STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
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APPLICATIONS OF CWM CHEMICAL SERVICES, LLC, for Permits pursuant to Articles 17, 19, 24, and 27 of the Environmental Conservation Law (ECL); Parts 201-5 (State Air Facility Permits), 373 (Hazardous Waste Management Facilities), 663 (Freshwater Wetlands Permit Requirements), 750 (State Pollutant Discharge Elimination System Permits) of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York; Section 401 of the federal Clean Water Act; and 6 NYCRR 608.9 (Water Quality Certifications); and for a Certificate of Environmental Safety and Public Necessity pursuant to 6 NYCRR Part 361 (Siting of Industrial Hazardous Waste Facilities)

DEC Permit Application Nos.9-2934-00022/00225, 9-2934-00022/00231, 9-2934-00022/00233, 9-2934-00022/00232, 9-2934-00022/00249
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MUNICIPALITIES' REPLY TO STAFF APPEAL

INTRODUCTION

In its appeal Department Staff argue that "the geologic and hydrogeologic characteristics of the Model City facility are well understood" (p. 7), and "the geologic and hydrogeologic characteristics . . . are fully documented in the record." (p. 9). The Municipalities disagreement is not with the existing site data but with Staff's interpretations of the data which, it is contended, disregards some basic hydrogeologic principles. With very few exceptions, Staff has adopted the applicant's interpretations. These erroneous interpretations result in mischaracterization of the critical stratigraphic section (the conceptual site model). Based on the applicant's data, the Municipalities offer to prove that the conceptually central glaciolacustrine silt/sand (GSS) aquifer unit is a hybrid that includes both an aquifer unit (sand and gravel within a buried valley) and a low-permeability aquitard (lacustrine silt over a bedrock ridge). Staff's reliance on this artificial creation has resulted in apparent groundwater flow directions, consistent with an assumed regional groundwater flow, obscuring localized deviations. As a result Staff proposes to approve a groundwater monitoring system that is incapable of detecting all landfill releases.

This offer of proof was elaborated and commented upon at the issues conference and in post-conference submissions. An adjudicatory hearing would be much more than an academic exercise on technical differences of opinion regarding the information already contained in the record, for two principal reasons. First, as both Staff and the applicant acknowledge, the denominated GSS groundwater-bearing zone is a complex and heterogeneous stratigraphic unit. However, Staff nevertheless relies on the applicant's utilization of median hydraulic conductivity values for an assurance that the area near the proposed RMU-2 project is hydrologically secure. The effect of this approach is to obscure the existence of localized, more homogenous highly transmissive units of sand and gravel. As will be discussed below, the area in which buried alluvial (sand and gravel) valleys were identified by CWM's predecessor (Wehran 1977, for SCA Chemical Services), and more recently by the Army Corps of Engineers, in connection with the Corps management of federal properties bordering the CWM site to the south and including "vicinity properties" on the CWM site, has not been well studied or monitored by CWM. The Municipalities contend that the available data is consistent with a localized sand and gravel unit flowing to the west in the southwest portion of the site where the RMU-2 landfill would be built, but welcomes more localized data in that area.

Second, new localized data was obtained after the deadline for petitions in this matter, and at present more such data is being obtained. The applicant initiated a new groundwater study in the West Drum Area (WDA) after petitions were filed, and a second post-petition groundwater study was initiated a few weeks ago, its results not yet available. Both studies involve drilling new groundwater monitoring wells in the western and eastern portion of CWM's property to address the Municipalities' concerns with the extent and permeability of deep sand and gravel deposits in that area. Since the applicant clearly seeks to resolve the Municipalities' concerns with this new data, consideration of the new data would not be merely an academic debate. Indeed, the applicant's conduct in undertaking new groundwater studies is an indication of the substantive and significant nature of our concerns.[1]

ISSUES IDENTIFIED IN THE ISSUES RULING (IR)

For the following issues, ALJ O'Connell found that the Municipalities have met their heavy burden, to demonstrate that each issue is substantive and significant.

