



Shaping the Future

May 17, 2013

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**Subject: Comments on Public Hearing Draft – Proposed Amendments to the
Massachusetts Contingency Plan, 310 CMR 40.0000
Cardno ATC No.: 052.75079**

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To Whom it May Concern:

Cardno ATC submits the following comments on the 2013 Public Hearing Draft - Proposed Amendments to the Massachusetts Contingency Plan (MCP). Cardno ATC is an environmental engineering firm with over thirty years of experience nationwide. Its lead LSP, Michael Gitten, is a Professional Engineer who has been the LSP of record on over 90 sites in Massachusetts. These comments are submitted by Cardno ATC as an experienced professional consulting firm addressing the issues we raise by our comments on a daily basis. In particular, Cardno ATC is offering a site-specific example regarding that illustrates some of the benefits and unintentional pitfalls that could arise from the proposed regulations.

MGL c.21e requires that sites where "No Significant Risk" has been established should be placed in Permanent Solution status. If this status cannot be achieved a Temporary Solution status is required. The Massachusetts Department of Environmental Protection's (MassDEP) stated objective of the proposed amendments is to streamline the Massachusetts Contingency Plan (MCP) compliance process and, when "No Significant Risk" is established, bring those MCP Disposal Sites quickly to Permanent Solution status. Many of the proposed amendments clearly meet this objective and we support their promulgation. Our comments focus on those proposed amendments that do not meet the MassDEP's intent or must be clarified to meet the MassDEP's objectives.

Our current work at the 190 Bridge Street, Salem Disposal Site associated with RTN 3-31129 illustrates our concerns. This RTN was assigned when a likely coal tar material, associated with a Manufactured Gas Plant ("MGP") that operated off of the property but in the area in the late 1800s, was observed in site soils. The likely coal tar material was presumptively classified as a non-aqueous phase liquid (NAPL) by MassDEP field personnel, who required notification of the presence of the coal tar observed in soil based upon their opinion that it represented an excess of 1/2 inches of NAPL. The small portion of the property where the more than 120 year old coal tar was observed is downgradient of the former MGP operation. Site assessment activities have confirmed that the assumed DNAPL material is "stable", and the coal tar is limited in extent with no current exposure pathways. Under the announced intent of the proposed amendments, this site would be an ideal candidate for achieving a Permanent Solution as it appears to meet the

requirements of No Significant Risk. However, as detailed below, without modifications to the proposed amendments this could be problematic.

This lack of a clear regulatory pathway to a Permanent Solution at this Site imposes significant economic costs on the property owner while there is no identified harm to human health or the environment due to the presence of the presumptive NAPL. We believe the comments below support achieving a Permanent Solution with Conditions at this site and other similar MCP disposal sites across the State. Such a solution implements MGL c.21E's requirements and supports the State's desire for sustainable redevelopment of Brownfield properties.

Below we provide the proposed amendments, followed by our comments and proposed revisions to the amendment language that we believe would lead to fully meeting the amendment's objectives noted in redline/strikeout. Note that all our comments relate to the "NAPL and Source Control Amendments" section of the proposed amendments.

40.0006: Terminology, Definitions and Acronyms

Proposed Amendment

Nonaqueous Phase Liquid and NAPL each means oil and/or hazardous material that is present in the environment as a separate phase liquid. The existence of NAPL in subsurface strata is indicated by its presence in a well, excavation or any other subsurface depression.

Cardno ATC Comment

We support this change with the understanding that NAPL must be observed as a liquid "in a well, excavation or any other subsurface depression" but would not include simply the presence of a liquid mixed within the soil pore space if it is not observed in a co-located groundwater monitoring well. Our understanding is consistent with the definition of "Non-Stable NAPL" found in the proposed regulation. If the MassDEP believes further clarification is required, we request that this clarification be provided by the MassDEP via the MCP Q&A vehicle.

