Schedule A

RFP Proposal

The PTAC CO_2 Enhanced Hydrocarbon Recovery (EHR) Steering Committee proposes to design and cost estimate a CO_2 collection system to aggregate CO_2 in the Fort Saskatchewan area of Alberta. The steering committee believes that sufficient CO_2 exists or will exist in the Fort Saskatchewan area to support commercial scale enhanced oil recovery (EOR) of conventional oil in Alberta (for example, potential fields at Redwater, Pembina and Swan Hills). Large CO_2 supplies currently exist at refineries and upgraders and several new facilities are proposed for the Fort Saskatchewan area.

The objective of the study is to quantify the capital and operating cost involved to aggregate CO_2 for EOR. At minimum, it is desired to have a project scope developed with an approximate +/-40% capital and operating cost estimate undertaken. The study will evaluate at least three representative CO_2 sources in order to understand what is required to aggregate different quality types of CO_2.

Three companies have agreed to provide CO_2 quantity and quality information in support of this study. High purity CO_2 is anticipated from Synenco's gasifier process as a result of hydrogen production. Shell and Petro-Canada facilities represent potential steam-methane-reforming hydrogen production, which generally create medium purity CO_2 gas streams. The intent of this study is to clarify what is required to process and aggregate these difference CO_2 streams to a high pressure appropriate for pipeline transport to EHR reservoirs.

The basic elements of the proposed design and cost estimate study are as follows:

1. Collection of CO_2 at the available quality and pressure at emissions sites. Determine alternatives of process and design to aggregate to a common pipeline system. Process design may include purification, dehydration and compression requirements.
2. Design a pipeline system to collect CO_2 from each source. Study the merits of a common compression site (location to be determined) to achieve ~2700 psig system pressure required for pipeline transport to EHR reservoirs.
3. The study is to estimate the capital and operating cost for the collection for each CO_2 supply. Identify processes necessary to achieve 95% CO_2 purity. Identify type and quantity of non- CO_2 impurities
4. The study scope will only include the required pipeline infrastructure to aggregate CO_2 to a common location. The study does not include pipelines to EHR fields at this time.
5. Key results and conclusions of the study will be available to the public upon completion.
6. Appropriate documentation must be maintained in the event the study is enhanced or expanded in the future. (confidential status of detailed information to be defined by the contractor and project funders)

The technology opportunity of this study is new and incremental to existing technology (choice "B") for the specific purpose of CO_2 capture and transportation. The opportunity for enhanced hydrocarbon recovery using CO_2 exists in Alberta; however, there are no currently available commercial volumes of CO_2. This study will specifically address the design concept of aggregating multiple CO_2 sources into a common pipeline system. The merits and economy of scale advantages of central processing and central compression will be addressed.

Studying these opportunities will further the science of CO_2 sequestration for benefit of EOR companies and emitters in terms of creating real infrastructure for EOR and future CO_2 disposal.

If an efficient CO_2 transportation system can be built to initially supply CO_2 for EOR, it could also be used for future disposal of CO_2 into deep aquifers for example. The general public may also benefit by addressing overall climate change issues if CO_2 can be sequestered.

This study is also unique as it proposes to aggregate different high to medium purity types of large volume CO_2 streams. It will be the first study to evaluate capture CO_2 from different industrial sources and evaluate common or shared compression and processing facilities. The results of the study could initiate discussion as to how such a system can be managed, for example, by using a common operations and open access management concepts.

Enhanced oil recovery operations will benefit from a combined, multi source CO_2 collection system. If one CO_2 source plant is shut-down, other plants will still be able to produce and supply CO_2. The collection system can also be expanded to included new sources of CO_2 and from differently locations. The study will define a base case example of commercial scale CO_2 collection.

Project Team

This study is organized and led by PTAC.

SNC Lavalin has created a project team and proposal to perform the study.

