

The Florida Drycleaning Solvent Cleanup Program

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Abstract: In 1994, the Florida Legislature created the Drycleaning Solvent Cleanup Program (DSCP) to provide funding to identify and rehabilitate sites and drinking water supplies contaminated by drycleaning solvents – the first such program in the nation. Over 1400 sites have been made eligible for the DSCP. To date, assessments have been completed at over 180 sites. The first remedial systems were installed at sites beginning in 1999; remedial systems have been installed at 20 sites. This includes some large pilot tests utilizing innovative technologies including: co-solvent flushing, chemical oxidation using potassium permanganate and hydrogen peroxide, enhanced biodegradation using Hydrogen Release Compounds (HRC™) and recirculating wells. Remedial proposals currently being evaluated are Oxygen Release Compounds (ORC®), ozone sparging, six-phase electrical heating, enhanced biodegradation using sodium lactate and molasses, enhanced bioremediation – Phoster's Process™, and co-solvent enhanced oxidation. Currently, 50% of the drycleaning sites where assessment work has been completed are scheduled for remedial action; 33% of the sites are in natural attenuation with monitoring and 15% of the sites require no further action. Site Rehabilitation Completion Orders have been issued for 25 sites.

In 1994, the Florida Legislature enacted the Drycleaning Contamination Cleanup Act (Chapter 376, Florida Statutes [F.S.]) to provide a source of funding for rehabilitating sites and drinking water supplies contaminated by drycleaning solvents. The legislation, sponsored by the drycleaning industry, provides for the cleanup of active and abandoned drycleaning sites and drycleaning wholesale supply facilities in order to address the environmental liability issues resulting from drycleaning solvent contamination. The DSCP limits the liability of the owner, operator, and real property owner of drycleaning and wholesale supply facilities for the costs of cleanup of drycleaning solvent contamination.

Applications to the DSCP were accepted from March 1996 through December 31, 1998. A total of 1,564 facilities applied to the program and, to date, 1,416 facilities have been made eligible. The Florida Department of Environmental Protection (FDEP), Bureau of Waste Cleanup administers the DSCP.

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Sites eligible for the program are scored in accordance with the scoring system prescribed in Section 376.3078(7) F.S.; eligible sites are prioritized based upon this score. Site scores are based primarily on proximity to a public supply well and the permitted capacity of that well. Scores are also dependent upon a measurement of groundwater vulnerability known as the DRASTIC Index. DRASTIC is an acronym for seven geologic factors which affect and control groundwater movement: depth to water, net recharge, aquifer media, soil media, topography, impact of vadose zone media, and hydraulic conductivity of the aquifer. In addition, scores are based upon aquifer classification, conditions favoring a continual source, and the environmental setting of each site.

In November 1996, ten private contractors were selected for the assessment and rehabilitation of eligible facilities. The contracts are managed through FDEP contract and project managers. To date, assessment work has been conducted at over 180 sites. This paper presents data compiled from program applications, site assessments, and remedial actions for 150 sites addressed through the DSCP.

Site assessment activities conducted through the DSCP have indicated that the primary contaminant source areas identified at drycleaning facilities are in the immediate vicinity of the drycleaning machine and/or still (>100 identified source areas) and the area just outside the rear door of the facilities (~50 identified source areas). Other identified source areas include storm sewers, above- and underground storage tanks, septic tanks/drainfields, and sanitary sewers.

Groundwater contamination investigations indicate that drycleaning solvent contamination is present at 97% of the assessed sites. Groundwater cleanup target levels are exceeded at 91% of the assessed sites with off-property exceedances of groundwater cleanup target levels at 43% of the sites. Based on groundwater PCE equivalent concentrations exceeding 10% of PCE aqueous solubility, dense non-aqueous phase liquid PCE is likely present in groundwater at approximately 20% of the sites.

Groundwater contaminant plumes are generally less than one acre in size (63% of sites). Twenty-eight percent of the sites have contaminant plumes of one to five acres and 9% of the sites have contaminant plumes greater than 5 acres. The largest plume identified is approximately 44 acres.

Selected remedial strategies are evaluated based upon Risk-Based Corrective Action principles. The program's remedial strategy is to perform active remediation in source areas and apply Natural Attenuation Monitoring (NAM), where appropriate, for low-level contaminant plume areas. The distribution of remedial approaches are as follows: 15% No Further Action; 33% Natural Attenuation with Monitoring; 50% Active Remedial Systems.

In August 1999, the Drycleaning Solvent Cleanup Criteria Rule (Chapter 62-782, Florida Administrative Code [F.A.C.]), and the Contaminant Cleanup Target Level Rule

(Chapter 62-777, F.A.C.), became effective. The Cleanup Criteria Rule provides cleanup procedures for sites contaminated with drycleaning solvents. The Contaminant Cleanup Target Level Rule provides cleanup target levels for groundwater, surface water, and soil, as well as natural attenuation default concentrations for groundwater. The rule also provides a listing of soil properties and test methods, a listing of site-specific conditions and geochemical parameters, and default parameters and equations that may be used to establish site-specific cleanup target levels.

Remedial actions have concentrated on source area treatment and removal. There has been an emphasis on employing in-situ treatment technologies to minimize operation and maintenance costs, including large-scale pilot tests utilizing innovative technologies such as co-solvent flushing and chemical oxidation using potassium permanganate and hydrogen peroxide. At sites where contaminant levels are below natural attenuation default concentrations, contamination has not migrated off-site, and there is no continual source; NAM has been selected as the remedial strategy. Currently, active remedial strategies have been performed at 45 sites, many of which have used a combination of strategies, including:

Active Remedial Strategies	Number of Sites
Septic Tank Cleanout	9
Excavation	6
Soil Vapor Extraction	20
Multi-Phase Extraction	2
Air Sparging	3
Recirculation Wells	1
Pump and Treat	3
In-Situ Enhanced Bioremediation using HRC™	2
In-Situ Chemical Oxidation using Fenton's Reagents	3
In-Situ Chemical Oxidation using Potassium Permanganate	2
In-Situ Co-Solvent Flushing using Ethanol	1

Remedial proposals currently being evaluated include Oxygen Release Compounds (ORC®), ozone sparging, six-phase electrical heating, enhanced biodegradation using sodium lactate and molasses, enhanced bioremediation – Phoster's Process™, and co-solvent enhanced oxidation.

In 1998, the Florida Legislature created the Voluntary Cleanup Tax Credit to encourage voluntary cleanup of certain drycleaning solvent contaminated sites and designated Brownfield areas. Eligible applicants can receive up to 35% of the costs of voluntary cleanup activity that is integral to site rehabilitation. The tax credits can be applied toward Corporate Income Tax or Intangible Personal Property Tax in Florida.

Additional information on the DSCP is located on the FDEP DSCP web site- www.dep.state.fl.us/dwm/programs.htm. Information on state drycleaning programs can be found at the State Coalition for the Remediation of Drycleaners web site – www.drycleancoalition.org.