

STATE OF MISSOURI  
DEPARTMENT OF NATURAL RESOURCES

McCartahan, Governor • Stephen M. Mallwood, Director

DIVISION OF ENVIRONMENTAL QUALITY  
P.O. Box 176 Jefferson City, MO 65102-0176

May 7, 1998

CERTIFIED MAIL # Z 290 135 114  
RETURN RECEIPT REQUESTED

Mr. Mark Puett  
Mallinckrodt Chemical, Inc.  
P.O. Box 5439  
St. Louis, MO 63147

RE: RCRA Facility Investigation Work Plan, Newly-identified Solid Waste  
Management Units Report and Permit Appeal-related Comments for Mallinckrodt  
Chemical, Inc., St. Louis, Missouri, Permit #MOD096726484

Dear Mr. Puett:

The Missouri Department of Natural Resources' (MDNR) Hazardous Waste Program (HWP) has completed review of the RCRA Facility Investigation (RFI) Work Plan dated January 16, 1998. The RFI Work Plan was submitted pursuant to Corrective Action Condition V. of Mallinckrodt's Missouri Hazardous Waste Management Facility Permit (hereafter referred to as the Part I Permit) dated September 19, 1997.

As you are aware, investigations performed pursuant to the RFI Work Plan must ultimately be sufficient to address the RFI objectives contained in Corrective Action Condition VI. of the Part I Permit. In general, the RFI Work Plan satisfactorily addresses the specific elements of investigation as they relate to individual Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) identified for further investigation in the Part I Permit. There are, however, a few exceptions. Comments concerning specific technical deficiencies in the RFI Work Plan and additional requirements related to the Newly-Identified SWMUs Report are provided below under the Technical Comments heading. Of greater concern is the broader conceptual approach to site investigation proposed in the RFI Work Plan. Comments concerning this approach are also provided below. Based on the HWP's review, Mallinckrodt's RFI Work Plan is hereby disapproved until all of the following RFI-related comments are satisfactorily addressed.

As part of the review of the RFI Work Plan, the HWP also reviewed Mallinckrodt's permit appeal letter of October 20, 1997, and the associated preliminary appeal resolution proposal dated January 14, 1998. The HWP felt this review was necessary inasmuch as resolution of the appeal may bear directly on the content of the RFI Work Plan. The HWP believes that the permit appeal may still be resolved via a permit modification; however, Mallinckrodt's proposed resolution must be rejected in its current form. Specific discussion of this topic can be found below under the Permit Appeal heading.

### GENERAL COMMENTS

The HWP agrees that Mallinckrodt's screening evaluation may be limited to gathering only the information necessary to determine whether a release of hazardous waste and/or hazardous constituents has occurred at SWMUs 8, 14, 15, 20, and 27, and AOCs G and I. The RFI Work Plan must, however, acknowledge the need for further investigation, including a determination of the nature and extent of contamination at those SWMUs/AOCs demonstrating confirmed releases as a result of the screening evaluation. Mallinckrodt may wish to consider incorporation of a step-out contingency in the RFI Work Plan in the event that obvious contamination is identified in the field during the screening evaluation. This would provide Mallinckrodt with explicit flexibility, once the RFI Work Plan is approved, to make field decisions regarding additional investigation to determine the extent of any release(s) at the time they are discovered, thus minimizing the scope of further investigation required as part of implementation of a Phase II RFI Work Plan. The HWP encourages Mallinckrodt to consider establishing a step-out provision which relies on use of best professional judgement in the field to minimize the iterations necessary to complete all necessary site characterization. Once the RFI Work Plan is approved, the HWP must be consulted, if possible, prior to any significant deviations from the approved work plan. When contacted, the HWP will attempt to expedite any regulatory decisions at that time regarding additional field work proposed by Mallinckrodt.

Regardless of Mallinckrodt's initial investigation methodology, the HWP may determine that additional investigation is warranted based on the findings and/or quality of the data gathered during the SWMU/AOC screening evaluation. This must be acknowledged in the revised RFI Work Plan, including the specification that a Phase II RFI Work Plan and investigation performed thereunder may be required to satisfy the RFI objectives contained in Corrective Action Condition VI. of the Part I Permit.

