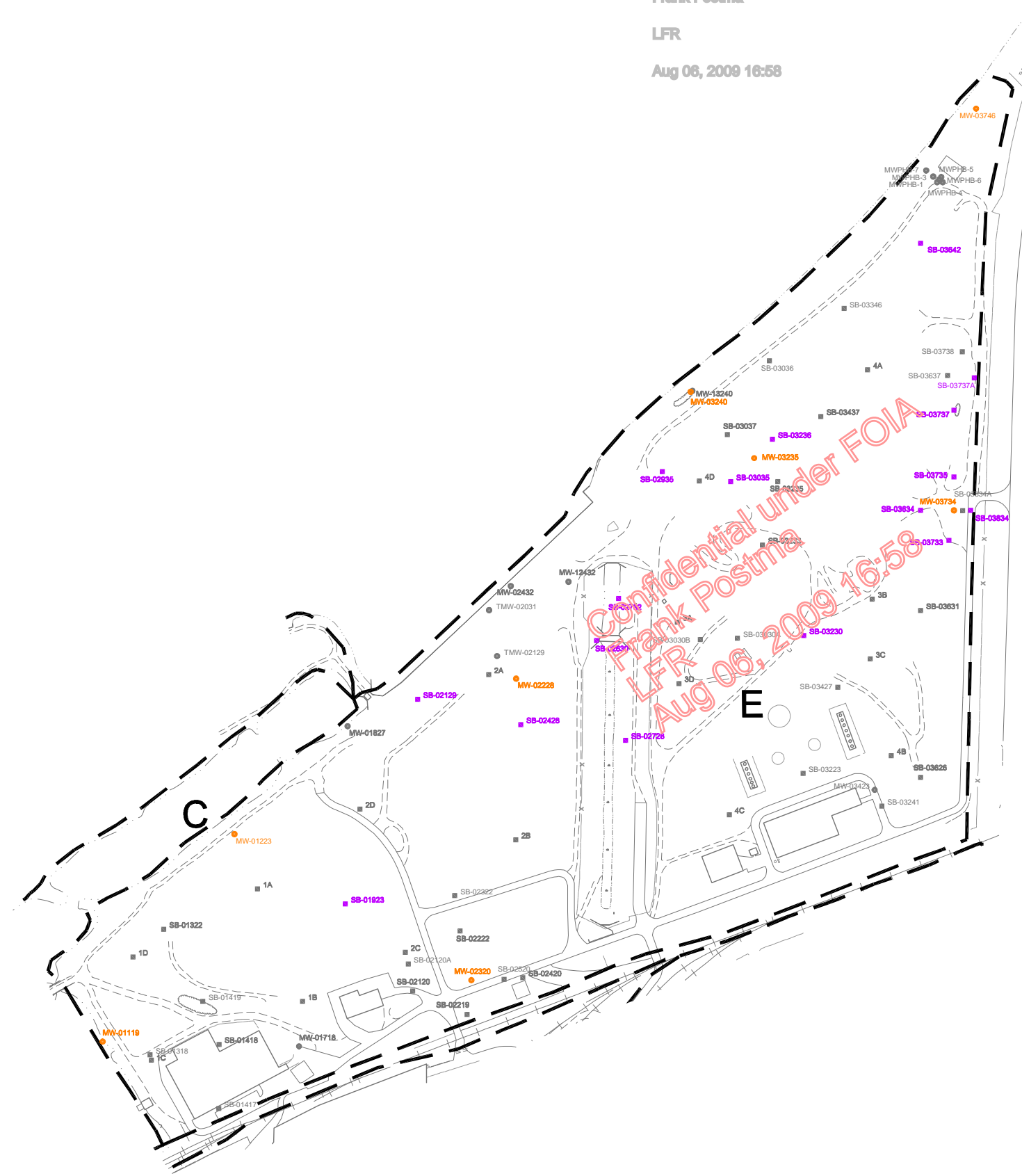
Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
NOTE: TOPO - SANBORN, 1996

Project Manager: I.R.	Reviewed By: M.T.	Date: OCTOBER 2003
Scale: 1" = 150'	Project N°: 17075-22	Report N°: 013
		Drawing N°: figure 2.8

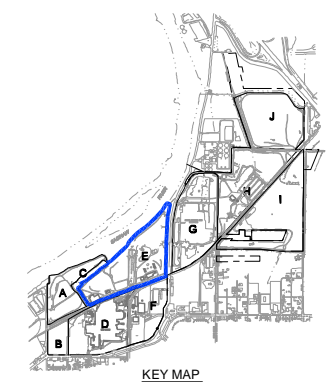
Frank Postma

LFR

Aug 06, 2009 16:58



- LEGEND**
- A--- INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
 - MONITORING WELL LOCATION - EXCEEDED CRITERIA
 - SOIL BORING LOCATION - EXCEEDED CRITERIA
 - SAMPLE LOCATION - NO EXCEEDANCES OF CRITERIA



SCALE VERIFICATION
 THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

**GENERAL MOTORS CORPORATION
 SAGINAW METAL CASTING OPERATIONS**
 SAGINAW, MICHIGAN
**INVESTIGATIVE UNIT E
 SOIL SAMPLE LOCATIONS**



Source Reference:
 MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
 TOPO - SANBORN, 1996

Project Manager: I.R.	Reviewed By: M.T.	Date: OCTOBER 2003
Scale: 1" = 200'	Project N°: 17075-22	Report N°: 013
		Drawing N°: figure 2.10

Frank Postma

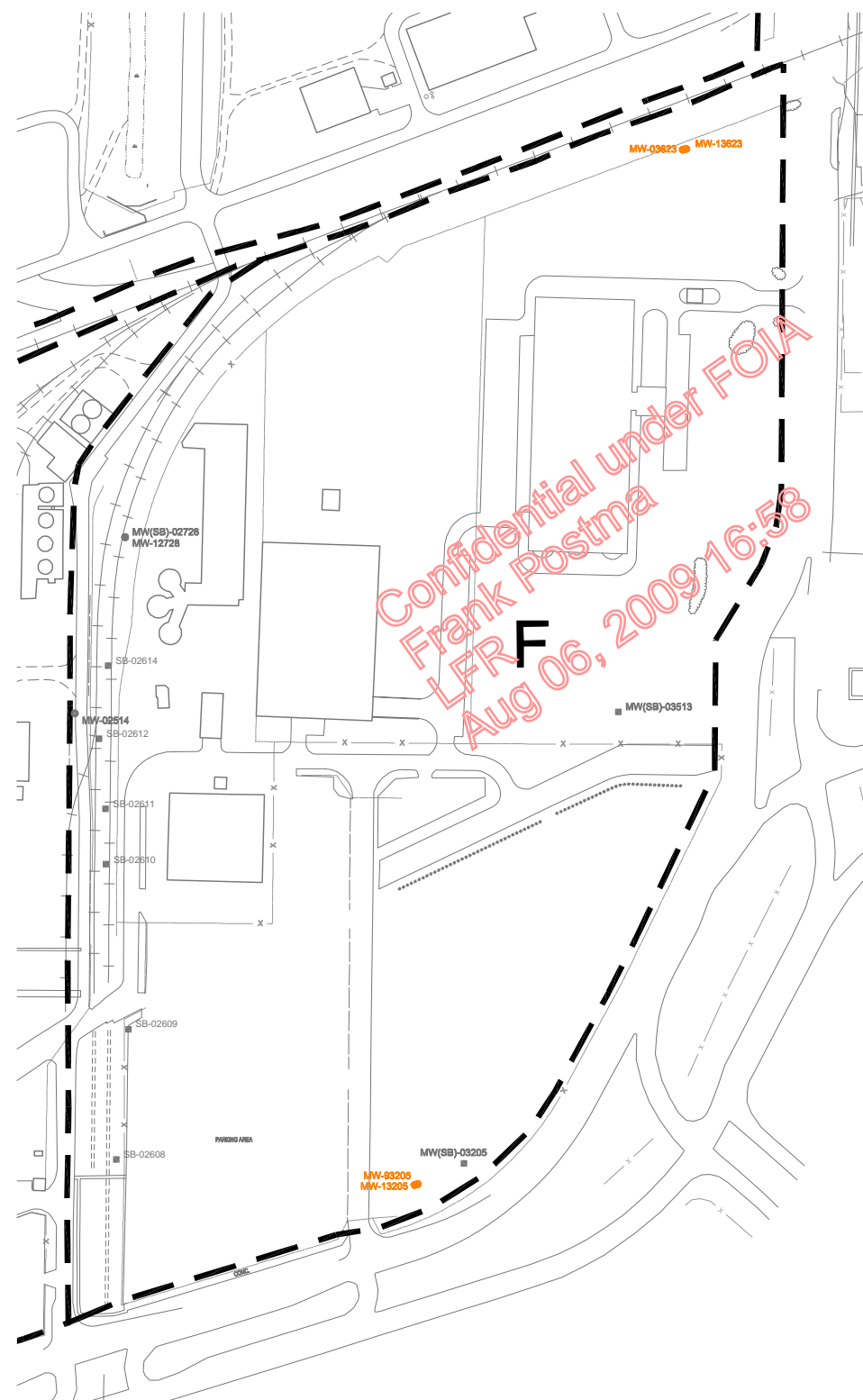
LFR

Aug 06, 2009 16:58

Frank Postma

LFR

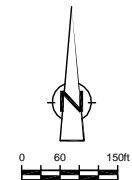
Aug 06, 2009 16:58



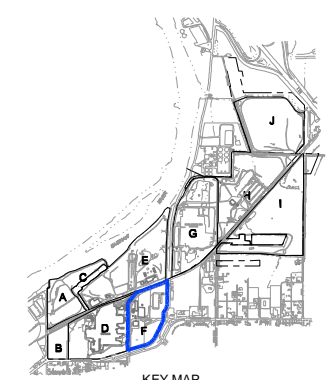
Frank Postma

LFR

Aug 06, 2009 16:58



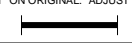
- LEGEND**
- A-- INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
 - MONITORING WELL LOCATION - EXCEEDED CRITERIA
 - SAMPLE LOCATION - NO EXCEEDANCES OF CRITERIA



KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.



**GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS**

SAGINAW, MICHIGAN

**INVESTIGATIVE UNIT F
GROUNDWATER SAMPLE LOCATIONS**



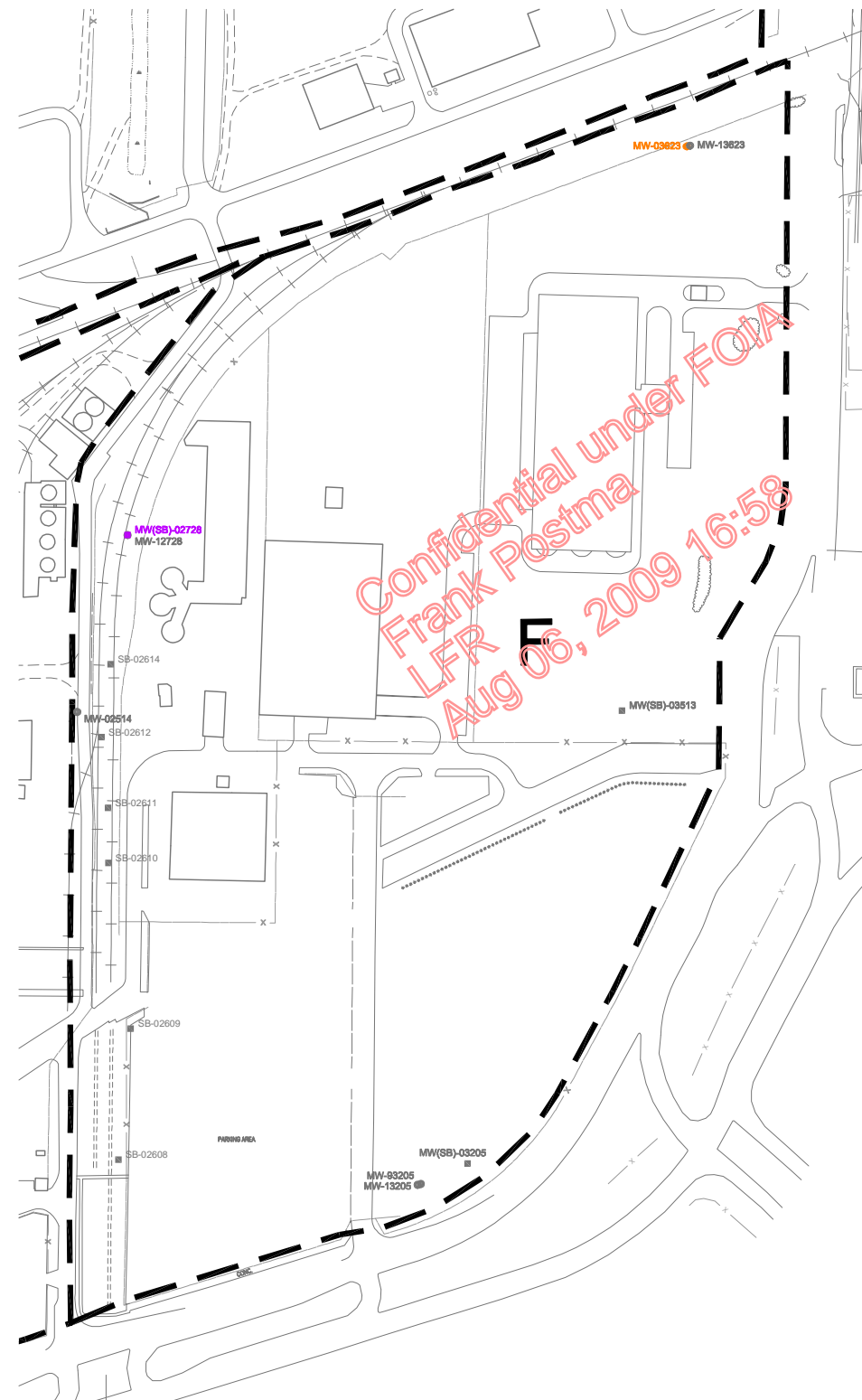
Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

Project Manager: I.R.	Reviewed By: M.T.	Date: OCTOBER 2003
Scale: 1" = 150'	Project N°: 17075-22	Report N°: 013
		Drawing N°: figure 2.11

Frank Postma

LFR

Aug 06, 2009 16:58

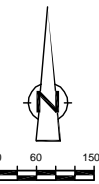


Confidential under FOIA
 Frank Postma
 LFR
 Aug 06, 2009 16:58

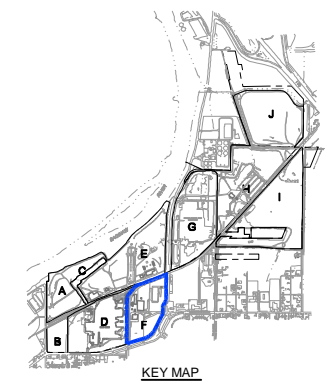
Frank Postma

LFR

Aug 06, 2009 16:58



- LEGEND**
- A--- INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
 - MONITORING WELL LOCATION - EXCEEDED CRITERIA
 - SOIL BORING LOCATION - EXCEEDED CRITERIA
 - SAMPLE LOCATION - NO EXCEEDANCES OF CRITERIA



SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.



GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT F
SOIL SAMPLE LOCATIONS



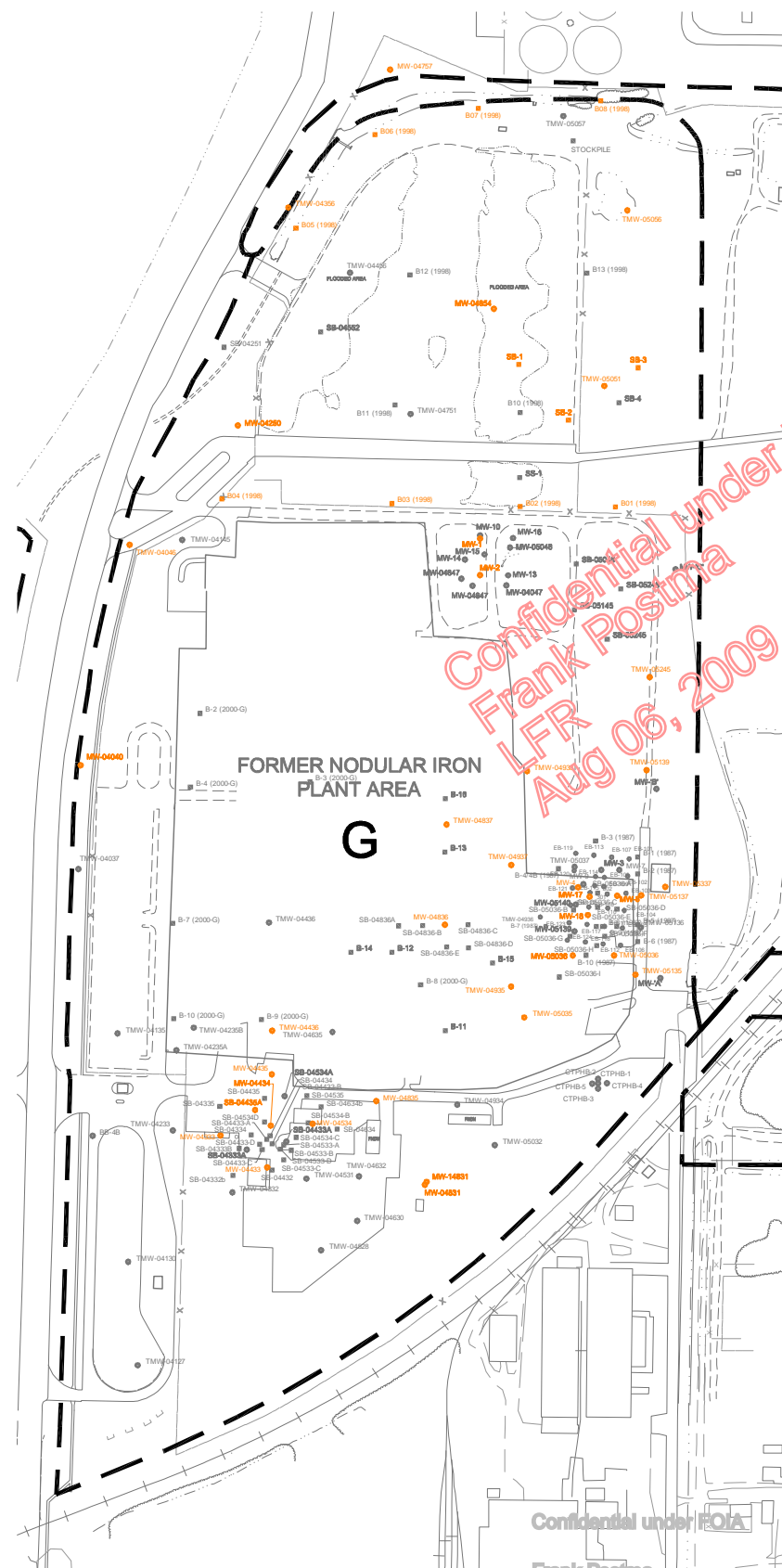
Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

Project Manager: I.R.	Reviewed By: M.T.	Date: OCTOBER 2003
Scale: 1" = 150'	Project N ^o : 17075-22	Report N ^o : 013
		Drawing N ^o : figure 2.12

Frank Postma

LFR

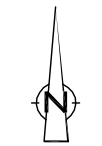
Aug 06, 2009 16:58



Frank Postma

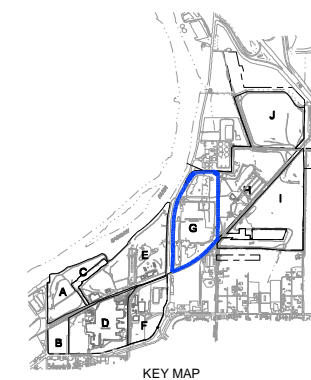
LFR

Aug 06, 2009 16:58



0 100 200ft

- LEGEND**
- A-- INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
 - MONITORING WELL LOCATION - EXCEEDED CRITERIA
 - SAMPLE LOCATION - NO EXCEEDANCES OF CRITERIA



KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.



GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

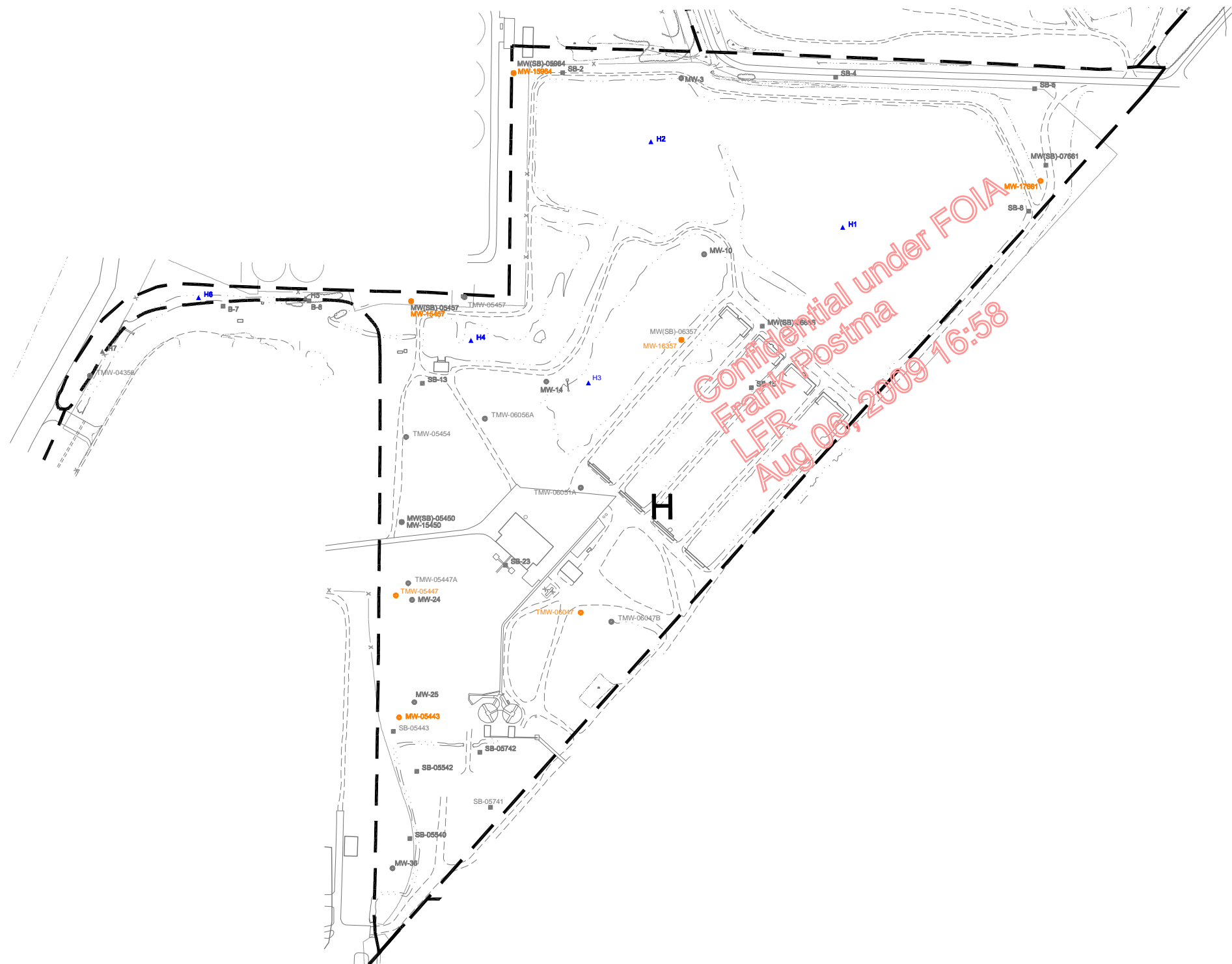
SAGINAW, MICHIGAN

INVESTIGATIVE UNIT G
GROUNDWATER SAMPLE LOCATIONS

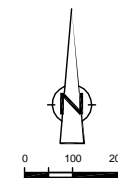


Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

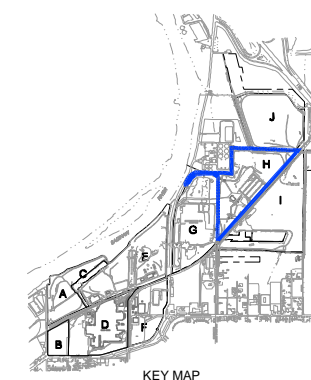
Project Manager: I.R.	Reviewed By: M.T.	Date: OCTOBER 2003
Scale: 1" = 200'	Project N°: 17075-22	Report N°: 013
		Drawing N°: figure 2.13



Confidential under FOIA
 Frank Postma
 LFR
 Aug 06, 2009 16:58



- LEGEND**
- A--- INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
 - MONITORING WELL LOCATION - EXCEEDED CRITERIA
 - ▲ SEDIMENT SAMPLE LOCATION - EXCEEDED CRITERIA
 - ▲ ● SAMPLE LOCATION - NO EXCEEDANCES OF CRITERIA



SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.



**GENERAL MOTORS CORPORATION
 SAGINAW METAL CASTING OPERATIONS**

SAGINAW, MICHIGAN

**INVESTIGATIVE UNIT H GROUNDWATER
 & SURFACE WATER SAMPLE LOCATIONS**



Source Reference:
 MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
 TOPO - SANBORN, 1996

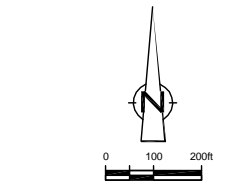
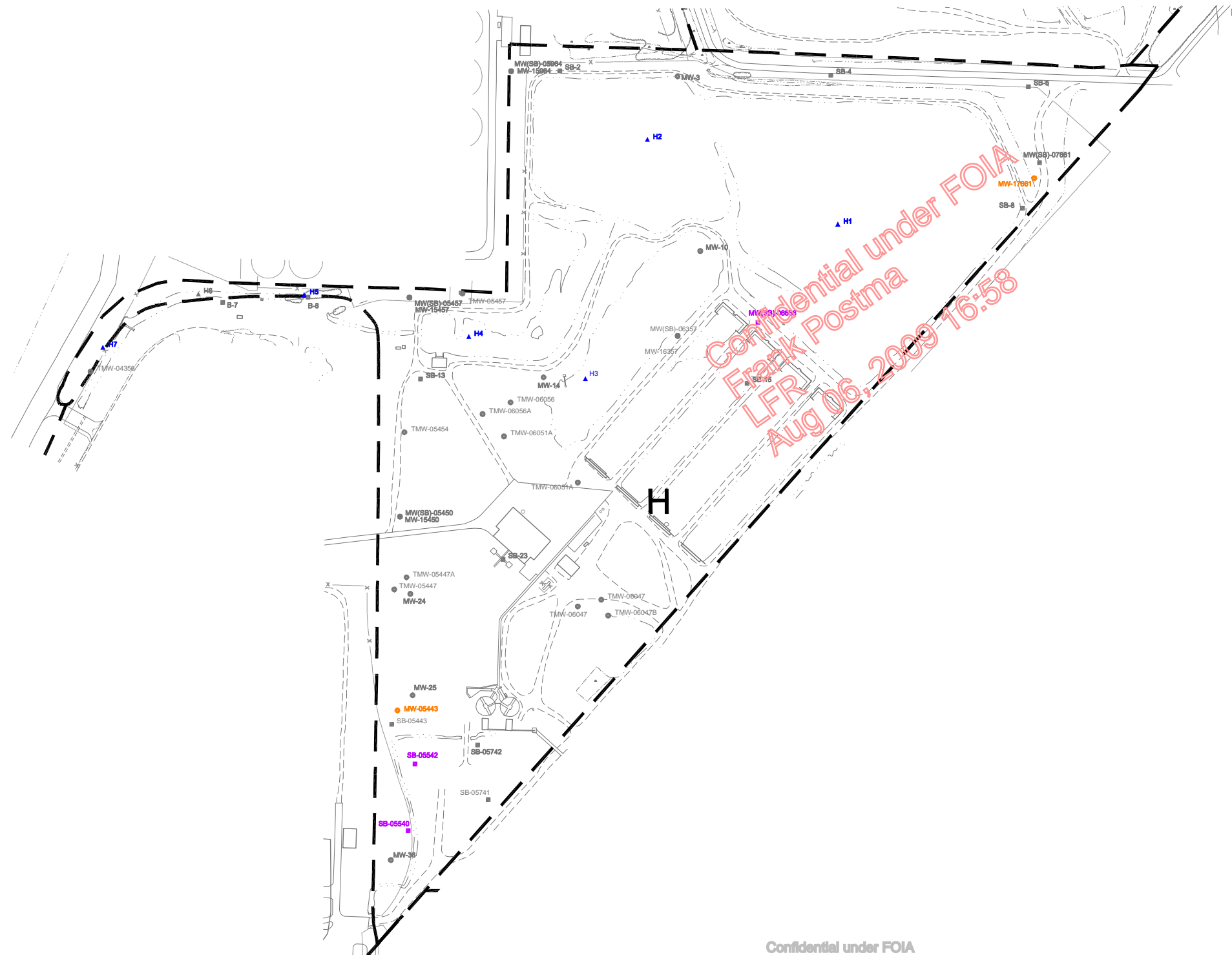
Project Manager: I.R.	Reviewed By: M.T.	Date: OCTOBER 2003
--------------------------	----------------------	-----------------------

Scale: 1" = 200'	Project N°: 17075-22	Report N°: 013	Drawing N°: figure 2.15
---------------------	-------------------------	-------------------	----------------------------

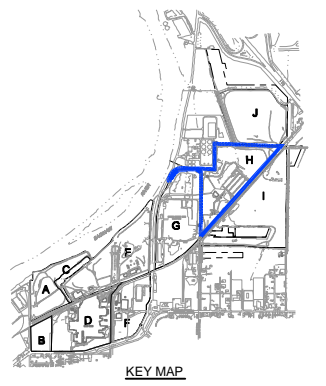
Frank Postma

LFR

Aug 06, 2009 16:58



- LEGEND**
- A--- INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
 - MONITORING WELL LOCATION - EXCEEDED CRITERIA
 - SOIL BORING LOCATION - EXCEEDED CRITERIA
 - ▲ SEDIMENT SAMPLE LOCATION - EXCEEDED CRITERIA
 - ▲ ■ ● SAMPLE LOCATION - NO EXCEEDANCES OF CRITERIA



SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.



GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

INVESTIGATIVE UNIT H
SOIL AND SEDIMENT SAMPLE LOCATIONS



Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

Project Manager: I.R.	Reviewed By: M.T.	Date: OCTOBER 2003
Scale: 1" = 200'	Project N°: 17075-22	Report N°: 013
		Drawing N°: figure 2.16

Frank Postma

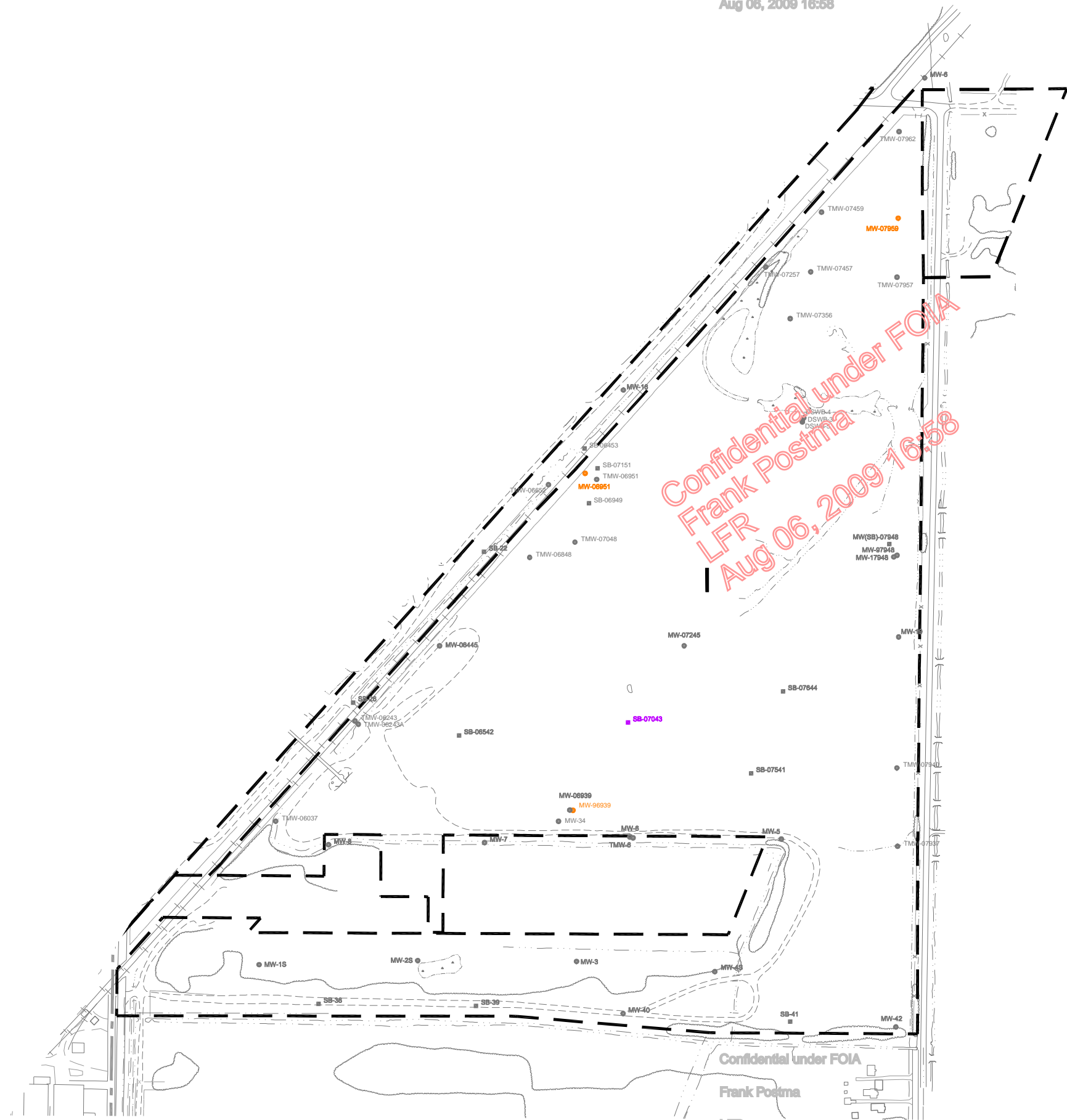
LFR

Aug 06, 2009 16:58

Frank Postma

LFR

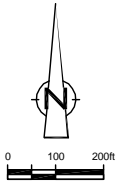
Aug 06, 2009 16:58



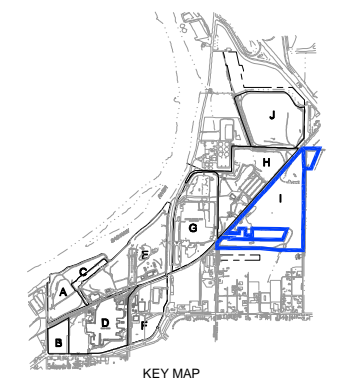
Frank Postma

LFR

Aug 06, 2009 16:58



- LEGEND**
- A--- INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
 - MONITORING WELL LOCATION - EXCEEDED CRITERIA
 - SOIL BORING LOCATION - EXCEEDED CRITERIA
 - SAMPLE LOCATION - NO EXCEEDANCES OF CRITERIA



