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
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1021 North Grand Avenue East
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Carol Webb
Hearing Officer
Illinois Pollution Control Board
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PLEASE TAKE NOTICE that on September 18, 2007, filed with the Clerk of the Illinois Pollution Control Board of the State of Illinois an original, executed copy of Petitioner's Post-Hearing Brief.

Dated: September 18, 2007

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 Post-Hearing Brief by e-mail and placing a copy in an envelope addressed to:

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from One North Wacker Drive, Suite 4400, Chicago, Illinois, before the hour of 5:00 p.m., on this 18th Day of September, 2007.

Carolyn S. Hesse

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L. KELLER OIL PROPERTIES/ FARINA,	)	
Petitioner,	)	
v.	)	PCB No. 07-147
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Respondent.	)	

PETITIONER'S POST-HEARING BRIEF

Petitioner, L. Keller Oil Properties / Farina ("Keller Oil" or "Keller/Farina"), by its counsel Barnes & Thornburg LLP, submits its post-hearing brief and requests that the Board grant the relief requested in Petitioner's appeal of an Illinois Environmental Protection Agency decision and requested herein. In support of its brief, Keller Oil states as follows:

INTRODUCTION

Keller/Farina was the owner of underground storage tanks (USTs) located at a gasoline service station in Farina, Illinois. These USTs were removed and samples were collected during early action. The samples collected during early action documented that the site was contaminated by releases from the UST system. Because contamination was documented during early action, a Stage I Site Investigation was performed to further investigate the contamination on site in compliance with the regulations at 35 Ill. Admin. Code 734.315. A Stage II Site Investigation Plan was then prepared in accordance with applicable regulations. This Plan included information about the Stage I Site Investigation as well as the proposal for further onsite investigation and a budget to cover the costs of the work. Supplemental information was provided to the Agency. In a letter dated May 17, 2007 (the "Letter"), Illinois EPA rejected

certain Stage I Site Investigation work that had been performed and rejected the proposal for performing the Stage II Site Investigation and the associated budget. Petitioner is appealing the Agency's final decisions that were set forth in the Letter.

The central issues in this appeal of the Letter concern the Agency's incorrect rejection of the methods by which monitoring wells were constructed and sampled, the Agency's incorrect rejection of the locations where soil boring samples were collected, the Agency's incorrect disapproval of Petitioner's proposed Stage 2 Site Investigation and the Agency's incorrect rejection of the associated budget for this work. Contrary to the Agency's assertions, the consultant for Keller/Farina performed the work and proposed additional work in compliance with all applicable regulations in accordance with generally accepted engineering practices or principles of professional geology. Accordingly, the Board should find that the Agency erroneously rejected the work that Petitioner performed and proposed to perform, and the Board should approve the Stage 1 Site Investigation work that has been completed and approve the proposed plan for Stage 2 work and the associated budget.

BACKGROUND FACTS

1. Keller/Farina was the owner of underground storage tanks located at a gasoline service station located at 1003 West Washington Avenue, Farina, Fayette County, Illinois. The site has been assigned LPC #0514155011 - Fayette. (R. 7)[1]

2. On November 15, 2005, the three gasoline USTs at this service station were investigated to determine if there might have been releases from the USTs, and it was determined that there had been releases. Accordingly, an incident was reported to the Illinois Emergency

[1] 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.

Management Agency ("IEMA") and Incident Number 20051539 was assigned on November 15, 2005. (R. 7) The USTs were removed on February 7, 2006. (R. 8) The gasoline USTs and the excavation pit from their removal are located north and slightly to the west of the building. (R. 28)

3. The diesel UST which was located to the west of the building and a heating oil UST located south of the building were then investigated on February 10, 2006, for releases and as a result, Incident Number 20060513 was obtained. (R. 7) These USTs were pulled on March 22, 2006. (R. 8) Even though there were releases associated with the heating oil UST, (*Id.*), all the contamination surrounding the heating soil tank was removed during early action. Samples from the excavation that remained after Early Action Activities confirmed that the contamination had been removed. (Ex. 1, 45-Day Report Addendum dated July 6, 2006, p. 4 and Sample Location Map) Thus, the heating oil UST area did not need further investigation. The heating oil UST is not one of the subjects of this appeal.

4. Keller/Farina's consultant submitted to the Agency requests for time extensions for early action activities for both incidents, which the Agency granted. (Ex. 1) In addition, 20-Day Certifications, 45-Day Reports and Stage 1 Certifications, and 45-Day Addendum Reports were submitted to the Agency. (R. 7, Ex. 1) Because two separate incidents had been reported for this facility and because of the regulatory deadlines that require timely filing of these reports, separate 20-Day Reports, 45-Day Reports, and Addenda to the 45-Day Reports were sent to the Agency for each incident.

5. During the early action tank removals, side wall samples were collected from the tank excavations and piping run samples were collected from the bottoms of the piping

excavations in accordance with the regulations at 35 Ill. Adm. Code 734.210(h)(1)(C). (Ex. 1, 45-Day Addendum Reports dated April 24 and July 6, 2007)

6. The 45-Day Addendum Reports contain data from the samples collected during early action. (*Id.*) The data from the samples were compared to the most stringent Tier 1 remediation objectives as required by subsections 734.210(h)(2)and(3) and data from some of the samples exceeded Tier 1 remediation objectives. (*Id.*) Accordingly, releases were documented from all the UST systems. Because releases were found to have occurred, pursuant to 35 Ill. Adm. Code 734.210(h), a Stage 1 Site Investigation was performed in accordance with 35 Ill. Adm. Code 743.315.

7. The Agency approved the 45-Day Addendum Reports. (Ex. 1, letter dated March 8, 2007, "the 45-day reporting requirements . . . have been satisfied.") The 45-Day Addendum Reports also contain certifications for performing a Stage 1 Site Investigation. (*Id.*) The Agency approved Petitioner's requests to perform a Stage 1 Site Investigation, based on the certifications, and the Stage 1 Site Investigation work was performed. (Ex. 1, letters dated April 7, 2006 and May 9, 2006.) For purposes of the subsequent investigations of the excavated areas, one set of reports was submitted to the Agency that includes both incident numbers.

8. On August 7, 2006, Petitioner sent a Stage 1 Report / Stage 2 Site Investigation Plan and Budget to the Agency for both incidents. (R. 1) This document contains the results of the Stage 1 Site Investigation and a proposal to perform a Stage 2 Site Investigation to further delineate onsite contamination as well as a budget for the proposed work and documentation of costs for previous work. On October 5, 2006, the Agency issued a letter disapproving the Stage 2 Site Investigation Plan dated August 7, 2006 and raising issues related to the Stage 1 Site Investigation. (R. 157-164)

9. On January 24, 2007, the Agency received a Stage II Site Investigation Plan and Budget, Additional Information and Reconsideration from Petitioner's consultant that was dated January 22, 2007. (R. 167-245) This document provided additional information, including data from two additional soil borings, SB-7 and SB-8, in response to the issues raised by the Agency in its October 5, 2006 letter.

10. On May 17, 2007, the Agency issued the Letter rejecting the Stage 2 Plan and Budget, which is the subject of this appeal. (R. 256-263) In the Letter, the Agency erroneously rejected the locations of two soil borings (SB-4 and SB-5), erroneously rejected the collection and analysis of soil samples that were collected from borings when monitoring wells were installed, incorrectly decided that the monitoring wells were not installed properly and, as a result, also improperly rejected the Stage 2 Site Investigation Plan, and improperly rejected the costs of work that had been completed and rejected the proposed budget for the work that was proposed.

11. A hearing in this matter was held on August 22, 2007. Petitioner presented four witnesses. One of the 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 probably 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.[2] (T. 11-81) His testimony was based on information contained in the record.

