Florida DEP

Bureau of Petroleum Storage Systems

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Internet / Websites

- www.dep.state.fl.us/waste/quick_topics/rules/default.htm
- www.dep.state.fl.us/waste/categories/pcp/default.htm
- www.dep.state.fl.us/labs/cgi-bin/aams/index.asp

Chapter 62-770, F.A.C.
(highlights)

Petroleum Contamination

Site Cleanup Criteria

Rule 62-770.140, F.A.C. Referenced Guidelines

- Technical Report: Development of Cleanup Target Levels (CTLs) for Chapter 62-777, F.A.C., Final, dated February 2005.
- Approach to the Assessment of Sediment Quality in Florida Coastal Waters, Volumes 1-4, dated November 1994.
- American Society for Testing and Materials (ASTM) RBCA Fate and Transport Models: Compendium and Selection Guidance, dated 1999.
- Chapter 62-770, F.A.C., Petroleum Risk-Based Corrective Action (RBCA) Flow Process Flow Charts, dated December 23, 2004.

Rule 62-770.140, F.A.C. Referenced Guidelines

- Guidance for the Selection of Analytical Methods and for the Evaluation of Practical Quantitation Limits, dated October 12, 2004.
- Development and Evaluation of Numerical Sediment Quality Assessment Guidelines for Florida Inland Waters, dated January 2003.
- Institutional Controls Procedures Guidance, Division of Waste Management, Florida Department of Environmental Protection, dated November 2004.

Rule 62-770.160, F.A.C. Applicability

- … to petroleum or petroleum products as these terms are defined in s. 376.301, F.S.
- Petroleum – (a) Oil, including crude petroleum oil and other hydrocarbons, regardless of gravity, which are produced at the well in liquid form by ordinary methods and which are not the result of condensation of gas after it leaves the reservoir & (b) all natural gas, including casinghead gas, and all other hydrocarbons not defined as oil in paragraph (a)

Rule 62-770.160, F.A.C. Applicability

- Petroleum Product - means any liquid fuel commodity made from petroleum, including, but not limited to, all forms of fuel known or sold as diesel fuel, kerosene, all forms of fuel known or sold as gasoline, and fuels containing a mixture of gasoline and other products, excluding liquefied petroleum gas and American Society for Testing and Materials (ASTM) grades no. 5 and no. 6 residual oils, bunker C residual oils, intermediate fuel oils (IFO) used for marine bunkering with a viscosity of 30 and higher, asphalt oils, and petrochemical feedstocks.

Rule 62-770.160, F.A.C. Applicability

- Supplemental guidance which lists 50 products commonly encountered in Florida storage tanks
- Classify as:
  - Petroleum
  - Petroleum Product
  - Excluded Petroleum Product
  - Solvent
  - Non-petroleum derivative

Rule 62-770.160, F.A.C. Applicability - Examples

- Petroleum products (62-770):
  - Gasoline, diesel 1, 2 & 4
  - Aviation gasoline, jet fuel
  - Fuel Oil 1, 2 & 4 (& 5 & 6 if eligible)
  - Motor Oil, Used oil, gear oil, ATF
  - Hydraulic oil if petroleum-based
  - Intermediate diesel fuel or fuel oil (w/viscosity > 30) if eligible
- Substances not under 62-770
  - 5 & 6 fuel oil if not eligible
  - Mineral spirits
  - Non-automotive lubricating/mineral oils
  - Hydraulic oil if not petroleum-based
  - Intermediate diesel fuel (w/viscosity > 30) if not eligible

Rule 62-770.160, F.A.C. Applicability

- If not petroleum product, need to be cleaned up under other applicable FDEP rules (e.g. – Chapter 62-780, F.A.C.)
- small discharges – excluded if less than 25 gallons onto a pervious surface, but still need to be properly removed and properly treated or disposed in accordance with rule 62-770.300 (interim source removal)

Rule 62-770.160, F.A.C. Applicability

- Grandfathering – made more generic since Chapter 62-770 has been modified several times since this provision was added
- Supplemental explanation of applicability and intent of RBCA process in the cleanup program – communication on RBCA issues, ability to calculate site-specific CTLs based on exposure assumptions

Rule 62-770.200, F.A.C. Acronyms and Definitions

- **Apportioned**: the CTLs of contaminants that are present together are adjusted to account for chemical interactions [currently, only additivity is considered]
  - Applicable to all carcinogenic contaminants, and the cumulative lifetime excess cancer risk level must be 1.0E-6
  - Applicable to non-carcinogenic contaminants that affect the same target organ(s) or system(s), or produce the same effect, and the hazard index (sum of the hazard quotients) must be 1
- **Background concentrations**: concentrations of contaminants that are naturally occurring in the groundwater, surface water, soil, or sediment in the vicinity of the site

Rule 62-770.200, F.A.C. Acronyms and Definitions

- **Best achievable detection limit**: the Practical Quantitation Limit (PQL) [Important for four PAHs (see below) with low Groundwater Cleanup Target Levels (GCTLs); target PQLs (see below) are provided in Table C of the document referenced in 62-770.140(5) (laboratories may be able to report lower values)]

Contaminant	GCTL (µg/L)	PQL (µg/L)	EPA Method
Benzo(a)anthracene	0.05	0.2	8310 or 8270
Benzo(b)fluoranthene	0.05	0.1	8310 or 8270
Dibenz(a,h)anthracene	0.005	0.2	8310 or 8270
Indeno(1,2,3-cd)pyrene	0.05	0.2	8310 or 8270

Rule 62-770.200, F.A.C. Acronyms and Definitions

- **Exposure unit**: an area over which receptors are expected to have equal and random exposure [the default is ¼ acre; used in 95% UCL calculations]
- **Interim source removal**: the removal of free product, contaminated groundwater, or contaminated soil, prior to approval of a Remedial Action Plan

Rule 62-770.220, F.A.C. - Notices Four Categories

- Notice of Field Activities [former .830]
- Initial Notice of Contamination Beyond Property Boundaries
- Subsequent Notice of Contamination Beyond Source Property Boundaries for Establishing a Temporary Point of Compliance (TPOC)
- Status Update 5-Year Notice

