FEASIBILITY STUDY WORK PLAN

WOODBURY SITE

JULY 2007

Prepared for

3M Company

Prepared by

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1. INTRODUCTION

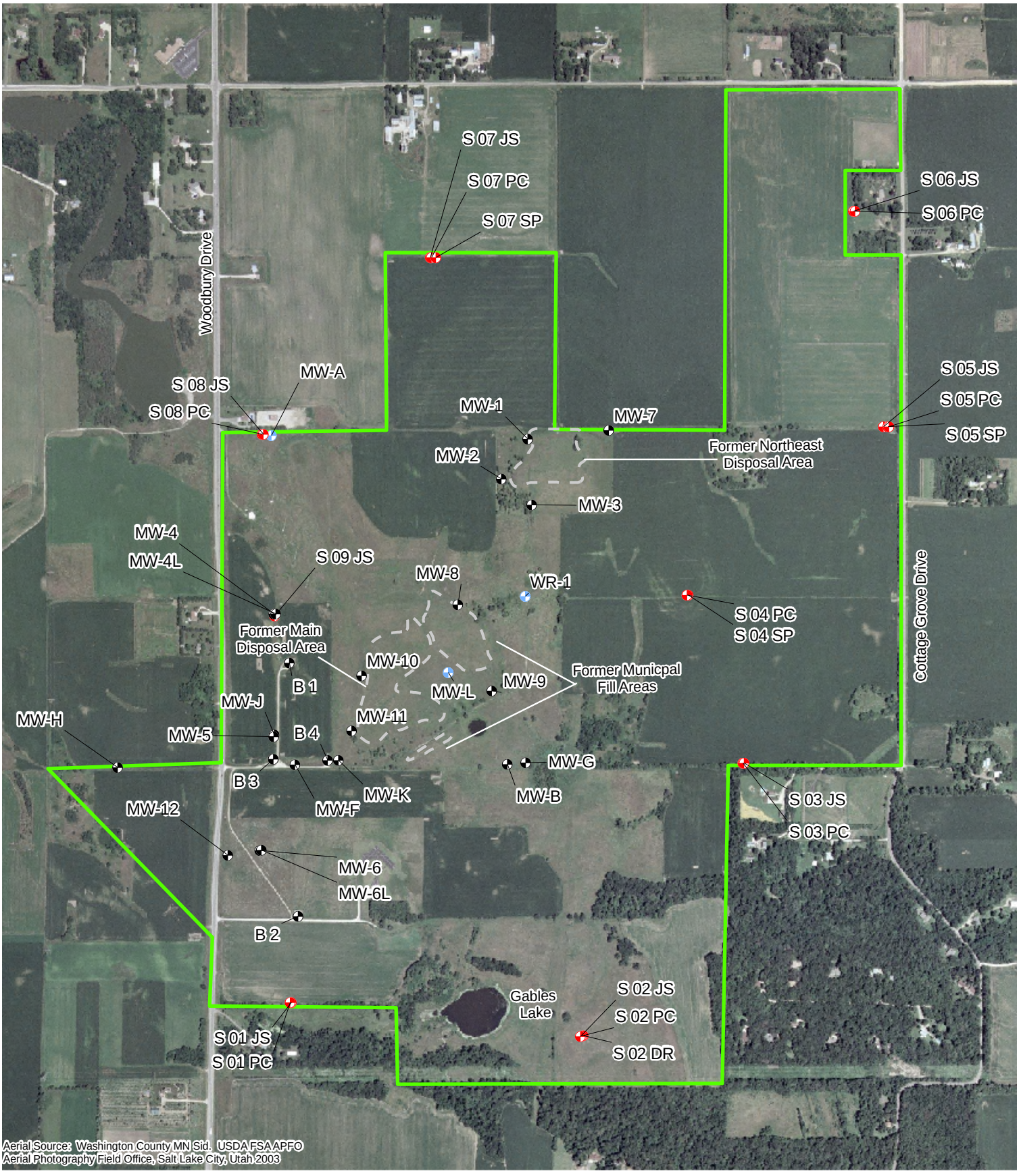
1.1 BACKGROUND AND SITE ASSESSMENT HISTORY

Since the late 1960s, the 3M Company (3M) has worked cooperatively with state and local authorities in the investigation and remediation of the former Woodbury disposal site (Woodbury Site) in Woodbury, Minnesota. The Woodbury Site consists of former waste disposal areas that had received industrial waste from the 3M St. Paul area facilities and the 3M Cottage Grove (Chemolite), Minnesota facility from 1960 to 1966. Municipal waste from Woodbury Township and the village of Cottage Grove was also disposed at the Site from 1960 to 1969.