## TECHNICAL COMMENTS

### Section 3.3.2, SWMU 14 and 15, page 3-4

This section indicates that in the absence of sensory evidence of contamination from the soil borings, the soil samples will be collected from a depth of five feet below ground surface at both boring locations. The HWP concurs with this approach for collecting soil samples at SWMU 14, only. Given the potential for release of contaminants at or below this depth at the SWMU 15 wastewater sump, the bottom of which is at a depth of 10 feet below ground surface, soil samples must be collected just below the level of the bottom of the wastewater sump even in the absence of sensory evidence. If evidence of a release(s) of hazardous waste or hazardous constituents is detected via field screening measurements (e.g., PID or FID readings), samples must be collected for laboratory analysis to confirm/deny the presence of a release. If the laboratory analyses confirm a release at any of the SWMUs/AOCs, additional soil and/or groundwater sampling will be required to define the vertical and horizontal extent of such contamination. As indicated above, Mallinckrodt may want to consider modifying the RFI Work Plan to specify a field contingency for further sampling in the event that obvious contamination is identified during the screening evaluation. The RFI Work Plan must, in any case, be revised to acknowledge the need for further investigation if a release(s) is discovered at the referenced SWMUs/AOCs.

### Section 3.5, Data Evaluation Protocol, page 3-8

The last two sentences of this section propose an approach for identifying areas requiring further action by comparing analytical results to site-specific industrial risk-based screening levels without identifying those levels and explaining where such levels came from or how they will be derived. It matters not, as Mallinckrodt cannot predicate completion of site characterization on industrial risk-based screening levels. Characterization using such criteria will not meet the RFI objectives contained in Corrective Action Condition VI. of the Part I Permit.

During the corrective action investigation process, risk-based "point of departure" concentrations (e.g., EPA Region III risk-based concentrations, Missouri Department of Health's proposed Any-use Soil Levels (ASLs), Proposed Subpart S Action Levels, Superfund Soil Screening Levels (SSLs)) may have utility in defining contamination "hot-spots," indicating the need for immediate stabilization or interim measures, triggering further investigation efforts and/or suggesting the need for a Corrective Measures Study (CMS). These "point of departure" concentrations should not, however, be misconstrued as contamination extent investigation criteria or default clean-up levels. If Mallinckrodt desires to clean-up to industrial levels, justification in the

form of a site-specific risk assessment will be required to ensure protection of human health and the environment. This assessment must consider and address, among other things, the nature, extent and migration potential of any released contaminants; current and future land use; plausible contaminant exposure routes, exposure scenarios and contaminant receptors; potential off-site impacts; and long-term institutional and/or engineering controls. Hence, any site-specific risk assessment will have to be based on characterization of contaminant releases to levels which are sufficient to address these issues.

As indicated above, the HWP agrees that potentially applicable "point of departure" contaminant concentrations must be considered within the context of site characterization, but not in the manner described by Mallinckrodt. In the HWP's experience, site-specific risk assessments are often initiated during the RFI; however, the information necessary to identify actual/potential exposure pathways, concentrations and receptors is often not available until the RFI is complete or nearly so. The appropriate time to comprehensively address clean-up levels, which can be based on a site-specific risk assessment, is during the evaluation of corrective measures alternatives as part of the CMS. In order for this evaluation to be valid, the site has to have been adequately characterized as to the extent of contamination, thereby enabling identification of actual/potential contaminant exposure pathways, concentrations and receptors.

#### Section 3.3.6 AOC I, page 3-6

This section indicates that the Department of Energy/U.S. Army Corps of Engineers (DOE/USACE) has investigated groundwater at the facility pursuant to their FUSRAP obligations and that the need for groundwater corrective action measures at the facility will also be evaluated under FUSRAP. As discussed previously with Mallinckrodt and as referenced in other sections of this letter, the HWP is willing to accept DOE's/USACE's groundwater-related data in partial satisfaction of the corrective action requirements of the Part I Permit. It is Mallinckrodt's responsibility to ensure that this data is integrated into the RFI Report. Mere reference to this information is unacceptable. Mallinckrodt should also recognize that DOE's/USACE's groundwater-related data, while helpful, is not expected by itself to sufficiently address the RFI objectives of Corrective Action Condition VI. of the Part I Permit.

