based on the Site-specific performance criteria is presented in Section 5.1.2, while Section 5.2 summarizes the closure and post-closure requirements for the CAMU.

3.2 Regulatory Basis for Alternate CAMU Design

As indicated above, FMC proposes to design the CAMU at the Facility without a liner and leachate collection system, as allowed under the CAMU regulations **[6 NYCRR 373-2.19(c)(5)(iii)(b) and 40 CFR Part 264.552(e)(3)(ii)].** FMC also proposes to use a permeable final cover to meet the CAMU closure requirements specified in the CAMU regulations **[6 NYCRR 373-2.19(c)(5)(v) and 40 CFR Part 264.552(e)(6)]** using Site-specific cover performance criteria (see Section 5.1.1), as authorized by the CAMU regulations **[6 NYCRR 373-2.19(c)(5)(vi)('d') and 40 CFR Part 264.552(e)(6)(iv)] and discussed in USEPA preamble language to the 2000 draft Amendments to the CAMU Rule and the 2002 final Amendments to the CAMU Rule.**

Appendix C contains a legal review of regulatory issues relative to the ability of the Agencies to designate a CAMU at the Middleport Facility with alternate requirements for a liner. A summary appears below.

USEPA issued a final rule in January of 2002 [67 Fed. Reg. 2962 (January 22, 2002)]. With regard to alternate requirements for the liner standard discussed above, USEPA noted that "[c]ommenters generally support this approach, and EPA is finalizing these provisions as proposed" [67 Fed. Reg. 2979]. In the Preamble to the final rule, USEPA stated the rationale for the alternate requirements for the liner standard:

> *"As discussed in the proposal, EPA believes that it may be appropriate to approve CAMU designs that do not include a liner . . . under certain circumstances. [citation omitted] For example, at some highly contaminated facilities, CAMUs may be located in areas of significant contamination is [sic] pervasive throughout the subsurface. At such facilities, remedial approaches may involve long-term ground water pump-and-treat systems, or subsurface soil contamination may be expected to remain in place as a source of ground water contamination. At these types of facilities, a liner and leachate collection system to reduce migration of hazardous constituents into an already significantly contaminated subsurface likely would not meaningfully increase protection of human health and the environment . . . . When approving alternate designs that do not include a liner . . . the Regional*

Administrator must find that potential migration of hazardous constituents from the CAMU will be consistent with the remedial goals for the facility . . ." [67 Fed. Reg. 2979].

To summarize, the CAMU regulations **[6 NYCRR 373-2.19(c)(5)(iii)('b') and 40 CFR Part 264.552(e)(3)(ii)]** specify that the Agencies may approve an alternate design for the CAMU predicated on the following conditions:

1. The CAMU will be situated in an area with existing significant levels of contamination.

2. The alternative design that does not include a liner will prevent migration from the CAMU that would exceed long-term remedial goals for the Facility.

As described in the following subsections, these conditions are met for the proposed alternate CAMU design.

3.3 Existing Contamination at Proposed CAMU Location

3.3.1 Historic Use and Solid Waste Management Units

The proposed CAMU footprint overlies and is adjacent to a formerly disturbed area of FMC property that contains several SWMUs (see Figure 6). As previously discussed, past industrial activities at the Facility have resulted in the presence of significant soil and groundwater contamination. Within portions of the proposed CAMU footprint, process wastewaters from the dithiocarbamates pesticide production and after about 1964 from the carbofuran pesticide production processes were managed in an unlined former wastewater basin (SWMU #3) from approximately 1964 to about mid-1977 (NYSDEC 1989). The former basin encompassed approximately 13 acres and was reportedly expanded in the mid 1970s. As shown in the Draft RFA (USEPA 1986), the southern extent of the lagoon extended into the south portion of the proposed Phase 3 CAMU area, south of the current Eastern Access Road. The former process wastewater basin was closed in 1977 by re-grading soils within and around the footprint of the basin between 1977 and 1978. An aerial photograph of the Facility dated May 22, 1978, was interpreted by the USEPA to show soil disturbance and potential disposal activities throughout the proposed CAMU area, and is included in Appendix D (USEPA 1987). Based on a review of the May 22, 1978 aerial photograph, soils under and around the former process wastewater basin were likely re-graded over much of the eastern side of the Facility.

In 1978, the unlined stormwater impoundment (i.e., the ESI) was constructed within the footprint of the former process wastewater basin and was used from approximately 1978 to 1988 for the temporary storage or detention of surface water that fell directly on the ESI and immediately adjacent area and surface water resulting from overflows of the WSI and water treatment plant In 1988, with notice to the NYSDEC, the ESI (SWMU #50) was removed from service and isolated so that it only received rain water that directly fell onto it. The Agencies classified the ESI as a RCRA–regulated unit under the interim status regulations (40 CFR Part 265 and 6 NYCRR Part 373-3). FMC submitted a document titled Plan of Closure: Surface Impoundments (Conestoga Rovers & Associates 1988) which proposed closure activities for the ESI and presented a contingent closure plan. Subsequently, the Agencies and FMC agreed that the closure of the ESI would be addressed as part of final corrective measures for the Facility following any investigative activities under the RFI.

