BEFORE THE POLLUTION CONTROL BOARD
OF THE STATE OF ILLINOIS

L. KELLER OIL PROPERTIES, INC. / FARINA	)	
	)	
Petitioner,	)	
	)	
v.	)	PCB No. 07-147
	)	
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY,	)	
	)	
Respondent.	)	

NOTICE OF FILING

TO:

Melanie A. Jarvis
Assistant Counsel
Division of Legal Counsel
Illinois Environmental Protection Agency
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276

Carol Webb
Hearing Officer
Illinois Pollution Control Board
1021 North Grand Avenue East
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PLEASE TAKE NOTICE that on January 11, 2008, filed with the Clerk of the Illinois Pollution Control Board of the State of Illinois an original, executed copy of Petitioner's Motion for Reconsideration and Request for Oral Argument along with Petitioner's Brief in Support of its Motion for Reconsideration.

Dated: January 11, 2008

Respectfully submitted,

L. KELLER OIL PROPERTIES / FARINA

By: Carolyn S Hesse
One of Its Attorneys

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CERTIFICATE OF SERVICE

I, on oath state that I have served the attached Petitioner's Motion for Reconsideration and Request for Oral Argument along with Petitioner's Brief in Support of its Motion for Reconsideration by placing a copy in an envelope addressed to:

Melanie A. Jarvis
Assistant Counsel
Division of Legal Counsel
Illinois Environmental Protection Agency
1021 North Grand Avenue East
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Carol Webb
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Springfield, Illinois 62794-9274

from One North Wacker Drive, Suite 4400, Chicago, Illinois, before the hour of 5:00 p.m., on this 11th Day of January, 2008.

Carolyn S. Hesse

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Respondent.	)	

PETITIONER L. KELLER OIL PROPERTIES/FARINA'S MOTION FOR RECONSIDERATION AND REQUEST FOR ORAL ARGUMENT

Petitioner, L. Keller Oil Properties / Farina ("Keller Oil" or "Keller/Farina"), by its counsel Barnes & Thornburg LLP and pursuant to 35 Ill. Adm. Code 101.500(e), moves the Board to Reconsider its Order and Opinion dated December 6, 2007. In support of this Motion, Keller Oil states as follows:

1. On December 6, 2007, the Board issued an Opinion and Order of the Board (the "Decision") in this case. In the Decision, the Board partially affirmed and partially reversed determinations made by the Illinois Environmental Protection Agency (the "Agency") in its May 17, 2007 letter rejecting L. Keller Oil Properties/Farina's ("Keller") Site Investigation Plan and Budget for the underground storage tank site located at 1003 West Washington Avenue, Farina, Fayette County (the "Site").

2. Specifically, the Board "affirm[ed] the Agency by finding that the Record supports the Agency's determination that Keller did not construct monitoring wells in a manner that allows for sampling at only the desired interval." *Id.*

3. Under the standard for a motion to reconsider, the Board should reconsider the rulings in its Order as errors in the application of existing law under the Act. A party can file a motion to reconsider "to bring to the [Board's] attention newly discovered evidence which was not available at the time of the hearing, changes in the law or errors in the [Board's] previous application of existing law." *People v. Community Landfill Co, Inc.*, PCB No. 03-191, 2006 Ill. Env. LEXIS 323, *2-3 (June 1, 2006). Moreover, a "motion to reconsider may specify 'facts in the record which were overlooked.'" *Id.* (quoting *Wei Enterprises v. IEPA*, PCB No. 04-23, slip op. at 5 (Feb. 19, 2004). Keller moves the Board to reconsider based on newly discovered evidence, errors in the Board's previous application of existing law, and facts in the Record that the Board appears to have overlooked.

4. Keller now moves the Board to reconsider the portion of the Decision affirming the Agency's determination that the monitoring wells were not constructed "in a manner that allows for sampling at only the desired interval" and, therefore, Keller did not comply with the Stage I groundwater monitoring requirements.

5. As set forth more fully in the accompanying memorandum, Keller moves the Board to reconsider this determination because (1) the Board's holding is not supported by the law for a number of reasons, including its approval of the Agency's interpretation of the term "desired interval"; (2) the Board's holding would result in monitoring wells at the Site being constructed in violation of the requirements of 35 Ill. Adm. Code 734.430(a) based on the undisputed evidence contained in the Record; (3) the Board's holding that requiring monitoring wells to be screened at the static groundwater level is reasonable for detecting petroleum indicator contaminants because those contaminants are lighter than the groundwater is not supported by the undisputed evidence contained in the Record; (4) the Board's holding is

contrary to accepted principles of professional geology and professional engineering practices and, therefore, is not in accordance with 35 Ill. Adm. Code 734.510(a); (5) the Board ignored the evidence in the Record establishing that groundwater at the Site is under confined conditions; (6) the Board erroneously concluded that the results of the hydraulic conductivity tests are consistent with the silty clay unit being the groundwater-producing layer; and (7) the Agency and the Board erroneously concluded that monitoring wells installed as the Agency directed would produce water even though undisputed evidence in the Record and newly discovered evidence demonstrates that they would not produce water.

6. Keller also moves the Board to reconsider its denial of Keller's request for attorney's fees and award a portion of those fees consistent with the issues on which Keller prevailed.

7. In addition, pursuant to 35 Ill. Admin. Code 101.700, Keller respectfully requests oral argument before the Members of the Board and suggests that oral argument be scheduled following or before a regularly scheduled Board meeting to allow all Board members to attend. The purpose of oral argument is to discuss the legal issues discussed elsewhere in this Motion and in the brief being filed simultaneously with this Motion. Oral argument will also allow the Board to ask questions.

8. Attorneys for Keller were served by certified mail with the Board's December 6, 2007 Order on December 12, 2007. Accordingly, this Motion to Reconsider is timely filed.

WHEREFORE, Keller respectfully requests that the Board grant this Motion for Reconsideration, award Keller attorney's fees, grant oral argument before the Board, and grant all other relief that the Board deems fair and just.

Respectfully submitted,

L. Keller Oil Properties (Farina)

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PETITIONER L. KELLER OIL PROPERTIES/FARINA'S
BRIEF IN SUPPORT OF ITS MOTION FOR RECONSIDERATION

INTRODUCTION

On December 6, 2007, the Illinois Pollution Control Board (the "Board") issued an Opinion and Order of the Board (the "Decision") in this case. In the Decision, the Board partially affirmed and partially reversed determinations made by the Illinois Environmental Protection Agency (the "Agency") in its May 17, 2007 letter rejecting L. Keller Oil Properties/Farina's ("Keller") Site Investigation Plan and Budget for the underground storage tank site located at 1003 West Washington Avenue, Farina, Fayette County (the "Site"). (D. 1)[1] Specifically, the Board "affirm[ed] the Agency by finding that the record supports the Agency's determination that Keller did not construct monitoring wells in a manner that allows for sampling at only the desired interval." *Id.* Based on this holding, the Board "direct[ed] Keller to submit to the Agency an amended Stage 2 Site Investigation Plan and Budget consistent with the terms of this opinion and order." (D. 1-2) The portion of the Decision affirming the Agency's

[1] The designation "D." refers to the December 6, 2007 Order and Decision of the Board. The designation "R." refers to the administrative record in this appeal. The designation "T." refers to the transcript of the Board hearing that took place in this appeal on August 22, 2007. The designation "Ex." refers to exhibits at the August 22, 2007 hearing.

determination that the monitoring wells were not constructed "in a manner that allows for sampling at only the desired interval" and, therefore, Keller did not comply with the Stage I groundwater monitoring requirements is the primary subject of this brief and the associated motion for reconsideration. In addition, Keller requests that the Board reconsider its denial of attorneys' fees as that issue had not yet been fully briefed.

As discussed in this brief, Keller requests that the Board grant its motion for reconsideration of its holding that Keller did not construct the monitoring wells in a manner that allows for sampling at only the desired interval because:

1. The Board's holding is not supported by the law. If the Board had interpreted the words "desired interval" in accordance with governing case law, the Board would have held that the term "desired interval" in 35 Ill. Adm. Code 734.430(a)(3) could not mean the static groundwater level[2] in the wells which is the water level that was found in the wells days after the wells were constructed. Instead, "desired interval" must mean the zone where groundwater is located in the ground where groundwater contaminants could be located as Keller contends. Holding that the term "desired interval" means the static groundwater level in a monitoring well and that the monitoring well must be screened at that level: (a) conflicts with Section 734.430(a) when it is read as a whole; (b) ignores the plain meaning of the word "interval"; and (c) ignores

[2] "Static level" is defined as the "water level of a well that is not being affected by withdrawal of ground water". Exhibit 4 at 197. It also synonymous with "hydrostatic level." *Id.* "Hydrostatic level" is defined as "[t]he water level in a well or piezometer. It defines the potentiometric surface." Id. at 105. "Potentiometric surface" is defined as "[a]n imaginary surface representing the total head of groundwater and defined by the level to which water will rise in a tightly cased well. The water table is the potentiometric surface of an **unconfined aquifer**." *Id.* at 156 (emphasis added). The static groundwater level in a monitoring well indicates the depth of the top of the groundwater in only an unconfined aquifer where the pressure on the surface of the groundwater is equal to atmospheric pressure. As discussed, the evidence in the record clearly demonstrates that the groundwater at the site is not an unconfined aquifer because there is at least a 4 to 5 foot difference between the level of water in the ground and the level of water in the wells. Thus, the groundwater at the Site meets the definition of confined groundwater. (Ex. 4, p. 40) The static groundwater level at the Site has no relation to the depth of the top of the groundwater in the ground.

that Section 734.430 uses the different terms "desired interval" and "static groundwater elevations" in different portions of that regulation and, therefore, those different terms must mean different things.

2. The Board's holding would result in monitoring wells at the Site being constructed in violation of the requirements of 35 Ill. Adm. Code 734.430(a) based on the undisputed evidence contained in the Record. The Record is clear that groundwater is present at the Site only beginning at a depth of approximately 10 to 11 feet below the ground surface and extending downward to a depth of approximately 13.5 feet. (R. 90-94) There is nothing in the Record that indicates that groundwater is located in the soil at a depth shallower than 10 feet below ground surface ("bgs"). Therefore, to monitor for potential contaminants in the groundwater, the monitoring well screens must be located at the interval where groundwater is located in the formation.[3] The Record is clear that groundwater does not exist at the Site at the depths associated with the static groundwater levels and, thus, placing the well screens at those depths would be pointless because representative groundwater samples could not be collected due to the absence of groundwater at those depths in the formation. Furthermore, if a monitoring well were installed according to the Agency's position and the Board's decision that the well should be screened at the water elevation in the well, that monitoring well would violate other requirements of 35 Ill. Adm. Code 734.430 because the well screen would be located too close to the surface of the ground.

[3] The term "formation" refers to the various layers of soil, sand, silt, clay located beneath the surface of the ground. The U.S. Environmental Protection Agency's document "Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells" defines "formation" as "[a] mappable unit of consolidated material or unconsolidated material characterized by a degree of lithologic homogeneity." EPA160014-891034, March 1991, p. 214.

3. The Board's holding that requiring monitoring wells to be screened at the static groundwater level is reasonable for detecting petroleum indicator contaminants because those contaminants are lighter than the groundwater is not supported by the undisputed evidence contained in the Record.

4. The Board's holding is contrary to accepted principles of professional geology and, therefore, is not in accordance with 35 Ill. Adm. Code 734.510(a). Keller presented testimony from two professional geologists that the desired interval is the interval at which groundwater is located in the ground. If the Agency personnel involved in this case understood geology, they would understand that the desired interval, the interval at which groundwater samples must be collected, must be the interval at which groundwater exists in the formation and not the static groundwater level in the monitoring well.

5. The Board's holding is not supported by and conflicts with evidence in the Record. The Record shows that groundwater was first encountered during drilling as moisture was first detected at depths of approximately 10 to 11 feet bgs. (R. 90-94; T. 23-24, 90, 121, 124) At a depth of 12 to 13.5 feet, there was wet sand, then the soil became dry again. *Id.* The wet sand layer, along with the moist area above it is the groundwater interval of interest. (T. 47-48, 60, 97) The evidence before the Board also demonstrated that the wells were screened across this interval of wet sand and moist soil so that water could flow from the wet sand and moist soil into the monitoring well. (R. 90-94, 102-102, 173; T. 34-35, 90-91) In fact, the well screens extended above the depth of 10 feet into the dry soil above the groundwater interval. (R. 102-106) Thus, if contaminants were floating on the groundwater, they would have been intercepted by the well screens. There is no evidence in the Record to support the Agency's erroneous

conclusions, which the Board adopted, that the wells were submerged or that the uppermost silty clay layer is a water bearing unit.

6. The Board erroneously concluded that the results of the hydraulic conductivity tests are consistent with the silty clay unit being the groundwater-producing layer. There is no evidence in the Record to support that conclusion. In fact, the evidence shows the opposite.

7. If a monitoring well were installed as the Agency directed and not screened at the depth at which the Record conclusively demonstrates corresponds to the interval in which groundwater is located in the ground, that monitoring well will not produce water. The Record documents that Keller informed the Agency of this and presented testimony at the hearing confirming this fact. (R. 173; T. 36-37, 49-50, 95-96) The testimony of Keller's witnesses was not rebutted. In addition, Keller installed a monitoring well in conformance with the Agency's position regarding the bottom depth of the well and the well screen after the Board issued its Decision. (*See* Appendix A) In other words, the well is not screened at the depth that Keller believes and the Record demonstrates is the desired groundwater interval. **That well did not produce water, as Keller predicted, and as the evidence in the Record dictated.**

STANDARD OF REVIEW

Under the standard for a motion to reconsider, the Board should reconsider the rulings in its Order as errors in the application of existing law under the Act. A party can file a motion to reconsider "to bring to the [Board's] attention newly discovered evidence which was not available at the time of the hearing, changes in the law or errors in the [Board's] previous application of existing law." *People v. Community Landfill Co, Inc.*, PCB No. 03-191, 2006 Ill. Env. LEXIS 323, *2-3 (June 1, 2006). Moreover, a "motion to reconsider may specify 'facts in the record which were overlooked.'" *Id.* (quoting *Wei Enterprises v. IEPA*, PCB No. 04-23, slip

op. at 5 (Feb. 19, 2004). In addition, the standard of review at a hearing before the Board under 415 ILCS 5/40 "is whether the application, as submitted to the Agency, would not violate the Act and Board regulations." *L. Keller Oil Properties, Inc. v. IEPA*, 2007 Ill. Env. LEXIS 510, *105-106 (Dec. 6, 2007).

Keller is filling its motion for reconsideration and this brief in support of that motion because the Board's holding that the Record supports the Agency's determination that Keller did not construct monitoring wells in a manner that allows for sampling at only the desired interval (a) constitutes an erroneous application of existing law, (b) is not supported by and ignores the undisputed facts and evidence in the Record, (c) would result in the installation of monitoring wells that would violate regulatory requirements and that would not conform to principles of professional geology, and (d) new evidence that documents that the desired interval for collecting a groundwater sample is the saturated zone that Keller has inconsistently told the Agency is the desired interval. In addition, the undisputed evidence contained in the Record clearly demonstrates that Keller's monitoring wells, as currently installed, do not violate the Act and the applicable regulations.

THE UNDISPUTED EVIDENCE IN THE RECORD DEMONSTRATES THAT THE MONITORING WELLS WERE PROPERLY CONSTRUCTED TO INTERSECT THE DESIRED INTERVAL OF GROUNDWATER

1. On July 12, 2006, monitoring wells were drilled at the Site using hollow stem augers. (R. 11, 90-94) During drilling, dry silty clay and clayey silt was observed to a depth of approximately 10 feet below ground surface ("bgs"). (R. 90-94, 102-106) (To assist the Board in its review of this Brief, R. 90-94 and 102-106 are attached at Appendix B.) At a depth of approximately 10 feet below ground surface, the silty clay became moist and at a depth of approximately 12 feet below ground surface wet sand was encountered. (*Id.*, T. 90, 91, 97) At a

depth of approximately 14 feet below ground surface, the soil became dry silt. *Id.* These observations were recorded in borehole logs for the site. The borehole logs are found at R. 90-94. The column labeled "soil and rock description" in the borehole logs shows that moisture was first observed at a depth of approximately 10 feet below ground surface and that a wet sand layer was observed between 12 and 13.5 feet bgs. The notation on the borehole logs "wet sand" means that this layer is saturated with water. There is no indication that moisture or wet conditions existed in the clayey silty soil at levels above 10 feet bgs. It is generally accepted professional geologist principles to record on soil boring logs conditions that were observed in the field while drilling soil borings and monitoring wells. In fact, Section 734.425(c) requires that observations while drilling soil borings be recorded on soil boring logs also known as borehole logs. Thus, the borehole logs in the Record clearly show that there is an interval of groundwater located in the wet sand layer and that there is no interval of groundwater located less than 10 feet bgs.

