

# Alphard

Montreal, June 28, 2018

URSA Operating Company  
792 Buckhorn Drive Rifle  
Colorado, 81650 USA

Subject: Leak Location Services on Exposed Geomembrane Using the Water Puddle Method  
Professional Services Proposal  
Exposed HDPE geomembrane produced water pit, CO, USA  
File Number: URS-001

Sir,

Groupe Alphard is pleased to present our Professional Services Proposal for a leak location survey on the approx. 300,000 ft<sup>2</sup> (~27,900 m<sup>2</sup>) HDPE geomembrane produced water pit project at Boies Ranch in Colorado, USA.

## OVERVIEW OF THE MANDATE

According to our present understanding of the project, URSA would like Groupe Alphard to perform an electrical location leak survey using the water puddle on both layers of approx. 300,000 ft<sup>2</sup> HDPE installation. About 35% of the area is 3H:1V slopes, and the remaining 65% is floor. The leak location survey would entail the following activities:

### LEAK DETECTION ON EXPOSED GEOMEMBRANE (WATER PUDDLE METHOD)

- Perform a first leak location survey, using the water puddle method, on the 300,000 ft<sup>2</sup> of exposed secondary geomembrane, using the natural subgrade for electrical connexion under the geomembrane (ground);
- Perform a second leak location survey, using the water puddle method, on the 300,000 ft<sup>2</sup> of exposed primary geomembrane, using the GeoConduc conductive geotextile for electrical connexion under the geomembrane;
- Submit a final report for the leak location activities.

### DESCRIPTION OF THE WATER PUDDLE METHOD (LEAK LOCATION ON EXPOSED GEOMEMBRANE)

The water puddle geoelectrical method (ASTM D7002) relies on the intrinsic insulation properties of geomembranes for the detection of small perforations (<1 mm<sup>2</sup>) in the geomembrane generally produced at the time of installation (see the following figure).

**GROUPE ALPHARD**  
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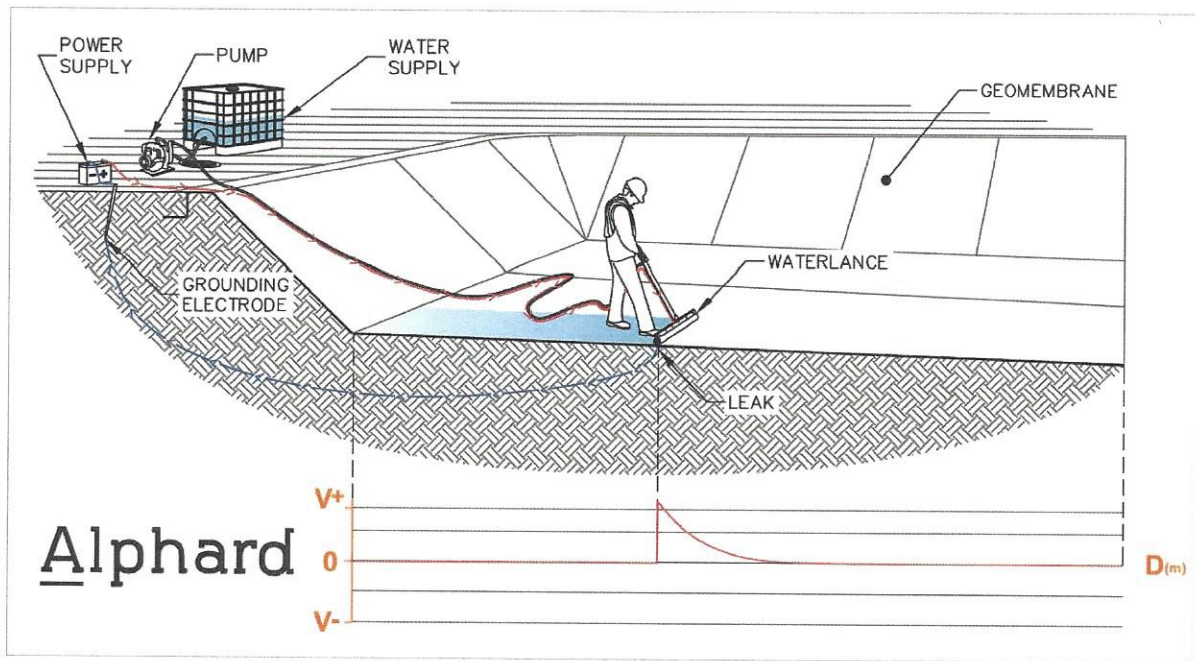
□ 5570, avenue Casgrain  
bur. 101, Montréal (Québec)  
H2T 1X9 CANADA