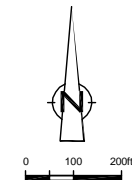
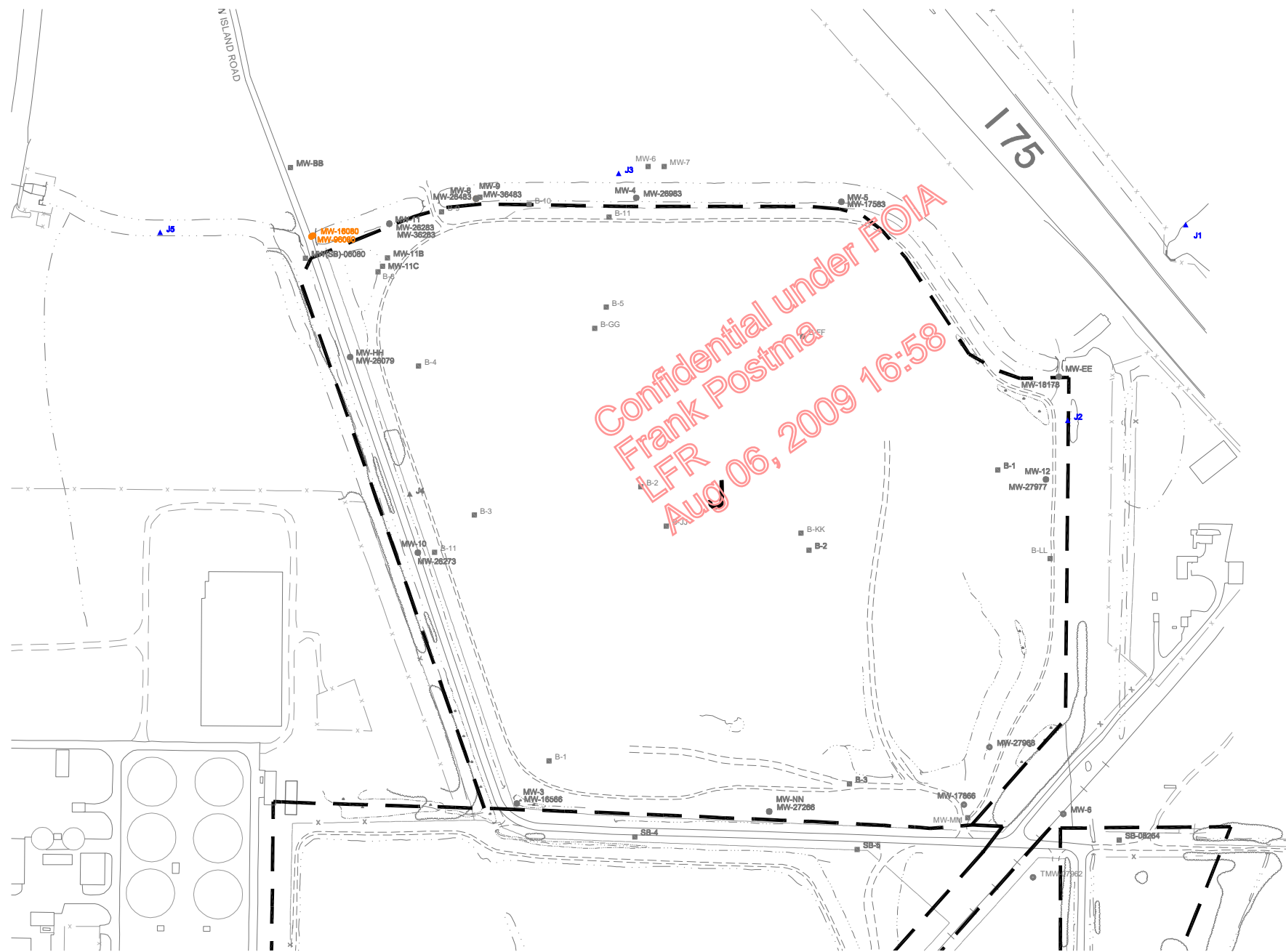
SCALE VERIFICATION
 THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS
 SAGINAW, MICHIGAN
 INVESTIGATIVE UNIT I
 SOIL SAMPLE LOCATIONS

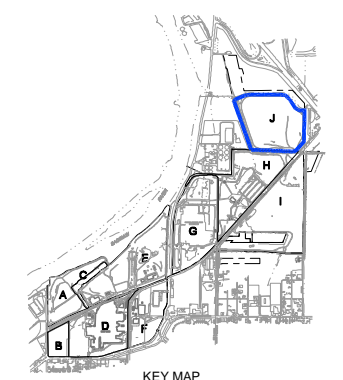


Source Reference:
 MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
 TOPO - SANBORN, 1996

Project Manager: I.R.	Reviewed By: M.T.	Date: OCTOBER 2003
Scale: 1" = 200'	Project No: 17075-22	Report No: 013
		Drawing No: figure 2.18



- LEGEND**
- A--- INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
 - MONITORING WELL LOCATION - EXCEEDED CRITERIA
 - ▲ SEDIMENT SAMPLE LOCATION - EXCEEDED CRITERIA
 - ▲ ● SAMPLE LOCATION - NO EXCEEDANCES OF CRITERIA



SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.



GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

INVESTIGATIVE UNIT J GROUNDWATER
& SURFACE WATER SAMPLE LOCATIONS



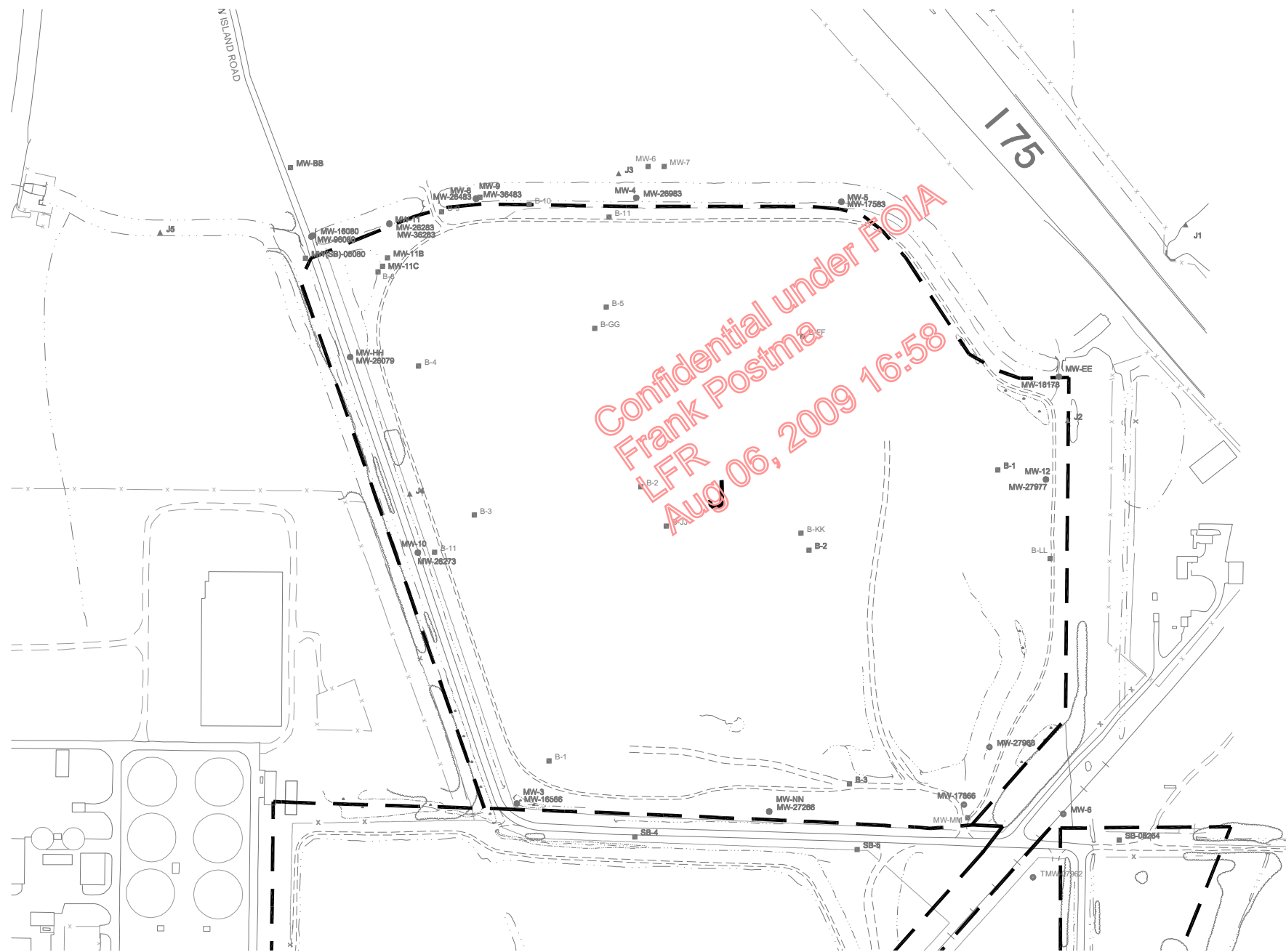
Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

Project Manager: I.R.	Reviewed By: M.T.	Date: OCTOBER 2003
Scale: 1" = 200'	Project N°: 17075-22	Report N°: 013
		Drawing N°: figure 2.19

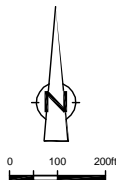
Frank Postma

LFR

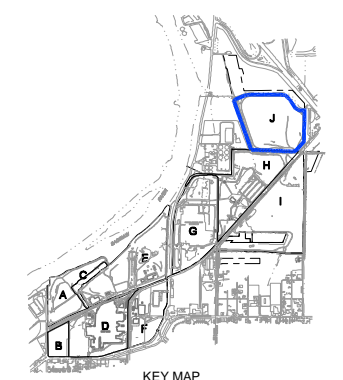
Aug 06, 2009 16:58



Confidential under FOIA
Frank Postma
LFR
Aug 06, 2009 16:58



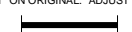
LEGEND
 A--- INVESTIGATIVE UNIT BOUNDARY AND IDENTIFIER
 ▲ ● SAMPLE LOCATION - NO EXCEEDANCES OF CRITERIA



KEY MAP

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.



**GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS**

SAGINAW, MICHIGAN

**INVESTIGATIVE UNIT J
SOIL SAMPLE LOCATIONS**



Source Reference:
MICHIGAN STATE PLANE SOUTH, NAD 83 USING INTERNATIONAL FEET, NGVD 88
TOPO - SANBORN, 1996

Project Manager: I.R.	Reviewed By: M.T.	Date: OCTOBER 2003
Scale: 1" = 200'	Project N°: 17075-22	Report N°: 013
		Drawing N°: figure 2.20

Frank Postma

LFR

Aug 06, 2009 16:58

Confidential under FOIA

Frank Postma

LFR

Aug 06, 2009 16:58

APPENDIX A

ENVIRON MEMORANDUM

Confidential under FOIA
Frank Postma
LFR
Aug 06, 2009 16:58

Confidential under FOIA

Frank Postma

LFR

Aug 06, 2009 16:58

October 3, 2003

MEMORANDUM

To: Cheryl Hiatt

From: Stephen Song
Mark Nielsen
Kevin Long

Subject: Updated Due Care Evaluation of SMCO Site Characterization Data

As requested, ENVIRON has updated its August 02, 2002 evaluation of RFI and non-RFI site characterization data from the GM Saginaw Metal Casting Operations (SMCO) facility in Saginaw, Michigan. The purpose of the evaluation was to determine whether concentrations in soil, groundwater, sediment and surface water that exceed Michigan Part 201 Generic Cleanup Criteria for industrial/commercial facilities would be expected to pose significant health risk under current conditions at the facility.

The data evaluated consisted of the soil, groundwater, sediment and surface water characterization data collected in Investigation Units (IUs) A through J during Phase 1A and 1B of the RFI as well as other soil and groundwater data collected as part of ongoing non-RFI related investigations. Current land use at the facility is industrial/commercial and information reviewed during the Phase 1A support a determination that reasonably anticipated future on-site land use will remain industrial/commercial. Thus, the RFI and non-RFI data was compared with Part 201 generic criteria for industrial land use category (which includes the Commercial II, III, & IV category) as published by Department of Environmental Quality (MDEQ) on December 2002.

Soil

The soil characterization data were compared with MDEQ Part 201 criteria selected to evaluate the following potentially relevant pathways of exposure:

- Worker incidental ingestion and dermal contact with industrial soil
- Worker inhalation of volatiles in ambient air from industrial soil
- Worker inhalation of particulates in ambient air from industrial soil
- Worker inhalation of vapor from soil which has migrated to industrial indoor air through cracks in building foundations

Among the data evaluated, 117 RFI soil results and 112 non-RFI soil results had concentrations higher than one or more of the Part 201 generic criteria listed above. Table 1 lists these 229 data points sorted by IU. For each IU, the data are sorted by chemical name, and for each chemical, the data are sorted by location and sample depth interval. For each data point, the table shows the concentration, the corresponding Part 201 generic criteria, and the ratios of the concentration and the individual criteria. The ratios that exceed 1.0 are highlighted and discussed below for each IU.

Investigative Unit A

The concentration of chromium in one RFI sample (B10029^{0^1^RFI}) at boring MW-00821 exceeds the Part 201 generic particulate soil inhalation criterion (PSIC) of 240 mg/kg with a concentration of 292 mg/kg. Sample B10029 is a surface sample located in an area that does not have routine vehicle traffic (currently, industrial activities occur in IU A only on an intermittent basis) as assumed in MDEQ's derivation of the PSIC. Therefore the appropriate PSIC, based on wind erosion, is 2,500 mg/kg, as explained in ENVIRON's Discussion Paper on the MDEQ Part 201 PSIC (ENVIRON 2000). This alternate PSIC is still highly conservative because it assumes that Cr is present entirely as hexavalent chromium. Data from soil samples at other locations at the facility show that most chromium is actually in the less toxic trivalent form. This sample is one of eight surface soil samples collected in IU A for chromium. All other samples have chromium concentrations lower than 240 mg/kg. The 95% upper confidence limit on the mean (UCL¹) of these samples is 181 mg/kg which is below the generic PSIC for chromium. Therefore, worker exposure to chromium concentrations in IU A surface soil is not significant.

The concentration of formaldehyde in one RFI sample (B50152-200301) at boring SB-00516 exceeds the Part 201 generic industrial soil volatilization to indoor air inhalation criteria of 65 mg/kg and the industrial soil volatilization to ambient air inhalation criteria of 69 mg/kg with a concentration of 79 mg/kg. The industrial soil volatilization to indoor air criteria is not relevant for evaluating formaldehyde in this sample as no buildings are located in the area of this sample. This sample is also one of 21 soil samples collected in IU A from all depths. All the other samples have formaldehyde concentrations lower than 65 mg/kg; the 95% UCL of these samples is 23.4 mg/kg which is well below the generic industrial soil volatilization to ambient air inhalation criteria for formaldehyde. Therefore worker exposure to formaldehyde in soil at IU A is not significant.

The concentrations of manganese in eleven RFI samples from borings MW-00821, SB-00718, SB-00718D, SB-00718E, SB-00820, SB-00821A, and SB-00822, exceed the Part 201 generic PSIC of 1,500 mg/kg.

- Six of the samples are located at a depth below ground surface (bgs) greater than 2 ft. Because these samples are not at ground surface, the PSIC is not relevant.

¹ The UCLs on the mean concentrations are calculated using a nonparametric bootstrap method known as the "BCa" (bias-corrected and accelerated) method (Efron and Tibshirani, 1998) with 4,000 bootstrap replications to ensure adequate accuracy. UCLs on the mean were calculated using data from surface soil (0- to 2-ft bgs) and soil data from all sampling depths. The UCLs used to further evaluate significance of potential exposures are the higher of these two values.

Aug 06, 2009 16:58

- Five of the samples are surface samples from borings MW-00821, SB-00820, SB-00821A, and SB-00822. The manganese concentrations in these samples range from 2,350 mg/kg to 12,600 mg/kg. These surface soil samples are located in an area that does not have routine vehicle traffic (currently, industrial activities occur in IU A only on an intermittent basis). Therefore the appropriate PSIC is 22,300 mg/kg and is based solely on wind erosion as explained in the Discussion Paper on the MDEQ Part 201 PSIC (ENVIRON 2000). Therefore worker exposure to manganese particulate emissions in IU A is not significant.

Investigative Unit B

The concentrations of benzo(a)pyrene in two RFI samples (B50031, B20238) at borings SB-00308 and SB-00508 exceed the Part 201 generic soil direct contact criterion of 8 mg/kg with concentrations of 44 mg/kg and 16 mg/kg respectively. These samples were collected beneath the surface gravel in an inactive area (and their extents have been delineated) so direct contact exposure is limited. These samples are 2 of 76 soil samples in IU B from all depths that have been analyzed for benzo(a)pyrene. The 95% UCL for benzo(a)pyrene in samples from IU B is 3.98 mg/kg which is below the generic criterion. Therefore worker exposure to benzo(a)pyrene in soil at IU B is not significant.

The concentration of dibenz(a,h)anthracene in one RFI sample (B50031) at borings SB-00308 exceeds the Part 201 generic soil direct contact criterion of 8 mg/kg with a concentration of 11 mg/kg. This sample was collected beneath the surface gravel in an inactive area so direct contact exposure is limited. This sample is 1 of 76 soil samples in IU B from all depths that have been analyzed for dibenz(a,h)anthracene. The 95% UCL of dibenz(a,h)anthracene in samples from IU B is 1.69 mg/kg which is below the generic criterion. Therefore worker exposure to dibenz(a,h)anthracene in soil at IU B is not significant.

The concentrations of lead in six RFI samples from borings SB-00104B, SB-00105, SB-00106, SB-00205, SB-00205, and SB-00508 and two non-RFI samples from borings B-15~B, B-7~B exceed the Part 201 generic soil direct contact criteria of 900 mg/kg; the lead concentrations in all eight samples range from 1,300 mg/kg to 5,490 mg/kg. Six of these samples are surface samples from borings B-15~B, B-7~B, SB-00105, SB-00205, SB-00205, and SB-00508. These 8 samples are among 78 soil samples in IU B that have been analyzed for lead. The arithmetic mean concentration of these samples in IU B is 449 mg/kg which is the appropriate exposure point concentration for evaluating potential exposures to lead in soil. This exposure concentration is below the generic criterion, and therefore, worker exposure to lead in soil at IU B is not significant.

The concentrations of manganese in five RFI samples at borings SB-00307a, SB-00508, and VAP-00209/SB-00308A exceed the Part 201 generic PSIC of 1,500 mg/kg.

- Two of the samples (B40122Q and B40123) from boring SB-00308A are located at a depth below ground surface (bgs) greater than 2 ft. Because these samples are not at ground surface, the PSIC is not relevant.

LFR

- The other three samples exhibited detected concentrations ranging from 2,020 mg/kg to 6,350 mg/kg. These three surface samples were among 12 other surface soil samples in IU B that have been analyzed for manganese and were collected beneath the surface gravel cover in an inactive area so particulate emissions will be limited. These surface soil samples are located in an area that does not have routine vehicle traffic. Therefore the appropriate PSIC is 22,300 mg/kg and is based solely on wind erosion as explained in the Discussion Paper on the MDEQ Part 201 PSIC (ENVIRON 2000). The 95% UCL among these samples is approximately 2,820 mg/kg. Therefore worker exposure to manganese particulate emissions in IU B is not significant.

