

Golder Associates Inc.

8933 Western Way, Suite 12
Jacksonville, FL USA 32256
Telephone (904) 363-3430
Fax (904) 363-3445



VIA FACSIMILE AND U.S. MAIL

March 8, 2000

P00-3931

Nassau County Board of County Commissioners
P.O. Box 1010
3163 Bailey Road
Fernandina Beach, Florida 32035

Attention: Mr. Walter D. Gossett
County Coordinator

00 MAR -9 PM 12:09

RE: COST PROPOSAL TO
DESIGN LANDFILL GAS INTERCEPTION AND COLLECTION SYSTEM
AND PREPARE A PERMIT MODIFICATION
WEST NASSAU LANDFILL
NASSAU COUNTY, FLORIDA

Dear Mr. Gossett:

Golder Associates Inc. (Golder) is pleased to provide this cost proposal to design a landfill gas (LFG) extraction and collection system and then prepare a permit modification for the system for the above referenced site. This work is required based on results of recent studies of LFG migration conducted at the site by Golder and recent detections in groundwater monitoring wells at the site (see Background below). The design will include a system for LFG extraction and collection from both the closed area and the active Class I area of the landfill. Additionally, as requested, we have included a preliminary cost estimate for the construction of the proposed system with some options, including costs for the portion of the system that should be installed in the near future to minimize offsite migration of the landfill gas, costs for the entire perimeter system installation, and for the entire system itself. Estimated unit prices for individual items are also provided.

BACKGROUND

The West Nassau Landfill is located approximately two miles northwest of Callahan, Florida. The site is comprised of two landfills, a closed unlined landfill and an active lined landfill. The active landfill was constructed adjacent to and expands over the closed landfill. These two landfills comprise approximately 50 acres and are surrounded by and divided below grade by interconnected bentonite slurry walls.

APPROVED

DATE 3/20/00 CS

The County's previous consultant, Roy F. Weston, Inc. (Weston) performed several investigations of the LFG reported outside the landfill area, and concluded that the subsurface geology had "trapped" LFG that had migrated prior to installation of the slurry wall that surrounds the facility. Golder commenced investigations regarding the LFG migration problem at the site in 1999. Although risk assessments indicate that the LFG does not pose any immediate threats to human health, the Florida Department of Environmental Protection (FDEP) expressed concern for the problem as the regulations require that the concentrations of combustible gas may not exceed 5 percent by volume at the property boundary.

In November 1999, Golder performed a series of pump tests to try to determine the source of the LFG. The pump tests indicated that the source of migration was most likely a combination of both the old and new landfills and appears to be related to the leachate management system in the new landfill (most likely the leachate collection layer and associated pipes). A report summarizing these tests was submitted in January 2000 to the FDEP and included recommendations that a LFG interception system (to be operated either passively or actively) be installed to reduce future offsite LFG migration. This report was reviewed by FDEP and a letter stating agreement with the conclusions was issued on February 18, 2000. Additionally, this letter indicated that a permit modification would be required for the site based on the installation of the system for the entire landfill area (including closed and active areas).

In early February 2000, the site reported detections of vinyl chloride in three groundwater wells that exceeded vinyl's chloride's maximum contaminant level (MCL) of 1 microgram per liter ($\mu\text{g/l}$). These detections were indicated during the December 1999 routine sampling event, and resampling in January 2000 confirmed the detections. Golder was requested by the County to submit to FDEP the appropriate data and a plan to perform actions required by the site's permit and to address the groundwater contamination. Golder's letter indicated that the groundwater detections were suspected to be related to the LFG migration in the area, and that the proposed action for addressing the groundwater was the design and installation of a gas extraction and collection system. Golder submitted a letter to FDEP on February 15, 2000 and in response, FDEP provided an assessment monitoring notification letter dated February 24, 2000. In its February 24th letter, FDEP issued its notification to initiate assessment monitoring, which requires specific wells to be installed and sampled¹. This letter also specified the regulatory requirements for addressing the groundwater detections, which includes the preparation of a contamination assessment plan as required by Chapter 62-701.510(7) of the Florida Administrative Code (F.A.C.). In discussions with FDEP regarding this matter, Golder understands that the referenced contamination assessment plan can include the design of a LFG extraction and collection system for the area of concern. Based on the recent groundwater detections, Golder recommends that the system be operated actively (i.e., supply a vacuum to each well) in order to adequately control the LFG being generated within the landfill. Golder also recommends that the system be designed for the entire facility, not just the area with groundwater detections.