Proposed Amendment

Conceptual Site Model or CSM means a site-specific description of how contaminants entered the environment, how contaminants have been and may be transported within the environment, and routes of exposure to human and environmental receptors that provides a dynamic framework for assessing site characteristics and risk, identifying and addressing data gaps and managing uncertainty, eliminating or controlling contaminant sources, developing and conducting response action strategies, and determining whether those strategies have been effective in achieving desired endpoints.

Non-Stable NAPL means a NAPL that is: (a) migrating along or within a preferred flow path; (b) discharging or periodically discharging to a subsurface structure, utility or surface water body; or (c) spreading or expanding laterally or vertically as a bulk fluid through or from subsurface strata.

Stable NAPL means NAPL that is not Non-Stable NAPL

Dense Nonaqueous Phase Liquid and DNAPL each means NAPL that has a specific gravity greater than one.

Light Nonaqueous Phase Liquid and LNAPL each means NAPL that has a specific gravity equal to or less than one.

Cardno ATC Comment

Overall, Cardno ATC supports the proposed new and revised definitions related to NAPL and believes they are required to provide the framework to support achieving Permanent Solution at disposal sites where NAPL is present.

By adding the CSM definition and incorporating the CSM as a requirement into various phases of MCP evaluation, this provides the avenue for the presence of DNAPL to be incorporated into the MCP process that we believe was the intent of the proposed amendment at 40.1003(5)(c). Therefore, there is no reason to incorporate a prescriptive requirement when this issue is otherwise appropriately addressed in the MCP process.

Proposed Amendment

Source of OHM Contamination means a point of discharge of OHM into environmental media and/or OHM within environmental media, that is migrating or is likely to migrate in a dissolved or vapor state or as a separate phase liquid. Sources of OHM Contamination may include, without limitation:

1. leaking storage tanks, vessels, drums and other containers;
2. dry wells or wastewater disposal systems that are not in compliance with regulations governing discharges from those systems;
3. contaminated fill, soil and sediment;
4. sludges and waste deposits; and
5. Nonaqueous Phase Liquids.

Cardno ATC Comment

We believe the above definition is overly broad and will lead to consideration of almost any contaminated media as a Source of OHM Contamination. Adopting the proposed amendment as currently drafted will lead to overly restrictive requirements for site closure, even when a condition of No Significant Risk is present. Such requirements would not be in accordance with risk-based approaches mandated by Chapter 21E. For example, almost ANY contaminated groundwater (even when these media have low contaminant concentrations below Method 1 standards, risk-based standards, AWQC, etc.) would be "OHM within environmental media" that is "migrating in a dissolved state", and therefore would be considered a "Source of OHM Contamination". This definition does not take into account attenuation that may be occurring, such as degradation, adsorption, or dispersion, or whether the contaminant levels are high enough to be a concern. The same reasoning also applies to contaminated soil gas, and to contaminated fill or soil that may be contributing to low levels of dissolved-phase or vapor-phase contamination.

Steady-state or declining concentrations of soil or soil gas contamination, even if bulk contaminated groundwater or soil gas is migrating (i.e. moving) through a site, should not be considered a "Source". We believe the existing definition at 40.1003(5) captures the true intent of the MCP by identifying a "Source" as impacting or having the potential to impact other environmental media.

We recommend that the existing definition found at 310 CMR 40.1003(5) should be retained in the new definition for "Source of OHM Contamination" as follows:

Source of OHM Contamination means a point of discharge of OHM into environmental media and/or OHM within environmental media, that is migrating or is likely to migrate in a dissolved or vapor state or as a separate phase liquid and which results or is likely to result in an increase in OHM concentration in an environmental medium. Sources of OHM Contamination may include, without limitation:

1.