[2] 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 hydrogeolic issues. (T. 66, 77) *Le Clerq v. The Lockformer Co.*, No. 00C7164, 2005

(T. 78) Mr. St. John also testified that 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)

12. In addition, three witnesses testified from the consulting firm, CW^3M, that performed the work at the Keller Oil/Farina property. Ms. Carol Rowe is a licensed professional geologist and has installed hundreds of monitoring wells, "perhaps pushing a thousand." (T. 87, Ex. 7) She was present at the Farina site during the first Stage 1 drilling event. (T. 88) Mr. Jeff Weinhoff is a licensed professional engineer (T. 126, Ex. 10) and was at the site during both of the UST removals and during the majority of the Stage 1 investigation. (T. 127) Mr. Vincent Smith is a licensed professional engineer, has conducted soil investigations at approximately 100 sites, was present at the Farina site during early action and collected early action samples, and provided management oversight. (T. 175, Ex. 13) These three laid out the plan for drilling before any drilling occurred at the site. (T. 180). As discussed below, the CW^3M witnesses testified as to how the monitoring wells were actually installed, how samples were collected during early action, and how the locations of soil borings were determined, as well as testifying about the proposed Stage 2 Site Investigation work. They also testified that the monitoring wells were installed and soil samples collected according to accepted practices and principles of professional geology and engineering.

13. On the other hand, the Agency presented no witnesses to testify to support the Agency's decisions. Even though the project manager for this site, Carol Hawbaker, was present during the entire hearing, she did not testify. Accordingly, the Agency is limited to the reasons

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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 hydrogeolic issues. (*Id.*)

for denial contained in the Record, which includes the Letter (R. 256-263) and Ms. Hawbaker's Reviewer Notes. (R. 246-255)

ARGUMENT

I. Standard of Review

Pursuant to sections 57.7(c) and 57.8(i) of the Illinois Environmental Protection Act (415 ILCS 5/57.7(c) and 57.8(i)), Keller/Farina was permitted to appeal the Agency actions to "disapprove or modify a plan or report" to the Board under section 40 of the Act. 415 ILCS 5/40. Section 40 then provides that "the Board's standard of review is whether the application as submitted to the Agency would not violate the Act and Board regulations." *Ayers v. IEPA*, PCB No. 03-214, 2004 Ill. Env. LEXIS 195, *20 (Apr. 1, 2004). Accordingly, "the Board must decide whether or not the application as submitted to the Agency, demonstrates compliance with the Act and Board regulations." *Id.* In addition, "the Agency's denial letter frames the issue on appeal." *Id.* Moreover, "the Board hearing affords petitioner the opportunity to challenge the Agency's reasons for its decision." *L. Keller Oil Properties, Inc. v. IEPA*, PCB 07-147 (July 12, 2007).

The Agency did not apply the proper standard of review when it reviewed the information that has been submitted by Keller/Farina's consultant. The appropriate standard of Agency technical review of reports and plans includes whether the locations of certain soil borings and installation of monitoring wells and proposed additional samples were "in accordance with generally accepted engineering practices or principles of professional geology." 35 Ill. Admin. Code 734.510.[3] The Agency is required to use this standard of review when reviewing such reports in addition to determining whether the work described in the report and

[3] Appendix A contains the relevant regulatory language for various regulations cited herein.

plans satisfy the requirements of the Act and regulations. The work performed at the site and proposed to be performed meet that standard. As discussed in more detail below, the Agency misread the applicable regulations. Further, the Agency does not appear to understand generally accepted engineering practices or principles of professional geology or the regulations related to how monitoring wells are to be constructed or how locations of soil borings are determined.

Considerable testimony was presented at hearing by Keller/Farina to assist the Board with understanding the nature of aquifers, confining layers, confined aquifers, hydrostatic pressure, hydraulic head, and static water levels. (*See* generally, St. John testimony T. 11-81) In addition, Exhibit 4 is a glossary of hydrogeological terms to assist the Board in understanding this terminology.

II. Petitioner's Stage 2 Site Investigation Plan and Budget, Along With Its Additional Information Should Be Approved

A. Petitioner Installed the Monitoring Wells in Accordance With Applicable Regulations and the Act

In Item 3 of the Letter, after citing the regulatory requirements at 734.430(a), the Agency made the following comments:

> The Agency wishes to clarify that the monitoring well must be installed in a manner to allow sampling only at the desired interval of the groundwater. For sampling of indicator contaminants pursuant to 35 IAC Section 734, the screen must intersect the water level *in the well* for accurate determination of contaminant levels in the groundwater because gasoline contaminants float on the surface of the water. According to the monitoring well completion report, the wells screens were set at a depth that allows total submersion of the screen and the well. Samples collected from wells screened in this manner do not provide acceptable data for determine [sic] concentrations of contaminants in the groundwater.

(R. 257-258) (emphasis in original)[4]

The Agency's comments are not only scientifically inaccurate and contrary to regulatory requirements, but also internally inconsistent. The Agency is correct that the well must be screened at the desired interval and, as explained in more detail below, the monitoring wells at the Farina site were screen at the desired interval. The desired interval is the saturated zone located about 12 to 13½ feet below ground surface that yields groundwater. (T. 21, 47, 90-91, 96-97, R. 90-94) The Agency's statement that the well should be screened at the level of the water in the well is in error because the water level in the well represents the static water level in a confined aquifer. The facts establish that the static water level was several feet above the level where groundwater was actually encountered in the lithology because the aquifer is confined. (T. 29, R. 90-107) Contrary to the Agency's assertions, the desired interval of groundwater for sampling is where the groundwater was encountered in the course grained confined aquifer at 12 to 13½ feet in depth. (T. 21, 47, 90-91, 96-97, R. 90-94)

1. The Monitoring Wells Were Installed Properly.

In fact, the monitoring wells were constructed in accordance with the regulatory requirements and principles and practices of accepted engineering and professional geology. (T. 58-61, *see also the borehole logs and well completion reports at* R. 90-107) Mr. St. John testified at hearing that he reviewed the various reports in the record and that the monitoring wells were constructed properly. (T. 28) Ms. Rowe also testified regarding how the wells at Keller/Farina were constructed. (T. 88-94) Wells were drilled using a hollow stem auger. (R. 90-95) Soil moisture was encountered at a depth of approximately 10 feet below ground

[4] Even though she was present during the entire hearing, Ms. Hawbaker failed to testify at the hearing. Therefore, the Agency is limited to explanations in the Letter.

surface. (T. 23, 89-90, 121, R. 90-95) A sand seam, or unit, was located between about 12 and 13½ feet below ground surface. (T. 21-23, 29 R. 90-95) This sand seam was wet (R. 90-94); it was saturated with water (T. 21, 90-91,) and is the groundwater desired interval for sampling (T. 47) The moist area located above the sand seam is likely the capillary fringe. (T. 23-25, 90) The wells were constructed so that the center of the ten-foot well screen was placed at approximately 10 feet below ground surface, the depth where the first saturated zone was encountered. (T. 34, 48, R. 102-107) The well screens were 10 feet in length because that is the length of well screen that the Agency generally requires. (T. 34, 97, R. 253) The screen extended from approximately 14½ or 15 feet below ground surface to approximately 4½ to 5 feet below ground surface. (T.124, R. 102-107) Thus, the screens intersected both the water bearing sand unit and the capillary fringe, (T. 34, 88-91, R. 90-95, 102-107) and were set to encounter the groundwater elevation during drilling. (R. 102-107, 173, 176) The screens were set to extend both above and below the groundwater depth that was found while drilling to accommodate seasonal fluctuations. (T. 123-124) Thus, the wells screens were set to intersect the desired groundwater interval.