This section provides a brief outline of the responsibilities of the personnel proposed by SNC-Lavalin. Section 6.0 below provides information on the experience of each individual.

Project Sponsor and Team Participant: *Brian Fraser, P. Eng.*

Brian will organize the team, coordinate the different discipline input and edit the final report. He will also supervise and participate in contacts with the existing and potential producers.

CO_2 Specialist: *Doug Macdonald, P. Eng.*

Doug will provide leadership and direction to the process function based on his extensive background in CO_2 capture and transportation projects. Doug will accompany Brian on the visits to the facilities.

Pipeline Lead: *Janusz Stuchly, P. Eng.*

Janusz will evaluate pipeline configurations for gathering, and sales pipeline systems, manage pipeline hydraulic calculations and conceptual level optimization. Janusz will also manage the pipeline cost estimating and write the pipeline section of the report.

Process Mechanical: Lead *Sorin Andrei*

Sorin will carry out conceptual design of the rotating equipment and other equipment that may be needed at the existing and potential producer sites as well as the central terminal and compressor facilities.

Technical Specialist: *Paul Cripps, P.Eng*

Paul will be a resource on design and materials issues relating to pipeline operations.

Compression Advisor: *Honory J. Beaujot, P.Eng*

Honory will assist in pipeline compression configuration and pipeline cost estimating

Pipeline Advisor: *Alex Huddleston*

Alex will be an available technical resource to assist in pipeline rights-of-way, sizing and hydraulics decisions as the project develops.

Cost Estimating: Mario Alexandre

Mario and his staff will provide review and confirmation of factored cost estimates prepared by the team.

The PTAC CO_2 Enhanced Hydrocarbon Recovery (EHR) Steering Committee has formed a smaller technical committee to monitor and manage this project. Some members of this team include:

Todd Cole, P. Eng. – ARC Resources Ltd.
Dave Peet, P. Eng. – Devon Canada
Gordon Wichert, M.Sc., P. Eng. – Penn West Energy Trust
Kelly Edwards, P. Eng. – Kereco Energy
Isabelle Filion, P. Eng., M.Sc. – Air Liquide
Jim McKay – Praxair Canada Inc.
Garth Ayres – Inter Pipeline Fund
Matthew Bower – EPCOR

PTAC's CO_2 committee funding this study represent companies with EOR potential reservoirs in Pembina, Swan Hills and other areas of Alberta. Also represented are liquid CO_2 suppliers and pipeline operators.

Project Work Plan, Budget, Results and Deliverables

The scope and work plan developed by the PTAC committee is summarized in the "request for proposals" document

PTAC requested bid proposals for this project and has selected SNC Lavalin (SNC) as the project contractor

The project can begin in May, pending AERI funding approvals, and is expected to be complete by September 2007.

The work plan can be summarized into three main stages.

1 Data gathering, site visits. Understand CO_2 streams to be studied and site specific issues.

2 Evaluate capture and purification technologies and the merits of central and common facilities.
3. Design and cost estimates.

Conclusions and decisions will be discussed after each stage with the PTAC working group

SNC has prepared the following detailed work plan.