Rule 62-770.220, F.A.C. Notices

- PRSR – Person Responsible for Site Rehabilitation
- - means the real property owner, facility owner, facility operator, the discharger, or other person or entity responsible for site rehabilitation, or the FDEP when the FDEP is conducting the site rehabilitation at facilities with eligible discharges
- FDEP ceases to be PRSR when an eligible site reaches its funding cap

Rule 62-770.220, F.A.C. - Notices Field Activities

- Examples – Performing interim source removal, installing monitoring wells, sampling, installing remediation equipment, installing engineering control
- Written notice to FDEP or LP at least 3 days prior to field activities when requested by the FDEP or LP
- FDEP or LP shall be allowed to observe field activities and take split samples
- FDEP or LP are responsible for confirming the field activities will be conducted on the schedule that has been provided

Rule 62-770.220, F.A.C. - Notices
Initial Notice of “off-site” contamination

- PRSR shall provide written notice by certified mail to FDEP DWM within 10 days of analytical results indicating that contamination exists beyond the source property boundary
- Form 62-770.900(3) – “Initial Notice of Contamination Beyond Property Boundaries”
- Copy mailed to FDEP district office and county health department office
- FDEP sends notices to “off-site” property owners

Rule 62-770.220, F.A.C. - Notices
Initial Notice of “off-site” contamination

- Location of property undergoing site rehabilitation under Chapter 62-770
- Listing of record owners of any real property at which contamination was discovered, including parcel ID, owner’s address and owner’s phone number
- Separate tables by medium of contaminants, sample date, concentrations, CTL basis
- Vicinity map with sample locations, sample date and result info, and property boundaries
- FDEP sends out notice letters to “off-site” property owners

Rule 62-770.220, F.A.C. - Notices Subsequent Notice to Establish TPOC

- Applies to all cases in which RAP or NAM approval by the FDEP is pending when “off-site” contamination exists
- PRSR provides actual notice by certified mail to real property owners and county health department
- Type of action, source site and RP ID, location where documents may be inspected, FDEP/LP contact person, 30-day comment period
- Copy of letters to FDEP

Rule 62-770.220, F.A.C. - Notices
5-year Notice of TPOC Status

- Additional notification provided to “off-site” property owners every 5 years with information as to the status of site rehabilitation - unless in the intervening time such persons have been informed that the contamination no longer affects the property into which the TPOC initially extended

Rule 62-770.250, F.A.C. Contamination Reporting (DRF)

- Storage tank related – as required by 62-761 & 62-762 = 24 hours
- Non-storage tank related – within 1 week
- If on ground surface or surface water, State Warning Point or FDEP BER needs to be notified within 24 hours
- If BER responds and a source removal is conducted, the BER may be the recipient of the DRF for the Department

Rule 62-770.300, F.A.C.
Interim Source Removal

- Free Product Recovery (no significant changes)
- Short-term Groundwater Recovery (new subsection)
- Soil excavation (no significant changes but new clarification guidance in the works)

Subsection 62-770.300(2), F.A.C. Short-term Groundwater Recovery

- Up to 30 consecutive days pumping duration of wells that intercept the water table
- Groundwater plume must be < ¼ acre & contamination confined to surficial aquifer
- Free product not present
- Should be reasonable likelihood that the pumping event will result in NAM or PARM
- No on-site treatment or disposal of water
- Sample representative wells after > 30 days

Subsection 62-770.300(2), F.A.C. Supplemental Clarification Guidance

- Site assessment data obtained prior to the pumping event, as well as post pumping data, must later be presented in the Site Assessment Report
- Air/fluid extraction techniques which generate vapor emissions may not be used
- Must document the pumping event in the Source Removal Report and SAR

Subsection 62-770.300(2), F.A.C. Supplemental Clarification Guidance

- Conclude site assessment with:
  - NAM proposal or,
  - If groundwater concentrations reduced to CTLs, perform two consecutive quarterly sample events. This may be done prior to submission of SAR and the SAR concluded with sample results and a request for SRCO if other SA requirements have been met (soil contamination)

Subsection 62-770.300(3), F.A.C. Soil Removal, Treatment, and Disposal

- Excavated soil must be properly disposed or treated off-site unless land-farmed
- Do not spread contamination to previously uncontaminated or less contaminated areas
- VES allowable only if necessary to abate imminent treat and FDEP notified in 24 hrs
- Stockpiling requirements and limitations
- Landfarming procedures

Subsection 62-770.300(3), F.A.C. Supplemental Clarification Guidance

- Source removal below groundwater table that requires dewatering:
  - Limits on duration of dewatering and scope of dewatering based on extent of soil contamination or free product and depth of smear zone (groundwater fluctuation records)
  - Water must be hauled off-site, discharged to sanitary sewer, or short-term NPDES Generic Permit
  - Summarize groundwater dewatering compliance in Source Removal Report

Subsection 62-770.300(3), F.A.C. Supplemental Clarification Guidance

- Clarify monitoring requirements following interim source removal to qualify for SRCO
- Defined in Site Assessment section, subparagraph 62-770.600(4)(m)3., F.A.C.
- At least two consecutive sampling events of representative monitoring wells sampled at least 3 months apart if gw contamination was present, one sampling event if gw contamination had not been present
- May conclude the Site Assessment with summary of the post-excavation monitoring data and include a No Further Action Proposal

Rule 62-770.400, F.A.C. Quality Assurance

- Sampling and analyses pursuant to this chapter shall comply with the applicable requirements of Chapter 62-160, F.A.C., Quality Assurance
  - Sampling must be performed according to the applicable field SOP referenced in Chapter 62-160, F.A.C. (e.g., FS 2200 for groundwater; see BPSS variance in PCS-005)
  - Laboratories must be certified for the applicable matrix/method/analyte combinations by the Department of Health (DoH) Environmental Laboratory Certification Program (ELCP) as delegated by the National Environmental Laboratory Certification Program (NELAP)

Rule 62-770.400, F.A.C. Quality Assurance

- Laboratory reports must include all information specified in subsection 62-160.340(2), F.A.C., and must be in the format specified in Chapter 62-160, F.A.C., including applicable qualifiers
  - Laboratory name, address and phone number
  - Project information such as client name, site name, client project number, or client project name
  - Client or field identification number for each sample
  - Date and time of sample collection
  - Sample matrix (e.g., groundwater, effluent, waste, soil, etc.)
  - Sample type (e.g., environmental sample, field blank, matrix spike)

