

**MISSOURI DEPARTMENT OF NATURAL RESOURCES
P.O. Box 176
Jefferson City, Missouri 65102**

In the Matter of:)
3M Company)
5400 Rte. B)
Columbia, MO 65205)
)
Proceeding Under the Missouri)
Hazardous Waste Management Law)
Section 260.410, RSMo)

CORRECTIVE ACTION ABATEMENT ORDER ON CONSENT

TO: 3M Company, P.O. Box 33331, St. Paul, MN 55133-3331

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SECTION I. DEFINITIONS

1. For purposes of this Order, terms used herein shall have the same meaning as those in Missouri Hazardous Waste Management Law and 40 CFR Parts 124, 260, 261, 265, 268, and 270, which are incorporated by reference in 10 CSR 25-3.260, 10 CSR 25-4, 10 CSR 25-7 and Section 260.360, RSMo, unless this Order specifically provides otherwise. Where terms are not defined in Missouri Hazardous Waste Management Law, the regulations, the Order, or EPA guidance or publications, the meaning associated with such terms shall be defined by a standard dictionary reference, or the generally accepted scientific or industry meaning of the term. Additional terms as used herein are defined as follows:
2. Area of Concern (AOC) means an area where an actual or potential release of hazardous waste or hazardous constituents, which is not from a solid waste management unit, is occurring and is determined by the Department to pose a current or potential threat to human health or the environment. Investigation and/or remediation of AOCs may be required pursuant to Sections 260.375 and 260.395, RSMo, and 40 CFR 270.32(b)(2), as incorporated by reference in 10 CSR 25-7.270(1).
3. Day shall mean a calendar day unless expressly stated to be a business day. 'Business day' shall mean a day other than Saturday, Sunday, or state holiday. In computing any period of time under this Order, where the last day would fall on a Saturday, Sunday, or state holiday, the period shall run until the end of the next business day.
4. Director shall mean the Director of the Missouri Department of Natural Resources.
5. Department shall mean the Missouri Department of Natural Resources.
6. Facility:
 - A. All contiguous land and structures, other appurtenances, and improvements on the land, used for treating, storing, or disposing of hazardous waste; and
 - B. All contiguous property under the control of the owner/operator, for the purpose of implementing corrective action under 40 CFR 264.101, as incorporated by reference in 10 CSR 25-7.264(1), and this Order.
7. Hazardous Constituent shall mean any constituent identified in Appendix VIII. of 40 CFR Part 261, as incorporated in 10 CSR 25-4.261.
8. Interim Measures or IM shall mean those actions taken to control or abate threats to human health and/or the environment, address source areas and prevent or minimize the further spread of contamination prior to the implementation of a final remedy.

9. RCRA shall mean the Solid Waste Disposal Act, as amended, 42 U.S.C. 6901, et seq. (also known as the Resource Conservation and Recovery Act).
10. 3M shall mean 3M Company, located at 5400 Rte. B, Columbia, Boone County, Missouri.
11. Solid Waste Management Unit (SWMU) shall mean any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at a Facility at which solid wastes have been routinely and systematically released.
12. Stabilization shall mean actions to control or abate threats to human health and/or the environment from releases at a Hazardous Waste Management Facility and/or to prevent or minimize the further spread of contamination while long-term remedies are pursued.

SECTION II. STATEMENT OF PURPOSE

13. In entering into this Corrective Action Abatement Order on Consent, the mutual objective of the Department and 3M is the protection of human health and the environment through the implementation of the final remedy selected by the Department as set forth in the Statement of Basis for the Facility, and the Final Remedy Decision dated March 30, 2001 in accordance with the requirements therein and the provisions set forth in this Order.

SECTION III. PARTIES BOUND

14. This Order shall apply to and be binding upon the Department and 3M, its officers, directors, employees, agents, successors and assigns, heirs, trustees and receivers acting under or on behalf of 3M.
15. 3M shall be responsible for and liable for any failure to carry out any activities required by this Order, regardless of 3M's use of employees, agents, contractors or consultants to perform such tasks.
16. No change in ownership or corporate or partnership status relating to the Facility shall in any way alter 3M's responsibility under this Order. 3M shall give written notice of this Order to any successor in interest prior to transfer of ownership or operation of the Facility (or any portion thereof) and shall notify the Department in writing 30 days prior to such transfer.
17. 3M shall provide a copy of this Order to all contractors, laboratories, and consultants retained to conduct or monitor any portion of the work performed pursuant to this Order within 14 days of the retention of such contractor and shall condition all such contracts on compliance with the terms of this Order.

18. 3M agrees to undertake all work specified in this Order.

SECTION IV. FINDINGS OF FACT

19. In addition to these findings of fact, an administrative record is maintained within the Department's files for this Facility and in support of this Order.
20. 3M is a Minnesota-based corporation that operates and conducts business in the state of Missouri. In 1970, 3M constructed the Facility to produce Fresnel lenses for use in overhead projectors. This product is still produced at the Facility. In 1972, the Scotchflex line of electrical connectors was added, and in 1973, the Micro-Interconnect Systems product line was added. Circuit board substrates were produced from 1978 to 1987. The Electronic Article Surveillance product line was started in 1987, and in 1988, the Facility began production of the Textool product line. Both of these product lines are currently in production at the Facility.
21. 3M is located approximately four miles north of Interstate 70 on Route B in Columbia, Boone County, Missouri. The 3M property is located in the Southwest ¼, Southeast ¼, Section 21, Township 49 North, Range 12 West or by the Universal Transverse Mercator coordinate system, in Boone County, Missouri, at approximately 39°00'30" north latitude, 92°16'15" west longitude. The Facility property comprises approximately 97 acres, including approximately 2590 feet of frontage along Route B.
22. During its operation, the Facility used impoundments to treat wastewater. The city of Columbia constructed the first impoundment (former northern impoundment) and started operating it in 1970. A second impoundment (former southern impoundment) was subsequently constructed adjacent to the first impoundment, and an aerator was added to the northern impoundment. The impoundments were closed in 1976 when the city of Columbia extended sanitary sewer service to the Facility.
23. In 1972, a clay-lined surface impoundment (former eastern impoundment) was constructed for process wastewater treatment. In 1974, solvent traps were added to the sewers to collect organic constituents prior to discharge to the eastern impoundment and eventually the city of Columbia's treatment system. This impoundment operated until June 1982. In August 1987, 3M received Department approval of the closure plan for the impoundment. The impoundment was then closed following the procedures and specifications contained in the approved plan. The Department received a Certification of Closure Report on December 1, 1987. The impoundment is subject to post-closure care as specified in the approved closure plan.
24. On September 26, 1990, the U.S. Environmental Protection Agency Region VII, issued an Administrative Order on Consent (EPA Order), Docket No VII-90-H-

- 0026, pursuant to RCRA Section 3008(h), directing 3M to conduct a RCRA Facility Investigation (RFI) and Corrective Measures Study (CMS).
25. Groundwater interim measures were implemented in 1990 in accordance with Task VI.A. of the EPA Order to intercept groundwater contamination coming from the source area associated with the former eastern impoundment. The interim measures consisted of groundwater extraction wells and treatment of that groundwater with granular activated carbon.
 26. The RFI concluded that three SWMUs were contaminated and could potentially act as continuing sources of significant contaminant releases to groundwater: (1) the Former Northern Municipal Treatment Pond; (2) the Former MIS Process Area; and (3) the Former Eastern Impoundment. The primary chemicals of concern at the Facility are Volatile Organic Compounds; primarily 1,1,1-trichloroethylene and 1,1-dichloroethylene. The RFI concluded that groundwater provides the only significant contamination migration route at the Facility.
 27. On April 14, 1996, verbal permission was given by the Department and EPA for the temporary discontinuation of operation of the groundwater extraction system.
 28. The CMS was approved with modification on April 6, 1998.
 29. A corrective measure consisting of the following has been selected by the Department and EPA to address the groundwater contamination at the Facility:
 - A. The final remedy for the eastern portion of the property (includes former eastern impoundment and former MIS process area) is to conduct semi-annual groundwater monitoring and implement institutional controls on the property.
 - B. In the area of the Former Northern Municipal Treatment Pond, three remedial actions will be implemented: (1) part of the former northern impoundment will be capped with a low permeability geosynthetic clay liner or asphalt; (2) groundwater will be monitored annually at monitoring wells that have yet to be installed; and (3) institutional controls will be implemented on groundwater use and soil disturbance.