The wells were developed as soon as the well was drilled. (T. 91) Subsection 734.430(a)(7) requires that wells be developed to allow free entry of groundwater, minimize turbidity in the sample and minimize clogging. There are various procedures for developing a monitoring well. The general requirement is to get physical surging action in the area of the well screen to loosen the fine grain particles that have been smeared around the aquifer materials during drilling. (T.35) The wells at this site were developed by putting a bailer into the well and purging the well. (T., 91-92) The purpose of developing a well is to remove the sediment that is created while installing the well to make a good hydraulic connection between the well screen

and the annular pack and the aquifer formation. (T. 35) During drilling the sediment gets smeared down into the aquifer from the soil closer to the surface. (T. 35-36, 92) This soil that was smeared down needs to be loosened so that groundwater can come out of formation and flow from the aquifer into the well. (T. 92)

On the next trip to the site, the consultant determined the static water levels in the monitoring wells. (T. 94) Because the aquifer was a confined aquifer, the hydrostatic pressure on the aquifer pushed the groundwater from the saturated zone into the wells to levels closer to the surface than where groundwater was observed during drilling. (T. 21, R. 173) The static water levels in the wells were generally about 4½ feet below ground surface and were about 5 to 7 feet above the levels where groundwater was actually encountered when drilling. (R. 102-107) The level where groundwater was encountered during drilling reflects where the water is located beneath the ground. (T. 121) The static water levels in the wells do not indicate the location of the desired groundwater interval. The only purpose of determining static water levels in the wells is to determine the potentiometric surface and the direction that groundwater flows . (T. 94-95)

Because the groundwater rose in the well to a level above where groundwater was located in the lithology, the aquifer is confined groundwater. (T. 30) ("By definition a confined aquifer is an aquifer that exhibits a static water level above the upper surface of the aquifer." *Id.*) The Glossary of Hydrology defines "confined groundwater" as "Ground water under pressure significantly greater than that of the atmosphere." (Ex. 4: American Geological Institute Glossary of Hydrology, W.E. Wilson and J.E. Moore, Editors, p. 40). An example of confined groundwater is demonstrated by an artesian well, which is "a well in which groundwater is

forced up by hydrostatic pressure." (Webster's New World Dictionary, 2nd Concise Edition, 1982)

In short, the monitoring wells were constructed and developed in accordance with applicable regulatory requirements, accepted engineering practices and principles of professional geology.

2. The Agency's Position Regarding Monitoring Well Construction is Wrong.

Based on the limited information in the Record, it appears that the Agency does not understand that the monitoring wells were properly installed in the water bearing sand unit that was found during drilling. Because the Agency failed to present any witnesses, the Agency is limited to its explanation in the Letter. Hints of the Agency's reasoning are found in the reviewer notes at R. 253 where Ms. Hawbaker states:

> The sampling interval should be where the screen intersects the water in the well. If the screen is submerged in the water, contaminants are generally found "floating" like benzene and napthlathene may not be accurately sampled.

In fact, the well screen was placed to include the capillary fringe so that, if petroleum indicators had been present as a free product (LNAPL or light non-aqueous phase liquid) floating on the groundwater, those indicators would have entered the wells. (T. 56-57) That being said, Mr. St. John also testified at hearing that the indicator contaminants for gasoline, which include benzene, ethylbenzene, toluene, and xylenes as well as MBTE are soluble in water and they were found in groundwater at the Keller/Farina site, even though a free product layer was not found. (T. 56, 59) In other words, because the indicator contaminates are soluble in water, they will be detected in groundwater. (T. 50-52) Once BTEX partitions into groundwater to the extent that their solubility allows, they do not migrate with some sort of buoyant factor in groundwater. (T.

50) Rather, the indicator contaminants move with the advective flow of groundwater. (*Id.*) The same is true for PNAs and MTBE. (T. 59) The constituents that dissolve from free-phase mixtures into groundwater are neutrally buoyant. (T. 55) Even so, if anything, contaminated groundwater tends to migrate downward. When clean water enters the top of the aquifer through precipitation events, the contaminated groundwater will get pushed downward. (T. 54) Thus, the Agency's assumption that the indicator contaminants are found only at the uppermost portion of the aquifer is incorrect. (T. 50-51)

On page 250 of the record, when discussing the installation of the monitoring wells, Ms. Hawbaker's reviewer notes state:

> If GW was encountered 10 ft., it is unclear why an additional 5 ft was drilled. Drilling an additional 5 ft beneath the groundwater table exceeds the minimum requirements. None of the well screens intersect the static water levels in the wells. If drilling stopped at the groundwater table, the screens would most likely intersect the groundwater.

Based on these statements in the reviewer notes, it is obvious that Ms. Hawbaker, and thus, the Agency does not understand basic hydrogeology and is misinterpreting the applicable regulations. If a well were screened in the manner that Ms. Hawbaker specifies, unless there was condensation in a well or a seasonal fluctuation in the groundwater level that caused the level to rise, the well would be dry (T. 49-50, 95-96) because there would not be a good hydraulic connection to the well, and there would not be good water entry into the well. (T. 36-37) In Ms. Hawbaker's scenario, the bottoms of the wells would not intersect the "desired interval" because the bottoms of the well screens would be set above the surface of the groundwater that was encountered when drilling. (T. 49-50) ("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." *Id.*)

While the regulations do not define the terms "groundwater interval of interest" or "desired groundwater interval," it is generally considered to be the aquifer that one is interested in sampling to determine if it is contaminated. (T. 48) In the Midwest it is the uppermost saturated zone that should be screened (T. 70). At the Farina site, the desired interval is the sand seam as well as the foot or foot and one half above that that appeared saturated during drilling. (T. 97) Under Ms. Hawbaker's scenario, the well screens would be located in the tight clay lithology located above the water bearing sand unit and the wells would be dry because groundwater could not flow into the wells. (T. 95-96) Monitoring wells constructed in the manner suggested by Ms. Hawbaker do not meet the requirements of 35 Ill. Admin. Code 734.430(a) because the desired groundwater interval would not be screened and representative samples could not be collected. (T. 37, 49-50, 95-96) Further, it would be very difficult to know in the field how to screen a well to intersect the static water level. (T. 49)

It also appears that Ms. Hawbaker erroneously thinks that the wells should be screened at the static water level, no matter how close to the surface of the ground that may be. (R. 285) At this site, if the wells were screened at the hydrostatic water level, the wells would be screened to within 2½ feet of the ground surface. (R. 90-94) This is contrary to the regulations at subsection 734.430(a)(5), which requires wells to be grouted below the frost line. Construction codes for projects at approximately the same latitude as Farina typically require construction that must be below the frost line to be at least 40 inches below ground surface. (T. 39). Thus, wells installed as Ms. Hawbaker suggests would not be grouted below the frost line and could heave in winter (T. 38-40) The purpose of grouting a well is to prevent surface contamination from flowing into

the monitoring well. (T. 41) If Ms. Hawbaker's advise were followed, subsection 734.430(a)(5) would be violated.

In addition, it is contrary to subsection 734.430(a)(4) and accepted engineering practices or principles of professional geology to place well screens as close to the ground surface as Ms. Hawbaker wants because wells that have screens that are that close to the ground surface can easily become contaminated from surface contaminants. (T. 36, 41-43) It is improper to have a well screened at the Farina site within 2 to 3 feet from the surface. (T. 43) There are at least two feet of compacted gravel and subbase below the asphalt that could act as a pathway for contamination to enter the well (T. 42-43, R. 92) Further, even though Ms. Hawbaker has taken issue with the wells at the Farina site, she has approved monitoring wells where the static water level rose above the top of the well screen at at least two other sites. (T. 98-99, 113, 114) Wells installed as Ms. Hawbaker described in the Letter and her reviewer notes would not be installed in a manner that is in compliance with subsection 734.430(a)(4) or consistent with accepted engineering practices or principles of professional geology.

