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To Whom It May Concern:

RE: Invitation for Expression of Interest

The Alberta Energy Research Institute ([AERI](http://www.aeri.ab.ca)) invites expressions of interest (EOI) for a new initiative: **“The Demonstration of a Produced Water Treatment Test Facility for thermal in situ bitumen operations”**. Expressions of interest are invited from operating companies, process developers, licensors and other organizations. Responses should be collaborative in nature and demonstrate the integrated team needed to own, build, operate and demonstrate this facility, as well as, provide the business case to continue to run the test facility according to a long-term sustainable, operational strategy.

Your submission should summarize your investment interest and preferred participation model. The EOI (up to 5 pages in length) should focus on a specific project aimed at demonstrating the mobile test facility, through the examination of one or more novel treatment technologies at a specific thermal in situ operation (eg. Steam assisted gravity drainage <SAGD> or cyclic steam stimulation <CSS>).

Note that the deadline for receipt of the EOI is July 31, 2007. By the end of August, 2007, AERI will select those EOI's of greatest interest and work with proponents toward the submission of formal proposals by October 31, 2007.

Should you have any questions with respect to this request, please contact the undersigned.

Sincerely,

L. Richard Nelson
Research Manager, AERI

Part A - Project Summary

1.1 Foreword

The Alberta Government and the Petroleum industry are committed to researching the use of non-potable water sources, as well as, increasing recycle rates by reducing the use of existing freshwater sources in thermal in situ bitumen operations, SAGD or CSS (as outlined in AEUB bulletin 2006-11). In order to improve both the profitability and sustainability of oil sands operations, the Alberta Energy Research Institute (AERI) considers it critical for industry, government, and research organizations to take a collaborative approach to innovation for thermal in situ bitumen processes.

AERI is establishing a program to address the gaps in moving toward advanced produced water treatment technology implementation on a commercial basis.

AERI invites expressions of interest (EOI) for a new initiative: “**The Demonstration of a SAGD Produced Water Treatment Test Facility**”. Interested parties should submit proposals summarizing their investment interest and preferred participation model. The EOI should focus on a specific project aimed at demonstrating the test facility, through the examination of one or more novel treatment technologies.

The EOI must include:

- A funding partnership that involves:
 - An owner/operator of the facilities
 - Technology vendor(s) who will be involved in the initial demonstration project, and
 - An in situ bitumen recovery operating company (such as SAGD or CSS) that is willing to host the facility demonstration project and offer funding support.
- A facility demonstration project description including a brief description of the proposed ownership and operating business plan that justifies sustainability of the business beyond the life of this initial feasibility demonstration project.

In principle, AERI will provide 33% of total costs up to a MAXIMUM of \$1million toward the demonstration project, pending AERI board approval.

2 Part B - Guidelines for Submission of Expressions of Interest

Expressions of interest are invited from operating companies, process developers and licensors and other organizations wishing to participate in the development of a SAGD Produced Water Test Facility. The program could be of particular interest to companies planning future expansions and wishing to be early adopters of new technologies.

The following steps and timelines are envisioned:

1. Expressions of Interest: **Deadline July 31, 2007.**
2. Review of expressions of interest and follow up discussions with prospective applicants: **August 31, 2007.**
3. Submission of formal proposals: **October 31, 2007.**

2.1 Guidelines for Submission of Expressions of Interest

Length: Submissions are generally not expected to exceed *five (5) pages in length*. More details can be provided as appendices if required.

Format: Submissions are to be made electronically as a word document or PDF format. AERI will maintain the confidentiality of the material submitted. The following **headings and topics** listed below are presented as a general guideline for the preparation of the project description and represent some of the criteria that will be used to evaluate the submissions.

Title of the proposed project:

Name, Address and Affiliation of the Principle Applicant(s):

Names: Project Key Contact

Description of Interest:

Model: What is the participation model and criteria by which you would describe your preferred involvement?

Specific Requirements: What specific information do you require to quantify your participation level, if Joint Industry Project (JIP) model is chosen?

Potential Strategic and Economic Benefits: What are the key strategic and economic benefits you would like to derive from participation in this facility?

Partners: What restrictions, if any, are there to the participation of other private or public sector organizations?

Test Site: What SAGD operator(s) are willing to support the proposed demonstration through use of their facilities?

