

REQUEST AUTHORIZATION FOR MAYOR AND FINANCE OFFICER TO SIGN PROFESSIONAL SERVICES AGREEMENT OR AMENDMENT

Date: February 21, 2012

Project Name & Number: Landfill Gas Utilization Study

CIP #:

Project Description: To provide professional services for phase 1 of a landfill gas utilization study.

Consultant: SAIC Energy, Environment & Infrastructure, LLC

Original Contract Amount: \$79,250.00	Original Contract Date: February 21, 2012	Original Completion Date:
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Addendum No:

Amendment Description:

Current Contract Amount: _____	Current Completion Date: _____
Change Requested: _____	
New Contract Amount: _____ \$0.00	New Completion Date: _____

Funding Source This Request:

Amount	Dept.	Line Item	Fund	Comments
\$79,250.00	7102	4223	615	
Total				

Agreement Review & Approvals

Project Manager _____ Date _____

Division Manager _____ Date _____

Compliance Specialist _____ Date _____

Department Director _____ Date _____

City Attorney _____ Date _____

ROUTING INSTRUCTIONS

Route **two** originals of the **Agreement** for review and signatures.
 Finance Office - Retain one original
 Project Manager - Retain second original for delivery to Consultant
 cc: Public Works
 Engineering
 Project Manager

FINANCE OFFICE USE ONLY

(Note to Finance: Please write date of Agreement in appropriate space in the Agreement document)

Date	Initials	Approved		
Appropriation			Y	N
Cash Flow			Y	N

PROFESSIONAL SERVICES AGREEMENT

This **PROFESSIONAL SERVICES AGREEMENT** ("Agreement") is dated _____, 2012, by and between **SAIC Energy, Environment & Infrastructure, LLC** ("Consultant"), with offices at 1380 Corporate Center Curve, Suite 305, St. Paul, MN 55121 and **City of Rapid City, South Dakota** ("Client"), with offices at _____.

NOW, THEREFORE in consideration of the promises herein and for other good and valuable consideration, the parties agree as follows:

1. **Scope of Services:** Consultant and Client agree Consultant will perform a Landfill Gas Utilization Study as described in the Scope of Services attached as Exhibit A in accordance with the schedule set forth therein.
2. **Independent Contractor:** Consultant is an independent contractor and is not an employee of Client. Services performed by Consultant under this Agreement are solely for the benefit of Client. Nothing contained in this Agreement creates any duties on the part of Consultant toward any person not a party to this Agreement.
3. **Standard of Care:** Consultant will perform services under this Agreement with the degree of skill and diligence normally practiced by professional engineers or consultants performing the same or similar services. No other warranty or guarantee, expressed or implied, is made with respect to the services furnished under this Agreement and all implied warranties are disclaimed.
4. **Changes/Amendments:** This Agreement and its exhibits constitute the entire agreement between the Parties and together with its exhibits supersede any prior written or oral agreements. This Agreement may not be changed except by written amendment signed by both Parties. The estimate of the level of effort, schedule and payment required to complete the Scope of Services, as Consultant understands it, is reflected herein. Services not expressly set forth in this Agreement or its exhibits are excluded. Consultant shall promptly notify Client if changes to the Scope of Services affect the schedule, level of effort or payment to Consultant and the schedule and payment shall be equitably adjusted. If Consultant is delayed in performing its services due to an event beyond its control, including but not limited to fire, flood, earthquake, explosion, strike, transportation or equipment delays, act of war, or act of God, then the schedule under the Agreement shall be equitably adjusted.
5. **Fee for Services:** The fee for the Phase 1 services under this Agreement will be based on the tasks described in Exhibit A. The fee for the services under this Agreement will not exceed a maximum of \$79,250.00, on the basis of the Scope of Services outlined in this Agreement, without obtaining the prior written authorization of Client. Consultant shall not be required to furnish services or incur expenses above the maximum amount without written authorization and additional funding from Client. Fees associated with the Phase 2

The logo for SAIC, consisting of the letters "SAIC" in a bold, italicized, sans-serif font. The letters are white with a black outline and are set against a dark, textured background.

services as described in the Consultant's November 17, 2011 proposal will be estimated at a later date, based on the outcome and completion of Phase 1 services.