The concentration of PCBs (total) in one RFI sample (B40119) at boring MW-00709 exceeds the Part 201 generic direct contact criteria of 16 mg/kg with a concentration of 43.5 mg/kg. This sample was not collected at ground surface (the sample was collected from 2-4 ft bgs), so the direct contact with these deeper soils by routine workers is not reasonably expected under current conditions. This sample is one of 46 soil samples for PCBs (total) located in the northeastern portion of IU B and adjacent northwestern portion of IU D. The 95% UCL on the mean for these samples is 4.97 mg/kg which is below the generic criteria. Therefore worker exposure to PCBs in soil at IU B is not significant.

Investigative Unit D

The concentration of antimony in one RFI surface soil sample (B10357) at boring SB-00710 exceeds the Part 201 generic soil direct contact criteria of 670 mg/kg with a concentration of 946 mg/kg. This sample is in an inactive area that is currently gravel covered so direct contact exposure of routine workers is not expected. This sample is one of 62 soil samples in IU D from all depths that have been analyzed for antimony. The 95% UCL Sb among samples from IU D is 177 mg/kg which is below the generic criterion. Therefore worker exposure to antimony in soil at IU D is not significant.

The concentration of benzo(a)pyrene in one RFI surface soil sample (B10318) at boring SB-00911 exceeds the Part 201 generic soil direct contact criterion of 8 mg/kg with a concentration of 30 mg/kg. This sample is in an inactive area that is currently gravel covered so direct contact exposure of routine workers is not expected. This sample is also one of 75 other surface soil samples collected in IU D, all having benzo(a)pyrene concentrations lower than 8 mg/kg; the 95% UCL for benzo(a)pyrene among these samples is 2.92 mg/kg which is much lower than the generic criterion. Therefore worker exposure to benzo(a)pyrene in soil at IU D is not significant.

The concentrations of chromium in seven RFI samples from borings MW-00812, MW-02410 and SB-02510, SB-198 and SB-298, exceed the Part 201 generic PSIC of 240 mg/kg. Four of these samples are surface samples and located within an inactive areas that is currently gravel (at MW-00812, SB-198, SB-298) and asphalt covered (at SB-02510) so particulate emissions is not expected. Two of the samples from the east side of the plant (at MW-02410 and SB-02510) were collected beneath the existing pavement and therefore, the PSIC is not relevant. The other three samples are subsurface samples, and therefore, the PSIC is not relevant. Further, this PSIC is highly conservative because it assumes that chromium is present entirely as hexavalent chromium. Data from soil samples at other locations at the

Site show that most chromium is actually in the less toxic trivalent form. Therefore under current conditions, worker exposure to chromium concentrations in IU D surface soil is not significant.

The concentration of formaldehyde in one sample (B10256) at boring SB-02510 exceeds the Part 201 generic soil volatilization to indoor air criterion of 65 mg/kg and soil volatilization to ambient air criterion of 69 mg/kg with a concentration of 84 mg/kg. Because there is no building at this location, the soil volatilization to indoor air criterion is not relevant under current conditions. This sample was collected beneath existing pavement and therefore, the volatilization to ambient air criterion is also not relevant. In addition, this sample is 1 of 21 soil samples from all depths collected in IU D. All the other samples have formaldehyde concentrations lower than 65 mg/kg. The 95% UCL for formaldehyde among these samples is 19 mg/kg which is well below the generic soil volatilization to indoor air and ambient air criteria. Therefore worker exposure to formaldehyde in soil at IU D is not significant.

The concentrations of manganese in 23 RFI soil samples at borings MW-00812, MW-01214, MW-02410, MW-02418, SB-00710, SB-00910, SB-01012, SB-02407, SB-02411, SB-02505, SB-02509, SB-02510, SB-02512, SB-02514, SB-198, and SB-298 and one non-RFI soil sample at boring MW-02418 exceed the Part 201 generic PSIC of 1,500 mg/kg.

- Twelve of the samples are surface soil samples with manganese concentrations ranging from 2,390 mg/kg to 11,400 mg/kg. They are located in an area that either does not have routine vehicle traffic and is currently gravel or asphalt covered (at MW-01214, MW-00812, SB-00710, SB-00711, SB-00910, SB-01012, SB-02407, SB-02505, SB-02510, SB-02514, SB-198, and SB-298). For the samples that are under pavement, the PSIC is not relevant as the potential for particulate emissions in this area is or will be prevented. For the samples in unpaved areas with no routine vehicle traffic, the appropriate PSIC, is 22,300 mg/kg and is based solely on wind erosion as explained in the ENVIRON's Discussion Paper on the MDEQ Part 201 PSIC (ENVIRON 2000).
- The other twelve samples are located at a depth below ground surface (bgs) greater than 2 ft. Because the samples are not at ground surface, the PSIC is not relevant.

Therefore worker exposure to manganese in soil at IU D is not significant.

The concentrations of PCBs (total) in 2 RFI samples and 107 non-RFI samples the MDEQ direct contact criterion of 16 mg/kg. All of these samples, except one, are under the paved basement floor of the Grey Iron Plant building in the #8 Mold Line area. This one sample (B00141) at boring SB-298 is in an area that is currently gravel covered, so direct contact exposure of routine workers is not expected. Because these concentrations of PCBs (total) are either under the building or under gravel cover, potential direct contact exposure of routine workers is not expected. There are no current plans for excavations or building renovations in this area, and such activities in the future would be conducted under SMCO's site health and safety procedures to ensure that appropriate precautions are taken to avoid unacceptable exposures to PCBs in this area. Therefore, potential worker exposure to PCBs in IU D soil is not significant.

Investigative Unit E

Aug 06, 2009 16:58

The concentrations of chromium in six RFI samples (B10022¹¹^{RFI}, B10023²¹^{RFI}, B10013⁰¹^{RFI}, B10014¹¹^{RFI}, B10015²¹^{RFI}, and B00072⁰¹^{RFI}) exceed the Part 201 generic PSIC of 240 mg/kg.

- One of the samples is a surface soil sample (B10013⁰¹^{RFI}) at boring MW-02320 and is the only surface soil sample among 11 collected in IU E which exceeds the Part 201 generic PSIC criteria with a concentration of 291 mg/kg. The 95% UCL for chromium among the 11 surface samples is 164 mg/kg, which is below the generic criterion. In addition, boring MW-02320 is in an area that does not have routine vehicle traffic. Therefore the appropriate PSIC is 2,500 mg/kg and is based solely on wind erosion as explained in the ENVIRON's Discussion Paper on the Michigan Part 201 PSIC (ENVIRON 2000). This alternate PSIC is still highly conservative because it assumes that Cr is present entirely as hexavalent chromium. Data from soil samples at other locations at the facility show that most chromium is actually in the less toxic trivalent form.
- The other five samples are subsurface samples (B10022¹¹^{RFI}, B10023²¹^{RFI}, B10014¹¹^{RFI}, B10015²¹^{RFI}, and B00072⁰¹^{RFI}) and are located at a depth below ground surface (bgs) greater than 2 ft. Because these samples are not at ground surface, the PSIC is not relevant.

Therefore, worker exposure to chromium in IU E soil is not significant.

The concentration of lead in one sample (B00081⁰¹^{RFI}) at boring MW-03235 exceeds the Part 201 generic direct contact criterion of 900 mg/kg with a concentration of 2,030 mg/kg. Samples collected around this boring show that the lead concentrations in the surrounding soil are much lower. This sample is among 25 surface soil samples collected in the eastern portion of IU E (east of the storm water ditch) that have been analyzed for Pb. The arithmetic mean concentration among the 25 samples is approximately 117 mg/kg, which is well below the Part 201 generic direct contact criterion of 900 mg/kg. Therefore worker exposure to lead in soil at IU E is not significant.

The concentrations of manganese in 30 samples exceed the generic PSIC.

- Twenty-two surface samples among 48 surface soil samples for manganese collected in IU E exceed the generic PSIC of 1,500 mg/kg with concentrations ranging from 2,090 mg/kg to 8,190 mg/kg. The 95% UCL for manganese among the 48 surface samples is 3,290 mg/kg (the average is 2,640 mg/kg). 19 surface soil samples collected in the west portion of IU E (west of the storm water ditch) have been analyzed for manganese, and the 95% UCL for manganese among these samples is 3,410 mg/kg (the average is 2,250). 29 surface soil samples collected in the east portion of IU E (east of the storm water ditch) have been analyzed for manganese, and the 95% UCL for manganese among these samples is 3,770 mg/kg (the arithmetic mean is 2,880 mg/kg). Currently activities in the eastern half of IU E involve routine vehicle traffic while activities in the western half of IU E do not. As indicated in ENVIRON's March 10, 2000 site-specific evaluation of the soil particulate inhalation

exposure for IU E and ENVIRON's Discussion Paper on the Michigan Part 201 PSIC (ENVIRON 2000), a conservative site-specific PSIC for IU E where activities involve routine vehicle traffic over unpaved areas is approximately 3,100 mg/kg. Also as explained in ENVIRON's Discussion Paper on the MDEQ Part 201 PSIC (ENVIRON 2000), for the samples in unpaved areas with no routine vehicle traffic, the appropriate PSIC is 22,300 mg/kg and is based solely on wind erosion. The 95% UCL for manganese in the eastern portion of IU E solely exceeds conservative site-specific PSIC. The 95% UCL for manganese in the western portion of IU E does not exceed conservative site-specific PSIC.

- The other eight samples are located at a depth below ground surface (bgs) greater than 2 ft. Because the samples are not at ground surface, the PSIC is not relevant.

Given that surface soil manganese concentrations exceed both the MDEQ PSIC and a conservative site-specific PSIC in the eastern portion of IU E, dust suppression activities will continue during active vehicle traffic in order to limit exposure of workers to surface soil manganese concentrations.

The concentrations of PCBs (total) in two RFI samples (B000710^1^RFI and B80117) exceed the Part 201 generic soil direct contact criterion of 16 mg/kg with concentrations of 52.2 mg/kg and 18.3 mg/kg, respectively. These two samples are surface soil samples and are located at borings MW-03734 and SB-03737A. RFI samples around this boring show that the PCBs concentrations in the surrounding soil are much lower. The 95% UCL for PCBs among the 56 surface soil samples in IU E is approximately 5.38 mg/kg, which is below the generic criterion of 16 mg/kg. 19 surface soil samples collected in the west portion of IU E (west of the storm water ditch) have been analyzed for PCBs, and the 95% UCL for PCBs among these samples is 1.42 mg/kg. 37 surface soil samples collected in the east portion of IU E (east of the storm water ditch) have been analyzed for PCBs, and the 95% UCL for PCBs among these samples is 8.22 mg/kg. The 95% UCLs in both portions of IU E are below the Part 201 generic direct contact criteria. Therefore worker exposure to PCBs (total) in soil at IU E is not significant.

Investigative Unit F

The concentration of benzo(a)pyrene from one RFI surface soil sample (B00068^2^1^RFI) at boring MW-02728 exceeds the Part 201 generic soil direct contact criteria of 8 mg/kg with a concentration of 10 mg/kg. This sample is a field duplicate of sample B00067^1^1^RFI. Averaging the benzo(a)pyrene concentrations in these two duplicate samples yields a benzo(a)pyrene concentration of 5 mg/kg, which is below the direct contact criteria. Therefore worker exposure to benzo(a)pyrene in soil at IU F is not significant.

Investigative Unit G

The concentration of arsenic from one non-RFI sample (EB-114b-(4-5.5)9187) at boring EB-114 exceeds the Part 201 generic soil direct contact criteria of 37 mg/kg. This sample was collected 4 ft below the ground surface, and therefore worker contact with soil exhibiting this concentration is not expected. This sample is one of 128 arsenic samples collected from IU

G. The 95% UCL for arsenic among these samples is 5.44 mg/kg which is below the generic criterion. Therefore worker exposure to arsenic in soil at IU G is not significant.

The concentrations of chromium from three RFI samples (B11^{0^1^NOR}, B12^{0^1^NOR}, B00023^{0^1^RFI}) at borings B-11, B-12 and MW-04250 and one non-RFI sample (B80211) at boring TMW-04635 exceed the Part 201 generic PSIC of 240 mg/kg. The RFI samples are from sampling depths greater than 2 ft bgs. Because the samples are not at ground surface, the PSIC is not relevant. The non-RFI sample, with a concentration of 309 mg/kg, was collected at the surface but is located in an active area of the Site that does not have routine vehicle traffic. Therefore the appropriate PSIC is 2,500 mg/kg and is based solely on wind erosion as explained in ENVIRON's Discussion Paper on the Michigan Part 201 PSIC (ENVIRON 2000). This alternate PSIC is still highly conservative because it assumes that chromium is present entirely as hexavalent chromium. Data from soil samples at other locations at the Site show that most chromium is actually in the less toxic trivalent form. Therefore worker exposure to chromium in soil at IU G is not significant.

The concentrations of manganese from four RFI samples (B11^{0^1^NOR}, B12^{0^1^NOR}, B00023^{0^1^RFI}, and SB-1^{0^1^NOR}) at borings B-11, b-12, MW-04250 and SB-1 exceed the Part 201 generic PSIC of 1,500 mg/kg. All four of these samples are from greater than 2 ft bgs. Because the samples are not at ground surface, the PSIC is not relevant. Therefore worker exposure to manganese in soil at IU G is not significant.

Investigative Unit H

The concentrations of manganese from three RFI surface soil samples (B00054^{0^1^RFI}, B00100^{0^1^RFI}, and B10300) at borings MW-06656, MW-17661 and SB-05542 exceed the Part 201 generic PSIC of 1,500 mg/kg. The manganese concentrations in these samples range from 2,790 to 3,380 mg/kg. These surface soil samples are located in an area that does not have routine vehicle traffic. Therefore the appropriate PSIC is 22,300 mg/kg which is based solely on wind erosion as explained in ENVIRON's Discussion Paper on the Michigan Part 201 PSIC (ENVIRON 2000). Therefore worker exposure to manganese in soil at IU H is not significant.

Investigative Unit I

The concentration of formaldehyde in one sample (B00065^{0^1^RFI}) at boring MW-06951 exceeds the Part 201 generic volatilization to indoor air criterion of 65 mg/kg and the volatilization to ambient air criterion of 69 mg/kg with a concentration of 78 mg/kg. Because there is no building at IU I the volatilization to indoor air criteria are not relevant. This sample is also one of 55 other soil samples collected in IU I from all depths. All the other samples have formaldehyde concentrations lower than 65 mg/kg. The 95% UCL for formaldehyde among these samples is 18.6 mg/kg which is well below the generic industrial soil volatilization to indoor air and ambient air inhalation criteria for formaldehyde. Therefore, worker exposure to formaldehyde in soil at IU I is not significant.

The concentrations of manganese in three RFI samples exceed the Part 201 generic PSIC of 1500 mg/kg.

- Sample B20231 from MW-96939 is surface soil sample having manganese concentration of 2,370 mg/kg. This sample is located in an area that does not have routine vehicle traffic. Therefore the appropriate calculated PSIC is 22,300 mg/kg which is based solely on wind erosion as explained in ENVIRON's Discussion Paper on the Michigan Part 201 PSIC (ENVIRON 2000).
- The other samples (B10044^0^1^RFI at MW-07959 and B20264 at SB-07043) are from below 4 ft bgs. Because these samples are not at ground surface, the PSIC is not relevant.

Therefore worker exposure to manganese in soil at IU I is not significant.

Groundwater

The groundwater characterization data were compared with MDEQ Part 201 criteria selected to evaluate the following potentially relevant pathways:

- Worker inhalation of groundwater vapor which has migrated to industrial indoor air through cracks in building foundations
- Worker direct contact exposure to groundwater during excavation activities below the water table

Among the data evaluated, 19 RFI groundwater sampling results and 2 non-RFI groundwater sampling results had concentrations higher than one or more of the Part 201 generic criteria listed above. The attached Table 2 lists these 21 data points sorted by IU. For each IU, the data are sorted by chemical name. For each data point, the table shows the concentration, the corresponding Part 201 generic criteria, and the ratios of the concentration and the individual criteria. The ratios that exceed 1.0 are highlighted and discussed below for each IU.

Investigative Unit B

The concentrations of benzo(a)pyrene in three RFI samples (M20237, H10019, and H10022) at MW-00309, SB-00307c and SB-00408a exceed the Part 201 generic groundwater contact criterion of 0.002 mg/l with concentrations of 0.003 mg/l.

The concentrations of benzo(b)fluoranthene in three RFI samples (M20252, M20237, and H10022) at MW-00306, MW-00309, and SB-00408a exceed the Part 201 generic groundwater contact criterion of 0.002 mg/l with concentrations of 0.003 mg/l.

The concentration of chrysene in one RFI sample (H10022) at SB-00408a exceeds the Part 201 generic groundwater contact criterion of 0.005 mg/l with a concentration of 0.01 mg/l.

The concentration of indeno(1,2,3-cd)pyrene in one RFI sample (H10022) at SB-00408a exceeds the Part 201 generic groundwater contact criterion of 0.002 mg/l with a concentration of 0.003 mg/l.

The concentrations of vinyl chloride in three RFI samples (M10002^0^1^RFI, M10216, and H70012) at MW-00509, and VAP00208 exceed the Part 201 generic groundwater contact criterion of 1 mg/l with concentrations ranging from 1.3 mg/l to 3.0 mg/l.

Because the depth to groundwater in IU B is approximately 3 ft bgs, potential exposure to construction workers is possible during excavations activities which take place at depths below the water table. There are no active operations in IU B that would likely require excavation work. However, if excavation work is conducted, GM will implement standard Health and Safety (H&S) protocols to mitigate groundwater contact exposures to the constituents discussed above during such excavations.

Investigative Unit E

The concentrations of benzo(a)pyrene in one RFI sample and its duplicate (M20211 and M20230Q) at MW-01119 exceed the Part 201 generic groundwater contact criterion of 0.002 mg/l with concentrations of 0.005 mg/l and 0.007 mg/l respectively.

The concentrations of benzo(b)fluoranthene in one RFI sample and its duplicate (M20211 and M20230Q) at MW-01119 exceed the Part 201 generic groundwater contact criterion of 0.002 mg/l with concentrations of 0.004 mg/l and 0.006 mg/l respectively.