The HWP expects Mallinckrodt to take an active role in investigating the extent of groundwater contamination at the facility outside of the FUSRAP areas (including off-site if necessary). The HWP also expects Mallinckrodt to take an active role in investigating the extent of groundwater contamination within the FUSRAP areas to the extent that chemical or radiological contamination is present which cannot be attributed to DOE's historical activities and for which DOE/USACE ultimately assumes no responsibility.

At this point, it is unclear what the division of responsibility is or will be between Mallinckrodt and DOE/USACE for chemical and/or radiological contamination of groundwater both inside and outside the FUSRAP areas. Based on review of DOE's/USACE's preliminary Summary and Analysis of the 1997-1998 Baseline Groundwater Sampling Data for the St. Louis Downtown Site dated March 1998, it is evident that substantial releases of chemical and radiological contaminants to groundwater have occurred at the facility. It is also evident that additional investigation is warranted to characterize these releases and determine whether or not they pose an actual or potential threat to human health or the environment. The RFI Work Plan must acknowledge that the groundwater-related information generated by DOE/USACE as a function of their FUSRAP obligations may be insufficient to assess the presence/absence and extent of release(s) of hazardous waste and hazardous constituents to the groundwater across the entire site. This information, at least with respect to the latest assessment, is limited to the FUSRAP areas. Again, this information may be used by Mallinckrodt for site characterization purposes and to focus any additional groundwater investigations consistent with Corrective Action Condition V.D. of the Part I Permit.

Based on review of the above-referenced DOE/USACE Summary Groundwater Report and considering the basic conceptual model of groundwater flow in similar alluvial systems, it appears that further investigation of the extent of groundwater contamination, both inside and outside of the FUSRAP areas, will be required. Inasmuch as the division of responsibility between Mallinckrodt and DOE/USACE for such investigation has not yet been fixed, the HWP is willing to defer Mallinckrodt's active investigation of the groundwater to Phase II of the RFI. The HWP would prefer that Mallinckrodt take an active role in groundwater investigation at this time including reconciliation of the division of responsibility with DOE/USACE leading to incorporation of provisions for such investigation in the revised RFI Work Plan. Mallinckrodt is advised that submission and implementation of a Phase II RFI Work Plan is a virtual certainty to the extent that Mallinckrodt chooses not to incorporate groundwater investigation provisions for non-FUSRAP areas into the revised RFI Work Plan.

To the extent that active groundwater investigation is proposed in the revised RFI Work Plan, the Health and Safety Plan contained in Volume III of the original RFI Work Plan must be revised to ensure that groundwater-related RFI activities including, but not limited to, monitoring well installation, development and sampling are conducted in a manner that is protective of human health and the environment.

Section 2.6, Potential exposure pathways and receptors, page 2-6

This section indicates that potential exposure pathways are incomplete because the ground surface at the facility is almost entirely covered by pavement/buildings and the industrialized setting does not provide habitat for living species. It would be much more appropriate to state that **exposure pathways are potentially incomplete** versus **potential exposure pathways are incomplete**. There is no technical foundation or substantive basis for the latter statement. Adequate site investigation, including determination of the nature, extent and rate of migration of released contaminants, is necessary to support any speculation that potential exposure pathways are incomplete. This is an integral part of any effort directed towards site-specific risk assessment to establish clean-up levels which are protective of human health and the environment. The HWP is aware of and has reviewed information regarding other sites in the St. Louis downtown area which, despite paving of the facility and current lack of groundwater use for drinking purposes, demonstrate significant potential for exposure to contaminants in soil and groundwater via plausible exposure pathways (e.g., subsurface utility excavations, contaminated groundwater and vapor seepage into sewers/subgrade structures and operation/maintenance of sewer pump stations and associated dewatering wells).

The HWP acknowledges that the Mallinckrodt facility is located in downtown St. Louis in an area that has been heavily industrialized for more than a century and as such is not in an environmentally "pristine" condition by any definition. Simply determining what a "naturally-occurring" condition is would be extremely difficult. However, to the extent that any release of hazardous waste and/or hazardous constituents poses an actual or potential threat to human health or the environment, it must be addressed by Mallinckrodt.