6. **Payment:** Client shall pay Consultant for services furnished under this Agreement upon submission of monthly invoices, an amount equal to actual hours of services furnished multiplied by Consultant's current labor factor (which include an allowance for benefits). Additionally, Client shall reimburse Consultant monthly for reasonable expenses and at cost plus 5% for the services of any Subconsultant.

Client shall pay Consultant in U.S. dollars within thirty (30) days of receipt of invoices less any disputed amounts. If Client disputes any portion of the invoice, the undisputed portion will be paid and Consultant will be notified in writing, within ten (10) days of receipt of the invoice of the exceptions taken. Consultant and Client will attempt to resolve the payment dispute within sixty (60) days or the matter may be submitted to arbitration as provided below. Additional charges for interest shall become due and payable at a rate of one and one-half percent (1-1/2%) per month (or the maximum percentage allowed by law, whichever is lower) on the unpaid, undisputed invoiced amounts. Any interest charges due from Client on past due invoices are outside any amounts otherwise due under this Agreement. If Client fails to pay undisputed invoiced amounts within sixty (60) days after delivery of invoice, Consultant, at its sole discretion, may suspend services hereunder or may initiate collections proceedings, including mandatory binding arbitration, without incurring any liability or waiving any right established hereunder or by law.

7. **Indemnity:** To the extent permitted by law, Consultant agrees to indemnify, defend and hold harmless Client and its directors, officers, shareholders and employees from and against any liability (including without limitation, reasonable costs and attorneys' fees) incurred by Client to the extent caused by Consultant's negligent acts, errors or omissions, including judgments in favor of any third party.

To the extent permitted by law, Client agrees to indemnify, defend and hold harmless Consultant and its directors, officers, shareholders, employees and subconsultants from and against any liability (including, without limitation, reasonable costs and attorney's fees) incurred by Consultant to the extent caused by Client's negligent acts, errors or omissions, including judgments in favor of any third party.

Each party (the "First Party") specifically and expressly waives its immunity under applicable worker's compensation and industrial insurance laws regarding liability against the other party (the "Second Party") for actions brought by any of the First Party's employees against the Second Party, to the extent the liability is caused by the First Party's negligent acts, errors or omissions.

8. **Reperformance of Services:** If Client believes any of the services provided under this Agreement do not comply with the terms of this Agreement, Client shall promptly notify Consultant to permit Consultant an opportunity to investigate. If the services do not meet the applicable standard of care, it will promptly reperform the services at no additional cost

PROFESSIONAL SERVICES AGREEMENT

to Client, including assisting Client in selecting remedial actions. If Client fails to provide Consultant with prompt notice of non-compliance and an opportunity to investigate and reperform its services, Consultant's total obligation to Client will be limited to the costs Consultant would have incurred to reperform the services.

9. Section Intentionally Left Blank.

10. **Insurance:** Consultant shall maintain insurance with the following required coverages and limits and upon request, will provide a Memorandum of Insurance to Client:

Worker's Compensation	Statutory
Employer's Liability	U.S. \$1,000,000
Commercial General Liability	U.S. \$1,000,000 per occurrence
	U.S. \$1,000,000 aggregate
Commercial Auto Liability	U.S. \$1,000,000 combined single limit
Professional Liability	U.S. \$1,000,000 per claim and in the aggregate

11. **Work Products:** Client shall have the unrestricted right to use the documents, analyses and other data prepared by Consultant under this Agreement ('Work Products'); provided, however Client shall not rely on or use the Work Products for any purpose other than the purposes under this Agreement and the Work Products shall not be changed without the prior written approval of Consultant. If Client releases the Work Products to a third party without Consultant's prior written consent, or changes or uses the Work Products other than as intended hereunder, (a) Client does so at its sole risk and discretion, (b) Consultant shall not be liable for any claims or damages resulting from the change or use or connected with the release or any third party's use of the Work Products and (c) Client shall indemnify, defend and hold Consultant harmless from any and all claims or damages related to the release, change or third party use. Consultant agrees all work products prepared under this agreement are strictly confidential and will not be shared with any third party without the prior written approval by the Client.