3. The Monitoring Wells Were Sampled Properly and Representative Groundwater Samples Were Collected.

Even though the static water levels in the monitoring wells may be above the upper extent of the screens in the monitoring wells, appropriate representative samples were collected. (T. 57-58) Prior to sampling a monitoring well, accepted practices are to purge the well by bailing the water out of the well to remove the stagnant water that is in the well and to bring in fresh groundwater from the formational groundwater. (T. 44) This allows fresh water to flow into the well from the water bearing unit and then the fresh water is sampled. (T. 93-94) Stagnant water is not representative of the formational groundwater (T. 44) The wells at the

Keller/Farina site were purged before sampling. (T. 92) This allowed fresh water from the sand unit to flow into the monitoring wells. (T. 44, 58, 93-94) The samples from those wells provided acceptable data to determine the concentrations of the indicator contaminants, benzene, ethylbenzene, toluene and xylene. (T. 58, 59, 93-94)

4. Depth to Groundwater is Determined During Drilling, and the Depth of Groundwater is Not the Same as the Static Water Level.

During the drilling and construction of a monitoring well, it is not possible to determine if there is a confined aquifer situation or what the static water level will be ultimately. (T. 32-33, 91) Typically, the static water level is determined at least a few days or weeks after the well is constructed (T. 94) and after the static water level has reached equilibrium with the atmosphere. (T. 33) It also appears that Ms. Hawbaker ignored subsection 734.430(c), which provides that the purpose of determining static water levels, also referred to as "static groundwater elevations" is to determine the gradient of the groundwater table. It is well understood by professional geologists and professional engineers that the only purpose of determining the static groundwater elevations is to determine which way groundwater is flowing. (T. 31, 94-95) Static water levels cannot be used to determine where to place well screens as Ms. Hawbaker suggests.

The Agency's misunderstanding of hydrogeology is further illustrated on page 250 of the Record, where the reviewer states, "if GW was encountered 10 ft, it is unclear why an additional 5ft was drilled. Drilling an addition 5 ft below the groundwater tables exceeds the minimum requirements." According to the Glossary of Hydrology, the term "water table" is defined as follows:

> The upper surface of the saturated zone. The surface in an unconfined aquifer or confining bed at which the pore water pressure is atmospheric. Its position can be identified by

> measuring the water level in a shallow well extending a few feet into the saturated zone.

(Ex. 4)

As clearly shown in the reports that were sent by Keller to the Agency, the upper most water bearing unit was not an unconfined aquifer where the pore water pressure was atmospheric. Rather, the groundwater is considered to be confined because the water rose in the wells to levels 5 to 7 feet above the saturated zone. (T. 30, R. 102-107) *See also definition of "confined groundwater" in Ex. 4)* Due to hydraulic pressure, the groundwater rose in the wells to levels that were several feet above where the groundwater was found in the lithology during drilling. (T. 30, R. 102-107) If the groundwater that was encountered had been at atmospheric pressure, there would have been no hydraulic head to push the water to a higher elevation in the well. Because the aquifer at Farina is confined, the water level in the wells cannot be used to determine the location of the saturated zone or the desired interval of groundwater for sampling.

As described above, and as supported by testimony at hearing and by the lack of testimony to the contrary by the Agency, Petitioner's monitoring wells were installed properly. (T. 28) They were installed in accordance with applicable regulatory requirements and in accordance with accepted professional engineering procedures and principles of professional geology. (T. 58-59, 68-69, 96) The wells were installed in a manner to enable the collection of representative groundwater samples. (T. 59-60) The wells were screened to allow sampling at the desired interval. (T. 60, 96-97) The Agency position is not reasonable, is contrary to regulatory requirements and is inconsistent with accepted engineering practices and principles of professional geology.

B. The Soil Sample Locations Were Properly Selected

1. Soil Borings SB-4 and SB-5 Were Properly Located.

In the Agency's final decision Letter in Item 1, the Agency raised issues with respect to the locations of soil borings SB-4 and SB-5. (R. 256) Jeff Weinhoff testified at hearing regarding the appropriateness and rationale for locating those soil borings. (T. 125-172) The Agency presented no witnesses or testimony to rebut and explain why the Agency thinks any of the soil borings were improperly located.

Mr. Weinhoff was on-site for both the UST removals and for the majority of the drilling during the Stage 1 investigation (T. 127). He, along with Ms. Rowe and Mr. Smith, also reviewed the plans and reports prior to their submittal to the Illinois EPA (*Id.*) and determined where soil borings should be located. (T. 131) Mr. Weinhoff stated that SB-4 was one of the two samples collected near the gasoline tank excavation; SB-3 was the other sample (T. 131, 180). The regulations allow up to four samples around an UST field. (T. 132, 35 IAC 734.315(a)(1)(A)) SB-4 was located approximately 20 feet directly north of the excavation sidewall sample, E-1, which was contaminated. (T. 134, 154, *see also* Ex. 11)[5] The samples that the Agency claims define that area, N-1 and SB-3 (R. 256), were located to the northwest and to the east, respectively, of E-1 and cannot be used to define contamination to the north. SB-4 is necessary because no other samples are located directly north of E-1. (T. 134-135, Ex. 11) Furthermore, sample SB-3 was collected on the same day as sample SB-4, so that results from SB-3 would not have been available when the sample was collected from SB-4 and sent to the lab for analysis. (T. 153, R. 125-126) Accordingly, SB-4 was necessary to determine whether

[5] Exhibit 11 is a figure on which sample locations and data are consolidated from numerous reports in the Record. (T. 128-131, 151-153)

contamination from E-1 extended to the north, and to define the extent of contamination from E-1. (T. 134-135)

Regarding the Agency's comments about benzene contamination in SB-5 being an anomaly (R. 256), testimony was presented at hearing that the contamination found in SB-5 was benzene contamination from a sample collected at a depth of 2½ feet (T. 126, 170, Ex. 11) and was likely due to an overfill at the diesel UST location. (T. 135. 156) The fire marshal onsite determined that piping releases and overfills at the diesel UST were the cause of the release. (T. 157, R. 8) Overfills are covered by the underground storage tank rules and remediation of an overfill is eligible for reimbursement from the Fund. (T. 136) While the Agency comments in the Letter that the excavation samples from the tank basin in the vicinity of SB-5 do not show exceedences of benzene, the Agency ignores the fact that those samples were collected at a greater depth than the samples from SB-5 that was collected at a depth of 2½ feet. At the Farina site, the excavation samples were collected at a level of approximately eight feet below ground surface (T. 157, 177) and, thus, would not necessarily detect the existence of a release caused by an overfill. In addition, even if contamination had not been found in SB-5, SB-5 is still useful because it is located to the northwest of sample D-10 which detected contamination. (T. 134) Accordingly, while SB-5's location was initially due to a clerical error (T. 154), SB-5 is in an appropriate area because there were no other samples in that area to determine whether contamination from D-10 migrated to that area. (T. 134, R. 170) Thus, the Stage 1 investigation was done in compliance with the regulations at section 734.315. (T. 131)

2. Monitoring Well Soil Samples Were Properly Submitted for Analysis.

The locations of the monitoring wells MW-1, MW-2, MW-3, MW-4 and MW-5 was in accordance with the regulatory requirements. (T. 136-137, Ex. 11, 35 IAC 734.315(a)(2)(B))