¹ The well installation and sampling required by this letter will be conducted by Golder under a separate task order, to be presented to the Board for consideration on March 13, 2000.

SCOPE OF WORK

Based on the above-described required activities, Golder has prepared this cost proposal to combine both the design of a LFG extraction and collection system for the site and the required preparation of the contamination assessment plan under Chapter 62-701.510(7) F.A.C. This cost proposal also includes the preparation and submittal of a permit modification to the FDEP for the LFG system. The following tasks are proposed for this project:

- Task 1 – Information/Data Review and Compilation;
- Task 2 – Preparation of Contamination Assessment Plan per Chapter 62-701.510(7); and
- Task 3 – Permit Modification

Work to be performed under each task is discussed below.

Task 1 – Information/Data Review and Compilation

Under this task, information necessary for the design of the LFG extraction and collection system will be compiled. As presented in the invoice narrative provided to the County regarding the previous task order addressing LFG (the pump test work), some work was conducted under the previous task order that was outside the proposed scope and exceeded the budgeted amount, but was considered necessary for completing the work even though it was not billed to the County. Much of that work conducted will be needed for the preparation of the LFG system design under this task order. Therefore, there are charges totaling approximately \$3,400 that Golder would like to include under this task for work previously performed. Also, there is additional data required to be obtained and compiled for design of a LFG system for this site. This may include as-built information for the existing cells, proposed final grades, proposed base grades, and other information on the construction of the landfill as well as the general landfill layout. A copy of the most recent topographic map will be used to design the initial system (around the site perimeter), along with available fill height data for the active filling area. The fill height data is assumed to be provided by the County. Costs for developing a new topographic map for the site or the active area are not included in this scope of work.

Task 2 – Preparation of Contamination Assessment Plan per Chapter 62-701.510(7)

As discussed with FDEP, the contamination assessment plan per Chapter 62-701.510(7) F.A.C. will be submitted that will include the design of a LFG extraction and collection system. This work will include preparation of a construction level design of the LFG interception and collection system for the entire facility, including the new and old landfills. The construction level design of the system will include preparation of drawings and specifications for the layout and the requirement for components that will make up the system. It should be noted that the drawings and specifications prepared under this task would be very close to being suitable for the construction of the system, the only additional work would be refining the specifications to assure that selected components will all function as a complete system, and adding any site specific specifications (such as site access, use of site facilities, etc.). The system design will be prepared such that the perimeter system can be installed in the near future, and the central wells

will be phased to accommodate the landfill development plan, i.e., they will be installed as the landfill reaches final grades². The main components of the system design will include:

- Layout and details of the active extraction wells;
- Layout and details of the header system interconnecting the wells and the flare station;
- Layout and details of the condensate management system;
- Specification of a skid mounted flare station to accommodate the flows from the initial and final system. The manufacturer will provide detailed drawings of the flare system; and
- Specifications for the various system components for construction.

Calculations necessary for the design of the system are also included under this task. These calculations may include gas generation estimates, well radius of influence calculations, head losses within the header pipe system, condensate generation estimates, and estimates of LFG flow.

The construction drawings for the system (also to be used for permitting) will include, but not be limited to, the following:

- Existing Conditions
- Gas Management System Plan
- Landfill Gas Extraction Well Details
- Header System Details
- Condensate Management System Details
- Flare Station Plan and Details

The contamination assessment plan, which will include the above-described drawings and specifications along with background information and justification for the LFG system design, will be submitted to FDEP for its review and comment. This task includes response to one set of comments from FDEP on this document.

