From:	Schmoller, Michael R - DNR
To:	Tinker, Steve E - DOJ; Demorett, Joe (jdemorett@madisonwater.org); Bemis, Brynn (BBemis@cityofmadison.com)
Cc:	Nehls-Lowe, Henry L - DHS
Subject:	FW: Follow-up with Madison Water Utility
Date:	Wednesday, February 26, 2014 3:24:13 PM

From: Trask (Cota), Jennine [mailto:Jennine.Trask@arcadis-us.com]
Sent: Wednesday, February 26, 2014 3:23 PM
To: Hausbeck, John (JHausbeck@publichealthmdc.com)
Cc: Schmoller, Michael R - DNR; jdemorett@madisonwater.org; Hanefeld, Linda S - DNR; Tony Koblinski; MMeunier@madison-kipp.com; Alina Walcek (awalcek@madison-kipp.com); Kubacki, Chris; Lipson, Dave; Schoen, Toni
Subject: RE: Follow-up with Madison Water Utility

As we discussed earlier this week, ARCADIS, at the request of Tony Koblinski at Madison Kipp, has prepared this email summary regarding the potential change of operation at Unit Well 8 from part time to full time.

All of the data, information, and best available science indicates that Unit Well 8 will not be impacted by PCE in groundwater at the Madison Kipp site if pumping Unit Well 8 operates 24/7 for the following reasons:

- The vertical extent of PCE has been delineated at the Madison Kipp site and is not deeper than approximately 170 feet below ground on the Madison Kipp site. The intake portion of pumping Unit Well 8 starts at approximately 280 feet below ground and, therefore, there are at least 110 feet of vertical separation between the bottom of the PCE plume and the top of the intake screen of Unit Well 8 as well as approximately 750 feet of horizontal separation.

- The intake portion of Well 8 is screened below a protective confining layer known as the "Eau Claire Shale" that is regional in extent, has a very low vertical hydraulic conductivity (0.0006 feet per day), and prevents groundwater above the confining layer from migrating vertically downward and into the deeper aquifer in which Unit Well 8 is screened. So in addition to the horizontal and vertical separation, a regional, highly competent shale/clay confining layer is present. Additional evaluation should be completed by the city to determine the extent to which the original test hole is or is not connected to Unit Well 8. If a connection exists, it is recommended that the city abandon the original test hole as a conservative measure to protect Unit Well 8.

- Pumping Well 8 24/7 will result in radial flow of groundwater from all directions toward well 8 to the extent that the vast majority (e.g., ~90%) of groundwater entering Unit Well 8 will be from other areas not associated with the Madison Kipp site.

- Moreover, because the Eau Claire Shale is absent beneath Lake Monona and because groundwater follows the path of least resistance, if Unit Well 8 pumps 24/7, then groundwater entering Unit Well 8 will likely be sourced from Lake Monona.

- The PCE source area at the Madison Kipp site (i.e., the zone with the highest PCE concentrations) will be hydraulically contained by Madison Kipp's new groundwater extraction system.

- The PCE plume has stabilized and is no longer expanding. The key controlling factors on plume stabilization are matrix diffusion, retardation, and biodegradation. So long as these mechanisms continue to operate in the subsurface, the PCE plume will continue to be stable. This conclusion is supported by the Madison Kipp site groundwater monitoring data which show stable or decreasing PCE concentration trends over time, and the results

of modeling analysis.

- There is a monitoring well cluster (MW-25) that is located between the PCE plume and Unit Well 8 that will serve as a sentinel well in the unlikely event that the PCE plume begins to migrate.

- Routine groundwater monitoring at the sentinel well (MW-25) and at other site monitoring wells will be initiated over the next few months and will provide early-warning data in the unlikely event that the PCE plume begins to migrate.

Madison-Kipp and ARCADIS will make themselves available to discuss these conclusions at any time and continue to pledge our full cooperation.

Best Regards,
Jennine

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From: Hausbeck, John [mailto:JHausbeck@publichealthmdc.com]
Sent: Thursday, February 20, 2014 11:22 AM
To: 'Mark Meunier'; Trask (Cota), Jennine
Subject: Follow-up with Madison Water Utility

Mark and Jennine,

I spoke with Joe Demorett at Madison Water Utility about the Water Utility Board's concern regarding Well 8. The Board is preparing a letter to WDNR asking for assurances that Well 8 will not be impacted by PCE in the groundwater if they spend money to allow pumping Well 8 24/7. While assurances are hard to come by, the data from the model would go a long way to helping the Board decide what they can do with Well 8.

Thanks for your consideration.

John

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