SECTION V. CONCLUSIONS OF LAW AND DETERMINATIONS

30. Based on the foregoing findings of fact and after consideration of the administrative record, the Department of Natural Resources makes the following conclusions of law and determinations:
 - A. Pursuant to the authority vested in the Department of Natural Resources, this Corrective Action Abatement Order on Consent is issued to 3M Company in accordance with the Missouri Hazardous Waste Management Law, including,

but not limited to, Sections 260.350, 260.375(15), 260.394, 260.395, 260.410, 260.420, 260.425, and 260.530, RSMo.

- B. Respondent is a “person” within the meaning of Section 260.360, RSMo.
- C. Respondent is the owner or operator of a Facility that has operated or is operating subject to Section 260.395, RSMo, incorporated by reference in 40 CFR 270.70.
- D. Certain wastes and constituents found at the Facility are hazardous wastes or hazardous constituents as defined by Section 260.360, RSMo, and the regulations at 40 CFR Parts 260 and 261, incorporated by reference in 10 CSR 25-3.260 and 4.261.
- E. There is or has been a release of hazardous wastes or hazardous constituents into the environment at the Facility.
- F. The actions required by this Order are necessary to protect human health and/or the environment.

SECTION VI. WORK TO BE PERFORMED

- 31. Pursuant to Sections 260.350, 260.375(15), 260.394, 260.395, 260.410, 260.420, 260.425, 260.530, RSMo. and/or 40 CFR 264.101, as incorporated by reference in 10 CSR 25-7.264(1), 3M agrees, and is hereby ordered, to perform the following acts in the manner and by the dates specified herein.

Corrective Measures Implementation (“CMI”) Work Plan

- 32. Within 60 calendar days of the effective date of this Order, 3M shall submit a Corrective Measures Implementation (CMI) Work Plan to the Department and EPA. This Work Plan shall include a schedule for implementation of the final remedy specified in the approved CMS. The schedule shall include, but not be limited to, milestones such as submission of detailed design specifications and construction plans for approval by the Department, initiation of construction activities and projected completion of construction.
- 33. The CMI Work Plan shall outline the objectives of the final remedy and shall contain a detailed description of the design, construction, operation, monitoring, quality assurance and maintenance requirements; the site-access restrictions; deed notice/restriction requirements; an amended cost estimate to more accurately define detailed costs for design, construction, operation, maintenance and monitoring; and a detailed schedule for final remedy implementation and management of contaminated environmental media during final remedy implementation.

34. The CMI Work Plan shall address the foregoing requirements and shall include applicable CMI elements as specified in Chapter V of the EPA document entitled, RCRA Corrective Action Plan (Final), May 1994, OSWER Directive 9902.3-2A, necessary for the effective and efficient implementation of the final remedy. The CMI elements shall be consistent with the objectives specified in the approved CMS Report as follows:
- A. The Department recognizes that 3M initiated quarterly sampling of monitoring Wells 5, 10, 11 and 30S in 2000. Subsequently, due to confirmed contaminant detections in monitoring Well 10, 3M voluntarily implemented certain of the well installation requirements of the CMS in 2001 although this Order had not yet been executed. Four new monitoring Wells (44, 45, 46 and 47) were installed at the site in the fall of 2001 in accordance with a Work Plan dated October 3, 2001, which was approved by the EPA and the Department on October 19, 2001.
 - B. If a chemical listed in Table 1 (attached as Appendix A) is detected above Groundwater Protection Standards (GPS) during a single sampling event at Wells 44, 45, 46 or 47, 3M shall immediately collect and analyze another sample to confirm the result.
 - C. Within 30 days of positive confirmation of the spread of contamination on the eastern portion of the property to Well 44, 45, 46 or 47, 3M shall submit to the Department and EPA an action plan for the installation of a groundwater interceptor trench to address plume migration, or shall propose an appropriate alternative technology to contain/control the contaminated groundwater in this area.
 - D. Groundwater use restrictions shall be placed in the property chain-of-title prohibiting the installation of wells for domestic or industrial use. The CMI Work Plan shall outline the specific institutional controls that will be placed in the property chain-of-title.
 - E. In the Former Northern Municipal Treatment Pond, 3M shall: (1) cap part of the former northern impoundment; (2) monitor groundwater annually at monitoring wells that have yet to be installed; and (3) impose institutional controls on groundwater use and soil disturbance.
 - F. 3M shall cap the northern third of the northern impoundment with a low permeability geosynthetic clay liner or asphalt to reduce surface infiltration.
 - G. 3M shall install one new monitoring well west of the impoundment and one new monitoring well shall be installed to the south to monitor plume migration. These wells shall be located in the projected path of contaminant migration and shall act as a sentinel system in monitoring the further

migration of contaminated groundwater. If the GPS is exceeded at either of these sentinel wells, the sampling frequency shall be increased from annual to semi-annual.

- H. If the same chemical is detected above the GPS for three consecutive semi-annual sampling events in the same well, 3M shall submit to the Department a plan for evaluating and implementing further corrective action, including groundwater and/or soil remediation in the area of the Former Northern Municipal Treatment Pond.
 - I. The location and design of the new monitoring wells (to the west and south of the former Pond Area); specific groundwater use and soil disturbance restrictions that will be recorded in the chain-of-title for the property; and design requirements of the northern impoundment cap shall be submitted to the Department and EPA as part of the CMI Work Plan for review and approval prior to construction.
35. The Department will review the CMI Work Plan in accordance with the procedures set forth in Section IX. (Review and Approval Procedures). Upon approval by the Department, 3M shall initiate all activities detailed therein and comply with all schedules in the approved CMI Work Plan.

Construction Completion (CC) Report

36. Within 60 calendar days of completion of all construction activities associated with implementation of the final remedy, 3M shall submit a Construction Completion (CC) Report to the Department and EPA. The CC Report shall contain a summary of all corrective measure construction activities implemented at the Facility, the specific “as-built” description of the soil cover; exact locations and design of the monitoring wells and discussion of any deviations from the approved CMI Work Plan.

Site Operation, Maintenance and Monitoring Plan

37. 3M shall submit, within 60 calendar days of completion of all construction activities associated with implementation of the final remedy, a Facility Operation, Maintenance and Monitoring (OM&M) Plan. The OM&M Plan shall specify operation, maintenance and monitoring procedures for the final remedy including, at a minimum, the following information:
- A. A description of the purpose of the OM&M plan and a summary description of long-term final remedy operation, maintenance and monitoring;
 - B. Presentation and discussion of the final remedy objectives including applicable media clean-up standards;

- C. A description of the management approach to long-term final remedy implementation, including: (1) the personnel involved, their level/authority and their project-related responsibilities; (2) defining the lines of communication; and (3) qualifications of key personnel who will operate, maintain and monitor the final remedy;
 - D. Identification of equipment needed for long-term final remedy implementation;
 - E. A description of the training requirements and training process for OM&M personnel;
 - F. A description of any start-up procedures for elements of the final remedy, including any operational testing;
 - G. A description of normal operation and maintenance procedures related to the final remedy, including: (1) ongoing operational tasks; (2) ongoing maintenance tasks; (3) a description of applicable treatment or operational conditions; and (4) a schedule showing the frequency of each OM&M task.
 - H. An inspection and/or replacement schedule for final remedy equipment and components;
 - I. A discussion of surface water drainage in and around the areas addressed by the final remedy including how long-term precipitation runoff will be managed;
 - J. A description of the process for evaluating the long-term effectiveness of the final remedy including determining when the corrective measures have achieved media clean-up goals criteria (e.g., GPS has been met); and
 - K. A description of the procedures to address any breakdown of or operational problems with the final remedy including a list of redundant and emergency back-up equipment and procedures.
38. The site OM&M Plan will be reviewed in accordance with the procedures set forth in Section IX. (Review and Approval Procedures). Upon approval by the Department, 3M shall implement all activities detailed therein and comply with the schedule(s) contained in the approved plan.