□ 2103, boul. Édouard  
bur. 100, St-Hubert (Québec)  
J4T 2A2 CANADA

□ 1300, boul. Lebourgneuf  
bur. 200, Québec (Québec)  
G2K 2N1 CANADA

□ 245, rue Riverin  
bur. 112, Saguenay (Québec)  
G7H 7W7 CANADA

A continuous DC voltage is applied into the metallic water puddle structure, and a grounding electrode is placed outside of the limits of the geomembrane. In the presence of a leak, the current will pass from the metallic structure, through the defect, into the subgrade and to the grounding electrode. A visual and auditory signal will be produced, indicating the presence of a leak to the technician. This technique requires only a thin film of water on the surface of the geomembrane, and provides a validation of the entire exposed surface surveyed.



## DOCUMENTATION AND VALIDATION OF THE LEAKS

Upon detection of a leak, Groupe Alphard's qualified technician will note the details of the defect (size, approximate location and probable cause) and photograph it for the final report.

It is strongly recommended that all leaks be repaired as quickly as possible after they have been documented. The technicians controlling the quality of the installation can therefore validate that the repair has been properly performed, and that the leak is sealed. It is recommended that the leak location technician then re-survey over the repair to ensure its imperviousness.

## FINAL REPORT

Once the survey has been completed, Groupe Alphard will produce a final report summarizing the water puddle survey activities performed on the water pond project. The Leak Location Report will detail the surfaces surveyed and the leaks located, and will also include an attestation as to the quality of the work performed. A photographic report and copies of the daily reports will be included in the appendices.

A final report will be sent within a maximum of two (2) weeks after the completion of the leak location activities.

## LEAK LOCATION EXPERIENCE

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Groupe Alphard's professionals have more than 15 years of experience in the field of geoelectrical leak location. Their expertise not only includes performing surveys on exposed and covered geomembranes, but also extends to developing new technologies and standardizing techniques. References are available upon request.

## SERVICES TO BE PROVIDED BY THE CLIENT

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The following list outlines the activities that fall under the responsibility of the Client, in order to ensure the successful execution of the leak detection survey:

1. In order to avoid downtime for the technicians, repairs should be done in a timely manner so that they can be quickly retested;
2. The Client must provide a secure, lockable storage area for the equipment (approximately 2 m<sup>2</sup>), as needed;
3. The Client must ensure that all penetrations and low points of the geomembrane installation are electrically isolated from the outside to avoid false signals.

## CONDITIONS SPECIFIC TO THE WATER PUDDLE METHOD

1. The Client must ensure that the surface of the exposed geomembrane is free of any gravel, debris or puddles;
2. The Client must provide a water supply for the duration of the water puddle survey: a container or pump (approximately 5 m<sup>3</sup> per day, it can be less if it is filled during lunch), as well as the needed length of hose (standard garden hose ending). Hoses must not be electrically conductive (as some neoprene black hoses are).

## SCHEDULE

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URSA will advise Groupe Alphard at least fifteen (15) days prior to the start of the leak location survey to provide sufficient time to mobilise the work-site technician.

According to our understanding of the mandate, and taking into account the particularities of the project, we estimate that the leak location survey will be executed over a 16-day period with a single technician on-site, at an estimated average pace of 3,500 m<sup>2</sup>/day. Although the anticipated number of days for the leak location survey is dependent on climatic conditions, the number of leaks found, as well as the manpower and materials supplied by the contractor, this appears, as a whole, to be a realistic target.