Project Schedule: Proposed key project milestones.

Please submit your expression of interest to:

Alice Hedges

Alberta Energy Research Institute

Suite 2540 801 6th Avenue SW

Calgary, AB T2P 3W2

Phone: (403) 297-8650

E-mail: alice.hedges@gov.ab.ca

AERI advises the Alberta Minister of Advanced Education and Technology and the Alberta government on energy research policy and supports applied research that will lead to technology implementation to secure the future sustainability of Alberta's energy industry. For more information on AERI see: www.aeri.ab.ca

Appendix A

Background

A [feasibility study](#) was sponsored by the Petroleum Technology Alliance Canada (PTAC) Water Innovation Planning Committee (WIPC), together with the Alberta Energy Research Institute (AERI). The study goals were to establish the need for a SAGD produced water treatment test facility, to determine who would need such a facility, what will be done at the facility, where the facility should be located, how the facility will be utilized, and who should own and operate the facility? The study was carried out by Hatch Ltd., with FRC Consulting, and included the following steps:

- Develop list of facility stakeholders
- Prepare and issue a survey
- Analyze the feedback
- Brainstorm, with the PTAC Steering Committee, the facility design and technologies for testing
- Develop Expression of Interest (EOI).

Four (4) stakeholder categories were identified for the facility:

- SAGD operators
- Water treatment equipment suppliers
- Engineering firms
- Government regulatory agencies and academic institutions.

The survey questions were organized in the following categories:

- Establishing the need for the facility
- Purpose of the facility
- Facility location and type
- Operational approach
- Utilization and functionality.

A survey was sent to representatives of each stakeholder category. Once the need and interest for such a facility had been established, the survey results were analyzed and formed the basis for the facility concept and EOI.

Test Facility Goals

The following facility goals were defined by the industry stakeholders:

- Reduce fresh water use; investigate use of saline sources.
- Increased recycle.
- Reduce overall operating costs.
- Reduce system energy requirements.

Key Facility Design Criteria

The stakeholders identified the following key issues critical to the success of the facility:

- Cost of the facility to users
- Flexibility to treat a variety of water sources to a variety of boiler feed water quality
- Applicability of test results
- Confidentiality of test results
- Scalability of flow sheets from pilot stage to full-scale.

Key Facility Requirements

The stakeholder feedback indicated the following requirements for the facility:

- The facility **must** be mobile in order to test site-specific water quality.
- The facility **must** cost-effectively have the ability to incorporate multiple process trains.
- The facility **must** offer the flexibility to achieve water quality objectives, e.g. for feed to once-thru-steam-generators, drum boilers
- The facility **must** treat a variety of raw water sources, e.g. saline, non-saline
- The facility **must** have the ability to treat make-up water, produced water, recycle water, and waste water.

Testing Goals

The stakeholders prioritized their testing goals for this facility as follows:

4. Optimization of existing technologies and flow sheets.
5. Innovation and adoption of technologies in common use in other industries.
6. Testing of emerging technologies.

Types of Technologies for Testing

There are five categories of technology that have been identified for testing:

- De-Oiling
- Soluble Organics
- Softening
- Silica Removal
- Waste Water Disposal.

The attached diagrams in Appendix A represent the technologies that may be considered around each water treatment objective. The technologies are then organized per the testing goals above, and are represented on the summary diagram, by priority (please see Appendix B).