Corrective Measures Completion (CMC) Report and Certification of Completion of Corrective Measures

39. Within 60 calendar days of completion of all corrective measures (i.e., all media protection/clean-up standards are met and all related corrective action activities are

- complete), 3M shall submit a CMC Report to the Department and EPA. The CMC Report shall contain a summary of corrective measures activities conducted at the Facility, including any long-term operation, maintenance and monitoring program associated with the corrective measures. In addition to summarization in the CMC Report, the completion of any short-term corrective action activities shall be reported in the Semi-Annual Groundwater Monitoring Reports required by Paragraph 62. of this Order. 3M shall provide, in the CMC Report comprehensive information demonstrating that all applicable clean-up standards have been met and all corrective activities are complete. This demonstration will form the primary basis of support for any subsequent determination by the Department that no further corrective action is required and that this Order may be terminated.
40. To verify completion of corrective measures at the Facility, 3M shall demonstrate in the CMC Report that groundwater contaminant levels have not exceeded the applicable GPS maximum concentration limits specified in Table I for a period of three consecutive years. 3M may demonstrate, in accordance with applicable regulations and guidance, that alternate concentration limits (ACLs) for groundwater are protective of human health and the environment. This ACL demonstration may be incorporated in the CMC Report and may be used to demonstrate the completion of corrective measures for groundwater. Any petition to modify approved GPS would require the proposed modification to be subject to public notice and comment prior to approval by the Department. 3M's facility-wide groundwater corrective action program shall continue until such time as 3M makes a successful groundwater demonstration. 3M may request discontinuation of groundwater corrective action in specific areas of the Facility prior to any facility-wide demonstration if it can be demonstrated that the three-year criterion has been met in those specific areas. 3M's groundwater corrective action program may cease upon written notification by the Department that the three-year criterion has been met.
 41. The CMC Report will be reviewed and approved in accordance with the procedures set forth in Section IX. (Review and Approval Procedures).
 42. Within 60 calendar days of receipt of Department approval of the CMC Report documenting completion of all corrective action, 3M shall submit to the Department and EPA, by certified mail, a written certification stating that the remedy has been completed in accordance with the approved CMS Report, CMI Work Plan and/or other plans or specifications approved by the Department. The certification shall be signed by 3M and an independent professional engineer registered in the state of Missouri.

Deed Restriction Requirements

43. Within 60 calendar days of the effective date of this Order, 3M shall submit to the Department for approval, two figures illustrating the boundaries for which levels of contamination in the subsurface soils and groundwater exceed background concentrations. Figures showing the areal extent of soil contamination in five-foot

- depth intervals shall be provided to the Department. The other figure shall illustrate the areal extent of groundwater contamination. These figures shall be to scale and indicate the horizontal boundaries of soil and groundwater contamination with respect to key landmarks, including the boundaries of the former impoundments.
44. Within 60 calendar days of the effective date of this Order, 3M shall submit to the Department for approval, a restrictive covenant to be recorded in the chain-of-title for the 3M property that specifies the types and locations of hazardous wastes and/or hazardous constituents remaining above background concentrations in the subsurface soils and groundwater. The restrictive covenant shall prohibit disturbance of the capped former impoundments and any other areas in which soils are contaminated above background levels outside of the capped areas. The restrictive covenant shall also prohibit: (1) use of groundwater for drinking or other domestic and non-domestic purposes; (2) any artificial penetration of the groundwater-bearing unit(s) containing contaminants which could result in cross-contamination of clean groundwater-bearing units, unless such penetration is necessary for corrective action purposes and has been approved in advance by the Department; and (3) installation of any new groundwater wells on the property, except those used for investigation and/or remediation purposes.
 45. Within 30 calendar days of the Department's approval of the figures required by paragraph 43 and the restrictive covenant language required by paragraph 44, 3M shall record, in accordance with state law, the approved figures and restrictive covenant in the chain-of-title for the Facility property.
 46. Within 15 calendar days of recording the information required by paragraph 45, 3M shall provide a notarized statement to the Department certifying that the information specified in paragraph 45 has been recorded. A copy of all information placed in the chain-of-title for the Facility property shall accompany the notarized certification statement.

Financial Assurance for Corrective Action

47. Within 120 days of approval of the CMI Work Plan required by this Order, 3M shall demonstrate compliance with the financial assurance requirements in effect at that time for corrective action performed under state law for any SWMU, AOC or release. Financial assurance is only required for that portion of the final remedy that is estimated, in the approved CMS Report and/or CMI Work Plan, to require greater than 12 calendar months from the effective date of this Order to complete (i.e., long-term groundwater monitoring, site-security, cap maintenance, etc.)
48. The financial assurance requirements for corrective action shall be consistent with and/or substantially equivalent to those specified in 40 CFR Part 264 Subpart H, as incorporated by reference in 10 CSR 25-7.264. The amount of financial assurance shall be based on 3M's amended cost estimate for the final remedy as contained in the CMI Work Plan.

49. Annually, by March 1, 3M shall adjust the corrective action cost estimate to account for inflation in accordance with 40 CFR 264.142(b) and any other changes in the costs associated with implementation, operation, maintenance and monitoring of the final remedy. If the cost estimate increases, documentation of adequate financial assurance for that increase shall be provided to the Department within 60 calendar days following the increase in the cost estimate.

Quarterly Progress Reports/Semi-Annual Groundwater Reports

50. 3M shall submit to the Department and EPA signed quarterly progress reports summarizing corrective action activities undertaken during each calendar quarter. Each quarterly progress report shall be submitted within 60 calendar days of the last day of each reporting period (e.g., March 1, June 1, September 1, and December 1).
51. The first quarterly progress report shall be due within 60 calendar days of the end of the calendar quarter in which this Order becomes effective. The quarterly progress reports shall continue to be submitted until such time as 3M's CMI construction activities are complete and the CC Report specified in paragraph 36 has been submitted. Thereafter, any corrective action progress updates may be submitted as part of the Semi-Annual Groundwater Reports required by Section VII. of this Order. The quarterly progress reports shall include the following information for the time period being reported:
- A. A description of the work completed;
 - B. Summaries of all findings, including summaries of laboratory data;
 - C. Summaries of all problems or potential problems encountered during the reporting period and actions taken to rectify any problems;
 - D. Projected work for the next reporting period; and
 - E. Any instances of noncompliance with the requirements of this Order.
52. Detailed technical information shall be submitted as part of the Semi-Annual Groundwater Report and/or other reports (CC Report) required by this Order. This detailed information need not be reproduced as part of 3M's Quarterly Progress Reports.
53. Copies of other reports (e.g., inspection reports), information or data shall be made available to the Department and EPA upon request. 3M shall maintain all raw data, such as laboratory reports, drilling logs, bench-scale or pilot-scale data and other supporting information gathered or generated during activities undertaken pursuant to this Order during the term of this Order.

