

***GUIDELINES FOR THE MANAGEMENT OF
RECOVERED SCREEN MATERIAL FROM C&D
DEBRIS RECYCLING FACILITIES IN FLORIDA***

**Office of the Division of Waste Management
Florida Department of Environmental Protection**

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DISCLAIMER

The information contained in this document is intended for guidance only. It is not a rule and does not create standards or criteria that must be followed by the regulated community. Compliance with this document does not relieve the owner or operator from any liability for environmental damages caused by the use of the recovered screen material, nor does it relieve the owner or operator from the responsibility of complying with the Department's rules or any local government requirements. This document does not establish policies or precedents applicable to other recycling or cleanup projects.

PREFACE

This revision, Revision No. 1, makes two substantive changes to the guidance document entitled *Guidelines for the Management of Recovered Screen Material from C&D Debris Recycling Facilities in Florida*. Revision No. 1 incorporates the definition of recovered screen material that was promulgated on January 1, 2010 in Chapter 62-701 of the Florida Administrative Code (F.A.C.). The current revision has also been updated to conform to the Division of Waste Management's most recent data quality assurance and quality control protocols.

The guidelines detailed herein only apply to recovered screen material generated at permitted construction and demolition debris recycling facilities. These guidelines supersede the guidelines issued on September 28, 1998 and will be periodically reviewed by the Department and revised as necessary to ensure recovered screen material is properly managed in Florida.

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INTRODUCTION

Construction and demolition (C&D) debris recycling facilities produce soil-like fines known in Florida as recovered screen material (RSM). The RSM is commonly generated using screening equipment to separate the fines from larger pieces of debris. The larger debris is then sorted and processed for recycling or disposal. New markets began to emerge in Florida for processed RSM in the years following Hurricane Andrew due to the inordinate quantities of C&D debris that was generated during the storm. In 1996 the Florida Legislature also enacted §403.707(9)(g) Florida Statutes (F.S.), which contained language directing the Department to establish criteria and guidelines that "encourage recycling where practical and provide for the use of recycled materials in a manner that protects the public health and the environment."

By direction given under §403.707(9)(g), F.S. the Department convened a workgroup of experts, regulators, industry professionals and concerned citizens. This "RSM Workgroup" was tasked with a three-fold mission: (a) compile available information on the environmental and health risks associated with RSM use, and initiate new investigation where needed to fill in gaps in knowledge; (b) establish field sampling and analysis protocols to ensure that any underlying chemical constituents present in RSM are accurately measured; and (c) identify off-site uses for RSM that are compatible with the levels of measured underlying chemical constituents.

The RSM Workgroup's findings were submitted to the Department for review in 1996, and later published in final form in 1998 (Townsend et al.). The Department subsequently issued guidelines for the management of recovered screen material from C&D debris recycling facilities in Florida based on the workgroup's findings (FDEP, 1998). The guidelines contained a detailed and multi-tiered analysis, monitoring and reporting scheme that was designed to ensure RSM was used in a safe manner. For example, RSM could only be used in a residential setting if the concentration of each regulated chemical constituent was below the most

protective human health exposure levels and leaching tests did not indicate any likelihood for adverse impacts to ground water.

There are a number of means routinely used by Department to actively monitor the RSM generating industry. Beneficial use proposals for processed RSM are evaluated by staff scientists and engineers. Specific conditions based on these guidelines for RSM use are incorporated into C&D processing facility permits. The facility owner or operator is thus required by permit to demonstrate that their RSM is managed and used in a manner that poses no significant threat to public health or the environment. Finally, the Department updates solid waste rules as the industry develops and as the science progresses for evaluating risks associated with solid waste recycling. Most recently, in January 2010, a new definition for RSM was promulgated in Rule 62-701.200(73) F.A.C.

"Recovered screen material" means the fines fraction, consisting of soil and other small materials, derived from the processing or recycling of construction and demolition debris which passes through a final screen size no greater than 3/4 of an inch.

The new definition restricts the maximum screen size opening, which serves to place an upper bounds limit on the size of the RSM. This limitation is necessary to ensure that larger-sized engineered materials such as asphalt roofing, foam insulation, metal and plastic are excluded from the RSM stream.

SAMPLING AND ANALYSIS

The sampling and analysis requirements detailed in this section provide a scientifically sound methodology for the RSM generator to use to demonstrate that their RSM is appropriate for its intended beneficial use. C&D processors may request to use an alternative procedure when operating conditions at the facility necessitate such actions. The Department will approve such

requests on a case-by-case basis if a reasonable justification is provided. Only procedures that conform to the data quality requirements of this section will be considered. Consideration will also be given to alternative procedures that make use of the statistics-based methods enumerated in Chapter Nine of the Resource Conservation and Recovery Act (RCRA) Document No. SW-846 (United States Environmental Protection Agency, 1992).

