

**Florida Department of Environmental Protection
FY 2007-08 INNOVATIVE GRANT APPLICATION FORM**

Project Information (on applicant letterhead)

- 1) **Applicant Name: Escambia County Department of Solid Waste Management**
- 2) **Primary contact person: Ronald C Hixson, Chief Engineering and Environmental
Quality**
- 3) **Complete Address: Department of Solid Waste Management
13009 Beulah Road
Cantonment, Florida 32533**
- 4) **Telephone Number(s) (including SunCom number): (850) 937-2160, SC 679-2160**
- 5) **E-mail address: ron_hixson@co.escambia.fl.us**
- 6) **Project Title: Landfill Mining and Reclamation**
- 7) **Grant Request Amount: \$150,500.00**
- 8) **Length of project (months): 12**

Authorizing Signature

Sandra Prince Jennings, E.I.

Director, Department of Solid Waste Management

Title

PROJECT ABSTRACT

(No more than 20 lines. Every word over 20 lines will constitute a one point deduction.)
(do not delete the instructions on this page)

The Escambia County Department of Solid Waste Management (ECDSWM) operates a Integrated Solid Waste Management Facility is tasked with providing the residents of the county with an economical and safe method for the disposal of municipal solid waste. Perdido Landfill, a 424-acre Municipal Solid Waste (MSW) facility, retains large tracts of undeveloped land for expansion. However, all the remaining areas are either green fields (undisturbed natural areas) or regulated wetlands. Expanding into green field areas, while technically and economically feasible may generate public opposition to the construction of a “dump” on unspoiled land. Expansion in wetland areas requires significant financial expenditures and could also present engineering dilemmas that could delay or prolong construction and substantially increase cost. The landfill disposal area comprises approximately 60 acres of lined Subtitle D cells and 45 acres of unlined trench filled cells. The ECDSWM is exploring landfill mining of the unlined trench areas as a means to provide future MSW disposal capacity. Landfill mining presents a unique opportunity to increase disposal capacity of Perdido Landfill and in doing so, provides for the environmentally safe and economical disposal of MSW. Mining controls cost through minimizing the physical expansion of the landfill footprint, thus restricting the growth in fees associated with final closure and long term care. Recovering soils and decomposed MSW that could be utilized as daily and final cover would reduce, or even eliminate, the need to import soil, or develop additional soil borrow areas. Lastly, mining of existing unlined cells, that are a current source of groundwater contamination, provides a significant improvement in protection to the environment by replacing older, unlined cells with lined disposal cells designed with leachate and landfill gas collection systems.

PROJECT DESCRIPTION

(1 page)

EXPANSION BY MINING OF UNLINED TRENCH FILL

The ECDSWM is responsible for providing environmentally safe and economical disposal of MSW for the residents of Escambia County. The department envisions landfill mining as an excellent method to meet those needs and proposes a pilot project on approximately 45 acres of unlined trench disposal area at Perdido Landfill. To further explore the old trench fill a pilot study is planned that includes exploratory excavations and borings in the trenched filled areas. A waste characterization study will target the composition of the waste disposed of in the trench filled landfill, the nature and quantity of marketable and reusable materials expected to be recovered, the nature and quantity of recoverable soil and fines suitable for landfill cover, the potential combustible fractions of the recovered waste, the quantity of excavated waste that will be re-landfilled, and any potential environmental impacts resulting from waste reclamation and reuse.

The 45-acre trench filled area will be divided into four sections that correspond to future landfill cell expansion. Exploratory excavations and borings will be performed in each of these four sections. Project staff will attempt to identify disposal locations for asbestos, construction / demolition debris, white goods, animal carcasses, and potentially hazardous chemicals prior to excavation or boring to minimize hazards to staff. MSW removed during exploratory excavations will be initially processed to remove any large or recyclable items (white goods, tires, etc.). The remaining material will then be screened in a trommel screen or similar device to further separate the excavated material. Decomposed MSW and soil fines will be used as daily or intermediate cover material and unusable or contaminated material will be re-deposited in the active Class I cell.