Functional Description of Facilities

- It is expected that the test facilities will consist of **mobile** pilot units and laboratory facilities to be located at existing operating sites with supporting core infrastructure, personnel and services. Equipment and assets acquired for the facility will be owned by the private sector participant(s). The facility should provide the means of connecting OEM-supplied pilot units for specific technology testing. This could be via quick-connect hoses with external connections available on each pilot unit.
- The core mobile units should be designed for maximum flexibility to test a variety of vendor-supplied technologies on a variety of water sources, e.g. make-up water, recycle water and produced water. Therefore, the infrastructure and equipment to support external connections to multiple pilot units should be considered for feedwater, wastewater, and treated water.
- The mobile units should be designed to meet with most SAGD site standards to permit on-site testing. For example, this may include **class I div I**.
- The core mobile units should be capable of providing the data-collection and instrumentation necessary to test equipment for the variety of SAGD water treatment requirements, e.g. de-oiling, softening, silica removal, wastewater treatment. It is envisioned that some instrumentation and data collection will be on-line, such as conductivity, silica, flows, and pressures, while other parameters for which in-line analyzers are not available, be provided as either hand-held units or bench top.
- The design and scale of the core facilities will depend upon the level of participant interest and funding. The facility may be developed in phases, according to the priority of the needs of the stakeholders. The next phase of this project will better define the physical scope of the facilities based on the level of stakeholder participation.
- It is envisioned that some permanent equipment will be supplied within the mobile test units. For example, it may be cost-effective in the de-oiling module to provide pressure vessels which allow for the testing of a variety of media and cartridge filters, rather than lease them each time from vendors. In addition, for the softening module, it is envisioned that permanent pressure vessels be available for testing various resins. Water tanks and pumps should be part of the permanent infrastructure on the modules in order to collect and distribute the feed for testing, as well as collect the waste for disposal. It may be cost-effective and convenient to provide chemical feeders as part of the infrastructure to provide the means of feeding chemicals for the various treatment units. For softening and silica removal, it may also be appropriate to provide membrane pressure vessels and a high pressure pump to permit the testing of various membranes.
- Portable enclosures may be required as part of the core mobile facilities in order to contain the vendor-supplied pilot units. Many pilot units available from vendors are too large to house in a standard trailer but require protection from the elements. Therefore, portable enclosures would provide flexibility with respect to the ability to test a variety of technologies. Some vendor-supplied pilot units are available trailer-mounted, and therefore, would simply require connection to the test module.
- Owner(s) should make allowances for special tools and equipment spares for field maintenance.
- Please refer to Appendix C for example sketches of mobile facility modules.

- Appendix C, Figure 1 is an example representation of the mobile lab facility. The module is 8 feet wide, 9 feet high, and 40 feet long, and is trailer-mounted for mobility. The facility has HVAC for heating, cooling and fume exhaust. One compartment of the module could contain compressed air for instrument and valve actuation, gas bottles such as nitrogen and propane for pilot units, a dedicated HVAC unit, a motor control centre and a control panel for operating the pilot units. The main compartment could serve as the sample preparation and testing area. It could contain chemical feeders, bench top test units, sample analyzers, and preparation areas. The final compartment could be for desk space, computer(s), and storage. The module would include external connections to power, potable water, and wastewater.
- Appendix C, Figure 2 is an example representation of the de-oiling module. This representation is 8 feet wide, 9 feet high and 40 feet long. It could house the portable building required to house externally-connected vendor-supplied pilot units, as well as spare parts storage. It would require a control panel for pilot unit operation. In addition to chemical feeders for the technology testing, it would contain feed and product tanks, as well as portable tanks to be utilized with externally-connected pilot units. It may also include pressure vessels available for various media testing.
- Please refer to Appendix D for typical costs for the example modules.
- OEM-supplied treatment technologies would likely be mobile (skid mounted) pilot units of sufficient size to provide commercial scale up confidence in the test results. As stated above, the infrastructure and equipment of the test facility trailers would provide the connections for the testing of these OEM-supplied test units.

Preliminary Utility Requirements

Each location wishing to utilize the pilot test facilities is expected to provide the necessary utilities and infrastructure to support the facilities' operation, which include, but are not limited to, the following:

- Power supply, e.g. 525/3/60
- Water supply for sample testing, equipment cooling, instrument flush and chemical and sample preparation.
- Steam for testing of evaporators.