2. The well construction reports found at R. 102-106 show that the well screens were 10 feet in length.[4] (*See* Appendix B) A well screen essentially is a pipe made of stainless steel or other material that is inert to the contaminants being monitored. The well screen has numerous small slits in it that allow water to migrate from the surrounding formation into the monitoring well. The Record that was before the Agency demonstrates that the 10 foot well screens at the Site were positioned so that the center of the monitoring well was located at or slightly above the level at which groundwater was first encountered during drilling. (R. 102-106) This was done to take into account possible seasonal fluctuations in the groundwater level. (T. 89) In addition, by positioning the wells so that the screen extended above the upper surface

[4] The Agency generally requires use of 10 foot long well screens. (R. 253)

of the groundwater, if there were contaminants on top of the groundwater, those contaminants would migrate from the formation through the slits in the well screen and into the monitoring well. (T. 57) By reviewing the Well Completion Report for Monitoring Well 1, located at R. 102, one can see that the depth to groundwater while drilling was approximately 10 to 11 feet. The well screen for that monitoring well was positioned so that it extended from 4.5 feet to 14.5 feet below ground surface. (The ground surface is at relative elevation of 100 feet and the top of the well screen is at 95.50 feet. 100 - 95.5 = 4.5 feet. Similarly, the bottom of the well screen is at 85.5 feet. 100 - 85.5 = 14.5) Thus, Monitoring Well 1 was completed so that several feet of the well screen extended above the upper-most level of moisture.

For Monitoring Well 2, the Well Completion Report at R. 103 documents that the depth to water while drilling was approximately 10 to 11 feet bgs. The 10 foot well screen was positioned so that the top of the screen was located approximately 4.5 feet below ground surface (ground surface located at 100.33 feet minus top of screen located at 95.83 feet = 4.5 feet). The bottom of the well screen was located at 14.5 feet below ground surface (100.33 feet minus 85.83 feet elevation at bottom of well screen = 14.5 feet). Thus, Monitoring Well 2 covered the entire interval where groundwater was located in the formation, and extended several feet above the surface of the groundwater interval.

The Monitoring Well 3 Well Completion Report is located at R. 104. This Report shows that the depth to water while drilling was approximately 10 to 11 feet below ground surface. The well screen for Monitoring Well 3 was set so that the top of the well screen was 4.5 feet below ground surface (ground surface at 101.47 feet minus top of well screen at 96.97 feet = 4.5 feet). The bottom of the well screen was set at 14.5 feet below ground surface (101.47 feet minus 86.97 feet). Thus, the well screen for Monitoring Well 3 crossed the entire interval of

groundwater in the formation, and the top of the well screen extended above the top of the upper most surface of the groundwater by several feet.

The Well Completion Report for Monitoring Well 4 is located at R. 105. This Well Completion Report documents that the depth to water when the well was drilled and constructed was approximately 10 to 11 feet. This report also documents that the top of the well screen was set at approximately 4.5 feet bgs (101.45 foot elevation of the ground surface minus 96.95 foot elevation for the top of the screen = 4.5 feet). Similarly, the bottom of the well screen was set at a depth of 14.5 feet below ground surface (101.45 foot elevation at ground surface minus 86.95 foot elevation to the bottom of screen). Thus, the well screen extended over the entire interval where groundwater was observed during drilling of the monitoring well and the well screen extended above the surface of the groundwater by several feet.

The Well Completion Report for Monitoring Well 5 is found at R. 106. That Well Completion Report shows that the depth of the groundwater was approximately 10 to 11 feet while drilling. The top of the well screen was located 4.5 feet below ground surface (100.70 ft. ground surface elevation minus 96.20 ft. elevation at top of screen). The bottom of the well screen was located at 14.5 feet below ground surface (100.70 feet elevation for the ground surface minus 86.20 feet elevation of bottom of screen). Thus, Monitoring Well 5 was screened to intersect the entire interval of groundwater in the formation and extended several feet above the surface of the groundwater encountered during drilling. In short, the Record that was before IEPA clearly documents that all five monitoring wells were screened to intersect the saturated, wet sand layer which is the desired interval for sampling groundwater as well as the moist layer and part of the dry zone above the groundwater.

3. Keller presented testimony at hearing from two licensed professional geologists who had installed thousands of monitoring wells. Their testimony explained certain generally accepted practices and principles of professional geologists as the regulations at 35 Ill. Admin. Code 734.510(a) require the Agency to review plans "in accordance with generally accepted engineering practices or principles of professional geology." In addition, they identified the portions of the Record that demonstrate that the desired interval of groundwater is the wet sand layer at 12 to 13.5 feet. They also testified that, if monitoring wells were installed at the Farina site as IEPA believes they should be installed, the wells would not produce water and would violate Board regulations and generally accepted professional engineering practices and principles of professional geology. While the Board is generally limited in permit appeals to considering the information in the Record before the Agency, "the Board hearing affords petitioner the opportunity to challenge the Agency's reasons for its decision." *See* Board Order in this mater dated July 12, 2007. At hearing, Keller presented evidence that the Agency's reasoning is wrong based on the information in the Record and wells installed according to the Agency's reasoning would result in violations of Board regulations and generally accepted practices for installing monitoring wells.

4. Ms. Rowe, who has installed hundreds of monitoring wells, installed the wells at the Site and is Keller's consultant. (T. 87) She testified that the wet sand seam, located at 12 to 13.5 feet was the desired interval for screening the wells. "[T]he sand seam was obviously the -- the primary aquifer" (T. 91)

> Q. And what would you describe the desired interval as at the Farina site?
>
> A. Definitely the sand seam would be a desired interval. And again the foot or foot and-a-half above that we are not sure if that was a producible unit or not. It appeared saturated

> during drilling. So it may have produced as well. So both - - both of those units would have been within the screened interval. (T. 97)

This fact is also documented in the borehole logs and the well construction reports in the Record at R. 90-94 and 102-106. During cross examination, Ms. Rowe confirmed that at "10 feet we hit moisture and then it became virtually saturated. . ." (T. 121) and that was the information Keller presented to the Agency. (T. 121-122) Ms. Rowe also testified that, when the wells were installed, they could not tell they were in a confined aquifer situation. (T. 91)

5. Another one of Keller's witnesses, Ron St. John, is a certified professional hydrogeologist by the American Institute of Hydrology, a certified professional geologist by the American Institute of Professional Geologists and a certified geologist in the State of Illinois. (T. 11-12) He has over 27 years of experience in his field and installed either in person or directed in the field the installation of more than 10,000 monitoring wells. (T. 14, Ex. 3) At the hearing in this appeal, Mr. St. John testified as an expert witness on hydrogeology and the correct installation of monitoring wells, and that the wells at the Site were installed in compliance with Board regulations and professional geologist practices.[5] (T. 11-81) His testimony was based solely on information contained in the Record that was before the Agency as he had not been to the site or discussed the site with Keller's consultant prior to the hearing. (T. 78) The boring logs and the monitoring well completion reports and related documents from the Record that he reviewed are the types of documents that a professional geologist would review to determine if monitoring wells were installed in accordance with professional geologist

[5] The hearing officer admitted Mr. St. John's expert testimony. Further, a federal district court judge has found Mr. St. John to be an expert on hydrogeologic issues. (T. 66, 77) *Le Clerq v. The Lockformer Co.*, No. 00C7164, 2005 WL 1162979 (N.D. Ill. April 28, 2005). Not reported in F. Supp. 2d, but available through Westlaw. While Mr. St. John's testimony was not admitted with respect to wastewater treatment in that matter, he was recognized as an expert on hydrogeologic issues (*Id.*), which is the subject of his testimony here.

practices. (T. 60-61) By reviewing information in the Record at R. 90-94, Mr. St. John testified that the soil became moist at approximately 10 feet below ground surface and that the sand seam below that, which was wet, was the water bearing unit. (T. 20-21, 29-30) The monitoring wells, as installed, intersected the desired groundwater interval and extended above that interval. (R. 90-94, 102-106; T. 60, 96-97) The monitoring wells were installed in accordance with the applicable regulations and accepted practices and principles of professional geology and professional engineering. (T. 58-59)

6. Mr. St John also testified at hearing that the silty clay layer that is the predominant soil type from the surface to about 12 feet "is incapable of yielding water to any degree freely to a borehole or a well. (T. 20-21) He also testified that "the only unit that would have [produced water] would have been the sand layer located at 12 to 13.5 feet below ground surface. (*Id.*) This wet sand layer is the desired interval for sampling groundwater. (T. 47-48) It is the groundwater bearing unit closest to the surface. (R. 37, 90-94) This is also the layer where one would most likely find groundwater contaminants. (T. 70) The layer of sand at 12 to 13.5 feet below the surface of the ground is where groundwater was encountered and there is an apparent confining pressure because the static water levels in the wells rose to a level of 2 or 3 feet below the ground surface. (T. 29-30) The static water level for a confined aquifer cannot be used to determine the top of a water bearing unit. (T. 30) When drilling a monitoring well in glacial till, like at the Site, "there's no way to really know what the ultimate level -- hydrostatic level will be for a well completed in a saturated zone or aquifer. . . . You simply have to wait until the well is completed and determine later on after the static water level has reached equilibrium with the atmosphere." (T. 32-33) In instances where soil permeabilities are not great, it may take days for the static water level to reach equilibrium. (T. 33) When a screen is

placed in a monitoring well, one cannot always tell what the static water level will be. (*Id.*) His testimony was based on his knowledge as a professional hydrogeologist and his review of the borehole logs and other documents contained in the Record. (T. 22-23, 26-28) Based on his review of the well completion logs at R. 102-106 the wells were screened in compliance with Board regulations (T. 34) and the saturated zone, which is the desired interval, was intersected by the well screen. (T. 34-35)

7. Thus, the Record demonstrates that the wells were screened to obtain water at the desired interval, which is the wet sand layer that is the upper saturated zone, located at 12 to 13.5 feet below ground surface, and well screens extended above that interval. (R. 90-94, 102-106; T. 59-60, 88-91, 96-97, 123-125) Thus, the well screen intersected the desired interval and, if there were petroleum contaminants floating on the groundwater, the well screen would have intersected them.

8. Because all of the well screens were positioned so that the screens extended above the surface of the observed groundwater interval, the well screens were not submerged beneath the desired groundwater interval (T. 47-48) and, if petroleum contaminants were floating on the groundwater, the monitoring well screens were positioned to collect samples of the petroleum. Further, the borehole logs found at R. 90-94 for Monitoring Wells MW-1, MW-2, MW-4 and MW-5 contain the statement in the remarks column that there was "no odor or discoloration throughout." (R. 90, 91, 93 and 94) The borehole log from Monitoring Well 3 at R. 92 indicates a slight odor and discoloration at a depth of approximately 4.5 feet below ground surface. None of the borehole logs indicate a layer of petroleum products on the groundwater. (R. 90-94) Had such a layer been observed, it would have been noted on one or more borehole logs. As a result,

the Record indicates that a layer of petroleum was not floating on the groundwater at the Keller site.

9. Mr. St. John testified about typical procedures for constructing monitoring wells. (T. 40-41) Monitoring wells are constructed when the holes for the wells were drilled, which is standard geological procedure. The casings for the wells are installed when drilling and the well screen is set during construction of a well. Because the boreholes that are drilled (typically 9 ¼ or 12.5 inches for hollow stem augers, which were used at the Site) are larger than the well casing and screen (typically 2 to 3 inch outer diameter), it is necessary to fill the space between the hole that was drilled and the well casing and screen. This space is referred to as the "annular space." (T. 40) A material such as sand is used, and was used at the Site, to fill the annular space between where the screen is located and the surrounding formation to allow water to freely flow from the formation into the well. (*Id.*, R. 14, 102-106) The regulations at subsection 734.430(a)(3) require that materials be used at the level of the well screen to allow water to enter the well. Above the level of the well screen a bentonite seal and then grout are placed in the annular space to prevent surface contamination from flowing into the monitoring well (T. 41) and that is how the wells were constructed at the Keller site. (R. 102-106) The top part of the monitoring well was cased in accordance with regulations and grouted to prevent surface contamination from entering the monitoring well and to prevent the monitoring well from heaving during the freeze thaw cycle, in accordance with 734.430(a)(3), (4), and (5). R. 102-106.

10. The static groundwater elevation, which is also known as the static water level, was determined on CW^3M's second trip to the site after the wells were installed. (T. 94) Typically, static water elevations are determined days or weeks after a monitoring well is drilled

to allow the water level in the well to reach equilibrium with atmospheric pressure, in accordance with generally accepted professional geology procedures. (T. 32-33) As discussed above in paragraph 6 of this Section, it may take days for the static water level to reach equilibrium in low permeability soil. The regulation at subsection 734.430(c) states: "Static groundwater elevations in each well must be determined and recorded following well construction and prior to each sample collection. . . . " 35 Ill. Admin. Code 734.430(c) (emphasis added). The Agency's position, which the Board adopted, that the well screen must be set during construction at an elevation that can be determined only after the well is constructed and the water level in the well has stabilized defies common sense, logic and the requirements of subsection 734.430(c).

11. Keller presented testimony at hearing that the only importance of determining the static water level is to compare the static water levels "to all the other wells at the site to determine which way groundwater is moving across the site or which direction groundwater is flowing." (T. 95) This opinion is entirely consistent with section 734.430, Monitoring Well Construction and Sampling, in which the only reference to static groundwater elevations is in subsection (c) in the context of determining "the gradient of the groundwater table." The Agency has presented no evidence nor referenced any regulations either at hearing or in the Record that there is another purpose for determining the static water levels, also referred to as static groundwater elevations. In short, the Agency presented no evidence to support its position and the Board incorrectly held that the water level in the well is the desired interval for sampling.

12. It is a generally accepted principle of hydrogeology that if the pressure on the water in the water bearing unit, which is referred to as hydrostatic pressure, is greater than atmospheric pressure, the static water elevation in the well will be higher than where the water is located in the ground. When this phenomenon occurs, the water bearing unit is considered a

"confined aquifer" or an "artesian aquifer." Mr. St. John testified that when you install a well into a confined sand layer that is saturated, which means that the spaces between the sand grains contain water (*i.e.*, wet) and there is hydrostatic pressure on the water, the water level in the well will actually rise up to a level above the top of the wet sand. (T. 21)[6], [7]

13. At the Site, the static water level was approximately 2 to 3 feet below ground surface a few days after the wells were installed and 6 to 8 feet above the level where moisture was first encountered when drilling in the formation. R. 102-106 The depth below ground surface can be determined by subtracting the static water level elevation from the ground surface

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[6] The Glossary of Hydrology, Ex. 4, contains the following definitions:

Aquifer: A formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

Confined aquifer: An aquifer that is bounded above and below by confining beds; an aquifer containing confined ground water.

Confined groundwater: Groundwater under pressure significantly greater than that of the atmosphere. Its upper surface is the bottom of a confining bed.

Confining bed: A body of distinctly les permeable material that is stratigraphically adjacent to one or more aquifers. In nature, its hydraulic conductivity may range from nearly zero to any value that is distinctly less than that of the aquifer.

Hydrostatic pressure: The pressure exerted at the base of a column of water.

Saturated: Said of the condition in which the interstices of a material are filled with a liquid, usually water. It applies whether the liquid is under greater than or less than atmospheric pressure, so long as all connected interstices are full.

Saturated zone: A subsurface zone in which all the interstices are filled with water under pressure greater than that of the atmosphere. Although the zone may contain gas-filled interstices or interstices filled with fluids other than water, it is still considered saturated. This zone is separated from the unsaturated zone (above) by the water table.

[7] The McGraw-Hill Dictionary of Scientific and Technical terms, 5th Ed. 1994 ("McGraw-Hill Dictionary") defines the terms as follows:

Confined Aquifer - *See* artesian aquifer

Artesian Aquifer - An aquifer that is bounded above and below by impermeable beds and that contains artesian water. Also known as confined aquifer.

Artesian Water - Groundwater that is under sufficient pressure to rise above the level at which is encounters a well, but does not necessarily rise to or above the surface of the ground.

Artesian Well - A well in which the water rises above the top of the water-bearing bed.

Hydrostatic Pressure - The pressure at a point in a fluid at rest due to the weight of the fluid above it.

elevation to determine how far below the surface of the ground groundwater rose in the well. This number is then compared to the depth of approximately 10 to 11 feet bgs where groundwater was observed when the hole was drilled for the monitoring well to determine how far the static water level was above the surface of the groundwater. The difference in elevation between the level of the groundwater observed when the well was drilled and the static water level in the well demonstrates that there is hydrostatic pressure on the groundwater and that the water bearing unit at the Site meets the definition of a confined aquifer, also known as an artesian aquifer. The fact that it is a confined aquifer is recognizable by someone with a modest knowledge of hydrogeology and was apparent to Mr. St. John, whose only knowledge about the Site consisted of reviewing the information in the Record.