With respect to groundwater at the facility, Mallinckrodt is located on the Mississippi River floodplain. The facility is underlain by a major groundwater aquifer that extends from the northern reaches of the Mississippi River to the Gulf of Mexico. This aquifer supplies groundwater for private, public, and commercial uses throughout most of its extent. The HWP recognizes that the Mississippi River alluvial aquifer in the general vicinity of the facility is not currently used for public water supply. However, the potential for future use cannot be discounted. The quantity and general quality of the water in this aquifer is adequate and suitable for many uses. Protection of the aquifer is reasonable and must be considered given the volume and reliability of the water present. The HWP recognizes that treatment of water obtained from this alluvial aquifer may be necessary prior to consumption or other use. The extent of treatment required may be impacted by man-made influences on the aquifer. However, the fact that treatment may be necessary or that man-made impacts may have influenced the

aquifer does not justify ignoring contamination risks that would or could cause degradation of water quality beyond reasonable limits for standard treatment by a user. All investigations and corrective measures at the facility must include efforts to identify and mitigate, to the extent required for human health and environmental protection, contaminants released to the groundwater including consideration of the alluvial aquifer as a usable water supply.

Although groundwater may not be currently used as a source of drinking water, its potential use as a potable or industrial water source must be considered. The quantity of groundwater needed for public or industrial water supply is available in the alluvium at the facility. The alluvial groundwater may not be potable, but potential exposure to contaminated groundwater or contamination derived therefrom is still a real possibility. Mallinckrodt must demonstrate, through site-specific investigation, risk assessment, corrective measures and/or implementation of institutional/engineering controls, that the groundwater pathway is incomplete, the risks to human and environmental receptors are insignificant and/or that implementation of corrective measures will mitigate any significant human health and/or environmental risks that are identified.

Mallinckrodt's Assessment Report for Newly-Identified SWMUs at the Mallinckrodt St. Louis Facility dated January 20, 1998, confirms a release(s) of hazardous waste including hazardous constituents (i.e., volatile and semi-volatile organic compounds and metals) to the environment at the former tank car unloading area east of Building 63 (newly-identified SWMU 41). This confirmation is based on voluntary investigation conducted by Mallinckrodt in 1996. The HWP has determined that further investigation is warranted to define the nature and extent of releases at SWMU 41. The RFI Work Plan shall, therefore, be revised to address the nature and scope of investigation at SWMU 41.

#### PERMIT APPEAL

As to the language originally proposed in Mallinckrodt's October 20, 1997, appeal letter to resolve the issue of Mallinckrodt's versus DOE's (now including the USACE's) remediation responsibilities, this language is rejected, primarily due to use of the term "completion." Mallinckrodt would become responsible only "after completion by DOE of all remediation activities." There are no criteria to define what constitutes "completion," thus rendering this term highly subjective. There is also no discussion or acknowledgment of who would determine "completion" or how such a determination would be memorialized.

As to Mallinckrodt's appeal resolution follow-up letter of January 18, 1998, the flow chart attached to this letter does not accurately represent the HWP's vision of the corrective action process at the facility (refer to site characterization discussion under General

Comments above). Specifically, final corrective action chemical and/or radiological clean-up standards for contaminated environmental media cannot be established prior to addressing the RFI objectives (including characterization of the nature, extent, and rate of contaminant migration) contained in Corrective Action Condition VI. of the Part I Permit. During the corrective action investigation process, risk-based "point of departure" concentrations may be useful as discussed above, but should not be misconstrued as contamination extent investigation criteria or default clean-up levels. Again, if Mallinckrodt desires to clean-up to industrial levels, justification in the form of a site-specific risk assessment will be required to ensure protection of human health and the environment. This assessment must consider all relevant factors, including those outlined above.

In addition to the foregoing clean-up standards issue, the flow chart has a decision item entitled "Was there a SWMU in this area historically?" Whether there was or was not a SWMU in the area addressed by DOE/USACE is largely irrelevant from a corrective action standpoint. The Part I Permit can and does require corrective action for both SWMUs and AOCs. If a release of hazardous waste or hazardous constituents is evident, it does not matter where it came from, if such a release poses an actual or potential threat to human health or the environment.