From December 1987 through June 1988, FMC conducted IRMs for the "Northern Ditches," consisting of the drainage ditches that run east to west along the north and south sides of active mainline railroad tracks in accordance with the terms and conditions of an Order on Consent (File No. 87-49) between the NYSDEC and FMC. The IRM involved the excavation of approximately 1,680 cubic yards of soil/sediment excavated from the invert of the Northern Ditches and the placement of the excavated soil in an engineered storage area (designated SWMU #53) outside the southern bounds of the former ESI. SWMU #53 was constructed as follows

- 40-mil high-density polyethylene (HDPE) underliner over a 12-inch-thick compacted clay layer
- Placement of a nominal 4-inch-thick layer of clay over the soil/sediment excavated from the Northern Ditches
- 40-mil HDPE overliner placed over the 4-inch clay layer and fused to the HDPE underliner along the entire perimeter of the storage area
- Clay and topsoil material placed over the HDPE overliner and seeded

Beginning in 1996, FMC performed an additional IRM, and several ICMs pursuant to the terms and conditions of the AOC, that involved the excavation of soil and debris from various areas and placement of non-hazardous excavated wastes within the ESI Fill Area (also known as the "ESI Soil Deposition Area") (Conestoga Rovers & Associates 1999). The area was designated as a solid waste management unit, SWMU #54. Between 1996 and the end of 2007, with approval from the Agencies and in accordance with approved work plans for the interim measures, FMC transported nearly 95,000 cubic yards of soil and debris generated during these interim measure remedation projects to the Facility and deposited them within the ESI Fill Area. From these projects, the existing soils within the ESI Fill Area contain remediation-derived materials:

- Royalton-Hartland Central School (Roy-Hart) School Bleacher Area IRM, conducted in 1996, involved the excavation of approximately 2,200 cubic yards of soil from the Roy-Hart School Bleacher Area and placement of the excavated soil in the ESI Soil Deposition Area (SWMU #54). The average arsenic concentration in the excavated soil that was placed in the ESI Fill Area was approximately 152 parts per million (ppm).

- Roy-Hart School Football Field Area ICM, conducted in 1999-2000, involved the excavation of approximately 39,000 cubic yards of soil from the southwestern portion of the school property and placement of the excavated soil in the ESI Soil Deposition Area (SWMU #54). The average arsenic concentration in the excavated soil that was placed in the ESI Fill Area was approximately 55 ppm.

- Fourteen Western Residential Properties ICM, conducted in 2003, involved the excavation of approximately 15,000 cubic yards of soil from the 14 Western Residential Properties ICM Area and placement of the excavated soil in the ESI Soil Deposition Area (SWMU #54). The average arsenic concentration in the excavated soil that was placed in the ESI Fill Area was approximately 94 ppm.

- Phase 1 ICM for the North Railroad Property, conducted in 2005, involved the excavation of approximately 16,000 cubic yards of soil from the Phase 1 ICM Area and placement of the excavated soil in the ESI Soil Deposition Area (SWMU #54). The average arsenic concentration in the excavated soil that was placed in the ESI Fill Area was approximately 250 ppm.

- 2007 Early Action ICM conducted in 2007, which involved the excavation of approximately 22,000 cubic yards of soil from the Wooded Parcel (known as the "Coe Property") north of the Facility, Culvert 105 properties south of Sleeper Street and north of the Erie Canal, and nine residential properties on the south side of Park Avenue and one of the east side of Maple Avenue, with placement of the excavated soil in the ESI Soil Deposition Area (SWMU #54). The average arsenic concentration in the excavated soil that was placed in the ESI Fill Area was approximately 50 ppm.

Overall, remediation-derived soil and debris removed during these actions and placed in the ESI Soil Deposition Area (SWMU #54) contain weighted total average arsenic concentrations, among the various remediation projects, up to approximately 250 ppm. The weighted total average arsenic concentration for all the remedial projects referenced above is 95 ppm. The arsenic present in the remediation-derived soil is believed to have originated from a combination of past activities at the Facility, widespread use of arsenical pesticides in the Middleport area, and/or natural background conditions.

3.3.2 Soil Contamination

As described above, past remedial measures have involved placing excavated materials containing elevated concentrations of arsenic in the proposed CAMU, including soil and debris placed in the ESI Fill Area, with the approval of the Agencies.

Soils in the eastern portion of the Site, including that under the ESI Fill Area, have been found to contain elevated concentrations of arsenic, lead and pesticide compounds, including DDT and DDD. Appendix E contains a summary of analytical results for soil samples obtained from the proposed CAMU area, not including soils previously placed in the ESI Fill Area. Subsurface soil southeast of the ESI (in the southeast portion of the proposed Phase 1 CAMU area) has been found to contain arsenic at a concentration of approximately up to approximately 2,000 ppm.

3.3.3 Groundwater Contamination

As discussed below (Section 3.6), groundwater beneath the proposed CAMU area is intercepted using blast-fractured trench/extraction well systems designated as Trench A (located in the eastern portion of the proposed CAMU area), Trench E (located west of the proposed CAMU area) and Trench G (located north of the proposed CAMU area). Locations of these trench systems are shown on Figure 4. Groundwater is regularly sampled and analyzed from the Trench A, E, and G extraction wells. The analytical results are each representative of a portion of the groundwater beneath the proposed CAMU area.

The most recent extraction well sampling event was conducted in September 2007. Analytical results for key Facility groundwater indicator constituents were:

Chemical	Concentrations in ug/L		
	Trench A (Extraction Well A-756X)	Trench E (Extraction Well A-757X)	Trench G (Extraction Well G-EX1)
Methylene Chloride	31	150,000	ND
Arsenic	2,190	93,700	13.1
Ammonia	10,600	44,500	155,000
Ethylene Thiourea (ETU)	2,900	74,000	13,000

Notes:
ug/L = micrograms per liter; part per billion (ppb)
ND = not historically detected

The methylene chloride concentration is measured to be 30,000 times higher than the New York State Class GA Groundwater Standard of 5 ug/L. Arsenic is detected at approximately 4,000 times the Class GA Standard of 25 ug/L. Ammonia is detected at 80 times the Class GA Standard of 2,000 ug/L. The Class GA Standard for ETU is non detect, and the measured concentration of ETU is notably higher than that.