12. **Limitation of Liability:** No employee of Consultant shall have individual liability to Client. To the extent permitted by law, the total aggregate liability of Consultant, its officers, directors, shareholders, employees and subconsultants for any and all claims arising out of this Agreement, including attorneys' fees, and whether caused by negligence, errors, omissions, strict liability, breach of contract or contribution, or indemnity claims based on third party claims, shall not exceed the revenue received by Consultant under this Agreement or one hundred fifty thousand dollars (U.S. \$150,000.00), whichever is greater.

13. **No Consequential Damages:** In no event and under no circumstances shall Consultant be liable to Client for any principal, interest, loss of anticipated revenues, earnings, profits, increased expense of operation or construction, loss by reason of shutdown or non-operation due to late completion or otherwise or for any other economic, consequential, indirect or special damages.

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14. **Information Provided by Others:** Client shall provide to Consultant in a timely manner any information Consultant indicates is needed to perform the services hereunder. Consultant may rely on the accuracy of information provided by Client and its representatives.
15. **Opinions of Cost:** Consultant does not control the cost of labor, materials, equipment or services furnished by others, nor does it control pricing factors used by others to accommodate inflation, competitive bidding or market conditions. Consultant estimates of operation expenses or construction costs represent its best judgment as an experienced and qualified professional and are not a guarantee of cost. This section does not apply to the cost of Consultant performing the Scope of Services.
16. **Safety and Security:** Consultant has established and maintains programs and procedures for the safety of its employees. Unless specifically included as a service to be provided under this Agreement, Consultant specifically disclaims any authority or responsibility for job site safety and safety of persons other than Consultant's employees. Consultant shall not provide any such services and disclaims any responsibility under this Agreement related to site security or the assessment, evaluation, review, testing, maintenance, operation or safety practices or procedures related to security.
17. Section Intentionally Left Blank.
18. **Termination:** Either party may terminate this Agreement upon thirty (30) days prior written notice to the other party. Client shall pay Consultant for all services rendered to the date of termination plus reasonable expenses for winding down the services. If either party defaults in its obligations hereunder, the non-defaulting party, after giving seven (7) days written notice of its intention to terminate or suspend performance under this Agreement, may, if cure of the default is not commenced and diligently continued, terminate this Agreement or suspend performance under this Agreement.
19. **Dispute Resolution:** Consultant and Client shall attempt to resolve conflicts or disputes under this Agreement in a fair and reasonable manner and agree that if resolution cannot be made to attempt to mediate the conflict by a professional mediator (except for payment disputes which may be submitted directly to arbitration). If mediation does not settle any dispute or action which arises under this Agreement or which relates in any way to this Agreement or the subject matter of this Agreement within ninety (90) days after either requests mediation, the dispute or conflict shall be subject to arbitration in English under the Construction Industry Arbitration Rules as promulgated by the American Arbitration Association and arbitrability shall be subject to the Federal Arbitration Act.
20. Section Intentionally Left Blank.
21. **Litigation Expenses:** Client will be responsible for payment of all expenses and costs associated with Consultant's compliance with a subpoena or Client request to produce documents, data or testimony relating to any proceeding relating to any information pertaining to Client's project or to the work Consultant performed for Client, excluding

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any litigation or proceeding between Client and Consultant. These costs will include hourly charges for persons involved in responding to a subpoena or Client request, travel and reproduction expenses, advice and participation of counsel in responding to a subpoena and other request and other reasonable expenses. Consultant will endeavor to confer with Client prior to responding to any subpoena or request covered by this paragraph.