Data Quality Requirements

- The Department's most recent standard operating procedures (SOPs), DEP-SOP-001/01 must be followed when collecting field samples of RSM (FDEP, 2008). The Department's SOPs are available for download at the following web address:

<http://www.dep.state.fl.us/water/sas/sop/sops.htm>

- Laboratory analyses must be performed by laboratories certified by the Department of Health and accredited under the National Environmental Laboratory Accreditation Program.
- Laboratory data must be generated using methods with detection limits at the lowest level that can be reliably measured during routine laboratory operating conditions within specified limits of precision and accuracy. If the detection limit is above the Groundwater Cleanup Target Levels (GCTLs) and Soil Cleanup Target Levels (SCTLs) listed in Chapter 62-777 F.A.C. (FDEP, 2005) an explanation must be submitted to the Department explaining why the detection limit was elevated. Chapter 62-777 F.A.C. is available for download at the following web address:

http://www.dep.state.fl.us/waste/quick_topics/rules/default.htm

- Laboratory data must be submitted to the Department as an electronic data deliverable, in electronic format that is consistent with the requirements for importing data into the Department's database. Electronic data deliverable guidance is available at the following web address:

<http://www.dep.state.fl.us/waste/categories/shw/pages/ADaPT.htm>

- Environmental data must be processed, verified and validated using the Automated Data Processing Tool (ADaPT) software. The ADaPT software is available for download, at no cost, at the following web address:

<http://www.dep.state.fl.us/waste/categories/shw/pages/ADaPT.htm>

- Uncertainties and variability within the environmental data set should be calculated using the FL-UCL tool. The FL-UCL tool is available for download, at no cost, at the following web address:

<http://www.dep.state.fl.us/waste/categories/wc/pages/ProgramTechnicalSupport.htm>

For more information about the Department's minimum sampling and analysis requirements see the quality assurance expectations detailed in the Department's quality assurance regulations contained in Chapter 62-160 F.A.C. (FDEP, 2008).

Sampling Procedure

This subsection describes the proper procedure for collecting an 8-hour composite sample. These sampling procedures apply to the initial baseline analysis conducted prior to beneficial use of RSM and also to the routine sampling conducted during the course of standard RSM generation. The 8-hour composite sample is the sample collection type that must be used to measure the average properties of the RSM. The C&D processor is responsible for taking all necessary steps to avoid errors during sample collection. The processor must carefully plan the sampling events, and follow the most recent SOPs cited in Chapter 62-160 F.A.C.⁸ Care must be taken to ensure that each individual 8-hour composite sample consists of separate subsamples collected at one hour intervals during the eight hour period. The sampling protocols detailed in this subsection apply to RSM collected directly from the conveyor belt or from the pile that forms in the direct proximity of the conveyor belt discharge. The procedures are as follows:

- Collect, store, composite and ship each subsample in accordance with the instructions detailed in SOP *General Sampling Procedures, FS 1000* (FDEP, 2008).
- Collect volatile organic and volatile inorganic subsamples before other constituent types.
- Prepare the 8-hour composite sample from 8 subsamples collected at 60 minute intervals. At each 60 minute interval, collect a subsample of undisturbed RSM.
- If subsamples are collected directly from the RSM conveyor belt, collect each subsample from the entire width and depth of the conveyor at a fixed point.
- If subsamples are collected from the fresh RSM pile, the sampling location is midway up the vertical height of the pile at a surface depth of approximately 6 to 12 inches into the RSM.
- Collect sufficient volume of subsample to fill the pre-cleaned subsample container.
- After eight subsamples are collected, combine the subsamples directly in the composite sample container with no pre-mixing. Notify the laboratory that the sample is an unmixed composite sample, and request that the laboratory thoroughly mix the sample before sample preparation or analysis.

Baseline Analysis

Baseline analysis refers to the initial characterization of RSM that must be performed when the C&D processor is seeking a beneficial use determination. The Department may approve the beneficial use of RSM only after the C&D processor conducts a baseline chemical analysis on a representative population of RSM sampled from the processor's waste stream. The overarching goal of the baseline analysis is to identify trace constituents present at concentrations exceeding human health toxicity criteria. If elevated trace constituents are identified, they will be placed on a list of contaminants of concern (COC) for targeted routine monitoring. The results of baseline testing will be one critical factor used by the Department when approving RSM beneficial use applications.