Groupe Alphard could mobilize to the site when required by URSA, currently planned for September 2018, for the first survey. The second one will be done with a separate mobilization, and planning will be done after the first leak location.

The contractor and the geomembrane installer must take into consideration—during the establishment of their schedule and the planning of their activities—that they will have to be on-site until the end of the leak location survey to enable the repair of any damage identified during the leak location survey.

## FEES AND EXPENSES

Groupe Alphard proposes to perform the mandate-as described in the previous sections-for the budgetary amounts indicated in the following table. These estimates are based on our best assessment of the work within the proposed schedule.

Electrical leak location can't be done during constant rain. In case of a complete day lost because of weather hazards (rain, winds, freezing, etc.), the waiting time will be billed at a rate of [REDACTED] to cover their salary, board and room.

**TABLE OF FEES AND EXPENSES (BEFORE TAXES), IN US DOLLARS (US\$)**

	Unit	Price	Qty	Cost (US\$)
Mobilisation/Demobilisation (including travel costs, 2 days of travel)	Each	[REDACTED]		
First Water Puddle Leak Location Survey on exposed secondary geomembrane (~3,500 m <sup>2</sup> /day)*	Day			
Second Water Puddle Leak Location Survey on exposed primary geomembrane (~3,500 m <sup>2</sup> /day)*	Day			
Leak Location Report	Lump sum			
<b>Total (budgetary)</b>				

\*Any downtime due to situations outside of Groupe Alphard's control will be billed at the following rate: [REDACTED] This cost includes board and room, and specialized leak location equipment.

This proposal is valid for 30 days. The project will be initiated upon receipt of a purchase order. Any additions or modifications to the scope of work will be subject to a budgetary review, with the respective work to be performed upon receipt of written approval.

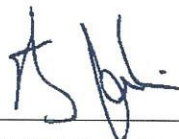
## CONDITIONS OF PAYMENT

Invoices for professional fees and expenses will be sent on a monthly basis (progressive billing, according to actual work performed). Payment is due upon receipt. A monthly interest rate of 1% (12% yearly) will be applied to any unpaid balances after a 30-day period.

We appreciate the confidence you have placed in our company, and look forward to working with you.  
Best regards,



Carl Charpentier  
Leak Location Manager – Shareholder



Thierry Jacquelin, Eng., DESS  
President, Associate



# LEAK LOCATION SERVICES, INC.

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June 26, 2018

Ms. Heather McDaniel  
Souder, Miller & Associates  
8000 West 14<sup>th</sup> Avenue  
Lakewood, CO 80214

Email: Heather.McDaniel@SouderMiller.com

Subject: Proposal for a Geomembrane Leak Location Survey of the Primary Geomembrane  
of the Boies Ranch Produced Water Pit near Rio Blanco County, Colorado  
LLSI Proposal 2902

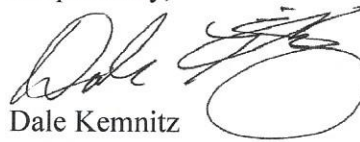
Dear Ms. McDaniel,

Leak Location Services, Inc. (LLSI) is pleased to submit the enclosed proposal for conducting a geomembrane leak location survey for the above mentioned site. LLSI is the most experienced geomembrane leak location firm in the world and the qualifications of our field crews are unmatched.

The technical staff of LLSI have a combined total of more than 104 years of commercial geomembrane leak location experience. LLSI has performed more than 3,500 leak location surveys and surveyed more than 519,550,000 square feet of geomembrane. LLSI has successfully performed leak location surveys worldwide for more than 24 years. LLSI has provided leak location services in 47 states, eight Canadian provinces, and 28 foreign countries.

In the attached proposal, your company is referred to as "Client." To engage our services for the work please reference proposal 2902 in a purchase order or contract. If there are any questions regarding leak location surveys or this proposal, please contact us at (210) 408-1241. We appreciate the opportunity to be of assistance on this important service requirement.