Confidentiality

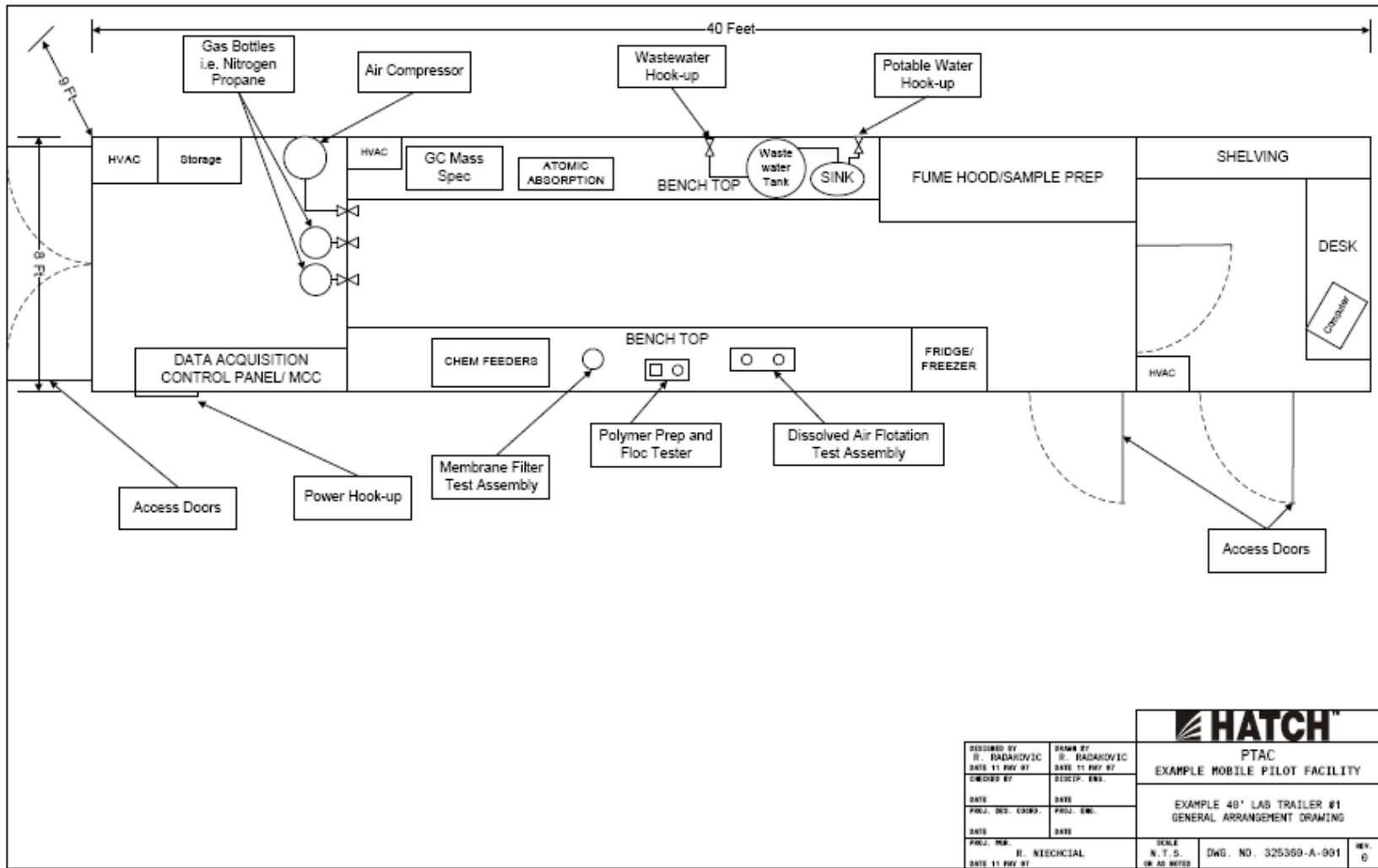
AERI agrees that all intellectual property and privileged project information associated with the testing carried out at the facility are to be kept confidential according to the terms of individual contract agreements.