14. While the manner in which Keller performed the hydraulic conductivity[8] test at this site is not in issue, the Agency grossly misrepresents the results of the hydraulic conductivity tests. Contrary to the Agency's statements in prior briefs, which the Board adopted in its decision, nowhere on R. 13 of the Record is it stated that the silty clay layer is a water bearing unit. (A copy of R. 13 is attached in Appendix C to facilitate the Board's review of that page.) Rather, R. 13 indicates that the hydraulic conductivity at the site is 9.61×10^{-7} and that the hydraulic conductivity calculations are based on the total well depth, screen length and radius, initial water depth and the water level change over time. R. 13. Because the well screens cross the wet sand layer as well as the dry silty clay above the zone where water is located, the hydraulic conductivity test is an average of the hydraulic conductivity of the wet sand unit as

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[8] The McGraw-Hill Dictionary defines hydraulic conductivity as:

Hydraulic Conductivity - *See* permeability coefficient - (fl. mechanics)

Permeability Coefficient - The rate of water flow in gal/day through a cross section of 1 square foot under a unit hydraulic gradient, at the prevailing temperature.

well as the clay and silt layers. (T. 79-80) Mr. St. John, an expert in hydrogeology, testified that if separate hydraulic conductivity tests, also referred to as slug tests, were conducted on the water bearing sand layer and on the silty clay layer that he would expect the fine grained sand to have a hydraulic conductivity of approximately 1 x 10^{-3} and for the silty clay to have a hydraulic conductivity in the range of 10^{-6} to 10^{-9}. (T. 72-73) However, because the well screen intersected both intervals, the hydraulic conductivity test tested both intervals at the same time and the water that entered the well came from the water bearing sand layer and very little water, if any, would be coming from the layer above that. (T. 81) Thus, Mr. St. John's testimony refutes the Agency's mistaken belief that the silty clay layer is a water bearing unit. There is simply no evidence in the Record to support the Agency's position, which the Board adopted. (D. 42) In fact, the evidence in the Record supports Keller's position.

15. The silty clay layer above the wet sand is a confining layer as documented in the Record. The hydraulic conductivity tests were conducted over the full length of the well screen (R. 13) which included both the silty clay layer as well as the wet sand layer (R. 102-106; T. 79-80) and showed a hydraulic conductivity of 1.61 x 10^{-6} and 9.61 x 10^{-7} (R. 229-230). The hydraulic conductivity of 1.61 x 10^{-6} means that groundwater has the potential of moving 1.61 centimeters in one million seconds. A hydraulic conductivity of 9.61 x 10^{-7} means that groundwater could move 9.61 centimeters in 10 million seconds. As discussed in more detail below, by way of comparison, the regulatory requirements for an impermeable liner at a landfill require the liner to have a hydraulic conductivity of 10^{-7} or less. 35 Ill. Adm. Code 724.401(c)(1)(A)(ii). In contrast, the groundwater regulations at Section 620.210 define a class 1 groundwater as "any geologic material which is capable of a . . . hydraulic conductivity of 1 times 10^{-4} centimeters per second or greater." 35 Ill. Admin. Code 620.210.

16. The fact that the silty clay layer above the wet sand is a confining layer is obvious from the Record. When a portion of the silty clay layer above the wet sand layer was removed by constructing the monitoring wells, the confining layer was removed at that location and the hydrostatic pressure on the groundwater in the sand layer forced water up into the well to a level approximately 6 to 8 feet above where water was located in the wet sand layer.

17. There is no evidence anywhere in the Record, including on any of the drilling borehole logs that indicate that water was present in the silty clay layer at the elevation where water was observed in the wells. In fact, the Record demonstrates that Keller advised the Agency that if a well were installed that was screened in the silty clay layer and was not screened across the saturated sand zone the well would be dry. (R. 172). In response to Agency comments, including the Agency's earlier incorrect statements that "the screens are fully submerged beneath groundwater" (R. 172), Keller submitted a supplemental report to the Agency. (R. 167-245) After explaining that the wells were screened where groundwater was encountered in the ground, Keller stated "The groundwater is still entering the monitoring wells in the screen as required by regulation. To have set the wells at shallower depths would have resulted in no production." (R. 173) Mr. St. John testified at hearing that if a monitoring well were drilled that did not connect to the groundwater, the well would not produce water because "you wouldn't have a good hydraulic connection to the well." (T. 36-37) He also testified that it would be very difficult to know in the field how to screen a well to intersect the static water level in the well. (T. 49) If "the screened interval of the well were to intersect the static water level in the well, often times in the case of confined aquifers, you wouldn't have any water. You couldn't have water in the well because the static water level would be too far above the saturated zone yielding water to the well and creating the static water level." (T. 49-50)

Ms. Rowe, one of Keller's consultants also testified at hearing that if a well were screened above the saturated sand layer, the well would be dry.

> Q. What would have been the result for the wells at Farina if they were installed where you first believe you would have encountered groundwater?
>
> A. If we would set the well at 10 to 11 feet, we believe there would be no production of water in that well. (T. 95-96)

To further illustrate this point and to demonstrate the error in the Agency's position and the Board's holding that the wells should have been screened at the static water level, rather than where groundwater is located in the formation, Keller installed another well that was screened solely in the silty clay layer of the formation that IEPA claims is a water bearing unit. In other words, the well was not screened at the interval that Keller believes is the desired interval. As discussed in more detail below and in attached Appendix A, that well did not produce water, even though one of the original monitoring wells, located only a few feet way, had a static water level at 1.8 feet below ground surface. Thus, Keller is correct. Groundwater enters MW-2 where it is screened in the wet sand. Then hydrostatic pressure pushes the water up the well until the water reaches the level where it is observed in the well. Where water is observed in the well is not the desired interval. The Agency's decision must be overturned.

18. Setting the wells at the level of the static water level would result in wells being screened at depths of 2 feet below ground surface or less. The problem with setting screens at such shallow levels is not whether the bottom of the well screen will reach the saturated interval located 12 to 13.5 feet below ground surface as the Agency and the Board appear to believe, but that such shallow wells violate generally accepted principles of professional geology. It would be improper for a number of reasons to have a well screened at the Farina site that went to within 2 to 3 feet of the ground surface. The biggest problem is that surface contaminants can enter

shallow wells through the upper portion of the well screen. (T. 38) The borehole log for MW-2, (location shown at R. 33), clearly shows that the top approximately 1.5 feet is asphalt/gravel subbase. (R. 91) Thus, if a well were screened to be above the static water level that was measured in 2006, which was approximately 3 feet bgs, the well screen would be very near the gravel beneath the concrete. In addition, as the new evidence shows, the water level in MW-2 was at 1.8 feet bgs in December, 2007 and, if a well were screened above that level, the well screen would clearly intercept the asphalt/gravel subbase. As a result, surface spills of gasoline or other contaminants could migrate into the monitoring well. (T. 42-43) In other words, if a well were screened so the top of the well screen was close to ground surface, there would be a vertical pathway for spills that occur on the surface or piping leaks to enter the well (*Id.*) and the well would violate 35 Ill. Admin. Code 734.430(a)(4).

In addition, wells must be grouted from a point above the well screen to the ground surface and the grout must extend below the frost line to prevent the well from heaving during the freeze thaw cycle. (T. 38) *See* 35 Ill. Admin. Code 734.430(a)(5). Grout at monitoring wells is similar to grout between tiles in a shower in that both are designed to prevent water from migrating between the things being grouted. Since the frost line at Farina is approximately 40 inches below grade (T. 39), if a well were screened at 2 feet (24 inches) below grade, the well screen would extend above the frost line and could not be properly grouted. Alternatively to avoid violating subsection 734.430(a)(5), the grout must extend to at least 3 feet 4 inches below ground surface, resulting in grout blocking the well screen. In short, screening wells at the Site in the manner ordered by the Board would result in violations of Board regulations.

19. There is no evidence in the Record to support the holding that the well screens were submerged below the desired interval for sampling. The Record clearly demonstrates that

the well screens were not submerged below the top of the saturated water producing layer located in the ground, which is the desired interval. (R. 90-94,102-106; T. 88-91, 96-97, 123-125) Unsworn statements in a letter from the Agency are not credible evidence that the wells were submerged below the desired interval. Questions by the Agency's attorney during cross-examination at hearing are not evidence. Ms. Jarvis' question about whether Keller intended the wells to be submerged is not evidence that the well screens were submerged because Ms. Jarvis did not define what she meant by submerged, nor is there any testimony or other evidence in the Record before the Board that the wells were not constructed as intended, nor is Ms. Jarvis' question about intentions evidence. In fact, the entire cross examination by Ms. Jarvis on those topics consisted of the following exchange:

> Q. When you set the well screen, did you intend the well to be submerged?
>
> A. No.
>
> Q. Okay.
>
> A. No.
>
> Ms. Jarvis: I have no further questions. (T. 123)

In addition, on re-direct examination, Ms. Rowe testified as follows:

> Q. Would you have set the screens differently . . . for these wells if you had known they would be submerged beneath the static water level?
>
> A. No, I don't think I would have. And, if I did, I would have probably only by six inches." (T. 125-125)

The Record is clear. The wells were constructed as intended, with the wells screened at the wet sand layer and the moist layer above that which are the desired interval. As stated above, the evidence in the Record shows clearly, to anyone with a modest understanding of hydrogeology,

that the well screens were not submerged below the desired interval for sampling groundwater because they were not submerged below the saturated zone in the ground. In other words, the wells screens were not submerged below where water was located in the ground or where the water entered the wells.

20. The Agency presented no evidence, no sworn testimony, no sworn affidavits, and no cites to credible authorities to explain the Agency's erroneous assertions that the wells should have been screened at levels 2 to 3 feet below ground surface which is the static water level, even though the evidence in the Record documents that the groundwater in the formation is located 10 feet bgs and 6 to 8 feet below the static groundwater elevation.

21. The Agency presented no evidence, no witnesses, no sworn affidavits and no cites to credible authorities to rebut Keller's evidence in the Record that the soil was dry above the 10 foot level.

22. The Agency presented no evidence, no sworn witnesses, no sworn affidavits and no cites to credible authorities to explain how water could flow from dry soil at the 2 to 4 foot below ground surface level, which was the location of the static water elevation, through a well screen into a monitoring well. In short the Agency failed to present any evidence that had the well been screened at that level that there would have been water in the formation to flow into the well. In short, the Agency presented no evidence that the well screens were submerged below the desired interval.

23. The proper method for determining if contamination is present in soil above the level of the groundwater is to analyze soil samples from soil borings. This, if contamination were presented in the soil above the level of the monitoring wells, it would be found in the soil samples that were analyzed. The Board correctly overturned the Agency's decision and

determined that Keller properly analyzed soil samples that were collected from the soil located above the groundwater, when the monitoring wells were drilled. (D. 45)

24. Because Keller presented a prima facie case based on evidence in the Record that the monitoring wells were installed in compliance with applicable regulatory requirements, the burden shifts to the Agency to rebut that presumption. The Agency presented no evidence to rebut Keller's evidence that the wells were installed properly. In fact, the Agency even failed to explain how the shallow wells requested by the Agency would not violation Board regulations. Thus, the Board should have held in favor of Keller. *John Sexton Contractors Co. v. Pollution Control Board*, 207 Ill. App. 3d 415, 425, 558 N.W.2d 1222, 1229 (1st Dist. 1990).

ARGUMENT

THE BOARD'S DECISION THAT "THE MONITORING WELLS WERE NOT CONSTRUCTED IN A MANNER THAT ALLOWS FOR SAMPLING AT ONLY THE DESIRED INTERVAL" CONFLICTS WITH ILLINOIS CASE LAW GOVERNING THE INTERPRETATION OF REGULATIONS, THE APPLICABLE REGULATIONS THEMSELVES, AND THE UNDISPUTED FACTS CONTAINED IN THE RECORD AND THUS CONSTITUTES CLEAR ERROR.

The issue before the Board in Keller's Motion for Reconsideration is whether the monitoring wells were "constructed in a manner that allows for sampling at only the desired interval." According to the Decision, the "desired interval" is the surface of the groundwater inside the well, which is also known as the static water level and is referred to in the regulations at subsection 734.430(c) as the "static groundwater elevation" and, therefore, a monitoring well's screen must be located at that level. (D. 40-41) In the Decision, the Board stated that it "finds that the Agency's policy of requiring the well screen to intersect the water level in the well in order to meet the performance standard specified at Section 734.430(a)(3) is reasonable for detecting petroleum indicator contaminants, as those contaminants are lighter than the

groundwater." (D. 41) The Board's holding is inconsistent with Illinois case law governing the interpretation of regulations. The Board's holding also is inconsistent with and directly conflicts with the regulations governing the construction of monitoring wells. Moreover, the Board's holding conflicts with the undisputed evidence contained in the Record.

1. The Board's Holding That the Term "Desired Interval" in 35 Ill. Adm. Code 734.430(a)(3) Means the Depth at Which Groundwater is Found in the Monitoring Well and, Thus, the Well Must Be Screened at That Depth is Inconsistent With Illinois Case Law Governing the Interpretation of Regulations and is Inconsistent With and Directly Conflicts With the Regulations Governing the Construction of Monitoring Wells and Would Result in Violation of Those Regulations.

The Board's holding that the term "desired interval" in 35 Ill. Adm. Code 734.430(a)(3) means the depth at which groundwater is found in a monitoring well and, thus, a monitoring well's screen must be located at that depth is erroneous when Illinois case law governing the interpretation of regulations is applied. As such, that holding conflicts with the law and must be overturned.

The law is clear that when regulations are interpreted: (1) they must be evaluated as a whole; (2) the plain meaning of a term governs when that term is undefined; and (3) when one phrase is used in a portion of the regulation and a different phrase is used in another portion of the regulation, different results are intended. The Illinois Supreme Court has provided that "[a]dministrative regulations have the force and effect of law and are construed according to the same standards that govern the construction of statutes." *People v. Hanna*, 207 Ill. 2d 486, 497, 800 N.E.2d 1201, 1207 (Ill. 2003); *Union Elec. Co. v. Dep't of Revenue*, 136 Ill. 2d 385, 391, 556 N.E.2d 236, 239 (Ill. 1990). In construing a regulation or a statute, a Court should review the regulation or statute as a whole. *Ultsch v. Ill. Municipal Retirement Fund*, 226 Ill. 2d 169, 181, 874 N.E.2d 1, 8 (Ill. 2007) ("The statute should be evaluated as a whole."); *People v. Jones*,

223 Ill. 2d 569, 581, 861 N.E.2d 967, 975 (Ill. 2006) ("We construe statutes as a whole, so that no part is rendered meaningless or superfluous."). In addition, when a term is not defined, it must be given its plain meaning. Where a term is not defined by statute or regulation, courts are to interpret that term according to its plain, ordinary, and popular meaning. *People v. Brooks*, 221 Ill. 2d 381, 390, 851 N.E.2d 59, 63 (Ill. 2006) ("*Brooks*") ("The Act does not define the word 'docketing.' As such, we must interpret it, and in so doing, we must give the word its plain, ordinary, and popularly understood meaning."); *People v. Sheehan*, 168 Ill. 2d 298, 306, 659 N.E.2d 1339, 1342 (Ill. 1995) ("*Sheehan*") ("Because the word 'committed' is not defined by statute, we may assume that the legislature intended for the term to possess its ordinary and popularly understood meaning."). Moreover, "[i]t is a basic rule of statutory construction that, 'by employing certain language in one instance and wholly different language in another, the legislature indicates that different results were intended." *In re Mary Ann P*, 202 Ill. 2d 393, 409, 781 N.E.2d 237, 247 (Ill. 2002) (quoting *In re K.C.*, 186 Ill. 2d 542, 549-50, 714 N.E.2d 491 (Ill. 1999)); *In re S.R.*, 349 Ill. App. 3d 1017, 1022, 811 N.E.2d 1285, 1289 (4th Dist. 2004) ("When the General Assembly uses a particular phrase in one provision and different language in another, we must assume that it intended different results for each."); *Emerald Casino, Inc. v. Illinois Gaming Board*, 346 Ill. App. 3d 18, 35, 803 N.E.2d 914, 928 (1st Dist. 2003) ("Generally, when the legislature uses certain words in one instance and different words in another, different results were intended.").

a. The Board's holding violates the rules of regulatory interpretation.

The Board's holding conflicts with the plain meaning of the word "interval." As required by Illinois case law, when a term is not defined in the regulations, the plain meaning of that term governs. *Brooks*, 851 N.E.2d at 63; *Sheehan*, 659 N.E.2d at 1342. "Groundwater is defined as

"underground water which occurs within the saturated zone and geologic materials where the fluid pressure in the pore space is equal to or greater than atmospheric pressure." 35 Ill. Adm. Code 734.115 (citing 415 ILCS 5/3.210). The term "interval" is defined as "a space between objects, units, points, or states". Merriam-Webster OnLine Dictionary. In this context, the "desired interval" is the zone of groundwater located between two zones that do not contain groundwater. The Agency's determination, which was upheld by the Board, that the "desired interval" is the depth of groundwater in a monitoring well, which is a single point, disregards the plain meaning of the term "interval."