Respectfully,



Dale Kemnitz  
Operations Manager



# LEAK LOCATION SERVICES, INC.

LLSI Proposal 2902  
June 26, 2018

*A Proposal for:*

## **GEOMEMBRANE LEAK LOCATION SURVEY OF THE PRIMARY GEOMEMBRANE OF THE BOIES RANCH PRODUCED WATER PIT NEAR RIO BLANCO COUNTY, COLORADO**

Approved by:



Matthew Kemnitz  
President

**\*\*CONFIDENTIALITY NOTICE\*\***

THIS PROPOSAL CONTAINS INFORMATION THAT IS CONFIDENTIAL OR LEGALLY PRIVILEGED. THIS PROPOSAL AND COST QUOTE ARE PROVIDED WITH THE STIPULATION THAT THIS INFORMATION IS FOR THE EXCLUSIVE USE OF THE ENTITY NAMED ON THE COVER LETTER FOR SUBMITTING A BID FOR THE TITLED PROJECT. THE DISCLOSURE OR DISTRIBUTION OF ANY OF THE INFORMATION TO ANY OTHER PARTY IS PROHIBITED.

### **I. INTRODUCTION**

This proposal offers these services for locating leaks in the primary geomembrane of the above mentioned. The work will be performed according to the relevant parts of the project specifications.

The site has an area of approximately 295,800 square feet and is lined from the bottom up with subgrade, soil fill, gas venting geocomposite layer, conductive geocomposite layer, leak detection geocomposite layer, and 60-mil HDPE textured primary geomembrane. The site has 3H:1V side slopes. This proposal describes the work that will be performed by LLSI and the important site preparations and support to be performed by the Client for a successful leak location survey.

## II. QUALIFICATIONS

The technical staff of LLSI have a combined total of more than 104 years of commercial geomembrane leak location experience. LLSI has performed more than 3,500 leak location surveys and surveyed more than 519,550,000 square feet of geomembrane. LLSI has successfully performed leak location surveys worldwide for more than 24 years. LLSI has provided leak location services in 47 states, eight Canadian provinces, and 28 foreign countries.

In 2017, LLSI completed 134 geomembrane leak location surveys. The area surveyed was more than 23,769,000 square feet (545 acres). In the last three years, LLSI has surveyed approximately 85,503,500 square feet (1,963 acres) of geomembrane. These surveys were performed in accordance with ASTM standards D7002, D7007, D7240, and D7953.

LLSI field personnel have received safety training for OSHA HAZWOPER, OSHA Construction Safety and Health, OSHA 30 Hour Construction Industry Outreach, MSHA work at surface mines, SafeLand USA, confined space entry, first aid, and CPR. In addition, LLSI subscribes to the ISN, PICS, PEC, Browz, and CanQual safety programs.

## III. TECHNIQUE

### A. General

The electrical leak location method detects electrical paths through the geomembrane caused by water or moisture in the leaks. A voltage is connected to one electrode that is placed in the water or soil covering the geomembrane and then to a second electrode connected to the water or soil under the geomembrane or earth ground. Electrical current flowing through the leaks in the geomembrane produces localized anomalous areas of high current density near the leaks. These areas are located by making electrical potential measurement scans in the water or soil covering the geomembrane.

### B. Bare Liner Survey

The water puddle survey method for bare geomembranes is described in ASTM D7002. A squeegee is used to push the water over the geomembrane during the survey. A low voltage electrical supply is connected to earth ground and to the leak detector. When a hole in the geomembrane is encountered, electrical current will flow through water in the leak contacting earth ground. The current is monitored using an electronic detector that converts the increase in the current to an audible tone indication.

LLSI uses a custom designed squeegee sensor with a custom designed electronic detector. The geomembrane area is systematically scanned with overlapping coverage. When a leak is detected, it is located exactly and marked for repair. The locations of leaks will be documented.