The Agency has not disputed the locations of the monitoring wells. The regulations at subsection 734.315(a)(2)(C)) require that soil samples be collected from the monitoring well borings and that the soil samples not be analyzed "if other soil sampling conducted to date indicates that the soil contamination does not extend to the location of the monitoring well installation boring. . . . "

In Item 2 of the Agency's Letter, the Agency states that soil samples from the monitoring wells MW-1, MW-2, MW-4, and MW-5 "exceed the minimum requirements to comply with the applicable regulations. (R. 257) Yet, the Agency provides no explanation for this conclusion. Further, the Agency chose not be present an explanation through Ms. Hawbaker at Hearing and cannot now try to justify its erroneous position. As discussed below, the soil samples from monitoring wells MW-1, MW-2, and MW-4 were analyzed in accordance with applicable regulations.[6]

Samples from the monitoring wells were collected on the same day that the soil boring samples were collected. (T. 153, 155, 161, R. 125-126) At the time those samples were collected, Petitioner's consultant did not have available the data from the soil boring samples. (T. 138-139, 171) Therefore, under the applicable regulations, soil sampling to date had not indicated the absence of soil contamination in these areas.

Keller Oil's consultant's soil borings not only complied with the regulations, they make practical sense. It is not efficient to make numerous trips to the field to collect samples to determine where contamination actually ends and to later collect "more samples to define exactly

[6] After MW-5 was drilled, CW^{3}M discovery that a clerical error had been made in a report in which the sample numbers for a contaminated sample and a clean sample were switched and the decision to analyze the soil samples from MW-5 was based on this erroneous information. Accordingly, Petitioner is not contesting that soil samples from MW-5 did not need to be analyzed, and MW-5 is no longer part of this appeal. (T. 8)

how bad it is and in what areas." (T. 167) It is more efficient and cheaper to collect all of the samples during the same trip to perform field work. (T. 167, 170)

In addition, the monitoring well soil samples could not be held until data was received from other samples collected on the same day. (T. 139) The samples had to be submitted to the laboratory for analysis shortly after collection because of the relatively short laboratory holding time. (T. 139) It typically takes approximately two weeks to obtain samples results. (T. 139) On the other hand, the laboratory holding time for such samples is only approximately fourteen days. (T. 139) Because BTEX[7] are volatile organic chemicals, they could evaporate from the sample. (T. 139) It is not prudent or good engineering practices to collect BTEX samples and submit them to the laboratory piecemeal. (T. 140) Accordingly, if one were to wait for the results of some soil samples before having others analyzed, the lab results would not be reliable. The samples must be analyzed within a certain time to maintain the integrity of the sample. (T. 139-140)

At trial, Mr. Weinhoff testified that MW-1, MW-2, and MW-4 were sited in accordance with subsection 734.315(b). MW-1 was sampled because contamination had been found in sample D-10, in the diesel UST area, and there was no data between D-10 and MW-1 to show that contamination had not extended to MW-1. (T. 138, Ex. 11) Similarly, there was no data between P-4 in the gasoline UST area and MW-1. (*Id.*) MW-2 soil samples were analyzed because there was nothing to define soil BTEX and MTBE contamination between P-4 and MW-2 or PNA contamination between D-10 and MW-2. (T. 140, 142, 159, Ex. 11) MW-4 soil samples were analyzed because there were no soil samples defining PNA contamination between

[7] BTEX (benzene, toluene, ethylbenzene and xylene) and MTBE are indicators of gasoline and BTEX and PNAs (polynuclear aromatic hydrocarbons) are indicators of diesel (T. 142, 35 IAC 734.405).

D-10 and MW-4. (T. 141, 160, Ex. 11) Petitioner complied with subsections 734.315(a) to (c) in its installation and sampling of monitoring wells and the analysis of soil samples collected during the drilling of those wells because, when those samples were collected and analyzed, there was no other data to date showing that contamination had not extended to those areas. (T. 171-172).

3. The Agency Misuses Data From Piping Run Samples.

The Agency's statement that piping run samples are acceptable under Section 734 for determining contamination extent, which is found in item 2 of the Letter (R. 257), is in error. The Agency incorrectly claims that the analysis of soil borings MW-1, MW-2 and MW-4 were not in compliance with the regulations because piping run samples had determined the extent of contamination. The Letter provides no specific regulatory citation to support its position. A possible clue to the basis for the Agency's position is found in the reviewer notes which contains a statement that: "If samples from the excavation and piping runs do not show exceedences from the prescribed sample areas during early action, the regs. state that no further investigation in that direction is necessary." (R. 253) However, the Agency has not identified any regulations that contain that provision.

It appears that the Agency is misreading subsections 734.210(h)(1) and 734.210(h)(3). Under subsection 734.210(h)(1), the owner or operator must collect certain excavation and piping run samples during early action and analyze the samples. Then the analytical data is compared to TACO Tier 1 Remediation Objectives. If the most stringent TACO Tier 1 remediation objectives have been met in <u>all</u> of the samples, under subsection 743.210(h)(3) the owner or operator is not required to do further investigation and should submit a report showing that the remediation objectives have been met. However, subsection 734.210(h)(3) does not

apply at this site because some of the early action samples did not meet the most stringent Tier 1 remediation objectives. (Ex. 1, 45-Day Report Addendum, dated April 24, 2006, p. 5 and 45-Day Report Addendum, dated July 6, 2006, p. 6)

Furthermore, Keller Oil provided testimony at hearing that, when there is a leak from a pipe, as was found at this site (*See date from samples D-10 and P-4*, Ex. 11) the contamination can migrate downward and then laterally so that contamination could be below the location where nearby piping run samples were collected. (T. 143-145, Ex. 12) Soil borings are necessary to try to intercept a potential contaminant plume that may have migrated from a piping release. (T. 145) Soil borings taken during Stage 1 should investigate from the ground surface all the way to the depth where groundwater is encountered. (T. 179, 35 IAC 734.315(a)(1)) Soil boring samples at this site were typically drilled to a depth of 10 feet below ground surface, the approximate level at which groundwater was first encountered. (R. 96-101) This was also explained to the Agency in the Stage II Site Investigation Plan and Budget - Additional Information and Reconsideration. (R. 171)

Piping run samples, on the other hand, are collected from the bottom of the excavation from which piping was removed, typically at a depth of approximately 2 to 3 feet below grade. (T. 146, R. 171). Here, they were collected at a depth of about 2½ to 3 feet below ground surface at the bottom of the piping trench. (T. 176) Thus, soil boring samples are collected at a greater depth than piping run samples and would be more likely to detect a release that migrated downward through the soil and then spread laterally. (T. 143-145) Piping run samples are collected from more shallow locations and, therefore, would not detect contamination that had migrated downward. (*Id.*, R. 171) Only if piping run samples were obtained by drilling, would information be obtained about anything beyond the bottom of the piping trench. (T. 179) While

piping run samples cannot be used to define the extent of contamination at a site, they may be useful for determining if a release occurred from the adjacent piping run. However, soil boring samples are necessary to determine if there is contamination throughout the entire vadose zone. (T. 143, R. 171) Thus, the data from the monitoring wells soil samples should be allowed.