The Board's holding also violates the rule of regulatory interpretation which provides that when different terms are used in different portions of the regulation, they must mean different things. In its holding, the Board incorrectly determined that "desired interval" means the static water level in the wells. (D. 41) The static water level in the wells also is known as the "static groundwater elevation" which is discussed in another portion of Section 734.430. According to the regulations, "[s]tatic groundwater elevations in each well must be determined and recorded following well construction and prior to each sample collection to determine the gradient of the groundwater table, and must be reported in the corresponding site investigation plan, site investigation completion report or corrective action completion report." 35 Ill. Adm. Code 734.430(c).

First, the Agency's own rules describe the function of static groundwater elevations and that function is to determine the gradient of the groundwater table which has nothing to do with the depth at which monitoring wells must be screened. Second, if the terms "desired interval" and "static groundwater elevation" were synonymous, one would expect that Section 734.430(a)(3) would have used the words "[s]tatic groundwater elevations" or referenced

subsection 734.430(c). Subsection 734.430(a)(3) contains no such language or reference. In fact, by using the term "desired interval" in 734.430(a)(3) and a different term, "[s]tatic groundwater elevations" in 734.430(c), it is clear those terms mean different things. The Agency must have known what the term "static groundwater elevation" meant when it proposed the monitoring well construction regulations because it used that very term in a subparagraph contained in those regulations. Therefore, if it meant "desired interval" to mean "static groundwater elevation", it would have said so.

Further, the regulation requires that the static groundwater elevation be determined after the well is constructed and this is typically done at least two days after a well is constructed to allow time for water to enter the well and for water levels to equilibrate. (T. 32-33) When a well is constructed, one cannot determine what the static water level will be. (T. 33) In addition, static groundwater water elevations are measured before each sample collection. 35 Ill. Adm. Code 734.430(c). Because constructing monitoring wells including setting well screens to intersect the desired groundwater interval and measuring static elevations occur at different times, it is clear that the terms "static groundwater elevations," which is the stabilized level of water in the monitoring wells, and the "desired groundwater interval," which is the zone that must be screened in order to collected a representative groundwater sample, have different meanings. To make them synonymous would result in a physical impossibility because static groundwater water elevation cannot be known with certainty when a well is constructed. (T. 33)

b. The Board's holding regarding the meaning of "desired interval" also is inconsistent with the requirements in subsection 734.430(a) when it is read as a whole.

The Board's holding that "desired interval" means the static groundwater level in a monitoring well and, thus, the well must be screened at that depth is inconsistent with the

requirements in subsection 734.430(a) when it is read as a whole. The relevant portions of Section 734.430(a) are as follows:

At a minimum, all monitoring wells constructed must satisfy the following requirements:

1) Wells must be constructed in a manner that will enable the collection of representative groundwater samples;

* * *

3) Wells must be screened to allow sampling only at the desired interval. Annular space between the borehole wall and well screen section must be packed with clean, well-rounded and uniform material sized to avoid clogging by the material in the zone being monitored. . . .;

4) Annular space above the well screen section must be sealed with a relatively impermeable, expandable material such as cement/bentonite grout that does not react with or in any way affect the sample, in order to prevent contamination of groundwater samples and groundwater and avoid interconnections. The seal must extend to the highest known seasonal groundwater level;

5) The annular space must be backfilled with expanding concrete grout from an elevation below the frost line and mounded above the surface and sloped away from the casing so as to divert surface water away;

* * *

7) Wells must be developed to allow free entry of groundwater, minimize turbidity of the sample, and minimize clogging.

35 Ill. Admin. Code 734.430(a) is intended to ensure that monitoring wells are constructed to allow the collection of representative samples of the groundwater most likely to be impacted by a release and to prevent the contamination of groundwater and groundwater samples. Therefore, each provision in Section 734.430(a) must be read together to accomplish that goal.

First, monitoring wells must be constructed to "enable the collection of representative groundwater samples[.]". 35 Ill. Adm. Code 734.430(a)(1) (bracketed material added). Also, "[w]ells must be developed to allow free entry of groundwater" into the monitoring well as required by 734.340(a)(7). "Groundwater" is defined as "underground water which occurs within the saturated zone and geologic materials where the fluid pressure in the pore space is equal to or greater than atmospheric pressure." 35 Ill. Adm. Code 734.115. Therefore, monitoring wells must be constructed in the portion of the formation that is saturated. Because the portion of the monitoring well that allows groundwater to flow into the well is the well's screen, the screen must be located at the depth at which groundwater is found which is the saturated zone and the geologic materials where the fluid pressure in the pore space is equal to or greater than atmospheric pressure. Holding that "desired interval" means the screen must be placed at the depth that corresponds to the static groundwater level in the monitoring well would not consistently allow groundwater to flow through the screen and into the monitoring well. The Keller Site is an example of a site where the zone that contains groundwater is located several feet below the static water level and water is not present in the formation at the elevation of the static groundwater level. Since water is not present at the static water elevation, there is no water present to flow through a well screen into a well even if a well were screened at that elevation. Therefore, the Board's holding conflicts and is inconsistent with 734.430(a)(7) that requires the well to be constructed to allow free entry of groundwater and 734.430(a)(1) that requires the collection of representative groundwater samples. Conversely, interpreting "desired interval" to mean the portion of the formation in which groundwater is located, as Keller contends, is fully consistent with these regulations.

Second, 734.430(a)(4) requires the seal between the formation and the monitoring well, called the "annular space," to extend to the "highest known seasonal groundwater level." This requirement is intended to allow groundwater to flow into a monitoring well through the screen as groundwater levels fluctuate over time. It also is intended to ensure that the monitoring well is sealed above that depth to prevent groundwater and groundwater samples from becoming contaminated by materials entering the well from the surface or shallow, unsaturated, portions of the formation. Therefore, holding that "desired interval" means the static groundwater level in the monitoring well would conflict with this requirement any time the static groundwater elevation was higher than the highest known seasonal groundwater level. Conversely, interpreting "desired interval" to mean the portion of the formation in which groundwater is located as Keller contends is fully consistent with this regulation.

Third, 734.430(a)(5) requires the annular space around a monitoring well to be backfilled with expanding cement grout beginning at an elevation below the frost line and extending above the ground surface. By using expanding cement grout, the portion of the well at which the grout is located will be sealed. Holding that "desired interval" means the static groundwater level in the monitoring well and the monitoring well screen must be located at that depth results in it being impossible to comply with 734.430(a)(5), 734.430(a)(1) and 734.430(a)(7) at the same time if the static groundwater level in the monitoring well is higher than the frost line. This is true for the Keller Site because, if the well screen were sealed because of being grouted below the frost line, free entry of groundwater into the monitoring well would be prevented under the Board's and Agency's theory, and the collection of representative groundwater samples as required by 734.430(a)(1) and (7) could not be achieved. Conversely, interpreting "desired

interval" to mean the portion of the formation in which groundwater is located as Keller contends is fully consistent with these regulations.

Fourth, 734.430(a)(3) requires monitoring wells to "be screened to allow sampling at only the desired interval."[9] However, it also requires that the annular space between the borehole and the well screen be packed with materials "to avoid clogging by the material *in the zone being monitored*." *Id.* (emphasis added). Because the phrases "desired interval" and "zone being monitored" are used in the same regulatory provision, they must be related to each other. Holding that "desired interval" means the depth at which groundwater is located in the monitoring well and that the well must be screened at that interval results in a conflict between the terms "desired interval" and "zone being monitored" at confined aquifer sites, like Keller's, where there is a difference of several feet between where water is located in the ground and the water level in the well. Therefore, the Board's holding results in 734.430(a)(3) being internally inconsistent. Conversely, interpreting "desired interval" as referring to the interval at which groundwater is found within the formation, as Keller contends, results in 734.430(a)(3) being internally consistent because it links the interval at which groundwater sampling will be performed, the "desired interval," to the portion of the formation that contains groundwater, the "zone being monitored." This interpretation also results in the requirements in 734.430(a)(3) being consistent with the other requirements in subsection 734.430(a).

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[9] While not an issue in this appeal, it is a well-established geological principle that a reason for placing well screens at only the desired groundwater interval is to prevent contaminants in one water bearing unit from being able to migrate into another and that is likely a basis for the regulation at Section 734.430(a)(3) that the well "be screened to allow sampling at only the desired interval." For example, at one state Superfund site, the Agency project manager wanted to be able to sample both the contaminated upper aquifer and the aquifer beneath it. The Agency caused a single monitoring well to be installed through the upper aquifer, through the confining layer between the upper aquifer and the aquifer below that and into the deeper aquifer. This allowed contaminants to migrate from the upper contaminated aquifer through the monitoring well into the lower aquifer. Subsequent monitoring at that site documented that the only contaminated area in the lower aquifer was down gradient of this monitoring well.

When the requirements in subsection 734.430(a) are read as a whole, it is clear that monitoring wells must be screened at the interval where groundwater is found in the formation. Furthermore, because constructing monitoring wells in conformance with the requirements in subsection 734.430(a) is intended to allow for the collection of representative groundwater samples so contamination can be detected, a monitoring well's screen must be located to include the depth at which contaminants in the groundwater would be present. Therefore, the term "desired interval" must mean the interval of groundwater in the formation at which contamination associated with a release is likely to be present, as Keller contends. When subsection 734.430(a) is read as a whole, the Board's holding affirming the Agency's determination that "desired interval" means the depth at which water is found in a monitoring well and not in the formation is contrary to the clear language in the regulation and conflicts with black letter law governing the interpretation of regulations. Therefore, it must be overturned.

By affirming the Agency's decision that "desired interval" refers to the depth at which water is found in a monitoring well and not the depth at which groundwater is found in the formation, the Board has divorced the phrase "desired interval" from the rest of the regulation and made the underlying regulation internally inconsistent.

For all these reasons, the Board's holding that "desired interval" is the static groundwater level in a monitoring well and the well must be screened at that level violates black letter law governing regulatory interpretation and must be overturned.

2. The Undisputed Evidence in the Record Show that the Board Incorrectly Held that the Term "Desired Interval" in 35 Ill. Adm. Code 734.430(a)(3) Means the Depth at Which Groundwater is Found in the Monitoring Well and, Thus, the Well Must be Screened at that Depth; the Board's Holding is Inconsistent With and Directly Conflicts with the Evidence in the Record and the Regulations Governing the Construction of Monitoring Wells and Would Result in Violations of Those Regulations.

The Board's holding that the term "desired interval" in 35 Ill. Adm. Code 734.430(a)(3) means the depth at which groundwater is found within a monitoring well and, thus, a monitoring well's screen must be located at that depth is inconsistent with and directly conflicts with the regulations concerning the construction of monitoring wells. Therefore, the Board's Decision that the Agency's policy requiring monitoring wells to be screened to intersect the level of water in the well is not supported by the governing regulations and must be overturned when viewed in light of the undisputed evidence contained in the Record.

The undisputed evidence contained in the Record demonstrates that the top of the groundwater at the Site is located at a depth of approximately 10 to 11 feet bgs because that was the depth at which the formation became moist. (R. 90-94) The Record also demonstrates that groundwater is present at the Site at an interval beginning at approximately 10 to 11 feet bgs and ending at approximately 13.5 feet bgs because that was the interval in which the formation was moist or wet. (*Id.*) Because groundwater at the Site is present in this interval and to give effect to each portion of subsection 734.430(a), the screen for each of the monitoring wells must be located in this interval and the Record documents that each screen was located at this interval. (R. 102-106)

Furthermore, if the monitoring wells at the Site were screened at the depth at which groundwater was present in the monitoring well as required by the Board's holding, the monitoring wells would violate Sections 734.430(a)(4) and (5). According to the undisputed

facts in the Record, the depth at which water is present in the monitoring wells at the Site ranges from 2.25 feet below the ground surface in Monitoring Well 1 to 4.36 feet below the ground surface in Monitoring Well 3. (R. 102-106) The undisputed evidence in the Record also demonstrates that groundwater is not located at those depths in the formation. (R. 37, 90-94) In other words, the formation at those depths does not contain groundwater that could flow through well screens into the monitoring wells. Each of the monitoring well boring logs and the Geologic Cross Section explicitly document the depths at which the formation was moist and wet and the depths of groundwater during drilling across the Site and none of those depths correspond to the water levels observed in the monitoring wells. In fact, the undisputed evidence in the Record clearly demonstrates that the highest known groundwater level is approximately 10 to 11 feet below the ground surface. (*Id.*) Therefore, if the monitoring wells were to be screened at the depth of the water found in the monitoring wells, the annular seal would not extend to the highest known groundwater level as required by 734.430(a)(4) because the highest known groundwater level found in the formation was approximately 5.64 to 7.75 feet lower than the water level in the monitoring wells.

In addition, 734.430(a)(5) requires the annular space surrounding the well be filled "with expanding cement grout from an elevation below the frost line. . . ." According to Mr. St. John's unrebutted testimony, the frost line at the latitude at which the Site is located is 40 inches, or 3 feet 4 inches. (T. 39) According to the Record, the depth of water in Monitoring Wells 1 and 5 was 2.25 and 2.7 feet respectively. (R. 102, 106) Therefore, if the monitoring wells were screened at those depths, the requirement in 734.430(a)(5) would be violated because the expanding cement grout could not extend below the frost line.

Constructing monitoring wells in this manner, though consistent with the Agency's determination and the Board's holding, would result in violations of 734.430(a)(4) and (5). Because the Board's holding would result in monitoring wells at the Site being constructed in violation of the regulations, that holding is clearly erroneous. Therefore, the term "desired interval" in 734.430(a)(3) must refer to the interval at which groundwater is present in the formation and at which contaminants would be located. Any interpretation of that phrase that would result in the desired interval being located at any other depth simply would be inconsistent with, and directly contrary to, the regulations based on the undisputed evidence contained in the Record.

3. The Evidence in the Record Does not Support the Board's Holding that Requiring Monitoring Wells to be Screened at the Depth Groundwater is Present in the Well is Reasonable for Detecting Petroleum Indicator Contaminants Because Those Contaminants are Lighter Than Groundwater.

To support its affirmation of the Agency's determination that monitoring wells must be screened at the elevation of the water in the monitoring well, the Board relied on the Agency's erroneous claims that such positioning was necessary to detect "petroleum indicator contaminants, as those contaminants are lighter than the groundwater." (D. 40-41) However, the Agency's claims and the Board's holding that was based on those claims ignores undisputed evidence in the Record.

Keller agrees that if free-phase petroleum indicator contaminants are present, they will float on groundwater. However, for free-phase petroleum indicator contaminants to be found floating on groundwater, groundwater must be present or there will be nothing upon which the petroleum indicator contaminants could float. The undisputed evidence in the Record demonstrates that the top of the groundwater in the formation is at a depth of no less than

approximately 10 to 11 feet below the ground surface. (R. 90-94) Therefore, if there were petroleum indicator contaminants floating on the groundwater at the Site, they would be located at approximately 10 to 11 feet below the ground surface.

The Record also is clear that the center of the 10 foot screen in each of the monitoring wells is located at a depth of 9.5 feet below the ground surface. (R. 102-106) Therefore, the screen for each monitoring well extends approximately 5.5 feet above the top of the groundwater that was detected in the formation at the time each monitoring well was drilled. Accordingly, if petroleum indicator contaminants were floating on the groundwater at the Site, the placement of the screen in each of the groundwater monitoring wells is appropriate to detect those contaminants.

The Agency's claim that because the top of the screen is below the depth of the water in the monitoring wells, they are "submerged" and thus will not detect petroleum indicator contaminants floating on the groundwater merely demonstrates the Agency's ignorance of groundwater movement and sampling in confined aquifers. If the intent is to detect petroleum indicator contaminants floating on groundwater, the salient facts are (1) the depth at which the top of the groundwater is located in the soil formation because that is the depth at which floating contaminants will be present; (2) the depth of the screen in relation to the depth at which the top of the groundwater is located in the formation because that will determine if there is a sufficient amount of screen above the top of the groundwater for floating contaminants to be detected; and (3) whether the monitoring well was adequately purged to allow for the collection of fresh groundwater from the formation. The ultimate elevation of the water in the well is simply irrelevant to this issue.

Clearly, if the goal is to detect these floating contaminants as the Agency claims and the Board agreed, then one does not want the well screen to be submerged *in relation to the depth of groundwater in the formation* because if it is, contaminants floating at the top of the groundwater in the formation will not flow into the well and be detected. The undisputed evidence in the Record clearly demonstrates that the screens are not submerged when compared to the depth of the top of the groundwater in the formation at the Site. (R. 90-94, 102-106) In fact, each monitoring well has more than 5 feet of screen above that depth. (*Id.*) Therefore, the evidence in the Record clearly demonstrates that the screens are not submerged when compared to the groundwater at the Site and are not submerged below the desired groundwater interval.