Usage Payment Model

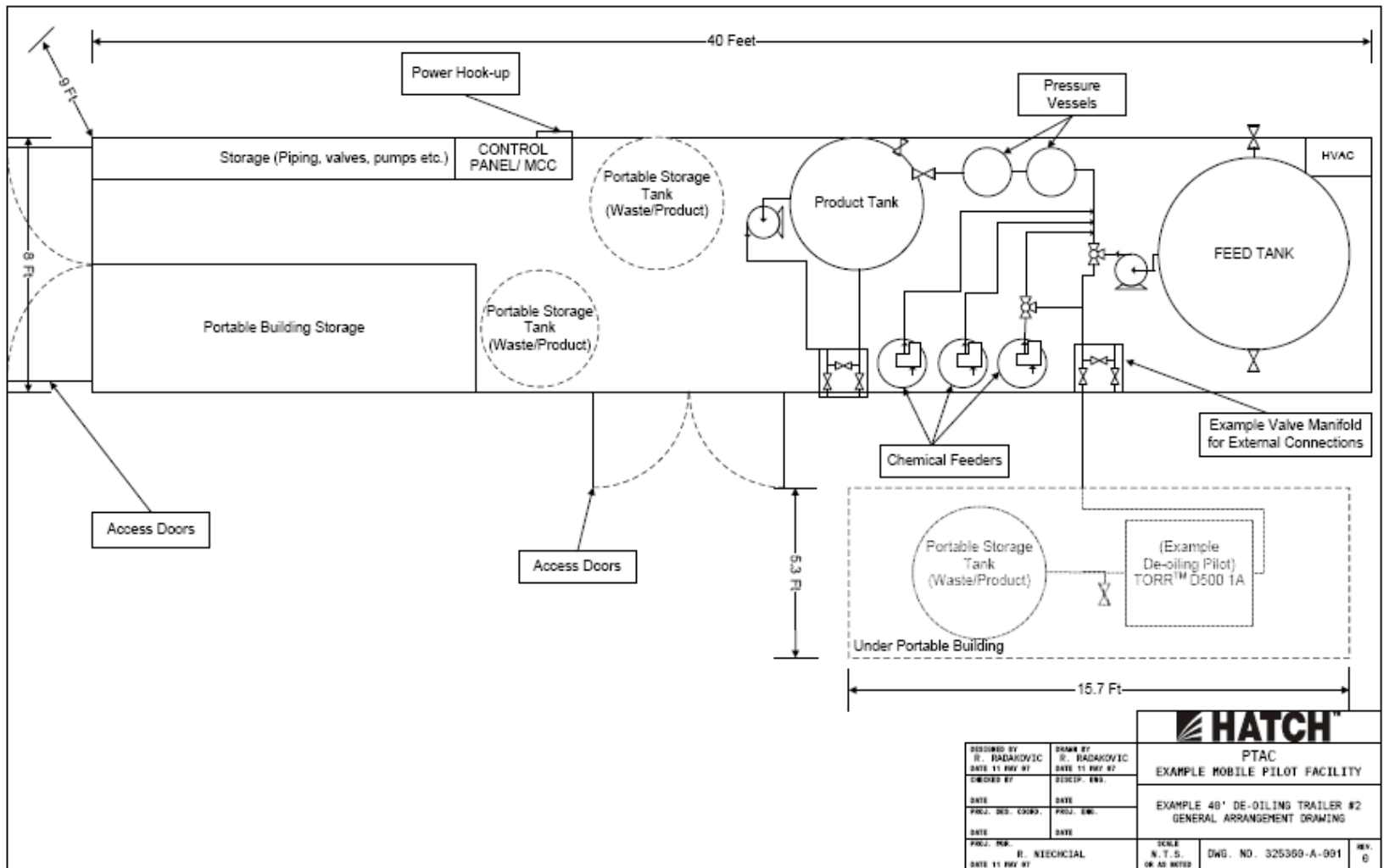
The stakeholder feedback suggested that use of the facility should be funded on a fee for service or modified pay per use basis. This could mean that multiple users with a common interest fund a series of tests, or that individual organizations pay per each use.

Appendix B

Example Mobile Test Facilities Sketches



HATCH PTAC EXAMPLE MOBILE PILOT FACILITY		DESIGNED BY R. BADAROVIC DATE 11 MAY 97	DRAWN BY R. BADAROVIC DATE 11 MAY 97
		CHECKED BY DATE	SUPERV. ENG. DATE
PROJECT NO. / NO. OF SHEETS DATE 11 MAY 97		PROJECT NO. / NO. OF SHEETS DATE	
PROJECT NO. / NO. OF SHEETS DATE 11 MAY 97		SCALE N. T. S. OR AS NOTED	DWG. NO. 325360-A-001 REV. 0



DESIGNED BY R. BADA KOVIC DATE 11 MAY 97		DRAWN BY S. BADA KOVIC DATE 11 MAY 97			
CHECKED BY DATE		DESIGN. ENG. DATE		EXAMPLE 40' DE-OILING TRAILER #2 GENERAL ARRANGEMENT DRAWING	
PROJ. DES. CHRG. DATE		PROJ. ENG. DATE			
PROJ. MGR. R. NIECHCJAL DATE 11 MAY 97		SCALE N.T.S. OR AS NOTED		DWG. NO. 325369-A-001 REV. 0	