To optimize the leak detection process the bare geomembrane should lay flat against the subgrade, or in this case conductive geocomposite layer that acts as the electrical ground path for the leak location survey method. Therefore, the survey is best performed when the geomembrane is cool and not subject to wrinkles. The best time to conduct the survey work is between the hours of 10:00 P.M. and 10:00 A.M. Although, this is dependent on the time of year the survey is conducted as well as the daytime temperatures during the survey.

C. Leak Detection Sensitivity Test

The leak location survey equipment is tested for proper operation and functionality using an artificial leak or an actual hole made in the geomembrane above the operational level. The artificial leak is the end of an 18 AWG insulated wire with the other end of the wire connected to the conducting media under the geomembrane. If an actual test hole is used, it has a diameter of 0.039 inches. Proper equipment operation and functionality are demonstrated if the test hole is detected when the squeegee sensor is passed over the artificial or actual leak. The results of this test are documented.

D. Reporting

The general results of the survey will be reported to a designated representative of the Client during the daily progress of the field work. A list of the locations of the leaks found shall be submitted to the representative after completion of the field work and before the survey personnel leave the site. A report documenting the work and results of the surveys will be prepared and submitted within fourteen days after completion of the field work.

IV. PREPARATIONS AND SUPPORT

The client will be responsible for preparing the site for the survey before arrival of LLSI personnel. These preparations include:

- Provide a source of water for water puddle survey method. A small water truck is ideal. The water supply should provide 5 gallons per minute with a pressure of at least 40 psi. Standard garden hose faucet connections are required at the water source. If a small water truck is used, one laborer may be needed to drive and maintain the water pressure in the vehicle.
- Provide lighting if the leak location survey is conducted at night for the water puddle survey method. One lighting trailer is required.
- Provide the assistance of one supervised laborers to help with handling the water hoses and other assistance. The labor support must be available during the hours that the LLSI crew is working, including working through weekends if needed.

- Remove standing water from the surface of the bare geomembrane. The client is responsible for the removal of excess debris, sand bags, scrap liner, sediment, rope, and/or any other materials in the pond that might interfere with the sensitivity of the survey or create an obstruction.
- Repair any leaks found for retesting if needed.
- This method of the leak location survey cannot be performed when temperatures are below freezing or with ice on the liner.

V. SCHEDULE

Scheduling priority is given to the earliest firm authorization to mobilize. The projected time for performing the proposed leak location survey as shown in the Cost section of this document assumes no standby time. **Work and standby will continue through weekends if necessary.** This proposal is valid for 90 days.

VI. COST

The costs for the survey work, including equipment, mobilization, survey and report with additional cost items if needed are:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>COST</u>
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INITIAL BARE LINER TEST OF PRIMARY GEOMEMBRANE

- A. Mobilization of a one-person field crew from LLSI, expenses\*, up to 16 hours of survey in two days or nights, and report .....

TOTAL ESTIMATED COST\* .....

COMPLIANCE DEEP WATER TESTS OF PRIMARY GEOMEMBRANE  
(separate preparations will apply)

- B. Mobilization of a one-person field crew from LLSI, expenses\*, up to 24 hours of survey in three consecutive days and report .....

TOTAL ESTIMATED COST\* .....

Additional Costs if Requested or Required:

- C. Additional survey or standby time (greater of actual time or 8 hours per day) \*\* .....



Leak Location Services, Inc.

- D. Additional round trip mobilization per technician (extra survey hours may be required as per item C).....

\* Expenses included are: transportation, equipment shipping, local transportation, lodging, meals, and expendable field supplies.

\*\* If standby occurs before proposed survey hours have been depleted then the proposed survey hours are deducted from first. Any additional hours above hours proposed will be charged at the additional survey or standby rate. Applies if more than the proposed time is needed to complete the work because of lack of preparations or support, delays due to weather (lightning within four miles, frozen soil, wind chill below 15 degrees F, wind speed above 25 mph, visibility below 1,000 feet, moderate rainfall or any other weather condition that would present a safety hazard), numerous leaks (more than three leaks per acre) or delays caused by circumstances beyond the control of LLSI. The extra hours of work or standby will be charged at the rate listed in item C. The survey cannot be conducted with more than one inch of snow on the cover material or if any part of the cover material above or below the geomembrane is frozen.