Monitorability of a release from the RMU-2 facility to groundwater, a siting restriction under 6 NYCRR § 373-2.14(b)(1), is an issue. Monitorability is linked to the need for a corrective action program to address contamination detected in the central area of the Model City facility, "between the compliance point for the RMU-1 landfill, and what would become the downgradient boundary of the proposed RMU-2 landfill, to the west," since "the corrective action plan is needed before CWM can demonstrate an ability to monitor any releases from the proposed RMU-2 landfill. (See Municipalities Petition at 36-39.)". IR, 96.

Also, 6 NYCRR § 373-2.14(b)(1) requires the Upper Tills unit to have hydraulic conductivity values that meet or exceed $1x10^{-5}$ cm/sec, which Department Staff acknowledge is

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[1] Staff's appeal suggests that current draft Part 373 permit modification for RMU-2 should allay the Municipalities' hydrogeology concerns, but does not identify which provisions of the permit modification Staff wishes the Commissioner to rely on.

not satisfied at some locations. IR, 98 (citing Staff Resp. to Petitions at A-11).[2]

Also, 6 NYCRR § 373-1.5(a)(3) requires a Part 373 permit application to contain adequate information to protect ground water.

Monitorability is also relevant to the Siting Board's consideration of impacts to groundwater, under 6 NYCRR § 361.7(b)(7).

The monitorability issue will include:

1) "whether the contours of the bedrock include any ridges, and if so, the location and configuration of those ridges" (IR, 99);

2) "the characteristics of the various units of unconsolidated deposits that may overlie the bedrock, as well as the physical properties of each unit," such as vertical or horizontal conductivity, and effects on groundwater flow direction and rate (IR, 99-100);

3) "what type or types of contaminants are present in which units of the unconsolidated deposits, as well as the concentration of any of these contaminants," including VOCs and DNAPL (IR, 100);

4) "whether the scope of the current corrective action program effectively addresses the ground water contamination. ([IC] Tr. at 51-55, 58.)" (*id.*).

As is apparent from this specification of subissues, resolution of the issues at an adjudicatory hearing will require a careful evaluation of the parties' contrasting interpretations of the available geological and hydrogeological data.

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[2] The reference is to Staff's response entitled "Abraham Party Status Petition," submitted under cover letter dated February 27, 2015, among 13 response documents, each addressing one of the petitions or expert reports filed by petitioners. Included among these submissions is a separate response to the expert report by the Municipalities' hydrogeology expert Dr. Michalski, filed with its petition. Staff's response to the Michalski Report reproduces the report in its entirety.

The ALJ notes initially that the DEIS (at 55-56) identifies "buried ridges" in the bedrock beneath the site. IR, 93. This is consistent with but less specific than Dr. Michalski's interpretation of the site hydrogeological setting, as Dr. Michalski contends a buried sand and gravel valley lies between ENE-WSW-striking bedrock ridges, directing localized flow to the WSW beneath a portion of the RMU-2 landfill footprint. The ALJ then provides a helpful outline of the unconsolidated hydrogeological units overlying bedrock, in ascending order:

Basal Red Till
Glaciolacustrine Silt/Sand [GSS] unit
Glaciolacustrine Clay unit [GC]
Middle Silt Till (between the upper and lower members of the Glaciolacustrine Clay unit)
Upper Tills unit (comprised of the Upper Silt Till, the Upper Clay Till and the Upper Alluvium)

As will be discussed below, the Municipalities contend that the underlying bedrock is a water-bearing zone and, where not overlain by GSS, comprises the regulatory uppermost aquifer at this site. *See* 6 NYCRR § 370.2(b)(210). Accordingly, where the RMU-2 is proposed to be located over such areas, monitoring wells must be screened in bedrock. *See* 6 NYCRR §§ 373-2.6(f)(1), (h)(1)(iii) and (h)(2).

REPLY

Staff's reliance on the large number of monitoring wells at this site is misplaced.