22. Non Exclusivity of Services: Consultant may perform for other clients similar or identical services to those services contemplated under this Agreement, subject to applicable confidentiality and ethical obligations of Consultant. In the event Client desires any level of exclusivity or other limitations on Consultant's services to its other clients, Client and Consultant shall confer regarding the scope of requested exclusivity or other limitations and the additional compensation to be paid to Consultant for the requested exclusivity or other limitations on providing services to other clients. Any agreed exclusivity or other limitations on providing similar or identical services shall be confirmed in writing signed by both parties and shall expressly state such provision shall supersede this Section 22. No fiduciary or agency obligations shall be created as a result of any exclusivity obligations or other limitations on Consultant's services to other clients.

23. Miscellaneous:

- a. This Agreement is binding upon and will inure to the benefit of Client and Consultant and their respective successors and assigns. Neither party may assign its rights or obligations hereunder without the prior written consent of the other party.
- b. Any notice required or permitted by this Agreement to be given shall be deemed to have been duly given if in writing and delivered personally or five (5) days after mailing by first-class, registered, or certified mail, return receipt requested, postage prepaid and addressed as follows:

PROFESSIONAL SERVICES AGREEMENT

Client: City of Rapid City
Attention: Karl Merbach
Address: 300 Sixth Street
Rapid City, SD 57701

Consultant: SAIC Energy, Environment & Infrastructure, LLC
Attention: Fred Doran
Address: 1380 Corporate Center Curve, Suite 305
St. Paul, MN 55121

With a copy to:

Legal Department (which will not be considered notice)
9400 N. Broadway, Suite 300
Oklahoma City, OK 73114

- c. Client expressly agrees that all provisions of the Agreement, including the clause limiting the liability of Consultant, were mutually negotiated and that but for the inclusion of the limitation of liability clause in the Agreement, Consultant's compensation for services would otherwise be greater and/or Consultant would not have entered into the Agreement.
- d. If any provision of this Agreement is invalid or unenforceable, the remainder of this Agreement shall continue in full force and effect and the provision declared invalid or unenforceable shall continue as to other circumstances.
- e. This Agreement shall be governed by, and construed in accordance with, the laws of the State of South Dakota.
- f. In any action to enforce or interpret this Agreement, the prevailing party shall be entitled to recover, as part of its judgment, reasonable attorneys' fees and costs from the other party.
- g. This Agreement shall not be construed against Consultant only on the basis that Consultant drafted the Agreement.
- h. Notwithstanding any statute to the contrary, the Parties agree that any action to enforce or interpret this Agreement shall be initiated within two (2) years from the time the party knew or should have known of the fact giving rise to its action, and shall not in any case be initiated later than six (6) years after Consultant completes its Scope of Services under this Agreement.
- i. This Agreement may be executed in multiple counterparts, each of which shall be deemed to be an original instrument, but all of which taken together shall constitute one instrument.

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IN WITNESS WHEREOF, the Parties have signed this Agreement the date first written above.

City of Rapid City

Signature _____	Signature _____
Name _____	Name _____
Title _____	Title _____
Date _____	Date _____

SAIC Energy, Environment & Infrastructure, LLC

Signature _____	Signature _____
Name _____	Name _____
Title _____	Title _____
Date _____	Date _____

EXHIBIT A
To Agreement between SAIC and City of Rapid City
Landfill Gas Utilization Study
Scope of Services and Schedule

Scope of Work

To achieve the landfill gas (LFG) utilization goals desired by the City, SAIC has prepared the following Scope of Work. The overall Scope of Work is divided into two phases comprised of consecutive tasks and subtasks as outlined in the November 17, 2011 proposal. This Exhibit A outlines Phase 1 and select tasks under Phase 2; this scope of work may be amended with additional tasks as the project progresses. A description of each task is provided below, along with proposed task meetings and deliverables, as appropriate.

Phase 1 – Landfill Gas Production Modeling (Evaluation Phase)

Task 1.0 – City Kick-off Meeting

The Project Team will meet with City engineering and solid waste staff to confirm the project approach and Scope of Work, clarify the needs of the City, confirm the schedule, and establish lines of communication. At this meeting, the City will furnish supporting information for the project including: hard copy or electronic files for the existing solid waste permit and existing condition plans for the Landfill, gas collection and control system (GCCS) design and construction plans, soil boring records, GCCS and probe monitoring information, historic waste disposal tonnage and characteristics, and current waste placement practices.