40.0835(4)(e)3: Phase II Report, Environmental Fate and Transport of OHM

Proposed Amendment

40.0835(4)(e)3. an evaluation of the potential for soil, groundwater, or LNAPL to be a source of vapors of oil and/or hazardous material to indoor air of occupied structures as described in 310 CMR 40.0900;

Cardno ATC Comment

We propose the following change to the proposed amendment to reflect our other comments regarding DNAPL. We believe that by incorporating the presence of DNAPL into Phase I and II activities, it is not necessary to include the proposed amendment under 40.1003(5)(c).

40.0835(4)(e)3. an evaluation of the potential for soil, groundwater, or NAPL ~~LNAPL~~ to be a source of vapors of oil and/or hazardous material to indoor air of occupied structures as described in 310 CMR 40.0900;

40.0860: Feasibility Evaluation

Proposed Amendment

(1) The criteria described in 310 CMR 40.0860 apply to:

..... (f) evaluating the feasibility of removing LNAPL.

Cardno ATC Comment

As with Phase II Comprehensive Site Assessments, Cardno ATC believes that the above evaluation should be for all NAPL. The "Note to Reviewers" in the Proposed Amendments (top of Page 168 of Redline pdf version) seems to support this interpretation by stating "Sites with any type of NAPL must demonstrate the reduction of NAPL through remedial and/or recovery measures to reduce NAPL volumes to the extent feasible." The feasibility evaluation, as currently implemented by the regulated community and as stated in the MCP and MassDEP guidance, would include both an evaluation of technical feasibility and a cost-benefit analysis.

We recommend that the proposed amendment at 310 CMR 40.0860(1)(f) be modified as noted below:

(f) evaluating the feasibility of removing NAPL ~~LNAPL~~.

40.0996: Method 3 Upper Concentrations Limits

Proposed Amendment

In this proposed amendment, MassDEP proposes to eliminate the definition of a UCL as including NAPL in an environmental medium at a thickness of greater than 1/2-inch.

Cardno ATC Comment

Cardno ATC supports this proposed amendment as consistent with the statutory requirement of assessing significant risk.

There are many sites with non-migrating NAPL where the NAPL does not contribute significantly to elevated concentrations of OHM in soil gas or groundwater. The Disposal Site associated with RTN 3-31129 is just one example. At some sites in particular, dissolved-phase and soil gas concentrations of OHM are actually decreasing over time even with the continued presence of NAPL. In general, the mass and "thickness" of NAPL can be difficult to evaluate in the subsurface, resulting in widely varying and inconsistent assessment of these parameters. Allowing site-specific, science-based evaluation of NAPL to determine whether the NAPL itself, or constituent contaminants within the NAPL, are migrating, or is

acting as a continuing source for elevated concentrations of OHM in other media that are at a site-specific level of risk is essential to make the MCP a set of regulations that allow PRPs and LSPs to manage sites based upon identification and management of significant risk.

40.1003(5): General Provisions for Permanent or Temporary Solutions/Source Elimination or Control

Proposed Amendment

Source Elimination or Control. A Permanent or Temporary Solution shall not be achieved unless and until each Source of OHM Contamination:

- (a) for a Permanent Solution, is eliminated or controlled;
- (b) for a Temporary Solution, is eliminated or controlled, to the extent feasible.
- (c) Parties conducting response actions shall seek to eliminate each Source of OHM Contamination. In cases where such elimination is not feasible, response actions shall control each Source of OHM Contamination. For the purposes of 310 CMR 40.1003(5), control of each Source of OHM Contamination requires:
 1. the absence of unpermitted releases of OHM to the environment;
 2. the absence of any Non-Stable NAPL;
 3. the removal of any LNAPL to the extent feasible, based upon cost-benefit analysis using current LCSM principles which may include, but are not limited to, Transmissivity, Residual Saturation, and/or decline-curve analysis;
 4. the absence of any DNAPL constituent concentration greater than 1 percent of its solubility limit; and
 5. demonstration that OHM plumes in any environmental media are not expanding.
- (d) The feasibility of eliminating or controlling a Source of OHM Contamination shall be evaluated in accordance with the criteria in 310 CMR 40.0860.