Staff assumes that "over 100 separate investigations over the decades, resulting in the completion of more than 600 investigative borings at the facility . . . [and] the current groundwater monitoring network of more than 300 wells", (Staff Appeal, 10), resolves the groundwater protection, monitoring and siting issues identified in the Issues Ruling. *See id.*, at 6 (listing hydrogeology issues). The Municipalities acknowledge that a large number of borings and monitoring wells have been installed at the CWM site. However, the majority of these borings and wells were completed within the Upper Till unit. Well coverage within the GSS unit, which the applicant considers the Detection Zone, is not uniform. The majority of such wells are located on the eastern and northern sides of the existing RMU-1 landfill and the proposed RMU-2 landfill footprint, but the well coverage west of Facultative Pond 8 is very sparse. There are no GSS (deep, "D") monitoring wells proposed for large distances between wells R118D and R202D in the east to west direction, and between wells R201D and R206D in the south to north direction. *See* Pet., Michalski Report, 9-10, Figs. 5 and 6, and Ex. 7A. *See also* IC Tr., 46-47. The area in which these spans are located is just east of, and extends to the south of the heavily contaminated Process Area, where contamination by NAPL/DNAPL is documented, and over the area of buried valley channels interpreted by Dr. Michalski. *Cf.* Michalski, "'2014 GSS Well Installation Report[,] West Drum Area, Model City New York' dated January 28, 2015", Ex. 2A, under cover letter by Abraham, February 10, 2015 (hereafter, "Michalski, Comments on WDA Well Report"). Accordingly, Staff's assertion that the existing monitoring well network "provides definitive evidence" that the siting criteria as well as the monitorability requirement are met is, at this point, not supported by the record. *See* Staff Appeal, 14.

In response to the Municipalities' assertion that the proposed RMU-2 violates the regulatory siting criterion at 6 NYCRR § 373-2.4(b)(1), which requires that the soil beneath the facility have a hydraulic conductivity of 10^{-5} centimeters per second or less, the Staff Appeal claims that Dr. Michalski chose to only include certain data for the calculations, rather than evaluating the data comprehensively, as Department Staff did in its determination. This is a misleading claim because the comprehensive set of data the applicant and Staff used to get a geometric mean of 3×10^{-6} cm/s was not based on field data obtained within the RWM-2 footprint but from a much larger area across the site.

Results of field hydraulic conductivity measurements conducted within the proposed RMU-2 footprint are provided in the Michalski Report, at Exhibit 10, after Table 3 of Golder (2010). Out of a total of 13 shallow or "S" (Upper Tills) wells tested within the RMU-2 footprint, only three wells meet the minimum hydraulic conductivity standard. These three wells are located at the northern perimeter of the proposed RMU-2 footprint. The 13 shallow wells tested within the RMU-2 footprint have a geometric mean hydraulic conductivity value of 6.9×10^{-5} cm/s, more than 23 times greater than the geometric mean of 3×10^{-6} cm/s claimed by the Applicant for the upper tills. As noted in the Michalski Report, (at 15), use of a geometric mean is not appropriate where, as here, the hydraulic gradient at the site is not uniform. As noted in the Issues Ruling, Staff agreed with this opinion.[3] Accordingly, a more fine-grained presentation of the available data at an adjudicatory hearing would clearly supplement the record.

Staff also asserts that site bedrock contours, characteristics and physical properties of the various units of unconsolidated deposits have been extensively investigated allowing for a final decision to be made without a hearing. However, as the Issues Ruling notes, (IR, 93), the DEIS

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[3] *See* Staff Response to Abraham Petition, at A-11:

> The hydraulic conductivity geometric mean of Upper Till unit based on test results over the entire facility property is 2.47×10^{-6} cm/sec. Likewise, the hydraulic conductivity geometric mean for the Glaciolacustrine Clay unit based on test results over the entire facility property is 3.51×10^{-7} cm/sec. Both of these units' geometric means meet the 10^{-5} cm/sec or less requirement for hydraulic conductivity as stipulated by the regulations (6 NYCRR 373-2.14(b)(1)). However, it is acknowledged that with respect to the Upper Till unit, there are locations where test results indicate hydraulic conductivities for this unit which are above 10^{-5} cm/sec.

identifies "buried ridges" in the bedrock beneath the site without, however, delineating the location and hydrological function of these ridges. In its responses to the Municipalities' petition, Staff acknowledge there is "limited data with respect to GSS thickness and hydraulic conductivity . . . over the RMU-2 area." Staff Resp., A-25. Dr. Michalski offers the following evidence that could address this lack of locational information.