SAIC will prepare an agenda and Request for Information (RFI) prior to the meeting. The meeting will occur at the Landfill. Questions that arise from the RFI will be reviewed at the meeting, in addition to plans of the Landfill facilities. A site tour of the Landfill, the Materials Recovery Facility (MRF), and other Landfill facilities will be conducted. SAIC will prepare meeting minutes to document the discussion.

Task 1.1 – Review of Existing Records

After the kick-off meeting, the Project Team will review the information received, and discuss any data questions with Landfill staff, in order to build a LFG generation and collection model that reflects the existing and future conditions. This review will take place at the Landfill following the kick-off meeting during the same trip. Specific records to be evaluated include:

- Subtask 1.1.1 – Solid Waste Permit 08-09 and the corresponding permit application to review the permitted cell limits, final cover design, cell airspace volume, and future expansion limits through Cell 19. SAIC will also discuss with Landfill staff the conceptual plan for cell development to the south on the Johnson property (i.e., conceptual horizontal limits and airspace).



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- Subtask 1.1.2 –Historic tonnage reports for the Landfill to ascertain as much as possible the waste tonnage disposed in each cell per year, and the character of the waste. The character (i.e., percent MSW, C&D, and special waste) has changed over time as recycling increased and operation of the MRF began. Staff input will be requested to define how these characteristics have changed. Also, staff will provide input on how waste tonnage and character may change in the future based on waste generation, planned operation, and any potential changes. This tonnage discussion will be part of the kickoff meeting. As part of this task, a schedule of cell construction and closure will be developed through Cell 19 and also for the Johnson property. This schedule is important since collection efficiency will require knowledge of when cell closure and GCCS installation occurs.
- Subtask 1.1.3 – Landfill gas monitoring records including past non-methane organic compound (NMOC) monitoring reports, quarterly perimeter LFG probe monitoring, and operating data from the existing GCCS. This information will indicate if LFG migration is occurring and if the GCCS operation needs troubleshooting to optimize flow and methane concentration values. This information will be reviewed prior to, and discussed during, the kickoff meeting.
- Subtask 1.1.4 – The GCCS design and construction documents to understand well design relative to waste depth, manifold and lateral slopes, condensate management, and flare operation and maintenance. Any planned GCCS construction as part of future cell construction will also be discussed during the kickoff meeting. This document review will occur during the initial trip subsequent to the kickoff meeting. As part of this subtask and during the initial trip, an SAIC LFG engineer will complete the following to better understand the GCCS operation and gather ideas to troubleshoot the system:
 - Review the City’s calibration and data collection process with Landfill staff;
 - Collect flow, methane, oxygen, and water level information from the collection wells using both our equipment and City equipment. City staff will assist with this information collection.
 - Complete a verification on the flare flow meter to make sure that the flow meter reading is within 5 percent of the actual flow through the pipe. Flow velocities at various diameters within the flowstream would be measured with a manometer and entered into one of our individualized spreadsheets that adjusts readings to standard atmospheric conditions, providing an actual flow reading to compare to the flow meter dedicated to the skid.
- Subtask 1.1.5 – Climate data for the Rapid City area directly influence LFG generation. Higher precipitation and temperatures increase LFG generation. Rapid City is semi-arid so generation will be reduced compared to other areas of the Midwest region. With reduced precipitation, the waste has more pore capacity to benefit from leachate recirculation and therefore boosting LFG generation. Climate data for the region will be obtained from National Oceanic and Atmospheric Administration (NOAA) or other meteorological source.
- Subtask 1.1.6 – Current waste placement and gas collection operation. Soil cover type and volume have a significant impact on LFG collection efficiency. Landfills that remove cover soil between lifts, use sand or more permeable cover material, and/or use spray on alternate daily cover have improved collection efficiency. SAIC will discuss waste placement and soil

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To Agreement between SAIC and City of Rapid City
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cover practices with Landfill staff as part of the kickoff meeting, and observe working face operation during the initial project trip.

