Memorandum

GROUNDWATER SCIENCES CORPORATION

To: file

From: Jennifer Reese

Date: May 14, 2013

Re: fYNOP Offsite PADEP File Review

On May 14, 2013, GSC (Jennifer Reese) conducted a PADEP file review for several selected properties west of Codorus Creek as part of fYNOP's research to determine the direction of groundwater flow in off-site properties to the west of the fYNOP site. The properties were identified through a PGWIS search for wells within the state's database. Properties identified for the file review included the following:

North York Car Wash (1720 N George St., York)
Lehr's Exxon (101 Arsenal Rd., York)
Rent a Center/Northgate Shopping Center (1500 N George St., York)
Cars Plus (2008 N George St., York)
Rutters Dairy (2100 N George St., York)

PADEP was able to provide files for Lehr's Exxon and a former Sunoce facility (currently the Cars Plus location). There was also a file for Rutters Dairy, but it did not include any information about wells or groundwater. The files for Lehr's Exxon and Sunoco were extensive due to hydrocarbon groundwater contamination at the properties.

Lehr's Exxon

Twelve monitoring wells exist on and south of the Lehr's Exxon property and their depths range from 45' to 78' below ground surface (bgs). The 9 northern-most wells were screened in the overburden or shale (Kinzers Shale) and the 3 southern-most wells penetrated dolostone. Groundwater elevation data from these wlls were reviewed. Multiple gauging events show that shallow groundwater flow is toward the south-southeast (see the attached maps).

The reports that were reviewed did not provide groundwater elevation data relative to feet above mean sea level (amsl); the reports only provided groundwater elevation data relative to an assigned datum on the property. However, the groundwater elevation of 353 feet amsl at Lehr's Exxon was estimated by GSC personnel using the ground surface elevation from Lidar data, ranging from 392.5 feet amsl to 395.5 feet amsl, and the measured depth to groundwater of approximately 40 feet (393 – 40 = 353). The elevation of Codorus Creek is approximately 339 feet amsl at the fYNOP Codorus 2 measuring point and the groundwater elevation at the fYNOP WPL area is approximately 340 feet amsl in nonpumping wells and 334 feet in pumping wells. These elevation data suggest that groundwater from the fYNOP would not flow west of Codorus Creek toward the Lehr's Exxon Property.

Sunoco / Cars Plus

Eighteen monitoring wells and four groundwater recovery wells exist on and east of the Sunoco / Cars Plus property and their depths range from 19' to 39' bsg. Well logs for the monitoring wells and one recovery well were available, but logs for the other three recovery wells were not seen in the file (these wells were reported to have been installed in September 2012). The wells penetrated and were screened in fractured limestone.

Groundwater elevation data from these wells were reviewed. Under static conditions (non-pumping and non-injection conditions), shallow groundwater flow beneath the Sunoco / Cars Plus property is toward the east (see the attached maps). It appears that the groundwater elevation datum at theis site is also based on an assigned value, so that groundwater elevation across the property is relative for all the wells monitored, but as with the Lehr's Exxon site, cannot be directly correlated with elevations relative to mean sea level, such as are measured at the fYNOP site.

Groundwater elevation amsl on the Sunoco / Cars Plus site was estimated by using the ground surface elevation from Lidar data, ranging from 376 to 380 feet amsl, and the depth to groundwater measured at the Sunoco / Cars Plus site (approximately 16 feet). Therefore, the groundwater elevation is approximately 360 feet amsl. This elevation is higher than the elevation of Codorus creek of 339 feet amsl and of the wells in the fYNOP WPL area (343 feet for non-pumping wells and 338 feet for pumping wells), suggesting that groundwater flow from the fYNOP would not flow west of Codorus Creek toward the Sunoco / Cars Plus property.