Furthermore, the fact that the elevation of the groundwater in the monitoring wells is above the top of the screen has no impact on a monitoring well's ability to detect petroleum indicator contaminants floating on the groundwater. As explained above, any floating petroleum indicator contaminants will enter the monitoring wells because those wells are screened above the top of the groundwater in the formation. Once the groundwater enters the monitoring well, it, as well as any floating contaminants, will move up the monitoring well until it reaches its static elevation. Just as the groundwater in the wells rose to elevations that exceed the elevations at which it was found in the formation, so too will any contaminants floating on the groundwater. Therefore, the rationale that submerging the screen in relation to the elevation of groundwater in the well will not allow for monitoring of floating contaminants simply demonstrates the Agency's fundamental misunderstanding of groundwater movement and sampling in confined aquifers.

The Board's Decision also "notes that the administrative record does not include any detailed discussion or determination to indicate that site-specific conditions warrant the location

of the well screen below the static water level in the monitoring wells." (D. 41) The Board's note is wrong for at least two reasons.

First, as discussed above, the static water level in the monitoring wells is irrelevant to the question of where the screens should be placed. They must be placed at a depth which allows for groundwater sampling and that depth is the interval at which groundwater is present in the formation and at which contaminants would be located. The static water level in the monitoring wells simply has nothing to do with the elevation of the groundwater in a formation or the proper location of a monitoring well's screen. In fact, its only function under the monitoring well construction regulations is "to determine the gradient of the groundwater table." 35 Ill. Adm. Code 734.430(c).

Second, the Record is replete with undisputed facts documenting why the screens are placed at their individual depths. The screens are centered at a depth of 9.5 feet below the ground surface. (R. 102-106) Groundwater was detected at the Site at a depth of approximately 10 to 11 feet below the ground surface. (R. 90-94, 102-106) The bottom of the screen in each of the monitoring wells is located at approximately 14.5 feet below the ground surface. (R. 102-106) Because 10 foot screens[10] were used for each of the monitoring wells, the screens extend from a depth of 4.5 to 14.5 feet below the ground surface. (*Id.*) The interval at which groundwater is present at the Site extends from a depth of approximately 10 to 11 feet below the ground surface to a depth of approximately 13.5 feet below the ground surface. (R. 90-94, 102-106) Therefore, the screens are located throughout the entire interval in which groundwater was detected in the formation and extend above that interval by approximately 5 feet to account for

[10] The Agency generally mandates the use of 10 foot screens. (R. 253)

fluctuations in groundwater depth over time thereby allowing any floating contaminants to be detected. As such, the Board's note is not supported by the facts in the Record and is erroneous.

4. The Board's Holding is Contrary to Accepted Principles of Professional Geology and, Therefore, is not in Accordance With 35 Ill. Adm. Code 734.510(a).

Illinois' petroleum underground storage tank regulations contain specific requirements concerning the Agency's standard of review for plans, budgets, and reports. According to 35 Ill. Adm. Code 734.510(a):

> A technical review must consist of a detailed review of the steps proposed or completed to accomplish the goals of the plan and to achieve compliance with the Act and regulations. Items to be reviewed, if applicable, must include, but not be limited to, number and placement of wells and borings, number and types of samples and analysis, results of sample analysis, and protocols to be followed in making determinations. **The overall goal of the technical review for plans must be to determine if the plan is sufficient to satisfy the requirements of the Act and regulations and has been prepared in accordance with generally accepted engineering practices or principles of professional geology. The overall goal of the technical review for reports must be to determine if the plan has been fully implemented in accordance with generally accepted engineering practices or principles of professional geology, if the conclusions are consistent with the information obtained while implementing the plan, and if the requirements of the Act and regulations have been satisfied.**

(emphasis added). Therefore, the Agency's review of Keller's submissions and the Board's Decision must be consistent with the regulations **and** generally accepted professional engineering practices and principles of professional geology. As discussed above, the portion of the Decision concurring with the Agency's position concerning "desired interval" conflicts with the regulations while Keller's position is consistent and in compliance with the regulations. As such, Keller's monitoring wells were installed in conformance with the regulations. They also

were installed in conformance with generally accepted engineering practices or principles of professional geology.

During the hearing, Keller presented the testimony of two professional geologists and two professional engineers. They testified that Keller's monitoring wells were constructed in accordance with generally accepted engineering practices and principles of professional geology. (T. 11-12, 58-59, 87, 126, 175) Because the Agency offered absolutely no testimony on this issue during the hearing, the testimony of these witnesses is the only evidence in the Record before the Board and that evidence establishes that the monitoring wells at issue were constructed pursuant to generally accepted engineering practices and principles of professional geology.

The Record demonstrates, and Ms. Rowe and Mr. St. John testified, that the moist layer begins at a depth of about 10 feet below the ground surface and becomes saturated at 12 to 13.5 feet below the ground surface. (T. 81, 97; R. 90-94) There is no evidence in the Record that indicates and the Agency presented no evidence that groundwater exists at the Site at any shallower depth.

As such, the desired interval for sampling groundwater at the Site is the wet sand seam (T. 97), which is located at 12 to 13.5 feet below the ground surface. (R. 90-94) In addition, the moist foot and one half above that may have produced some water as well. (T. 97) This wet sand seam is the water bearing unit of interest because it is the one located closest to the surface and the one most likely to become contaminated by releases from underground storage tanks. (R. 90-94) The wet sand seam and moist zone above it were screened so they could be sampled (T. 81, 88-91, 121; R. 102-106) and the Agency never presented any evidence to support its erroneous claim that the desired interval is located anywhere else.

Although the Agency produced no witnesses to explain what the Agency believes regarding the location of the water producing zone at the Site, it appears from the Agency's May 17, 2007 Letter (the wells must be screened at the level of the water in the well) (R. 258), that the Agency believes that at a confined aquifer site, which is what exists here (T. 29-30), water can enter through a well screen located at the same elevation as the static water level in the well. The Agency ignores the fact that the evidence in the Record shows that the clayey silt is not wet or even moist at the same elevation as the static water level, which is the level of the groundwater in the wells. (R. 90-94, 102-106) As shown above, the static water level is between 2.25 and 4.36 feet below the ground surface and at least 5 feet above the saturated zone. The borehole logs do not indicate wet or even moist conditions in the formation at that depth. (*Id.*) The Agency provided no evidence to show that groundwater is present in the formation at the Site at the level to which groundwater rose in the wells. If groundwater is not present in the formation at that depth, it cannot enter the well at that level through the well screen.

In summary, screening the wells at the level of the water in the wells will not result in water entering the well at that level because water is not present at that level at the Site. The Agency's policy that the monitoring wells should have been screened at the level of the groundwater in the wells and the Board's holding affirming that policy are clearly erroneous, against the manifest weight of the evidence, contrary to generally accepted professional engineering practices and principles of professional geology, and at sites like Keller's would result in a violation of Board regulations.

5. The Undisputed Evidence in the Record Clearly Demonstrates that Groundwater at the Site is Under Confined Conditions.

The Decision also takes Keller to task because it "did not substantiate its claims [that groundwater at the Site is under confined conditions] with a detailed analysis of the Site's hydrology to show that groundwater encountered at the site is present under confined conditions." (D. 42) (bracketed material added).[11] It is true that the August 2006 Stage II Site Investigation Plan and the January 2007 Stage II Site Investigation Plan and Budget-Additional Information and Reconsideration documents might not use the words "confined condition." However, they both contain sufficient information for anyone with even a marginal understanding of geology or hydrogeology to understand that the location of groundwater in the ground and the level to which groundwater rises in the monitoring wells due to hydrostatic pressure are two different elevations. This is evidence that groundwater at the Site is under confined conditions. Even if someone is not familiar with the term "confined aquifer" or "artesian aquifer," the Record clearly demonstrates that the location of groundwater in the formation is several feet below the level where groundwater is located in the monitoring wells. Thus, while this condition meets the definition of "confined aquifer" whether that term is used or not is irrelevant to the basic principle that the well must be screened at the interval where groundwater is located in the ground so that groundwater can flow into the monitoring well and a representative groundwater sample can be collected.

A "confined aquifer" is defined as "[a]n aquifer that is bounded above and below by *confining beds*; an aquifer containing *confined ground water*." (Ex. 4 at 40) (emphasis in original). A "confining bed" is defined as "[a] body of distinctly less permeable material that is

[11] No such detailed analysis is required by the regulations.

stratigraphically adjacent to one or more aquifers. In nature, its hydraulic conductivity may range from nearly zero to any value that is distinctly less than that of the aquifer." (*Id.*) "Confined groundwater" is defined as "[g]round water under pressure significantly greater than that of the atmosphere. Its upper surface is the bottom of a confining bed." (*Id.*) Also, Mr. St. John testified at the hearing that "[b]y definition a confined aquifer is an aquifer that exhibits a static water level **above** the upper surface of the aquifer." (T. 30) (emphasis added).

What information is in the Record that demonstrates the aquifer at the Site is confined? First, the Geologic Cross Section in the August 2006 Site Investigation Plan shows the location of the top of the groundwater during drilling as at the bottom of the silty clay layer in the formation and above the underlying clayey silt layer and sand layer. (R. 37) Second, the drilling borehole logs for Monitoring Wells 1 through 5 document that the depth to the top of the groundwater is between 10 and 11 feet below the ground surface; the formation became moist at approximately 10 feet below the ground surface; the formation was wet to a depth of approximately 13.5 feet below the ground surface; and the formation was dry at approximately 14 feet below the ground surface. (R. 91-94) Therefore, the aquifer at the Site is located between the depths of approximately 10 to 11 feet below the ground surface and 12 to 13.5 feet below the ground surface. Third, the LUST Well Completion Reports document that the depth to groundwater during drilling was approximately 10 to 11 feet but the static water levels in the monitoring wells ranged from 2.25 feet below the ground surface in Monitoring Well 1 to 4.36 feet below the ground surface in Monitoring Well 3. Therefore, the static water levels clearly are **above** the upper surface of the aquifer. (R. 102-106) Fourth, in response to the Agency's comment concerning the depth at which the monitoring wells were screened, Keller responded as follows:

> Well screens were set at the groundwater table encountered at drilling. The moisture in the soil in [sic] indicative to the groundwater table, which was encountered around ten to eleven feet. The well screens are then placed so that there is room for seasonal fluctuation and still produce in the well stem. Due to the hydro-static pressure or hydraulic head of the formation, the isostatic water levels rose in the monitoring wells. This is described by the Potentiometric Surface, which is the surface that represents the level to which water will rise in tightly cased wells.

(R. 173) "Potentiometric surface" is defined as "[a]n imaginary surface representing the total head of ground water and defined by the level to which water will rise in a tightly cased well." (Ex. 4, p. 156) (Emphasis added) In other words, Keller told the Agency that the well screens were set to intersect the wet sand layer where groundwater was found when the wells were drilled and the well screens extended above that level in case the groundwater level changed due to seasonable fluctuations. Because there was pressure on the groundwater (hydraulic head or hydrostatic pressure) that pressure pushed groundwater from the wet sand layer up the monitoring well until the water level in the well stabilized, which was several feet above where the groundwater was actually located in the ground. The stabilized water level in the well is referred to as the static (or isostatic) water level (or elevation). This isostatic water level in the wells indicates the potentiometric surface. Thus, Keller did explain in the Record using geologic terminology why the saturated zone and the static water level are at two different levels and that the groundwater was under confined conditions. Apparently, the Agency project manager did not understand this explanation because she does not have even a modest understanding of hydrogeology.

Based on the undisputed fact that the static water level in the monitoring wells was well above the depth at which groundwater was found when the wells were drilled, only one

conclusion can be reached – the groundwater is under confined conditions.[12] And the Record clearly supports that conclusion.

6. The Board Erroneously Concluded that the Results of the Hydraulic Conductivity Tests are Consistent with the Silty Clay Unit Being the Groundwater-Producing Layer.

As an initial matter, the hydraulic conductivity tests were not raised by the Agency in its May 17, 2007 letter that was the basis for Keller's appeal. (R. 256-63) Therefore, information regarding hydraulic conductivity was not properly before the Board. Despite that fact, the Board's Decision agreed with the Agency that "the results of the hydraulic conductivity tests are consistent with the silty clay unit being the groundwater-producing layer." (D. 42) This conclusion is erroneous based on the Record. In fact, the Agency misrepresented in its post-hearing brief that the Record at R. 13 demonstrated that the silty clay layer was a water producing unit. The Board adopted this argument in its Decision, apparently, without reviewing page 13 of the Record. Nowhere on R. 13 is it stated or otherwise indicated that the upper silty clay layer is a water bearing unit. (A copy of R. 13 is contained in Appendix C)

As previously discussed in detail, before a layer can be groundwater-producing, groundwater must be present in that layer. The depth at which groundwater is present at the Site is in the interval beginning at approximately 10 to 11 feet below the ground surface and extending downward to a depth of approximately 13.5 feet below the ground surface. (R. 90-94, 102-106) This interval consists of the bottom of the silty clay layer and extends down through the sand layer. (R. 37, 90-94) These layers are the groundwater-producing layers because they are the layers at which groundwater is located at the Site.

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[12] Frankly, Keller is mystified how the Agency could review these facts and not reach the technical conclusion that groundwater at the Site is in a confined condition but instead conclude that these facts demonstrate that the wells should have been screened at a depth that is well above the top of the groundwater.

Regarding the hydraulic conductivity results, Keller does not dispute that the results range from a high of $1.31x10^{-6}$ cm/sec to $9.61x10^{-7}$ cm/sec. (R. 229-30) What Keller does dispute is that these results are indicative of a groundwater-producing unit.

Using the hydraulic conductivity result of $1.31x10^{-6}$ cm/sec, which is the hydraulic conductivity that represents the most rapid movement of water through the formation as determined at the Site, groundwater movement would be 1.31 cm/1,000,000 sec., or 0.00000131, centimeters per second. Given that there are 2.54 centimeters in an inch, 12 inches in a foot, and 31,536,000 seconds in a year, the rate of groundwater movement at a hydraulic conductivity measurement of 1.31x10-6 cm/sec equates to 1.4 feet per year. As Mr. St. John testified, the definition of a Class 1 aquifer in Illinois includes a hydraulic conductivity of approximately 1 x 10^{-4} centimeters per second, which is 1 cm per 10,000 sec., or greater. (T. 16) A class 1 aquifer is defined in Illinois' groundwater regulations as "any geologic material which is capable of a . . . hydraulic conductivity of 1 times 10^{-4} centimeters per second or greater." 35 Ill. Admin. Code 620.210. Therefore, a Class 1 aquifer has a hydraulic conductivity that is at least 100 times greater than the hydraulic conductivity at this Site. To put it another way, the hazardous waste regulations require that the bottom component of the bottom liner for a hazardous waste landfill must have a hydraulic conductivity of no more than 1 X 10^{-7} cm/sec. (1 cm/10,000,000 sec.) 35 Ill. Adm. Code 724.401(c)(1)(A)(ii). As such, the hydraulic conductivity results for the Site are nearly as impermeable as a hazardous waste landfill liner. No one would contend that the bottom liner for a hazardous waste landfill is a groundwater-producing layer simply because it has a hydraulic conductivity that is approximately the same as the hydraulic conductivity at the Site.

Furthermore, the Record shows that the hydraulic conductivity calculations were based on the total well depth, screen length and radius, initial water depth and the water depth change over time. (R. 13) Here, the 10 foot well screens spanned not only the moist and wet zones which extended from about 10 to 13.5 feet below the surface of the ground, they also extended into the dry layer above that interval. Thus, the hydraulic conductivity test results were in a sense a mixture of the various layers of sand and clayey silt that were screened. (T. 79-80) As such, the hydraulic conductivity test results do not demonstrate that the silty clay unit is the groundwater-producing layer. They merely show that water can move through the entire formation but only at an extremely slow rate. Any claims by the Agency that the hydraulic conductivity tests shows that the upper silty clay layer is the water bearing unit misstates information in the Record and demonstrates the Agency's lack of knowledge about geology.

7. Both the Record and Newly Discovered Evidence Demonstrates that the Board is Incorrect by Stating "Even if the Well Screen Was Raised Above the Static Water Level, the Well Screen Interval of 10 Feet Would Have Provided Adequate Screen Interval Below the Surface for Collection of Groundwater Samples"; The Board's Holding Would Also Result in Violations of 35 Ill. Adm. Code 734.430.

Finally, the Board stated in its Decision that "even if the well screens were raised above the static water levels, the well screen interval of 10 feet would have provided adequate screen interval below the surface for collection of groundwater samples." (D. 42) If Keller were to construct monitoring wells in a manner that complied with this statement, the wells would violate 35 Ill. Adm. Code 734.430.

Raising the screens above the elevation of the static water level would violate two provisions of Section 734.430 even if it physically could be done. First, if the well screens were raised above the static water levels, Section 734.430(a)(5) would be violated because the annular space surrounding the well could not be filled with expanding cement grout to an elevation

below the frost line as discussed above. Second, subsection 734.430(c) requires the static groundwater elevations to be determined **after** the well is constructed. However, well screens must be set **during** construction to intersect the desired groundwater interval, so the desired interval can be sampled. 35 Ill. Adm. Code 734.430(a)(3). Moreover, it is impossible to know what the static water level will be during construction of a monitoring well. (T. 32-33) Typically, static water levels are determined days after a well is constructed and developed. Further, once a well is constructed, it is impossible to move the screen in a well to a new elevation. Thus, it is impossible to always be able to screen a well at the elevation of the static water level because one does not know where the static water level is until days after the well is constructed.

