**Section 732.307 Site Evaluation**

a) Except as provided in Section 732.300(b), or unless an owner or operator submits a report pursuant to Section 732.202(h)(3) of this Part demonstrating that the most stringent Tier 1 remediation objectives of 35 Ill. Adm. Code 742 for the applicable indicator contaminants have been met or elects to classify a site under Section 732.312, the owner or operator of any site for which a release of petroleum has been confirmed in accordance with regulations promulgated by the OSFM and reported to IEMA shall arrange for site evaluation and classification in accordance with the requirements of this Section. A Licensed Professional Engineer or Licensed Professional Geologist (or, where appropriate, persons working under the direction of a Licensed Professional Engineer or Licensed Professional Geologist) shall conduct the site evaluation. The results of the site evaluation shall provide the basis for determining the site classification. The site classification shall be certified by the supervising Licensed Professional Engineer or Licensed Professional Geologist.

b) As a part of each site evaluation, the Licensed Professional Engineer or Licensed Professional Geologist shall conduct a physical soil classification in accordance with the procedures at subsection (c) or (d) of this Section. Except as provided in subsection (e) of this Section, all elements of the chosen method of physical soil classification must be completed for each site. In addition to the requirement for a physical soil classification, the Licensed Professional Engineer or Licensed Professional Geologist shall, at a minimum, complete the requirements at subsections (f) through (j) of this Section before classifying a site as High Priority or Low Priority and subsection (f) through (i) of this Section before classifying a site as No Further Action.

c) Method One for Physical Soil Classification:

1) Soil Borings

A) Prior to conducting field activities, a review of scientific publications and regional geologic maps shall be conducted to determine if the subsurface strata are as generally mapped in the Illinois State Geological Survey Circular (1984) entitled "Potential for Contamination of Shallow Aquifers in Illinois," incorporated by reference in Section 732.104 of this Part. A list of the publications reviewed and any preliminary conclusions concerning the site geology shall be included in the site classification completion report.

B) A minimum of one soil boring to a depth that includes 50 feet of native soil or to bedrock shall be performed for each tank field with a release of petroleum.

C) If, during boring, bedrock is encountered or if auger refusal occurs because of the density of a geologic material, a sample of the bedrock or other material shall be collected to determine permeability or an in situ test shall be performed to determine hydraulic conductivity in accordance with subsections (c)(3)(A) and (c)(3)(B) of this Section. If bedrock is encountered or auger refusal occurs, the Licensed Professional Engineer or Licensed Professional Geologist shall verify that the conditions that prevented the full boring are expected to be continuous through the remaining required depth.

D) Borings shall be performed within 200 feet of the outer edge of the tank field or at the property boundary, whichever is less. If more than one boring is required per site, borings shall be spaced to provide reasonable representation of site characteristics. The actual spacing of the borings shall be based on the regional hydrogeologic information collected in accordance with subsection (c)(1)(A) of this Section. Location shall be chosen to limit to the greatest extent possible the vertical migration of contamination.

E) Soil borings shall be continuously sampled to ensure that no gaps appear in the sample column.

F) If anomalies are encountered, additional soil borings may be necessary to verify the consistency of the site geology.

G) Any water bearing units encountered shall be protected as necessary to prevent cross-contamination during drilling.

H) The owner or operator may utilize techniques other than those specified in this subsection (c)(1) for soil classification provided that:

i) The techniques provide equivalent, or superior, information as required by this Section;

ii) The techniques have been successfully utilized in applications similar to the proposed application;

iii) Methods for quality control can be implemented; and

iv) The owner or operator has received written approval from the Agency prior to the start of the investigation.

2) Soil Properties

The following tests shall be performed on a representative sample of each of the stratigraphic units encountered in the native soil boring that has been determined most conducive to transporting contaminants from the source based on site factors, including but not limited to visual and tactile observations, the classification of the soil, any prior evaluation of the site stratigraphy, the volume of the release, the thickness or extent of the stratigraphic unit, and the requirements of ASTM D 2488-93, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), approved September 15, 1993:

A) A soil particle analysis using the test methods specified in ASTM (American Society for Testing and Materials) Standard D 422-63 or D 1140-92, "Standard Test Method for Particle-Size Analysis of Soils," or "Standard Test Method for Amount of Material in Soils Finer than the No. 200 (75µm) Sieve," incorporated by reference in Section 732.104 of this Part, or other Agency approved method;