C. The Stage 2 Site Investigation Proposed Samples are Located Properly.

In Item 4 of the Agency's Letter, the Agency rejects the proposed Stage 2 Site Investigation. (R. 258-260) This rejection was wrong. As part of this rejection, the Agency rejected the locations of two proposed monitoring wells and one proposed soil boring located between the gasoline pump island where contamination was found and the area of MW-2, which is 200 feet east of the pump islands. Testimony was presented at hearing regarding the benefit of data from sampling those locations. (T. 147-148) Data from the proposed samples would be useful because Stage 1 Investigation and early action data are compared to Tier 1 remediation objectives. (*See* 35 IAC 734.210(h)(3) and (4) and 734.315(c)) Once the site investigation is completed, a Tier 2 analysis is done in order to reduce the area of the plume that needs remediation. (T. 149) Contamination levels at MW-2 might meet Tier 2 remediation objectives, after Tier 2 remediation objectives are calculated using site specific data. (T. 148, *see also* R. 175) Data from samples collected between the known leak at the pump island and MW-2 would be invaluable for designing corrective actions and could reduce corrective action costs by reducing the size of the area that must be remediated. (T. 148-149, R. 175) Because the Act prohibits corrective action activities in excess of those required to meet the minimum requirements of Title XVI of the Act, and data the proposed wells and soil boring between the gasoline pump island and MW-2 could help reduce the size of the area subject to corrective action, these proposed wells and soil boring should be approved. (*See* 415 ILCS 5/57.7(c)(3))

Also in Item 4, the Agency took issue with the proposed monitoring well located south of the gasoline pump island, apparently because the Agency believes the piping run samples are acceptable for determining contamination extent in that direction. (R. 259) However, as mentioned above and as testimony was provided at hearing, such piping run samples are too shallow to determine if contamination that was found at E-1 could have sunk and then migrated beneath the piping run samples. (T. 143, Ex. 12) The sample collected at E-1 was taken at a depth of approximately 8 feet below ground surface. (T. 177) The piping run samples to the south of E-1 were taken at a depth of only 2½ to 3 feet below ground surface. (T. 176, R. 171)

Piping run samples do not span the entire vadose zone (the unsaturated zone above the saturated zone) and are insufficient to determine the extent of contamination in the vadose zone. (T. 143, R. 171) Thus, clean piping run samples cannot be used to define the extent of contamination in the entire vadose zone (*Id.*), and the proposed monitoring well south of the gasoline pump island should be approved.

The Agency reviewer also took issue in Item 4 with the proposed soil borings located west of the diesel tank excavation. However, the Agency's reasoning is not clear because, as the Agency noted in the Letter, benzene contamination that was apparently from an overfill (T. 135) was found in the shallow sample 2½ feet below ground surface from SB-5. (R.109) As discussed above, the excavation sample was collected at a depth of 8 feet, whereas, the benzene contamination was likely from an overfill as it was located closer to the surface, at a depth of 2½ feet. The regulations at subsection 734.210(h)(4) require additional investigation in this area to delineate the extent of contamination identified in D-10 and SB-5. The proposed soil boring to the west of the diesel tank excavation is to define the contamination found in that location and to the west to southwest of D-10 and the south of SB-5. (T. 147)

In the Agency's rejection of SB-5, which contained benzene, it appears that the Agency somehow thinks that benzene was not found in other samples from the diesel UST area because it was somehow "missed." Contrary to the Agency's assertions in the reviewer notes, on page 253 of the Record that "'Missing' the contamination from the excavation is not a generally accepted engineering practice," testimony was presented at hearing that, while in the field, it is not always possible to determine if laboratory analysis will find contamination or not. (T. 156, 171, 177) The person collecting samples onsite does the best job he or she can to get the most contaminated wall sample from that area after removing the early action backfill. When collecting an excavation wall sample in compliance with the regulations, as was done here, a sample size that is approximately a 3 inch cube is taken to represent an area that is 20 feet long by 10 to 12 feet deep. (T. 176-178, 35 IAC 734.210(h)(1)(A)) Thus, the representative sample is a very small portion of the area it represents. Both Mr. Weinhoff and Mr. Smith testified that, even someone who has years of experience, can occasionally get fooled. (T. 156, 171-177) Accordingly, while every effort is made to collect samples of the most contaminated areas, occasionally contamination can be missed. (*Id.*) Even so, the Agency's comments about missing contamination are irrelevant because Keller/Farina determined that the contamination at SB-5 was likely due to an overfill, rather than a tank leak. (T. 135) In addition, the State Fire Marshal determined that the releases at the diesel UST were from piping and overfills. (R. 8) The data is consistent with that determination.

The Agency also rejected the Stage 2 groundwater sampling proposal due to the Agency's erroneous belief that the Stage 1 monitoring wells were not installed in accordance with section 734.430. However, as discussed above and documented in the record, the wells

were installed correctly. (R. 92-94, 102-107, 177) Accordingly, the proposed Stage 2 Site Investigation Plan should be approved.

D. The Work That was Performed Met Generally Accepted Engineering Practices and Principles of Professional Geology

The standards for review of plans, budgets or reports found at 35 Ill. Admin. Code 734.510 require that technical reviews not only consist of a review of the steps proposed and completed but that:

> 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.

(*See* Appendix A)

Petitioner provided testimony at hearing that the work that was done, including early action sampling, soil boring installation and sampling, and monitoring well installation and sampling, as well as the Stage 2 Site Investigation Plan are in compliance with applicable regulatory requirements and in accordance with generally accepted engineering practices or principles of professional geology. (T. 58-61, 150, 180-182) The Agency has presented no evidence and provided no witnesses at the hearing to support a contrary position.

E. Certification

As stipulated during the hearing, Petitioner provided the certification the Agency requested in Item 5 (T. 7, Ex. 2), even though Petitioner did not believe that this certification needed to be presented to the Agency again, as it was included at R. 19-21. Thus, this issue is no longer subject to appeal.

F. The Agency Erroneously Rejected the Budget

The Letter also rejected the Plan budget for several reasons. (R. 261-262) In Item 1 the Agency incorrectly rejected the costs of soil boring SB-4 and SB-5 and the costs to analyze soil samples collected from the monitoring wells because the Agency incorrectly rejected the locations of SB-4 and SB-5 and incorrectly determined that soil samples from the monitoring wells should not have been analyzed. As demonstrated above, this work was done correctly. Even so, as Petitioner stipulated at hearing, soil samples were analyzed from monitoring well MW-5 because of a clerical error in a report and Petitioner is no longer seeking reimbursement for the costs of analyzing the soil samples from MW-5. (T. 8) However, the costs related to the other monitoring wells and SB-4 and SB-5 are reimbursable.

In Budget Item 2, the Agency incorrectly denied reimbursement for the costs of installing the monitoring wells because the Agency incorrectly decided that the wells were not installed properly. (R. 261) However, as shown above, the monitoring wells were installed in accordance with applicable regulations and with accepted engineering procedures and professional geology practices. Accordingly, costs to install the monitoring wells should be approved.

The Agency also disallowed the line item cost for preparing and reviewing a Stage 1 budget because budgets are not required for Stage 1. (R. 261) Keller/Farina agrees that budgets are not required for Stage 1, however, the costs of Stage 1 Site Investigations are reimbursable

pursuant to 35 Ill. Admin. Code 734625(a) and the costs of preparing reimbursement requests are likewise reimbursable pursuant to 35 Ill. Admin. Code 734.625(a)(14). Information on Stage 1 costs were presented in the Stage II Site Investigation Plan to give the Agency information on those costs (R. 41-66). However, a reimbursement request was not submitted, so Keller/Farina considers the Agency's comment merely advisory.

Finally, the Agency disapproved the budget for the proposed plan because the plan was rejected. (R. 261) As shown above, the Agency erred when it disapproved the proposed plan. As a result, the plan and associated budget should be approved.