The concentration of benzo(k)fluoranthene in one RFI sample (M20230Q) at MW-01119 exceeds the Part 201 generic groundwater contact criterion of 0.005 mg/l with a concentration of 0.006 mg/l. This sample is a duplicate of M20211 which had a benzo(k)fluoranthene concentration of 0.005 mg/l.

The concentration of chrysene in one RFI sample (M20230Q) at MW-01119 exceeds the Part 201 generic groundwater contact criterion of 0.005 mg/l with a concentration of 0.006 mg/l. This sample is a duplicate of M20211 which had a chrysene concentration of 0.005 mg/l.

The concentrations of indeno(1,2,3-cd)pyrene in one RFI sample and its duplicate (M20211 and M20230Q) at MW-01119 exceed the Part 201 generic groundwater contact criterion of 0.002 mg/l with concentrations of 0.003 mg/l and 0.004 mg/l respectively.

Because the depth to groundwater in IU E is approximately 4 ft bgs, potential exposure to construction workers is possible during excavations activities which take place at depths below the water table. In the event that excavation work is required in IU E, GM will implement worker protection to mitigate groundwater contact exposures to the constituents discussed above during such excavations.

Sediment

Generic risk-based screening criteria for evaluating the health significance of potential exposure to sediments are not well established. Therefore, as a conservative approach, the sediment characterization data were compared with MDEQ Part 201 industrial soil direct contact criteria selected to evaluate the following potentially relevant pathway:

- Maintenance worker incidental ingestion and dermal contact with sediment

Use of soil criteria is conservative because potential exposures of maintenance workers to sediment at the facility are expected to be lower than those assumed in deriving the soil criteria. Among the data evaluated, 15 RFI sediment data points out of 85 had concentrations higher than the screening criteria listed above. The attached Table 3 lists these data points sorted by IU. For each IU, the data are sorted by chemical name. For each data point, the table shows the concentration, the corresponding Part 201 generic criteria, and the ratios of the concentration and the individual criteria. The ratios that exceed 1.0 are highlighted and discussed below for each IU.

Investigative Unit C

The concentration of arsenic in one RFI sample (S00014^0^1^RFI) at sediment sampling location C1 exceeds the Part 201 generic soil direct contact criteria of 37 mg/kg with a concentration of 65 mg/kg. This sample is one of 2 sediment samples collected that were analyzed for arsenic in IU C. The other sample exhibited an arsenic concentration of 25 mg/kg, which is lower than 37 mg/kg. The arithmetic mean arsenic concentration of the two samples is 35 mg/kg which is lower than the generic criteria. Further, potential exposures of maintenance workers to these concentrations are unlikely to result in significant risks as the exposure frequency and exposure duration of typical maintenance activities at these locations are expected to be much lower than those assumed by MDEQ in deriving the generic soil direct contact criteria. Therefore worker exposure to arsenic in sediment in IU C is not significant under current conditions. However, in the event that maintenance activities are required in IU C, GM will implement worker protection to mitigate direct contact exposures to lead in IU C sediment.

The concentrations of lead in two RFI samples (S00014^0^1^RFI and S00015^0^1^RFI) at sediment sampling locations C1 and C3 exceed the Part 201 generic soil direct contact criteria of 900 mg/kg with concentrations ranging from 1,150 mg/kg to 1,550 mg/kg. Two methods, SW6010M and SW7421, were used to analyze for lead in these two samples. The results from the two methods showed good agreement. Potential exposures of maintenance workers to these concentrations are unlikely to result in significant risks as the exposure frequency and exposure duration of typical maintenance activities at these locations are expected to be much lower than those assumed by MDEQ in deriving the generic soil direct contact criteria. In the event that maintenance activities are required in IU C, GM will implement worker protection to mitigate direct contact exposures to lead in IU C sediment.

Investigative Unit H

The concentration of arsenic in one RFI sample (S00006^0^1^RFI) at sediment sampling location H4 exceeds the Part 201 generic soil direct contact criteria of 37 mg/kg with a concentration of 47 mg/kg. This sample is one of 9 sediment samples collected that were analyzed for arsenic in IU H. All the other samples have arsenic concentrations lower than 37 mg/kg. The 95% UCL for arsenic among these samples is 32.7 mg/kg which is below the generic criteria. Therefore worker exposure to arsenic in sediment in IU H is not significant.

The concentrations of lead in four RFI samples (S00003^1^1^RFI, S00004^2^1^RFI, S00005^0^1^RFI, and S00006^0^1^RFI) at sediment sampling locations H1, H2 and H4 exceed the Part 201 generic soil direct contact criteria of 900 mg/kg with concentrations ranging from 1,580 mg/kg to 2,490 mg/kg. Two methods, SW6010M and SW6010M, were used to analyze lead for these four samples. The results from the two methods showed good agreement. 18 sediment samples were collected and analyzed for lead in IU H. The arithmetic mean lead concentration is 1,160 mg/kg, which is higher than the generic criteria. Potential exposures of maintenance workers to these concentrations are unlikely to result in significant risks as the exposure frequency and exposure duration of typical maintenance activities at these locations are expected to be much lower than those assumed by MDEQ in deriving the generic soil direct contact criteria. However, in the event that prolonged maintenance activities are required in IU H, GM will implement worker protection to mitigate direct contact exposures to lead in IU H sediment.

Surface Water

Generic risk-based screening criteria for evaluating the health significance of potential exposure to surface water are not well established. Therefore, as a conservative approach, the surface water characterization data were compared with MDEQ Part 201 groundwater contact criteria selected to evaluate the following potentially relevant pathway.

- Worker incidental ingestion and dermal contact with surface water

Use of the groundwater criteria is conservative because potential exposures of maintenance workers to surface water at the facility are expected to be lower than those assumed in deriving the groundwater criteria. Among the surface water data evaluated, there are no results exceeding the Part 201 generic groundwater contact criteria.

Evaluation of the surface data shows that under current conditions at the facility, none of the chemical concentrations in surface water would be expected to pose unacceptable risk to workers.

References

- ENVIRON. 2000. Discussion Paper Michigan Part 201 Generic Particulate Soil Inhalation Criteria. March.
- Michigan Department of Environmental Quality (MDEQ). 2002. Part 201 Generic Cleanup Criteria and Screening Levels.

Table 1: Soil Data Due Care Evaluation
GM-15-MCO, Saginaw Michigan

Aug 08, 2009 16:58																			
IU	Location	Sample ID	RFI or Non-RFI Sample	Sample Type	Top Depth (ft)	Bottom Depth (ft)	Sample Date	Chem Group	Chemical	Conc (mg/kg)	Qual	Industrial Soil Volatilization to Indoor Air Criteria (mg/kg)	Ratio of Conc to Industrial Soil Volatilization to Indoor Air Criteria	Industrial Soil Volatilization of Ambient Air Criteria (mg/kg)	Ratio of Conc to Industrial Soil Volatilization of Ambient Air Criteria	Industrial Particulate Inhalation Criteria (mg/kg)	Ratio of Conc to Industrial Particulate Inhalation Criteria	Industrial Direct Contact Criteria (mg/kg)	Ratio of Conc to Industrial Direct Contact Criteria
A	MW-00821	B10029*0*1*RFI	RFI	N	0	2	9/17/1998	INORG	Chromium (total)	2.92E+02	J	6.5E+01	1.2E+00	6.9E+01	1.1E+00	2.4E+02	1.2E+00	9.2E+03	3.2E-02
A	SB-00516	B50152-200301	RFI	N	10	12	1/6/2003	OTHER	Formaldehyde	7.90E+01	J					3.0E+05	2.6E-04	6.0E+04	1.3E-03
A	MW-00821	B10029*0*1*RFI	RFI	N	0	2	9/17/1998	INORG	Manganese	5.22E+03	J					1.5E+03	1.3E+00	9.0E+04	5.3E-02
A	MW-00821	B10030*0*1*RFI	RFI	N	2	6	9/17/1998	INORG	Manganese	2.38E+03	J					1.5E+03	1.3E+00	9.0E+04	2.2E-02
A	SB-00718	B10237	RFI	N	11	14	6/1/2000	INORG	Manganese	2.67E+03	J					1.5E+03	1.3E+00	9.0E+04	2.5E-02
A	SB-00718D	B50195	RFI	N	6	8	1/8/2003	INORG	Manganese	3.41E+03	J					1.5E+03	1.3E+00	9.0E+04	3.3E-02
A	SB-00718E	B50185	RFI	N	16	18	1/7/2003	INORG	Manganese	2.17E+03	J					1.5E+03	1.3E+00	9.0E+04	1.9E-02
A	SB-00820	B50161-20021220	RFI	N	0	2	12/20/2002	INORG	Manganese	1.26E+04	J					1.5E+03	1.1E+00	9.0E+04	1.4E-01
A	SB-00820	B50162-20021220	RFI	N	2	4	12/20/2002	INORG	Manganese	4.67E+03	J					1.5E+03	2.8E+00	9.0E+04	4.7E-02
A	SB-00821A	B50159-20021220	RFI	N	0	2	12/20/2002	INORG	Manganese	1.07E+04	J					1.5E+03	1.1E+00	9.0E+04	1.1E-01
A	SB-00821A	B50160-20021220	RFI	N	2	4	12/20/2002	INORG	Manganese	4.95E+03	J					1.5E+03	3.0E+00	9.0E+04	5.0E-02
A	SB-00822	B50156-20021220	RFI	N	0	2	12/20/2002	INORG	Manganese	3.95E+03	J					1.5E+03	2.3E+00	9.0E+04	3.9E-02
A	SB-00822	B50157Q-20021220	RFI	FD	0	2	12/20/2002	INORG	Manganese	2.35E+03	J					1.5E+03	1.3E+00	9.0E+04	2.1E-02
B	SB-00308	B50031	RFI	N	2	4	12/11/2001	SVOC	Benzo(a)pyrene	4.40E+01	J					1.9E+03	2.3E-02	8.0E+00	1.3E+00
B	SB-00508	B20238	RFI	N	1	3	6/1/2000	SVOC	Benzo(a)pyrene	1.60E+01	J					1.9E+03	8.4E-03	8.0E+00	2.0E+00
B	SB-00308	B50031	RFI	N	2	4	12/11/2001	SVOC	Dibenz(a,h)anthracene	1.0E+01	J					4.4E+04	2.9E-02	9.0E+02	1.4E+00
B	B-15-B	B-15-011800	non-RFI	N	0	1	1/18/2000	INORG	Lead	1.30E+03	J					4.4E+04	5.0E-02	9.0E+02	2.4E+00
B	B-7-B	B-7-011800	non-RFI	N	0	1	1/18/2000	INORG	Lead	2.20E+03	J					4.4E+04	4.1E-02	9.0E+02	2.0E+00
B	SB-00104B	B20276	RFI	N	2	4	7/5/2000	INORG	Lead	1.82E+03	J					4.4E+04	6.3E-02	9.0E+02	3.1E+00
B	SB-00105	B00229	RFI	N	0	1	3/1/2000	INORG	Lead	2.78E+03	J					4.4E+04	1.2E-01	9.0E+02	1.1E+00
B	SB-00106	B10382	RFI	N	2	4	6/30/2000	INORG	Lead	5.49E+03	J					4.4E+04	6.3E-02	9.0E+02	3.1E+00
B	SB-00205	B00228	RFI	N	0	1	3/1/2000	INORG	Lead	1.34E+03	J					4.4E+04	3.0E-02	9.0E+02	1.4E+00
B	SB-00205	B00230-Q	RFI	FD	0	1	3/1/2000	INORG	Lead	2.0E+03	J					4.4E+04	4.6E-02	9.0E+02	2.1E+00
B	SB-00508	B20238	RFI	N	1	3	6/1/2000	INORG	Lead	3.66E+03	J					4.4E+04	8.3E-02	9.0E+02	4.0E+00
B	SB-00307a	B10302	RFI	N	1.5	3.5	6/13/2000	INORG	Manganese	2.02E+03	J					1.5E+03	1.1E+00	9.0E+04	1.8E-02
B	SB-00508	B20238	RFI	N	1	3	6/1/2000	INORG	Manganese	3.75E+03	J					1.5E+03	2.2E+00	9.0E+04	3.7E-02
B	VAP-00209/SB-00308A	B40120	RFI	N	0	2	12/12/2002	INORG	Manganese	6.35E+03	J					1.5E+03	3.9E+00	9.0E+04	6.6E-02
B	VAP-00209/SB-00308A	B40122Q	RFI	FD	2	4	12/12/2002	INORG	Manganese	1.24E+04	J					1.5E+03	6.0E+00	9.0E+04	1.3E-01
B	VAP-00209/SB-00308A	B40123	RFI	N	4	6	12/12/2002	INORG	Manganese	1.70E+04	J					1.5E+03	1.1E+01	9.0E+04	1.8E-01
B	SB-00709	B40119	RFI	N	2	4	12/12/2002	P/PCB	PCBs (total)	4.35E+01	J	1.6E+04	2.7E-03	2.8E+04	1.6E-03	6.5E+03	6.7E-03	1.6E+01	2.7E+00
D	SB-00710	B10357	RFI	N	0	2	6/20/2000	INORG	Antimony	9.46E+02	J					5.9E+03	1.6E-01	6.7E+02	1.2E+00
D	SB-00911	B10318	RFI	N	0	2	6/19/2000	SVOC	Benzo(a)pyrene	3.00E+01	J					1.9E+03	1.6E-02	8.0E+00	1.3E+00
D	MW-00812	B00142*0*1*RFI	RFI	N	1	3	10/21/1998	INORG	Chromium (total)	3.62E+02	J					2.4E+02	1.1E+00	9.2E+03	3.9E-02
D	MW-02410	B00108*0*1*RFI	RFI	N	2	4	10/2/1998	INORG	Chromium (total)	2.99E+02	J					2.4E+02	1.2E+00	9.2E+03	3.3E-02
D	MW-02410	B00109*0*1*RFI	RFI	N	4	6	10/2/1998	INORG	Chromium (total)	2.71E+02	J					2.4E+02	1.1E+00	9.2E+03	2.9E-02
D	SB-02510	B10255	RFI	N	0.7	2.7	6/6/2000	INORG	Chromium (total)	6.83E+02	J					2.4E+02	2.0E+00	9.2E+03	7.4E-02
D	SB-02510	B10256	RFI	N	2	4	6/6/2000	INORG	Chromium (total)	2.28E+03	J					2.4E+02	1.6E+00	9.2E+03	2.5E-01
D	SB-198	B00139*0*1*RFI	RFI	N	0	2	10/21/1998	INORG	Chromium (total)	3.81E+02	J					2.4E+02	1.2E+00	9.2E+03	4.1E-02
D	SB-298	B00141*0*1*RFI	RFI	N	1	3	10/21/1998	INORG	Chromium (total)	2.98E+02	J					2.4E+02	1.2E+00	9.2E+03	3.2E-02
D	SB-02510	B10256	RFI	N	2	4	6/6/2000	OTHER	Formaldehyde	8.40E+01	J	6.5E+01	1.3E+00	6.9E+01	1.2E+00	3.0E+05	2.8E-04	6.0E+04	1.4E-03
D	MW-00812	B00142*0*1*RFI	RFI	N	1	3	10/21/1998	INORG	Manganese	1.14E+04	J					1.5E+03	1.3E+00	9.0E+04	1.2E-01
D	MW-01214	B00105*0*1*RFI	RFI	N	0	2	10/2/1998	INORG	Manganese	3.65E+03	J					1.5E+03	2.1E+00	9.0E+04	3.6E-02
D	MW-01214	B00106*0*1*RFI	RFI	N	4	6	10/2/1998	INORG	Manganese	3.44E+03	J					1.5E+03	2.0E+00	9.0E+04	3.3E-02
D	MW-02410	B00108*0*1*RFI	RFI	N	2	4	10/2/1998	INORG	Manganese	1.09E+04	J					1.5E+03	7.0E+00	9.0E+04	1.2E-01
D	MW-02410	B00109*0*1*RFI	RFI	N	4	6	10/2/1998	INORG	Manganese	1.09E+04	J					1.5E+03	7.0E+00	9.0E+04	1.2E-01
D	MW-02418	B00075*0*1*RFI	RFI	N	2	4	9/22/1998	INORG	Manganese	2.39E+03	J					1.5E+03	1.3E+00	9.0E+04	2.2E-02
D	MW-02413	B00075-9/21/94	non-RFI	N	2	4	9/22/1998	INORG	Manganese	2.39E+03	J					1.5E+03	1.3E+00	9.0E+04	2.2E-02
D	SB-00710	B10357	RFI	N	0	2	6/20/2000	INORG	Manganese	2.94E+03	J					1.5E+03	1.7E+00	9.0E+04	2.8E-02
D	SB-00910	B10294	RFI	N	0.3	2.3	6/9/2000	INORG	Manganese	4.75E+03	J					1.5E+03	2.0E+00	9.0E+04	4.8E-02
D	SB-00910	B10295Q	RFI	FD	0.3	2.3	6/9/2000	INORG	Manganese	8.54E+03	J					1.5E+03	1.4E+00	9.0E+04	9.0E-02
D	SB-01012	B10297	RFI	N	0	2	6/9/2000	INORG	Manganese	2.93E+03	J					1.5E+03	1.7E+00	9.0E+04	2.8E-02
D	SB-02407	B10258Q	RFI	FD	0.8	2.8	6/6/2000	INORG	Manganese	2.39E+03	J					1.5E+03	1.3E+00	9.0E+04	2.2E-02
D	SB-02411	B10251	RFI	N	6.5	8.5	6/5/2000	INORG	Manganese	1.08E+04	J					1.5E+03	1.3E+00	9.0E+04	1.2E-01
D	SB-02505	B50180	RFI	N	1	3	1/7/2003	INORG	Manganese	5.56E+03	J					1.5E+03	1.4E+00	9.0E+04	5.7E-02
D	SB-02509	B4049	RFI	N	2	4	12/3/2001	INORG	Manganese	6.16E+03	J					1.5E+03	1.8E+00	9.0E+04	7.5E-02
D	SB-02509	B4050	RFI	N	4	6	12/3/2001	INORG	Manganese	6.16E+03	J					1.5E+03	3.8E+00	9.0E+04	6.4E-02

