GSI Job No. 4827

GSI ENVIRONMENTAL

20 May 2020

Ms. Natalie Long
Assistant Attorney General
Environmental Bureau/Springfield
Illinois Attorney General's Office
500 South Second Street
Springfield, Illinois 62706

Subject: Response to IEPA's Comments on the Groundwater Management Zone (GMZ) Application for Manlove Natural Gas Storage Field, People v. People's Gas Light and Coke Company, Champaign County, Case No. 17-CH-218

Dear Ms. Long:

At the direction of Peoples Gas Light and Coke Company (Peoples Gas), GSI Environmental Inc. (GSI) is submitting this letter to respond to the comments of the Illinois Environmental Protection Agency (IEPA) on the GMZ Application submitted on behalf of People's Gas on 1 August 2019. In our responses below, we provide additional information regarding each task to be performed by Peoples Gas, as outlined in the IEPA correspondence.

E-Mail From Ms. Natalie Long, Office of the Illinois Attorney General, 23 March 2020:

We heard back from Illinois EPA regarding the GMZ submission, and wanted to follow-up to share the feedback that we received.

As previously noted by Illinois EPA, the State's strong preference is that Peoples provide a fate-and-transport model at the present time, which could then serve as the basis for an approval/disapproval of the GMZ.

In the alternative, however, and with the understanding that Peoples does not have sufficient information to provide a fate-and-transport model upfront, the Agency is willing to accept a compromise position wherein Peoples:

i) installs relief wells in the four stratigraphic trap areas identified in their 3-D visualization model and cross sections;

ii) secures permits for, and begins flaring, existing relief wells (or continuing that flaring, to the extent it has already been initiated);

iii) submits for review and approval a more extensive, ongoing monitoring and reporting protocol while the newly-installed and existing relief wells are operating;

iv) collects data from both the newly-installed and existing relief wells;

v) submits for review and approval a proposal of a network of dedicated groundwater monitoring wells in each of the four stratigraphic trap areas;

vi) conducts extensive sampling of the groundwater monitoring wells, including a minimum of eight samples per well, per month, for a year, with quarterly sampling thereafter; and

vii) uses all data generated, including integrating the groundwater monitoring well data with the potable well sampling data, to develop a fate-and-transport model.

Response to IEPA on Behalf of People's Gas

GSI has considered each of the recommendations provided by IEPA and offers the following actions to accommodate execution of this GMZ:

1) Proposed actions for installation of relief wells in the four stratigraphic trap areas identified in their 3-D visualization and cross sections.

a) In each of the four stratigraphic trap areas, one stratigraphic boring will be drilled to bedrock, with coring of selected intervals. Specific locations within each area will depend on physical access and the ability of Peoples Gas to obtain landowner permission for well installation.

b) During drilling, the soil cores, cuttings, and drilling fluids will be screened for methane gas levels to provide supplemental information on gas presence.

c) Based on screening for gas and observed stratigraphy, a target interval to intersect the optimal pressurized gas zone within the Mahomet Aquifer, or related transmissive zones, will be selected in the field. This zone will be screened using a 4-inch diameter well casing and stainless steel screen, which will be installed permanently and grouted to surface.

d) After installation, each relief well will be developed and pilot tested for gas production by groundwater pumping and other methods. Based on the results of this testing, a program of gas production will be developed for each well, with appropriate specifications for equipment, operation, and other aspects of the gas recovery at that location.

e) Relief wells that are found to produce little to no gas may be retained for monitoring purposes or permanently abandoned, but will not be incorporated into the gas relief well system.

2) Proposed actions for securing permits for, and beginning flaring of, existing relief wells.

a) Each of the three existing relief wells (RW-1, RW-2, and RW-3) will be pilot tested for gas production, as described above.

b) If pilot testing shows that wells RW-1, RW-2, and/or RW-3 exhibit the capability to produce significant volumes of gas, these will be incorporated into the gas relief well system, including all appropriate permitting.

c) In this event, Peoples Gas may elect to replace one or more of these wells with co-located wells equipped with longer screens (these wells currently have 4-foot long screens). If this is done, the existing relief wells will be abandoned in a manner compliant with state regulations.

d) If RW-1, RW-2, and/or RW-3 produce little to no gas, they may be retained for monitoring purposes or permanently abandoned, but will not be incorporated into the gas relief well system.

e) For each new or existing relief well, gas emissions will be monitored and controlled pursuant to the applicable air emissions permits.

f) For levels of gas emission that require control, combustion is anticipated to be used as the control method; however, Peoples Gas may elect to use other methods that meet permit and regulatory requirements.