Disposal of 3M materials occurred at two primary locations on the property, known as the Former Main Disposal Area and the Former Northeast Disposal Area. Residents of Woodbury and Cottage Grove disposed of municipal waste at separate locations on the Site. The locations of the former disposal areas are depicted in Figure 1-1.

In 1966, 3M conducted groundwater sampling at the Woodbury Site and vicinity. Volatile organic compounds (VOCs), primarily isopropyl ether (IPE), were detected in the groundwater samples from on-site wells and one off-site well. 3M stopped all industrial disposal activities at the Woodbury Site, initiated remedial activities, and commenced a groundwater monitoring program. These efforts were coordinated with state and local authorities.

Four "barrier" pumping wells (B1, B2, B3, and B4) were installed on the downgradient portion of the property between 1967 and 1973 and have been operated continuously since installation. The location of these barrier wells and Woodbury Site monitoring wells are shown on Figure 1-1. Groundwater extraction also was conducted at four different wells (referred to as "removal wells") in source areas from 1969 until the early 1970s. Operation of the removal wells was discontinued when it was determined that they were not performing as anticipated due to dewatering of the area from the pumping of the barrier wells. The removal wells were abandoned in 1991.



Legend:

- Monitoring Well Locations
- Abandonded Well Locations
- Sentinel Well Locations
- Approximate Disposal Area Boundaries
- Site Boundary

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WESTON SOLUTIONS

FIGURE 1-1
WOODBURY SITE MAP
WOODBURY, MINNESOTA

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The barrier wells were installed to prevent migration of chemical constituents downgradient of the Woodbury Site. The water withdrawn at the Woodbury Site is conveyed in an underground pipeline to the 3M Cottage Grove, Minnesota facility for use primarily as non-contact process water at the plant. A relatively small portion of the water is used in contact process applications at the site. VOC monitoring data collected from the barrier wells have demonstrated effective removal of VOCs. In addition, hydraulic gradient control in the vicinity of the Woodbury Site has been repeatedly demonstrated and documented in annual reports submitted to the MPCA.

Additional remedial activities conducted by 3M at the Woodbury Site included a waste destruction program and installation of a soil cover over the former disposal areas. The waste destruction program, which consisted of controlled burning of the Woodbury Site wastes, was conducted in 1968 with approval from the Minnesota Pollution Control Agency (MPCA) and the towns of Cottage Grove and Woodbury. Material from the trenches was excavated, burned and placed in mounds between the trenches.

In 1992, 3M entered the Woodbury Site into the MPCA Voluntary Investigation and Cleanup (VIC) Program. Under this program, 3M conducted additional investigations in 1992 and 1993 to further characterize site soil and groundwater quality. It was found that the Former Municipal Fill Areas were not significantly impacting underlying soils and groundwater. At the Former Main Disposal Area, the presence of residual constituents was primarily found in the soil directly below the disposal trenches and groundwater quality data indicated that this area was not a significant source of VOCs to groundwater.

In the Former Northeast Disposal Area, where acidic residue/tar waste from the Cottage Grove facility was disposed, VOCs were detected in soil samples. Soil vapor data indicated that the unsaturated sandstone bedrock beneath the area contained residual VOCs. The highest VOC concentrations in Woodbury Site groundwater were found directly downgradient from the Former Northeast Disposal Area and as groundwater migrated south-southwest from this area, VOCs decreased due to natural attenuation. Annual evaluations of groundwater elevation and groundwater quality data indicate that the barrier well system effectively contains the VOCs on-site.

In 1996, as part of an Interim Response Action, 3M re-graded and covered the Former Main and Municipal Disposal Areas and the Former Northeast Disposal Area. This Interim Response Action was performed voluntarily by 3M under the MPCA-approved Response Action Plan. In 2001, 3M filed a deed restriction that placed certain restrictions on the future use of the Former Main Disposal Area and the Former Northeast Disposal Area.

More recently, 3M has been working cooperatively with the MPCA to examine fluorochemicals (FCs) at the Woodbury Site. Specifically, the four barrier pumping wells and the combined discharge from these wells were sampled for FCs in March, April, and May 2005. This work was completed as prescribed in the MCPA-approved *Facility-wide Fluorochemical (FC) Investigation Work Plan for the 3M Cottage Grove, MN Facility* (WESTON, 2004). FCs were detected in three of the four barrier wells and in the combined discharge from these wells. The sampling results were summarized and provided to the MPCA in the *Fluorochemical (FC) Data Assessment Report for the 3M Cottage Grove, MN Facility* (WESTON, 2006).