Rule 62-770.400, F.A.C. Quality Assurance

- Laboratory reports . . . (cont.)
  - Laboratory identification number for each sample fraction
  - Sample receipt conditions such as proper and intact custody seals, or receipt temperature
  - Type of chemical and/or physical sample preservative and if intact at sample receipt/analysis
  - Sample analysis method
  - Sample preparation method, if applicable
  - Date of sample preparation, if applicable
  - Date of sample analysis

Rule 62-770.400, F.A.C. Quality Assurance

- Laboratory reports . . . (cont.)
  - Analyte name
  - Analyte CAS registry number or NELAP parameter code, if available
  - The analytical result for each analysis with applicable Data Qualifiers (non-detected analytes shall be indicated by the method detection limit value, followed by the code "U")
  - Result units
  - Method detection limit(s)
  - Practical quantitation limit(s)
  - Dilution factor

Rule 62-770.400, F.A.C. Quality Assurance

- Examples of proper use of data qualifiers

Contaminant	Result	MDL	PQL
Benzo(a)pyrene	0.1 U	0.1	0.2
Benzene	0.76 I	0.5	1.0

- List in groundwater analytical summary table as

Benzo(a)pyrene	ND (0.1) [or <0.1]
Benzene	0.76 I [and include a footnote to explain what the qualifier means]

Rule 62-770.600, F.A.C.
Site Assessment

- Objectives
  - To evaluate the current exposure and potential risk of exposure to humans and the environment, including multiple pathways of exposure. The physical, chemical, and biological characteristics of each petroleum products' contaminant of concern and the individual site characteristics shall be considered

Rule 62-770.600, F.A.C.
Site Assessment

- Objectives (cont.)
  - To determine whether contamination is present and the types of contaminants present, and to determine the horizontal and vertical extent of contamination in every medium found to be contaminated (for soil in the unsaturated zone, to the more stringent of the direct exposure residential soil CTLs and the applicable leachability-based soil CTLs provided in Chapter 62-777, F.A.C., Table II; and for groundwater, to the groundwater CTLs or to the surface water CTLs provided in Chapter 62-777, F.A.C., Table I, as applicable)

Rule 62-770.600, F.A.C.
Site Assessment

- Objectives (cont.)
  - To establish the background concentrations
  - To determine by means of a well survey whether public or private water supply wells are present (if “off-site” contamination is discovered at any time, within 60 days of such discovery the responsible party shall conduct the well survey and provide the results)

Rule 62-770.600, F.A.C.
Site Assessment

- Tasks
  - If used oil contamination was reported, collection of a soil sample for limited used oil parameters even if no visual signs of contamination are identified. Limited parameters are:
    - VOHs (Volatile Organic Halocarbons)
    - PAHs (Polycyclic Aromatic Hydrocarbons)
    - TRPHs (Total Recoverable Petroleum Hydrocarbons)
    - PCBs (Polychlorinated Biphenyls)
    - 4 priority metals (Arsenic, Cadmium, Chromium, Lead)

Rule 62-770.600, F.A.C.
Site Assessment

- Tasks (cont.)
  - Collection of unsaturated zone soil samples to perform:
    - Analyses to determine degree and extent of soil contamination
      - Compare results to both DE Residential and Leachability Based on GW Criteria Soil CTLs
      - If any of the 7 carcinogenic PAHs is present, use Benzo(a)pyrene conversion table to determine total Benzo(a)pyrene equivalents and compare result to DE Residential Soil CTL for Benzo(a)pyrene

Rule 62-770.600, F.A.C.
Site Assessment

- Tasks (cont.)
  - Collection of unsaturated zone soil samples to perform (cont.):
    - Measurement of appropriate soil properties (such as texture, pH, moisture content, dry bulk density, organic carbon content, infiltration rate) to develop alternative DE Residential [applicable to volatiles only] and Leachability-based Soil CTLs
    - Compare soil analytical results to alt. Soil CTLs

    Although alternative Soil CTLs are established, no restrictions are required for closure

Rule 62-770.600, F.A.C.
Site Assessment

- Tasks (cont.)
  - Collection of unsaturated zone soil samples to perform (cont.):
    - Fractionation of TRPHs using the MADEP method or the TPHCWG method [a sub-sample must be analyzed by FL-PRO]
    - Compare results to applicable “default” Soil CTLs of the TRPH fractions

      Although alternative Soil CTLs are utilized, no restrictions are required for closure

Rule 62-770.600, F.A.C.
Site Assessment

- Tasks (cont.)
  - Collection of unsaturated zone soil samples to perform (cont.):
    - Direct leachability testing by SPLP extraction (1 for BTEX/MTBE and 1 for PAHs) and analyses [a sub-sample must be analyzed for the applicable contaminants]
    - Compare leachate analytical results to default Groundwater CTLs

      Although alternative Soil CTLs are “established,” no restrictions are required for closure

Rule 62-770.600, F.A.C.
Site Assessment

- Tasks (cont.)
  - Installation and sampling of monitoring wells to determine degree and extent of groundwater contamination [see PCS-006 for guidance on design, installation and placement of MWs]
    - Compare results to default Groundwater CTLs, or to alternative GCTLs based on site-specific background concentrations or best achievable detection limits [PQLs]
  - Groundwater analytical results included in Site Assessment Report must be < 270 days old

Rule 62-770.600, F.A.C.
Site Assessment

- Tasks (cont.)
  - If an interim source removal was performed and NFA will be recommended:
    - If groundwater contamination present before interim source removal was performed, Groundwater CTLs must be met for two consecutive sampling events
    - If only soil contamination present before interim source removal was performed, Groundwater CTLs must be met for only one sampling event