B) A soil moisture content analysis using the test methods specified in ASTM Standard D 2216-92 or D 4643-93, "Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock," or "Standard Test Method for Determination of Water (Moisture) Content of Soil by the Microwave Oven Method," incorporated by reference in Section 732.104 of this Part, or other Agency approved method;

C) A soil classification using the test methods specified in ASTM Standard D 2487-93 or D 2488-93, "Standard Test Method for Classification of Soils for Engineering Purposes" or "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)," incorporated by reference in Section 732.104 of this Part, or other Agency approved method;

D) Unconfined compression strength shall be determined in tons per square foot by using a hand penetrometer; and

E) If representative samples of each stratigraphic unit are collected for soil property testing by the use of thin-walled tube sampling, an additional soil boring must be performed for this sampling within 5 feet of the site classification boring. Thin-walled tube sampling must be conducted in accordance with ASTM Standard Test Method D 1587-83, incorporated by reference in Section 732.104 of this Part, or other Agency approved method. The boring from which the thin-walled tubes are collected must be logged in accordance with the requirements of Section 732.308(a) of this Part.

3) Hydraulic Conductivity

A) If a water bearing unit is encountered while performing soil boring(s) for the physical soil classification, an in-situ hydraulic conductivity test shall 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 shall be performed on each such unit.

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

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

B) If no water bearing unit is encountered in the required soil boring(s), then the following laboratory analyses shall be conducted, as applicable, on a representative sample from each stratigraphic unit:

i) A hydraulic conductivity analysis of undisturbed or laboratory compacted granular soils (i.e., clay, silt, sand or gravel) using the test method specified in ASTM Standard D 5084-90, "Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter," incorporated by reference in Section 732.104 of this Part, or other Agency approved method.

ii) Granular soils that are estimated to have hydraulic conductivity greater than 1 x 10**-**3 cm/sec will fail the minimum geologic conditions for "No Further Action", i.e., rating of D, E, F, or G as described in the Berg Circular, and therefore, no physical tests need to be run on the soils.

iii) A hydraulic conductivity analysis of bedrock using the test method specified in ASTM Standard D 4525-90, "Standard Test Method for Permeability of Rocks by Flowing Air," incorporated by reference in Section 732.104 of this Part, or other Agency approved method.

iv) If representative samples of each stratigraphic unit are collected for soil property testing by the use of thin-walled tube sampling, an additional soil boring must be performed for this sampling within 5 feet of the site classification boring. Thin-walled tube sampling must be conducted in accordance with ASTM Standard Test Method D 1587-83, incorporated by reference in Section 732.104 of this Part, or other Agency approved method. The boring from which the thin-walled tubes are collected must be logged in accordance with the requirements of Section 732.308(a) of this Part.

4) If the results of the physical soil classification or groundwater investigation reveal that the actual site geologic characteristics are different from those generally mapped by the Illinois State Geological Survey Circular (1984) entitled "Potential for Contamination of Shallow Aquifers in Illinois," incorporated by reference at Section 732.104 of this Part, the site classification shall be determined using the actual site geologic characteristics.

d) Method Two for Physical Soil Classification:

1) Soil Borings

A) A minimum of one soil boring to a depth that includes native material from the invert elevation of the most shallow UST to 15 feet below the invert elevation of the deepest UST for each tank field with a release of petroleum.

B) This boring shall meet the requirements of subsections (c)(1)(C) through (c)(1)(G) of this Section.

2) Soil Properties

The following tests must be performed on a representative sample of each of the stratigraphic units encountered in the native soil boring that has been determined most conducive to transporting contaminants from the source based on site factors including but not limited to visual and tactile observations, the classification of the soil, any prior evaluation of the site stratigraphy, the volume of the release, the size or extent of the unit, and the requirements of ASTM D 2488-93, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), approved September 15, 1993 and incorporated by reference in Section 732.104 of this Part:

A) A soil particle analysis satisfying the requirements of subsection (c)(2)(A) of this Section; and

B) Either:

i) A pump test or equivalent to determine the yield of the geologic material. Methodology, assumptions and any calculations performed shall be submitted as part of the site classification completion report. If the aquifer geometry and transmissivity have been obtained through a site-specific field investigation, an analytical solution may be used to estimate well yield. The Licensed Professional Engineer or Licensed Professional Geologist shall demonstrate the appropriateness of the analytical solution to estimate well yield versus an actual field test. Well yield should be determined for either confined or unconfined formations. Once the yield has been determined site-specifically, the hydraulic conductivity shall be calculated; or

ii) Hydraulic conductivity shall be determined in accordance with subsection (c)(3) of this Section. Once the hydraulic conductivity has been determined site-specifically, the yield shall be calculated.