The top surface of the very old (Ordovician) Queenston Formation bedrock exhibits a series of ridges and intervening valleys that follow the ENE-WSW strike of the formation. These ridges and valleys reflect different erosional resistance of the bedrock beds. The ridges are apparent on a 1913 topographic map of the study area. Michalski Report, Figs. 3a and 3b (after Kindle and Taylor (1913) who described the ridges as "[c]omposed mainly of stony till generally overlying ridges of shale"). LiDAR imagery, (Michalski Report, Fig. 4), shows several ENE-WSW trending lines in the vicinity of the CWM site. These lineaments run parallel to the bedrock strike and run for long distances, providing another indication of the grain and significant elevation differences along the top of bedrock surface later covered by unconsolidated deposits.

The presence of a bedrock valley and adjacent ridges beneath the CWM site was documented by Wehran (1977). An offsite extension of this valley beneath the northwest portion of the NFSS was documented by Acres (1981). These low-permeability ridges would function to block regional groundwater flow to the north and direct the flow westward along the high-permeability alluvial sand and gravel unit at the bottom of the buried valley–the preferential flow and contaminant migration pathway at the CWM site. This flow direction is toward the Lewiston-Porter combined schools campus and the Niagara River. However, the applicant has made no effort to define the course of the preferential pathway, west of the line from the West Drum Area to Facultative Ponds 1 & 2.

The bedrock surface is coated by a patchwork of the Red Basal Till. This highly indurated till is different from the Late Wisconsin Till found at the site near ground surface. The Red Basal Till is of pre-Wisconsin age (Kindle and Tylor, 2014), or more than 100,000 years old. The Applicant incorrectly states the age of this Red Basal Till is probably Late Wisconsin. *See* Golder, *2014 Hydrogeologic Update*, 11. There was a long hiatus of some 80,000 years between the deposition of the Red Basal Till and the Late Wisconsin period, which started some 20,000 years ago, during which lake (glaciolacustrine) sediments and two other tills (the Middle Silt and the Upper Till) were deposited. During that long hiatus, the topographic relief in the area was much greater than today. Streams first eroded some of the Red Basal Till from the valleys and then filled the valley with alluvial and glaciofluvial deposits. The latter resulted from an advancing Mid-Wisconsin glacier close to the study area. Later, lake deposits covered both alluvium-filled valleys and bedrock ridges.

Wehran (1977, 43), on behalf of CWM's predecessor SCA Chemical Services, emphasized that the sand and gravel fill of the buried valley forms a distinct and separate water-bearing unit that would be considered the most vulnerable to any landfill-derived contamination should it occur. Wehran estimated groundwater velocity in the buried alluvial valley beneath the central portion of the CWM site in the range of 88 to 624 feet per year. When CWM became the new site owner and hired a different hydrogeologic consultant, a new aquifer unit known as Glaciolacustrine Silt/Sand (GSS) was created in an apparent attempt to replace and eliminate the sand and gravel unit and its potential vulnerability. Environmental reports prepared for the adjacent NFSS site leave no doubt as to the origin, character and occurrence of the Sand and Gravel Unit that makes, together with bedrock, the Lower Aquifer unit there, as is exemplified by the following quote from the U.S. Army Corp of Engineers' *Sampling and Analysis Plan*, October 2013, p. 1-3:

> Sand and Gravel Unit – The Sand and Gravel Unit, also referred to as Alluvial Sand and Gravel, consists of clean sand to mixtures of sand, gravel, and silt. The unit is glaciofluvial in origin, normally wet or saturated, and exhibits loose to medium relative density. In general, the thickest portions of the unit are present where depressions occur in the underlying bedrock.

An aquifer is a geologic formation, group of formations, or part of a formation capable of yielding a significant amount of ground water to wells or springs. 6 NYCRR § 370.2(b)(12). Only the sand and gravel unit of the buried valley and the bedrock satisfy this definition. All other units, including portions of the GSS unit over the bedrock ridge, are not aquifers but aquitards, low-permeability units. The Staff Appeal asserts that the sand and gravel deposits within the buried valley are not continuous and claims that "[t]he data only identified isolated pockets at the facility of coarse sand and gravel that may produce anomalously high permeability measurements in a few scattered monitoring wells but it does not support a finding of a pathway for groundwater flow or contaminant transport." Staff Appeal, 11 (bottom).