Rule 62-770.600, F.A.C.
Site Assessment

- Site Assessment Report
  - A table that summarizes the use and well construction details, if available, and locational information (i.e., the nearest street address, if available, or latitude and longitude coordinates, if the street address is not available), of all the water supply wells identified during the well survey, and a map that is keyed to the table
  - Separate tables by medium (soil, sediment, groundwater, and surface water) that list all contaminants detected, their corresponding CTLs and the basis or reason for any alternative CTLs, detection limits achieved for non-detected analytes, and analyses performed, and that summarize all available analytical results

Rule 62-770.610, F.A.C. Fate and Transport Model and Statistical Method Requirements

- Fate and Transport Models
  - Must be able to adequately simulate movement and degradation of petroleum products' contaminants of concern in the aquifer over time and distance, taking into account attenuation mechanisms including biological, physical, and chemical processes
  - Must be appropriate for the site conditions
  - Must be selected from the ASTM document referenced in subsection 62-770.140(3), F.A.C., or submitted for approval

Rule 62-770.610, F.A.C.
Fate and Transport Model
and Statistical Method Requirements

- Statistical Methods
  - Must be appropriately based on statistical properties of the site-specific data set such as the number of samples, distribution of the data set, and the percent of non-detect sample results
  - Must be appropriate for the site conditions
  - Must be selected from the list of approved statistical methods maintained by the FDEP, or submitted for approval

Rule 62-770.650, F.A.C.
Risk Assessment

- Task elements
  - An exposure assessment that identifies pathways and routes by which human and environmental receptors may be exposed to COCs and determines levels of these contaminants to which human and environmental receptors may be exposed
  - A toxicity assessment that determines human health and environmental criteria for COCs found at the site, taking into consideration acute and chronic health effects associated with short-term and long-term exposure, shall be may be developed for applicable to exposure pathways and routes identified in the exposure assessment

    [Note: toxicant profiles have been developed already]

Rule 62-770.650, F.A.C.
Risk Assessment

- Task elements (cont.)
  - A risk characterization that utilizes the results of the exposure assessment and the toxicity assessment to characterize cumulative risks to the affected population(s) and the environment from petroleum products' contaminants of concern found at the site
  - A justification for alternative CTLs (apportioned if applicable) for groundwater and/or soil

Resources to be Proficient at Risk Management Options Evaluation

- Technical Report: Development of Cleanup Target Levels for Chapter 62-777, F.A.C.
- Chapter 62-770 Table IV Interpretation, 7/13/98
- DWM Institutional Controls Procedures Guidance, November 2004
- Soil Cleanup Target Level Calculation Spreadsheet
- Benzo(a)pyrene conversion table
- Florida UCL/Pro UCL Calculation Tools

$$SCTL(mg/kg) = GCTL(\mu g/L) \times CF(mg/\mu g) \times DF \times \left[K_{oc}(L/kg) \times f_{oc}(g/g) + \frac{\theta_w (L_{water}/L_{soil}) + \theta_a (L_{air}/L_{soil}) \times H'}{\rho_b (g/cm^3)} \right]$$

Parameter	Definition (units)	Variables and Default
GCTL	groundwater cleanup target level (µg/L)	table-specific value [1]
CF	conversion factor (mg/µg)	0.001
DAF	dilution attenuation factor (unitless)	20 [2]
K_{oc}	soil-organic carbon partition coefficient (L/kg)	chemical-specific value [3]
f_{oc}	fraction organic carbon in soil (g/g)	0.002 [4]
θ_w	water-filled soil porosity (L_{water}/L_{soil})	$\omega\rho_b$
θ_a	air-filled soil porosity (L_{air}/L_{soil})	$\eta - \theta_w$
H	Henry's Law constant (atm-m^3/mol)	chemical-specific value [3]
H'	Henry's Law constant (unitless)	H × 41
ρ_b	dry soil bulk density (g/cm^3)	1.5 [4]
ω	average soil moisture content (g_{water}/g_{soil})	0.2 (20%) [4]
η	total soil porosity (L_{pore}/L_{soil})	$1-(\rho_b/\rho_s)$
ρ_s	soil particle density (g/cm^3)	2.65

Contaminants of Concern	Direct Exposure Residential (mg/kg)	Direct Exposure Commercial/ Industrial (mg/kg)	Leachability Based on Groundwater Criteria (mg/kg)	Leachability Based on Freshwater / Marine Surface Water Criteria (mg/kg)	Leachability Based on Groundwater of Low Yield/Poor Quality Criteria (mg/kg)
PAHs:					
Acenaphthene	2,400	20,000	2.1	0.3 / 0.3	21
Acenaphthylene	1,800	20,000	27	NA / NA	270
Anthracene	21,000	300,000	2,500	0.4 / 0.4	25,000
Benzo(a)anthracene	#	#	0.8	NA / NA	8
Benzo(a)pyrene	0.1	0.7	8	NA / NA	80
Benzo(b)fluoranthene	#	#	2.4	NA / NA	24
Benzo(g,h,i)perylene	2,500	52,000	32,000	NA / NA	320,000
Benzo(k)fluoranthene	#	#	24	NA / NA	240
Chrysene	#	#	77	NA / NA	770
Dibenz(a,h)anthracene	#	#	0.7	NA / NA	7
Fluoranthene	3,200	59,000	1,200	1.3 / 1.3	12,000
Fluorene	2,600	33,000	160	17 / 17	1,600
Indeno(1,2,3-cd)pyrene	#	#	6.6	NA / NA	66
Methylnaphthalene, 1-	200	1800	3.1	10 / 10	31
Methylnaphthalene, 2-	210	2100	8.5	9.1 / 9.1	85
Naphthalene	55	300	1.2	2.2 / 2.2	12
Phenanthrene	2,200	36,000	250	NA / NA	2,500
Pyrene	2,400	45,000	880	1.3 / 1.3	8,800
VOAs:					
Benzene	1.2	1.7	0.007	0.5 / 0.5	0.07
Ethylbenzene	1,500	9,200	0.6	12 / 12	6
Toluene	7,500	60,000	0.5	5.6 / 5.6	5
Xylenes, total	130	700	0.2	3.9 / 3.9	2