Memorandum

GROUNDWATER SCIENCES CORPORATION

To: file

From: Jennifer Reese

Date: July 1, 2013

Re: fYNOP Offsite Reconnaissance West of Codorus Creek

On June 11, 2013, GSC (Jennifer Reese) conducted a site reconnaissance at North York Car Wash/T Mobile Store (property owned by Shipley Energy). No wells were observed at the Car Wash, but 3 monitoring wells were observed at the T Mobile store. One well was only 7.11 feet deep and was dry. Depth to groundwater in a second well was 27.18 feet below the ground surface and the well was 45.6 feet deep. A third well was observed, but could not be accessed because the drive-over manhole cover was wedged too tightly in place. GSC also performed a reconnaissance visit to the parking lot at the Northgate Shopping Center (Rent a Center and McDonalds), but there were no wells observed or identified in the parking lot.

An approximate ground surface elevation of 390.45 feet amsl for the well at the T Mobile store was determined using Lidar data. Therefore, groundwater elevation is calculated at 363.27 feet amsl. The elevation of Codorus Creek is approximately 339 feet amsl at the fYNOP Codorus 2 measuring point indicating that groundwater would be unlikely to flow westward from the Codorus Creek area to the T Mobile store.

I also performed a reconnaissance at the parking lot of the Northgate Shopping Center (Rent a Center and McDonalds) looking for wells, but did not find any wells.

On June 18, 2013, GSC (Jennifer Reese) received an email from Marianne McDonald regarding wells at the Northgate Shopping Center (Rent a Center and McDonalds). The email is attached and states that there are no wells currently on the property, therefore access is denied.

RE Access to Wells
at the Northgate Sho

Memorandum

GROUNDWATER SCIENCES CORPORATION

To: file

From: Jennifer Reese

Date: May 19, 2015

Re: fYNOP Offsite PADEP File Review

On August 8, 2013, GSC (Jennifer Reese) conducted a PADEP file review for the Rutters Brothers Dairy property located west of Codorus Creek in Manchester Township, York County, Pennsylvania as part of fYNOP's research to determine the direction of groundwater flow in off-site properties to the west of the fYNOP site. The property was identified through a PGWIS search for wells within the state's database (PAGWIS).

PADEP provided file no. 2G 6432 for the property.

The file noted the existence of Rutters Spring Well No.1 – Meadow Well. This well is reported to exist at lat. 39 deg 59 min 35.9 sec and long 76 deg 44 min 17.7 sec. Well construction information is that the well is 80 feet deep and is 6 inches in diameter from 50 feet to 80 feet bgs. A water-bearing zone was encountered between 75 feet and 77 feet, and produces a water yield of 100 gpm. Aquifer tests were performed at the Rutters Spring Well No.1 on February 19, 2004 and September 1 through 3, 2004. This well is located about 800 feet away from an unnamed tributary to Codorus Creek. This tributary is the one that discharges to Codorus Creek north of the York City Sewer Treatment Plant. The elevation of this well was reported to be at approximately 390 feet amsl. Static water level was 10.62 feet below the top of the well casing (casing stickup is about 2 feet above the ground surface) on September 1, 2004. The elevation of Codorus Creek is approximately 339 feet amsl. The higher groundwater elevation in Rutters Spring Well No. 1 indicated that a downward gradient exists from that well toward the Codorus Creek.

The file reports the existence of South Spring (aka Rutter's Dairy Spring), located 620 feet SE of Well No. 1. It is probable that this is the spring which produces the tributary to Codorus Creek. Flow in the spring reportedly varies from 1,040 to 1,160 gallons per minute. The spring emerges at a contact between the Ledger and Vintage Formations.

A Sassoon Spring 3 was also mentioned in the file. Its flow was reported to be intercepted by borehole, TW-1, which was planned for use as a public water supply (bottled spring water). It is unknown if this is the same location as South Spring (and Rutters Spring Well No. 1.

The existence of North Spring was reported in the file. Its location is 2,650 feet north of Rutters Spring Well No.1. North Spring supplies water for the dairy herd.

Well No. 2 (The Lawn Well) was the original location selected as the production well, instead of Rutters Spring Well No.1. Utilities and structures prevented it from being located at the optimal location.