Baseline analysis must be repeated whenever operational changes are implemented at the facility, or whenever there is a change to the composition of the waste stream, and if such changes could be expected to adversely impact the quality of processed RSM. For example, a new baseline test must be performed whenever the generator's service area expands such that new waste streams are processed at the facility.

Potential Contaminants of Concern

The groups of chemicals listed in Table 1 are the potential contaminants of concern that require laboratory analysis in order to establish the baseline contaminant of concern list.

Table 1

Recommended analytical methods for totals analysis of potential contaminants of concern

Class of trace contaminant	EPA Methods for Analysis †
RCRA metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag)	US EPA SW-846 Method 6010, 7471‡
Volatile organic compounds	US EPA SW-846 Method 8260
Semi-volatile organic compounds	US EPA SW-846 Method 8270
Pesticides	US EPA SW-846 Method 8081

†Alternative analytical methods must have equivalent or better sensitivity and selectivity.

‡Mercury is analyzed following Method 7471.

To establish baseline conditions the processor must prepare a minimum of 14, 8-hour composite RSM samples collected over a time period of 7 to 14 days. The processor's sampling team must adhere to the data quality requirements and sampling procedures detailed herein. Pre-approval must be obtained from the Department if the processor wishes to sample according to an alternative procedure. The analytical laboratory must be instructed to measure the total concentration of each constituent identified in Table 1. The analytical laboratory must also be instructed to prepare a leachate extract from each composite RSM sample following the

Synthetic Precipitation Leaching Procedure (SPLP), EPA Method 1312. Subsequently, a totals analysis for the Table 1 constituents must be performed on the SPLP extract.

The COC list is populated by comparing the 95% upper confidence level (UCL) of the mean concentration of each potential contaminant of concern against the respective cleanup-target level published in Table I or Table II of Chapter 62-777 F.A.C. (FDEP, 2005). The total concentration is compared with the *direct exposure criteria* listed in the SCTL table of 62-777 F.A.C. In this way the risk to human health associated with direct exposure to RSM is assessed. The total concentration of each measured chemical constituent present in the SPLP extract must be compared with the *groundwater criteria* listed in the GCTL table to assess risk of groundwater contamination associated with land application scenarios. If fewer than ten observed values for a particular constituent are above the detection limit then use the highest value measured above the detection limit for comparison with the cleanup target levels.* Otherwise, the 95% UCL of the mean must be used for comparison with the clean up target levels.

Reporting and Approval Requirements

Before the Department will issue a beneficial use determination the C&D Processor must submit a complete report of all findings to their regional district office and the Solid Waste Section in Tallahassee. The processor's RSM is not authorized for sale or beneficial use until the Department provides written approval. The Department's approval letter will detail the list of COCs that require routine monitoring. The report must be submitted in an electronic format consistent with the Department's requirements. A complete report includes the following specific items:

* The FL UCL tool will not make recommendations if the data set is too small or if there are too many values below detection limit. For example, if 14 samples are collected during the baseline analysis then the FL UCL tool requires no more than four observations be below detection limit for a particular constituent in order to return a recommended value for the 95 % UCL of the mean.

- A cover letter providing a brief description of the requested use of the RSM and sampling results indicating all detections that exceed cleanup target levels.
- Tabulated summary of the measured chemical concentration for each constituent. The table must include the maximum detected concentration or the 95% UCL of the mean concentration for each constituent, as determined above, and a list of the applicable *direct exposure criteria* and *groundwater criteria* from the SCTL and GCTL tables for comparison.
- ADaPT compatible laboratory electronic data deliverables.
- Complete set of data reports generated by the laboratory with the results of all testing and quality control analyses.

Routine Monitoring

Routine monitoring is performed in order to measure drift in the quality of RSM away from baseline conditions. The routine monitoring gives the processor, Department and end-user assurance that the approved offsite use scenario is appropriate for the level of contamination present. After one year the C&D processor may request a reduction in the number of sampling parameters and the sampling frequency, but only if the monitoring results demonstrate that stability in RSM quality has been achieved. The Department will evaluate this request primarily based on the results of the data collected during the high and low frequency routine monitoring events. Any reduction in the monitoring requirements is conditional upon the processor repeating the baseline analysis if changes are implemented to the waste processing operations or waste stream in a manner that may adversely impact the quality of the RSM.