These results indicate that existing groundwater contamination is present beneath the proposed CAMU area.

3.4 Facility Remedial Goals

The overall Facility remedial goal is to prevent unacceptable risk to human health and the environment associated with transport and exposure to hazardous wastes and/or hazardous constituents from operations or conditions at the Facility. For impacted soil and groundwater at the Facility, this goal is currently attained though implementation of remedial measures to prevent exposure to and off-Site transport of contaminants. These measures include capping of certain areas, surface water runoff collection and treatment and groundwater extraction and treatment. Specific remedial goals for soil and groundwater at the Facility are described below.

3.4.1 Remedial Goals for On-Site Soils

For impacted soils on the Facility and within the capture zone of the groundwater extraction system (described below in Section 3.6.2), including soils throughout the proposed CAMU area, the objectives are:

1. To prevent unacceptable human exposure to soils via direct contact and ingestion pathways

2. To minimize off-Site transport of Facility-derived chemicals via wind or water erosion of impacted soils

Actions to achieve these objectives currently include restricting access to the Facility, capping of certain areas (i.e., North Site Cover) and collection and treatment of storm water runoff from impacted areas. These remedial actions and other possible alternatives will be evaluated further during the RCRA Corrective Action RFI/CMS process for the Facility.

3.4.2 Remedial Goals for Groundwater

The document titled “Work Plan for Remedial Systems Effectiveness Monitoring,” prepared by FMC and dated March 2002, describes the objectives of the groundwater remediation systems at the Facility as follows:

1. To minimize off-Site groundwater contaminant migration within specific hydrogeologic intervals (i.e., overburden and shallow bedrock) which contain significant concentrations of Site-related chemicals

2. To reduce the concentrations of Site-related contaminants in the groundwater

The first objective is being attained through hydraulic containment utilizing the perimeter blast-fractured trenches (Trenches A, B, C, D and G) shown on Figure 4. The second objective is being addressed by long-term mass removal utilizing the aforementioned perimeter blast-fractured trenches along with two source control blast-fractured trenches (Trenches E and F).

3.5 Consistency of Alternate Design with Facility Remedial Goals for Soils

Prevention of off-Site wind and waterborne transport of materials placed in the CAMU will entail placement and maintenance of temporary (interim) covers and a final cover. During periods of prolonged inactivity while the CAMU is being constructed, consistency with the objectives listed in Section 3.4 would require the placement of interim covers to prevent wind erosion and fugitive dust emissions. In addition, during active placement activities, stormwater runoff potentially in contact with contaminated materials will be required to be collected, managed and treated as appropriate. These measures are included in the proposed CAMU design as follows:

- Construction of interim covers (see Section 4.4.4)
- Construction of final cover (see Section 5.1.2)
- Stormwater management (see Sections 4.3 and 5.1.3)

After placement of remediation waste in the CAMU has concluded, FMC would implement closure and post-closure activities (Section 5), which would include the construction of the final cover over the CAMU.

As discussed in Section 5.1.2, the final cover would consist of a minimum of 12-inch of clean soil vegetated with a variety of low-maintenance grasses, and shrubs. The key to the effectiveness of the final cover in meeting the soil remedial objectives is implementation of a post closure continuing inspection and maintenance program. The final cover would be placed above a demarcation layer consisting of a high visibility geotextile fabric. The demarcation layer would not only provide visual indication of areas where cover maintenance is necessary but would also mitigate possible erosion of the CAMU emplaced materials.

Facility security measures (such as the perimeter security fence) and the presence of the interim and final covers would also limit access to the CAMU. Appropriate health and safety and cover maintenance procedures would be used to control exposures of construction and Plant workers to the materials placed in the CAMU. The CAMU design would include the management of surface water runoff from and around the CAMU. Surface water runoff from the CAMU and from the remaining portion of the Facility would be addressed to meet the discharge requirements specified in the Facility's SPDES permit.

3.6 Consistency of Alternate Design with Facility Remedial Goals for Groundwater

3.6.1 CAMU Requirements for Attainment of Groundwater Remedial Goals

In order to be consistent with the groundwater remediation goals for the Facility, the CAMU would be designed to meet the following criteria:

1. The materials placed in the CAMU would not be a continuing source of contamination to groundwater sufficient to prevent long term reduction in the concentrations of contaminants in the groundwater.

2. The CAMU would not adversely impact the performance of the existing groundwater extraction and treatment system.

Specific CAMU design elements to meet these criteria are described in the following subsections.

3.6.2 Evaluation of Continuing Source (Leaching) Potential of CAMU Materials

Arsenic, lead, and/or other constituents (such as DDT and DDD) that may be present in soil that would be placed in the CAMU have low potential to migrate to groundwater. The Agency for Toxic Substances and Disease Registry (ATSDR) toxicological profiles on arsenic, lead, and DDT/DDD, respectively (ATSDR, 2007a, 2007b and 2002), state the following with regard to the transport and partitioning of these constituents in soil:

"Arsenic in soil may be transported by wind or in runoff or may leach into the subsurface soil. However, because many arsenic compounds tend to partition to soil or sediment under oxidizing conditions, leaching usually does not transport arsenic to any great depth (EPA, 1982c; Moore et al., 1988; Pantsar-Kallio and Manninen 1997; Welch et al., 1988). Arsenic is largely immobile in agricultural soils; therefore, it tends to concentrate and remain in upper soil layer indefinitely."