In December 2006, additional groundwater sampling was conducted at the Woodbury Site that included the four barrier wells, the combined discharged from the wells, and on-site monitoring wells MW-2, MW-3, MW-5, MW-7, and MW-8. In a letter to 3M dated February 1, 2007, the MPCA requested that further assessment for FCs be conducted at the Woodbury Site. Accordingly, 3M retained Weston Solutions, Inc. (WESTON®) to prepare the *Fluorochemical (FC) Groundwater Monitoring Plan for the 3M Woodbury Site* (Woodbury Site Groundwater Monitoring Plan) and the *Fluorochemical (FC) Assessment Work Plan for the 3M Woodbury Site* (Woodbury Site FC Work Plan), which addressed the MPCA's requests (WESTON, 2007a and 2007b). The MPCA provided its conditional approval of these reports in a letter to 3M dated March 20, 2007.

The Woodbury Site FC Work Plan included a summary of the PFBA results of the December 2006 groundwater sampling event. It also included the plan for further assessment of FCs through performance of the following tasks: a soil boring and sampling program at the Former Northeast Disposal Area, a barrier well evaluation,

sentinel well installation, a conveyance line assessment, and implementation of a Woodbury Site Groundwater Monitoring Plan. The field program (sentinel well installation and Former Northeast Disposal Area soil boring program) was conducted in March and April 2007 and performance of the remaining tasks is ongoing.

In April 2007, 3M commenced discussions with the MPCA to formalize, under a Settlement Agreement and Consent Order (Consent Order), the process of conducting remedial investigations and response actions to address FCs present at three sites in Minnesota, namely, the Cottage Grove, Oakdale and Woodbury Sites. The Consent Order became effective on May 22, 2007 and it requires that 3M conduct a Remedial Investigation/Feasibility Study (RI/FS) with respect to release or threatened release of FCs and VOCs at and from the Woodbury Site. In the Consent Order, MPCA cited its conditional approval of the Woodbury Site FC Work Plan and Groundwater Monitoring Plan in the MPCA's March 20, 2007 letter to 3M. It is further stated that within 60 days of the effective date of the Consent Order, an RI/FS Work Plan shall be submitted. Since work plans for the RI have already been submitted to the MPCA and approved and the RI work is underway and nearly completed only the FS Work Plan is due to the MPCA on July 21, 2007. As such, this document is the FS Work Plan to address possible response actions in compliance with the Consent Order.

1.2 PURPOSE OF THE FS WORK PLAN

The purpose of the FS Work Plan is to describe the procedures that will be followed to conduct a Feasibility Study (FS) and prepare an FS Report for the Woodbury Site. The objective of the FS is to provide an evaluation of various response action alternatives, which address FCs in soil and groundwater at the Woodbury Site, and to provide a recommendation for implementation in accordance with the Consent Order provisions, which include MPCA guidance contained in *Guidelines: Remedy Selection* (MPCA, 1988), and United States Environmental Protection Agency (USEPA) guidance contained in *Guidance for Conducting Remedial Investigations and Feasibility Studies under the Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) (USEPA, 1988).

1.3 PROJECT MANAGEMENT

The performance of RI activities at the Woodbury Site is being conducted under work plans approved by MPCA and concurrently with performance of the FS. Thus, the following sections provide a generalized description of the organization and responsibilities of key individuals in the performance of the RI/FS. The organization of the project responsibilities described in this section is depicted in Figure 1-2.

1.3.1 3M Company Personnel

Mr. Robert Paschke, P.E. will serve as the 3M Project Manager. The Alternate is Ms. Katie Winogrodzki. To the maximum extent possible, communications between 3M and the MPCA concerning the terms and conditions of the Consent Order as they apply to response actions for the Site will be directed through the 3M and MPCA-designated Project Managers. The MPCA's designated Project Manager is Mr. Gerald Stahnke. The 3M Project Manager will be responsible for assuring that all communications from the MPCA Project Manager are appropriately disseminated and processed.

