FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION
BOB MARTINEZ CENTER
2600 BLAIRSTONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

RICK SCOTT
GOVERNOR
HERSCHEL T. VINYARD JR.
SECRETARY

MEMORANDUM

TO: **Interested Parties**

FROM: **Diane Pickett, P.G., Chief Geologist** DPP
Robert Cowdery, P.E., Chief Engineer RCC
Division of Waste Management
Petroleum Restoration Program

SUBJECT: **Petroleum Restoration Program Closure Sampling Guidelines for Groundwater**

DATE: **January 27, 2014**

The following is a discussion of issues/questions that may arise when determining when a Site Rehabilitation Completion Order (SRCO) can be issued at a petroleum site.

Issue 1: Do all existing Monitoring Wells (MWs) need to be sampled to obtain closure?

No, it is not necessary to sample every MW in order to issue a SRCO at a site as long as appropriate areas of the plume have been monitored by representative sampling locations pursuant to 62-780.680(1)(c), Florida Administrative Code (F.A.C.). However, a network of representative and appropriate monitoring points must be identified to properly document and track any cleanup target level (CTL) exceedences in the source area(s), in all areas where active remedial action (RA) was performed, and at the perimeter in order to track contaminant attenuation and obtain closure of the site.

In some cases, the Florida Department of Environmental Protection (FDEP) may allow the last sampling event of site assessment or a sampling event conducted at least 30 days after cessation of active remedial action to count as the first sampling event of approved NAM or PARM. In order to count sampling events which were conducted prior to the issuance of a NAM or PARM Order, the sampling event must have been properly notified and analytical results data must meet all quality assurance and control requirements. It is not acceptable to produce analytical results from groundwater sampling events conducted more than three months prior to the issuance of the NAM or PARM order which had not previously been submitted to the FDEP and to count those results toward NAM or PARM. Individual wells that are not part of the approved monitoring network are not required to achieve two clean quarters before the site can be issued a SRCO. However, any MW that has had documented contamination must have at least one clean sampling event unless and pursuant to 62-780.680(1)(c), F.A.C., the FDEP or the FDEP local program has concurred that groundwater sampling is unnecessary based on site-specific

conditions (for example, a compliance well or MW of questionable integrity, a MW impacted by another discharge, or other MW(s) in the vicinity that adequately represent(s) the groundwater quality at that well).

Issue 2: Are NAM/PARM Orders Required for funded sites?

No, an order approving Natural Attenuation Monitoring/Post Active Remediation Monitoring (NAM/PARM) Plans does not have to be issued for funded program sites. However, approval of the monitoring requirements must be documented (i.e. in a deliverable approval letter). This documentation must include a list of wells as part of the monitoring network, and any additional wells that must be sampled before the site is issued an SRCO. For non-program (non-funded) sites, a formal NAM or PARM Order should be issued defining the monitoring requirements.

Issue 3: How many monitoring events (using the representative wells outlined above) are required before an SRCO can be issued?

There are three different scenarios to consider:

1. Sites that have had active RA:

    a) For sites that have had active RA other than a soil source removal with or without short-term groundwater recovery under 62-780.500, F.A.C., and unless a different sampling frequency is specified in a Remedial Action Plan, a minimum of four quarters of monitoring are required post cessation of active RA, of which the last two must have CTLs achieved. However, if CTLs are not achieved after the first four quarters, PARM must cease unless:

        i. the data shows clear signs of contamination rebound in which startup of the remedial system should be considered; or
        ii. CTLs are expected to be achieved at the end of the fifth quarter in which sampling for another quarter is acceptable.

        If after the first four quarters of PARM, CTLs are not achieved, a site must be moved to NAM, where the sampling frequency is not expected to occur on a quarterly basis. Under statutory authority, the FDEP can consider higher Natural Attenuation Default Concentrations (NADCs) if the exposure pathway is not completed in the footprint of the plume or a reduction in mass or concentrations of constituents over time or distance is taking place due to naturally occurring physical, chemical, and biological processes such as: biodegradation, dispersion, dilution, adsorption, and volatilization.

    b) For sites which conduct interim source removal consisting of short-term groundwater recovery or soil excavation meeting the requirements of Section 62-780.500, F.A.C., post-source removal monitoring must be conducted for a minimum of either:

i. one sampling event if ground water contamination was not present before the source removal [62-780.600(5)(m)3.b., F.A.C.], or
ii. two sampling events if ground water contamination was present before the source removal [62-780.600(5)(m)3.a., F.A.C.].

c) For sites with chemical or biological RA application, the four quarter monitoring requirement does not start until the application ends and the amendments are no longer actively remediating the discharge. If supplemental amendment injection is conducted after NAM or PARM begins, then the four quarters of PARM must start over and once it is verified the chemical remediation products are exhausted and no longer actively remediating groundwater.