The Permits Section understands that discussions are ongoing as to what, if any, responsibility DOE/USACE will have for sampling, analysis and/or remediation of chemical versus radiological contamination of environmental media in the FUSRAP areas. Conversely, the Permits Section understands that discussions are ongoing as to what, if any, responsibility Mallinckrodt will have for sampling, analysis and/or remediation of radiological versus chemical contamination in environmental media in the non-FUSRAP areas. Ultimately, it appears to be in Mallinckrodt's best interest to communicate with DOE/USACE to work these issues out since Mallinckrodt is liable pursuant to the Part I Permit for investigation and/or remediation of any and all releases of hazardous waste and hazardous constituents at the facility, including any which may have migrated off-site. It is Mallinckrodt's and DOE's/USACE's responsibility to discuss and come to terms as to which entity will take responsibility for chemical and/or radiological contamination in specific areas. This includes defining the transition point for these responsibilities. MDNR is not responsible for defining these responsibilities nor does MDNR anticipate being the mediator or arbitrator of any disputes between Mallinckrodt and DOE/USACE in this regard.

As stated herein and in past correspondence, MDNR agrees that there should be minimal, if any, duplicative regulatory effort in investigating and remediating the FUSRAP areas. MDNR reiterates its intention to allow DOE/USACE to discharge its investigation and remediation obligations as fully as possible pursuant to the FFA prior to requiring any additional corrective action by Mallinckrodt. However, MDNR retains



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the ability under the Part I Permit to require Mallinckrodt to perform additional corrective action in the FUSRAP areas at any time for releases of hazardous waste and/or hazardous constituents as necessary to protect human health and the environment. MDNR would have no compelling reason for triggering such action on the part of Mallinckrodt as long as the DOE/USACE effort is sufficient to address substantive corrective action requirements and the investigation/remediation process under the FFA proceeds in a timely manner. MDNR cannot stress strongly enough that Mallinckrodt and DOE/USACE must communicate and work closely to develop criteria for the transition of environmental responsibilities in the FUSRAP areas and outside of those areas to the extent that contaminant migration has occurred which could be the responsibility of DOE/USACE.

In order to address the concerns expressed by Mallinckrodt in the Part I Permit appeal and to try and avoid regulatory gridlock, the MDNR hereby proposes modifying paragraph C. under Corrective Action Condition I. of the Part I Permit as follows:

"The Permittee shall be responsible for working with the Department of Energy (DOE) and/or the U.S. Army Corps of Engineers (USACE) to define the environmental responsibilities of each agency at the facility including development of site investigation and remediation criteria. The Permittee shall be responsible for performing any necessary corrective action for any releases of hazardous waste, including hazardous constituents, to the environment attributable to SWMUs or AOCs at the facility which are not explicitly determined to be the responsibility of DOE/USACE pursuant to the Federal Facilities Agreement (FFA) between DOE and EPA dated June 26, 1990."

"Further, the Department acknowledges that there should be minimal, if any, duplicative regulatory effort in investigating and remediating the FUSRAP areas. The Department intends to allow DOE/USACE to discharge its investigation and remediation obligations as fully as possible pursuant to the FFA prior to requiring any additional corrective action in the FUSRAP areas by Mallinckrodt. The Department would have no compelling reason for triggering early action in the FUSRAP areas on the part of Mallinckrodt as long as the DOE/USACE effort is sufficient to address substantive corrective action requirements and the investigation/remediation process under the FFA proceeds in a timely manner."

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In closing, Mallinckrodt is hereby directed to submit a revised RFI Work Plan within 45 days of receipt of this letter to address the foregoing comments. MDNR also requests that Mallinckrodt respond to the MDNR's modified permit language proposal within this time frame. If you have any questions concerning this letter, the appropriate response or wish to schedule a meeting to discuss the issues identified herein, please do not hesitate to contact Richard A. Nussbaum, P.E., R.G., or Fuad Marmash, of my staff, at (573) 751-3553.

Sincerely,

HAZARDOUS WASTE PROGRAM



Cindy Kemper  
Director

CK:rnw

c: Ms. Shelley Woods, Attorney General's Office  
Mr. Bob Geller, HWP-Federal Facilities  
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bc: Rich N.  
Fuad M.