SECTION VII. GROUNDWATER MONITORING

54. The Groundwater Protection Standard (GPS) establishes the maximum concentration limits for hazardous constituents in the groundwater at the Facility. The hazardous constituents and maximum concentration limits specified in Table I constitute the GPS for the 3M Facility.
55. The maximum concentration limits for the GPS hazardous constituents listed on Table I are based on protection of human health and the environment and were derived from several different sources as explained by the footnotes to Table I.
56. 3M's groundwater corrective action program shall continue until the GPS maximum concentration limits established in Table 1 have not been exceeded for a period of three (3) consecutive years. The corrective action program shall address any hazardous constituents above the GPS maximum concentration limits listed in Table 1 that are reasonably expected to be in or derived from waste disposed of at the Facility.
57. During the term of this Order, 3M may, at any time, make a demonstration to the Department supporting establishment of Alternate Concentration Limits (ACLs) in lieu of the GPS maximum concentration limits specified herein. Any such demonstration shall ensure that any and all ACLs proposed in lieu of the GPS maximum concentration limits are protective of human health and the environment in accordance with the requirements of 40 CFR 264.94(b). In proposing an ACL(s), 3M shall consult EPA's Alternate Concentration Limit Guidance, Interim Final, OSWER Directive 9481.00-6C, July 1987, and shall formally address those factors bearing on establishment of an ACL(s) as listed in 40 CFR 264.94(b)(1) and (2). Any ACL proposal by 3M will be reviewed and approved in accordance with the procedures set forth in Section IX. (Review and Approval Procedures).
58. 3M shall comply with that portion of 40 CFR 264.97, as incorporated by reference in 10 CSR 25-7.264(1), applicable to monitoring programs conducted in accordance with 40 CFR 264.100. The Department recognizes that the RFI for the Facility has been completed and was approved by the EPA in 1995. However, the Department and 3M recognize that depending upon the conditions encountered during the implementation of this Order, there may be a need to conduct additional site investigations. In the event such a situation were to occur, 3M will comply with the following requirements:
 - A. 3M's groundwater monitoring systems shall be designed, installed, operated and maintained during the term of this Order in a manner that ensures:
 - (1) detection and/or delineation of the horizontal and vertical extent of groundwater contamination (including beyond the Facility property boundary, if necessary);
 - (2) determination of representative concentrations of hazardous constituents and/or contaminant plume indicator parameters in the

groundwater; and (3) 3M's ability to determine the effectiveness of the groundwater corrective action program in terms of contaminant removal, destruction and/or containment.

- B. During the term of this Order, the number, location and depth of the monitoring wells shall be sufficient to define the horizontal and vertical extent of groundwater contamination beneath 3M's property and beyond the Facility property boundary. If, at any time during the term of this Order, 3M or the Department determines that the existing monitoring system fails to define the horizontal and/or vertical extent of groundwater contamination, 3M shall submit, within 30 days of such determination by 3M or receipt of written notification by the Department, a proposal for the installation of additional monitoring wells to define such extent.
- C. At such time as the Department determines that 3M has adequately redefined the horizontal and/or vertical extent of groundwater contamination, the wells defining such extent shall be incorporated into and designated for continued monitoring in 3M's Groundwater Sampling and Analysis Plan (SAP). The Department will notify 3M of this determination in writing. Within 30 days of receipt of this notification, 3M shall submit appropriate Groundwater SAP revisions to the Department's Hazardous Waste Program.
- D. Any new groundwater monitoring well(s) installed by 3M to meet the requirements of this Order shall be designed and constructed in accordance with the requirements of 40 CFR 264.97, 10 CSR Chapter 4 of the Monitoring Well Construction Code of the Missouri Well Construction Rules, and/or well-specific plans and specifications approved by the Department. 3M shall submit to the Department's Hazardous Waste Program a copy of the well certification report form and the resulting certification acceptance required by 10 CSR 23-4.020 for any new monitoring wells installed pursuant to this Order. This information shall be reported as part of the Semi-Annual Groundwater Corrective Action Reports required by paragraph 60 of this Order.
- E. Plugging and abandonment of any groundwater monitoring well(s) operated by 3M pursuant to the requirements of this Order shall meet the requirements of 10 CSR 23-4.080.
 - 1. 3M shall submit to the Department's Hazardous Waste Program a copy of the well registration report form and resulting registration acceptance required by 10 CSR 23-4.080 for any monitoring wells plugged pursuant to this Order. This information shall be reported as part of the Semi-Annual Groundwater Corrective Action Reports required by paragraph 60 of this Order.

2. At such time as 3M's well registration has been accepted by the Department's Geologic Survey and Resource Assessment Division (GSRAD), the plugged wells shall be removed from 3M's Groundwater SAP. Within 30 days of GSRAD's registration acceptance, 3M shall submit appropriate Groundwater SAP revisions to the Department's Hazardous Waste Program.
- F. 3M shall contact the Department at least five working days prior to conducting any field work associated with the construction or modification of the groundwater monitoring system required by this Order. The Department shall then have the option of observing any portion of the system's construction or modification.
- G. 3M shall revise and resubmit for Department approval the Groundwater SAP for the Facility within 60 days of the effective date of this Order to reflect the additional requirements contained in this Order that are not addressed in 3M's April 3, 1992, Groundwater SAP. All Groundwater SAP procedures and techniques used in groundwater sampling, analysis and measurement of groundwater-related parameters shall be designed to meet the requirements of 40 CFR Part 264 Subpart F, as incorporated by reference in 10 CSR 25-7.264(1), and this Order. 3M's sampling, analysis and measurement protocols shall ensure the representative nature of all analysis and measurement results. The revised Groundwater SAP will be reviewed and approved in accordance with the procedures set forth in Section IX. (Review and Approval Procedures).
- H. A monitoring well inspection and maintenance program shall be implemented during the term of this Order. This program shall be designed to ensure the long-term structural integrity of all monitoring well installations. 3M's revised Groundwater SAP shall include the details of this program and address the following requirements:
1. Surface well integrity inspections shall be performed at the time of each sampling event and shall be documented on an inspection log sheet. Surface integrity evaluations for each monitoring well shall include a visual inspection of the outer protective casing, inner casing riser, surface well seal, well cap and locking mechanism to document any damage or deterioration. The ground surface in the immediate vicinity of each monitoring well and the annular space between the outer protective casing and casing riser shall be inspected for visible anomalies (e.g., collection or ponding of water, ground subsidence, etc.)
 2. Subsurface well inspections shall be performed annually in all wells, in accordance with the provisions contained in 3M's revised Groundwater SAP and shall be documented on a well inspection log

sheet. The following methods can be used to conduct subsurface well integrity inspections: total well depth measurements; groundwater turbidity measurements; in-situ hydraulic conductivity tests; casing caliper logs; down-hole television camera surveys and/or other methods capable of verifying the subsurface integrity of the well casing and screen.

3. 3M's revised Groundwater SAP shall specify performance of an annual wellbore siltation evaluation to assess downwell siltation and well screen occlusion in all monitoring wells. This evaluation shall be designed to ensure the representative nature of 3M's groundwater sample analysis and field measurement results through minimization of sampling and measurement interferences (e.g., turbidity, excessive well screen occlusion, etc.).
 4. 3M's revised groundwater SAP shall specify a well redevelopment trigger criterion based on a percentage of well screen occlusion and the potential of such occlusion to compromise the representative nature of 3M's groundwater sample analysis and field measurement results. Wells demonstrating well screen occlusion equal to or in excess of the selected criterion shall be redeveloped prior to the next scheduled sampling event.
 5. Any necessary monitoring well repairs shall be undertaken within 30 days of identification of any surface or subsurface well integrity problem. If adverse weather or site conditions preclude 3M from gaining access to and repairing the affected monitoring wells within 30 days, then 3M shall take appropriate action with respect to this requirement as soon as practicable. Written justification for any delay, completed well inspection log sheets, a narrative description of any well repairs and before and after photographic repair documentation (in the case of visible surface well repairs) shall be provided to the Department as part of the Semi-Annual Groundwater Corrective Action Reports required by paragraph 60.
59. 3M shall perform groundwater sampling/analysis and field measurements of groundwater-related parameters to monitor releases from the former impoundments in accordance with the most recent Department-approved Groundwater SAP.
- A. Sampling and analysis in accordance with any revised Groundwater SAP shall begin during the next regularly scheduled sampling event following approval of the revised Groundwater SAP. Given the potential lag time between the effective date of this Order and approval of the revised Groundwater SAP, 3M shall continue sampling and analysis in accordance with the latest Department-approved version of 3M's Groundwater SAP until such time as the revised Groundwater SAP is approved.

