Florida Department of

Memorandum **Environmental Protection**

TO: Interested Parties

FROM: Mike Sole, Chief
Bureau of Petroleum Storage Systems

DATE: October 29, 1998

SUBJECT: Guidance on Site Assessment and Supplemental Assessment Report Preparation for Petroleum Preapproval Sites

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In accordance with Section 376.3071(2)(c), Florida Statutes (F.S.), the Petroleum Cleanup Program has developed a required format for the text, figures, tables, and forms submitted in site assessment documents. The standardized format is designed to promote consistent, complete reports, and to make it easier for project and site managers to review assessment documents, including Site Assessment Reports (SARs), and SAR Addenda. The effective date of this document is November 15, 1998.

The text, figures, tables, and forms listed below are available on the Bureau's web site (www2.dep.state.fl.us/waste/programs/pcp/index.htm) and may be modified or omitted as needed depending on the type of information being submitted.

TEXT

All assessment reports must include a summary of work performed, conclusions, and recommendations. Depending on the circumstances, a cumulative summary of all assessment data obtained to date may also be required. The reports must be reviewed, signed, and sealed by a Florida Licensed Professional Geologist or a qualified Professional Engineer (to be "qualified," an engineer must have a degree related to geology and must have had the necessary thirty hours of geologic course work required for a core program in geology) as per Ch. 62-770, Florida Administrative Code (F.A.C.) and Ch. 492, F.S.

Summary of Work

Depending on the nature of the work, the monitoring well installation, groundwater sampling, soil survey, site lithology and hydrology determinations, potable well survey, or other assessment tasks need to be summarized. This summary consists of documentation of what, why, and how the work was performed, including any pertinent observations made in the field. The Scope of Work should describe what activities were completed and in what manner, and if anything out of the ordinary or in need of mention occurred (such as any significant events or seasonal variations which may have influenced sampling procedures or analytical results). A listing of the personnel that participated in the field activities should be included. If any part of the scope of work originally outlined in the work order was not performed, then an explanation for the revised work scope needs to be provided. A list of items to be changed in the work order agreement (used for documenting the basis of the required invoice reduction) needs to be included.

Conclusion (Summary of Data)

After analyzing all of the data gathered, a conclusion must be provided which documents the consultant's interpretation of all available assessment data accumulated to date. The professionals can tap their knowledge of the petroleum cleanup business and make conclusions about what is occurring at the site in question. The conclusions should state data trends and include explanations for any unusual findings. Statements concerning the horizontal and vertical extent of contamination, the existence and/or persistence of various Chemicals of Concern (COCs), fluctuations in the water table, or other factors specific to the task at hand must be included.

Recommendation

A recommendation for the scope of work to be included in the next work order needs to be provided whether the recommendation is for additional assessment, No Further Action (NFA), or preparation of a Remedial Action Plan (RAP). If the recommendation is for additional assessment, it may, for example, include a site map illustrating the locations of any proposed soil borings and/or monitoring wells if the assessment is not considered complete.

FIGURES

All site and/or vicinity maps must be drawn to scale and must include a graphic representation of the scale used (i.e., a bar scale). All maps and figures must be in black and white, be named and dated, contain a legend, and include a north arrow. When submitting multiple site maps for the same area, the maps should be drawn at the same scale, unless enlargement of specific areas is necessary or desirable to provide a better level of detail.

USGS Topographic Map.

This is a copy of a portion of the most recent USGS topographic map, including quadrangle name, date, and scale. The site location in relation to the surrounding area should be identified. This map can be combined with the well survey map. If combined, the 1/2-mile and 1/4-mile radius circles should be drawn centered around the site. Municipal or public supply wells located within a 1/2-mile radius and private supply wells (including potable, irrigation and industrial) located within a 1/4-mile radius should be clearly illustrated in reference to the accompanying well survey table. If no public or private wells are located within 1/2 or 1/4 mile, then the circles do not need to be shown. See Attachment 1 for an example.

Well Survey Map

A well survey map should be provided separately if not combined with the topographic map. Municipal or public supply wells located within a 1/2-mile radius and private supply wells (including potable, irrigation and industrial) located within a 1/4-mile radius should be clearly illustrated in reference to the accompanying well survey table. See Attachment 2 for an example.

Vicinity Map

A vicinity map shows adjacent property usage in the area (typically within at least a one block radius of the contaminant plume). The map should include any potential off-site sources of contamination, including former and current petroleum retail stations and bulk storage facilities, and non-petroleum product sources such as former or current dry cleaners. The FDEP facility identification numbers should be provided for registered petroleum storage and dispensing facilities that have the potential to contribute to the contamination at the subject site. The map should also include any potential human or environmental receptors, such as surface water bodies, public or private supply wells, schools, or parks. See Attachment 3 for an example.

Site Map

This is a map showing all monitoring and compliance wells in relation to former and current tank areas, integral piping and dispensers, buildings, land cover, sidewalks, utilities (above and underground), and any public or private supply wells on site. When not immediately apparent, property lines and right-of-ways should be indicated. Assessment data should not be plotted on the site map. See Attachment 4 for an example.