- Subtask 1.1.7 – South Dakota Department of Environment and Natural Resources (DENR) laws and administrative rules pertaining to LFG collection and monitoring to determine what design and operation methods are currently allowed and any impacts to the existing Landfill permit.

Task 1.2 – Develop Operational Recommendations to Optimize LFG Production

As discussed in the proposal, there are several design and operation methods to increase LFG volume collected and methane concentration. Based on our understanding of existing Landfill design and operation, methods will be identified based on SAIC experience and literature research.

- Subtask 1.2.1- Operation changes that increase waste moisture content, improve moisture movement within the Landfill, reduce waste particle size, and reduce daily cover soil will increase potential LFG production. Bioreactor technology, water injection, or stormwater infiltration are not feasible based on the administrative rules. Leachate recirculation is allowed but restricted based on the liner design. SAIC has reviewed various solid waste technologies, such as waste shredding before disposal with and without recirculation for other sites in the region. Shredded increases the exposure of moisture and nutrient to the waste particles and resident bacteria, increasing LFG generation relative to straight recirculation and “dry-tomb” landfilling. Limited soil cover usage and removal of soil between waste lifts, increases moisture movement through the waste and improves collection efficiency. The effect of sludge addition is similar to leachate recirculation. Directing additional sludge waste could be an option. These and other changes will be identified in this subtask.
- Subtask 1.2.2 – Gas collection method changes can also improve the volume of LFG collected. SAIC has permitted and implemented such methods as:
 - Installation of pumps within gas extraction wells to remove accumulated water to maximize the open well screen and increase LFG flow rate.
 - Collection of LFG from leachate collection piping at the base of the Landfill. LFG can be collected once the first lift of waste is in place.
 - Installation of horizontal gas collection lateral or Permeable Beds (PBs) as waste is placed in cells, capturing LFG as it is generated.

These and others will be identified in this subtask with guidance on how they can be implemented in future Landfill development.

- Subtask 1.2.3 – Based on the above review, potential design and operational changes for waste placement and gas collection will be presented to City staff in a draft report and meeting at the Landfill. The results of the GCCS troubleshooting completed in Subtask 1.1.4 will also be presented. As necessary, training will be provided to Landfill staff for waste placement and cover, GCCS operation and maintenance, and GCCS monitoring during the meeting and subsequently at the Landfill. SAIC will prepare meeting minutes to document the discussion.

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Scope of Services and Schedule**

As part of this subtask, a meeting with City, SAIC and DENR participants will be held in Pierre to also present proposed modifications to waste placement and gas collection, and to discuss the scope of the LFG utilization plan. Permit and construction requirements that apply to the proposed changes will be identified in the meeting. SAIC will prepare meeting minutes to document the discussion and conclusions.

SAIC will finalize the Operations Recommendation Report based on feedback from the City and DENR. LFG collection impacts resulting from these recommended changes will be assessed in Subtask 1.3.2.

Task 1.3 – Landfill Gas Production Modeling**▪ Subtask 1.3.1 – Site Specific Model for Baseline Conditions**

SAIC will complete a recovery model for the LFG generated within the Landfill under its current operational conditions, presuming they continue as such in the future. Model inputs will be based on the information gathered in Task 1.1 and continued operation of the MRF. Collection efficiency will be based on continued vertical well installation coincident with cell closure, and any planned collection to be installed during future cell construction. Modeling will account for the current waste fill progression from Cell 16, 15, 17, 18, to 19 under the current solid waste permit, with the associated volumes and schedule for GCCS expansion. The unique SAIC model will identify both forecasted LFG generation and collection volume, providing graphical output in flow (cfm) and power (kW and MMBTU/hour) over the operating and post-closure life of the Landfill. The model timeframe will extend through the 30-year post-closure period after closure of Landfill development on the Johnson property.