- B. Sampling and analysis of groundwater from any new wells installed pursuant to this Order shall be performed no later than the next regularly scheduled sampling event following their installation.
 - C. Field parameter values measured and reported by 3M shall be representative of stabilized well conditions. Downwell measurement of Non-Aqueous Phase Liquid (NAPL) thickness (when applicable), static water level and total well depth shall be taken prior to well purging. Specific conductance, pH and temperature measurements reported to the Department shall be those taken immediately following well purging. Additional field parameter measurements, such as those taken to verify the adequacy of well purging, shall be recorded in the field logbook.
 - D. If sampling of wells identifies hazardous constituents in the groundwater that are not currently specified in the GPS, 3M may resample the groundwater in accordance with 40 CFR 264.99(g). If 3M's subsequent groundwater analyses confirm the presence of additional hazardous constituents or contamination indicator parameters, then 3M shall add the confirmed hazardous constituent(s) or contamination indicator parameter(s) to the GPS (Table I) and the monitoring program specified in the Groundwater SAP.
 - E. Any future changes to the list of wells established in 3M's revised Groundwater SAP shall be approved in writing by the Department in accordance with Section IX. Within 30 days of receipt of this approval, 3M shall submit additional Groundwater SAP revisions to incorporate the approved changes.
60. 3M shall prepare and submit, on a semi-annual basis for the preceding calendar half-year, Groundwater Corrective Action Reports providing a comprehensive evaluation of the Facility-wide groundwater corrective action program. 3M's Semi-Annual Groundwater Corrective Action Reports shall be submitted to the Department by September 1 and March 1 for each preceding calendar half-year.
61. 3M's Semi-Annual Groundwater Corrective Action Reports shall contain a narrative discussion of the nature and evolution of 3M's groundwater corrective action program as well as conclusions concerning the overall adequacy of the program as related to its intended purpose. Any conclusions concerning inadequacies in 3M's groundwater corrective action program shall be accompanied by a discussion of proposed remedies. Specific details concerning any proposed remedies will be further developed outside of the scope of these reports and/or as otherwise specified in this Order.
62. The Semi-Annual Groundwater Corrective Action Reports shall comprehensively address all of the technical requirements of 40 CFR Part 264 Subpart F and this Order. 3M shall summarize relevant groundwater monitoring information and shall present this information in the form of narrative discussions, groundwater flow

- calculations and/or diagrammatic illustrations (i.e., tabular groundwater and statistical data summaries, hydrogeologic and potentiometric contour maps/cross sections, chemical parameter trend graphs, calculated rate(s) of contaminant migration, contaminant isoconcentration maps/cross-sections, fence/isometric diagrams, groundwater flow nets, etc.), as appropriate.
63. 3M's Semi-Annual Groundwater Corrective Action Reports shall evaluate the effectiveness of the groundwater corrective action program, including, but not limited to the following:
- A. The rate and direction of groundwater movement in the affected aquifer(s) and the potential effects on any corrective measures being designed or implemented at the Facility for removal, containment or control of the groundwater contaminant plume(s).
 - B. The horizontal and vertical extent and concentrations of hazardous constituents (Table I) in groundwater throughout the contaminant plume(s) as evaluated from the data obtained from 3M's groundwater monitoring program.
 - C. Any surface and/or subsurface well integrity problems and their potential or actual influence on the groundwater data or efficiency of the groundwater corrective action program.
 - D. The quantity of NAPL's and/or groundwater extracted from the subsurface as part of operation of the groundwater remedy, any pilot studies or interim measures/stabilization activities and/or as part of 3M's groundwater monitoring program.
 - E. A summary of the analytical results from groundwater monitoring conducted during the reporting period including discussion of any groundwater-related findings, trends or conclusions bearing on the efficacy of the groundwater corrective action program.
64. 3M shall submit to the Department, in the Semi-Annual Groundwater Corrective Action Reports, detailed boring logs for any new exploratory borings and/or detailed as-built monitoring well diagrams for any new monitoring wells installed during the corresponding reporting period.
65. 3M shall submit to the Department, in the Semi-Annual Groundwater Corrective Action Reports, a copy of all original, uninterpreted laboratory analytical results for groundwater samples analyzed during the preceding calendar half-year. The Semi-Annual Groundwater Corrective Action Reports shall also include 3M's field parameter measurement results, a copy of all field sampling and well inspection log sheets, well repair documentation, QA/QC data and any other relevant groundwater-related information.

SECTION VIII. CONTINGENT CORRECTIVE ACTION

Notification Requirements for, and Assessment of, Newly-Identified SWMUs/AOCs and Releases

66. 3M shall notify the Department and EPA in writing of any newly-identified SWMU(s)/AOC(s) or releases identified subsequent to the issuance of this Order no later than 15 calendar days after discovery. A newly-identified SWMU or AOC is one that has not been previously identified and has been discovered during the course of groundwater monitoring, field investigation, environmental auditing or other activities.
67. After review of the information provided under paragraph 66 and/or discussion with 3M, the Department may require an Assessment Work Plan for conducting an investigation of any newly-identified SWMU(s)/AOC(s) or releases. Within 60 calendar days after receipt of the Department's request for an Assessment Work Plan, 3M shall submit an Assessment Work Plan which shall include a discussion of past waste management practices at the unit, as well as a sampling and analysis program for groundwater, land surface and subsurface strata, surface water and/or air, as necessary to determine whether a release of hazardous waste, including hazardous constituents, from such unit(s) has occurred, or is occurring. The sampling and analysis program shall yield representative samples and shall include monitoring parameters sufficient to assess the release of hazardous waste and/or hazardous constituents to the environment. The plan shall contain a schedule for implementation of the work to be conducted thereunder, which shall be linked to Department approval of the plan. The Assessment Work Plan shall specify any data to be collected to provide for a complete Assessment Report, as specified below.
68. The Assessment Work Plan will be reviewed in accordance with the procedures set forth in Section IX. (Review and Approval Procedures). 3M shall implement the approved plan in accordance with the schedule contained therein.
69. 3M shall submit an Assessment Report to the Department and EPA according to the schedule specified in the approved Assessment Work Plan. The Assessment Report shall present and discuss the information obtained from implementation of the approved Assessment Work Plan. At a minimum, the Assessment Report shall provide the following information for each newly-identified SWMU, AOC and/or release, as appropriate:
 - A. The location of the newly-identified SWMU, AOC or release in relation to any other SWMUs/AOCs;
 - B. The type and function of the unit;

- C. The general dimensions, capacities, and structural description of the unit or release;
 - D. The period during which the unit was operated or the release is suspected to have occurred;
 - E. The physical and chemical properties of all wastes that have been or are being managed at the SWMU/AOC, to the extent available;
 - F. The results of any sampling and analysis conducted;
 - G. Past and present operating practices;
 - H. Previous uses of the area occupied by the SWMU, AOC or release;
 - I. Amounts of waste handled; and
 - J. Drainage areas and/or drainage patterns near the SWMU(s), AOC(s) or releases.
70. The Assessment Report will be reviewed in accordance with the procedures set forth in Section IX. (Review and Approval Procedures). Based on the findings of this report, the Department will determine the need for further investigation, including stabilization, a RCRA Facility Investigation (RFI), and/or a Corrective Measures Study (CMS), at specific unit(s) identified in the Assessment Report.
71. If the Department determines that additional investigation is necessary, the Department will notify 3M in writing as to the nature of the additional investigation and the basis for its determination. 3M shall submit a Work Plan, within 30 calendar days of the date it receives the determination, for additional investigation, which shall be reviewed and approved in accordance with the procedures set forth in Section IX. (Review and Approval Procedures). The plan shall contain a schedule for implementation of the work to be conducted thereunder, which shall be linked to Department approval of the plan. 3M shall implement the approved plan in accordance with the schedule contained therein.