Groundwater Elevation Contour Map(s)

This is a site map with the estimated elevation contours and an interpretation of the groundwater flow direction. The water-level elevation calculated for each monitoring well or piezometer should be illustrated. Separate figures should be submitted for each date on which measurements were recorded. If different strata of the aquifer(s) are affected (such as perched, water-table, intermediate, or deep zones of the aquifers), separate figures should be submitted depicting the flow in each stratum or aquifer. If the site's groundwater is tidally influenced, separate figures should be submitted depicting groundwater flow at high and low tides. If one or more wells are dry or if the data are suspect, then an explanation should be provided in the text of the report. See Attachment 5 for an example.

Lithologic Cross Section(s)

The cross section should illustrate the site-specific stratigraphy across the site using information obtained during the advancement of soil borings and the completion of wells. A cross section is generally not necessary when the subsurface is characterized by a homogeneous stratigraphy. The screened intervals and high and low water levels in the wells should be shown. The datum of the vertical axis should be tied to mean sea level. See attachment 6 for an example.

Soil Screening and Plume Map(s)

At least one site map showing all soil sampling locations (soil boring locations and monitoring well locations where soil screening data were obtained) in relation to the former and current tank areas, integral piping, dispensers and excavated areas should be provided. If OVA soil readings are above background levels, then a separate site map

plotting OVA data should be prepared. The horizontal extent of unsaturated zone soil contamination should be illustrated with isoconcentration contours. If the unsaturated zone is relatively thin, the highest corrected unsaturated zone OVA reading (along with the depth the sample was taken, if appropriate) at each boring location must be plotted. If the unsaturated zone is relatively thick, more than one isoconcentration map may be required to properly represent soil screening results at depth. The vertical extent of the soil contamination may also need to be plotted in cross section. Overlaying the OVA data on the lithologic cross section is acceptable when possible and useful. Only data obtained above the highest water level should be plotted and considered to be contaminated soil from within the unsaturated zone (however, water-level data from an unusually wet season may be ignored for this purpose). See Attachments 7A, 7B, and 7C for examples.

Free Product Map

This is a site map showing the free product thickness measured in monitoring wells and/or piezometers, and depicting the estimated horizontal extent of free product. See Attachment 8 for an example.

Groundwater Contamination Concentration Map(s)

This map displays the monitoring well analytical results at each sampling location. The petroleum constituents that should be illustrated on one map (if applicable) are Benzene, Ethylbenzene, Toluene, total Xylenes, Total VOAs, MTBE and Naphthalene. If PAHs other than Naphthalene are present above cleanup target levels, a separate map showing the individual contaminants and their concentrations should be included. Any other analytes detected and non-petroleum constituents should be plotted on another map. The sampling dates should be included with each set of analytical data. When appropriate, historical concentration values for specific constituents should be listed on one map. See Attachments 9A and 9B for examples.

Groundwater Contamination Plume Map(s)

This is a site map that utilizes isoconcentration contours to illustrate the degree and approximate horizontal extent of groundwater contamination. Separate plume maps for Benzene, Ethylbenzene, Toluene, total Xylenes, MTBE, Naphthalene and other significant/widespread COCs may be desirable if illustrative. When there are more than one contaminated aquifer zones, separate plume maps should be prepared that illustrate the extent of the groundwater contamination in each zone. A cross section illustrating the approximate vertical extent of groundwater contamination may also be desirable. See Attachment 10 for an example.

Well Completion Report

This is a figure illustrating the well construction details for each monitoring well or for a set of similarly constructed wells. Included should be the drilling company that installed the well, installation date(s), method of installation (e.g., hollow stem auger, hand auger, rotary drilling, etc.), top of casing elevation, length of aboveground riser if completed

above grade, total depth, screened interval, boring and well diameters, casing length, screen length and slot size, sand pack interval, surface seal interval, and the location of the observed water table. For multiple-cased wells, the diameter(s) and length(s) of the outer casing(s) should also be indicated. See Attachment 11 for an example.

Boring Log

This is a figure that should be completed for all borings to document lithologies, moisture content, depth to groundwater, OVA measurements, presence of odors (if observed), soil discoloration, and free product. The lithologies should be classified according to one of the standard systems [the Department recommends the Unified Soil Classification System (USCS)] and the classification system used should be specified on the log. The log should include the start and finish date and time of the boring, and the name of the person (preferably a geologist) completing the log. Sampling information, including the sampling interval and percent of sample recovered, should be included. See Attachments 12A and 12B for examples.

TABLES

The Department encourages preapproval contractors to use the tables developed by the Department.

Well Construction Details

This table should summarize the well construction details for piezometers, monitoring wells, compliance wells, and recovery wells, and must be updated any time additional wells are installed or abandoned. Included should be the installation date, method of installation (e.g., hollow stem auger, hand auger, rotary drilling, etc.), top of casing (TOC) elevation, length of aboveground (A/G) riser if completed above grade, total depth, screened interval, well diameter, and the lithology of the screened interval. If the construction details of the compliance wells are unknown, information can be obtained in the field (such as total depth, well diameter, and screened interval) or from owner files. Should any of the wells be abandoned, the date of abandonment should be added. Use the Department's "Well Construction Details" table, Attachment 13.