Cardno ATC Comment

Cardno ATC supports the new 40.1003(5)(c)1, 2 and 5. We believe that they represent rational application of the current understanding of NAPL and its behavior in the subsurface. To clarify Requirement 5, we suggest that the phrase "emanating from an OHM source" be inserted as noted below.

Cardno ATC does not support 40.1003(5)(c)3, because it is limited to LNAPL and not NAPL in any form (LNAPL and DNAPL). In general, we note that the proposed amendments often make a distinction between LNAPL and DNAPL, often where such a distinction is not warranted. For this specific section, we believe it should be required that all NAPL be removed to the extent feasible, not just LNAPL. See Cardno ATC comment above on proposed amendment to 40.0835(4)(e)3: Phase II Report and 40.0860: Feasibility Evaluations.

Additionally, 40.1003(5)(c)4, which requires the absence of any DNAPL constituent concentration greater than 1 percent of its solubility limit is inconsistent with the statutory requirements of MGL c.21E and has unintended consequences. As it is not specifically defined, we presume that this rule refers to a contaminant concentration in the dissolved-phase in groundwater, compared to its single-compound water solubility. The literature commonly indicates that a concentration >1% of the compound solubility limit indicates a potential presence of DNAPL at a Site. But this does not indicate whether or not the DNAPL actually exists or is

controlled, simply that it may be present. And even then, it is only a qualitative guideline; a compound may be present at a concentration >1% of solubility even when no DNAPL is present. It is appropriate to use this guideline during the investigation phase of a site assessment, to evaluate the nature and extent of contamination, including whether a potential DNAPL is present. Cardno ATC supports the proposed requirement that Conceptual Site Models be developed (which by definition would incorporate the suspected or actual presence of DNAPL) and expanded language requiring assessment of NAPLs during the Phase I and Phase II phases of Comprehensive Response Actions. However, we believe that the use of this guideline as a characteristic that would unilaterally prevent achieving any type of Permanent Solution violates the overriding requirement of the MGL c.21E of managing sites according to significant risk.

We present additional supporting information for our comments below:

- > The constituents of some multi-component DNAPLs are no more toxic than constituents of some LNAPLs. Some DNAPLs and LNAPLs have the same constituents. We would not dispute that the nature and extent of DNAPL does require specific evaluation and these evaluations should be performed prior to Phase IV.
- > Dissolved-phase contaminants emanating from Stable DNAPL may not be present at a level of concern, even if they are present at a concentration greater than 1% of the compound's single-component water solubility. The "bright line" of 1% of solubility does not necessarily correspond to acceptable risk-based levels of a compound in groundwater. This relates primarily to compounds that would be part of multi-component DNAPLs such as coal tar. For instance, Cardno ATC compared 1% solubility levels for various compounds (derived from water solubility values in MassDEP Method 1 derivation spreadsheets) to the most stringent Method 1 criteria (usually, but not always, the GW-1 criteria). Most PAHs, as well as some pesticides, VOCs (including xylenes), SVOCs, and mercury, all have 1% solubility levels that are less than the most stringent Method 1 cleanup standard and in most cases drinking water standards. Such residual concentration levels clearly would not pose a Significant Risk to human health or the environment. But under the proposed amendment, such sites might not be eligible for a Permanent Solution.

If we consider a site's specific setting as it relates to groundwater categories (for instance, a site not within a GW-1 area), an even larger group of compounds fits this scenario. And if we go one step further and consider another very common situation, where a site is not within a GW-1 area and vapor studies, mitigation systems, and/or AULs have shown that vapor intrusion is not a concern, fully 74% of compounds that have Method 1 standards (excluding most metals) would have a 1% solubility level lower than the most stringent applicable standard, preventing achievement of a Permanent Solution if the currently proposed amendment is promulgated.