The 3M Project Manager, as well as the MPCA Project Manager, has the authority to (1) take samples or direct that samples be taken; (2) direct that work at a Site stop for a period not to exceed seventy-two (72) hours if the Project Manager determines that activities at the Site may create a danger to public health or welfare or the environment; (3) observe, take photographs and make such other reports on the progress of the work as the Project Manager deems appropriate; (4) review records, files and documents relevant to the Consent Order and (5) make or authorize minor field modifications in the RI, FS, Response Action Plan (RAP) or RAs or in techniques, procedures or design utilized in carrying out the Consent Order which are necessary to the completion of those activities. Any field modifications will be approved orally by both the 3M and MPCA Project Managers. If the 3M Project Manager requests a field modification, he will within seventy-two (72) hours following the modification, prepare a memorandum detailing the modification and the reasons thereof and will provide or mail a copy of the memorandum to the MPCA Project Manager. The 3M Project Manager will either be on the Site or available on call by telephone during all hours of work at the Site.

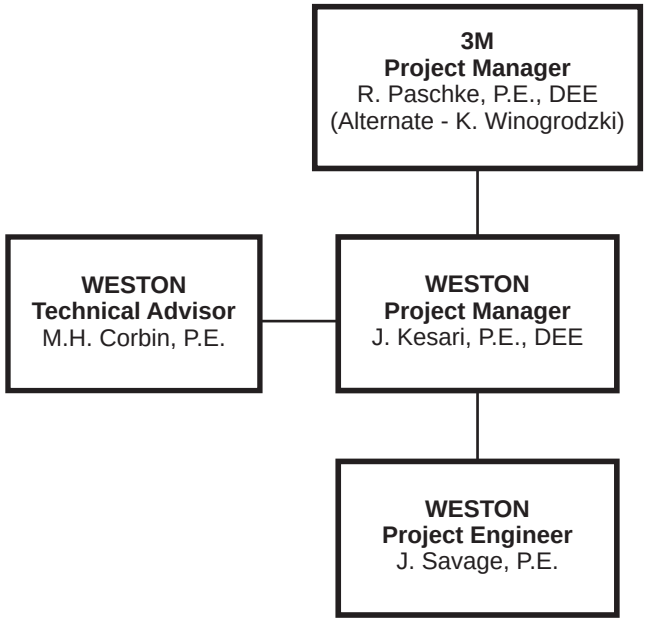

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**FIGURE 1-2 PROJECT ORGANIZATION CHART
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
WOODBURY SITE**

1.3.2 Weston Personnel

Mr. Jaisimha Kesari, P.E., will serve as the WESTON Project Manager. He will be responsible for day-to-day activities on the project and planning, coordinating, integrating, and managing all project activities. These will include the activities of any subcontractors to WESTON. Mr. Kesari will also provide technical oversight and review for performance of the Remedial Investigation/Feasibility Study.

Mr. Michael Corbin, P.E., will serve as the WESTON Technical Advisor. He will be responsible for guiding and providing technical oversight in the performance of the RI/FS and ensuring that it meets Consent Order requirements and follows USEPA guidance (USEPA, 1988).

Ms. Janet Savage, P.E., will serve as the WESTON Project Engineer. She will be responsible for conducting the FS and preparing the RI/FS report in accordance with the Consent Order and USEPA guidance.

2. LIST OF POSSIBLE TECHNOLOGY TYPES AND PROPOSED TREATABILITY STUDIES

In accordance with the requirements of the Consent Order Sections VI and VII and Exhibit E, Section III.E.3, the development and screening of response action alternatives for the Woodbury Site will be based on the List of Possible Technology Types presented in the FS Work Plan and approved by the MPCA Commissioner. The List of Possible Technology Types for the Woodbury Site has been developed as described in the following discussion.

It is important to note that soil and groundwater at the Woodbury Site are being considered as separate operable units. As such, a technology evaluation is provided for each media so that media-specific technologies can be combined into response action alternatives for each media.

General response actions have been identified for the Woodbury Site based on the preliminary information and data previously and currently being collected at the site. The general response actions, response technology type, and associated process options are presented in Table 2-1 for soil and Table 2-2 for groundwater along with a brief description of the process option and a screening comment. In their guidance, EPA states "During this screening step, process options and entire technology types are eliminated from further consideration on the basis of technical implementability", (EPA,1988).