▪ Subtask 1.3.2 – Site Specific Model for Operational Changes

The model inputs and collection efficiency will be adjusted on a yearly basis based on the recommended waste placement, leachate recirculation, gas collection, and any other recommendations agreed upon from Subtask 1.2.3. Output for each scenario or combination of scenarios will be presented as in Subtask 1.3.1. Three models (or Landfill operation changes) are assumed.

▪ Subtask 1.3.3 – Site Specific Model Accounting for Johnson Property Development

The models completed in Subtasks 1.3.1 and 1.3.2 will be extended to cover development of the Johnson property and the subsequent post-closure period.

▪ Subtask 1.3.4 Model Verification Field Work

In this subtask, SAIC will perform verification pump testing to provide a more distinct LFG generation rate prediction for model calibration. SAIC owns two portable test rigs consisting of a 1-horsepower vacuum blower, with a 3-inch diameter inlet and a 2-inch diameter exhaust hose, a temperature gauge, a vacuum and relief gauge, and dual velocity metering sample ports set on a movable skid. The test rig has been used at several landfills to predict the collectable LFG as part of LFG re-use feasibility studies and to provide migration control. The test rig will be connected to selected sample points (passive gas vents or leachate collection cleanout risers) and monitored for temperature, vacuum, methane and oxygen parameters until steady state conditions are observed (typically after 3 to 4 days). After training by SAIC, this monitoring will be performed by Landfill staff. The data will then be evaluated used by SAIC to verify

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and/or adjust the model parameters so that the model is aligned with the actual results from the verification pump test. Aligning the model LFG current generation rates with current conditions will provide more reliable and precise future LFG generation rates.

To better assess the benefit of horizontal collectors and a vertical well in the segmented waste profile in Cells 12-14, we propose that the portable rig will be connected to:

- GW-35, a shallow well currently installed in Cell 12, and
- A 300 -foot horizontal gas collector (HGC) in Cell 14.

The portable test rig will be connected to GW-35 and the verification testing will begin on this collector during the initial trip after the kickoff meeting. During this initial trip, SAIC will also discuss with Landfill staff the best location for the HGC installation. This HGC installation will then be scheduled as soon as practical. City staff will provide equipment and operators for the installation of the HGC. It is necessary for Landfill staff to place about 15 feet of waste over the HGC, at about a 100-foot width, prior to testing so the timing of waste filling operation will be discussed during the kickoff meeting. SAIC will provide construction documentation of the HGC. Once the verification testing begins, data will then be collected by City staff for a one week period at each location.

Task 1.4 LFG Production Model Sensitivity Analysis

As part of the initial Task 1.1 (i.e., kickoff meeting), SAIC and City staff will identify three critical solid waste program variables that could impact LFG generation and collection. These could include waste tonnage growth, increased diversion to the MRF, and implementation of leachate recirculation. Each variable will have a parameter input range. For example, MSW tonnage growth could range from 0 to 3 percent depending on population or commercial growth projections. Each model output will have a high/low curve range based on these agreed upon sensitivities. The baseline model (Subtask 1.3.1) and up to three models developed in Subtask 1.3.2 for recommended operation changes, will be modified to reflect the LFG generation and collection resulting from these sensitivities.

Task 1.5 LFG Production Modeling Summary Report

Phase 1 will culminate with a draft report that will be submitted to Landfill staff and reviewed on a conference call. The report will provide:

- A discussion of the data that formed the basis of the model.
- A summary of field work that was completed to calibrate the model.
- The model results for baseline, operational changes, and sensitivity scenarios (18 potential model scenarios).
- Output will reflect generation and collection in flow (cfm) and power (kW and MMBTU/hour) through the 30-year post-closure period for development of the Johnson property.

A final report will be prepared based on interaction and feedback from the City and presented to the City in a meeting at the Landfill.