In addition, a well screen interval of 10 feet that began above the static water levels would not transect the groundwater interval present at the Site and such a requirement is unsupported by the undisputed evidence contained in the Record. According to the Record, the groundwater interval ranges from approximately 10 to 11 feet below the ground surface to approximately 13.5 feet below the groundwater surface. (R. 90-94, 102-106) Furthermore, the highest static water elevation observed at the site based on evidence in the Record was only 2.25 feet below the ground surface. (R. 102) Therefore, simple mathematics demonstrates that placing the top of the well screen at or above 2.25 feet below the ground surface would result in the bottom of the screen being located at not more than 12.25 feet below the ground surface which is above the bottom of the groundwater interval. Placing a screen in that manner would not allow for the collection of representative groundwater samples as required by 734.430(a)(1).

Finally, in an effort to satisfy the Board's Decision and the Agency's erroneous position that the wells not be drilled below 10 feet while ensuring that the well complied with the

requirement in Section 734.430(a)(5) that the well be grouted below the frost line, Keller installed a new monitoring well, MW-2A on December 6, 2007. (*See* attached report, Appendix A.) MW-2A is located in close proximity to Monitoring Well 2. MW-2A was terminated at a depth of 10 feet according to the Agency's position and was screened with 6 feet of screen to allow for the placement of expanding cement grout at an elevation below the frost line. No water was detected in MW-2A on December 13, 2007 even though the elevation of the water in Monitoring Well 2 was 1.8 feet on that same date. These newly discovered facts confirm the evidence in the Record by demonstrating that the groundwater interval begins at approximately 10 feet but extends downward for another 3.5 feet and that groundwater will not enter a monitoring well that is not screened in that groundwater interval. (R. 173; T. 36-37, 49-50, 95-96) As such, these newly discovered facts also disprove the Agency's incorrect belief that such a well would allow for the collection of groundwater samples.

These newly discovered facts also demonstrate that requiring a monitoring well to be screened at or above the static groundwater elevation in the well is impossible. As demonstrated by the Record, the static groundwater elevation in Monitoring Well 2 was 3.43 feet below the ground surface shortly after it was installed on July 12, 2006. (R. 103) However, the static groundwater elevation in Monitoring Well 2 was at a depth of 1.8 feet below the ground surface in December, 2007. Yet the soil was dry at that depth when MW-2A was drilled. (*See* Appendix A borehole log) Based on this information and to comply with the Board's holding that the monitoring well's screen must be located at the depth of the static groundwater elevation, the well would have to be constructed in a manner that would allow the screen to be moved as the static groundwater elevation changed over time. Moving a well screen simply is impossible

after the well has been constructed because 734.430(a)(5) requires the annular space around the monitoring well to be filled with expanding concrete grout which prevents the well from moving.

Furthermore, because 734.430(a)(4) requires the annular space around the well to be sealed to the elevation of the highest known seasonal groundwater level, moving the well screen to a new depth (assuming that were possible) based on the static groundwater level in the well would result in the well screen being sealed in relation to the formation at that new depth. This would result in a violation of 734.430(a)(7) requiring that the well allow free entry of groundwater because the seal would prevent the entry of any material, including groundwater if it were present. On the other hand, if the well screen extended above the static water level at 1.8 feet bgs to allow petroleum contaminants floating on the groundwater to enter the well, subsection 734.430(a)(4) would be violated because the well would not be sealed "in order to prevent contamination of groundwater samples and groundwater and to avoid interconnections." In other words, contamination from surface spills could enter the well. The undisputed evidence in the Record clearly demonstrates groundwater simply is not present in the formation at the depths that correspond to the static groundwater levels in the monitoring wells and, if the wells were constructed as the Agency and Board direct, numerous regulations would be violated.

8. The Board Should Reconsider its Denial of Keller's Request for Attorney Fees and Grant a Portion of Those Fees Consistent With Those Issues on Which Keller Prevailed.

The Board should also reconsider its rejection of Keller's request for attorneys fees and costs, as its decision was premature. In support of its ruling, the Board cited and summarized the case of *Webb & Sons, Inc. v. IEPA*, PCB 07-24 (May 3, 2007). (*See* D. 47) Procedurally, the *Webb* case was before the Board on the petitioner's supplemental brief in support of reimbursement of petitioner's legal fees, in which the petitioner presented its case for why it was

entitled to its fees and costs related to its UST appeal. *Webb & Sons*, PCB 07-24, slip op. at 2. On consideration of that supplemental brief that detailed the petitioner's fees and costs, the Board was able to determine that 45 percent of the fees and costs were recoverable because that percentage of the fees and costs were related to the petitioner's success in its appeal. *Id.* at 5. Similarly, in *Ayers v. IEPA*, PCB 03-214, slip op. at 1 (Aug. 5, 2004), the Board allowed the petitioner to seek attorneys fees and costs related to its appeal in which the requested relief was granted in part and denied in part by a previous order. In that case, the Board ultimately decided to grant the request for reimbursement of legal fees. *Id.* at 9.

In the instant case, the Board prematurely denied Keller's request for attorneys fees and costs. In both the *Webb & Sons* and *Ayers* cases, the Board granted in part and denied in part the underlying relief requested by the petitioners. *Webb & Sons*, PCB 07-24, slip op. at 1-2; *Ayers v. IEPA*, PCB 03-214, slip op. at 1. Because the relief sought by those petitioners was not granted or denied in total, the petitioners were allowed to brief the issue of what fees and costs they were entitled to for only obtaining partial success in their appeals. *Id.* Similar to those cases, Keller has prevailed in part in this case as to the Agency's determinations regarding sampling soil borings from monitoring wells MW-1, MW-2, and MW-4 and performing additional sampling near SB-5. (the "Prevailing Issues"). (*See* D. 48) Consistent with the *Webb & Sons* and *Ayers* cases, Keller should now be allowed to file a brief on the issue of what fees and costs Keller is entitled to related to the Prevailing Issues. Instead, the Board has prematurely denied Keller its right to outline the exact fees and costs related to the Prevailing Issues. The Board should reconsider its ruling on Keller's request for attorneys fees and costs, and allow Keller to submit a brief specifying the fees and costs that were incurred related to the Prevailing Issues. Furthermore, if Keller prevails on the issues that are the subject of Keller's Motion to

Reconsider, Keller should also be allowed to submit a brief regarding the costs and fees related to the issues in its Motion to Reconsider.

SUMMARY

The Record clearly demonstrates and Keller's witnesses testified at hearing that Keller's monitoring wells were properly constructed to intersect the desired interval for sampling as required by the Board's regulations. The evidence shows that desired interval of groundwater is the saturated zone located in the formation beneath the ground surface at a depth of 12 to 13.5 feet which is indicated on the borehole logs in the Record as wet sand. In addition because the moist layer that started at 10 to 11 feet below ground surface might be capable of producing groundwater, the 10 foot well screens were placed so the center of the screens were located at 9.5 feet bgs. Accordingly, the well screens ran from 4.5 to 14.5 feet bgs. Since groundwater was located at least 10 feet bgs, if petroleum contaminants were floating on the groundwater, the monitoring wells were screened to allow the groundwater as well as the petroleum contaminants to enter the wells.

The Agency presented no evidence to support its erroneous claim, that the Board also adopted in its holding, that the wells should be screened where the water is observed in the wells, which was between 2.25 feet at MW-1 to 4.36 feet at MW-3. The Record clearly shows that the formation surrounding the wells at those elevations is dry. The Agency presented no evidence to explain how water or contaminants floating on groundwater could enter wells through well screens if groundwater is not there. In other words, groundwater must be present in the formation in order for groundwater to flow into a well.

Nor did the Agency explain how a well could be screened at a level that cannot be observed until after the well is constructed and the screen is placed. The Agency's positions defy

logic and clearly demonstrate the Agency's misunderstanding of geology, which is unfortunate because the regulations at Section 734.510(a) require the Agency's technical review to include generally accepted engineering practices or principles of professional geology. Instead, the Record demonstrates that the Agency does not understand such principles and practices.

Further, as demonstrated in the Agency comments and briefs, the Agency, or at least the project manager, does not understand the concept of hydraulic conductivity. The Agency claims that soil with a hydraulic conductivity similar to the Board's requirements for a liner at a hazardous waste landfill is a water bearing unit. Just because the term "hydraulic conductivity" is used does not mean a unit is water bearing. The term is merely a measure of the ability by which water can move through that unit. In some cases, such as the silty clay layer, water does not move very well and would take more than a year to travel one foot.

The Agency's claims that the Record does not support Keller's position is obviously due to the Agency's ignorance of the science and engineering that the Agency is charged with overseeing on a day to day basis. If the Agency had the competence necessary to perform a review in accordance with Section 734.510, the Agency would have concluded that the monitoring wells were installed to intersect the desired interval. In fact, Mr. St. John, a hydrogeologist whose knowledge of the Site was limited to the information in the Record concluded that the wells were properly installed and did intersect the desired interval and that representative groundwater samples could be collected.

The Agency's ignorance of geology and the regulatory requirements is further demonstrated by the Agency's demands that monitoring wells be constructed in a manner that would violate numerous provisions of the Board's regulations and not be in accordance with generally accepted engineering practices or principles of professional geology.

To summarize, Keller has demonstrated through evidence in the Record and explanations of that evidence at hearing that the desired interval for sampling is the saturated layer located 10 to 13.5 feet bgs. The Agency presented no evidence to the contrary. When a petitioner presents a *prima facie* case on an issue, the burden then shifts to the Agency to present some **evidence** to dispute the issue. *John Sexton Contractors Co. v. PCB*, 201 Ill. App. 3d 415, 425, 558 N.E.2d 1222, 1229 (1st Dist. 1990) ("Once Sexton had established a *prima facie* case that the [permit] conditions were unnecessary, it became incumbent upon the Agency to refute the *prima facie* case."); *Marathon Petroleum Co. v. IEPA*, PCB No. 88-179, p. 16 (July 27, 1989) (Petitioner prevailed on monitoring and reporting issue where it presented evidence to support issue, and IEPA " did not refute this *prima facie* case."); *IEPA v. Bliss*, PCB No. 83-17, pp. 6-7 (Aug. 2, 1984). Indeed, if a petitioner submits evidence and proves a *prima facie* case, and IEPA presents no evidence to dispute the issue, there is no issue of fact that petitioner is entitled to prevail on the undisputed issue. *Id.* Keller/Farina proved its case. The Agency presented no credible or other **evidence** to rebut Keller's case, only unsupported arguments. Thus, Keller should prevail.

Because some of these issues may be new to the Board and because it appears to Keller that the Board did not review the entire Record and may not have understood the technical issues, Keller is requesting oral argument before all the Board members so that Keller can respond to questions from the Board. The oral argument may be scheduled at a time convenient to the Board, such as in conjunction with a regularly scheduled Board meeting.

CONCLUSION

Because the Board's Decision is contrary to the underlying regulations, contrary to Illinois case law governing the interpretation of regulations, contrary to the undisputed evidence contained in the Record, and is not supported by Keller's newly discovered evidence, the holding that Keller did not construct monitoring wells in a manner that allows for sampling at only the desired interval must be overturned. In addition, the Board's holding that Keller must submit an amended Stage 2 Site Investigation Plan and Budget consistent with the terms of the Decision must be overturned for the same reasons. Further, Keller should be awarded fees and costs for those issues where Keller prevailed.

CONCLUSION

Because the Board's Decision is contrary to the underlying regulations, contrary to Illinois case law governing the interpretation of regulations, contrary to the undisputed evidence contained in the Record, and is not supported by Keller's newly discovered evidence, the holding that Keller did not construct monitoring wells in a manner that allows for sampling at only the desired interval must be overturned. In addition, the Board's holding that Keller must submit an amended Stage 2 Site Investigation Plan and Budget consistent with the terms of the Decision must be overturned for the same reasons. Further, Keller should be awarded fees and costs for those issues where Keller prevailed.

Respectfully submitted,

L. Keller Oil Properties (Farina)

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CHDS01 CSH 442934v1

APPENDIX A

CW³M Company
Environmental Consulting Services

701 W. South Grand Avenue
Springfield, IL 62704

Phone: (217) 522-8001
Fax: (217) 522-8009

January 10, 2008

REPORT ON CONSTRUCTION OF MW-2A

RE: LPC #0514155011—Fayette County
Farina/L. Keller Oil Properties, Inc. (Farina 711)
1003 West Washington Avenue
Incident Numbers: 2005-1539 & 2006-0153
LUST Technical Reports—Amended Stage 1 Site Investigation

Following the decision of the Illinois Pollution Control Board (IPCB) on December 6, 2007, CW³M personnel were mobilized to the site on December 11, 2007 in order to install an additional monitoring well for Stage 1 site investigation. This was deemed required as the IPCB determined that "Keller did not construct the wells in a manner that allows for sampling only at the desired interval." The Board disagreed with Keller that the desired interval was the moist and wet zone between 10 and 13½ feet below ground surface. The plan was to install wells per the project manager's review notes and comments, which the IPCB affirmed. The pertinent items are as follows from the administrative record:

- Pages 149 and 250 -- 10 feet would be the proper placement for the bottom of the borehole.
- Page 253 -- The Agency requires at least a 10 foot screen, even though this requirement is not specified in the rules.
- Page 258 - In citing the regulations, at Section 734.430(a)(5) the Agency states, that the annular space must be backfilled with expanding cement grout from an elevation below the frost line.

All three of these items cannot be accomplished simultaneously. Using a ten foot well screen with a borehole that ends at 10 feet cannot be sealed below the frost line. Therefore, in attempting to install wells where the Agency (affirmed by the Board) states is appropriate, a borehole was drilled to 10 feet below ground surface with a 6 foot well screen in order to seal the well below the frost line.

MW-2A was installed on December 11, 2007, 14½ feet to the north of MW-2. The boring log, Well Completion Report and a map showing its location are attached. As it was installed near MW-2, the soils were similar to those found at MW-2. The soils were mostly dry with moisture beginning to be noticed at the very bottom of the borehole. Therefore, the well was set at 10 feet. Water did not produce on the day of installation. Therefore, no other wells were set, in order to avoid the possibility of multiple dry wells.

CW^3M personnel returned to the site on December 13, 2007 in order to survey the newly installed monitoring well and determine if it had yet produced groundwater. MW-2A remained dry upon inspection. It should be noted that it was within two days, after the initial drilling, that static water elevations were measured in the original wells. As a point of reference, and in order to determine whether groundwater levels had dropped, MW-2 was checked. Groundwater was measured at 1.8 feet deep in that well as a result of the hydraulic head on the wet sand layer pushing groundwater up into MW-2, as explained in the hearing transcripts, page 18.

This information that was obtained during and after construction of MW-2A documents that our position is correct. The desired interval that must be screened in a monitoring well in order to collect a representative groundwater sample at the Farina site is the wet sand layer and moist layer that are located between 10 and 13½ feet below ground surface. This information also reinforces the point all along that CW^3M, with a licensed professional geologist has been stating, and that was confirmed during the hearing by an additional professional expert not employed by CW^3M. That water is entering the wells at the site between 10 and 13½ feet below land surface, and the hydrostatic pressure of the confined aquifer that is located there is pushing the static water elevations in the wells above the tops of the well screens. Representative groundwater samples can be collected by properly purging the water levels in the wells down to the level where the water is entering the well and then collecting the samples of fresh groundwater as it flows into the well. This is the only method by which sampling at the "desired interval" can occur at this site.

I certify under penalty of law that all activities that are the subject of this plan were conducted under my supervision or were conducted under the supervision of another Licensed Professional Engineer or Licensed Professional Geologist and reviewed by me; that this plan and all attachments were prepared under my supervision; that, to the best of my knowledge and belief, the work described in this plan has been completed in accordance with the Environmental Protection Act [415 ILCS 5], 35 Ill. Adm. Code 734, and generally accepted standards and practices of my profession; and that the information presented is accurate and complete. I am aware there are significant penalties for submitting false statements or representations to the Illinois EPA, including but not limited to fines, imprisonment, or both as provided in Sections 44 and 57.17 of the Environmental Protection Act [415 ILCS 5/44 and 57.17].