This project will attempt to identify key issues related to landfill mining and reclamation as well as develop and refine the techniques and procedures required to implement a full-scale mining and reclamation project.

Specific tasks include:

- 1) Waste characterization – quantities of reusable materials, recyclables and unsuitable materials requiring disposal.
- 2) Waste excavation techniques and methods.
- 3) Waste separation and classification techniques.
- 4) Identification, handling and disposal of hazardous and unsuitable materials (asbestos, tires or chemicals).
- 5) Development of operational plans:
 - a. Operations Plan
 - i. Daily Work Plan
 - ii. Stormwater Management
 - iii. Leachate Management
 - iv. Landfill Gas Management
 - b. Health and Safety Plan
 - c. Contingency Plan
 - i. Emergency Operations – Hazardous Gas or Materials
 - ii. Medical Emergences

Criteria 1: TECHNOLOGIES or PROCESSES

(1 page)

(do not delete the instructions on this page)

(20 points) The range of scoring is between 0 and 20 points, with up to 10 points for meeting one of the following sub-criteria, up to 15 points for meeting two, and up to 20 points for meeting all three. Note: applicant may adjust space used to address each sub-criteria.

Sub-criteria 1 – Not in common use in Florida.

The use of landfill mining to provide expansion is relatively uncommon, not only in Florida, but in the United States solid waste industry. In much of Florida there is still an abundance of available green spaces to located new landfills, but that is rapidly changing. With the explosive growth in population and accompanying development in many parts of the state, available, affordable land for new landfills is rapidly vanishing. This will stimulate development of new and innovative methods for waste disposal. Landfill mining can provide that new direction. It provides additional waste disposal capacity but without the cost associated with acquisition of new land and the development of additional infrastructure. There is also less public resistance to the expansion of an existing MSW facility then to the development of a exclusively new facility.

Sub-criteria 2 – Novel application of an existing technology or process.

The application of landfill mining relies in part on the use of existing technology developed or proven for other processes. Mining exploits demonstrated constructions techniques and equipment but in a different environment. Instead of excavating soil for a disposal cell, mature, decomposed MSW is excavated instead. While soil is a relatively uniform material, MSW is very heterogeneous material requiring slightly different methods. The addition of a trommel screen to separate the excavated MSW fractions is the only additional step in the MSW excavation. After separation, the different fractions of MSW are handled by conventional means, front-end loaders and dump trucks, in the same manner as sand or clay. The completion of the mined cell then proceeds as in normal cell construction, installation of subgrade, liner and leachate collection system.

Sub-criteria 3 – Overcoming obstacles to recycling/waste reduction in new or innovative ways.

Not applicable.

Criteria 2: TARGETS

(1 page)

(do not delete the instructions on this page)

(10 Points) Demonstrate innovative processes to collect and recycle or reduce these targeted materials/sectors: Construction and Demolition Materials, Commercial/Institutional Sectors, Hurricane Debris, Pay-As-You-Throw and Waste Tires. Note: if the proposed project also includes materials/sectors other than those targeted by this criteria, the project will receive less than the maximum 10 points allocated for the criteria.

Primary Target

The main purpose in landfill mining is to increase available MSW disposal capacity in the most economical and environmentally safe method as well as removing the source of existing groundwater contamination. The methods and procedures developed in this project will allow the ECDSWM to provide adequate MSW disposal capacity within its existing footprint. By constraining the growth of the disposal area the department will minimize design and construction and operating cost, reduce permitting fees and closure cost.

Criteria 3: BENEFITS/ COST-EFFECTIVENESS

(1 page)

(do not delete the instructions on this page)

(25 points) Demonstrate the potential economic, environmental, and cost-effectiveness of the program's approach. Note: applicant may adjust space used to address each sub-criteria.

Sub-criteria 1 - Environmental Benefits (5 points).

- **Methodology** – One of the primary benefits of landfill mining is the reuse of the existing landfill disposal space. This methodology drastically reduces the need for development of additional green space and infrastructure. Many existing MSW facilities are centrally located, while many new facilities would likely be more distant from the source of MSW. This would require additional travel time, consumption of additional fuels and increased generation of greenhouse gases.
- **Toxicity** – The reduction in possible groundwater contamination is the second most significant benefit in landfill mining. By removing unlined cells, sources of groundwater contamination are appreciably reduced.