#### VII. INSURANCE

LLSI carries comprehensive general liability, hired non-owned automobile liability and workers compensation insurance coverage with limits appropriate for construction projects of this nature.

#### VIII. PAYMENT

Client shall pay LLSI the amount stated in Section VI of this proposal for the work which may include additional standby or survey costs. All invoices rendered Client by LLSI shall be paid within 30 days from date of invoice. Should LLSI find it necessary to employ an attorney to collect any unpaid invoice amount, Client shall pay all attorney's fees required to collect the unpaid debt.

#### IX. WARRANTY

As with any technology, there are ultimate limits to the technology and practical field procedures. The electrical leak location method can accurately find the smallest electrical paths of practical interest. However, conditions may exist where an electrical path is not established through a leak because of preparations or other conditions not under the control of LLSI. LLSI also has no control over the reliability or completeness of the repairs and has no control over possible future geomembrane failures or damage to the geomembrane. For a small proportion of the total cost of a geomembrane-lined facility, LLSI cannot assume any liability for possible existing and future pollution damages and litigation costs.

Nevertheless, Leak Location Services, Inc. is the most experienced in the world for field applications of the electrical leak location method for geomembranes, and the results of these

applications have been outstanding. To reflect these practical realities, LLSI provides the following warranty:

**LIMITED WARRANTY**

LEAK LOCATION SERVICES, INC. WILL PERFORM THE PROPOSED WORK DESCRIBED HEREIN IN A GOOD AND WORKMANLIKE MANNER WITH THE DEGREE OF HIGH PROFESSIONAL SKILL AND SOUND PRACTICES AND JUDGEMENT THAT IS NORMALLY EXERCISED BY RECOGNIZED PROFESSIONAL FIRMS WITH RESPECT TO SERVICES OF A SIMILAR NATURE.

HOWEVER, BECAUSE THE WORK INVOLVES CONDITIONS THAT ARE NOT UNDER THE CONTROL OF LLSI BEFORE, AFTER, OR DURING THE TESTING, LLSI DOES NOT WARRANT THAT IT WILL DETECT, OR IDENTIFY, OR MARK ALL LEAKS IN THE GEOMEMBRANE.

IN ADDITION, LLSI DOES NOT ASSUME ANY LIABILITY FOR THE DIRECT, FORESEEABLE OR CONSEQUENTIAL LOSS, COST OR DAMAGE RESULTING FROM DEATH, PERSONAL INJURIES, LOSS OR DAMAGE TO PROPERTY, OR IMPAIRMENT, OR ANY DAMAGE TO ANY RIGHT, INCLUDING BUT NOT BY ANY WAY OF LIMITATION, THE RIGHT TO BE PAID FOR THE LOSS OF TIME, LOSS OF SERVICES, FINES, PENALTIES, OR ATTORNEY'S FEES AND OTHER EXPENSES INCURRED, ARISING OUT OF OR AS A CONSEQUENCE OF THE USE OR MISUSE OF ANY SURVEY RESULTS, DATA OR OTHER INFORMATION RESULTING FROM PERFORMING THE PROPOSED SERVICES.

THE PARTIES AGREE THAT ANY DAMAGES, CLAIMS, OR LOSSES INCLUDING ENVIRONMENTAL OR POLLUTION DAMAGES, CLAIMS, OR LOSSES RESULTING FROM THE WORK LLSI PERFORMS UNDER THIS AGREEMENT WILL BE LIMITED TO THE AMOUNT OF COMPENSATION LLSI HAS RECEIVED UNDER THIS CONTRACT.

Accepted and authorized:

\_\_\_\_\_  
Authorized Signature Date

\_\_\_\_\_  
Printed Name Title

\_\_\_\_\_  
Purchase Order Number

☐ Our company does not utilize a purchase order system.  
(Check box and enter N/A above)