The rest of this section describes the procedure for collecting and reporting routine monitoring data. The requirements are provided to aid in developing specific permit conditions for those facilities intending to produce RSM for beneficial reuse. At a minimum, one 8-hour composite

sample is collected during each routine monitoring event following the procedures detailed in the Sampling Procedure section of this guidance.

High Frequency Monitoring

High frequency monitoring must be conducted once each week or when 1,000 tons of RSM is generated, whichever is less frequent. The laboratory must be instructed to measure the total concentration of arsenic and each constituent present on the COC list. The laboratory may be instructed to randomly select four aliquots from the composite sample and initially analyze only one while holding the remaining aliquots in storage pending the results. If the concentration of any constituent is found to exceed its corresponding SCTL then the remaining three aliquots should be analyzed.

Low Frequency Monitoring

Low frequency monitoring must be conducted once every three months or when 10,000 tons of RSM is generated, whichever is less frequent. The laboratory must be instructed to measure the total concentration of arsenic, lead, chromium, cadmium, mercury, copper, nickel and any other COC list constituent identified during baseline analysis. One aliquot of extract must also be prepared using the SPLP method followed by analysis of the extract for the full suite of VOCs, semi-VOCs, and any other COCs identified during baseline sampling.

Reporting and Approval Requirements

The Department must be notified within 24 hours if any routine monitoring result indicates that the RSM contains or leaches a COC in excess of the applicable SCTL (use the industrial/commercial SCTL unless the RSM is used in a residential area) or GCTL. The

processor may continue to sell or use the RSM until the Department provides notification to cease and desist.

Once each quarter the processor must submit the results of each high and low frequency monitoring event to their regional district office and the Solid Waste Section in Tallahassee. The report must be submitted within 30 days of completing the quarterly monitoring event. The report must be submitted in an electronic format consistent with the Department's requirements. A complete report includes the following specific items:

- A cover letter providing a brief description of results indicating all detections that exceed cleanup target levels.
- Tabulated summary of the measured chemical concentration for each constituent. The table must include a list of the applicable *direct exposure criteria* and *groundwater criteria* from the SCTL and GCTL tables for comparison.
- ADaPT compatible laboratory electronic data deliverables.
- Complete set of data reports generated by the laboratory with the results of all testing and quality control analyses.

OFF-SITE USE REQUIREMENTS

In all instances written approval from the Department must be granted to the C&D processor before the RSM may be beneficially used or used off-site. The Department's approval will be based upon the results of the baseline testing and routine monitoring. The facility must continue conducting routine monitoring as described in the SAMPLING AND ANALYSIS section.

General Prohibitions and Best Management Practices

Experience has shown that the land application of RSM may potentially lead to violations of the Department's secondary ground water standards for total dissolved solids and sulfate if the gypsum wallboard fraction in the processed RSM is too high. The disposal of gypsum wallboard in a high moisture environment under anaerobic conditions can also lead to the generation of objectionable odors. Therefore, as a best management practice the C&D processor must remove gypsum wallboard as much as practical from the C&D debris before the waste stream is processed. In general, RSM may not be used as fill material in surface waters or wetlands unless a permit specifically authorizing these uses has been issued by the Department.

Special Beneficial Use

Use of RSM is allowed under the following special conditions with written approval from the Department. Weekly monitoring may be discontinued if all RSM produced by the facility is used in the manner detailed below:

- Recovered screen material may be used at a permitted Class I or III landfill as subsurface construction material, or as initial and intermediate cover provided it also meets the criteria of Rule 62-701.200(53) and (55) F.A.C. (FDEP, 2010). Use as initial and intermediate cover may require approval by the Department as part of the landfill permit.
- Recovered screen material may be used with encapsulation technologies, for example, as part of the aggregate feed in the production of concrete or asphalt, provided the applicant can demonstrate the proposed use will not result in violations of the Department's ground water standards or criteria.

Residential Beneficial Use

Written approval from the Department must be granted to the RSM processing facility before the RSM may be installed in the residential setting. The Department's approval will be based upon the results of the baseline testing and routine monitoring. The Department's approval letter will detail the list of COCs that require routine monitoring.

Residential use of RSM is allowed under the following conditions:

- The 95% UCL of the mean for each contaminant of concern is below its respective residential SCTL.
- The leaching tests and other characterization data do not indicate that the use of the RSM will result in violations of the Department's ground water standards or criteria.

Other Beneficial Use

Permission may be granted for RSM to be used in other applications on a case-by-case basis provided the applicant can demonstrate that the proposed use will not pose a significant risk to human health or the environment. The Department may require institutional controls, such as property deed restrictions or permanent access controls, depending on the proposed use of the RSM.

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