Sub-criteria 2 – Economic Benefits (5 Points).

The economic benefits of landfill mining can be noteworthy. The primary benefit is the reduced acquisition and construction cost for additional disposal area. Acquisition of new land for landfill use, aside from the public opposition that is drawn to any new development, can be extremely time consuming and costly. The area has to be centrally located and easily accessible, both of which normally command a high marketable value. A second major asset in mining is the possible reduction in ground and surface water contamination. Remediation and treatment of contaminated water is expensive and can require very long completion times. Any method of disposal that reduces or eliminates the possibility of ground or surface water contamination is extremely important. In reducing the possible sources of contamination, the need for expensive remediation systems is eliminated. This provides savings in design and installation as well as long term operational and maintenance cost. A additional benefit in the process is the recovery of soil-sized materials that can be utilized in the place of virgin soil.

Sub-criteria 3 – Cost-Effectiveness (15 Points).

The cost effectiveness of landfill mining is illustrated in several ways, some of which have been touched on in other sections. By minimizing the amount of additional land required for expansion, land acquisition cost is reduced. Maintaining the same footprint size reduces grounds upkeep, stormwater ponds and conveyance installation and maintenance. Smaller facility size may reduce the need for expensive equipment, saving on acquisition and maintenance cost. The number of surface and groundwater monitoring wells and sites would be reduced, leading to a reduction in the cost for sampling and analysis. Perimeter fencing, gates, and security cost would also be reduced.

Criteria 4: SUSTAINABILITY:

(1 page)

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(25 points) Demonstrate the sustainability of the proposed program.

Landfill mining meets the sustainability challenge by reducing the need to acquire and develop green fields for present and future MSW disposal. The development and refinement of mining techniques and procedures will reduce cost and improve implementation of landfill mining projects throughout Florida.

Specifically this project will allow the ECDSWM to meet the present and future MSW disposal need for the citizens of Escambia County without the need for expansion into pristine areas. Mining also allows reuse of decomposed MSW and recovery of daily and intermediate cover soils placed during the original MSW disposal. This soil recovery and reuse negates the need for additional soil borrow pits, which again conserves wilderness areas and reduces operation cost.

Landfill mining, therefore allows continued use of existing facilities prolonging the use of operating sites within the current permitted boundaries at substantial savings compared to the cost of new facilities.

Criteria 4: TRANSFERABILITY

(1 page)

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(10 Points) Demonstrate transferability of technology and processes and specify how the project will promote transferability. Note: applicant may adjust space used to address each sub-criteria.

Sub-criteria 1 – Transferability of technology and processes (5 points).

The ECDSWM in cooperation with the University of Florida, Department of Environmental Engineering Sciences, Dr Timothy Townsend, P.E. is conducting this project to improve solid waste disposal technology and enhance protection of the environment. The technology and processes developed during this project would be applicable to most MSW facility. Development of methods and procedures would center on the use of standard industry practices to minimize the cost and improve the probability of successful implementation of this technology.

Sub-criteria 2 – How project will promote transferability (5 points).

Completion of this landfill-mining project will permit refinement and standardization of excavation and construction techniques, which will allow successful implementation at other MSW sites. Development of landfill mining techniques and procedures would begin with a careful, in depth review of previous mining projects. This review would include interviews with engineers, managers and operators to document the best, most effective methods in performing a landfill-mining project. By developing and documenting mining methods and procedures, preparing operation and contingency plans, the ECDSWM hopes to design a mining system that could be applicable to other MSW facilities.

Criteria 5: LOCAL SUPPORT

(1 page)

(do not delete the instructions on this page)

(10 Points) Demonstrate local support for the proposed project in commitment of cash or in-kind matching funds. Please provide the name, address and phone number of ALL contributors. (Points will be allocated for only those contributors located within the jurisdiction of the applicant.)

