MANITOWOC CITY / FORMER NEWTON TN GRAVEL PIT TECHNICAL INFORMATION MEETING MINUTES
April 1, 2015

Conference Room 1 - Oshkosh DNR Service Center

Attendees: Elizabeth Heinen (WDNR), Dave Johnson (WDNR), Tauren Beggs (WDNR), Dan Koski (City of Manitowoc), Dave Henderson (AECOM), Jeff Maletzke (AECOM)

1. Site Conditions – *Dave Henderson provided overview of existing site conditions and distribution of chlorinated compounds in groundwater as previously presented in report submittals, etc.*
    a. Source area
        i. Residual soil contamination in vadose zone
        ii. (NAPL) Free Product Lab Data from 1994, LNAPL and DNAPL
            1. PCBs, petroleum, chlorinated solvents
            Discussed March 4, 1968 letter of waste haulers found during due diligence for the TSCA determination. TSCA determination was DNR oversight for PCBs. 1994 LNAPL results were for waste characterization purposes only, Arochlor 1248 at 77ppm. Discussed view that free product is a mixture of compounds and that DNAPL in pure form does not appear to be present.
    b. Dissolved Phase Contaminants in Groundwater
        i. Monitoring Well Location Map
        ii. Cross Sections – updated 2014 cross sections and historical cross sections *(as presented at the public meeting in December 2014)*
        iii. Groundwater Quality data
        iv. Groundwater Elevation data
        v. Groundwater Flow
        Shallow flow system: additional control points in fall 2014 in Silver Creek, near surface discharge to creek, consistent flow pattern.
        630ft msl: Lose influence from creek
        600ft msl: Less control points (just above bedrock)
        Bedrock: Upper 20ft of bedrock, dips and bedding planes come into play for groundwater in bedrock.
        Discussed Regional Flow System: possibility for E flow to swing more NE due to influence of Manitowoc River on groundwater flow (river is approx. 1.7 mile N of Veibahn St) and towards Lake Michigan. Also influenced by complex geology (massive reef systems known to be within the county)
        vi. Horizontal and Vertical Hydraulic Gradients, Hydrogeology aspects, Travel Times
        Included review of a series of draft groundwater flow maps and linear velocity calculations based on November 2014 data. Flow at the water table is to the SE at approximately 52 ft/yr; flow within

sand and gravel at elevation 630 ft MSL is to the SE at approximately 31 ft/yr; flow within less permeable materials (primarily clay) at elevation 600 ft MSL is to the SE at 0.1 ft/yr; non-fracture (primary porosity) flow within bedrock is to the east at approximately 7 ft/yr.

c. Dissolved Phase Contaminants Impacting Potable Wells
    i. Potable Well Location Map
    ii. Potable Well Quality Data
    iii. Impacted Wells installed in Overburden (Unconsolidated Soil) vs. Bedrock

    Discussed SE trending chlorinated plume within the unconsolidated soil entering bedrock in vicinity of the Yindra well and continuing to the east-southeast (as detected in potable wells in bedrock). A little more problematic explaining potable well impacts within unconsolidated soil northeast of the Western Source Area (i.e. impacts at 3611 CTH CR, approximately 5400 feet from the source area. Seemingly contradicts groundwater travel time (at 52 ft/yr = 103 years). Leads to questions of possible other contaminant source areas – see Agenda Item #3.

d. Surface Water
    i. Silver Creek Sampling Locations Map
    ii. Silver Creek Surface Water Data

    Surface water concentrations below applicable regulatory levels downstream of GW discharge plume zone. Surface water system in a fair amount of flux due to a high recharge area and seasonal gaining stream. Near surface discharge to creek. Surface elevation at creek approx. 682ft msl.

2. <u>Remedial Action</u>
    a. Brief Explanation and Schedule for upcoming AECOM 2015 Budget Proposal to Committee of the Whole

    Update from Dan:

    - *There is a desire from the Council to determine if there is a second source.*
    - *The Council has given us permission to design the water main along Viebahn.*
    - *The 2015 budget from the City is nearly depleted at this time.*

    b. Concerning Contaminant Phases for Remedial Action
        i. Known source LNAPL
        ii. DNAPL
        iii. Dissolved Phase – Chlorinated Solvents
    c. Site Strategy (AECOM and DNR R&R, D&GW, and Peer Review Aspects)
        i. Conceptual Site Model, Remedial Objectives, Remedial Approach, Monitoring Approach, and Remedy Evaluation
        ii. Remedial Action Options with Green and Sustainable Remediation

d. Potential Funding Sources to Consider for Site Work
    i. Causers
    ii. EPA