CONCLUSION

As discussed above, the Agency's decisions in the Letter regarding soil borings SB-4 and SB-5, the installation of monitoring wells, and the analysis of soil samples from MW-1, MW-2, and MW-4 are wrong. That work was performed in compliance with applicable regulations and the Act. (T. 58-61, 131, T. 180-182) Thus, Petitioner is asking the Board to overturn the Agency's decisions regarding that work. In addition, the Agency incorrectly rejected Petitioner's proposal for a Stage 2 Site Investigation and incorrectly rejected the budget for work that had been completed and work that was proposed. Both the proposed Stage 2 Site Investigation Plan and the budget complied with applicable requirements. Accordingly, Petitioner respectfully requests that the Board overturn the Agency's decisions and approve the completed Stage 1 investigation, the proposed Stage 2 investigation, and the budget.

WHEREFORE, L. Keller Oil Properties (Farina) respectfully requests that the Board overturn the Agency's decisions set forth in the Letter and approve Petitioner's work as described herein and approve Petitioner's request for attorneys' fees and costs pursuant to 35 Ill. Admin. Code 734.630(g).

Respectfully submitted,

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APPENDIX A

APPLICABLE REGULATIONS

Section 734.210 Early Action

h) The owner or operator must determine whether the areas or locations of soil contamination exposed as a result of early action excavation (e.g., excavation boundaries, piping runs) or surrounding USTs that remain in place meet the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 for the applicable indicator contaminants.

1) At a minimum, for each UST that is removed. the owner or operator must collect and analyze soil samples as indicated in subsections (h)(1)(A). The Agency must allow an alternate location for, or excuse the collection of, one or more samples if sample collection in the following locations is made impracticable by site-specific circumstances.

A) One sample must be collected from each UST excavation wall. The samples must be collected from locations representative of soil that is the most contaminated as a result of the release. If an area of contamination cannot be identified on a wall, the sample must be collected from the center of the wall length at a point located one-third of the distance from the excavation floor to the ground surface. For walls that exceed 20 feet in length, one sample must be collected for each 20 feet of wall length, or fraction thereof, and the samples must be evenly spaced along the length of the wall.

B) Two samples must be collected from the excavation floor below each UST with a volume of 1,000 gallons or more. One sample must be collected from the excavation floor below each UST with a volume of less than 1,000 gallons. The samples must be collected from locations representative of soil that is the most contaminated as a result of the release. If areas of contamination cannot be identified, the samples must be collected from below each end of the UST if its volume is 1,000 gallons or more, and from below the center of the UST if its volume is less than 1,000 gallons.

C) One sample must be collected from the floor of each 20 feet of UST piping run excavation, or fraction thereof. The samples must be collected from a location representative of soil that is the most contaminated as a result of the release. If an area of contamination

cannot be identified within a length of piping run excavation being sampled, the sample must be collected from the center of the length being sampled. For UST piping abandoned in place, the samples must be collected in accordance with subsection (h)(2)(B) of this Section.

D) If backfill is returned to the excavation, one representative sample of the backfill must be collected for each 100 cubic yards of backfill returned to the excavation.

E) The samples must be analyzed for the applicable indicator contaminants. In the case of a used oil UST the sample that appears to be the most contaminated as a result of a release from the used oil UST must be analyzed in accordance with Section 734.405(g) of this Part to determine the indicator contaminants for used oil. The remaining samples collected pursuant to subsections (h)(1)(A) and (B) of this Section must then be analyzed for the applicable used oil indicator contaminants.

2) [Subsection 734.210(h)(2) refers to USTs that remain in place and is not applicable here.]

* * *

3) If the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 for the applicable indicator contaminants have been met, and if none of the criteria set forth in subsections (h)(4)(A) through (C) of this Section are met, within 30 days after the completion of early action activities the owner or operator must submit a report demonstrating compliance with those remediation objectives. The report must include, but not be limited to, the following:

* * *

[Because some samples exceeded Tier 1 remediation objectives, subsection 734.210(h)(3) does not apply.]

4) If the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 for the applicable indicator contaminants have not been met, or if one or more of the following criteria are met, the owner or operator must continue in accordance with Subpart C of this Part:

A) There is evidence that groundwater wells have been impacted by the release above the most stringent Tier 1 remediation

objectives of 35 Ill. Adm. Code 742 for the applicable indicator contaminants (e.g., as found during release confirmation or previous corrective action measures);

B) Free product that may impact groundwater is found to need recovery in compliance with Section 734.215 of this Part; or

C) There is evidence that contaminated soils may be or may have been in contact with groundwater, unless:

(i) The owner or operator pumps the excavation or tank cavity dry, properly disposes of all contaminated water, and demonstrates to the Agency that no recharge is evident during the 24 hours following pumping; and

(ii) The Agency determines that further groundwater investigation is not necessary.

Section 734.315 Stage 1 Site Investigation

The Stage 1 site investigation must be designed to gather initial information regarding the extent of on-site soil and groundwater contamination that, as a result of the release, exceeds the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 for the applicable indicator contaminants.

a) The Stage 1 site investigation must consist of the following:

1) Soil investigation.

A) Up to four borings must be drilled around each independent UST field where one or more UST excavation samples collected pursuant to 734.210(h), excluding backfill samples, exceed the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 for the applicable indicator contaminants. One additional boring must be drilled as close as practicable to each UST field if a groundwater investigation is not required under subsection (a)(2) of this Section. The borings must be advanced through the entire vertical extent of contamination, based upon field observations and field screening for organic vapors, provided that borings must be drilled below the groundwater table only if site- specific conditions warrant.

B) Up to two borings must be drilled around each UST piping run where one or more piping run samples collected pursuant to

Section 734.210(h) exceed the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 for the applicable indicator contaminants. One additional boring must be drilled as close as practicable to each UST piping run if a groundwater investigation is not required under subsection (a)(2) of this Section. The borings must be advanced through the entire vertical extent of contamination, based upon field observations and field screening for organic vapors, provided that borings must be drilled below the groundwater table only if site-specific conditions warrant.

C) One soil sample must be collected from each five-foot interval of each boring drilled pursuant to subsections (a)(1)(A) and (B) of this Section. Each sample must be collected from the location within the five-foot interval that is the most contaminated as a result of the release. If an area of contamination cannot be identified within a five-foot interval, the sample must be collected from the center of the five-foot interval. All samples must be analyzed for the applicable indicator contaminants.

2) Groundwater investigation.

A) A groundwater investigation is required under the following circumstances:

i) There is evidence that groundwater wells have been impacted by the release above the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 for the applicable indicator contaminants;

ii) Free product that may impact groundwater is found to need recovery in compliance with Section 734.215 of this Part; or

iii) There is evidence that contaminated soils may be or may have been in contact with groundwater, except that, if the owner or operator pumps the excavation or tank cavity dry, properly disposes of all contaminated water, and demonstrates to the Agency that no recharge is evident during the 24 hours following pumping, the owner or operator does not have to complete a groundwater investigation, unless the Agency's review reveals that further groundwater investigation is necessary.

B) If a groundwater investigation is required, the owner or operator must install five groundwater monitoring wells. One monitoring well must be installed in the location where groundwater contamination is most likely to be present. The four remaining wells must be installed at the property boundary line or 200 feet from the UST system, whichever is less, in opposite directions from each other. The wells must be installed in locations where they are most likely to detect groundwater contamination resulting from the release and provide information regarding the groundwater gradient and direction of flow.