Staff's assertion significantly misrepresents the actual site data. First, logs of available soil borings and wells show the continuous presence of a sand and gravel unit deposited by an ancient river overlying the basal till or bedrock, along the bottom of the buried valley in the southwest portion of the CWM site, in the vicinity of RMU-2. This alluvial sand and gravel unit is not found in logs of well borings installed over the bedrock ridge north of the buried valley.

Second, results of slug tests conducted in wells completed within and along the axis of the buried valley show much higher permeability (hydraulic conductivity) compared to wells installed in the ridge area. *See* Michalski Report, 9, Fig. 5. The consistency of this pattern is particularly striking in the area of RMU-1 and the proposed RMU-2 landfill (north of Facultative Ponds 3 and 8), the area with the highest density of hydraulic conductivity measurements. Every well installed within the bottom of the buried valley there shows hydraulic conductivity values greater than 10^{-4} cm/s. Thus, this area exhibits a consistent pattern, not as Staff asserts, anomalously high permeability measurements in a few scattered monitoring wells. The hydraulic conductivity values in the buried valley wells are approximately one hundred times greater than hydraulic conductivity values for wells installed in the GSS unit in the ridge area. Such a large contrast in hydraulic conductivity values results in the formation of a preferential flow pathway to the west-southwest.

Third, the most reliable and recognized method of evaluating hydraulic continuity between wells is based on drawdown responses observed during pumping tests. Although no pumping tests have been conducted at the site, there are data on drawdown responses to dewatering pumping conducted at the adjacent Modern Landfill, and at two clay mining pits located west of the CWM site. As discussed in the Michalski Report, dewatering pumping at the Modern Landfill caused a potentiometric head decline of as much as five feet in wells located more than 2,000 feet away and completed in the sand and gravel unit and the bedrock. Much larger drawdowns of site groundwater, on the order of 10-15 feet were attributed to dewatering pumping at the Pletcher Road borrow pit ponds located approximately 1,500 feet to the WSW of the CWM site. The drawdown was more pronounced in the western area of CWM s property, towards the pit. These drawdown impacts were even greater than those caused by the Modern Landfill dewatering.

Fourth, available historic hydrographs for onsite wells indicate that potentiometric levels in GSS wells declined by as much as 35 feet during the 1979-1981 period. The decline was likely caused by mining/dewatering operations at the John Long mine (now a Walleye rearing pond), located approximately 4,000 feet west-southwest of the West Drum area. A 33-foot decline was recorded in well B-38 located along the axis of the buried valley north of the CWM s onsite Fire Pond (NE of East Salt), a 25-foot decline in B-34 located farther to the east, and a 22-foot decline in well B-44 located east of RMU-1. Only a small decline was observed in wells located at the northern ridge (*e.g.*, well W-3). The large extent of significant drawdown along the buried valleys, stretching for a distance of thousands of feet from the borrow pits to beyond the eastern boundary of the CWM site, attests to the hydraulic continuity and significant transmissivity of the sand and gravel unit within the buried valley. The lack of any significant responses in CWM's overburden wells located at the northern ridge to the hydraulic stresses from dewatering operations at Modern Landfill, and the Pletcher Road and John Long borrow pits provides verification of the hydraulic role of this ridge as a flow barrier.

The hydraulic conductivity values measured for the alluvial sand and gravel deposits were as high as 10^{-2} cm/s (Table 5 in Golder, *2014 Hydrogeologic Update*), typical of well-sorted sand with gravel. Grain-size analyses provided in earlier hydrogeologic reports (Wehran 1978, Golder 1985) indicate that this type of deposit is present within the buried valley.

Mixtures of sand, gravel and silt are more prevalent in the buried valley, consistent with a moderate topographic relief at the time of alluvial and glaciofluvial deposition. The hydraulic conductivity values obtained from slug testing of these deposits are in the 10^{-3} cm/s to 10^{-4} cm/s range.

A critical distinction is that the alluvial and glaciofluvial deposits of the buried valley are very different from the overlying glaciolacustrine deposits, in terms of their origin, grain size distributions, hydraulic properties, and areal distribution. By combining these arguably distinct units into one hydrostratigraphic unit known as GSS, the applicant's interpretation on which Staff relies obscures the hydrogeological setting. On the adjacent NFSS site, the U.S. Army Corps of Engineers considers the sand and gravel unit to be an aquifer unit separate from the overlying glaciolacustrine deposits.