Contaminants of Concern	Direct Exposure Residential (mg/kg)	Direct Exposure Commercial/ Industrial (mg/kg)	Leachability Based on Groundwater Criteria (mg/kg)	Leachability Based on Freshwater / Marine Surface Water Criteria (mg/kg)	Leachability Based on Groundwater of Low Yield/Poor Quality Criteria (mg/kg)
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Acenaphthylene	1,800	20,000	27	NA / NA	270
Anthracene	21,000	300,000	2,500	0.4 / 0.4	25,000
Benzo(a)anthracene	#	#	0.8	NA / NA	8
Benzo(a)pyrene	0.1	0.7	8	NA / NA	80
Benzo(b)fluoranthene	#	#	2.4	NA / NA	24
Benzo(g,h,i)perylene	2,500	52,000	32,000	NA / NA	320,000
Benzo(k)fluoranthene	#	#	24	NA / NA	240
Chrysene	#	#	77	NA / NA	770
Dibenz(a,h)anthracene	#	#	0.7	NA / NA	7
Fluoranthene	3,200	59,000	1,200	1.3 / 1.3	12,000
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Naphthalene	55	300	1.2	2.2 / 2.2	12
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VOAs:					
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Ethylbenzene	1,500	9,200	0.6	12 / 12	6
Toluene	7,500	60,000	0.5	5.6 / 5.6	5
Xylenes, total	130	700	0.2	3.9 / 3.9	2

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Acenaphthylene	1,800	20,000	27	NA / NA	270
Anthracene	21,000	300,000	2,500	0.4 / 0.4	25,000
Benzo(a)anthracene	#	#	0.8	NA / NA	8
Benzo(a)pyrene	0.1	0.7	8	NA / NA	80
Benzo(b)fluoranthene	#	#	2.4	NA / NA	24
Benzo(g,h,i)perylene	2,500	52,000	32,000	NA / NA	320,000
Benzo(k)fluoranthene	#	#	24	NA / NA	240
Chrysene	#	#	77	NA / NA	770
Dibenz(a,h)anthracene	#	#	0.7	NA / NA	7
Fluoranthene	3,200	59,000	1,200	1.3 / 1.3	12,000
Fluorene	2,600	33,000	160	17 / 17	1,600
Indeno(1,2,3-cd)pyrene	#	#	6.6	NA / NA	66
Methylnaphthalene, 1-	200	1800	3.1	10 / 10	31
Methylnaphthalene, 2-	210	2100	8.5	9.1 / 9.1	85
Naphthalene	55	300	1.2	2.2 / 2.2	12
Phenanthrene	2,200	36,000	250	NA / NA	2,500
Pyrene	2,400	45,000	880	1.3 / 1.3	8,800
VOAs:					
Benzene	1.2	1.7	0.007	0.5 / 0.5	0.07
Ethylbenzene	1,500	9,200	0.6	12 / 12	6
Toluene	7,500	60,000	0.5	5.6 / 5.6	5
Xylenes, total	130	700	0.2	3.9 / 3.9	2

Rule 62-770.680, F.A.C.
No Further Action

- Site closure (site qualifies for SRCO)
- How to Achieve SRCO
  - No Further Action without Controls
    - Risk Management Options Level I
  - No Further Action with Controls
    - Risk Management Options Level II or Level III

Rule 62-770.680, F.A.C.
No Further Action

- Risk Management Options Level I
  - Free product not present and no fire or explosive hazard
  - “Excessively contaminated” soil not present
  - Contaminated soil not present in the unsaturated zone
    - Direct exposure criteria
    - Leachability criteria
  - Contaminated groundwater not present
  - Contaminated surface water not present
  - Contaminated sediment not present

Rule 62-770.680, F.A.C.
No Further Action

- Risk Management Options Level I
  - Soil – Human Health / Direct Exposure
    - Options 1A – Soil contaminant concentrations (or average soil concentrations calculated using 95% UCL) do not exceed less stringent of:
      - Default DE Residential Soil CTLs [Ch. 62-777, Table II] (or apportioned Soil CTLs if 95% UCL used)
      - Background concentrations
      - Best achievable detection limits [not a concern for contaminants listed in Ch. 62-770, Table A]

Rule 62-770.680, F.A.C.
No Further Action

- Risk Management Options Level I
  - Soil – Human Health / Direct Exposure
    - Option 1B – Soil contaminant concentrations do not exceed alternative DE Residential Soil CTLs established using site-specific soil properties such as texture, pH, moisture content, dry bulk density, organic carbon content, and infiltration rate
    - If 95% UCL used, Soil CTLs must be apportioned prior to comparison to average concentrations

Rule 62-770.680, F.A.C.
No Further Action

- Risk Management Options Level I
  - Soil – Human Health / Direct Exposure
    - Option 1C – Soil concentrations of the applicable [MADEP or TPHCWG] TRPH fractions do not exceed “default” DE Residential Soil CTLs of the applicable TRPH fractions
    - If 95% UCL used, Soil CTLs of the applicable TRPH fractions must be apportioned prior to comparison to average concentrations of the TRPH fractions

Rule 62-770.680, F.A.C.
No Further Action

- Risk Management Options Level I
  - Soil – Human Health / Direct Exposure – 95% UCL approach used
    - Florida-UCL tool or other approved statistical method
    - Maximum soil contaminant concentrations do not exceed any CTL based on Acute toxicity and do not exceed 3 times CTLs based on Chronic toxicity
    - Exposure Unit does not exceed ¼ acre and located within the source property boundaries
    - Minimum of 10 representative soil samples [applies only to Florida-UCL Tool]
    - Apportionment (if applicable) required if more than one contaminant is present

Rule 62-770.680, F.A.C.
No Further Action

- Risk Management Options Level I
  - Soil – Leachability
    - Options 1A – Soil contaminant concentrations do not exceed less stringent of:
      - Default Groundwater and (if applicable) Surface Water Leachability-based Soil CTLs [Ch. 62-777, Table II]
      - Background concentrations
      - Best achievable detection limits [not a concern for contaminants listed in Ch. 62-770, Table A]

Rule 62-770.680, F.A.C.
No Further Action

- Risk Management Options Level I
  - Soil – Leachability
    - Option 1B – Soil contaminant concentrations do not exceed alternative Groundwater and (if applicable) Surface Water Leachability-based Soil CTLs based on alternative Groundwater and (if applicable) Surface Water CTLs based on site-specific background concentrations or best achievable detection limits [PQLs]