3) ***<u>Proposed actions</u> for submittal of a more extensive, ongoing monitoring and reporting protocol, while the newly-installed and existing relief wells are operating.***

   a) All water supply wells within the GMZ boundaries will be sampled initially, in addition to any monitoring wells, subject to Peoples Gas's ability to obtain landowner permission for sampling.

   b) All water supply wells exhibiting ≥10 mg/L of MC2 thermogenic methane will be incorporated into the on-going monitoring program.

   c) A minimum of 10 additional water supply wells within the GMZ will also be selected for inclusion into the on-going monitoring program. Selected wells will include those that contain less than 10 mg/L MC2 thermogenic methane, or contain microbial gas, but are present at locations that are useful for monitoring any potential outward migration of MC2 gas ("sentinel wells").

   d) All monitoring wells will be included in the on-going monitoring program.

   e) All wells included in the monitoring program will be sampled quarterly for the first year of remedy implementation, and semiannually until remedy goals are attained, subject to Peoples Gas's ability to obtain landowner permission for sampling.

   f) The number of wells, frequency of sampling, and specific wells used for monitoring purposes will be re-evaluated every three years.

4) ***<u>Proposed actions</u> for collecting data from both the newly-installed and existing relief wells.***

   a) For each relief well, the following will be monitored and recorded:

      - Times of well operation vs. downtime
      - Volume and rate of water produced
      - Volume and rate of air produced
      - Percent natural gas concentration in produced air
      - Estimated volume of natural gas produced at atmospheric pressure
      - Molecular and isotopic composition of produced natural gas (analyzed initially, and repeated if there are significant changes in well conditions)
      - Volume of water discharged, dissolved methane concentration, and associated water chemistry, as required by discharge permit.

   b) The performance of all relief wells will be evaluated by Peoples Gas on a quarterly basis. Depending on gas production, Peoples Gas may shift individual well operation to an intermittent basis or terminate the operation of that well in the event of no or minimal gas production.

5) ***<u>Proposed actions</u> for a proposed network of dedicated groundwater monitoring wells in each of the four stratigraphic trap areas.***

   a) Peoples Gas proposes to install three monitoring wells at off-set locations surrounding each of the four newly installed relief wells, screened in the same zone as that targeted for gas recovery. Specific locations within each area will depend on physical access and the ability of Peoples Gas to obtain landowner permission for well installation. Additionally, monitoring well locations may be adjusted as described below so as to provide useful information on gas occurrence and migration within the aquifer.

b) If pilot testing finds that a given relief well does not produce significant volumes of gas and will therefore not be incorporated into the gas relief well system, the three monitoring wells designated for that relief well will be redistributed to other areas, with the new location and depth of completion subject to agreement between Peoples Gas and IEPA, and the ability of Peoples Gas to obtain landowner permission for installation.

c) Similarly, if there are existing water supply wells in the vicinity of a given relief well such that these water supply wells provide adequate information on nearby gas conditions, the three monitoring wells designated for that relief well will be redistributed as described above. Regardless of redistribution, the maximum number of monitoring wells to be installed will be 12.

6) ***Proposed actions for conducting an extensive sampling of the groundwater monitoring wells, including a minimum of eight samples per well, per month, for a year, with quarterly sampling thereafter.***

Peoples Gas will perform the sampling of monitoring wells at the frequency described above for Item 3.

7) ***Proposed actions for use of all data generated, including integrating the groundwater monitoring well data with the potable well sampling data, to develop a fate-and-transport model.***

a) Operate the gas relief system for at least two years, together with the described groundwater monitoring program.

b) After two years of operation, operating data and the other hydrogeologic information acquired in this study will be incorporated into a two-phase fate-and-transport model for free and dissolved gas in groundwater.

c) This fate and transport model will be submitted to IEPA before the end of the third year of operation.

d) This model will be utilized by Peoples Gas and IEPA to evaluate the effectiveness of the remedy system and assess alternative scenarios for management of the GMZ.

If you require additional information or need to discuss this further, please let us know. We look forward to receiving approval of the Groundwater Management Zone Application.

Best Regards,

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