Groundwater Elevation Summary

This table summarizes the groundwater elevation data. Included should be the TOC elevations, screened intervals, depths to groundwater (DTW), water-level elevations, and the dates on which the data were obtained. The thickness of free product (FP) should be noted if detected in any well. If the well has been destroyed or replaced, the date the well was abandoned should be indicated. Use the Department's "Groundwater Elevation Summary" table, Attachment 14.

Soil Screening and Analytical Summary Tables

These tables summarize the soil OVA screening and laboratory analytical data. Included should be the unfiltered and filtered OVA soil readings and the corrected hydrocarbon measurements obtained at each sampling location and depth as well as any lab analytical data obtained. The date(s) when the data were obtained and the approximate depth at which groundwater was first encountered should be indicated. The results of any laboratory analyses performed should be summarized and reported in milligrams per kilogram. Staining, odors, moisture content, or other observations should be noted. Use the Department's "Soil Screening Summary" and "Soil Analytical Summary" tables, Attachments 15A and 15B.

Groundwater Monitoring Well Analytical Summary

This table summarizes the groundwater (and surface water) analytical results. The petroleum constituents Benzene, Toluene, Ethylbenzene, total Xylenes, Total VOAs, MTBE, EDB, total Lead, Naphthalene, and TRPHs should be included. When detected, 1,2-dichloroethane, PAHs other than Naphthalene, and all other contaminants detected in concentrations over their applicable CTLs or guidance concentrations, should be listed individually. The detection limits used should be indicated if the constituent was not detected (e.g., results for individual parameters should be listed as "<1," not "ND" or "BDL"). Each set of analyses should include the sampling date, and all groundwater analytical results should be reported in micrograms per liter (ppb). If free product is detected during a sampling event, then "FP" should be entered into the table on the date observed. If surface water samples were collected and analyzed, the results can be included in this table. Use the Department's "Groundwater Monitoring Well Analytical Summary" table, Attachment 16.

Free Product Summary

A current table should summarize all free product thickness measured, volumes recovered for each event and cumulative volume of FP recovered, and date(s) the measurements were recorded. Use the Department's "Free Product Summary" table, Attachment 17.

Well Survey Table

This table summarizes the distance and direction from the site, address, owner, use, and available well construction details of all public and private supply wells identified during the well survey and shown on the well survey map. The table should include the depths of the wells, the approximate screened (or open hole) intervals, and the usage (potable, public supply, industrial and/or irrigation). See Attachment 18 for an example.

FORMS

The Department requires contractors to use the Chain of Custody (see Attachment 19) and Water Sampling Log (see Attachment 20) mandated by Ch. 62-770, F.A.C. when submitting sampling results for review.

ASSESSMENT DELIVERABLES

The final deliverable for an assessment project depends on the nature of the work completed. Certain activities require specific deliverables (such as text, tables, maps, etc.). Below is a general description of deliverable requirements based on a breakdown of activities commonly performed at a site:

1. All assessment reports (unless agreed otherwise) require:

    a) USGS Topographic Map (only in the first report)
    b) Vicinity Map (if applicable)
    c) Site Map (including latest utility information)
    d) Lithologic Cross Section(s) (if applicable)
    e) Summary of Work, Conclusions, and Recommendations
    f) Reviewed/Signed/Sealed by a Florida Licensed P.G., or qualified (per Ch. 492) P.E.

2. If an area survey is performed, include:

    a) Scaled Vicinity Map illustrating survey results
    b) Cleanup status of potential off-site contamination sources (if applicable)

3. If water table elevation measurements are obtained, include:

    a) Groundwater Elevation Contour Map(s)
    b) Groundwater Elevation Summary Table

4. If groundwater sampling is performed, include:

    a) Groundwater Contamination Concentration Map
    b) Groundwater Contamination Plume Map(s) (if applicable)
    c) Groundwater Monitoring Well Analytical Summary Table
    d) Water Sampling Logs
    e) Lab Analytical Report with Chain of Custody

5. If monitoring wells are installed, include:

    a) Site Map illustrating well locations
    b) Well Completion Report(s)
    c) Boring Log(s)
    d) Updated Well Construction Details Table
    e) Groundwater Elevation Summary Table

6. If a soil investigation is performed, include:

    a) Site Map illustrating boring locations
    b) Soil Screening and Plume Map(s)
    c) Boring Logs
    d) Soil Screening Table
    e) Analytical Summary Table
    f) Lab Analytical Report with Chain of Custody (if applicable)

7. If a well survey is completed, include:

    a) Well Survey Map
    b) Vicinity Map illustrating well locations (if applicable)
    c) Well Survey Table

8. If free product is measured, include:

    a) Free Product Map
    b) Groundwater Elevation Summary Table documenting Free Product thickness
    c) Groundwater Monitoring Well Analytical Sumary Table with “FP” entered where applicable
    d) Free Product Summary Table

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