A hearing on the hydrogeology and geology issues would supplement the available data regarding the groundwater flow and rate at the Model City facility.

With the addition in 2014 by CWM of monitoring wells in the West Drum Area, the pattern of potentiometric contours and flow directions in the GSS unit becomes more evident. Revised potentiometric maps generated for the WDA well study report do not reflect all the data generated by the study. Potentiometric data with fractions of a foot difference were obtained, but potentiometric surface isopachs are reported in whole feet on the study report maps. *See, e.g.*, Michalski, Comments on WDA Well Study, Ex. 3A. A more fine-grained use of the data would support a more revealing set of isopachs. Dr. Michalski offers to demonstrate the applicant's data shows the presence of a potentiometric divide coinciding with the top of the east-west bedrock ridge. South of this divide, the flow in the GSS unit is south-southwesterly, towards the buried valley that acts as a drain collecting flows from the sides of the valley and providing a preferential flow outlet westward. This flow pattern reflects the highest permeability and transmissivity of the GSS, and confirms the dominant hydraulic role played by the sand and gravel unit of the buried valley at the CWM site.

CWM's and Staff's interpretation of northwesterly groundwater flow direction in the GSS unit over the entire area of the previously-referenced potentiometric maps is incorrect. This interpretation fails to recognize the presence of continuously higher potentiometric levels in wells over the bedrock ridge area, and attempts to show them as isolated features, and fails to insert an additional potentiometric contour of 0.5 ft interval that would clearly show the presence of the divide.

The WDA well study report maps and all prior potentiometric maps of the GSS unit prepared by the applicant show a large potentiometric plateau (very low hydraulic gradient) over areas of both the buried valley and the northern ridge. To satisfy the physical principle of flow continuity, a low hydraulic gradient along a groundwater flowpath is a reflection of higher transmissivity of the low gradient segment. The north-northwesterly groundwater flowpath claimed by the applicant is based on a low gradient flowpath segment extending onto the northern ridge area. However, the ridge area of the GSS is characterized by hydraulic conductivity values approximately 100 times lower than the buried valley area. *See* Michalski Report, Fig. 5. Even greater contrast exists in the measured transmissivity values, due to a much smaller thickness of the GSS over the ridge area than over the buried valley. Based on the principle of flow continuity, the ridge area should exhibit a very steep hydraulic gradient to sustain the claimed north-northwesterly direction, but no steep gradient has been measured there, as the area is part of the gradient plateau. The only alternative satisfying the principle of flow continuity in the ridge area is the presence of a groundwater divide that acts as a no-flow boundary for lateral flow.

The Municipalities' interpretation of the water level data, which is based on their proper contouring and sound hydraulic principles, shows that the sand and gravel unit of the buried valley conveys groundwater flow beneath most of the RMU-1 and RMU-2 area in a different direction than the applicant assumes in the design of the proposed RMU-2 groundwater monitoring system. The proposed monitoring system is inadequate and unable to detect potential landfill releases. *Cf.* Michalski Report, 23-24.

The 2014 West Drum Area well study shows that the GSS unit is either missing or very thin in that area, even thinner than over the rest of the bedrock ridge area. *Cf.* Michalski, Comments on WDA Well Study, *passim*. Hydraulic conductivity values of GSS wells in that area are very low ($<10^{-5}$ cm/s; *id.*, 9, Fig. 5), which makes this unit an aquitard relative to the underlying bedrock aquifer. As vertical (here downward) flow prevails in aquitards, bedrock should be designated as the regulatory uppermost aquifer and the detection zone within the ridge area. Currently, there is no bedrock monitoring well at the CWM site and none is proposed for RMU-2, despite the fact that DNAPL was found over the Basal Till in the PRO-21 area. Michalski Report, 20. *See also* IC Tr., 53. In contrast, numerous bedrock monitoring wells are used on the adjacent NFSS and Modern Landfill sites where the bedrock and the sand and gravel unit form the lower aquifer.

The record would clearly be supplemented by consideration of a new groundwater study underway at the time of this writing. In a March 25, 2016 phone conference, CWM notified the ALJ and the parties that it is installing five new groundwater monitoring wells and additional soil borings in the western periphery of the RMU-2 expansion area. CWM stated that, like the post-petition WDA well study, also focused on the western periphery of the expansion area, (*see* IC Tr., 52-53), this new study is intended to address the Municipalities' concerns regarding localized groundwater flow and rate of the uppermost aquifer in this area.[4] However, the parties have not been provided any information about the precise location of this groundwater study or the depths of wells and borings.