Interim/Stabilization Measures (ISMs)

72. If 3M becomes aware of a situation that may require ISMs to protect human health and the environment, 3M shall notify the Department and EPA within 24 hours of the time 3M becomes aware of the situation.
73. If, during the course of any activities initiated under this Order, and/or after review of the available data and/or discussions with 3M, 3M or the Department determines that a release or potential release of hazardous waste, including hazardous

- constituents, poses a threat to human health or the environment, the Department may require ISMs to slow or stop the further spread of contamination until final corrective action measures can be implemented.
74. 3M shall submit an ISM plan within ten calendar days of notification by the Department that an ISM is required. The ISM plan shall propose the specific action(s) to be taken to implement ISMs and the schedule for such implementation. Any such proposal shall be reviewed and approved in accordance with the procedures set forth in Section IX. (Review and Approval Procedures). If the Department independently determines the specific action(s) that shall be taken to implement ISMs and the schedule for such implementation, the Department will inform 3M of its decisions regarding the action(s)/schedule in writing.
75. If, at any time, 3M determines that the ISM program is not effectively limiting or stopping the further spread of contamination, 3M shall notify the Department and EPA in writing no later than ten calendar days after such a determination is made. The Department may require that the ISM program be revised to make it effective in limiting or stopping the spread of contamination, or that final corrective action measures are necessary to remediate the contaminated media.
76. In cases where releases or potential releases present minimal human and environmental exposure concerns and/or the proposed remedial solution is relatively uncomplicated, 3M may propose ISMs for review and approval by the Department. These ISMs shall be consistent with and may supplement and/or satisfy the requirements for a final remedy(s) in specific areas. Proposed ISMs that are determined by the Department to be significant (e.g., those which are anticipated to comprise a substantial portion of a final remedy) shall be subject to public notice and comment prior to final approval by the Department.

SECTION IX. REVIEW AND APPROVAL PROCEDURES

77. Following submission of any plan or report required by this Order with the exception of the quarterly progress reports and semi-annual groundwater reports, the Department will review and either approve or disapprove the plan or report in writing. It is specifically agreed that any time periods or schedules are extended by the amount of time which the Department requires for review and approval of 3M submissions and/or data and that, should review and approval take longer than expected, the schedule date(s) applicable to 3M will be adjusted accordingly, and no stipulated penalties will apply to such review period delays, if any.
78. If the Department does not approve the plan or report, the Department will notify 3M in writing of the plan's or report's deficiencies, specifying a due date for submission of a revised plan or report.

79. If the Department does not approve the revised plan or report, the Department will work informally with 3M to resolve the remaining deficiencies or issues. If these informal efforts prove unsuccessful, the Department may modify the plan or report and notify 3M in writing of the modifications. The plan or report as modified by the Department shall be the approved plan or report. If 3M disagrees with any Departmental plan or report modifications and any dispute is not resolved informally, the dispute shall be handled pursuant to Section XVIII. (Dispute Resolution) of this Order.

SECTION X. ADDITIONAL WORK

80. The Department may determine that certain tasks, including investigatory work, engineering evaluation, or procedure/methodology modifications are necessary in addition to, or in lieu of tasks included in any Department-approved work plan, when such additional work is necessary to protect human health or the environment.
81. If the Department determines that additional work is necessary, the Department will notify 3M in writing as to the nature of the additional work and the basis for its determination.
82. If required by the Department, 3M shall submit to the Department for review and approval a Work Plan for any such additional work. Such Work Plan shall be submitted in accordance with the time frame specified in the notification letter, unless a longer period of time has been agreed to in writing by the parties. All additional work performed by 3M pursuant to this paragraph shall be performed in a manner consistent with this Order and any applicable provisions of such approved Work Plans.
83. If the Parties are unable to reach agreement, either Party may invoke the provisions of Section XVIII. (Dispute Resolution).

SECTION XI. QUALITY ASSURANCE

84. Throughout all sample collection and analysis activities, 3M shall use EPA-approved quality assurance, quality control and chain-of-custody procedures as specified in approved Work Plans. In addition, 3M shall:
- A. Ensure that laboratories used by 3M for analysis perform such analyses according to the EPA methods included in the most current version of Test Methods for Evaluating Solid Waste (SW-846) or other methods acceptable to the Department. If methods other than EPA-approved methods are to be used, 3M shall submit all protocols to be used for analysis to the Department for approval prior to their use.
 - B. Ensure that laboratories used by 3M for analysis participate in a quality assurance/quality control program equivalent to that followed by the

Department's Environmental Services Program (ESP). As part of such a program, and upon request by the Department, such laboratories shall perform analyses of samples provided by the Department's ESP to demonstrate the quality of the analytical data.

- C. Inform the Department's Project Coordinator at least 15 calendar days in advance of sampling which laboratories will be used by 3M.

SECTION XII. SAMPLING

- 85. All results of sampling, tests, modeling or other data (including uninterpreted data) generated by 3M, or on 3M's behalf, during implementation of this Order, shall be submitted to the Department after sampling, tests, modeling or other data have been verified by 3M's quality assurance/quality control procedures. The Department will provide 3M with copies of all Department-generated sampling, tests, modeling, and other data (including uninterpreted data) collected in conjunction with this Order after the results have been verified by the Department's quality assurance/quality control procedures.
- 86. 3M will orally notify the department at least 15 calendar days prior to conducting field events as described in the work plans submitted pursuant to this Order. At the Department's oral or written request, or at the request of the Department's authorized representative, 3M shall allow the Department, or its authorized representatives, to split or duplicate samples collected by 3M in implementing this Order.

SECTION XIII. ACCESS

- 87. The Department and its authorized representatives shall have access to the Facility for the purpose of reviewing 3M's progress in carrying out the provisions of this Order, including, but not limited to, inspecting and copying records, collecting samples and verifying data.
- 88. To the extent that work required by this Order must be performed on property not owned or controlled by 3M, 3M shall write to the property owner requesting access to the property. The request shall be sent by certified mail, return receipt requested, with a copy to the Department. 3M shall obtain site access agreements with the owners of such property prior to work plan approval for off-site work for which site access is required.
- 89. 3M shall use its best efforts to gain access for off-site work. "Best Efforts" shall include sending the letter described above in paragraph 88 and agreeing, upon request, to provide splits or duplicates of all samples collected on the property and the results of all analyses for samples collected on the property.

90. In the event that access agreements are not obtained, 3M shall notify the Department in writing, within 15 calendar days of the failure to obtain access. 3M shall indicate both the lack of agreement and the efforts made to obtain access. The Department may, as it deems appropriate, assist 3M in obtaining access. In the event that the Department obtains access, 3M shall undertake the Department-approved work required by this Order on such property. Nothing in this Order shall limit or otherwise affect the Department's rights of access and entry.
91. In the event 3M's best efforts fail to result in an executed access agreement, 3M shall, on an annual basis, contact the property owner attempt to obtain access as specified above.

SECTION XIV. RECORD PRESERVATION

92. 3M shall preserve all final documents relating to work performed under this Order for ten years following completion of the removal actions required by this Order. At the end of this ten-year period and at least 90 calendar days before any document is destroyed, 3M shall notify the Department that such documents are available to them for inspection, and upon the request of the Department, shall provide the originals or copies of non-privileged documents to the party requesting the documents. In addition, 3M shall provide non-privileged documents retained under this section at any time before expiration of the ten-year period at the written request of the Department.
93. In accordance with Sections 260.430 and 260.550, RSMo, the Department will make information available to the public unless nondisclosure is requested by 3M in writing, including a justification to the satisfaction of the director that such information constitutes a trade secret or information which is entitled to confidential treatment in order to protect any plan, process, tool, mechanism or compound which is known only to the person claiming confidential treatment and where confidential treatment is necessary to protect such person's trade, business or manufacturing process, where such nondisclosure will not result in an unreasonable threat to the health of humans or other living organisms and disclosure is not required under any federal hazardous waste management act. If the Director finds the information does not warrant confidential treatment, the Director will notify 3M by certified mail. The information may be released to the public after 30 calendar days of receipt of the notice from the Director unless 3M obtains a restraining order prohibiting disclosure. Any action by the Director concerning confidential treatment may be appealed to the Hazardous Waste Management Commission pursuant to Sections 260.415 and 260.430, RSMo.