Licensed Professional Engineer or Geologist

Name: Vince E. Smith
Company: CWM Company, Inc.
Address: 701 South Grand Ave. West
City: Springfield
State: Illinois
Zip Code: 62704
Phone: (217) 522-8001
Ill. Registration No.: 62-46118
License Expiration Date: 11/30/2009
Signature:
Date: 1/10/08

L.P.E. or L.P.G. Seal

Illinois Environmental Protection Agency

CW³M COMPANY, INC.
DRILLING BOREHOLE LOG

LUST INCIDENT #: 05-0153/ 06-0153
BOREHOLE NUMBER: MW-2A
SITE NAME: Keller Oil Company, Inc./Farina 711
BORING LOCATION: 14.5' N or MW-2
SITE ADDRESS: I 57 & IL Rt. 185
Farina, Illinois
RIG TYPE: Longyear Truck-Mount
DATE/TIME STARTED: 12/11/07 1:45 PM
DRILLING/SAMPLE METHOD: Hollow Stem Augers/5' Cont. Sampler
DATE/TIME FINISHED: 12/11/07 2:25 PM
BACKFILL: N/A- Set Well

DEPTH (FEET)	SOIL AND ROCK DESCRIPTION	USCS CLASS	Sample Recovery	PID (ppm)	Sample Type	SAMPLE NUMBER	REMARKS: (Odor, Color, Moisture, Penetrometer, etc.)
0							
1	Asphalt/gravel subbase	GP					No odor or discoloration throughout
2	Brown silt loam	ML	90%	0.0	grab	MW2-2.5'	
3	Brown clayey silt	ML					
4							
5							
6	stiffens						
7							
8	Grey silty clay till w/ some poorly-sorted sand & very small pebbles, stiff	CL	100%	0.0	grab	MW2-7.5'	
9							
10	moist						
11	End of boring						
12							
13							
14							
15							

Stratification lines are approximate, in-situ transition between soil types may be gradual.

NOTES: No soil samples because they were already taken immediately adjacent to this location at MW-2.

Manway / Surface Elevation: 100.31

Groundwater Depth While Drilling: ~10'
Auger Depth: 10'
Driller: CW³M

Groundwater Depth After Drilling:
Rotary Depth:
Geologist: JRW

Illinois Environmental Protection Agency — **LUST Well Completion Report**

Incident No.	05-1539/06-0153	**Well No.**	MW-2A
Site Name	Farina 711	**Date Drilled**	12/11/07
Drilling Contractor	CW^3M	**Date Completed**	12/11/07
Driller	CW^3M	**Geologist**	JRW
Drilling Method	Hollow stem auger	**Drilling Fluids**	N/A

Annular Space Details

Type of Surface Seal	Concrete
Type of Annular Sealant	Bentonite
Type of Bentonite	High-Yield
Type of Sand Pack	Coarse 20-20

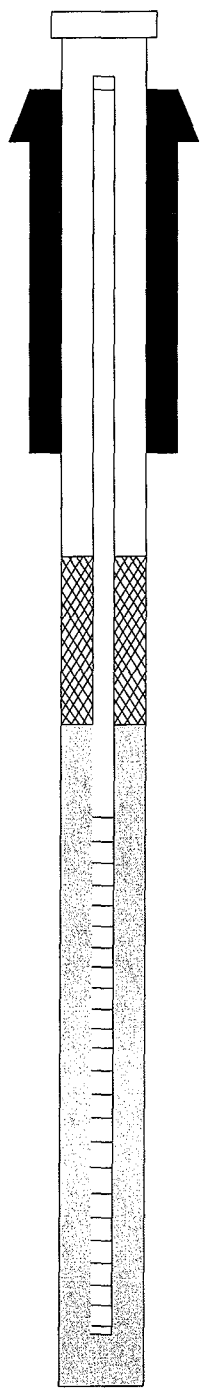
Well Construction Materials

	Stainless Steel Type	PVC Specify Type	Other Specify Type
Riser Coupling Joint			
Riser Pipe Above w.t.		Sched.-40	
Riser Pipe Below w.t.			
Screen		Sched.-40	
Coupling Joint Screen to Riser		Sched.-40	
Protective Casing			Steel

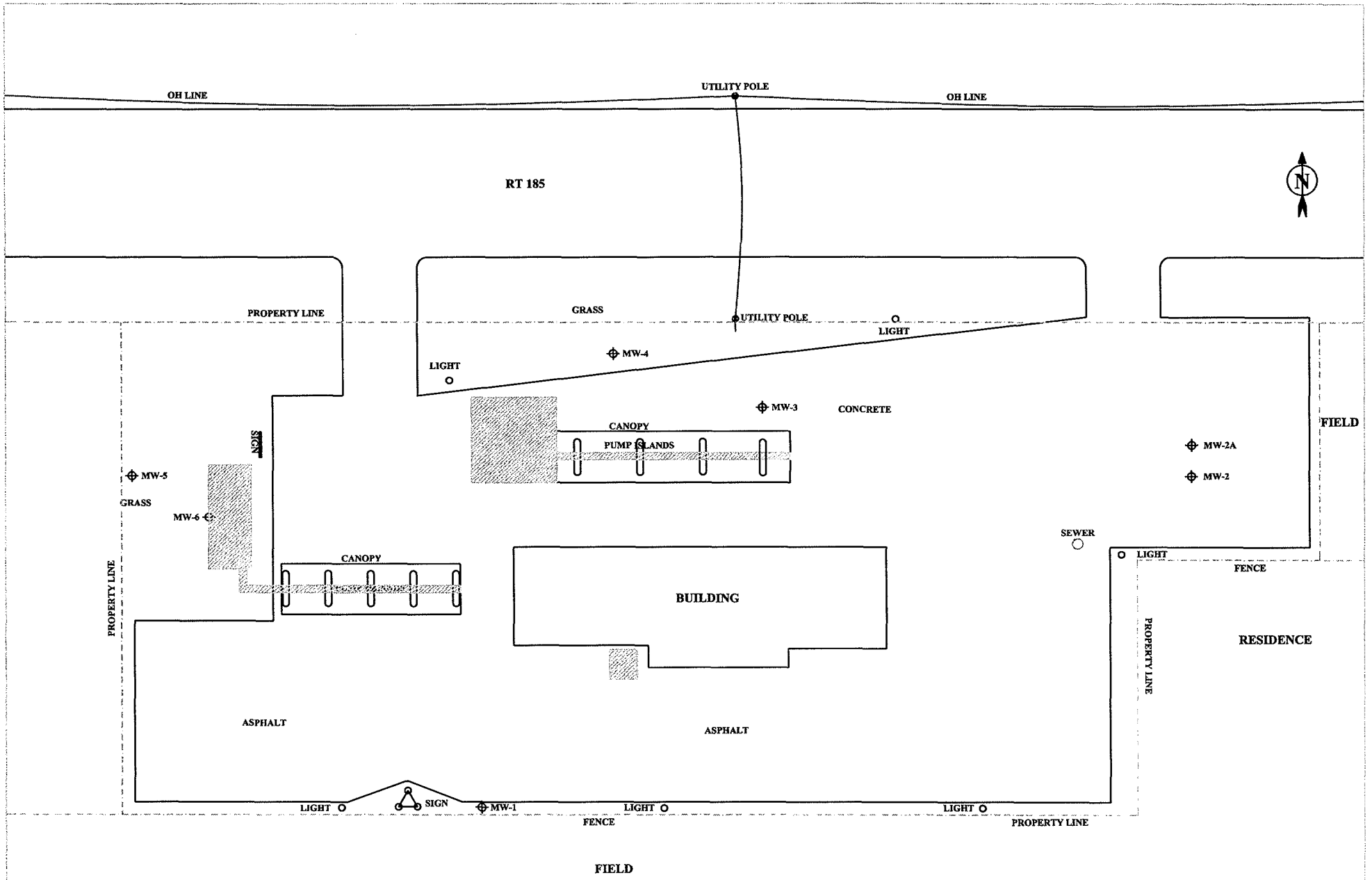
Measurements

Riser Pipe Length	4.25 ft.
Screen Length	6.0 ft.
Screen Slot Size	10-slot
Protective Casing Length	N/A
Depth to Water	~10 while drilling
Depth to Water	Dry -- static
Free Product Thickness	N/A
Gallons removed (develop)	
Gallons removed (purge)	
Other	

Completed by: JRW



100.31 ft.	Top of Protective casing
100.06 ft.	Top of riser pipe
100.31 ft.	Ground surface
99.81 ft.	Top of Annular Sealant
N/A	Casing Stickup
99.81 ft.	Top of Seal
2.5 ft.	Total Seal interval
97.31 ft.	Top of Sand
96.81 ft	Top of Screen
6.0 ft.	Total Screen Interval
90.81 ft.	Bottom of Screen
90.31 ft.	Bottom of Borehole



CW²M COMPANY, INC. 701 W. SOUTH GRAND SPRINGFIELD, IL. 62704 (217) 522-8001	L. KELLER OIL PROPERTIES, INC. FARINA STATION FAYETTE COUNTY INCIDENT #05-1539	MONITORING WELL LOCATION MAP	SCALE: 1"=60' DATE: 12/9/05 REVISED DATE: 12/18/07 DRAWING: 00058	DRAWN BY: BAB REVISED BY: JRW REVIEWED BY: CLR MWLOC.DWG

APPENDIX B

Illinois Environmental Protection Agency

CW³M COMPANY, INC.
DRILLING BOREHOLE LOG

Page 1 of 1

T INCIDENT #: 05-0153/ 06-0153
SITE NAME: Keller Oil Company, Inc./Farina 711
SITE ADDRESS: I 57 & IL Rt. 185
Farina. Illinois
DATE/TIME STARTED: 7/12/06 8:10
DATE/TIME FINISHED: 7/12/06 9:00

BOREHOLE NUMBER: MW-1
BORING LOCATION: 69' S of SW corner of the bldg.
RIG TYPE: Longyear Truck-Mount
DRILLING/SAMPLE METHOD: Hollow Stem Augers/5' Cont. Sampler
BACKFILL: N/A- Set Well

DEPTH (FEET)	SOIL AND ROCK DESCRIPTION	USCS CLASS	Sample Recovery	PID (ppm)	Sample Type	SAMPLE NUMBER	REMARKS: (Odor, Color, Moisture, Penetrometer, etc.)
0							
1	Gravel/topsoil	GP					No odor or discoloration throughout
2	Brown silt loam	ML	95%				
3	Brown clayey silt	ML		0.0	Grab	MW1-2.5'	BETX, MTBE, PNAs
4							
5							
6	stiffens						
7							
8	Grey silty clay till w/ some poorly-sorted sand & very small pebbles, stiff	CL	100%	0.0	Grab	MW1-7.5'	BETX, MTBE, PNAs
9							
10							
11	Brown clayey silt, moist	ML					
12	some fine-grained sand						
13	Grey very fine sand, wet	SP	100%				
14	Brown till/silty clay/large chert	CL					
	Brown silt, hard, dry	ML					
15	Fine grey sand, dry	SP					

Stratification lines are approximate, in-situ transition between soil types may be gradual.

NOTES:

Manway / Surface Elevation: 100.00'
Groundwater Depth While Drilling: ~10-11'
Groundwater Depth After Drilling:
Auger Depth: 15'
Rotary Depth:
Driller: CW³M
Geologist: CLR/JRW

Illinois Environmental Protection Agency

CW³M COMPANY, INC.

DRILLING BOREHOLE LOG

INCIDENT #: 05-0153/ 06-0153
SITE NAME: Keller Oil Company, Inc./Farina 711
SITE ADDRESS: I 57 & IL Rt. 185
Farina, Illinois
DATE/TIME STARTED: 7/12/06 9:00
DATE/TIME FINISHED: 7/12/06 9:40

BOREHOLE NUMBER: MW-2
BORING LOCATION: 200' from SE corner of pump island
RIG TYPE: Longyear Truck-Mount
DRILLING/SAMPLE METHOD: Hollow Stem Augers/5' Cont. Sampler
BACKFILL: N/A- Set Well

DEPTH (FEET)	SOIL AND ROCK DESCRIPTION	USCS CLASS	Sample Recovery	PID (ppm)	Sample Type	SAMPLE NUMBER	REMARKS: (Odor, Color, Moisture, Penetrometer, etc.)
0							
1	Asphalt/gravel subbase	GP					No odor or discoloration throughout
2	Brown silt loam	ML	90%				
3	Brown clayey silt	ML		0.0	Grab	MW2-2.5'	BETX, MTBE, PNAs
4							
5							
6	stiffens						
7							
8	Grey silty clay till w/ some poorly-sorted sand & very small pebbles, stiff	CL	100%	0.0	Grab	MW2-7.5'	BETX, MTBE, PNAs
9							
10	moist						
11	Brown clayey silt, moist	ML					
12	some fine-grained sand						
13	Grey very fine sand, wet	SP	100%				
14	Brown till/silty clay/large chert	CL					
15	Brown silt, hard, dry	ML					

Stratification lines are approximate, in-situ transition between soil types may be gradual.

NOTES:

Manway / Surface Elevation: 100.33'

Groundwater Depth While Drilling: ~10-11'
Auger Depth: 15'
Driller: CW³M

Groundwater Depth After Drilling:
Rotary Depth:
Geologist: CLR/JRW

Illinois Environmental Protection Agency

CW³M COMPANY, INC.

DRILLING BOREHOLE LOG

Page 1 of 1

INCIDENT #: 05-0153

BOREHOLE NUMBER: MW-3

SITE NAME: Keller Oil Company, Inc./Farina 711

BORING LOCATION: 85' N & 50' W of NE corner of bldg.

SITE ADDRESS: I 57 & IL Rt. 185
Farina. Illinois

RIG TYPE: Longyear Truck-Mount

DATE/TIME STARTED: 7/12/06 10:10

DRILLING/SAMPLE METHOD: Hollow Stem Augers/5' Cont. Sampler

DATE/TIME FINISHED: 7/12/06 11:15

BACKFILL: N/A- Set Well

DEPTH (FEET)	SOIL AND ROCK DESCRIPTION	USCS CLASS	Sample Recovery	PID (ppm)	Sample Type	SAMPLE NUMBER	REMARKS: (Odor, Color, Moisture, Penetrometer, etc.)
0							
1	Concrete/gravel	GP					
2							
3	Brown clayey silt	ML	90%	0.0	Grab	MW3-2.5'	BETX, MTBE
4							
5							Slight odor and discoloration
6	very stiff						
7							
8	Grey silty clay till w/ some poorly-sorted sand & very small pebbles, stiff	CL	100%	0.2	Grab	MW3-7.5'	BETX, MTBE
9							
10							
11	Brown clayey silt, moist	ML					
12	some fine-grained sand						
13	Grey very fine sand, wet	SP	100%				
14	Brown till/silty clay/large chert	CL					
15	Brown silt, hard, dry	ML					

Stratification lines are approximate, in-situ transition between soil types may be gradual.

NOTES:

Manway / Surface Elevation: 101.47'

Groundwater Depth While Drilling: ~10-11' **Auger Depth:** 15' **Driller:** CW³M

Groundwater Depth After Drilling: **Rotary Depth:** **Geologist:** CLR/JRW

Illinois Environmental Protection Agency

CW³M COMPANY, INC.

DRILLING BOREHOLE LOG

INCIDENT #: 05-0153/06-0153	**BOREHOLE NUMBER:** MW-4
SITE NAME: Keller Oil Company, Inc./Farina 711	**BORING LOCATION:** 111' N & 47' E of NW corner of bldg.
SITE ADDRESS: I 57 & IL Rt. 185 Farina. Illinois	**RIG TYPE:** Longyear Truck-Mount
DATE/TIME STARTED: 7/12/06 11:45	**DRILLING/SAMPLE METHOD:** Hollow Stem Augers/5' Cont. Sampler
DATE/TIME FINISHED: 7/12/06 12:25	**BACKFILL:** N/A- Set Well

DEPTH (FEET)	SOIL AND ROCK DESCRIPTION	USCS CLASS	Sample Recovery	PID (ppm)	Sample Type	SAMPLE NUMBER	REMARKS: (Odor, Color, Moisture, Penetrometer, etc.)
0							
1	Grass/topsoil						No odor or discoloration throughout
2							
3	Brown silty loam	ML	100%	0.0	Grab	MW4-2.5'	BETX, MTBE, PNAs
4	Brown/grey clayey silt	ML					
5	oxidation stiffens						
6							
7							
8	Grey silty clay till w/ some poorly-sorted sand & very small pebbles, stiff	CL	100%	0.1	Grab	MW4-7.5'	BETX, MTBE, PNAs
9							
10							
11	Brown clayey silt, moist	ML					
12	some fine-grained sand						
13	Grey very fine sand, wet	SP	100%				
14	Brown till/silty clay/large chert	CL					
	Brown silt, hard, dry	ML					
15	Fine grey sand, dry/hard	SP					

Stratification lines are approximate, in-situ transition between soil types may be gradual.

NOTES:

Manway / Surface Elevation:	101.45'				
Groundwater Depth While Drilling:	~10-11'	**Auger Depth:**	15'	**Driller:**	CW³M
Groundwater Depth After Drilling:		**Rotary Depth:**		**Geologist:**	CLR/JRW

Illinois Environmental Protection Agency

CW³M COMPANY, INC.