Frank Postma

Table 1: Soil Data Due Care Evaluation
GM TACO, Saginaw Michigan

Aug 06, 2009 16:58

IU	Location	Sample ID	RFI or Non-RFI Sample	Sample Type	Top Depth (ft)	Bottom Depth (ft)	Sample Date	Chem Group	Chemical	Conc (mg/kg)	Qual	Industrial Soil Volatilization to Indoor Air Criteria (mg/kg)	Ratio of Conc to Industrial Soil Volatilization to Indoor Air Criteria	Industrial Soil Volatilization of Ambient Air Criteria (mg/kg)	Ratio of Conc to Industrial Soil Volatilization of Ambient Air Criteria	Industrial Particulate Inhalation Criteria (mg/kg)	Ratio of Conc to Industrial Particulate Inhalation Criteria	Industrial Direct Contact Criteria (mg/kg)	Ratio of Conc to Industrial Direct Contact Criteria
D	SB-02510	B10255	RFI	N	0.7	2.7	6/6/2000	INORG	Manganese	1.06E+04						1.5E+03	7.0E+00	9.0E+04	1.1E-01
D	SB-02510	B10256	RFI	N	2	4	6/6/2000	INORG	Manganese	3.77E+03						1.5E+03	2.5E+00	9.0E+04	3.7E-02
D	SB-02510	B4047	RFI	N	2	4	12/3/2001	INORG	Manganese	8.66E+03						1.5E+03	5.8E+00	9.0E+04	9.1E-02
D	SB-02510	B4048	RFI	N	4	6	12/3/2001	INORG	Manganese	3.00E+03						1.5E+03	2.0E+00	9.0E+04	2.8E-02
D	SB-02512	B4046	RFI	N	4	6	12/3/2001	INORG	Manganese	3.89E+03						1.5E+03	2.6E+00	9.0E+04	3.8E-02
D	SB-02514	B50161-200301	RFI	N	1	3	1/6/2003	INORG	Manganese	1.02E+04						1.5E+03	6.8E+00	9.0E+04	1.1E-01
D	SB-198	B00139*01*RFI	RFI	N	0	2	10/21/1998	INORG	Manganese	1.00E+04						1.5E+03	6.4E+00	9.0E+04	1.1E-01
D	SB-298	B00141*01*RFI	RFI	N	1	3	10/21/1998	INORG	Manganese	8.99E+03						1.5E+03	5.7E+00	9.0E+04	9.5E-02
D	19-D-28	19-43089-57155725	non-RFI	N	571.5	572.5	4/30/1989	P/PCB	PCBs (total)	9.67E+01		1.6E+04	6.0E-03	2.8E+04	3.5E-03	6.5E+03	1.5E-02	1.6E+01	1.6E+00
D	19-D-28	19-43089-57255735	non-RFI	N	572.5	573.5	4/30/1989	P/PCB	PCBs (total)	9.70E+01		1.6E+04	6.1E-03	2.8E+04	3.5E-03	6.5E+03	1.5E-02	1.6E+01	1.6E+00
D	19-D-28	19-43089-57355745	non-RFI	N	573.5	574.5	4/30/1989	P/PCB	PCBs (total)	2.53E+02		1.6E+04	1.6E-02	2.8E+04	9.0E-03	6.5E+03	3.9E-02	1.6E+01	1.6E+01
D	19-D-28	19-43089-57455755	non-RFI	N	574.5	575.5	4/30/1989	P/PCB	PCBs (total)	8.50E+01		1.6E+04	5.3E-03	2.8E+04	3.0E-03	6.5E+03	1.3E-02	1.6E+01	1.6E+00
D	19-D-28	19-43089-57555765	non-RFI	N	575.5	576.5	4/30/1989	P/PCB	PCBs (total)	1.02E+02		1.6E+04	6.4E-03	2.8E+04	3.6E-03	6.5E+03	1.6E-02	1.6E+01	1.6E+00
D	19E-D-28	19E-43089-57255735	non-RFI	N	572.5	573.5	4/30/1989	P/PCB	PCBs (total)	5.30E+01		1.6E+04	3.3E-03	2.8E+04	1.9E-03	6.5E+03	8.2E-03	1.6E+01	1.6E+00
D	19E-D-28	19E-43089-57355745	non-RFI	N	573.5	574.5	4/30/1989	P/PCB	PCBs (total)	2.00E+02		1.6E+04	1.3E-02	2.8E+04	7.1E-03	6.5E+03	3.1E-02	1.6E+01	1.6E+01
D	19E-D-28	19E-43089-57455755	non-RFI	N	574.5	575.5	4/30/1989	P/PCB	PCBs (total)	1.10E+02		1.6E+04	6.9E-03	2.8E+04	3.9E-03	6.5E+03	1.7E-02	1.6E+01	1.6E+00
D	19E-D-28	19E-43089-57555765	non-RFI	N	575.5	576.5	4/30/1989	P/PCB	PCBs (total)	1.09E+01		1.6E+04	4.4E-03	2.8E+04	2.5E-03	6.5E+03	1.1E-02	1.6E+01	1.6E+00
D	19E-D-28	19E-43089-57655775	non-RFI	N	576.5	577.5	4/30/1989	P/PCB	PCBs (total)	4.70E+01		1.6E+04	2.9E-03	2.8E+04	1.7E-03	6.5E+03	7.2E-03	1.6E+01	1.6E+00
D	19EA-D-28	19EA-43089-57405750	non-RFI	N	574	575	4/30/1989	P/PCB	PCBs (total)	2.20E+01		1.6E+04	1.4E-03	2.8E+04	7.9E-04	6.5E+03	3.4E-03	1.6E+01	1.6E+00
D	19EA-D-28	19EA-43089-57605770	non-RFI	N	576	577	4/30/1989	P/PCB	PCBs (total)	7.25E+01		1.6E+04	4.5E-03	2.8E+04	2.6E-03	6.5E+03	1.1E-02	1.6E+01	1.6E+00
D	19W-D-28	19W-43089-57105720	non-RFI	N	571	572	4/30/1989	P/PCB	PCBs (total)	4.50E+01		1.6E+04	2.8E-03	2.8E+04	1.6E-03	6.5E+03	6.9E-03	1.6E+01	1.6E+00
D	19W-D-28	19W-43089-57205730	non-RFI	N	572	573	4/30/1989	P/PCB	PCBs (total)	1.40E+02		1.6E+04	8.8E-03	2.8E+04	5.0E-03	6.5E+03	2.2E-02	1.6E+01	1.6E+00
D	19W-D-28	19W-43089-57305740	non-RFI	N	573	574	4/30/1989	P/PCB	PCBs (total)	2.40E+02		1.6E+04	1.5E-02	2.8E+04	8.6E-03	6.5E+03	3.7E-02	1.6E+01	1.6E+01
D	19W-D-28	19W-43089-57405750	non-RFI	N	574	575	4/30/1989	P/PCB	PCBs (total)	1.90E+02		1.6E+04	1.2E-02	2.8E+04	6.8E-03	6.5E+03	2.9E-02	1.6E+01	1.6E+01
D	19W-D-28	19W-43089-57505760	non-RFI	N	575	576	4/30/1989	P/PCB	PCBs (total)	1.50E+02		1.6E+04	9.4E-03	2.8E+04	5.4E-03	6.5E+03	2.3E-02	1.6E+01	1.6E+00
D	19W-D-28	19W-43089-57605770	non-RFI	N	576	577	4/30/1989	P/PCB	PCBs (total)	1.40E+02		1.6E+04	8.8E-03	2.8E+04	5.0E-03	6.5E+03	2.2E-02	1.6E+01	1.6E+00
D	19WA-D-28	19WA-43089-57105720	non-RFI	N	571	572	4/30/1989	P/PCB	PCBs (total)	1.40E+02		1.6E+04	8.8E-03	2.8E+04	5.0E-03	6.5E+03	2.2E-02	1.6E+01	1.6E+00
D	19WA-D-28	19WA-43089-57205730	non-RFI	N	572	573	4/30/1989	P/PCB	PCBs (total)	1.76E+02		1.6E+04	1.1E-02	2.8E+04	6.3E-03	6.5E+03	2.7E-02	1.6E+01	1.6E+01
D	19WA-D-28	19WA-43089-57305740	non-RFI	N	573	574	4/30/1989	P/PCB	PCBs (total)	2.65E+02		1.6E+04	1.7E-02	2.8E+04	9.5E-03	6.5E+03	4.1E-02	1.6E+01	1.6E+01
D	19WA-D-28	19WA-43089-57405750	non-RFI	N	574	575	4/30/1989	P/PCB	PCBs (total)	1.83E+02		1.6E+04	1.1E-02	2.8E+04	6.5E-03	6.5E+03	2.8E-02	1.6E+01	1.6E+00
D	19WA-D-28	19WA-43089-57505760	non-RFI	N	575	576	4/30/1989	P/PCB	PCBs (total)	9.40E+01		1.6E+04	5.9E-03	2.8E+04	3.4E-03	6.5E+03	1.4E-02	1.6E+01	1.6E+00
D	19WA-D-28	19WA-43089-57605770	non-RFI	N	576	577	4/30/1989	P/PCB	PCBs (total)	1.61E+02		1.6E+04	1.0E-02	2.8E+04	5.8E-03	6.5E+03	2.5E-02	1.6E+01	1.6E+01
D	19WA-D-28	19WA-43089-57705780	non-RFI	N	577	578	4/30/1989	P/PCB	PCBs (total)	2.03E+02		1.6E+04	1.3E-02	2.8E+04	7.3E-03	6.5E+03	3.1E-02	1.6E+01	1.6E+01
D	19WB-D-28	19WB-43089-57005710	non-RFI	N	570	571	4/30/1989	P/PCB	PCBs (total)	3.80E+01		1.6E+04	2.4E-03	2.8E+04	1.4E-03	6.5E+03	5.8E-03	1.6E+01	1.6E+00
D	19WB-D-28	19WB-43089-57105720	non-RFI	N	571	572	4/30/1989	P/PCB	PCBs (total)	3.24E+02		1.6E+04	2.0E-02	2.8E+04	1.2E-02	6.5E+03	5.0E-02	1.6E+01	1.6E+01
D	19WB-D-28	19WB-43089-57205730	non-RFI	N	572	573	4/30/1989	P/PCB	PCBs (total)	3.98E+02		1.6E+04	2.5E-02	2.8E+04	1.4E-02	6.5E+03	6.1E-02	1.6E+01	1.6E+01
D	19WB-D-28	19WB-43089-57305740	non-RFI	N	573	574	4/30/1989	P/PCB	PCBs (total)	2.86E+02		1.6E+04	1.8E-02	2.8E+04	1.0E-02	6.5E+03	4.4E-02	1.6E+01	1.6E+01
D	19WB-D-28	19WB-43089-57405750	non-RFI	N	574	575	4/30/1989	P/PCB	PCBs (total)	3.84E+02		1.6E+04	2.4E-02	2.8E+04	1.4E-02	6.5E+03	5.9E-02	1.6E+01	1.6E+01
D	19WB-D-28	19WB-43089-57505760	non-RFI	N	575	576	4/30/1989	P/PCB	PCBs (total)	1.92E+02		1.6E+04	1.2E-02	2.8E+04	6.9E-03	6.5E+03	3.0E-02	1.6E+01	1.6E+00
D	19WB-D-28	19WB-43089-57605770	non-RFI	N	576	577	4/30/1989	P/PCB	PCBs (total)	2.61E+02		1.6E+04	1.6E-02	2.8E+04	9.3E-03	6.5E+03	4.0E-02	1.6E+01	1.6E+01
D	19WB-D-28	19WB-43089-57705780	non-RFI	N	577	578	4/30/1989	P/PCB	PCBs (total)	2.35E+02		1.6E+04	1.5E-02	2.8E+04	8.4E-03	6.5E+03	3.6E-02	1.6E+01	1.6E+01
D	19WC-D-28	19WC-43089-56905700	non-RFI	N	569	570	4/30/1989	P/PCB	PCBs (total)	5.22E+01		1.6E+04	3.3E-03	2.8E+04	1.9E-03	6.5E+03	8.0E-03	1.6E+01	1.6E+00
D	19WD-D-28	19WD-43089-56805690	non-RFI	N	568	569	4/30/1989	P/PCB	PCBs (total)	6.30E+01		1.6E+04	3.9E-03	2.8E+04	2.3E-03	6.5E+03	9.7E-03	1.6E+01	1.6E+00
D	19WD-D-28	19WD-43089-57005710	non-RFI	N	570	571	4/30/1989	P/PCB	PCBs (total)	7.12E+01		1.6E+04	4.5E-03	2.8E+04	2.5E-03	6.5E+03	1.1E-02	1.6E+01	1.6E+00
D	19WD-D-28	19WD-43089-57305740	non-RFI	N	573	574	4/30/1989	P/PCB	PCBs (total)	2.25E+02		1.6E+04	1.4E-02	2.8E+04	8.0E-03	6.5E+03	3.5E-02	1.6E+01	1.6E+01
D	19WE-D-28	19WE-43089-57105720	non-RFI	N	571	572	4/30/1989	P/PCB	PCBs (total)	1.80E+01		1.6E+04	1.1E-03	2.8E+04	6.4E-04	6.5E+03	2.8E-03	1.6E+01	1.6E+00
D	19WE-D-28	19WE-43089-57205730	non-RFI	N	572	573	4/30/1989	P/PCB	PCBs (total)	3.20E+01		1.6E+04	2.0E-03	2.8E+04	1.1E-03	6.5E+03	4.9E-03	1.6E+01	1.6E+00
D	19WE-D-28	19WE-43089-57305740	non-RFI	N	573	574	4/30/1989	P/PCB	PCBs (total)	3.10E+01		1.6E+04	1.9E-03	2.8E+04	1.1E-03	6.5E+03	4.8E-03	1.6E+01	1.6E+00
D	19WE-D-28	19WE-43089-57505760	non-RFI	N	575	576	4/30/1989	P/PCB	PCBs (total)	3.00E+02		1.6E+04	1.9E-02	2.8E+04	1.1E-02	6.5E+03	4.6E-02	1.6E+01	1.6E+01
D	19WE-D-28	19WE-43089-57605770	non-RFI	N	576	577	4/30/1989	P/PCB	PCBs (total)	8.10E+01		1.6E+04	5.1E-03	2.8E+04	2.9E-03	6.5E+03	1.2E-02	1.6E+01	1.6E+00
D	19WE-D-28	19WE-43089-57705780	non-RFI	N	577	578	4/30/1989	P/PCB	PCBs (total)	8.11E+01		1.6E+04	5.1E-03	2.8E+04	2.9E-03	6.5E+03	1.2E-02	1.6E+01	1.6E+00
D	8																		