Rule 62-770.680, F.A.C.
No Further Action

- Risk Management Options Level I
  - Soil – Leachability
    - Option 1C – Direct leachability testing results using SPLP [or TCLP if contamination derived from oily waste] do not exceed the default Groundwater and (if applicable) Surface Water CTLs, or alternative CTLs based on site-specific background concentrations or best achievable detection limits [PQLs]

Rule 62-770.680, F.A.C.
No Further Action

- Risk Management Options Level I
  - Soil – Leachability
    - Option 1D – Soil contaminant concentrations do not exceed alternative Leachability-based Soil CTLs established using site-specific soil properties such as texture, pH, moisture content, dry bulk density, organic carbon content, and infiltration rate, and the default Groundwater and (if applicable) Surface Water CTLs, or alternative CTLs based on site-specific background concentrations or best achievable detection limits [PQLs]

Rule 62-770.680, F.A.C.
No Further Action

- Risk Management Options Level I
  - Soil – Leachability
    - Option 1E – Soil concentrations of the applicable [MADEP or TPHCWG] TRPH fractions do not exceed the “default” Leachability-based Soil CTLs of the applicable TRPH fractions

Rule 62-770.680, F.A.C.
No Further Action

- Risk Management Options Level I
  - Soil – Leachability
    - Option 1F – Soil contaminant concentrations may exceed applicable Leachability-based Soil CTLs if
      - Soil has been exposed to the elements (not covered) and whole unsaturated zone was subject to infiltration for a minimum of 2 years after discharge occurred
      - Demonstration is made by minimum 1 year of GW monitoring, that contaminants did not leach at concentrations that exceed appropriate Groundwater and (if applicable) Surface Water CTLs
      - Demonstration must consider site-specific characteristics [see 62-770.680(1)(c)2.f.]

Rule 62-770.680, F.A.C.
No Further Action

- Risk Management Options Level I
  - Groundwater
    - Options 1A – Groundwater contaminant concentrations do not exceed less stringent of:
      - Default Groundwater and (if applicable) Surface Water CTLs [Ch. 62-777, Table I]
      - Background concentrations
      - Best achievable detection limits [PQLs; 4 PAHs (see 62-770.140(5), Table C)]

Rule 62-770.680, F.A.C.
No Further Action

- Risk Management Options Level I
  - Surface water
    - Options 1A – Surface water contaminant concentrations do not exceed less stringent of:
      - Default Surface Water CTLs (freshwater or marine) [Ch. 62-777, Table I]
      - Background concentrations
      - Best achievable detection limits [PQLs; most PAHs (see 62-770.140(5), Tables D & E)]

Rule 62-770.680, F.A.C.
No Further Action

- Risk Management Options Level I
  - Sediment
    - Options 1A
      - Contaminated sediment is not present [no CTLs applicable; use documents referenced in 62-770.140(2) or (6), F.A.C., as applicable]
      - Contaminant concentrations do not exceed background concentrations

Risk Management Options
Level II

- No Further Action with institutional controls and, if appropriate, engineering controls
  - Never have an engineering control without an institutional control
  - Current property owner(s) of the source property subject to controls must agree to implementation of controls
  - Fate and Transport models supported by minimum of one (1) year of monitoring data may be utilized to justify NFA Proposal
  - For contaminants that do not meet RMO Level I criteria
    - See criteria on following slides

RMO Level II Criteria provided for each medium:

Soil

Human Health/Direct Exposure

Note: The 95% UCL may be used for comparison to the CTLs provided the CTLs are apportioned.

Options IIA

COCs < Commercial/industrial CTLs (Table II)

Option IIB

COCs > Level I residential CTLs (Table II), provided: engineering controls such as cover material (minimum 2 feet of clean soil, concrete pad, etc.) are used to prevent or manage human exposure

Option IIC

COCs ≤ Apportioned alternative commercial/ industrial CTLs calculated using site-specific soil properties (Figs. 4-7 and Table VI)

Option IID

TRPH levels ≤ TRPH commercial/industrial CTLs for the TRPH fractions provided in App. C

Direct Exposure Criteria

- Soil contaminant concentrations (or Average soil contaminant concentrations calculated using 95% UCL):
  - Do not exceed Commercial / Industrial DE SCTLs in Table II (if 95% UCL is used must apportion CTLs)
  - Institutional control that the site will only be used for commercial / industrial use will be required
  - Example -> residential DE CTL for naphthalene = 55 mg/kg, commercial / industrial = 300 mg/kg. If max concentration is between 55 and 300 mg/kg and no other COCs exceed DE CTLs this closure option could be utilized to address soil direct exposure
    - Qualification – must still address leachability (1.2 mg/kg)

Direct Exposure Criteria

- Engineering Control that prevents human exposure is implemented
  - Permanent cover material or a minimum of 2 feet of soil such that soils below the permanent cover or 2 or more feet of soil may exceed DE SCTLs
  - Certification by registered Professional Engineer that EC is consistent with accepted engineering practices, appropriately designed and constructed, and has been implemented
  - Need institutional control to maintain engineering control

Direct Exposure Criteria

- Site-specific soil properties used to establish alternative commercial / industrial SCTLs
- Site-specific fractions of TRPHs established for commercial / industrial CTLs
- 95% UCL approach used
  - Florida-UCL Tool or other approved statistical method
  - Maximum soil concentrations do not exceed three (3) times the applicable SCTL established for DE commercial / industrial
  - Exposure Unit located within the source property boundaries and reflects normal activity patterns for existing commercial / industrial land use with supporting ICs.
  - Minimum of 10 representative soils samples (applies only to Florida-UCL Tool)
  - Use the apportionment approach if more than one contaminant is present

RMO Level II Criteria provided for each medium:

Leachability

Options IIA

COCs ≤ Alternative leachability-based soil CTLs calculated (Fig. 8) using applicable Level II GW CTLs

Option IIB

Direct leachate results (SPLP/TCLP) ≤ applicable Level II GW CTLs

Option IIC

COCs > Level I leacability-based soil CTLs (Table II), provided: engineering control such as impermeable cover is used to prevent infiltration (minimum 1 year of GW monitoring)