"Most lead is retained strongly in soil, and very little is transported through runoff to surface water or leaching to groundwater except under acidic conditions."

"Organic carbon partitioning coefficients…for p,p'-DDT, p,p'-DDE, and p,p'-DDD, respectively, suggest that these compounds strongly adsorb to soil."

Due to the nature of soils and debris that would be placed in the CAMU, the conditions within the CAMU would not be oxidizing or acidic. Therefore, conditions identified in the ATSDR profile documents that are conducive to leaching of these constituents will not exist and these constituents will be strongly retained by the soil.

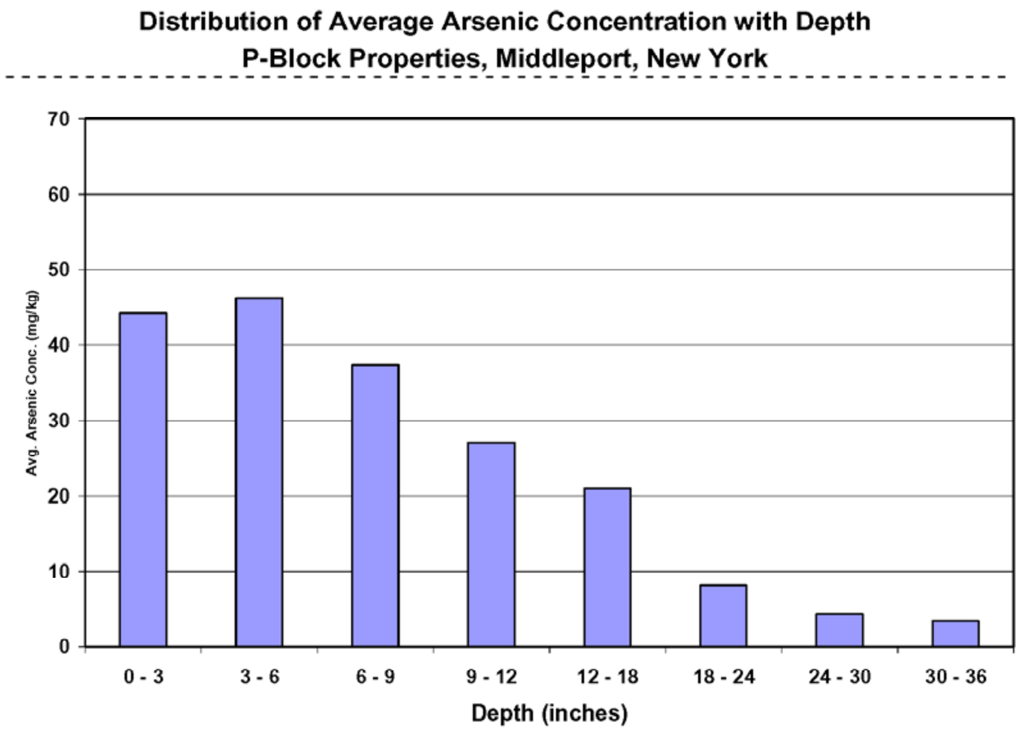
To further assess leaching potential, results of the Toxicity Characteristic Leaching Procedure (TCLP) arsenic analyses conducted during the remediation of the North Railroad property were reviewed. Results for five samples within areas designated zones 1 through 5 were analyzed for both whole soil sample and TCLP arsenic concentrations. The TCLP procedure was designed to mimic mildly acidic rain water leaching metals from the sample and potentially migrating into the groundwater. Results are summarized as follows:

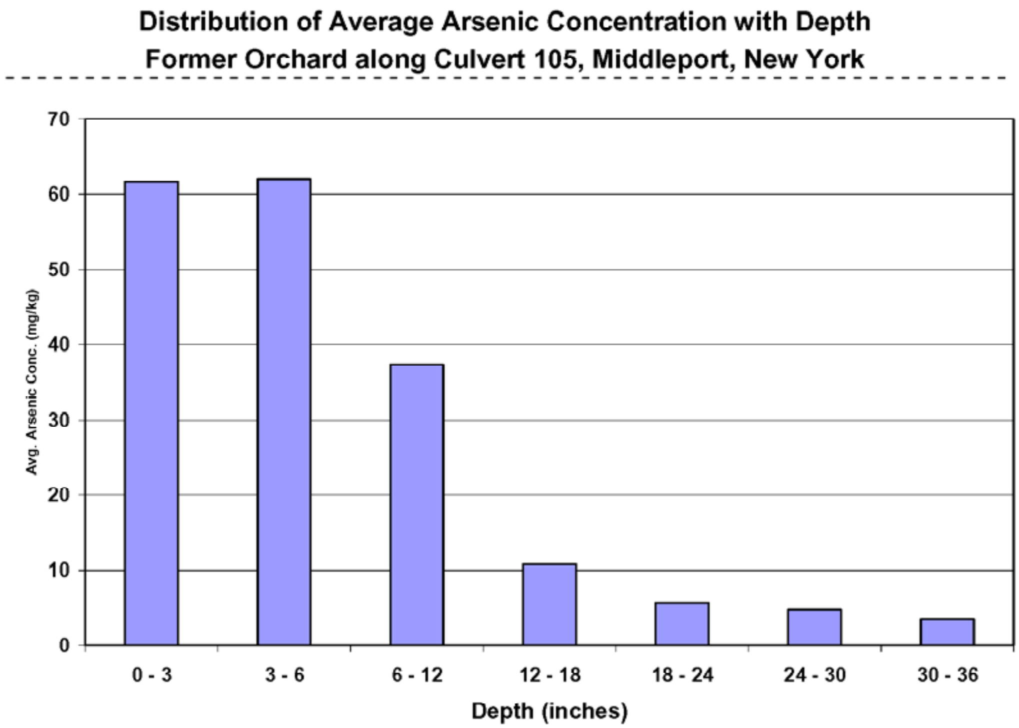
Paired TCLP/Whole Sample Arsenic Results for Samples Obtained for the North Railroad Property