SECTION XV. PROJECT COORDINATION

94. The Department designates Ms. Julie Pearson (whose address and telephone number appear in Section XVI. [Submission/Notification] of this Order) and EPA designates

Dr. Jeff Johnson (whose address and telephone number also appear in Section XVI. [Submission/Notification] of this Order) as their respective Project Coordinators.

95. All work performed by 3M pursuant to this Order shall be under the direction and supervision of a Project Coordinator appointed by 3M who shall be qualified to supervise the activities to be performed hereunder. Prior to the initiation of work at the Facility, 3M shall notify the Department in writing of the name, title and qualifications of the Project Coordinator and of any known contractors and/or subcontractors to be used in carrying out the terms of this Order. The Department, EPA and 3M shall each have the right to change their respective Project Coordinator. 3M shall provide at least 15 calendar days written notice to the Department prior to changing its Project Coordinator. The Department and EPA will provide 3M with written notice upon any change in their designated Project Coordinators.
96. To the maximum extent practicable, all communications between 3M and the Department shall be directed among Project Coordinators. The absence of designated coordinators on the part of the Department or 3M shall not be cause for stoppage of work.

SECTION XVI. SUBMISSION/NOTIFICATION

97. Unless otherwise specified by the Department, two copies of all written reports, correspondence, notices or other submissions relating to or required under this Order shall be sent to:

Ms. Julie Pearson
Missouri Department of Natural Resources
Hazardous Waste Program
P.O. Box 176
Jefferson City, MO 65102
(573) 751-3553
or (for parcel delivery)
1738 East Elm (Lower Level)
Jefferson City, MO 65101

98. One copy of all written reports, correspondence, notices or other submissions relating to or required under this Order shall be sent to:

Dr. Jeff Johnson
RCRA Corrective Action and Permitting Branch
U.S. Environmental Protection Agency Region VII
901 North 5th Street
Kansas City, KS 66101
(913) 551-7000

SECTION XVII. RESERVATION OF RIGHTS

99. Nothing in this Order shall constitute or be construed as a release from any claim, cause of action or demand in law or equity against any person, firm, partnership or corporation for any liability it may have arising out of or relating in any way to the handling or release of any hazardous waste and/or hazardous constituent found at, taken to, or taken from the Facility.
100. Notwithstanding compliance with the terms of this Order, the Department and EPA reserve the right to take further action as necessary under the Missouri Hazardous Waste Management Law (Section 260.350, et seq., RSMo), RCRA, CERCLA or other statutory authority with respect to any conditions or releases at the Facility. The Department and EPA expressly reserve all rights that they may have to require that 3M perform tasks in addition to those detailed in this Order.
101. The Department and EPA reserve the right to take any enforcement action pursuant to the Missouri Hazardous Waste Management Law (Section 260.350, et seq., RSMo), RCRA, CERCLA, or other statutory authority or to seek other injunctive relief, monetary penalties and punitive damages for any violation of law or this Order. 3M reserves any rights it may have subject to the terms of this Order.

SECTION XVIII. DISPUTE RESOLUTION

102. This section shall apply to any dispute, disapproval, modification, determination, or other decision or directive made by the Department pursuant to this Order.
103. If 3M disagrees with any disapproval, modification, determination or other decision or directive made by the Department pursuant to this Order, 3M shall notify the Department in writing of its objections and the bases therefore within 30 calendar days of receipt of such disapproval, modification, determination, decision or directive. This notice shall set forth the specific points of the dispute, the position 3M maintains should be adopted as consistent with the requirements of this Order, the factual and legal bases for 3M's position and all matters 3M considers necessary for the Department to make a determination.
104. 3M and the Department shall have 30 calendar days from the Department's receipt of 3M's objections to attempt to informally resolve the dispute. Both parties may agree in writing to an extension of the 30 calendar day time period set forth above. If an agreement is reached on the issue in dispute, the resolution shall be reduced to writing, signed by representatives of each party and incorporated into this Order. If the parties are unable to reach agreement within the time allotted for informal negotiations, the parties will submit their positions to the Hazardous Waste Management Commission, whose decision shall be binding on the parties and whose decision shall be incorporated into this Order. The decision of the Hazardous Waste Management Commission may be appealed as allowed by law.

SECTION XIX. - FORCE MAJEURE

105. For purposes of this Order, “force majeure” means a strike or an act of God, war, riot or other catastrophe.
106. In the event that a force majeure event should arise, 3M shall use its best efforts to avoid a delay. The requirement that 3M exercise “best efforts to avoid delay” includes using best efforts to anticipate any potential force majeure event and best efforts to address the effects of any potential force majeure event: (1) as it is occurring; and (2) following the potential force majeure event such that the delay is minimized to the greatest extent practicable. Examples of events that are not force majeure events include, but are not limited to, increased cost or expense of any work to be performed under this Order or the financial difficulty of 3M to perform such work.
107. If any event occurs or has occurred that is likely to delay the performance of an obligation under this Order, whether or not caused by a force majeure event, 3M shall notify the Department by telephone within 48 hours if 3M knows that the event is likely to cause a delay. Within five calendar days thereafter, 3M shall provide in writing the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to mitigate the effect of the delay; and a statement as to whether, in the opinion of 3M, such event may cause or contribute to an endangerment to the public health, public welfare or the environment. Failure to comply with the above requirements shall preclude 3M from asserting any claim of force majeure.
108. If the Department agrees that the delay or anticipated delay is attributable to a force majeure event, the time for performance of any obligation under this Order that is directly affected by the force majeure event shall be extended by written agreement of the parties, pursuant to Section XXV. (Effective Date and Subsequent Modification) of this Order, for a period of time not to exceed the actual duration of the delay caused by the force majeure event. An extension of time for performance of the obligation directly affected by the force majeure event shall not, of itself, extend the time for performance of any subsequent obligation.
109. If the Department does not agree that the delay or anticipated delay has been, or will be caused by a force majeure event, or does not agree with 3M on the length of the extension, the issue shall be subject to the Dispute Resolution procedures set forth in Section XVIII. (Dispute Resolution) of this Order. In any such proceeding, to qualify for a force majeure defense, 3M shall have the burden of demonstrating by a preponderance of the evidence that the delay or anticipated delay has been or will be caused by a force majeure event, that the duration of the delay was or will be warranted under the circumstances, and that 3M exercised or is exercising due diligence by using its best efforts to avoid and mitigate the effects of the delay.

110. Should 3M carry the burden set forth in the previous paragraph, the delay at issue shall not be a violation of the affected obligation of this Order.