Option IID

COCs ≤ Alternative leachability-based soil CTLs calculated (Fig. 8) using site-specific soil properties and the applicable Level II GW CTLs

Option IIE

TRPH levels ≤ Alternative leachability-based soil CTLs for the TRPH fractions caculated using Fig. 8, the chemical/physical properties provided in App. C and the applicable TRPH Level II GW CTL

Option IIF

Demonstration (minimum 1 year of GW monitoring) that COCs based on site-specific conditions will not leach at levels > applicable Level I or Level II GW CTLs

Leachability Criteria

- Soil contaminant concentrations do not exceed:
  - Alternative leachability-based SCTLs, Figure 8 using:
    - Alternative GW CTLs established in 62-770.680(2)(c), and, if applicable,
    - Surface Water CTLs in 62-770.680(1)(d)
- Direct leachability testing compared to alternative GW and SW CTLs

Leachability Criteria

- Engineering control that prevents infiltration
  - Permanent impermeable cover material
  - Certification by registered Professional Engineer that EC is consistent with accepted engineering practices, appropriately designed and constructed, and has been implemented
  - Minimum of 1 year of GW monitoring data that contaminants will not leach
    - GW not already contaminated
    - GW already contaminated

Leachability Criteria

- Alternative leachability-based SCTLs established using site-specific soil properties & alternative level II groundwater CTLs
  - Moisture content, dry bulk density, organic carbon content
- Site-specific fractions of TRPHs < alternative leachability-based CTLs for the TRPH fractions & level II GW CTL
- Minimum of one (1) year of GW monitoring data and, if applicable, fate and transport modeling results, contaminants will not leach above alternative GW CTLs
  - No surface cover present

$$SCTL(mg/kg) = GCTL(\mu g/L) \times CF(mg/\mu g) \times DF \times \left[K_{oc}(L/kg) \times f_{oc}(g/g) + \frac{\theta_w (L_{water}/L_{soil}) + \theta_a (L_{air}/L_{soil}) \times H'}{\rho_b (g/cm^3)} \right]$$

Parameter	Definition (units)	Variables and Default
GCTL	groundwater cleanup target level (µg/L)	table-specific value [1]
CF	conversion factor (mg/µg)	0.001
DAF	dilution attenuation factor (unitless)	20 [2]
K_{oc}	soil-organic carbon partition coefficient (L/kg)	chemical-specific value [3]
f_{oc}	fraction organic carbon in soil (g/g)	0.002 [4]
θ_w	water-filled soil porosity (L_{water}/L_{soil})	$\omega\rho_b$
θ_a	air-filled soil porosity (L_{air}/L_{soil})	$\eta - \theta_w$
H	Henry's Law constant (atm-m^3/mol)	chemical-specific value [3]
H'	Henry's Law constant (unitless)	H × 41
ρ_b	dry soil bulk density (g/cm^3)	1.5 [4]
ω	average soil moisture content (g_{water}/g_{soil})	0.2 (20%) [4]
η	total soil porosity (L_{pore}/L_{soil})	$1-(\rho_b/\rho_s)$
ρ_s	soil particle density (g/cm^3)	2.65

RMO Level II Criteria provided for each medium:

Groundwater

Options IIA

COCs ≤ GW of low yield/poor quality CTLs (Table I), provided the following criteria are met:

1. Aquifer is of low yield, or poor quality,
2. No actual impact or potential impact to surface water (the more stringent of GW or FSW Level I CTLs, and
3. Demonstration (minimum 1 year of GW monitoring) that contaminant concentrations in GW at the property boundaries will not exceed the applicable Level I CTLs

Options IIB

COCs > Applicable CTLs provided engineering controls such as a permanent containment (e.g., slurry wall) are used to prevent off-site contaminant migration (minimum 1 year of GW monitoring) and no impact or potential impact to surface water (the more stringent of GW, FSW, or MSW Level I CTLs)

Options IIC

COCs > GW or FSW CTLs (Table I), and COCs ≤ MSW CTLs (Table I) provided: contamination is affecting or may potentially affect only a MSW body, and there are no other properties or FSW bodies located between the source property and the MSW body

Options IID

COCs > Applicable groundwater CTLs, provided the following are met:

1. Demonstration (historical data or modeling results) that contaminant concentrations in GW at the property boundries will not exceed the applicable Level I CTLs,

2. Contamination is limited to the source area (contamination < 1/4 acre) and is not migrating from the localized source area (minimum 1 year of GW monitoring), and

3. No impact or potential impact to on-site FSW or MSW (the more stringent of GW, FSW, or MSW Level I CTLs)

Groundwater Criteria

- Alternative GW CTLs have been established based on current and projected use of GW:
  - Low yield or poor quality, use Chapter 62-777 Table I for comparison, and minimum of one (1) year of GW monitoring data that GW at the property boundaries do not, and will not, exceed the appropriate GW CTL specified in 62-770.680(1)(d)1., and will not affect freshwater or marine surface water body

Groundwater Criteria

- Engineering control that prevents migration of the plume (barrier wall) beyond the source property is implemented
  - Minimum of one (1) year of GW monitoring data
  - Periodic monitoring of EC to verify effectiveness
  - PRSR shall report any failures within 30 days of discovery
  - Certification by registered Professional Engineer that EC is consistent with accepted engineering practices, appropriately designed and constructed, and has been implemented
  - Institutional control to maintain engineering control

Groundwater Criteria

- Marine Surface Water
  - Contamination is affecting or may potentially affect only a Marine SW body, compare to Chapter 62-777 Table I Marine SW criteria column
  - No other properties or Freshwater SW bodies between source property and Marine SW body

Groundwater Criteria

- GW contained within the property boundaries and is limited to the immediate source area:
  - GW contamination is < ¼ acre
  - Plume is confined to the source property
  - Demonstration that plume is stable or shrinking
  - Has not or will not affect FW or marine SW body
  - Institutional control for prohibition of supply wells will be implemented

Level II Risk Management Options Free Product

- Free Product may remain within the property boundary provided:
  - Source removal is demonstrated to be not feasible, and
  - Institutional controls and, if necessary, engineering controls are used to protect human health, public safety, and the environment