Sample ID	Date Collected	Whole Sample	TCLP
Zone 1 (12-15)	8/8/05	657 ppm	0.137 ppm
Zone 2 (12-15)	8/8/05	3,490 ppm	2.21 ppm
Zone 3 (12-15)	8/8/05	2,160 ppm	1.41 ppm
Zone 4 (12-15)	8/8/05	4,370 ppm	1.91 ppm
Zone 5 (12-15)	8/8/05	47 ppm	0.035 ppm

These results indicate very low Site-specific soil to water partitioning, and very low potential to migrate downward with precipitation that may percolate through the CAMU and result in leachate. The presence of these constituents at elevated levels in groundwater on-Site would appear to be the result of historic use of unlined lagoons and impoundments in recharge areas and subsurface disposal of waste materials in areas where there was potential direct contact with groundwater.

The following graphs summarize Site-specific data, from within the off-Site Study areas, where soils have been excavated (P-Block residential soil) or may be remediated (former orchard along Culvert 105), and illustrate the lack of downward migration of arsenic in soil.





Any contribution of constituents from leachate from the remediation wastes placed in the CAMU to the groundwater will be minor and will not prevent the groundwater extraction system from meeting the objectives of control of migration or reduction over time of contaminant concentrations.

3.6.3 Existing Groundwater Extraction and Treatment System

The proposed CAMU area is within the capture zone of the existing groundwater extraction system; therefore, the groundwater extraction system would serve to collect leachate that may be generated from remediation wastes placed in the CAMU.

Figure 4 shows the layout of the groundwater extraction systems. The effectiveness of the groundwater extraction systems is monitored, evaluated, and reported to the Agencies on a quarterly basis in accordance with the Facility's GMP under the terms and conditions of the AOC.

The groundwater extraction system components include overburden underdrains and shallow bedrock blast-fractured trenches (and associated sumps and extraction wells) that are pumped to maintain an inward hydraulic gradient throughout the Site (i.e., direction of groundwater movement is toward the extraction system). The components of the groundwater extraction system are listed below:

1. Sanitary sewer underdrain collection system designed to collect potentially impacted groundwater along the sewer pipe bedding
2. Approximately 1,500 linear feet of underdrains and associated sumps that collect overburden groundwater from beneath the northern portion of the Site
3. Underdrains and a sump system (Sump 3) under the WSI that intercepts and controls groundwater in the northwest quadrant area of the Site
4. Blast-fractured bedrock migration control collection Trench A (approximately 300 feet in length) and extraction well A-756X to intercept shallow bedrock groundwater and control groundwater along the Site's eastern property boundary
5. Approximately 2,300 feet of blast-fractured bedrock migration control collection trenches and extraction wells to intercept shallow bedrock groundwater and control groundwater along the Site's northern property boundary consisting of:
    - Trench B (approximately 200 feet in length) and extraction well A-758X
    - Trench C (approximately 820 feet in length) and extraction wells C-EX1, A-759X, and C-EX2
    - Trench D (approximately 480 feet in length) and extraction well A-760X, D-EX1 and D-EX2
    - Trench G (approximately 790 feet in length) and extraction wells G-EX1, G-EX2, and G-EX3
6. Blast-fractured bedrock source recovery collection Trench E (approximately 275 feet in length) and Trench F (consisting of four short spurs totaling 150 feet in length) and associated extraction wells A-757X and A-542RX, respectively, for the recovery of impacted shallow bedrock groundwater at source areas in the interior of the Site
7. Deep bedrock extraction well BC-752X for the recovery of impacted groundwater at a potential source area within the facility boundary
8. On-Site Water Treatment plant that treats the extracted groundwater prior to discharge at the SPDES-permitted outfall

In the vicinity of the proposed CAMU area, groundwater flow is controlled by blast-fractured trenches A, D, E, and G (see Figure 4). Groundwater flow in the shallow bedrock zone is intercepted by the blast-fractured trenches, which physically penetrate the shallow bedrock zone. The bedrock blasting included the overburden/bedrock interface. Therefore, blast-fractured trenches are physically and hydraulically connected to the lower overburden unit. This allows overburden groundwater flow to be controlled by induced downward migration into the trenches and associated extraction wells. A more detailed description of the blast-fractured trench design and hydraulic control of overburden and bedrock groundwater flow is presented in the report titled 2005 Groundwater ICM Construction & Performance Report (BBLES 2005).

By letter dated May 15, 2007, NYSDEC issued an Environmental Indicator Determination (CA750) indicating that migration of contaminated groundwater from the Facility, which includes the proposed CAMU area, is under control. The Environmental Indicator Determination is included in Appendix B. This determination supports the proposition that the existing groundwater extraction system could serve as an effective leachate collection system for the proposed CAMU.

3.6.4 Potential Impacts on Effectiveness of the Groundwater Extraction System

As discussed above, the CAMU-emplaced materials would not represent a significant continuing source of groundwater contamination via leaching. Therefore, any increase in chemical loading to the groundwater extraction system and Water Treatment Plant attributable to the presence of the CAMU would be addressed by the existing water treatment system.

Similarly, there is no anticipated increase in the hydraulic loading to the groundwater extraction system and treatment plant associated with the presence of the CAMU. Infiltration into the CAMU would be managed to prevent an increase in infiltration compared to existing conditions throughout the proposed CAMU area. This would be accomplished by appropriate sloping and grading of the final cover, use of perimeter ditches, and/or mid-slope diversion swales.