Table 2-1 Initial Screening of Technology and Process Options – Soil

General Response Action	Remedial Technology Types	Process Options	Description	Screening Comments
Removal	Excavation	Excavation	Excavate impacted soil from the site	Retained for further screening
Treatment	Chemical treatment	Oxidation/reduction	Treat impacted soil with a chemical oxidation/reduction technology	Not feasible due to the fact that it is uncertain whether existing technologies would effectively treat/destroy FCs, although oxidation/reduction technologies have been demonstrated for treatment of various VOCs
	Physical	Solidification/ stabilization	Mixing of impacted soil with a stabilizing agent such as cement kiln dust (CKD) to prevent the leaching of constituents	Not feasible due to the fact that it is uncertain that stabilization would reduce leaching of FCs and VOCs and this technology type would result in a significant volume increase
	Biological	Anaerobic/aerobic	Treat impacted soil with a biological technology to break down constituents using a microbial population	Not feasible as FCs are recalcitrant compounds, and to date, there have been no microbial populations identified that can significantly affect the biodegradation of FCs, while there may be some populations at the site that can degrade the VOCs
	Thermal	Incineration	Treat impacted soil by incineration to destroy constituents	Retained for further screening
Disposal	Landfill	New	Dispose impacted soil in a newly constructed/dedicated landfill	Retained for further screening
		Existing	Dispose impacted soil in an existing landfill	Retained for further screening
Containment	Cap	Soil/clay	Installation of soil/clay cover over impacted soil to prevent direct contact and/or reduce infiltration	Retained for further screening
		Engineered cap	Installation of a multilayer engineered cap over impacted soil to prevent direct contact and reduce/eliminate infiltration to impacted soil	Retained for further screening
Institutional and Site Controls	Access restrictions	Deed restrictions	Deed for the Site property would include restrictions on soil disturbance	This institutional control is already in place and would be part of a no action alternative. Therefore, it is not retained for further screening.
		Fencing	Install fence around site to limit access to impacted soil	Access areas to the site are currently fenced and controlled by locked gates. Existing fence could be supplemented or enhanced. Retained for further screening
No Action	None	Not applicable	No action	Retained for a baseline comparison

Table 2-2 Initial Screening of Technologies and Process Options – Groundwater

General Response Action	Remedial Technology Types	Process Options	Description	Screening Comments
Collection	Groundwater recovery	Groundwater recovery wells	Install wells for extraction of impacted groundwater	Extraction wells are currently in-place and operating. These could be enhanced or supplemented. Retained for further screening
	Subsurface drain	Interceptor trench	Install subsurface perforated pipe surrounded by porous media to collect impacted groundwater	Not feasible due to the extensive depth (i.e., greater than 60 ft bgs) to groundwater at the Site and there is no confining layer.
Discharge	On-site	Local stream	Discharge extracted groundwater to a local stream	Due to large volume of water pumped at the site and the potential load to a local stream, this technology is not retained
	Off-site	POTW or Mississippi River	Discharge extracted groundwater to the POTW, Mississippi River or reuse at the Cottage Grove Plant.	Due to large volume of water pumped at the site and the potential load to the POTW, this technology is not retained for discharge to a POTW, but it is retained for discharge to the Mississippi River or reuse at Cottage Grove which is already in place
Containment	Cap	Soil/clay	Installation of soil/clay cover to reduce infiltration to groundwater	A soil cover is currently in place over disposal areas which could be enhanced or upgraded. Retained for further screening
		Engineered cap	Installation of a multilayer engineered cap over impacted soil to reduce/eliminate infiltration to groundwater	Retained for further screening
	Vertical barriers	Slurry wall	Trench around impacted groundwater is filled with a soil bentonite slurry to cut off horizontal groundwater flow and contain impacted groundwater	The extensive depth to groundwater at the Site is prohibitive to construction of a slurry wall and there is not a significant aquitard layer to key into; therefore, this technology is not retained
		Sheet piling	Sheets of steel are driven into bedrock or confining layer around the impacted groundwater area to cut off horizontal groundwater flow and contain impacted groundwater	The extensive depth to groundwater at the Site is prohibitive to installation of sheet piling and there is not a significant aquitard layer to key into; therefore, this technology is not retained

Table 2-2 Initial Screening of Technologies and Process Options – Groundwater (continued)