² The design may also be prepared such that the perimeter system only in the area of groundwater detections can be installed in the very near future, the remainder of the perimeter system installed later (but still in the near future), and the central wells phased to accommodate the landfill development plan.

Task 3 - Permit Modification

As discussed previously, the FDEP requires that the design of the LFG extraction and collection system for the site be submitted as a major modification to the site's permit. The work that is additional to the design included under Task 2 is the update of all sections of the permit that are affected by the installation of the system. This includes updating the operations plan, the contingency plan, monitoring plan, final closure requirements, long-term care requirements, etc. This would likely be a separate submittal from the contamination assessment plan under Task 2, although the documents may be submitted to FDEP at about the same time based on the County's need to install at least a portion of the system as soon as possible. Response to one round of comments from FDEP is also included in this task.

SCHEDULE

This cost proposal has been submitted in anticipation of presentation to the Board at its March 13, 2000 meeting. Assuming approval at this meeting, work on Task 1 would be started immediately and is estimated to take approximately two weeks, assuming timely availability of the information from the County. Because the work under this task order is time critical based on the groundwater detections, Tasks 2 and 3 will be conducted somewhat concurrently, but the majority of the work is required under Task 2. Preparation of a draft design document for the County's review will take approximately 6 weeks to complete. Assuming the County's review will take approximately two weeks, a final contamination assessment plan under Chapter 62-701.510 F.A.C. is anticipated to be submitted to FDEP by around May 26, 2000. The permit modification document prepared under Task 003 will require some of the design information prepared under Task 002, but for expediency, work will be conducted such that this document is submitted at approximately the same time as the design. FDEP must submit comments on these documents within 30 days of receipt. As stated previously, one round of comments/responses is anticipated for the submitted documents. Golder will prepare responses to the comments (including County review) within 30 days and then FDEP would have 30 days to issue approval. This schedule would put approval of the design of the LFG system towards the end of July 2000, at which time construction (not included in this task order) could move forward.

COST ESTIMATE

Golder's cost estimate to complete this work is \$51,130 based on the scope of services as outlined above. A detailed breakdown of this cost estimate is presented in Table 1, which is attached to this letter.

Golder proposes to perform this work on a cost reimbursable not-to-exceed basis in accordance with the labor and unit rates listed in Table 1. The County will only be billed actual hours and expenses incurred on the project for work within the agreed scope of work. Direct expenses will be marked-up 10 percent for administrative purposes. Photocopies, computer and AutoCAD time will be billed at the unit rates listed in Table 1. Travel and communications costs will not be billed to Nassau County as stated in our August 1998 proposal. The cost estimate will not be exceeded without prior authorization from the County.

TERMS AND CONDITIONS

This work will be performed under the Agreement for Consulting Services between Golder and the County, dated February 22, 1999.

PRELIMINARY CONSTRUCTION COST ESTIMATES

As discussed previously and as requested by the County, Golder has developed preliminary construction cost estimates for the installation of the LFG system at the site. The unit prices used for the estimates are based on recent construction of a similar system in South Georgia. The attached Tables 2 through 4 provide a summary of preliminary cost estimates for three construction options for the installation, respectively:

- Preliminary Cost Estimate, Construct Entire System (Table 2)
- Preliminary Cost Estimate, Construct Perimeter System Only (Table 3)
- Preliminary Cost Estimate, Construct Initial System Only (Table 4)

For the construction of the entire LFG management system (Table 2), we have assumed that the system will be constructed in three phases. The first phase would include installation of a perimeter system that would be installed this year, and the remaining wells will be phased to accommodate the landfill development plan, i.e., they will be installed as the landfill reaches final grades and as areas are permanently closed. Please note that the estimate for three phases is an assumption at this time, but the schedule for the interior LFG system installation will be determined based on the operations and closure schedule. The cost factors for additional phases are primarily additional costs for contractor mobilization and demobilization and insurance and bond fees required of the contractor(s)³. A total of 50 wells are assumed (about one per acre) with an average cost per well of about \$4,800. The wells will be interconnected by a series of header pipes of varying diameters in order to convey the gas to a central flare location. The system will also include a condensate management system that will convey the condensate collected at the low points in the header lines to the leachate storage tanks for disposal.