Frank Postma

Table 1: Soil Data Due Care Evaluation
GM, BMCO, Saginaw Michigan

Aug 06, 2009 16:58

IU	Location	Sample ID	RFI or Non-RFI Sample	Sample Type	Top Depth (ft)	Bottom Depth (ft)	Sample Date	Chem Group	Chemical	Conc (mg/kg)	Qual	Industrial Soil Volatilization to Indoor Air Criteria (mg/kg)	Ratio of Conc to Industrial Soil Volatilization to Indoor Air Criteria	Industrial Soil Volatilization of Ambient Air Criteria (mg/kg)	Ratio of Conc to Industrial Soil Volatilization of Ambient Air Criteria	Industrial Particulate Inhalation Criteria (mg/kg)	Ratio of Conc to Industrial Particulate Inhalation Criteria	Industrial Direct Contact Criteria (mg/kg)	Ratio of Conc to Industrial Direct Contact Criteria
D	8E-D-28	8E-43089-57255735	non-RFI	N	572.5	573.5	4/30/1989	P/PCB	PCBs (total)	3.30E+01	1	1.6E+04	2.1E-03	2.8E+04	1.2E-03	6.5E+03	5.1E-03	1.6E+01	1.6E+01
D	8E-D-28	8E-43089-57355745	non-RFI	N	573.5	574.5	4/30/1989	P/PCB	PCBs (total)	4.60E+01	1	1.6E+04	2.9E-03	2.8E+04	1.6E-03	6.5E+03	7.1E-03	1.6E+01	1.6E+01
D	8N-D-28	8N-43089-57205730	non-RFI	N	572	573	4/30/1989	P/PCB	PCBs (total)	1.56E+02	1	1.6E+04	9.8E-03	2.8E+04	5.6E-03	6.5E+03	2.4E-02	1.6E+01	1.6E+01
D	8N-D-28	8N-43089-57305740	non-RFI	N	573	574	4/30/1989	P/PCB	PCBs (total)	1.13E+02	1	1.6E+04	7.1E-03	2.8E+04	4.0E-03	6.5E+03	1.7E-02	1.6E+01	1.6E+01
D	8S-D-28	8S-43089-56605670	non-RFI	N	566	567	4/30/1989	P/PCB	PCBs (total)	5.00E+01	1	1.6E+04	3.1E-03	2.8E+04	1.8E-03	6.5E+03	7.7E-03	1.6E+01	1.6E+01
D	8S-D-28	8S-43089-56705680	non-RFI	N	567	568	4/30/1989	P/PCB	PCBs (total)	1.10E+02	1	1.6E+04	6.9E-03	2.8E+04	3.9E-03	6.5E+03	1.7E-02	1.6E+01	1.6E+01
D	8S-D-28	8S-43089-56805690	non-RFI	N	568	569	4/30/1989	P/PCB	PCBs (total)	1.40E+02	1	1.6E+04	8.8E-03	2.8E+04	5.0E-03	6.5E+03	2.2E-02	1.6E+01	1.6E+01
D	8S-D-28	8S-43089-56905700	non-RFI	N	569	570	4/30/1989	P/PCB	PCBs (total)	6.30E+01	1	1.6E+04	3.9E-03	2.8E+04	2.3E-03	6.5E+03	9.7E-03	1.6E+01	1.6E+01
D	8S-D-28	8S-43089-57005710	non-RFI	N	570	571	4/30/1989	P/PCB	PCBs (total)	1.20E+02	1	1.6E+04	7.5E-03	2.8E+04	4.3E-03	6.5E+03	1.8E-02	1.6E+01	1.6E+01
D	8S-D-28	8S-43089-57105720	non-RFI	N	571	572	4/30/1989	P/PCB	PCBs (total)	2.00E+02	1	1.6E+04	1.3E-02	2.8E+04	7.1E-03	6.5E+03	3.1E-02	1.6E+01	1.6E+01
D	8S-D-28	8S-43089-57205730	non-RFI	N	572	573	4/30/1989	P/PCB	PCBs (total)	9.80E+01	1	1.6E+04	6.1E-03	2.8E+04	3.5E-03	6.5E+03	1.5E-02	1.6E+01	1.6E+01
D	8S-D-28	8S-43089-57305740	non-RFI	N	573	574	4/30/1989	P/PCB	PCBs (total)	1.10E+02	1	1.6E+04	6.9E-03	2.8E+04	3.9E-03	6.5E+03	1.7E-02	1.6E+01	1.6E+01
D	8SA-D-28	8SA-43089-57155725	non-RFI	N	571.5	572.5	4/30/1989	P/PCB	PCBs (total)	8.47E+01	1	1.6E+04	5.3E-03	2.8E+04	3.0E-03	6.5E+03	1.3E-02	1.6E+01	1.6E+01
D	8SA-D-28	8SA-43089-57255735	non-RFI	N	572.5	573.5	4/30/1989	P/PCB	PCBs (total)	4.75E+01	1	1.6E+04	3.0E-03	2.8E+04	3.0E-03	6.5E+03	1.3E-02	1.6E+01	1.6E+01
D	8SA-D-28	8SA-43089-57355745	non-RFI	N	573.5	574.5	4/30/1989	P/PCB	PCBs (total)	2.80E+02	1	1.6E+04	1.8E-02	2.8E+04	1.0E-02	6.5E+03	4.3E-02	1.6E+01	1.6E+01
D	8SA-D-28	8SA-43089-57455755	non-RFI	N	574.5	575.5	4/30/1989	P/PCB	PCBs (total)	9.63E+01	1	1.6E+04	6.0E-03	2.8E+04	3.4E-03	6.5E+03	1.5E-02	1.6E+01	1.6E+01
D	8SA-D-28	8SA-43089-57555765	non-RFI	N	575.5	576.5	4/30/1989	P/PCB	PCBs (total)	8.23E+01	1	1.6E+04	5.7E-03	2.8E+04	3.4E-03	6.5E+03	1.5E-02	1.6E+01	1.6E+01
D	8SA-D-28	8SA-43089-57655775	non-RFI	N	576.5	577.5	4/30/1989	P/PCB	PCBs (total)	1.13E+02	1	1.6E+04	7.4E-03	2.8E+04	4.2E-03	6.5E+03	1.8E-02	1.6E+01	1.6E+01
D	8SA-D-28	8SA-43089-57755785	non-RFI	N	577.5	578.5	4/30/1989	P/PCB	PCBs (total)	8.51E+01	1	1.6E+04	5.3E-03	2.8E+04	3.0E-03	6.5E+03	1.3E-02	1.6E+01	1.6E+01
D	8SB-D-28	8SB-43089-57205730	non-RFI	N	572	573	4/30/1989	P/PCB	PCBs (total)	1.81E+02	1	1.6E+04	1.0E-02	2.8E+04	5.8E-03	6.5E+03	2.5E-02	1.6E+01	1.6E+01
D	8SB-D-28	8SB-43089-57805790	non-RFI	N	578	579	4/30/1989	P/PCB	PCBs (total)	1.97E+01	1	1.6E+04	1.2E-03	2.8E+04	7.0E-04	6.5E+03	3.0E-03	1.6E+01	1.6E+01
D	8W-D-28	8W-43089-56455655	non-RFI	N	564.5	565.5	4/30/1989	P/PCB	PCBs (total)	1.78E+02	1	1.6E+04	1.1E-02	2.8E+04	6.4E-03	6.5E+03	2.7E-02	1.6E+01	1.6E+01
D	8W-D-28	8W-43089-56555665	non-RFI	N	565.5	566.5	4/30/1989	P/PCB	PCBs (total)	1.86E+02	1	1.6E+04	1.2E-02	2.8E+04	6.6E-03	6.5E+03	2.9E-02	1.6E+01	1.6E+01
D	8W-D-28	8W-43089-56655675	non-RFI	N	566.5	567.5	4/30/1989	P/PCB	PCBs (total)	1.30E+02	1	1.6E+04	8.1E-03	2.8E+04	4.6E-03	6.5E+03	2.0E-02	1.6E+01	1.6E+01
D	8W-D-28	8W-43089-56755685	non-RFI	N	567.5	568.5	4/30/1989	P/PCB	PCBs (total)	2.75E+01	1	1.6E+04	1.7E-03	2.8E+04	9.8E-04	6.5E+03	4.2E-03	1.6E+01	1.6E+01
D	8W-D-28	8W-43089-56855695	non-RFI	N	568.5	569.5	4/30/1989	P/PCB	PCBs (total)	1.60E+02	1	1.6E+04	1.0E-02	2.8E+04	5.7E-03	6.5E+03	2.5E-02	1.6E+01	1.6E+01
D	8W-D-28	8W-43089-56955705	non-RFI	N	569.5	570.5	4/30/1989	P/PCB	PCBs (total)	7.30E+01	1	1.6E+04	4.6E-03	2.8E+04	2.6E-03	6.5E+03	1.1E-02	1.6E+01	1.6E+01
D	8W-D-28	8W-43089-57055715	non-RFI	N	570.5	571.5	4/30/1989	P/PCB	PCBs (total)	4.40E+01	1	1.6E+04	2.8E-03	2.8E+04	1.6E-03	6.5E+03	6.8E-03	1.6E+01	1.6E+01
D	8W-D-28	8W-43089-57155725	non-RFI	N	571.5	572.5	4/30/1989	P/PCB	PCBs (total)	2.40E+02	1	1.6E+04	1.5E-02	2.8E+04	8.6E-03	6.5E+03	3.7E-02	1.6E+01	1.6E+01
D	8W-D-28	8W-43089-57255735	non-RFI	N	572.5	573.5	4/30/1989	P/PCB	PCBs (total)	2.80E+02	1	1.6E+04	1.8E-02	2.8E+04	1.0E-02	6.5E+03	4.3E-02	1.6E+01	1.6E+01
D	8W-D-28	8W-43089-57355745	non-RFI	N	573.5	574.5	4/30/1989	P/PCB	PCBs (total)	4.20E+02	1	1.6E+04	2.6E-02	2.8E+04	1.5E-02	6.5E+03	6.5E-02	1.6E+01	1.6E+01
D	8WA-D-28	8WA-43089-56855695	non-RFI	N	568.5	569.5	4/30/1989	P/PCB	PCBs (total)	7.41E+01	1	1.6E+04	4.6E-03	2.8E+04	2.6E-03	6.5E+03	1.1E-02	1.6E+01	1.6E+01
D	8WA-D-28	8WA-43089-56955705	non-RFI	N	569.5	570.5	4/30/1989	P/PCB	PCBs (total)	2.10E+01	1	1.6E+04	1.3E-03	2.8E+04	7.5E-04	6.5E+03	3.2E-03	1.6E+01	1.6E+01
D	8WA-D-28	8WA-43089-57055715	non-RFI	N	570.5	571.5	4/30/1989	P/PCB	PCBs (total)	3.91E+02	1	1.6E+04	2.4E-02	2.8E+04	1.4E-02	6.5E+03	6.0E-02	1.6E+01	1.6E+01
D	8WA-D-28	8WA-43089-57155725	non-RFI	N	571.5	572.5	4/30/1989	P/PCB	PCBs (total)	2.07E+02	1	1.6E+04	1.3E-02	2.8E+04	7.4E-03	6.5E+03	3.2E-02	1.6E+01	1.6E+01
D	8WA-D-28	8WA-43089-57255735	non-RFI	N	572.5	573.5	4/30/1989	P/PCB	PCBs (total)	2.07E+02	1	1.6E+04	1.3E-02	2.8E+04	7.4E-03	6.5E+03	3.2E-02	1.6E+01	1.6E+01
D	8WA-D-28	8WA-43089-57355745	non-RFI	N	573.5	574.5	4/30/1989	P/PCB	PCBs (total)	2.75E+02	1	1.6E+04	1.7E-02	2.8E+04	9.8E-03	6.5E+03	4.2E-02	1.6E+01	1.6E+01
D	8WB-D-28	8WB-43089-56755685	non-RFI	N	567.5	568.5	4/30/1989	P/PCB	PCBs (total)	2.50E+01	1	1.6E+04	1.6E-03	2.8E+04	8.9E-04	6.5E+03	3.8E-03	1.6E+01	1.6E+01
D	8WC-D-28	8WC-43089-57805790	non-RFI	N	578	579	4/30/1989	P/PCB	PCBs (total)	5.25E+01	1	1.6E+04	3.3E-03	2.8E+04	1.9E-03	6.5E+03	8.1E-03	1.6E+01	1.6E+01
D	9-D-28	9-43089-57305740	non-RFI	N	573	574	4/30/1989	P/PCB	PCBs (total)	3.33E+02	1	1.6E+04	2.1E-02	2.8E+04	1.2E-02	6.5E+03	5.1E-02	1.6E+01	1.6E+01
D	9E-D-28	9E-43089-57555765	non-RFI	N	575.5	576.5	4/30/1989	P/PCB	PCBs (total)	1.64E+02	1	1.6E+04	1.0E-02	2.8E+04	5.9E-03	6.5E+03	2.5E-02	1.6E+01	1.6E+01
D	9E-D-28	9E-43089-57655775	non-RFI	N	576.5	577.5	4/30/1989	P/PCB	PCBs (total)	9.60E+01	1	1.6E+04	6.0E-03	2.8E+04	3.4E-03	6.5E+03	1.5E-02	1.6E+01	1.6E+01
D	9N-D-28	9N-43089-57305740	non-RFI	N	573	574	4/30/1989	P/PCB	PCBs (total)	3.74E+01	1	1.6E+04	2.3E-03	2.8E+04	1.3E-03	6.5E+03	6.4E-02	1.6E+01	1.6E+01
D	9N-D-28	9N-43089-57505760	non-RFI	N	575	576	4/30/1989	P/PCB	PCBs (total)	4.18E+02	1	1.6E+04	2.6E-02	2.8E+04	1.5E-02	6.5E+03	6.4E-02	1.6E+01	1.6E+01
D	9N-D-28	9N-43089-57805770	non-RFI	N	576	577	4/30/1989	P/PCB	PCBs (total)	2.18E+02	1	1.6E+04	1.4E-02	2.8E+04	7.8E-03	6.5E+03	3.4E-02	1.6E+01	1.6E+01
D	9S-D-28	9S-43089-56955705	non-RFI	N	569.5	570.5	4/30/1989	P/PCB	PCBs (total)	4.94E+01	1	1.6E+04	3.1E-03	2.8E+04	1.8E-03	6.5E+03	7.6E-03	1.6E+01	1.6E+01
D	9S-D-28	9S-43089-57155725	non-RFI	N	571.5	572.5	4/30/1989	P/PCB	PCBs (total)	6.70E+01	1	1.6E+04	4.2E-03	2.8E+04	2.4E-03	6.5E+03	1.0E-02	1.6E+01	1.6E+01
D	9S-D-28	9S-43089-57255735	non-RFI	N	572.5	573.5	4/30/1989	P/PCB	PCBs (total)	7.16E+01	1	1.6E+04	4.5E-03	2.8E+04	2.6E-03	6.5E+03	1.1E-02	1.6E+01	1.6E+01
D	9S-D-28	9S-43089-57355745	non-RFI	N	573.5	574.5	4/30/1989	P/PCB	PCBs (total)	1.15E+02	1	1.6E+04	7.2E-03	2.8E+04	4.1E-03	6.5E+03	1.8E-02	1.6E+01	1.6E+01
D	9S-D-28	9S-43089-57455755	non-RFI	N	574.5	575.5	4/30/1989	P/PCB	PCBs (total)	2.91E+02	1	1.6E+04	1.8E-02	2.8E+04	1.0E-02	6.5E+03	4.5E-02	1.6E+01	1.6E+01
D	9S-D-28	9S-43089-57555765	non-RFI	N	575.5	576.5	4/30/1989	P/PCB	PCBs (total)	7.38E+01	1	1.6E+04	4.6E-03	2.8E+04	2.6E-03	6.5E+03	8.4E-03	1.6E+01	1.6E+01
D	9S-D-28	9S-43089-57655775	non-RFI	N	576.5	577.5	4/30/1989	P/PCB	PCBs (total)	2.24E+01	1	1.6E+04	1.4E-03	2.8E+04	8.0E-04	6.5E+03	3.4E-03	1.6E+01	1.6E+01
D	9S-D-28	9S-43089-57755785	non-RFI	N	577.5	578.5	4/30/1989	P/PCB	PCBs (total)	5.46E+01	1	1.6E+04	3.4E-03	2.8E+04	2.0E-03	6.5E+03	8.4E		