Rule 62-770.680, F.A.C.
No Further Action

- When applicable criteria in Rule 62-770.680, F.A.C., are met, a No Further Action Proposal should be submitted
- If the NFAP is approved, a Site Rehabilitation Completion Order is issued, including:
  - An identification of the source property, including FDEP Facility Number and street address
  - Date(s) of the discharge(s)
  - A reference to an attached map of the source property
  - A reference to the attached (most recent) tables summarizing all available analytical results
  - If applicable, a reference to all engineering and institutional controls that were implemented (for institutional controls a copy of a recorded restrictive covenant must be attached)

Rule 62-770.690, F.A.C.
Natural Attenuation Monitoring

- May be performed after the site assessment is completed, or may be performed following active remediation, as long as the following criteria are met:
  - Free product not present and no fire or explosive hazard
  - Contaminated soil not present, except that Leachability-based Soil CTLs may be exceeded if it is demonstrated:
    - Soil does not constitute a continuing source of contamination to the groundwater
    - Rate of natural attenuation of contaminants in groundwater exceeds rate at which contaminants are leaching from soil
    - The presence of contaminated soil will not result in increased cleanup cost

Rule 62-770.690, F.A.C.
Natural Attenuation Monitoring

- May be performed as long as the following criteria are met (cont.):
  - Groundwater contamination completely defined horizontally and vertically (contaminant concentrations at perimeter monitoring wells [temporary points of compliance] do not exceed Groundwater CTLs)
  - The physical, chemical and biological characteristics of contaminants are conducive to natural attenuation
  - If more than one sampling event performed, available data show overall decrease in mass of contamination

Rule 62-770.690, F.A.C.
Natural Attenuation Monitoring

- May be performed as long as the following criteria are met (cont.):
  - It is anticipated that NFA criteria will be met in 5 years or less and contaminant concentrations do not exceed levels specified in Ch. 62-777, Table V

  OR

  - Cost effectiveness of NA monitoring may be demonstrated by:
    - Technical evaluation of groundwater and soil characteristics, chemistry, and biological activity
    - Scientific evaluation of plume migration in relation to the TPOC, an estimate of expected annual reductions in contaminant concentrations, and an estimate of time required to meet NFA criteria

Rule 62-770.690, F.A.C.
Natural Attenuation Monitoring

- If NA Monitoring follows site assessment, the recommendation for NA Monitoring must be included in the SAR
- If NA Monitoring follows active remediation, the recommendation for NA Monitoring must be included in a Remedial Action Letter Report or O&M Report
- Results of monitoring program must be submitted in NA Monitoring Report

Rule 62-770.690, F.A.C.
Natural Attenuation Monitoring

- Criteria for site rehabilitation completion:
  - If NA Monitoring follows site assessment, a minimum of 2 sampling events is required and NFA criteria must be met for 2 consecutive sampling events
  - If NA Monitoring follows active remediation, a minimum of 4 sampling events is required and NFA criteria must be met for at least the last 2 sampling events
  - If soil contamination present at the beginning of the monitoring program, soil samples must be collected as applicable to demonstrate that NFA criteria for soil are met at the end of the monitoring program

Rule 62-770.690, F.A.C.
Natural Attenuation Monitoring

- If a Remedial Action Plan is submitted during the monitoring program to enhance NA processes, NA monitoring must be suspended during the implementation of the RAP (active remediation monitoring sampling events do not count toward cleanup completion)
- When NA Monitoring is considered complete, a Site Rehabilitation Completion Report must be submitted for review

Rule 62-770.700, F.A.C.
Active Remedial Action

- Reference to TPOC noticing requirements
- Change from 3 to 2 quarters of consecutive monitoring with concentrations below CTLs to delete COCs from monitoring schedule
- Active remediation indicator measurements, alternative frequencies may be specified for:
  - Monitoring well sampling (if cleanup < 2yrs)
  - Volume of groundwater recovered
  - Concentrations of COCs in system effluent
  - Untreated recovered water

Rule 62-770.700, F.A.C.
Active Remedial Action

- Measurements of in situ sparging, chemical, or bioremediation indicator parameters may be discontinued if unchanged after several consecutive quarters
- Report status of system operation at time of site visit, dates of system O&M
- Active remediation status reports shall include updated figures depicting groundwater flow direction, and extent and degree of contamination
- Suspend NAM monitoring while “enhancement” is in use
- RA cannot be implemented until approved by the FDEP

Rule 62-770.750, F.A.C.
Post Active Remediation Monitoring

- No PARM necessary if existence of groundwater contamination was not previously confirmed by installing and sampling a monitoring well
- PARM report must be signed and sealed if action levels exceeded and include:
  - Recommend supplemental assessment, or
  - Recommend continue with PARM monitoring, or
  - Implement supplemental remedial action

Rule 62-770.750, F.A.C.
Post Active Remediation Monitoring

- Must have a minimum of 4 quarterly sample events in PARM and meet CTLs for last two consecutive events
- If no groundwater contamination was previously detected in monitoring wells, only one sample event is necessary

Rule 62-770.800, F.A.C.
Time Schedules

- No substantive changes to this section
- Time schedules do not apply to eligible sites
- Time schedules in consent orders take precedence over Chapter 62-770
- Procedures for requesting and approval of changes to time frame requirements
- Timeframes are tolled while the FDEP or LP is considering the request

Rule 62-770.890, F.A.C.
Alternative Procedures and Requirements

- No significant changes to this section
- Alternative procedures may be allowed for procedural requirements
- Alternative procedures are not allowed for numerical cleanup criteria
- Petroleum Cleanup Section 3 of BPSS must review requests for approval of alternative procedures
- Copy should be submitted to district or LP

Rule 62-770.900, F.A.C. Forms

- 62-770.900(3) is new form to comply with requirement for initial notice of “off-site” contamination (contamination beyond property boundaries)
- Former 62-770.900(3) (Groundwater Sampling Log) replaced with form required by FS 2200, Groundwater Sampling [unfortunately it does not include an area to record the FDEP Facility Number]

Tables

- VOHs, PAHs and PCBs added to Table C to account for limited used oil suite
- Other analytical methods for metals added to Tables B, C and D