As described below, groundwater chemistry and flow conditions in the vicinity of the CAMU would continue to be monitored as part of the Facility's existing GMP.

3.6.5 Groundwater Monitoring Program

Groundwater conditions (hydraulic head and chemistry) would be monitored on all sides of the proposed CAMU as part of the Facility's GMP.

The GMP, as specified in the GMP Work Plan (Conestoga Rovers & Associates 2002), consists of:

1. Quarterly measurement of groundwater hydraulic heads from the hydraulic head monitoring network shown in Appendix F

2. Semi-annual inspection of monitoring wells, including well soundings

3. Semi-annual collection and analyses of groundwater samples from the monitoring wells listed in Appendix F and analysis for the four groundwater indicator parameters (i.e., arsenic, methylene chloride, ETU and ammonia) for the Facility

4. Biennial (i.e., every 2 years) collection and analyses of groundwater samples from the monitoring wells listed in Appendix F and analysis for the more extensive Groundwater Indicator Parameter List (GIPL)

3.7 Summary

The design proposed in this CAMU application does not include an integrated liner and leachate control system or a low-permeability cap. This alternate design approach is allowable based on the conditions set forth in the CAMU regulations **[6 NYCRR 373-2.19(c)(5)(iii) and 40 CFR Part 264.552(e)(3)(ii)]**:

1. The CAMU would be situated in an area with significant levels of soil and groundwater contamination.

2. There will not be migration of hazardous constituents from the unit that will jeopardize or adversely affect long-term remedial goals.

These conditions will be satisfied in the alternate design as follows:

1. Analytical results from sampling of soil and groundwater in and around the proposed CAMU area show elevated levels of arsenic, ETU, ammonia, methylene chloride, DDD, DDT, and other pesticide compounds indicative of significant contamination.

2. The alternate design would be consistent with remedial goal for the Facility, and soil and groundwater remediation objectives for the Facility, based on the following:

   a) Prior to final closure, interim soil covers and drainage controls would be used to prevent off-Site transport of soils being placed in the CAMU.

   b) Facility security and worker health and safety procedures would be in place to control any unacceptable human exposure to the materials placed in the CAMU.

   c) Surface water runoff from the CAMU would be managed to meet the discharge requirements specified in the Facility's SPDES permit.

   d) As part of the closure activities for the CAMU, a final cover consisting of a 12-inch minimum thickness of clean vegetated soil placed above a high-visibility geotextile (demarcation layer) would be used to prevent wind and water erosion. The final cover would be subject to inspection and maintenance requirements as part of the post-closure activities.

   e) Leaching potential based on existing soil conditions coupled with an evaluation of paired TCLP/whole sample analyses of soils from past remediation activities (North Railroad Property) show little potential for arsenic leaching from the CAMU. The CAMU would not be a significant source of continuing groundwater contamination and would not prevent the Facility groundwater extraction and treatment system from achieving a long-term reduction in the chemical concentrations in Site groundwater. Therefore, a low-permeability cap is not necessary.

   f) Surface water drainage controls would be used to prevent any increase in groundwater recharge in the proposed CAMU area.

   g) With the caveat that any water percolating through the CAMU-emplaced soil would contain very low concentrations of contaminants compared to the underlying groundwater, the Facility groundwater extraction system would collect any impacted water which may be generated from remediation wastes placed in the CAMU and would also minimize the potential for off-Site migration of contaminated groundwater beneath the CAMU, consistent with the Facility's groundwater remediation goals. Therefore, an integrated liner and leachate collection system would not be necessary, and would be redundant with the groundwater control and extraction system.

h) Groundwater in and around the CAMU would continue to be monitored as part of the Facility's existing GMP.

4. CAMU Design

This section provides a general overview of the conceptual CAMU design and the factors that were considered during development of the conceptual CAMU design. Detailed final CAMU designs will be developed prior to the start of each phase of CAMU construction following the receipt of additional community input, relative to the conceptual CAMU design, and the Agencies' review of design details with respect to the proposed CAMU at the Facility.

4.1 Conceptual Design Components

A detailed description of the areal configuration and geometry of the proposed CAMU is provided in Section 2.2. Below is a brief summary of these and other primary design components of the proposed CAMU.

- Location
  - Eastern portion of Facility, which includes the area currently identified as the ESI Fill Area and the area of the Facility south of the ESI Fill Area (as shown on Figure 7)
- Areal Extent
  - *Overall Footprint:* approximately 16.9 acres, consisting of three phases of construction (i.e., Phase 1, Phase 2, and Phase 3)
- Base Liner and Leachate Collection System
  - *Base Liner:* no base liner
  - *Leachate Collection System:* the existing Facility groundwater extraction and treatment system will serve to collect any leachate generated from remediation wastes placed in the proposed CAMU
- Final Grades (Geometry)
  - *Maximum Slope:* 25%
  - *Minimum Slope:* 4%

- *Maximum Height:* 35 feet (above average surrounding grade)

- Final Cover

  - 12 inches (minimum) of clean, vegetated cover soil, underlain with a high-visibility geotextile demarcation layer

- Capacity

  - *Overall Gross Air Space* (as measured from existing grade, following completion of North Rail Road Property Phase 1 ICM activities [i.e., late 2005], to the bottom of the final cover and which does not including the volume associated with the recently completed 2007 Early Actions work) : approximately 404,000 cubic yards (includes all three phases)

  - *Overall Anticipated Net Air Space* (i.e., anticipated volume available for future placement of remediation wastes [includes all three phases], excluding the anticipated volume of clean interim cover soil that will be placed during waste-filling operations): approximately 373,000 cubic yards

  - *Maximum Potential Volume of Remediation Wastes Remaining in Place Following Closure:* Volume Remaining after Closure = Volume Placed in ESI Fill Area to date (i.e., approximately 95,000 cubic yards, as described in Section 3.3) + Net Air Space Available for Additional Placement (i.e., approximately 373,000 cubic yards) = approximately 468,000 cubic yards.