C) If representative samples of each stratigraphic unit are collected for soil property testing by the use of thin-walled tube sampling, an additional soil boring must be performed for this sampling within 5 feet of the site classification boring. Thin-walled tube sampling must be conducted in accordance with ASTM Standard Test Method D1587-83, incorporated by reference in Section 732.104 of this Part, or other Agency approved method. The boring from which the thin-walled tubes are collected must be logged in accordance with the requirements of Section 732.308(a) of this Part.

3) The results of the boring(s) and tests described in subsections (d)(1) and (d)(2) of this Section shall be used to demonstrate whether the native material from the invert elevation of the most shallow UST to 15 feet below the invert elevation of the deepest UST meets all of the following criteria:

A) Does not contain unconsolidated sand, gravel or sand and gravel that is 5 feet or more in thickness with 12 percent or less fines (i.e., fines that pass through a No. 200 sieve tested according to ASTM Standard Test Method D 2487-93, "Standard Test Method for Classification of Soils for Engineering Purposes," incorporated by reference at Section 732.104 of this Part, or other Agency approved method);

B) Does not contain sandstone that is 10 feet or more in thickness, or fractured carbonate that is 15 feet or more in thickness;

C) Is not capable of sustained groundwater yield, from up to a 12 inch borehole, of 150 gallons per day or more from a thickness of 15 feet or less; and

D) Is not capable of hydraulic conductivity of 1 x 10**-**4 cm/sec or greater.

e) If, during the completion of the requirements of subsection (c) or (d) of this Section, a Licensed Professional Engineer or Licensed Professional Geologist determines that the site geology is not consistent with area D, E, F or G of the Illinois State Geological Survey Circular (1984) entitled, "Potential for Contamination of Shallow Aquifers in Illinois," incorporated by reference in Section 732.104 of this Part or that the criteria of subsection (d)(3) are not satisfied, any remaining steps required by subsection (c) or (d) may be suspended, provided that the soil investigation has been sufficient to satisfy the requirements of subsection (g) of this Section. If activities are suspended under this subsection (e), the Licensed Professional Engineer or Licensed Professional Geologist shall complete the requirements of subsections (f) through (j) of this Section in order to determine whether the site is High Priority or Low Priority. The site conditions upon which the suspension of the requirements of subsection (c) or (d) of this Section is based shall be documented in the site classification completion report.

f) Survey of Water Supply Wells. At a minimum, the owner or operator must conduct a water supply well survey to identify all potable water supply wells located at the site and within 200 feet of the site, all community water supply wells located at the site and within 2,500 feet of the site, and all regulated recharge areas and wellhead protection areas in which the site is located. Actions taken to identify the wells must include, but are not limited to, the following.

1) Contacting the Agency's Division of Public Water Supplies to identify community water supply wells, regulated recharge areas, and wellhead protection areas;

2) Using current information from the Illinois State Geological Survey, the Illinois State Water Survey, and the Illinois Department of Public Health (or the county or local health department delegated by the Illinois Department of Public Health to permit potable water supply wells) to identify potable water supply wells other than community water supply wells; and

3) Contacting the local public water supply entities to identify properties that receive potable water from a public water supply.

g) Investigation of Migration Pathways

1) The Licensed Professional Engineer or Licensed Professional Geologist shall conduct an investigation either separately or in conjunction with the physical soil classification to identify all potential natural and man-made migration pathways that are on the site, in rights-of-way attached to the site, or in any area surrounding the site that may be adversely affected as a result of the release of petroleum from the UST system. Once the migration pathways have been identified, the areas along all such pathways shall be further investigated in a manner sufficient to determine whether there is evidence that migration of petroleum or vapors along such pathways:

A) May potentially threaten human health or human safety; or

B) May cause explosions in basements, crawl spaces, utility conduits, storm or sanitary sewers, vaults or other confined spaces.