- **00 points 0% up to and including 1% of total project cost**
- **01 points Greater than 1% up to and including 10% of total project cost**
- **02 points Greater than 10% up to and including 20% of total project cost**
- **03 points Greater than 20% up to and including 30% of total project cost**
- **04 points Greater than 30% up to and including 40% of total project cost**
- **05 points Greater than 40% up to and including 50% of total project cost**
- **06 points Greater than 50% up to and including 60% of total project cost**
- **07 points Greater than 60% up to and including 70% of total project cost**
- **08 points Greater than 70% up to and including 80% of total project cost**
- **09 points Greater than 80% up to and including 90% of total project cost**
- **10 points Greater than 90% up to and including 100% of total project cost**

The Escambia County Board of County Commissioners through the ECDSWM will supply local support for this project. The department will supply support with both in-kind and matching funds up to 50% of the total project cost. In-kind funding will include:

- Personnel Support
 - Heavy Equipment Operators
 - Environmental Specialist
 - Office Assistants
 - Accounting Technicians
- Construction Equipment
 - Excavators
 - Off road dump trucks
 - Drilling rigs
- Sampling and Analytical Services

Matching funds will be provided directly during the project for the renting and purchasing of equipment and material. Additional funding is being provided to the University of Florida, Department of Environmental Engineering Services, Dr. Timothy Townsend, P.E. directly or through the consulting firm of Jones, Edmunds & Associated, Gainesville, Florida.

BUDGET

(1 page using Budget Table Template)

(do not delete the instructions on this page)

Describe the project's budget allocated by task and budget categories per the Budget Table Template available from DEP's Innovative Grants web site in Microsoft Excel digital format

(www.dep.state.fl.us/waste/categories/recycling/pages/InnovativeGrants2007-08.htm).

Applicant: Escambia County Department of Solid Waste Management					Project Title: Landfill Mining and Reclamation						
Budget											
(1) Tasks	Categories								Local Match		(12) Total Grant Request
	(2) Personnel	(3) Travel	(4) Equipment	(5) Supplies	(6) Contractual	(7) Construction	(8) Other	(9)* Total Budget	(10) In-Kind Match	(11) Cash Match	
Excavate MSW	\$8,000.00		\$16,000.00	\$2,000.00				\$26,000.00	\$13,000.00		\$13,000.00
Separate MSW Fractions	\$8,000.00		\$18,000.00	\$2,000.00				\$28,000.00	\$14,000.00		\$14,000.00
Transport MSW Fractions	\$8,000.00		\$20,000.00					\$28,000.00	\$14,000.00		\$14,000.00
MSW Characterization	\$8,000.00	\$5,000.00	\$1,000.00	\$1,000.00				\$15,000.00		\$7,500.00	\$7,500.00
Landfill Mining Techniques and Methods Research and Development	\$85,000.00	\$20,000.00	\$3,000.00	\$2,000.00			\$6,000.00	\$116,000.00		\$58,000.00	\$58,000.00
Sample collection and analytical Services.	\$3,000.00			\$1,000.00			\$10,000.00	\$14,000.00	\$7,000.00		\$7,000.00
Preparation of Landfill Mining Plans and Procedures	\$20,000.00	\$5,000.00		\$2,000.00				\$27,000.00		\$13,500.00	\$13,500.00
Site preparation for MSW characterization study	\$2,000.00		\$4,000.00	\$2,000.00				\$8,000.00	\$4,000.00		\$4,000.00
Site restoration	\$6,000.00		\$4,000.00	\$2,000.00				\$12,000.00	\$6,000.00		\$6,000.00
Project Management	\$22,000.00	\$5,000.00						\$27,000.00		\$13,500.00	\$13,500.00
TOTALS	\$170,000.00	\$35,000.00	\$66,000.00	\$14,000.00	\$0.00	\$0.00	\$16,000.00	\$301,000.00	\$58,000.00	\$92,500.00	\$150,500.00

* NOTE: Column 9 is the total of columns 2 through 8. It also should equal the total of columns 10 through 11

Percentage Match 50.00%