A 15 percent contingency has been added to the subtotal to allow for variations in the material quantities and other factors. Engineering for the system construction is estimated at 20 percent, which would include design support and full-time oversight of the system construction. The total preliminary estimated cost for construction of the entire system is about \$1,065,000 (see Table 2).

³ Please note that the estimated remaining life of the landfill is about 8 to 9 years, which means the cost for future phases of construction will likely be incurred two to three years apart.

Table 3 provides a cost estimate for construction of the first phase of the system only, which would include installation of wells around the perimeter of the site where final grades have been achieved or are within a certain criteria. These wells would be interconnected by a header system that would be designed to handle the flow from the additional central wells, once installed, and would include the necessary piping to convey the gas to the proposed final flare location. Using assumptions for contingency and engineering as described above, the estimate for the first phase of the system construction is approximately \$695,000. Table 3 provides a summary of the estimated number of wells and associated lengths of header piping for this estimate. It should be noted that the remainder of the system will still need to be constructed in future phases, as discussed above. However, the costs shown provide an estimate for the upcoming capital layout for the County. The installation of the entire perimeter LFG system will allow the County to begin to alleviate the gas migration detections that have occurred at several locations around the site, not just in the area of groundwater detections.

Table 4 summarizes an estimate for installing only a localized portion of the system near the area of immediate concern (where groundwater impacts have been reported). This estimate assumes that the system would be installed along a 1,000-foot area and would include the necessary piping to convey the gas to the proposed final flare location. The estimated cost for this scenario is about \$290,000. The assumed material quantities are provided in the table. The disadvantage to this alternative is that additional costs will be incurred for additional mobilizations and bond fees for at least one additional phase of construction, to complete the perimeter system. The schedule for that phase may or may not be able to coincide with the first closure area phase because if, after construction of the localized portion of the system, other areas around the landfill where gas migration is occurring may incur groundwater impacts. However, an advantage to this option is it has the least cost to be incurred during the upcoming year.

It should be noted that these estimates are considered preliminary and should be refined once the entire system design is complete and approved by FDEP. As shown, these costs include a contingency for materials and other variables in the construction and the engineering costs are based on a percentage of the estimated construction cost. These costs also do not consider the traditional aspect of procurement of the work, such as preparation of bid documents, review of bids, and negotiation of contract, which could be on the order of \$15,000 to \$30,000. Nor do the costs consider options for procurement, such as having Golder provide total project management for the County including hiring of the contractor(s) and providing assurance that the work is completed as designed, which has the advantage of getting the work completed on a shorter schedule than the traditional approach. These are options to be considered by the Board once the design of the system is underway.

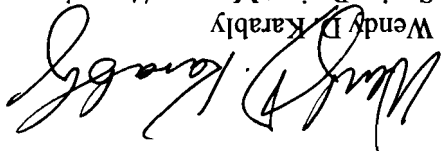
March 8, 2000
P00-3931

Nassau County Board of County Commissioners
Attn: Mr. Walter D. Gossett
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Golder appreciates this opportunity to provide our services to Nassau County. If you have any questions regarding this cost proposal, please do not hesitate to call.

Very truly yours,

GOLDER ASSOCIATES INC.