- *WDNR goals: 1)Protect Public Health; 2) Remediation at the Source*
- *On-site remediation discussion:*
    - *LNAPL source removal, additional characterization of LNAPL needed.*
    - *Address residual contamination in vadose zone.*
    - *Deeper look for DNAPL in source area (i.e. between WT-02 and WT-02A) – recheck existing data*
    - *Dave Johnson brought up the idea to consider a pond with phreatophyte vegetation on pit floor downgradient of the source area – create a sink, capture and volatilize*
    - *Install monitoring well(s) closer to whatever the final remedy is in order to quantify that the system is working*
- *Potable well discussion:*
    - *Include sentinel well monitoring to the east and expand down gradient if impacts – monitor once every 2 years and then scale back dependent on results*
    - *Long-term monitoring – target twice a year for 1or 2 years, then scale back to once annually; consider extreme rainfall events, etc. and adapt monitoring plan accordingly.*
    - *Develop a 2 year plan (for starters); include staggering which wells are sampled as part of a long-term monitoring and sentinel well monitoring to minimize costs, etc. Design to include a consistent number of wells each year (i.e. 10)*

- *Other possible remedies/technologies to consider:*
    - *Skimmer pump to remove LNAPL; dual pump system (free produce and GW)*
    - *Source area cap*
    - *SVE, passive/active*
    - *Dechlorination wall/barrier wall*

3. <u>Investigation: Questioned Source Area(s) and Delineation of Groundwater Plume</u>
    a. Viebahn St Area

- *Additional investigation needed to delineate the NE edge of impacts. Low priority but before closure.*
- *Consider special well casing area and the fact that residents are on City water*
- *Incorporate WGNHS sentinel well at the Visitor Center*
- *Search for missing well logs (8 wells along CTH CR) to determine if screened in unconsolidated material or bedrock; if unable to find, consider pulling the pumps and measuring depth to water and total depth of the wells. Also ask residents if they have recently had work done on their pumps (might have additional data)*

    b. WT-16 Area

Discussed impacts at WT-16. Did not come to a consensus about source of impacts. WDNR to review data further.

c. Delineation
    i. Special Well Casing Depth Area
    ii. Horizontal and Vertical Extent
        1. Monitoring Well Nests
        2. Other Options

- *Surround possible second source area along Viebahn & CTH CR, better define groundwater flow system and nature and extent of groundwater impacts to potable wells.*
    - *Consider three or four 1- to 3-well nests at locations shown on attached mark-up.*
    - *At each location continuous sample to approximately 20 below top of bedrock and set deep piezometers in upper part of bedrock (priority to delineate potential top of rock impacts)*
    - *Based on the stratigraphy encountered (i.e. sand and gravel or clay till) determine screened interval for other wells in the nest. In lieu of notable permeable materials (i.e. minimum 2 to 5 feet thick), consider installing at elevations consistent with previous wells installed as part of this investigation.*
    - *Not a priority to define the shallow water table system.*
    - *If a 2nd source is identified in the Viebahn & CTH CR area, discussion about who would be responsible for financial aspects of the water main installation.*

Summary: Priorities:

1 - Western source area remediation

Treat on-site down gradient GW plume and begin mass removal. Possible for 2015 to review remedial alternatives and begin feasibility work – scope determined by City budget constraints.

2 – Replacement wells/water main along Viebahn and CTH CR.

The City is proceeding with engineering design for the water main. Delineation of a possible second source may impact who is responsible for financing the water main work. Discussion noted that the State may have financial responsibility if a new source area was discovered and verified.

3 – Delineation of Target Zone GW plumes, investigation to separate Target Zone GW plumes.

A) Research addition WCR for Sentinel Zone wells between the Target Zones to determine where they draw water.

B) If no WCRs are found, obtain ROE from homeowners and contract with a well driller to pull pumps and measure wells.

C) Possibly install two well nests, one at SW corner of 3120 CTH CR and one on the eastern edge of county farm land, west of Hwy 43.

D) eventually, before closure, WDNR may require additional horizontal delineation of GW plume to the NE of Viebahn.

4 – Possible Viebahn source area investigation

A) If work to delineate Target Zone GW plumes provides a definitive separation of the plumes, then additional work will be necessary to ID a possible new source. No definition at this time who would direct/pay for additional work.

B) If the Target Zone GW plumes appear to be all from the western source area, then no additional source area investigation may be necessary.

5 – Potable well work plan

City to provide new potable work plan for a two year time period taking into consideration a two cycle 6-month Target Zone sampling period and 2nd year Sentinel Zone well sampling event – or a mixture of Target and Sentinel Zone sampling. Even though this is lower priority since the focus is being shifted to remedial action, this plan still needs to be prepared & implemented in 2015 because the last monitoring round has taken place for the previously implemented 1 year potable well work plan.