As we stated in the Municipalities' February 10, 2015 comments on the WDA groundwater study, those wells were screened in materials that, because of their low porosity (hydraulic conductivity), cannot be considered an aquifer.[5] The WDA study therefore failed to reach the critical hydrostratigraphic formation. We welcome new data about the hydrogeology of the western periphery of the RMU-2 expansion area, the evaluation of which an adjudicatory hearing would obviously supplement the record.

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[4] Regarding the earlier WDA study, *cf.* Golder Associates, "Re: 2014 GSS Well Installation Report", January 28, 2015, 1 (purpose of the study is "to address Municipal Stakeholder concerns associated with the Residuals Management Unit No. 2 (RMU-2) permit application regarding possible contaminant migration and "westward flow" in the Glaciolacustrine Silt/Sand aquifer (GSS) in the west-central part of the site").

[5] Prior to the 2014 WDA well study the muncipalities provided detailed recommendations on the location and depth for those wells which was not followed. *See* Abraham Letter to Abby Snyder, Regional Director, NYSDEC Region 9, September 29, 2014, attaching technical comments of Dr. Michalski on CWM, "Supplemental Investigation: Well Installation Plan, West Drum Area," dated September 18, 2014.

Corrective actions performed by CWM fail to adequately address groundwater contamination.

The Staff Appeal, (at p. 13), states that "[t]here is no disagreement that groundwater contamination, including DNAPL, is present in the upper tills above the GC [glaciolacustrine clay] unit and that contaminated soil and groundwater are present below the GC in a few areas below the Process Area." However, Staff is silent on the need for delineation of contaminants already present in the GSS unit and likely in the bedrock. Apart from a conclusory assertion that "[t]he comprehensive groundwater monitoring network also ensures that any possible releases from the proposed RMU-2 landfill, should they occur, will be quickly detected", (*id.*, 14), Staff does not indicate how new releases would be distinguished from prior contamination in the already impacted areas.

Staff's argument that no significant groundwater contamination from Process Area sources has been detected in approximately three decades of monitoring the GSS unit does not consider the actual groundwater flow and transport pathways into the buried valley and the bedrock, which has not been monitored. Because the existing monitoring of the GSS assumes an apparent groundwater flow pathway to the north-northwest, there has been no monitoring of the deep aquifer and the bedrock to the west or, in that area, potential transport pathways to the aquifer. *See discussion at* Michalski Report, 19-21. DNAPL-level contamination was found in soil and groundwater samples over the Basal Red Till in PRO-21, (*id.*, 20), which indicates that the bedrock has also likely been impacted. Not one bedrock monitoring well has been installed in or adjacent to the Process Area despite the fact that the bedrock acts, and as noted previously should be designated as, the regulatory uppermost aquifer within the bedrock ridge area. Numerous bedrock monitoring wells operate at the adjacent NFSS and Modern Landfill sites but none at the CWM site. The finding of the 2014 WDA well study, that the GSS unit is either very thin or absent in the newly installed wells in the West Drum Area, underscores the need for bedrock monitoring.

CONCLUSION

Because the data supporting the applicant's and Staff's interpretation of the hydrogeological setting in the vicinity of the proposed RMU-2 project is "limited . . . with respect to GSS thickness and hydraulic conductivity," (Staff Resp. to Pet., A-25), the informational and siting requirements under Part 373 of the Department's regulations could result in permit denial or modification, making the issues discussed herein "significant." 6 NYCRR § 624.4(c)(3). Because the applicant's ability to comply with the applicable regulatory requirements is in doubt, as discussed herein and in the Issues Ruling, these issues are also "substantive." 6 NYCRR § 624.4(c)(2). Accordingly, for these issues, the Issues Ruling should be adopted by the Commissioner.

Respectfully submitted,

/s/
Gary A. Abraham
Attorney for Niagara County, the Town and Village of Lewiston, and the Village of Youngstown

DATED: April 6, 2016

cc: Service List (via email and U.S.P.S.)