DRILLING BOREHOLE LOG

INCIDENT #: 05-0153/06-0153	**BOREHOLE NUMBER:** MW-5
SITE NAME: Keller Oil Company, Inc./Farina 711	**BORING LOCATION:** 186' W & 97' N of SW corner of the bldg.
SITE ADDRESS: I 57 & IL Rt. 185 Farina, Illinois	**RIG TYPE:** Longyear Truck-Mount
DATE/TIME STARTED: 7/12/06 12:25	**DRILLING/SAMPLE METHOD:** Hollow Stem Augers/5' Cont. Sampler
DATE/TIME FINISHED: 7/12/06 1:00	**BACKFILL:** N/A- Set Well

DEPTH (FEET)	SOIL AND ROCK DESCRIPTION	USCS CLASS	Sample Recovery	PID (ppm)	Sample Type	SAMPLE NUMBER	REMARKS: (Odor, Color, Moisture, Penetrometer, etc.)
0							
1	Grass/topsoil						No odor or discoloration throughout
2	Brown silt loam	ML					
3	Brown clayey silt	ML	100%	0.0	Grab	MW5-2.5'	BETX, MTBE, PNAs
4							
5	stiffens						
6							
7							
8	Grey silty clay till w/ some poorly-sorted sand & very small pebbles	CL	100%	0.0	Grab	MW5-7.5'	BETX, MTBE, PNAs
9	stiff						
10							
11	Brown clayey silt, moist	ML					
12	some fine-grained sand						
13	Grey very fine sand, wet	SP	90%				
14	Brown till/silty clay/large chert clasts	CL					
	Brown silt, hard, dry	ML					
15	Fine grey sand, dry	SP					

Stratification lines are approximate, in-situ transition between soil types may be gradual.

NOTES:

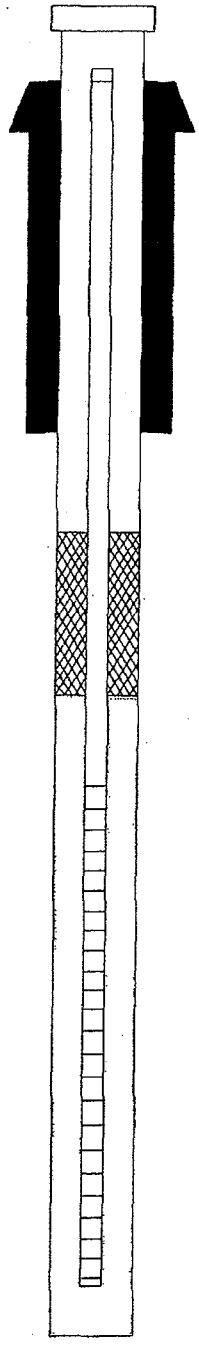
Manway / Surface Elevation:	100.70'				
Groundwater Depth While Drilling:	~10-11'	**Auger Depth:**	15'	**Driller:**	CW³M
Groundwater Depth After Drilling:		**Rotary Depth:**		**Geologist:**	CLR/JRW

Illinois Environmental Protection Agency — **LUST Well Completion Report**

Incident No.	05-1539/06-0153	**Well No.**	MW-1
Site Name	Farina 711	**Date Drilled**	7/12/06
Drilling Contractor	CW^3M	**Date Completed**	7/12/06
Driller	CW^3M	**Geologist**	CLR/JRW
Drilling Method	Hollow stem auger	**Drilling Fluids**	N/A

Annular Space Details

Type of Surface Seal	Concrete
Type of Annular Sealant	Bentonite
Type of Bentonite	High-Yield
Type of Sand Pack	Coarse 20-20



100.00 ft.	Top of Protective casing
99.75 ft.	Top of riser pipe
100.00 ft.	Ground surface
99.50 ft.	Top of Annular Sealant
N/A	Casing Stickup
99.50 ft.	Top of Seal
3.0 ft.	Total Seal interval
96.50 ft.	Top of Sand
95.50 ft	Top of Screen
10.0 ft.	Total Screen Interval
85.50 ft.	Bottom of Screen
85.00 ft.	Bottom of Borehole

Well Construction Materials

	Stainless Steel Type	PVC Specify Type	Other Specify Type
Riser Coupling Joint			
Riser Pipe Above w.t.		Sched.-40	
Riser Pipe Below w.t.			
Screen	Sched.-40		
Coupling Joint Screen to Riser		Sched.-40	
Protective Casing			Steel

Measurements

Riser Pipe Length	4.25 ft.
Screen Length	10.0 ft.
Screen Slot Size	10-slot
Protective Casing Length	N/A
Depth to Water	~10-11 while drilling
Depth to Water	97.75 feet static
Free Product Thickness	N/A
Gallons removed (develop)	Approximately 3 gallons
Gallons removed (purge)	Approximately 3 gallons
Other	

Completed by: MKC

Illinois Environmental Protection Agency — **LUST Well Completion Report**

Incident No.	05-1539/06-0153	**Well No.**	MW-2
Site Name	Farina 711	**Date Drilled**	7/12/06
Drilling Contractor	CW^3M	**Date Completed**	7/12/06
Driller	CW^3M	**Geologist**	CLR/JRW
Drilling Method	Hollow stem auger	**Drilling Fluids**	N/A

Annular Space Details

Type of Surface Seal	Concrete
Type of Annular Sealant	Bentonite
Type of Bentonite	High-Yield
Type of Sand Pack	Coarse 20-20

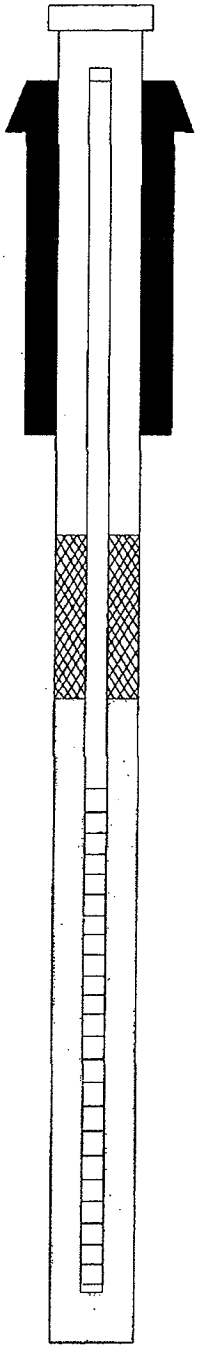
Well Construction Materials

	Stainless Steel Type	PVC Specify Type	Other Specify Type
Riser Coupling Joint			
Riser Pipe Above w.t.		Sched.-40	
Riser Pipe Below w.t.			
Screen	Sched.-40		
Coupling Joint Screen to Riser		Sched.-40	
Protective Casing			Steel

Measurements

Riser Pipe Length	4.25 ft.
Screen Length	10.0 ft.
Screen Slot Size	10-slot
Protective Casing Length	N/A
Depth to Water	~10-11 while drilling
Depth to Water	96.91 feet static
Free Product Thickness	N/A
Gallons removed (develop)	Approximately 3 gallons
Gallons removed (purge)	Approximately 3 gallons
Other	

Completed by: MKC



100.33 ft.	Top of Protective casing
100.08 ft.	Top of riser pipe
100.33 ft.	Ground surface
99.83 ft.	Top of Annular Sealant
N/A	Casing Stickup
99.83 ft.	Top of Seal
3.0 ft.	Total Seal interval
96.83 ft.	Top of Sand
95.83 ft	Top of Screen
10.0 ft.	Total Screen Interval
85.83 ft.	Bottom of Screen
85.33 ft.	Bottom of Borehole

Illinois Environmental Protection Agency — **LUST Well Completion Report**

Incident No.	05-1539	**Well No.**	MW-3
Site Name	Farina 711	**Date Drilled**	7/12/06
Drilling Contractor	CW^3M	**Date Completed**	7/12/06
Driller	CW^3M	**Geologist**	CLR/JRW
Drilling Method	Hollow stem auger	**Drilling Fluids**	N/A

Annular Space Details

Type of Surface Seal	Concrete
Type of Annular Sealant	Bentonite
Type of Bentonite	High-Yield
Type of Sand Pack	Coarse 20-20

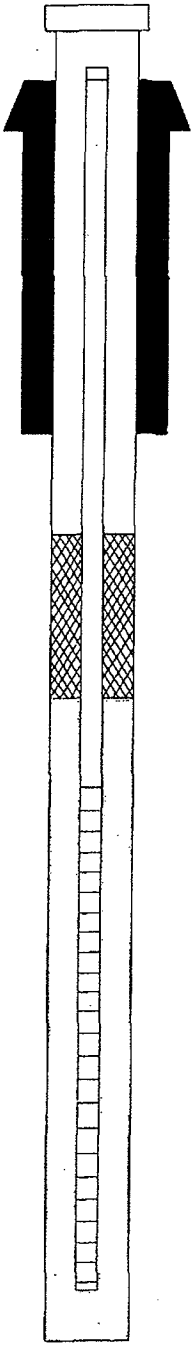
Well Construction Materials

	Stainless Steel Type	PVC Specify Type	Other Specify Type
Riser Coupling Joint			
Riser Pipe Above w.t.		Sched.-40	
Riser Pipe Below w.t.			
Screen	Sched.-40		
Coupling Joint Screen to Riser		Sched.-40	
Protective Casing			Steel

Measurements

Riser Pipe Length	4.25 ft.
Screen Length	10.0 ft.
Screen Slot Size	10-slot
Protective Casing Length	N/A
Depth to Water	~10-11 while drilling
Depth to Water	97.11 feet static
Free Product Thickness	N/A
Gallons removed (develop)	Approximately 3 gallons
Gallons removed (purge)	Approximately 3 gallons
Other	

Completed by: MKC



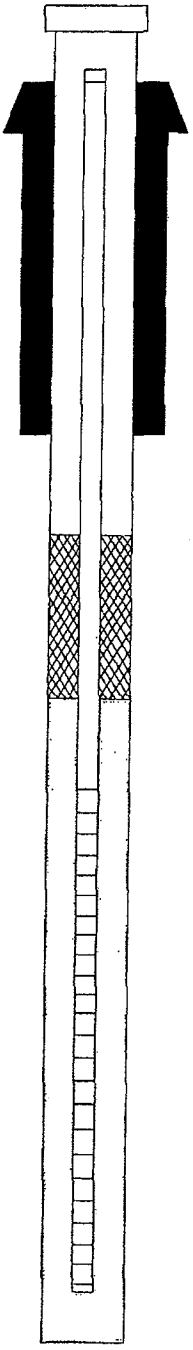
101.47 ft.	Top of Protective casing
101.22 ft.	Top of riser pipe
101.47 ft.	Ground surface
100.97 ft.	Top of Annular Sealant
N/A	Casing Stickup
100.97 ft.	Top of Seal
3.0 ft.	Total Seal interval
97.97 ft.	Top of Sand
96.97 ft	Top of Screen
10.0 ft.	Total Screen Interval
86.97 ft.	Bottom of Screen
86.47 ft.	Bottom of Borehole

Illinois Environmental Protection Agency — **LUST Well Completion Report**

Incident No.	05-1539/06-0153	**Well No.**	MW-4
Site Name	Farina 711	**Date Drilled**	7/12/06
Drilling Contractor	CW^3M	**Date Completed**	7/12/06
Driller	CW^3M	**Geologist**	CLR/JRW
Drilling Method	Hollow stem auger	**Drilling Fluids**	N/A

Annular Space Details

Type of Surface Seal	Concrete
Type of Annular Sealant	Bentonite
Type of Bentonite	High-Yield
Type of Sand Pack	Coarse 20-20



101.45 ft.	Top of Protective casing
101.20 ft.	Top of riser pipe
101.45 ft.	Ground surface
100.95 ft.	Top of Annular Sealant
N/A	Casing Stickup
100.95 ft.	Top of Seal
3.0 ft.	Total Seal interval
97.95 ft.	Top of Sand
96.95 ft	Top of Screen
10.0 ft.	Total Screen Interval
86.95 ft.	Bottom of Screen
86.45 ft.	Bottom of Borehole

Well Construction Materials

	Stainless Steel Type	PVC Specify Type	Other Specify Type
Riser Coupling Joint			
Riser Pipe Above w.t.		Sched.-40	
Riser Pipe Below w.t.			
Screen	Sched.-40		
Coupling Joint Screen to Riser		Sched.-40	
Protective Casing			Steel

Measurements

Riser Pipe Length	4.25 ft.
Screen Length	10.0 ft.
Screen Slot Size	10-slot
Protective Casing Length	N/A
Depth to Water	~10-11 while drilling
Depth to Water	97.30 feet static
Free Product Thickness	N/A
Gallons removed (develop)	Approximately 3 gallons
Gallons removed (purge)	Approximately 3 gallons
Other	

Completed by: MKC

Illinois Environmental Protection Agency — **LUST Well Completion Report**

Incident No.	05-1539/06-0153	**Well No.**	MW-5
Site Name	Farina 711	**Date Drilled**	7/12/06
Drilling Contractor	CW^3M	**Date Completed**	7/12/06
Driller	CW^3M	**Geologist**	CLR/JRW
Drilling Method	Hollow stem auger	**Drilling Fluids**	N/A

Annular Space Details

Type of Surface Seal	Concrete
Type of Annular Sealant	Bentonite
Type of Bentonite	High-Yield
Type of Sand Pack	Coarse 20-20

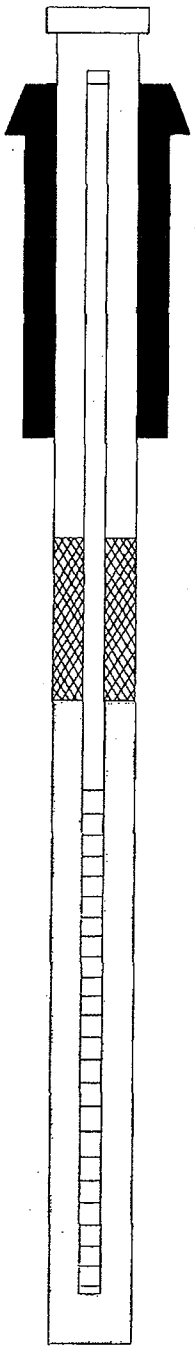
Well Construction Materials

	Stainless Steel Type	PVC Specify Type	Other Specify Type
Riser Coupling Joint			
Riser Pipe Above w.t.		Sched.-40	
Riser Pipe Below w.t.			
Screen	Sched.-40		
Coupling Joint Screen to Riser		Sched.-40	
Protective Casing			Steel

Measurements

Riser Pipe Length	4.25 ft.
Screen Length	10.0 ft.
Screen Slot Size	10-slot
Protective Casing Length	N/A
Depth to Water	~10-11 while drilling
Depth to Water	98.00 feet static
Free Product Thickness	N/A
Gallons removed (develop)	Approximately 3 gallons
Gallons removed (purge)	Approximately 3 gallons
Other	

Completed by: MKC



100.70 ft.	Top of Protective casing
100.45 ft.	Top of riser pipe
100.70 ft.	Ground surface
100.20 ft.	Top of Annular Sealant
N/A	Casing Stickup
100.20 ft.	Top of Seal
3.0 ft.	Total Seal interval
97.20 ft.	Top of Sand
96.20 ft	Top of Screen
10.0 ft.	Total Screen Interval
86.20 ft.	Bottom of Screen
86.70 ft.	Bottom of Borehole

APPENDIX C

3.4 SITE SPECIFIC PHYICAL PARAMETERS

In accordance with 35 Ill. Adm. Code 734.410, remediation objectives will be determined in accordance with 35 Ill. Adm. Code 742. Therefore, during the Stage I Site Investigation, the following site-specific parameter was determined:

Hydraulic Conductivity (K): $9.61 * 10^{-7}$

During Stage II activities a Tiered Approach to Corrective Action Objectives (TACO) Tier II sample will be collected to determine the other site-specific parameters, which will be obtained for the analytical results. It will be collected in the vicinity of MW-1.

In order to determine the hydraulic conductivity, a slug test was performed. The test was performed by lowering a "slug" constructed of polyvinyl chloride (PVC) into a monitoring well. When the slug is lowered into the well, the groundwater is displaced by the volume of the slug. As the water within the well equilibrates, water depth changes are recorded in relation to the time interval that has passed since the test was initiated.

The hydraulic conductivity calculations are based on the total well depth, screen length and radius, initial water depth and the water depth change over time. The depth-to-water changes over time will be plotted on a semi-logarithmic graph and the curve will be evaluated. The slope of the straight-line portion of the curve, along with the other slug test data, is used to calculate the hydraulic conductivity.

Velocity was calculated using the hydraulic conductivity results determined at the site, as well as the hydraulic gradient. The hydraulic gradient was found by calculating the change in gradient between the most up-gradient well (MW-6, 98.10 feet) and the most down-gradient well (MW-2, 96.91 feet), then dividing this answer by the distance in feet between the two wells (445 feet). Formula R24, ($U_{gw} = K \bullet i$) of 35 Ill. Adm. Code § 742 Appendix C, Table C. The resulting velocity is 3.00×10^{-9} cm/sec.