SECTION XX. DELAY IN PERFORMANCE/STIPULATED PENALTIES

111. Failure to comply with this Order within the times specified herein may result in the Department initiating court action for injunctive relief, assessment of penalties not to exceed \$10,000.00 per day for each day or part thereof noncompliance, and any other applicable remedy pursuant to Section 260.425, RSMo. Belated compliance with this Order does not preclude the Department from pursuing penalties for failure to perform the corrective action activities outlined in this Order within the times specified.
112. Requests for extensions to the compliance dates associated with this Order will be considered, and may be granted, on a case-by-case basis. Any extension request(s) must specify the proposed new compliance date and must be accompanied by an explanation of the reason for the extension. Extension requests must be received by the Department at least 15 calendar days prior to the originally scheduled compliance date.
113. 3M shall pay stipulated penalties according to the following schedule if 3M fails to comply with the terms and conditions set forth in this Order in the time and manner specified herein unless there has been: (1) a written modification of a compliance date signed by the Department; (2) a written modification of an approved work plan condition signed by the Department; (3) a force majeure event as defined in Section XIX.; or 4) a pending dispute resolution pursuant to Section XVIII. If 3M fails to comply with the compliance dates listed in Section VI. (Work to be Performed) of this Order, then the per day penalties set forth below are to be assessed beginning with the first day of noncompliance after the scheduled deadline in Section VI. (Work to be Performed) of this Order.

PERIOD OF NONCOMPLIANCE

PENALTY PER VIOLATION

First through 30 th day	-0-
31 st through 60 th day	\$500.00
61 st through 90 th day	\$1,000.00
Beyond 91 st day	\$1,500.00

114. Where a month, rather than a specific date or number of days is set forth in the Order, the compliance date, for purposes of calculating the stipulated penalties listed in this section, shall be the last day of the month. Accordingly, the first day of noncompliance, for the purposes of calculating the stipulated penalties, shall be the first day of the following month.

115. The stipulated penalties set forth in this section shall apply only to the schedules addressed in Section VI (Work to be Performed) of this Order. In no event shall stipulated penalties be due for any time period(s) of delay(s) of the Department in reviewing submittals or information from 3M.
116. All penalties set forth in this section shall begin to accrue from the date of noncompliance and shall continue to accrue through the final day of noncompliance unless otherwise determined not to accrue pursuant to other provisions contained in this Order.
117. Stipulated penalties shall continue to accrue during the formal Dispute Resolution process or any appeal. In the event 3M prevails, stipulated penalties shall not be due or owed. The Department may, in its sole discretion, waive, suspend or reduce the amount of any stipulated penalties, or the accrual of such penalties, due under this section based on equitable considerations.
118. Upon written demand from the Attorney General's Office, all payments accruing under this section shall be made by certified check made payable to the Boone County Treasurer as Trustee for the Boone County School Fund and delivered to the Attorney General of Missouri, P.O. Box 899, Jefferson City, MO 65102-0899, Attention: Ms. Shelley A. Woods, Assistant Attorney General, or designee.

SECTION XXI. NON-ADMISSION OF LIABILITY

119. The parties agree that the actions undertaken by 3M in accordance with this Order do not constitute an admission of liability by 3M. 3M agrees to comply with and be bound by the terms of this Order and the CMI Work Plan. However, 3M does not admit, and retains the right to controvert in any subsequent proceedings, other than proceeding to implement or enforce this Order, the validity of the Findings of Fact, Conclusions of Law and Determinations set forth in this Order.

SECTION XXII. OTHER APPLICABLE LAWS

120. All actions required to be taken pursuant to this Order shall be undertaken in accordance with the requirements of all applicable federal, state, and local laws and regulations. 3M shall be responsible for obtaining all federal, state or local permits necessary for the performance of the work described herein.

SECTION XXIII. SEVERABILITY

121. If any provision of this Order or the application of this Order to any party or circumstances is held by any judicial or administrative authority to be invalid, the application of such provision to other parties or circumstances and the remainder of the Order shall remain in full force and shall not be affected thereby. The parties

specifically agree that the dispute resolution procedures are integral to this Order and, that to the maximum extent permitted by law, such provisions shall remain in full force and effect.

SECTION XXIV. INDEMNIFICATION OF THE STATE OF MISSOURI

122. 3M agrees to indemnify the state of Missouri and to hold the state, its agencies, departments, agents and employees harmless from any and all claims or causes of action arising from or on account of acts or omissions of 3M, its employees, agents, servants, receivers, successors, assigns or subsidiaries in carrying out activities under the Order. The state or any agency or authorized representative thereof shall not be held as a party to any contract entered into by 3M in carrying out activities under this Order. Similarly, 3M or its agents, contractors, employees, successors and assigns shall not be held out as party to any contract entered into by the state. This indemnification provision does not apply to any persons not a party to this Order.

SECTION XXV. EFFECTIVE DATE AND SUBSEQUENT MODIFICATION

123. The effective date of this Order shall be the date upon which 3M receives the fully executed Order as evidenced by certified mail receipt.
124. All time lines for performance and compliance begin to run from the effective date of this Order.
125. This Order may be amended by mutual agreement of the Department and 3M. Any such amendments shall be in writing and shall be effective when 3M receives such fully executed amendments as evidenced by certified mail receipt. The Department's Project Coordinator shall be authorized to extend in writing any date, deadline, or schedule contained in any Department-approved work plan or report.
126. No informal advice, guidance, suggestions or comments by the Department regarding reports, plans, specifications, schedules or any other writing submitted by 3M shall be construed as relieving 3M of its obligations to obtain such formal approval as may be required by this Order.

SECTION XXVI. TERMINATION

127. The provisions of this Order shall be deemed satisfied by 3M on written notice from the Department that 3M has demonstrated that all of the terms of this Order, including any additional work as may be performed pursuant to Section X. of this Order, have been completed to the satisfaction of the Department.
128. Termination of this Order shall not, however, terminate Section XIV. (Record Preservation) and XVII. (Reservation of Rights), of this Order.

SECTION XXVII. GENERAL SITE MAPS

Figures 1 and 2 are attached as Appendix B.

SECTION XXVIII. SIGNATURE

So Ordered: DEPARTMENT OF NATURAL RESOURCES

NOV 20 2002 [Original signed by James D. Werner]

Date James D. Werner, Director
Air and Land Protection Division

[Original signed by Shelley A. Woods]

October 22, 2002
Date JEREMIAH W. ("JAY") NIXON
ATTORNEY GENERAL

Shelley A. Woods
Assistant Attorney General

3M Company

9/19/2002
Date [Original signed by R. A. Paschke]

APPENDIX A

Table 1 – Groundwater Protection Standards for the 3M Columbia Facility

Chemical Constituent	Maximum Concentration Limit (µg/l)	Regulatory Basis*
INORGANICS		
Arsenic	50	a, b
Barium	2000	a, b
Cadmium	5	a, b
Chromium	100	a, b
Copper	1300	a, b
Iron	2800	d
Lead	15	a, b
Manganese	640	d
Mercury	2	a, b
Nickel	100	a, b
Selenium	50	a, b
Silver	50	a, b
Zinc	5000	a, b
Sodium	99,750	d
Chloride	250,000	a, b
Fluoride	4000	a, b
Nitrogen, Nitrate	10,000	a, b
Sulfate	250,000	a, b
ORGANICS		
Acetone	610	c
Benzene	5	a, b
Bromodichloromethane	100	a, b
Carbon Disulfide	1000	c
Chloroethane	3.6	c
Chloroform	100	a, b
1,1-Dichloroethane	800	c
1,2-Dichloroethane	5	a, b
1,1-Dichloroethylene	7	a, b
Trans-1,2-Dichloroethylene	100	a, b
Tetrachloroethene	5	a, b
Methylene Chloride	5	a, b
Toluene	1000	a, b
1,1,1-Trichloroethane	200	a, b
1,1,2-Trichloroethane	5	a, b
Trichloroethene	5	a, b
Vinyl Chloride	2	a, b
1,4-Dioxane	6.1	e

a - Denotes limit obtained from state (10 CSR 60 Chapter 4) and federal public drinking water regulations, November 1997.

b - Denotes limit obtained from Missouri Water Quality Standards (10 CSR 20-7.031) for protection of groundwater, March 1994.

c - Denotes limit obtained for tap water from EPA Region III Risk-Based Concentration Tables, October 1999.

d - Denotes limit obtained from site-specific background concentration.

e - Denotes limit obtained for tap water from EPA Region IX Preliminary Remediation Goals, October 2004.

APPENDIX B

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