2. Sites that have only performed assessment and have NOT had active RA, or active RA has not been performed in at least two years:

a) Two consecutive quarterly monitoring events are required where CTLs have been achieved. An additional monitoring event is left at the professional discretion of FDEP.
b) Only one sampling event where CTLs have been achieved is required for discharges that did not have lab-verified contamination (i.e. some of the EDI discharges that were made eligible for a non-lab verified reason such as odor in a MW, OVA results, or inventory discrepancy). An additional monitoring event is left at the professional discretion of FDEP.

3. Sites where there is a delay or break in monitoring, such as parked sites:

a) If the results of the groundwater sampling prior to the site being parked were below CTLs, then only one additional quarterly groundwater sampling event is required to demonstrate that results are still below CTLs.

Issue 4: When the water table drops during NAM/PARM and MWs are dry and cannot be sampled do we need to <u>immediately</u> reinstall wells with a deeper screened interval?

No, in general, water table variations in Florida are normal given our State's surficial geology, rainfall amounts, and/or tidal influence. In cases where the water table elevations fall below the bottom of the monitoring well screen interval, groundwater monitoring can be suspended for one year (or a full seasonal variation in water table). However, depending on site-specific conditions (the concentrations last detected, the underlying geology, rainfall precipitation frequency and amount, how impervious the site and adjacent properties are, size and steady-state nature of the plume, and/or the lack of a completed exposure pathway at the site), groundwater monitoring may be suspended for longer than one year. Please evaluate these factors before requesting the installation of deeper monitoring wells.

Issue 5: Do all sites need to be analyzed for the full Table C suite?

No, not all sites need to be analyzed for the full Table C suite. For instance:

1. If the sampling is being conducted during the site assessment phase, the discharge is anticipated to meet the NFA criteria, and the discharge is known to be just from a GAG (Gasoline Analytical Group) source, a limited suite of only BTEX and PAH can be analyzed per 62-780.600(4)(b) F.A.C. If a Kerosene Analytical Group (KAG) source is known or suspected, TRPH should be included.
2. We have regulatory authority to require analysis of the chemicals included in Table B [Contaminant of Concern (COC) list] of Chapter 62-780, F.A.C. However, unless there is a site-specific reason to differentiate between an eligible and an ineligible discharge, a full EPA Method 8260 scan looking for chemicals such as trimethylbenzenes, isopropylbenzene, and/or oxygenates is not necessary. Use professional judgment. However, once a monitoring report is submitted to the FDEP indicating exceedence of groundwater CTLs for other petroleum related chemicals not listed in Table A, it will be necessary to continue analysis for these chemicals until concentrations are less than CTLs for two consecutive sample events.
3. If the initial soil and groundwater analytical results do not indicate that any COCs within the suite of analytes for a particular method are present above CTLs, then that analytical method is no longer required for subsequent sampling events.

Issue 5: What is an acceptable variation in sampling intervals for "quarterly" sampling for NAM or Long Term Natural Attenuation Monitoring (LTNAM)?

In general, natural attenuation is <u>not</u> a process that progresses at a rapid pace. Where risk of exposure to groundwater does not exist or is not expected to occur, the monitoring of groundwater that is expected to naturally attenuate can occur at semiannual or longer frequencies.

Issue 6: Under what circumstances should a well be resampled within 30 days after applicable COCs exceed action levels as per 62-780.750(4)(e) and 62-780.690(8)(e), F.A.C.?

The resampling provision is intended to be applied when:

1. Action levels in a NAM/PARM approval letter (program eligible site) or order (non-program site) are exceeded, for example:
    a. Natural Attenuation Default Criteria (NADCs, or other action level) in the source area, or
    b. CTLs at perimeter wells.
2. The analytical results are inconsistent with the historical results and may indicate mislabeled samples, lab error, a compromised sample, or a new discharge.

The 30-day resampling provision should not be used in a manner that allows normal seasonal fluctuation in concentrations of COCs (i.e. associated with dry or wet seasons) to be disregarded or to circumvent the requirement for two consecutive clean quarterly sampling events before issuance of an SRCO.