4.2 Conceptual Design Objectives

In general accordance with state and federal CAMU regulations **[6 NYCRR 373-2.19(c)(3) and 40 CFR Part 264.552(c)]**, the conceptual design objectives for the siting and construction of the proposed CAMU are to:

- Facilitate the implementation of reliable, effective, protective, cost-effective, and potentially broad-based remedies and provide a means to accommodate the implementation and timing of possible future remedial activities.

- Manage wastes placed in the CAMU such that the waste shall not create unacceptable risks to humans or to the environment as a result of exposure to hazardous waste or hazardous constituents.
- Minimize the potential for future releases from the proposed CAMU area (e.g., off-Site contaminant migration via wind, surface water, and/or groundwater following final closure).
- Minimize, to the extent practicable, the land area of the Facility upon which wastes would remain in place after closure of the CAMU by maximizing the amount of net air space available for the placement of remediation wastes within the CAMU.
- Minimize impacts to existing Facility operations, to the extent practicable.
- Avoid damage to and minimize the need for relocation of existing Facility features (e.g., monitoring wells, extraction wells, and forcemains), to the extent practicable.

4.3 CAMU Siting

The location of the proposed CAMU within the Facility was selected in accordance with the above-stated conceptual design objectives and in consideration of a number of additional Site factors, including the following:

- Locations and congestion of existing Facility features
- Available, constructible, contiguous land area
- Ease of access
- Ongoing industrial operations at the Facility
- Locations of existing Facility-based environmental and security controls
- Minimizing visibility concerns

As can be seen on Figures 2 and 3, much of the existing land area at the Facility is currently occupied by existing Site features, including buildings and water storage tanks, surface water drainage ditches, site access roads and parking lots, groundwater monitoring and extraction wells, and aboveground and underground utilities (e.g., overhead electric lines, underground storm sewer piping, aboveground and underground forcemain systems). Therefore, the amount of contiguous on-Site land area available for the construction of a CAMU is quite limited. With the exception of the ESI Fill Area, the eastern and contiguous southeastern portions of the Facility, however, are largely unused presently.

The inclusion of this area within the limits of the proposed CAMU is the preferred location with respect to other areas of the Facility, due to its proximity to existing areas of contamination (e.g., the former ESI), the lack of existing Facility features in this area, its position with respect to the Facility's existing groundwater extraction and treatment system (i.e., within the capture zone of the groundwater extraction system), and for other reasons, as stated below.

Access to the eastern portion of the Facility is facilitated by existing roads that traverse the northern and central portions of the Facility. Access to the proposed CAMU area is also facilitated by a potential railroad crossing location at an existing access gate in the Site security fence immediately north of the ESI Fill Area, which has been used for access to the ESI Fill Area on past remediation projects. This alternate access point also allows construction vehicles to bypass/avoid the central portion of the Facility, where the majority of the Facility's ongoing industrial operations currently take place.

In addition to lack of congestion and ease of access, the eastern portion of the Facility serves as a desirable location for the proposed CAMU due to the presence of existing Facility-based environmental and security controls. The existing Facility security fence would be extended and the proposed CAMU area would be located entirely within the existing Facility security fence, providing an additional measure of protection against potential human contact with remediation soils and debris during filling operations and following final closure. As discussed in Section 3.6.3, the proposed CAMU area is also bordered by components of the Facility's existing groundwater extraction and treatment system to the north (Trench G), east (Trench A), and west (Trench E). Given the primary direction of groundwater flow in the vicinity of the Facility (i.e., generally south to north), it is anticipated that the Facility's existing groundwater extraction and treatment system would control groundwater flow in the proximity of the proposed CAMU in overburden or shallow bedrock groundwater.

Lastly, in siting the proposed CAMU, consideration was given to the visibility of the CAMU during construction and following final closure. Based on numerous meetings and discussions with the Town of Royalton and Village of Middleport representatives and community members, visibility of the completed CAMU was determined to be a major concern. All other siting factors aside, the eastern/southeastern portion of the

Facility is considered to be the least visible portion of the entire Facility as viewed from adjacent and nearby roadways, community gathering areas, and residential properties.

4.4 CAMU Construction

4.4.1 Fill-Placement Activities

Remediation soil and debris generated as part of FMC's ongoing RCRA corrective action program would be placed within the proposed CAMU in the future in accordance with the following procedures:

- Only non-hazardous waste soil and debris (debris may include non-hazardous material, that is not soil, encountered during remedial activities, such as , wood, demolition debris, concrete, weeds, roots, vegetation, and stones) would be placed within the CAMU. Any large concrete debris would be broken into manageable sized pieces (maximum dimension in any direction shall not exceed 2 feet) prior to placement into the CAMU.
- Appropriate dust control measures would be implemented during CAMU filling and grading activities, including the following:
  - Making a water source(s) (e.g., water truck, water hose) available for use prior to beginning any filling or grading activities within the CAMU
  - Wetting the soils as necessary during filling and grading activities to control dust generation
  - At the end of each work day, covering excavated soil placed in the CAMU with plastic sheeting, temporary clean soil cover (minimum of 4 inches), hydromulch, or wetting down with water to minimize dust generation during off-work hours
  - Wetting haul roads with water, as needed, to reduce the potential for dust generation
  - Monitoring and controlling construction-related vehicle speeds to minimize dust generation along haul roads
- A minimum 50-foot offset distance would be maintained between the outer edge of the CAMU (i.e., toe of final cover) and the Facility's property boundary.
- Concrete debris would be covered with at least 6 inches of soil material prior to construction of final cover.