The Disposal Site associated with RTN 3-31129 is a specific example of where a 1% DNAPL solubility threshold could raise challenges to achieving a Permanent Solution. Anthracene, fluoranthene, phenanthrene, pyrene, and four other PAH compounds emanating from coal tar DNAPL, are present in groundwater at concentrations above the associated 1% solubility levels. For each of these compounds, the observed concentration is well below the applicable GW-3 Method 1 Standard and even the GW-1 Method 1 Standard, which are not applicable at this site. Under the proposed amendments, this finding would make this Brownfield redevelopment site, with a more than 120 year old Stable NAPL associated with a former upgradient MGP operation, potentially ineligible for a Permanent Solution. In contrast, under the currently proposed changes to the MCP, a disposal site with a Stable gasoline LNAPL, contributing higher levels of these compounds in groundwater, would be eligible for a Permanent Solution. This inconsistency alone requires a change in the proposed amendment rule.

- > Contaminants may emanate from a NAPL (either light or dense) into groundwater or soil gas at a concentration greater than 1% solubility, but biodegradation or other natural attenuation may cause the resultant plume to be stable or even diminish in size and concentration. It seems appropriate to provide a Permanent Solution to such sites where a risk assessment indicates No Significant Risk, and the plumes are not expanding.
- > Compounds with a specific gravity of greater than one do not necessarily exist as a DNAPL. Some contaminants with specific gravities of greater than one may exist in LNAPLs. For example, contaminants with a specific gravity of more than one that are more soluble in xylene than water would preferentially exist in a LNAPL with xylene and not form a DNAPL at all. Some NAPLs that are originally an LNAPL, and not subject to the proposed 1% solubility rule, might become DNAPLs over time as certain compounds attenuate through various processes (i.e., migration, volatility, dispersion, etc.). The behavior of hydrophobic contaminants becomes even more uncertain, especially when water solubilities, and other determinants of environmental fate, reach the limits of a parameter's linear extrapolation. This is especially true of some polycyclic aromatic hydrocarbons and many highly persistent chlorinated hydrocarbons (e.g. PCBs).
- > Contaminant solubility is not the only factor determining mobility in the environment for compounds that originate from DNAPLs. Contaminant mobility can also be influenced by the soil matrix, mineral composition, and presence of naturally occurring organic materials within which the DNAPL may exist. For example, some soils can render DNAPL constituents more or less mobile. Such factors contribute to the determination of whether a DNAPL compound is "controlled", but are not considered in the "less than 1% solubility" rule in the proposed MCP revisions.

To address the above concerns, we believe the following change to 40.1003(5) is necessary:

Source Elimination or Control. A Permanent or Temporary Solution shall not be achieved unless and until each Source of OHM Contamination which is resulting or is likely to result in an increase in concentrations of OHM in an environmental medium, either as a consequence of a direct discharge or through inter-media transfer of oil and/or hazardous material.

.....

(c) Parties conducting response actions shall seek to eliminate each Source of

.....

3. the removal of any ~~LNAPL~~ to the extent feasible, based upon cost-benefit analysis using current CSM principles. When LNAPL is present, this ~~which~~ may include, but are not limited to, Transmissivity, Residual Saturation, and/or decline-curve analysis;
4. demonstration that an OHM plume emanating from an OHM source in any environmental media are not expanding.
5. the downgradient leading edge of a plume of oil and/or hazardous material dissolved in and migrating with groundwater shall not, in and of itself, be considered a source of oil and/or hazardous material

Conclusions

In summary, we believe that most of the proposed MCP Amendments regarding NAPL are sound and will be useful in focusing efforts on true risks and making the MCP process more effective for many real-world sites that pose little risk but are currently prevented from achieving a Permanent Solution. However, we urge you to take into consideration the further amendments we noted above.

Massachusetts Department of Environmental Protection
May 17, 2013

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We believe that incorporating these comments into the final MCP will help ensure that the overall goal of these revisions will be met.

Sincerely,

A handwritten signature in black ink that reads 'Daniel P. White'.

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File: MCP Comments Cardno ATC