Wendy D. Karably
Senior Project Manager/Associate

Attachments

cc: Bob McIntyre, Nassau County Solid Waste Director – via facsimile and U.S. Mail
Kevin Brown, Golder Associates Inc. – mail only

FN: G:/COMMON/ADAMS/PROPOSAL/NASSAUCO/Gassys.DOC

TABLE 1

**Cost Estimate
Landfill Gas System Design
and Permit Modification
West Nassau Landfill
Callahan, Nassau County, Florida**

LABOR		LABOR CATEGORY AND RATE										TOTAL HOURS	SUBTOTAL LABOR
		Associate \$110	LFG Specialist \$120	Senior Proj. Mgr. \$105	Senior Engineer \$95	Project Engineer \$75	Staff Engineer I \$60	Senior CAD Designer \$55	Drafting \$45	Technician \$40	Clerical \$40		
TASK	DESCRIPTION												
1	Information/Data Review and Compilation	10	2	4	12	4	30	4	4	0	8	78	\$5,720
2	Preparation of CAP per 62-701.510(7)	20	40	20	60	10	150	120	0	0	20	440	\$31,950
3	Permit Modification	4	12	4	16	8	40	4	0	0	8	96	\$7,360
TOTALS:		34	54	28	88	22	220	128	4	0	36	614	\$45,030

EXPENSES		Field Vehicle (day) \$75	Per Diem (day) \$25	Communications (est.)	Mileage (mile) \$0.33	Shipping/Postage (est.)	Lab Testing (est.)	Office Computer (hr) \$10	AutoCAD Computer (hr) \$20	Photo-copying (each) \$0.15	Drawing Reproduction (est.)	Subcontractors (est.)	SUBTOTAL EXPENSES
TASK	DESCRIPTION												
1	Information/Data Review and Compilation	0	0	\$0	0	\$75	\$0	6	8	300	\$50	\$0	\$390
2	Preparation of CAP per 62-701.510(7)	0	0	\$0	0	\$120	\$0	40	120	1,000	\$750	\$0	\$3,820
3	Permit Modification	0	0	\$0	0	\$100	\$0	16	4	1,000	\$400	\$1,000	\$1,890
TOTALS:		\$0	\$0	\$0	\$0	\$295	\$0	\$620	\$2,640	\$345	\$1,200	\$1,000	\$6,100

COST SUMMARY				
TASK	DESCRIPTION	SUBTOTAL LABOR	SUBTOTAL EXPENSES	TASK TOTAL
1	Information/Data Review and Compilation	\$5,720	\$390	\$6,110
2	Preparation of CAP per 62-701.510(7)	\$31,950	\$3,820	\$35,770
3	Permit Modification	\$7,360	\$1,890	\$9,250
TOTALS		\$45,030	\$6,100	\$51,130

TABLE 2
PRELIMINARY COST ESTIMATE
LFG MANAGEMENT SYSTEM - COMPLETE SYSTEM

Item	Unit	Unit Price	Estimated Quantity	Estimated Cost
Contractor Mob/Demob.	each	\$7,500	3	\$22,500
Insurance / Bonds	each	\$15,000	3	\$45,000
LFG Extraction Wells	each	\$4,800	50	\$240,000
4" Diameter HDPE Pipe	LF	\$9	10,000	\$90,000
8" Diameter HDPE Pipe	LF	\$13	5,000	\$65,000
10" Diameter HDPE Pipe	LF	\$17	5,000	\$85,000
14" Diameter HDPE Pipe	LF	\$22	2,000	\$44,000
Condensate Manholes	each	\$10,000	5	\$50,000
2" Diameter HDPE Forcemain	LF	\$5	6,000	\$30,000
Skid Mounted Flare Station	each	\$100,000	1	\$100,000
<i>SUBTOTAL =</i>				<i>\$771,500</i>
<i>15 % CONTINGENCY =</i>				<i>\$115,725</i>
<i>20% ENGINEERING =</i>				<i>\$177,445</i>
<i>TOTAL PRELIMINARY ESTIMATE =</i>				<i>\$1,064,670</i>

Notes:

1. This cost estimate is for the entire system to encompass the old and new landfills.
2. It is assumed that condensate may be treated as leachate. Storage will be mixed with leachate, therefore, no additional storage tanks will be required.
3. Well costs will vary with depth, \$4,800 is an average cost per well including the well head and connections.
4. The three separate mob/demob costs and insurance/bond costs reflect construction of the system in three phases (assumed). The phases will be conducted two to three years apart, based on operational and closure schedules.