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Scope of Services and Schedule**

In conjunction with the completion of the final report, a meeting will be held with City Council, and possibly the public, to briefly present the results of the LFG modeling effort and to kick off the utilization planning effort. The scope and expected outcomes of the project will be discussed. It is important at this point to lay out for interested parties (i.e., political representatives and general public) what beneficial reuse options are being considered by SAIC and City staff and what other options they may want reviewed. This will minimize requests for deliverable revisions when the final utilization plan is prepared. This meeting will also serve to provide information to invited local energy markets, providing the basis of the City's interest in renewable energy, potential market benefits, and scale of involvement.

Phase 2 – Landfill Gas Utilization Plan**Task 2.1 – Identify Potential Beneficial Users**

In conjunction with the Subtask 1.2.3 visit, SAIC will meet with City staff and American Engineering Testing (AET) to identify potential options within a 5-mile radius for LFG beneficial reuse in the vicinity of the Landfill. We will also meet with the Rapid City Economic Development Center to determine if they are aware of businesses looking for power or gas, or of any potential business interested in locating to an industrial park adjacent to the Landfill to take advantage of LFG. Options to be considered include:

- Subtask 2.1.1 – Internal use at City owned facilities. The electricity and natural gas demand at the MRF may be a match for electric generation with waste heat recovery from exhaust heat exchangers. Excess electricity could be sold to the local utility (Black Hills Power). Direct use of medium-BTU LFG may also be an option for building heat.
- Subtask 2.1.2 - Direct use of medium-BTU LFG by an adjacent existing or future industry. Two potential options have been identified during our development of this proposal: Dakota Panel, a countertop manufacturer located northeast of the Landfill and Deadwood Biofuels, a fuel pellet manufacturer east of the Landfill. SAIC will meet with both industries (in Task 2.2) to determine their interest, the energy demand, the logistics of how LFG would be provided, and what retrofits would be required by the industry. Up to four options will be identified in this subtask.
- Subtask 2.1.3 – Production and sale of high-BTU pipeline quality gas. Typically, because of the significant capital investment for LFG cleaning equipment, these projects are only viable at LFG flows over 1,000 cfm. SAIC will review this option and discuss the potential with Montana-Dakota Utilities (MDU) to identify their interest and requirements. This option will not be investigated beyond this discussion.
- Subtask 2.1.4 – Electric generation for sale to electric utility. Both Black Hills Power and the local cooperative purchasing power from Basin Electric may be interested in purchasing power generated by the City or procured developer, or having an ownership stake. In some instances, the utility has taken an ownership stake in the project. This is more likely when a state has a renewable portfolio standard for the utility. In 2008, South Dakota enacted legislation establishing an objective that 10 percent of all retail electricity sales in the state be obtained from renewable and recycled energy by 2015. Landfill gas is designated as an

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eligible source of renewable energy in the legislation. However, as a voluntary objective (as opposed to a mandatory standard) there are no penalties for retail providers that fail to meet this goal.

- Subtask 2.1.5 – Use as compressed gas in City fleet. Depending on the price of diesel fuel and natural gas, this may be a viable option. The City has a modest fleet of waste collection trucks, street department trucks, and buses. SAIC will meet with City staff to determine energy usage by the City fleet, and assess viability relative to diesel and natural gas prices.

Task 2.2 – Identify and Contact Potential Partners and Beneficial Users

From the list generated in Task 2.1, including possible developers, SAIC will contact these entities to gauge their interest, determine their energy needs and cost, identify any permitting hurdles, and discuss a starting point for gas or electric purchase. The potential of the partner to take an ownership stake in the project or pay for part of the construction and/or operation will be evaluated. Through SAIC's extensive independent engineering work, we have multiple contacts in the investment and energy developer communities to bring to the Project.

Budget for Consulting Services

The budget for the Scope of Work outlined above including all labor and expenses is \$79,250. The total cost represents a "not to exceed" figure, which will not be exceeded without written authorization from the City. The budget includes \$7,200 for material for a 300-foot HGC installation. The City will provide equipment and operators for the installation of the HGC, and labor for data collection during the verification testing (Subtask 1.3.4).

Schedule

The schedule for completion of the above Scope of Work is approximately 14 weeks from the date of Notice to Proceed.