General Response Action	Remedial Technology Types	Process Options	Description	Screening Comments
Treatment	Physical	Carbon adsorption	Adsorption of constituents onto activated carbon by passing impacted groundwater through vessels containing activated carbon	GAC has been used for FC removal. Retained for further screening
		Ion exchange resin	Adsorption of constituents onto ion exchange resin by passing impacted groundwater through vessels containing ionic resin	This technology is being retained as a possible supplementary technology to activated carbon.
		Reverse osmosis	Separation process that uses pressure to force water through a membrane that retains the solute on one side and allows water molecules to pass to the other side.	This technology is being retained as a possible supplementary technology to activated carbon.
		Air stripping	Mix large volumes of air with water in a packed column or tray stripper to promote transfer of constituents to air	Retained for further screening for removal of VOCs, if needed.
	Chemical	Oxidation/ reduction	Treat impacted groundwater with a chemical oxidation/reduction technology	Not feasible due to the fact that it is uncertain whether existing technologies would effectively treat/destroy FCs although it is expected to address VOCs
	Biological	Aerobic/ anaerobic	Treat impacted groundwater with a biological technology to break down constituents using a microbial population	Not feasible as FCs are recalcitrant compounds and to date, there have been no microbial populations identified that can significantly affect the biodegradation of FCs although there are some that may address the VOCs
	Off-site	POTW	Extracted groundwater discharged to POTW for treatment	Due to large volume of water pumped at the Site and the potential load to the POTW, this technology is not retained
	In situ	Aeration	Sparging of air down wells into the groundwater to volatilize constituents from the groundwater	Not feasible since FCs do not have Henry's Law Constants in the range acceptable for this technology and do not readily transfer from the water to air phase. The VOCs would be more amenable to this technology.
		Permeable treatment/ reactive barriers	Downgradient trench filled with adsorptive or reactive media (e.g., activated carbon or zero valent iron) to remove constituents from the groundwater.	Not feasible due to the extensive depth to groundwater at the Site and this technology is of uncertain effectiveness and could require multiple replacement of trench materials over time as they are spent
		Chemical injection	Inject chemicals into the groundwater by means of wells to treat impacted groundwater	Not feasible due to the fact that it is uncertain whether existing technologies would effectively treat/destroy FCs although oxidation/reduction technologies have been demonstrated for treatment of various VOCs

Table 2-2 Initial Screening of Technologies and Process Options – Groundwater (continued)

General Response Action	Remedial Technology Types	Process Options	Description	Screening Comments
Institutional and Site Controls	Access restrictions	Deed restrictions	Deed for the Site property would include restrictions on installation of groundwater supply wells	This institutional control is already in place and would be part of a no action alternative. Therefore, it is not retained for further screening.
		Fencing	Install fence around site to limit access to impacted groundwater/surface water ponds	The site is currently fenced and gated which could be enhanced or supplemented. Retained for further screening
	Alternate water supply	Bottled water/public water	Supply alternate water source to local residents	Retained for further screening
	Monitoring	Groundwater monitoring	Continue groundwater monitoring	Groundwater monitoring is currently performed and could be enhanced or supplemented. Retained for further screening
No Action	None	Not applicable	No action	Retained for a baseline comparison

POTW - Publicly-owned treatment works

The general response action/technology types and process options that have been retained as the List of Possible Technology Types from this initial screening are summarized below:

LIST OF POSSIBLE TECHNOLOGY TYPES

Soil

- Removal - Excavation
- Treatment - Thermal
  - Incineration
- Disposal - Landfill
  - New landfill
  - Existing landfill
- Containment - Cap
  - Soil/clay cap
  - Engineered multilayer cap
- Institutional and Site Controls - Access restrictions
  - Fencing
  - Deed Restriction (Already in Place)
- No action

Groundwater

- Collection - Groundwater recovery
  - Recovery wells
- Discharge – Off-site
  - Reuse /Mississippi River
- Containment – Cap
  - Soil/clay cap
  - Engineered multilayer cap
- Treatment - Physical
  - Activated carbon
  - Ion exchange resin
  - Reverse osmosis
  - Air stripping
- Institutional and Site Controls
  - Fencing
  - Alternate water supply
  - Monitoring
  - Deed Restriction (Already in Place)
- No action

Following approval of the FS Work Plan by MPCA, these technologies will be assembled into response action alternatives for screening and evaluated further for implementation at the Woodbury Site as described in Section 3 of this FS Work Plan. Further testing and data collection may be conducted in an effort to collect additional information for technology evaluation and implementation. For instance, a bench- or pilot-scale test may be conducted to determine effectiveness and usage rate in the treatment of groundwater containing FCs and VOCs by activated carbon and/or ion exchange resin. Although chemical and solidification treatment technologies have been screened out due to the lack of data regarding the use of these technologies to effectively treat FCs, 3M may choose to conduct bench-scale and/or pilot-scale testing to determine if these technologies should be considered for possible innovative application at the Woodbury Site.

3M will notify MPCA if additional studies are to be conducted. 3M will prepare a work plan for submission to MPCA that will provide details on the performance of the study and reporting of results. The results of any studies will be included in the FS Report and considered in the evaluation of response action alternatives.