2) Natural pathways shall be identified using data obtained from investigation at the site. This must include, but is not limited to, identification and location of groundwater if encountered during excavation activities or soil boring activities, identification of different soil strata during excavation activities or soil boring activities and inspection of surface water bodies. Investigation and evaluation of natural migration pathways shall include, for applicable indicator contaminants along potential natural migration pathways:

A) Soil sampling and laboratory analysis of samples; and

B) When groundwater is encountered or when there is potential for surface water contamination, groundwater and surface water sampling and laboratory analysis of samples.

3) Man-made pathways shall be identified from available sources, including but not limited to site plans; a review of underground utilities as identified by the Joint Utility Location Information for Excavators (J.U.L.I.E.), the Chicago Utility Alert Network (Digger), another public locator, or a private locator; and interviews with site owners or personnel. The Licensed Professional Engineer or Licensed Professional Geologist must determine whether migration of indicator contaminants along any of these pathways has occurred, using laboratory analytical data for applicable indicator contaminants obtained as follows:

A) From prior sampling, provided that such laboratory analytical data demonstrates that no contaminant of concern has migrated to or along any man-made pathways;

B) From soil samples, and groundwater samples if groundwater is encountered, taken between man-made pathways and contaminated soil, provided that such laboratory analytical data demonstrates that no contaminant of concern has migrated to or along any man-made pathways; or

C) From soil samples, and groundwater samples if groundwater is encountered, taken along man-made pathways.

4) The Licensed Professional Engineer or Licensed Professional Geologist shall provide a map of the site and any surrounding areas that may be adversely affected by the release of petroleum from the UST system. At a minimum, the map shall be to scale, oriented with north at the top, and shall show the location of the leaking UST system(s) with any associated piping and all potential natural and man-made pathways that are on the site, that are in rights-of-way attached to the site, or that are in areas that may be adversely affected as a result of the release of petroleum.

5) Unless the Agency's review reveals objective evidence to the contrary, the Licensed Professional Engineer or Licensed Professional Geologist shall be presumed correct when certifying whether or not there is evidence that, through natural or man-made pathways, migration of petroleum or vapors:

A) May potentially threaten human health or human safety; or

B) May cause explosions in basements, crawl spaces, utility conduits, storm or sanitary sewers, vaults or other confined spaces.

h) The Licensed Professional Engineer or Licensed Professional Geologist shall verify whether Class III groundwater exists within 200 feet of the UST system.

i) The Licensed Professional Engineer or Licensed Professional Geologist shall locate all surface bodies of water on site and within 100 feet of the site and provide a map noting the locations. All such surface bodies of water shall be inspected to determine whether they have been adversely affected by the presence of a sheen or free product layer resulting from the release of petroleum from the UST system.

j) Groundwater Investigation

1) For sites failing to meet NFA site classification or for sites where a groundwater investigation is necessary pursuant to Section 732.302(b) of this Part, the Licensed Professional Engineer or Licensed Professional Geologist shall perform a groundwater investigation as required under this Part in accordance with this subsection (j) to determine whether the most stringent Tier 1 groundwater remediation objectives of 35 Ill. Adm. Code 742 for the applicable indicator contaminants have been exceeded at the property boundary or 200 feet from the UST system, whichever is less, as a result of the UST release of petroleum.

2) Applicable indicator contaminants shall be those identified pursuant to Section 732.310 of this Part.

3) Except as provided in subsection (j)(6) of this Section, a minimum of four groundwater monitoring wells shall be installed at the property boundary or 200 feet from the UST system, whichever is less. In the event that a groundwater monitoring well cannot be physically installed at the property line or 200 feet from the UST system, whichever is closer, in accordance with this subsection (j), the owner or operator shall request approval from the Agency to place the well further out, but at the closest practical point to the compliance point. The owner or operator may elect to place a monitoring well in a location that is closer to the UST system than this Part requires. However, once the election is made, the owner or operator may not withdraw the election at a later time. The Agency may require the installation of additional monitoring wells to ensure that at least one monitoring well is located hydraulically upgradient and three monitoring wells are located hydraulically downgradient of the UST system. The wells must be installed so that they provide the greatest likelihood of detecting migration of groundwater contamination. At a minimum, monitoring well construction shall satisfy the following requirements:

A) Construction shall be in a manner that will enable the collection of representative groundwater samples;

B) All monitoring wells shall be cased in a manner that maintains the integrity of the borehole. Casing material shall be inert so as not to affect the water sample. Casing requiring solvent-cement type couplings shall not be used;

C) Wells shall be screened to allow sampling only at the desired interval. Annular space between the borehole wall and well screen section shall 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 shall be designed to minimize clogging. Screens shall be fabricated from material that is inert with respect to the constituents of the groundwater to be sampled;

D) Annular space above the well screen section shall 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 shall extend to the highest known seasonal groundwater level;

E) The annular space shall 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;

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

G) All wells shall be developed to allow free entry of groundwater, minimize turbidity of the sample, and minimize clogging.

4) Monitoring well construction diagrams prescribed and provided by the Agency shall be completed for each monitoring well.

5) Static water elevations shall be measured for each monitoring well. Groundwater samples shall be taken from each well and analyzed for the applicable indicator contaminants. The data collected shall be used to determine the direction of groundwater flow and whether the applicable groundwater remediation objectives have been exceeded. Samples shall be collected and analyzed in accordance with the following procedures:

A) Samples shall be collected in accordance with "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," EPA Publication No. SW-846, incorporated by reference at Section 732.104 of this Part, or other procedures approved by the Agency.

B) Groundwater elevation in a groundwater monitoring well shall be determined and recorded to establish the gradient of the groundwater table.

C) The analytical methodology used for the analysis of the indicator contaminants shall be consistent with both of the following:

i) The methodology must have a practical quantitation limit (PQL) at or below the most stringent objectives or detection levels set forth in 35 Ill. Adm. Code 742 or as set for mixtures or degradation products as provided in Section 732.310 of this Part; and

ii) The methodology must be consistent with the methodologies contained in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," EPA Publication No. SW-846, as incorporated by reference at Section 732.104, or other Agency approved methods.

D) In addition to analytical results, sampling and analytical reports shall contain the following information:

i) Sample collection information including but not limited to the name of sample collector, time and date of sample collection, method of collection, and monitoring location;

ii) Sample preservation and shipment information including but not limited to field quality control;

iii) Analytical procedures including but not limited to the method detection limits and the practical quantitation limits (PQL);

iv) Chain of custody and control; and

v) Field and lab blanks.

6) As an alternative to the installation of monitoring wells under subsection (j)(3) of this Section, the Licensed Professional Engineer or Licensed Professional Geologist may demonstrate to the Agency through a site-specific evaluation that the groundwater monitoring should not be required.

A) The evaluation shall be based on a demonstration of the following factors:

i) Whether groundwater is present within the depth of the boring used to perform physical soil classification under the selected method (Method One under subsection (c) of this Section or Method Two under subsection (d) of this Section);

ii) Whether groundwater is withdrawn for potable use within 1000 feet of the UST system and at what depths; and

iii) Whether seasonal fluctuation in groundwater could result in groundwater contacting contaminated soil (e.g., historical records).

B) The presence or absence of a water bearing unit under subsection (j)(6)(A)(i) of this Section shall be determined on the basis of at least one soil boring to the depth necessary to perform physical soil classification under the selected method (Method One under subsection (c) of this Section or Method Two under subsection (d) of this Section), unless auger refusal occurs because of the density of a geologic material or because bedrock is encountered. If auger refusal occurs, then the Licensed Professional Engineer or Licensed Professional Geologist must demonstrate the depth to a water bearing unit from the available site specific or regional information.

C) If the evaluation fails to demonstrate to the Agency that a groundwater investigation should not be required as part of site classification activities, then the Licensed Professional Engineer or Licensed Professional Geologist shall perform a groundwater investigation in accordance with the remainder of this subsection (j).

D) If the evaluation demonstrates to the Agency that a groundwater investigation should not be required, then the site shall be classified as Low Priority, unless other High Priority criteria are present. Upon Agency approval of the evaluation to demonstrate that a groundwater investigation should not be required, then the site shall be classified as Low Priority and a No Further Remediation Letter shall be issued to the owner or operator of the site, unless other High Priority criteria are present.

(Source: Amended at 30 Ill. Reg. 4928, effective March 1, 2006)