C) One soil sample must be collected from each five-foot interval of each monitoring well installation boring drilled pursuant to subsection (a)(2)(B) of this Section. Each sample must be collected from the location within the five-foot interval that is the most contaminated as a result of the release. If an area of contamination cannot be identified within a five-foot interval, the sample must be collected from the center of the five-foot interval. All soil samples exhibiting signs of contamination must be analyzed for the applicable indicator contaminants. For borings that do not exhibit any signs of soil contamination, samples from the following intervals must be analyzed for the applicable indicator contaminants, provided that the samples must not be analyzed if other soil sampling conducted to date indicates that soil contamination does not extend to the location of the monitoring well installation boring:

i) The five-foot intervals intersecting the elevations of soil samples collected pursuant to Section 734.210(h), excluding backfill samples, that exceed the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 for the applicable indicator contaminants.

ii) The five-foot interval immediately above each five-foot interval identified in subsection (a)(2)(C)(i) of this Section; and

iii) The five-foot interval immediately below each five-foot interval identified in subsection (a)(2)(C)(i) of this Section.

D) Following the installation of the groundwater monitoring wells, groundwater samples must be collected from each well and analyzed for the applicable indicator contaminants.

E) As a part of the groundwater investigation an in-situ hydraulic conductivity test must be performed in the first fully saturated layer below the water table. If multiple water bearing units are encountered, an in-situ hydraulic conductivity test must be performed on each such unit.

i) Wells used for hydraulic conductivity testing must be constructed in a manner that ensures the most accurate results.

ii) The screen must be contained within the saturated zone.

3) An initial water supply well survey in accordance with Section 734.445(a) of this Part.

b) The Stage 1 site investigation plan must consist of a certification signed by the owner or operator, and by a Licensed Professional Engineer or Licensed Professional Geologist, that the Stage 1 site investigation will be conducted in accordance with this Section.

c) If none of the samples collected as part of the Stage 1 site investigation exceed the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 for the applicable indicator contaminants, the owner or operator must cease site investigation and proceed with the submission of a site investigation completion report in accordance with Section 734.330 of this Part. If one or more of the samples collected as part of the Stage 1 site investigation exceed the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 for the applicable indicator contaminants, within 30 days after completing the Stage 1 site investigation the owner or operator must submit to the Agency for review a Stage 2 site investigation plan in accordance with Section 734.320 of this Part.

Section 734.320 Stage 2 Site Investigation

The Stage 2 site investigation must be designed to complete the identification of the extent of soil and groundwater contamination at the site that, as a result of the release, exceeds the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 for the applicable indicator contaminants. The investigation of any off-site contamination must be conducted as part of the Stage 3 site investigation.

a) The Stage 2 site investigation must consist of the following:

1) The additional drilling of soil borings and collection of soil samples necessary to identify the extent of soil contamination at the site that exceeds the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 for the applicable indicator contaminants. Soil samples must be collected in appropriate locations and at appropriate depths, based upon the results of the soil sampling and other investigation activities conducted to date, provided, however, that soil samples must not be collected below the groundwater table. All samples must be analyzed for the applicable indicator contaminants; and

2) The additional installation of groundwater monitoring wells and collection of groundwater samples necessary to identify the extent of groundwater contamination at the site that exceeds the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 for the applicable indicator contaminants. If soil samples are collected from a monitoring well boring, the samples must be collected in appropriate locations and at appropriate depths, based upon the results of the soil sampling and other investigation activities conducted to date, provided, however, that soil samples must not be collected below the groundwater table. All samples must be analyzed for the applicable indicator contaminants.

b) The Stage 2 site investigation plan must include, but not be limited to, the following:

1) An executive summary of Stage 1 site investigation activities and actions proposed in the Stage 2 site investigation plan to complete the identification of the extent of soil and groundwater contamination at the site that exceeds the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 for the applicable indicator contaminants;

2) A characterization of the site and surrounding area, including, but not limited to, the following:

A) The current and projected post remediation uses of the site and surrounding properties; and

B) The physical setting of the site and surrounding area including, but not limited to, features relevant to environmental, geographic, geologic, hydrologic, hydrogeologic, and topographic conditions;

3) The results of the Stage 1 site investigation, including but not limited to the following:

A) One or more site maps meeting the requirements of Section 734.440 that show the locations of all borings and groundwater monitoring wells completed to date, and the groundwater flow direction;

B) One or more site maps meeting the requirements of Section 734.440 that show the locations of all samples collected to date and analyzed for the applicable indicator contaminants;

C) One or more site maps meeting the requirements of Section 734.440 that show the extent of soil and groundwater contamination at the site that exceeds the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 for the applicable indicator contaminants;

D) One or more cross-sections of the site that show the geology of the site and the horizontal and vertical extent of soil and groundwater contamination at the site that exceeds the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 for the applicable indicator contaminants;

E) Analytical results, chain of custody forms, and laboratory certifications for all samples analyzed for the applicable indicator contaminants as part of the Stage 1 site investigation;

F) One or more tables comparing the analytical results of the samples collected to date to the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 for the applicable indicator contaminants;

G) Water supply well survey documentation required pursuant to Section 734.445(d) of this Part for water supply well survey activities conducted as part of the Stage 1 site investigation; and

H) For soil borings and groundwater monitoring wells installed as part of the Stage 1 site investigation, soil boring logs and monitoring well construction diagrams meeting the requirements of Sections 734.425 and 734.430 of this Part; and

4) A Stage 2 sampling plan that includes, but is not limited to, the following:

A) A narrative justifying the activities proposed as part of the Stage 2 site investigation;

B) A map depicting the location of additional soil borings and groundwater monitoring wells proposed to complete the identification of the extent of soil and groundwater contamination at the site that exceeds the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 for the applicable indicator contaminants; and

C) The depth and construction details of the proposed soil borings and groundwater monitoring wells.

c) If the owner or operator proposes no site investigation activities in the Stage 2 site investigation plan and none of the applicable indicator contaminants that exceed the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 as a result of the release extend beyond the site's property boundaries, upon submission of the Stage 2 site investigation plan the owner or operator must cease site investigation and proceed with the submission of a site investigation completion report in accordance with Section 734.330 of this Part. If the owner or operator proposes no site investigation activities in the Stage 2 site investigation plan and applicable indicator contaminants that exceed the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 as a result of the release extend beyond the site's property boundaries, within 30 days after the submission of the Stage 2 site investigation plan the owner or operator must submit to the Agency for review a Stage 3 site investigation plan in accordance with Section 734.325 of this Part.

d) If the results of a Stage 2 site investigation indicate that none of the applicable indicator contaminants that exceed the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 as a result of the release extend beyond the site's property boundaries, upon completion of the Stage 2 site investigation the owner or operator must cease site investigation and proceed with the submission of a site investigation completion report in accordance with Section 734.330 of this Part. If the results of the Stage 2 site investigation indicate that applicable indicator contaminants that exceed the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 as a result of the release extend beyond the site's property boundaries, within 30 days after the completion of the Stage 2 site investigation the owner or operator must submit to the Agency for review a Stage 3 site investigation plan in accordance with Section 734.325 of this Part.

Section 734.430 Monitoring Well Construction and Sampling

a) At a minimum, all monitoring well construction must satisfy the following requirements:

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

2) Wells must be cased in a manner that maintains the integrity of the borehole. Casing material must be inert so as not to affect the water sample. Casing requiring solvent cement type couplings must not be used;

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. The slot size of the screen must be designed to minimize clogging. Screens must be fabricated from material that is inert with respect to the constituents of the groundwater to be sampled;

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 cement 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;

6) Wells must be covered with vented caps and equipped with devices to protect against tampering and damage. Locations of wells must be clearly marked and protected against damage from vehicular traffic or other activities associated with expected site use; and

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

b) Monitoring well construction diagrams must be completed for each monitoring well. The well construction diagrams must be submitted in the corresponding *site investigation* plan, site investigation completion report, or corrective action

completion report on forms prescribed and provided by the Agency and, if specified by the Agency in writing, in an electronic format.

c) Static 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.

Section 734.510 Standards for Review of Plans, Budgets, or Reports

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 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.