2.1 RESPONSE ACTION OBJECTIVES

During the initial stages of response alternative development, response action objectives will be established for the Woodbury Site. Response action objectives consist of medium-specific or operable unit-specific goals for protecting human health and the environment. Based on the response action objectives, an estimate can be prepared regarding the volume of media and area to which containment, treatment, or removal actions may be applied.

Through interaction with the MPCA, the Site-specific response action objectives and cleanup levels that will be protective of human health and the environment will be established.

3. DEVELOPMENT AND SCREENING OF RESPONSE ACTION ALTERNATIVES

3.1 DEVELOPMENT OF RESPONSE ACTION ALTERNATIVES

The List of Possible Technology Types will be assembled into a range of response action alternatives. The range of alternatives developed for soil may include, but will not be limited to: an excavation and treatment alternative, an excavation and disposal alternative, a containment alternative, and/or a no action or limited action alternative. The range of alternatives developed for groundwater may include, but will not be limited to: an extraction and treatment alternative, an extraction alternative, and/or a no action or limited action alternative.

3.2 SCREENING OF RESPONSE ACTION ALTERNATIVES

According to MPCA guidance, each response action alternative or evaluated alternative must meet the threshold criterion of providing overall protection of public health and welfare, and the environment (MPCA, 1998). This criterion is met if the response action alternative or evaluated alternative will achieve response action objectives and cleanup levels or provides for a permanent remedy.

As stated in the Consent Order Exhibit E, Section III.E.3.a, once the response action alternatives have been developed, they will be evaluated and screened using the Site-specific response action objectives and cleanup levels discussed in Section 2.1. Those response action alternatives that do not meet the response action objectives and cleanup levels will be eliminated from further consideration. Response action alternatives that pass this screening will be designated as “evaluated alternatives” and will be further evaluated in the Detailed Analysis Report (DAR).

4. DETAILED ANALYSIS REPORT

Once a set of response action alternatives meeting the threshold criterion of providing overall protection of public health and welfare, and the environment has been developed, a detailed evaluation of each alternative and a comparison of the alternatives will be performed so that a recommendation for response action alternative implementation at the Woodbury Site can be made. The DAR section of the FS Report will contain an assessment of each alternative with respect to balancing criteria and a comparative analysis of the alternatives as described in Sections 4.1 and 4.2, respectively.

4.1 DETAILED DESCRIPTION AND ASSESSMENT OF RESPONSE ACTION ALTERNATIVES

In the DAR, each evaluated response action alternative will be described and individually assessed with respect to balancing criteria including long-term effectiveness, implementability, short-term risks, and total cost. At a minimum, the detailed description of each response action alternative will include the following information as appropriate: the operable unit to which the evaluated alternative would be applied, a description of the technology type and process option, engineering considerations required for implementation (e.g., for a pilot treatment facility, identification of any additional studies that may be needed to proceed with final response action design), operation, maintenance, and monitoring requirements, off-site disposal needs and transportation plans, temporary storage requirements, safety requirements associated with implementation, a description of how other alternatives could be combined with this alternative to optimize the system or better achieve response action objectives and cleanup levels, a review of on-site or off-site treatment or disposal facilities which could be utilized to ensure compliance with applicable or relevant and appropriate requirements (ARARs), and decommissioning activities that would be conducted upon completion of the response action.

Each of the response action alternatives will be assessed in the DAR using balancing criteria. The following is a description of the balancing criteria in order of importance:

- **Long-term effectiveness** – Long-term effectiveness is the ability of an evaluated alternative to maintain the desired level of protection of public health and welfare, and the environment over time. Permanent remedies provide long-term effectiveness. In the event a permanent remedy is not feasible, evaluated alternatives that significantly alter the FCs to produce significant reductions in toxicity, mobility, or volume will be preferred.

  In addition, the ability of the alternative to obtain and/or manage treatment residuals, minimize transfer of contaminants to another environmental media, and maintain established response action objectives and cleanup levels over time will be a major consideration.

- **Implementability** – For this criterion, technical and administrative factors and the availability of services and materials are considered with respect to their affect on the ability to implement each alternative.

- **Short-term risks** – For this criterion, the short-term risks that may be posed as a result of implementing an alternative will be considered and weighted against the ultimate long-term benefits of implementing the alternative.

- **Total costs** – For this criterion, a conceptual cost estimate for implementation of the response action alternative will be provided including long-term monitoring, operation and maintenance, and decommissioning activities.