TABLE 3
PRELIMINARY COST ESTIMATE
LFG MANAGEMENT SYSTEM - PERIMETER SYSTEM ONLY

Item	Unit	Unit Price	Estimated Quantity	Estimated Cost
Contractor Mob/Demob.	each	\$7,500	1	\$7,500
Insurance / Bonds	each	\$15,000	1	\$15,000
LFG Extraction Wells	each	\$4,800	30	\$144,000
4" Diameter HDPE Pipe	LF	\$9	5,000	\$45,000
8" Diameter HDPE Pipe	LF	\$13	3,000	\$39,000
10" Diameter HDPE Pipe	LF	\$17	3,000	\$51,000
14" Diameter HDPE Pipe	LF	\$22	1,000	\$22,000
Condensate Manholes	each	\$10,000	5	\$50,000
2" Diameter HDPE Forcemain	LF	\$5	6,000	\$30,000
Skid Mounted Flare Station	each	\$100,000	1	\$100,000
<i>SUBTOTAL =</i>				<i>\$503,500</i>
<i>15 % CONTINGENCY =</i>				<i>\$75,525</i>
<i>20% ENGINEERING =</i>				<i>\$115,805</i>
<i>TOTAL PRELIMINARY ESTIMATE =</i>				<i>\$694,830</i>

Notes:

1. This cost estimate is for a perimeter system around the entire site.
2. It is assumed that condensate may be treated as leachate. Storage will be mixed with leachate, therefore, no additional storage tanks will be required.
3. Well costs will vary with depth, \$4,800 is an average cost per well including the well head and connections.
4. These costs do not include construction of the remaining LFG system at the site.

FN: G:\COMMON\ADAMS\PROPSAL\NASSAUCO\PRECOSTS.XLS (Prelim. Cost - Perimeter System)

**TABLE 4
PRELIMINARY COST ESTIMATE
LFG MANAGEMENT SYSTEM - INITIAL SYSTEM ONLY**

Item	Unit	Unit Price	Estimated Quantity	Estimated Cost
Contractor Mob/Demob.	each	\$7,500	1	\$7,500
Insurance / Bonds	each	\$15,000	1	\$15,000
LFG Extraction Wells	each	\$4,800	10	\$48,000
4" Diameter HDPE Pipe	LF	\$9	200	\$1,800
8" Diameter HDPE Pipe	LF	\$13	500	\$6,500
10" Diameter HDPE Pipe	LF	\$17	0	\$0
14" Diameter HDPE Pipe	LF	\$22	0	\$0
Condensate Manholes	each	\$10,000	2	\$20,000
2" Diameter HDPE Forcemain	LF	\$5	2,000	\$10,000
Skid Mounted Flare Station	each	\$100,000	1	\$100,000
SUBTOTAL =				\$208,800
15 % CONTINGENCY =				\$31,320
20% ENGINEERING =				\$48,024
TOTAL PRELIMINARY ESTIMATE =				\$288,144

Notes:

1. This cost estimate is for a perimeter system near the area of groundwater impacts. The system is assumed to cover a 1,000 ft length along the perimeter.
2. It is assumed that condensate may be treated as leachate. Storage will be mixed with leachate, therefore, no additional storage tanks will be required.
3. Well costs will vary with depth, \$4,800 is an average cost per well including the well head and connections.
4. These costs do not include construction of the remaining LFG system at the site.

7:40:00 After much discussion, it was moved by Commissioner Marshall, seconded by Commissioner Cooper and unanimously carried to approve Golder Associates' cost proposal for Tasks 1 thru 3 in the amount of \$51,130 to design landfill gas interception and collection system and prepare a permit modification for the West Nassau Landfill.