Frank Postma

Table 1: Soil Data Due Care Evaluation
GM, SMC, Saginaw Michigan

Aug 06, 2009 16:58

IU	Location	Sample ID	RFI or Non-RFI Sample	Sample Type	Top Depth (ft)	Bottom Depth (ft)	Sample Date	Chem Group	Chemical	Conc (mg/kg)	Qual	Industrial Soil Volatilization to Indoor Air Criteria (mg/kg)	Ratio of Conc to Industrial Soil Volatilization to Indoor Air Criteria	Industrial Soil Volatilization of Ambient Air Criteria (mg/kg)	Ratio of Conc to Industrial Soil Volatilization of Ambient Air Criteria	Industrial Particulate Inhalation Criteria (mg/kg)	Ratio of Conc to Industrial Particulate Inhalation Criteria	Industrial Direct Contact Criteria (mg/kg)	Ratio of Conc to Industrial Direct Contact Criteria
D	9SB-D 28	9SB-43089-57805790	non-RFI	N	578	579	4/30/1989	P/PCB	PCBs (total)	1.13E+02		1.6E+04	7.0E-03	2.8E+04	4.0E-03	6.5E+03	1.7E-02	1.6E+01	7.0E-02
D	9SC-D 28	9SC-43089-57805770	non-RFI	N	576	577	4/30/1989	P/PCB	PCBs (total)	4.30E+01		1.6E+04	2.7E-03	2.8E+04	1.5E-03	6.5E+03	6.6E-03	1.6E+01	2.7E-02
D	9SC-D 28	9SC-43089-57705780	non-RFI	N	577	578	4/30/1989	P/PCB	PCBs (total)	2.35E+01		1.6E+04	1.5E-03	2.8E+04	8.4E-04	6.5E+03	3.6E-03	1.6E+01	1.5E-02
D	SB-02011	B10361	RFI	N	16	18	6/23/2000	P/PCB	PCBs (total)	2.08E+01	J	1.6E+04	1.3E-03	2.8E+04	7.4E-04	6.5E+03	3.2E-03	1.6E+01	1.3E-02
D	SB-298	B00141*0*1*RFI	RFI	N	1	3	10/21/1998	P/PCB	PCBs (total)	3.22E+01	J	1.6E+04	2.0E-03	2.8E+04	1.1E-03	6.5E+03	4.9E-03	1.6E+01	2.0E-02
E	MW-02228	B10022*1*1*RFI	RFI	N	4	6	9/16/1998	INORG	Chromium (total)	4.17E+02	J					2.4E+02	7.0E+00	9.2E+03	4.5E-02
E	MW-02228	B10023*2*1*RFI	RFI	FD	4	6	9/16/1998	INORG	Chromium (total)	4.67E+02	J					2.4E+02	9.0E+00	9.2E+03	5.1E-02
E	MW-02320	B10013*0*1*RFI	RFI	N	0	2	9/14/1998	INORG	Chromium (total)	2.91E+02						2.4E+02	7.0E+00	9.2E+03	3.2E-02
E	MW-02320	B10014*1*1*RFI	RFI	N	2	6	9/14/1998	INORG	Chromium (total)	2.64E+02						2.4E+02	7.0E+00	9.2E+03	2.9E-02
E	MW-02320	B10015*2*1*RFI	RFI	FD	2	6	9/14/1998	INORG	Chromium (total)	3.35E+02						2.4E+02	7.0E+00	9.2E+03	3.6E-02
E	MW-03734	B00072*0*1*RFI	RFI	N	6	8	9/22/1998	INORG	Chromium (total)	2.74E+02						2.4E+02	7.0E+00	9.2E+03	3.0E-02
E	MW-03235	B00081*0*1*RFI	RFI	N	0	2	9/23/1998	INORG	Lead	2.03E+03						4.4E+04	4.6E-02	9.0E+04	3.2E-02
E	Comp 2	Comp 2, 0-0.5 ft	RFI	N	0	0.5	6/16/2000	INORG	Manganese	4.57E+03						1.5E+03	7.0E+00	9.0E+04	4.6E-02
E	Comp 2	Comp 2, 0-2 ft	RFI	N	0	2	6/16/2000	INORG	Manganese	4.55E+03						1.5E+03	7.0E+00	9.0E+04	4.6E-02
E	Comp 4	Comp 4, 0-0.5 ft	RFI	N	0	0.5	6/19/2000	INORG	Manganese	3.83E+03	J					1.5E+03	7.0E+00	9.0E+04	3.8E-02
E	MW-01119	B10032*0*1*RFI	RFI	N	2	4	9/17/1998	INORG	Manganese	2.23E+03	J					1.5E+03	7.0E+00	9.0E+04	2.0E-02
E	MW-01223	B20234	RFI	N	0	2	5/31/2000	INORG	Manganese	5.07E+03						1.5E+03	7.0E+00	9.0E+04	2.9E-02
E	MW-02228	B10021*0*1*RFI	RFI	N	0	2	9/16/1998	INORG	Manganese	7.39E+03	J					1.5E+03	7.0E+00	9.0E+04	7.7E-02
E	MW-02228	B10022*1*1*RFI	RFI	N	4	6	9/16/1998	INORG	Manganese	1.13E+04						1.5E+03	7.0E+00	9.0E+04	1.2E-01
E	MW-02228	B10023*2*1*RFI	RFI	FD	4	6	9/16/1998	INORG	Manganese	1.21E+04						1.5E+03	7.0E+00	9.0E+04	1.3E-01
E	MW-02320	B10013*0*1*RFI	RFI	N	0	2	9/14/1998	INORG	Manganese	5.93E+03						1.5E+03	7.0E+00	9.0E+04	6.1E-02
E	MW-02320	B10014*1*1*RFI	RFI	N	2	6	9/14/1998	INORG	Manganese	8.19E+03						1.5E+03	7.0E+00	9.0E+04	8.6E-02
E	MW-02320	B10015*2*1*RFI	RFI	FD	2	6	9/14/1998	INORG	Manganese	1.02E+04						1.5E+03	7.0E+00	9.0E+04	1.1E-01
E	MW-03235	B00081*0*1*RFI	RFI	N	0	2	9/23/1998	INORG	Manganese	6.17E+03						1.5E+03	7.0E+00	9.0E+04	8.4E-02
E	MW-03734	B00071*0*1*RFI	RFI	N	0	2	9/22/1998	INORG	Manganese	3.72E+03						1.5E+03	7.0E+00	9.0E+04	3.6E-02
E	MW-03734	B00072*0*1*RFI	RFI	N	6	8	9/22/1998	INORG	Manganese	2.09E+03						1.5E+03	7.0E+00	9.0E+04	1.8E-02
E	MW-03746	B00014*0*1*RFI	RFI	N	0	2	9/14/1998	INORG	Manganese	2.11E+03						1.5E+03	7.0E+00	9.0E+04	1.9E-02
E	SB-01923	B10243	RFI	N	4.5	6	6/1/2000	INORG	Manganese	2.68E+03	J					1.5E+03	7.0E+00	9.0E+04	2.5E-02
E	SB-02129	B10266	RFI	N	0	2	6/7/2000	INORG	Manganese	3.70E+03	J					1.5E+03	7.0E+00	9.0E+04	3.6E-02
E	SB-02630	B10264	RFI	N	0	2	6/7/2000	INORG	Manganese	3.42E+03	J					1.5E+03	7.0E+00	9.0E+04	3.3E-02
E	SB-02630	B10265	RFI	N	2.6	4.6	6/7/2000	INORG	Manganese	2.58E+03	J					1.5E+03	7.0E+00	9.0E+04	2.4E-02
E	SB-02728	B00221	RFI	N	0	2	11/18/1999	INORG	Manganese	5.25E+03						1.5E+03	7.0E+00	9.0E+04	5.3E-02
E	SB-02732	B00220	RFI	N	0	0.33	11/18/1999	INORG	Manganese	3.76E+03						1.5E+03	7.0E+00	9.0E+04	3.7E-02
E	SB-02935	B00218	RFI	N	0	1.5	11/18/1999	INORG	Manganese	3.29E+03						1.5E+03	7.0E+00	9.0E+04	3.2E-02
E	SB-03035	B00206	RFI	N	0	0.67	11/17/1999	INORG	Manganese	6.83E+03						1.5E+03	7.0E+00	9.0E+04	7.1E-02
E	SB-03035	B00207Q	RFI	FD	0	0.67	11/17/1999	INORG	Manganese	7.37E+03						1.5E+03	7.0E+00	9.0E+04	7.7E-02
E	SB-03230	B00215	RFI	N	0	0.92	11/18/1999	INORG	Manganese	2.09E+03						1.5E+03	7.0E+00	9.0E+04	1.8E-02
E	SB-03230	B00216Q	RFI	FD	0	0.92	11/18/1999	INORG	Manganese	2.23E+03						1.5E+03	7.0E+00	9.0E+04	2.0E-02
E	SB-03634	B00204	RFI	N	0	1.33	11/17/1999	INORG	Manganese	9.52E+03						1.5E+03	7.0E+00	9.0E+04	1.0E-01
E	SB-03642	B00211	RFI	N	0	1	11/17/1999	INORG	Manganese	2.72E+03						1.5E+03	7.0E+00	9.0E+04	2.5E-02
E	SB-03735	B00203	RFI	N	0	0.25	11/17/1999	INORG	Manganese	3.49E+03						1.5E+03	7.0E+00	9.0E+04	3.4E-02
E	SB-03737	B00210	RFI	N	0	1.5	11/17/1999	INORG	Manganese	5.67E+03						1.5E+03	7.0E+00	9.0E+04	5.8E-02
E	MW-03734	B00071*0*1*RFI	RFI	N	0	2	9/22/1998	P/PCB	PCBs (total)	5.22E+01	J	1.6E+04	3.3E-03	2.8E+04	1.9E-03	6.5E+03	8.0E-03	1.6E+01	3.1E-02
E	SB-03737A	B80117	RFI	N	0	2	12/12/2002	P/PCB	PCBs (total)	1.83E+01	J	1.6E+04	1.1E-03	2.8E+04	6.5E-04	6.5E+03	2.8E-03	1.6E+01	1.1E-02
F	MW-02728	B00068*2*1*RFI	RFI	FD	0	2	9/22/1998	SVOC	Benzo(a)pyrene	1.00E+01	J					1.9E+03	5.3E-03	8.0E+00	3.5E-02
G	EB-114-G 5	EB-114b-(4-5.5)9187	non-RFI	N	4	5.5	9/1/1987	INORG	Arsenic	8.10E+01						9.1E+02	8.3E-02	3.7E+01	2.0E+00
G	B11	B11*0*1*NOR	RFI	N	3	4	2/6/1998	INORG	Chromium (total)	4.87E+02						2.4E+02	7.0E+00	9.2E+03	5.3E-02
G	B12	B12*0*1*NOR	RFI	N	3	4	2/6/1998	INORG	Chromium (total)	3.28E+02						2.4E+02	7.0E+00	9.2E+03	3.6E-02
G	MW-04250	B00023*0*1*RFI	RFI	N	4	6	9/15/1998	INORG	Chromium (total)	3.58E+02	J					2.4E+02	7.0E+00	9.2E+03	3.9E-02
G	TMW-04635	B80211	non-RFI	N	0	2	3/6/2003	INORG	Chromium (total)	3.09E+02						2.4E+02	7.0E+00	9.2E+03	3.4E-02
G	B11	B11*0*1*NOR	RFI	N	3	4	2/6/1998	INORG	Manganese	1.14E+04						1.5E+03	7.0E+00	9.0E+04	1.2E-01
G	B12	B12*0*1*NOR	RFI	N	3	4	2/6/1998	INORG	Manganese	9.60E+03						1.5E+03	7.0E+00	9.0E+04	1.0E-01
G	MW-04250	B00023*0*1*RFI	RFI	N	4	6	9/15/1998	INORG	Manganese	9.86E+03	J					1.5E+03	7.0E+00	9.0E+04	1.0E-01
G	SB-1	SB-1*0*1*NOR	RFI	N	2	3	6/2/1998	INORG	Manganese	2.32E+03						1.5E+03	7.0E+00	9.0E+04	2.1E-02
H	MW-06656	B00054*0*1*RFI	RFI	N	0	2	9/18/1998	INORG	Manganese	2.79E+03						1.5E+03	7.0E+00	9.0E+04	2.6E-02
H	MW-17661	B00100*0*1*RFI	RFI	N	0	2	9/29/1998	INORG	Manganese	3.36E+03						1.5E+03	7.0E+00	9.0E+04	3.3E-02

Frank Postma

LFR

Aug 06, 2009 16:58

Table 1: Soil Data Due Care Evaluation
GMS/CO, Saginaw Michigan

													Aug 06, 2009 16:58						
IU	Location	Sample ID	RFI or Non-RFI Sample	Sample Type	Top Depth (ft)	Bottom Depth (ft)	Sample Date	Chem Group	Chemical	Conc (mg/kg)	Qual	Industrial Soil Volatilization to Indoor Air Criteria (mg/kg)	Ratio of Conc to Industrial Soil Volatilization to Indoor Air Criteria	Industrial Soil Volatilization of Ambient Air Criteria (mg/kg)	Ratio of Conc to Industrial Soil Volatilization of Ambient Air Criteria	Industrial Particulate Inhalation Criteria (mg/kg)	Ratio of Conc to Industrial Particulate Inhalation Criteria	Industrial Direct Contact Criteria (mg/kg)	Ratio of Conc to Industrial Direct Contact Criteria
H	SB-05542	B10300	RFI	N	0	2	6/12/2000	INORG	Manganese	3.34E+03						1.5E+03	1.3E+00	9.0E+04	3.2E-02
I	MW-06951	B00065*0*1*RFI	RFI	N	4	6	9/21/1998	OTHER	Formaldehyde	7.80E+01	J	6.5E+01	1.2E+00	6.9E+01	1.1E+00	3.0E+05	2.6E-04	6.0E+04	1.3E-03
I	MW-07959	B10044*0*1*RFI	RFI	N	10	12	9/22/1998	INORG	Manganese	3.23E+03						1.5E+03	1.3E+00	9.0E+04	3.1E-02
I	MW-96939	B20231	RFI	N	0	2	5/31/2000	INORG	Manganese	2.37E+03						1.5E+03	1.3E+00	9.0E+04	2.1E-02
I	SB-07043	B20264	RFI	N	22	24	6/21/2000	INORG	Manganese	5.18E+03						1.5E+03	3.2E+00	9.0E+04	5.3E-02
Notes:																			
The Screening Criteria for Pyrene was used as a surrogate for Phenanthrene and Benzo(g,h,i)perylene.																			
The Screening Criteria for Phenol was used as a surrogate for Phenols (total).																			
The Screening Criteria for Naphthalene was used as a surrogate for 2-Methylnaphthalene.																			
The Screening Criteria for cis-1,2-Dichloroethene was used as a surrogate for 1,2-Dichloroethene (total).																			
The Screening Criteria for Chromium (total) is based on a 1:6 ratio of Cr VI:Cr III.																			
The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.																			
The concentrations for all PCB isomers were summed before comparing to Polychlorinated biphenyls (PCBs) for cancer effects and Aroclor 1254 for noncancer effects.																			
The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.																			
The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.																			
Chem Group - Chemical Group																			

Confidential under FOIA
Frank Postma
LFR
Aug 06, 2009 16:58

Table 2: Groundwater Data Due Care Evaluation
GM: SMC, Saginaw Michigan

Aug 06, 2009 16:58

IU	Location	Sample ID	RFI or Non-RFI Sample	Sample Type	Sample Date	Meas Basis	Chem Group	Chemical	Conc (mg/L)	Qual	Industrial Groundwater Volatilization to Indoor Air Criteria (mg/L)	Ratio of Conc to Industrial Groundwater Volatilization to Indoor Air Criteria	Groundwater Contact Criteria (mg/L)	Ratio of Conc to Groundwater Contact Criteria	Solubility (mg/L)	Ratio of Conc to Solubility
B	MW-00309	M20237	RFI	N	7/31/2000	T	SVOC	Benzo(a)pyrene	3.00E-03				2.0E-03	1.5E+00	1.62E-03	1E+00
B	SB-00307c	H10019	RFI	N	6/22/2000	T	SVOC	Benzo(a)pyrene	3.00E-03				2.0E-03	1.5E+00	1.62E-03	1E+00
B	SB-00408a	H10022	RFI	N	6/22/2000	T	SVOC	Benzo(a)pyrene	3.00E-03				2.0E-03	1.5E+00	1.62E-03	1E+00
B	MW-00306	M20252	RFI	N	8/9/2000	T	SVOC	Benzo(b)fluoranthene	3.00E-03				2.0E-03	1.5E+00	1.50E-03	1E+00
B	MW-00309	M20237	RFI	N	7/31/2000	T	SVOC	Benzo(b)fluoranthene	3.00E-03				2.0E-03	1.5E+00	1.50E-03	1E+00
B	SB-00408a	H10022	RFI	N	6/22/2000	T	SVOC	Benzo(b)fluoranthene	3.00E-03				2.0E-03	1.5E+00	1.50E-03	1E+00
B	SB-00408a	H10022	RFI	N	6/22/2000	T	SVOC	Chrysene	1.00E-02				5.0E-03	2.0E+00	1.60E-03	1E+00
B	SB-00408a	H10022	RFI	N	6/22/2000	T	SVOC	Indeno(1,2,3-cd)pyrene	3.00E-03				2.0E-03	1.5E+00	2.20E-05	1E+02
B	MW-00509	M10002*0*1*RFI	RFI	N	11/17/1998	T	VOC	Vinyl Chloride	3.00E+00		1.3E+01	2.3E-01	1.0E+00	3.0E+00	2.76E+03	1E-03
B	MW-00509	M10216	RFI	N	7/31/2000	T	VOC	Vinyl Chloride	2.40E+00	J	1.3E+01	1.8E-01	1.0E+00	2.1E+00	2.76E+03	9E-04
B	VAP-00208 (30-35)	H70012	RFI	N	12/20/2001	T	VOC	Vinyl Chloride	1.30E+00		1.3E+01	1.0E-01	1.0E+00	1.3E+00	2.76E+03	5E-04
E	MW-01119	M20211	RFI	N	7/26/2000	T	SVOC	Benzo(a)pyrene	5.00E-03				2.0E-03	2.5E+00	1.62E-03	1E+00
E	MW-01119	M20230Q	RFI	FD	7/26/2000	T	SVOC	Benzo(a)pyrene	7.00E-03				2.0E-03	3.5E+00	1.62E-03	1E+00
E	MW-01119	M20211	RFI	N	7/26/2000	T	SVOC	Benzo(b)fluoranthene	4.00E-03				2.0E-03	2.0E+00	1.50E-03	1E+00
E	MW-01119	M20230Q	RFI	FD	7/26/2000	T	SVOC	Benzo(b)fluoranthene	8.00E-03				2.0E-03	4.0E+00	1.50E-03	1E+00
E	MW-01119	M20230Q	RFI	FD	7/26/2000	T	SVOC	Benzo(k)fluoranthene	6.00E-03				5.0E-03	1.2E+00	8.00E-04	1E+00
E	MW-01119	M20230Q	RFI	FD	7/26/2000	T	SVOC	Chrysene	6.00E-03				5.0E-03	1.2E+00	1.60E-03	1E+00
E	MW-01119	M20211	RFI	N	7/26/2000	T	SVOC	Indeno(1,2,3-cd)pyrene	3.00E-03				2.0E-03	1.5E+00	2.20E-05	1E+02
E	MW-01119	M20230Q	RFI	FD	7/26/2000	T	SVOC	Indeno(1,2,3-cd)pyrene	4.00E-03				2.0E-03	2.0E+00	2.20E-05	2E+02

Notes:
 The Screening Criteria for Pyrene was used as a surrogate for Phenanthrene and Benzo(g,h,i)perylene.
 The Screening Criteria for Phenol was used as a surrogate for Phenols (total).
 The Screening Criteria for Naphthalene was used as a surrogate for 2-Methylnaphthalene.
 The Screening Criteria for cis-1,2-Dichloroethene was used as a surrogate for 1,2-Dichloroethene (total).
 The Screening Criteria for Chromium (total) is based on a 1:6 ratio of Cr VI:Cr III
 The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.
 The concentrations for all PCB isomers were summed before comparing to Polychlorinated biphenyls (PCBs) for cancer effects and Aroclor 1254 for noncancer effects.
 The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.
 The concentrations for the Chlordane isomers (alpha and beta) were summed before comparing to the Screening Criteria.
 The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

Chem Group - Chemical Group
 Meas Basis - Measured Basis; T = Total, D = Dissolved

**Table 3: Sediment Data Due Care Evaluation
GM: SMCO, Saginaw Michigan**

Aug 08, 2009 16:58

IU	Location	Sample ID	RFI or Non-RFI Sample	Method	Sample Type	Sample Date	Chem Group	Chemical	Conc (mg/kg)	Qual	Industrial Direct Contact Criteria (mg/kg)	Ratio of Conc to Industrial Direct Contact Criteria
C	C1	S00014^0^1^RFI	RFI	SW7060	N	11/19/1998	INORG	Arsenic	6.50E+01		3.7E+01	1.8E+00
C	C1	S00014^0^1^RFI	RFI	SW6010M	N	11/19/1998	INORG	Lead	1.54E+03		9.0E+02	1.7E+00
C	C1	S00014^0^1^RFI	RFI	SW7421	N	11/19/1998	INORG	Lead	1.55E+03	J	9.0E+02	1.7E+00
C	C1	S00014^0^1^RFI	RFI	SW7421	N	11/19/1998	INORG	Lead	1.55E+03	J	9.0E+02	1.7E+00
C	C3	S00015^0^1^RFI	RFI	SW6010M	N	11/19/1998	INORG	Lead	1.33E+03	J	9.0E+02	1.5E+00
C	C3	S00015^0^1^RFI	RFI	SW7421	N	11/19/1998	INORG	Lead	1.15E+03	J	9.0E+02	1.3E+00
H	H4	S00006^0^1^RFI	RFI	SW7060	N	11/17/1998	INORG	Arsenic	4.70E+01		3.7E+01	1.3E+00
H	H1	S00003^1^1^RFI	RFI	SW6010	N	11/17/1998	INORG	Lead	1.58E+03		9.0E+02	1.7E+00
H	H1	S00003^1^1^RFI	RFI	SW6010M	N	11/17/1998	INORG	Lead	2.00E+03	J	9.0E+02	2.2E+00
H	H1	S00004^2^1^RFI	RFI	SW6010	FD	11/17/1998	INORG	Lead	1.69E+03		9.0E+02	1.9E+00
H	H1	S00004^2^1^RFI	RFI	SW6010M	FD	11/17/1998	INORG	Lead	1.83E+03	J	9.0E+02	2.0E+00
H	H2	S00005^0^1^RFI	RFI	SW6010	N	11/17/1998	INORG	Lead	1.80E+03		9.0E+02	2.0E+00
H	H2	S00005^0^1^RFI	RFI	SW6010M	N	11/17/1998	INORG	Lead	2.49E+03	J	9.0E+02	2.7E+00
H	H4	S00006^0^1^RFI	RFI	SW6010	N	11/17/1998	INORG	Lead	1.80E+03		9.0E+02	2.0E+00
H	H4	S00006^0^1^RFI	RFI	SW6010M	N	11/17/1998	INORG	Lead	2.43E+03	J	9.0E+02	2.7E+00
NA	SD-28A	S40315	RFI	SW8270	N	9/1/2000	SVOC	Benzo(a)pyrene	2.40E+01		8.0E+00	3.0E+00

Notes:
 The Screening Criteria for Pyrene was used as a surrogate for Phenanthrene and Benzo(g,h,i)perylene.
 The Screening Criteria for Phenol was used as a surrogate for Phenols (total).
 The Screening Criteria for Naphthalene was used as a surrogate for 2-Methylnaphthalene.
 The Screening Criteria for cis-1,2-Dichloroethene was used as a surrogate for 1,2-Dichloroethene (total).
 The Screening Criteria for Chromium (total) is based on a 1:6 ratio of Cr VI:Cr III
 The concentrations for the Methylphenol (2, 3, & 4) were summed before comparing to the Screening Criteria for 4-Methylphenol.
 The concentrations for all PCB isomers were summed before comparing to Polychlorinated biphenyls (PCBs) for cancer effects and Aroclor 1254 for noncancer effects.
 The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.
 The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

Chem Group - Chemical Group