4.2 COMPARATIVE ANALYSIS OF RESPONSE ACTION ALTERNATIVES

Once the response action alternatives have been described and individually assessed using the balancing criteria, a comparative analysis of the alternatives will be conducted and presented in the DAR. The purpose of the comparative analysis is to identify the advantages and disadvantages of each response action alternative relative to one another with respect to each of the balancing criteria.

The comparative analysis will include both a narrative discussion and a tabular summary of the strengths and weaknesses of each alternative relative to one another considering specific components of each criterion. A narrative will be provided for each criterion with a discussion of each alternative's expected performance. Differences among the alternatives will be described and presented both quantitatively and qualitatively, as appropriate.

4.3 RECOMMENDATION OF RESPONSE ACTION ALTERNATIVE AND CONCEPTUAL DESIGN

Based on the detailed analysis and comparison of response action alternatives, 3M will provide a recommendation for implementation to address FCs in soil and groundwater at the Woodbury Site. A preliminary conceptual plan for implementation of the recommended alternative will be presented in the DAR and is envisioned to include the following: conceptual plan drawings, layouts, and cross sections to depict the various components of the response action alternative, descriptions of the equipment and process used, as well as expected quantities and volumes of materials required, identification of additional data needs for the final design, discussion of operation and maintenance requirements, institutional issues, costs, and estimated schedule for implementation.

5. COMMUNITY RELATIONS AND PUBLIC INVOLVEMENT

3M is committed to keeping local residents and public officials informed of activities at the Woodbury Site and responding to inquiries they may have. This section outlines some of the approaches that will be used to conduct the community relations and public involvement components of the project. Throughout the implementation of the Consent Order requirements, 3M will be coordinating with the MPCA on the community relations activities described herein, along with many other aspects of the investigation and remediation of the Woodbury site.

The communication tools below are intended to serve as an initial plan for communicating to local residents and public officials. 3M will seek the advice from the MPCA, city officials and others regarding these public communications tools.

3M offers the following for use in communicating project activities:

- **3M Fluorochemical Website:** 3M has established and maintains a website for disseminating important information on fluorochemicals. The URL for this site is: www.3M.com/pfos-pfoa. The site will include a link to the Woodbury Site, on which information will exist to direct local residents and public officials to the availability of relevant documents and meeting dates. Additionally, the website will indicate that people can contact 3M via a telephone helpline, "1-800-3M HELPS", to make inquiries about the status of the remediation efforts.

- **Public Repository at Local Library:** Key documents about the project will be maintained and available for the public to review at the R.H. Stafford Library located at 8595 Central Park Place. Examples of the types of documents to be available at this location would include the Settlement Agreement and Consent Order and key submittals to the MPCA such as the Feasibility Study Work Plan and Remedial Investigation/Feasibility Study Report.

- **Informational and Public Meetings:** 3M recognizes the importance of input from the public, including public officials and staff at the municipal level. Information meetings will be conducted to update interested local residents and public officials and to provide opportunities for their input. The following briefly describe some of the forums that will be used:

- **Elected Officials and Staff:** 3M will continue to provide periodic updates to Woodbury public officials and staff. These updates may be formal or informal. At these meetings, public officials can provide input relative to opportunities for public participation.

- **MPCA Citizens Board:** Quarterly updates to the MPCA Citizens Board will occur on the progress being made on investigations and remediation efforts at the Site. This will provide opportunities to inform the Board on developments at the Site and to address questions.

- **Public Meetings:** It is envisioned that at least two public meetings will occur prior to the implementation of any response actions at the Site.

  An initial meeting will be conducted by 3M during development of the Remedial Investigation/Feasibility Study Report. The purpose of this meeting is to provide the community information about the investigation and remedial alternatives so that public comments can be taken into account. 3M will work with city officials on how best to publicize the meeting to ensure timely notice to the community. Following this meeting, and with the benefit of the public's questions and comments, the comparative analysis and recommended evaluated alternatives and conceptual design steps will be completed.

  A second public meeting will be convened by the MPCA after reviewing the RI/FS Report and before selecting a remedy for the Site.

6. FEASIBILITY STUDY REPORT AND SCHEDULE

3M will work with MPCA to determine Site-specific response action objectives and cleanup levels. Based on the response action objectives and cleanup levels, 3M will prepare a combined RI/FS Report. The performance and results of the remedial investigation will be included in the RI/FS Report, as well as the feasibility study, as described in this FS Work Plan. In accordance with the Consent Order, the combined RI/FS Report is due to the MPCA within 180 days of MPCA's approval of this FS Work Plan.

7. REFERENCES

MPCA, 1998. *Draft Guidelines: Remedy Selection.* Working Draft, September 1998.

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