- Soil materials would be placed in 2-foot maximum lifts (i.e., uncompacted thickness) and compacted prior to placement of successive lifts.
- Following completion of final fill grading and prior to placement of final cover, any sediments that have accumulated upgradient of any temporary erosion and sediment controls (e.g., silt fence, check dams) would be removed and placed within the CAMU.

4.4.2 Decontamination Activities

One or more decontamination stations will be constructed within or near to the CAMU and used during active filling activities to minimize the potential for tracking of remediation soils beyond the limits of active filling areas. If equipment tires/tracks and/or undercarriages come into contact with remediation soils while operating in an active filling area, the tires/tracks and undercarriage will be decontaminated prior to leaving the active filling area. Decontamination stations will be classified as either “dry-brush” or “wet,” depending on the type of decontamination that will be performed at the designated station, as follows:

- Activities at “dry-brush” decontamination stations will consist of brushing off all visible deposits of soil material with a dry broom or brush.
- Activities at “wet” decontamination stations will consist of hosing down construction equipment with pressurized water (and detergent, if required) to remove all visible soil deposits.

In general, decontamination stations will be constructed within the limits of the active filling area(s) and consist of a stone pad of sufficient dimensions to accommodate the types of equipment being used for construction. If constructed outside of an active waste-filling area, the decontamination station, regardless of type, will be underlain with an impermeable geomembrane liner and any equipment requiring decontamination at such a station will be transported to the station on the bed or trailer of a clean vehicle. The equipment and the bed or trailer of the clean vehicle will be decontaminated at the station, and decontamination waters (if generated) will be collected and transported to FMC’s on-Site Water Treatment Plant or to an appropriate off-Site water treatment facility. Decontamination station materials (e.g., stone, fabric, geomembrane) will be disposed of within the CAMU upon completion of use.

4.4.3 Haul/Access Roads

Haul roads will be constructed, as needed, for transporting remediation soils and debris to active filling areas of the CAMU to reduce the potential for contact between haul vehicle tires and remediation soils. At the beginning of each phase of CAMU construction, a perimeter haul road will be constructed, as needed, around the active phase of the CAMU to facilitate access for operation, maintenance, and monitoring purposes. Likewise, upon final completion of all phases of CAMU construction, a perimeter access road will be constructed along the north, east, south, and southwest sides of the CAMU to facilitate post-closure activities. The perimeter access road will connect to existing site access roads that traverse the northern and central portions of the Facility.

4.4.4 Interim Cover

During periods of prolonged inactivity (e.g., between the end of one remediation project and the beginning of the next), CAMU fill areas that have not yet achieved final fill grades will be covered with an interim soil cover consisting of at least 6 inches of clean vegetated soil. The interim soil cover will serve to minimize the potential for erosion of underlying remedial soils and debris.

4.4.5 Interim Stormwater Management

General stormwater management procedures during fill placement activities will include the following:

- Consistent with the currently approved grading procedures for the ESI Fill Area, a soil berm (at least 1 foot high) will be installed and maintained around the perimeter of active filling areas to contain direct-contact surface water runoff within the active filling areas.
- Prior to initiating and during fill placement activities, accumulated surface water runoff within active filling areas will be managed using one or more of the following methods:
  - Allowing to drain and/or pump into existing on-Site drainage ditches that flow to the WSI
  - Pumping into a temporary storage tank or truck and transported to FMC's on-Site Water Treatment Plant
  - Pumping directly to FMC's on-Site Water Treatment Plant and/or

- Pumping into a temporary storage tank or truck and transported to an off-Site water treatment facility

- Non-contact surface water runoff from interim cover areas will be allowed to discharge directly to the perimeter stormwater ditches and/or mid-slope swales.
- Perimeter ditches and/or mid-slope diversion swales (depending on the stage of construction) will be constructed during each of the phases to collect and convey non-contact surface water runoff from covered areas of the CAMU to a stormwater attenuation area (South Basin) located in an uncontaminated area of the Facility, south of the Eastern Access Road and west of the CAMU (see Figure 13). Actual locations and configurations of stormwater management features will vary during the different phases of CAMU construction and will be dependent upon available topography and location of active and completed work areas.
- The South Basin will discharge via direct infiltration into the underlying soils and via overflow to an existing storm sewer inlet (South Culvert Inlet) located in the southeastern portion of the Facility.
- The South Basin will also serve as a sedimentation basin (i.e., for clean sediments) during interim and final cover placement.

Graphical depictions of the existing watershed drainage and the proposed stormwater management plan and proposed watershed drainage conditions are included as Figures 5, 13 and 14, respectively.

In addition to the stormwater management features/practices described above, various temporary erosion and sediment controls will also be employed as part of the CAMU construction. These temporary erosion and sediment controls may include the following:

- A reinforced silt fence would intercept sediment laden runoff from disturbed areas and promote deposition of suspended sediments.
- Stone check dam(s) would reduce the energy and velocity of potentially sediment-laden runoff within drainage ways, thereby reducing the potential for erosion and promoting the deposition of suspended sediments.
- Hay bale check dam(s) would intercept and filter potentially sediment-laden runoff within drainage ways.

Specific temporary erosion and sediment controls will be identified in the final designs for each phase of CAMU construction, and may include additional controls not