SCOPE OF SERVICES – LUMP SUM CONTRACT

1. Capital and operating cost estimate in the +/-40% range
2. Goal is to develop information to produce a 95% pure CO_2 product at about 2,700 psig system
3. Work with PTAC to establish appropriate contacts with the potential CO_2 producers for obtaining the necessary information and determining the need, if any, for confidentiality of information provided.
4. Brief kick-off meeting with PTAC representatives to confirm mutual understanding of the Services
5. SNC-Lavalin will carry out interviews with Shell, Synenco and Petro-canada (Fort Hills)
6. Gather and evaluate the raw CO_2 production quantity and quality data. This will be done mainly by electronic communication, plus we would recommend a visit to each producer for a discussion on potential supplies. Our scope includes (1) discussions with Synenco and Petro-Canada design team in their Calgary offices, and (2) one trip of 2 SNC-Lavalin staff to for 1-2 days including travel time to Fort Saskatchewan to visit Shell Scotford and Petro-Canada Edmonton Refinery.
7. An assessment of the production capacity, composition, delivery conditions and variability for each of the four potential CO_2 sources provided by Synenco, Shell and Petro-Canada.
8. Develop preliminary gathering pipeline routings based on existing pipeline corridors
9. Develop a conceptual design for gathering facilities (pipelines and processing) outlining pipeline pressures, compression and dehydration locations within the system.
10. Carry forward only one case. A CO_2 gathering pipeline design and routing that on a preliminary rough optimization ties in each of the four potential CO_2 sources to a central processing and compression facility at a location to be determined
11. Preliminary equipment list(s), PFDs and plot plan(s) of required conditioning and/or compression facilities at each of the four identified potential CO_2 sources. Equipment lists will cover only major equipment items. PFD's will cover main process streams in the detail necessary to do a Class V cost estimate.
12. Develop a conceptual design for the potential central terminal facility at a site that appears from our studies to be optimal to the overall scheme, but without reference to landowners, local authorities or government/regulatory bodies.
13. Preliminary equipment list, PFD and plot plan of processing and compression facilities at the potential central compression terminal. Equipment lists will cover only major equipment items. PFD's will cover main process streams in the detail necessary to do a Class V cost estimate.
14. Expand the conceptual design data to the level necessary to prepare Class 5 capital cost estimates and a preliminary operating cost estimate.

15. Class 5 (capacity factored) capital cost estimates for facilities at each of the four potential CO_2 sources.
16. Class 5 (capacity factored) capital cost estimates for facilities at the proposed central terminal.
17. Class 5 (capacity factored) capital cost estimates for each leg of the primary CO_2 gathering pipeline system.
18. Operating cost estimates for major facilities, including operations personnel, maintenance and fuel consumption.
19. One hard copy report and CD for internal PTAC purposes including its members. PFDs, drawings and plot plans will be simple diagrammatic, schematic or block diagrams to convey the sense of the conceptual design, rather than engineered drawings. It will be organized according to the list of deliverables and will be structured
    - ❑ Summary;
    - ❑ Summary (for public disclosure);
    - ❑ Introduction/Objectives;
    - ❑ Scope and Methodology;
    - ❑ Discussion of Major Facility Components;
    - ❑ Conclusions;
    - ❑ Appendices
20. Included in the report a section that would cover the information subject to public disclosure and whose content would be developed in consultation with PTAC.
21. During the three month project, SNC-Lavalin will hold two half-day progress meetings with the managing person or committee, both in Calgary
22. SNC-Lavalin has allowed minimal time for answering questions, but has assumed that one all-day technical meeting to present results will be required in Calgary.
23. SNC Lavalin will submit a draft report to PTAC by the end of July. PTAC will provide comments to SNC-Lavalin within 1 week. The final report will be submitted by the end of August or earlier.

EXCLUSIONS

1. SNC-LAVALIN is not including a location study in this scope of work and if PTAC does not provide a specific location, then SNC-LAVALIN will base the work performed hereunder on an assumed location in the Fort Saskatchewan Sturgeon County axis.

2. SNC-Lavalin will use its in-house knowledge of environmental conditions and regulations in Alberta, but will not formally assess environmental impacts of the proposed facilities.

3. Travel time as well as expenses of visits to locations other than those indicated in Article 6.0 of Scope of Services.

4. Manhours after four months or for any changes to the Scope of Services agreed to during the term.

5. A detailed evaluation of local utilities is excluded from the scope of work. SNC-Lavalin will check availability of local surplus utilities with each CO_2 provider, but in the event insufficient existing services are available, cost allowances will be used to cover supply of utilities.

ASSUMPTIONS

1. Existing pipeline corridors have space for proposed pipelines.
2. Natural gas available at all facility boundaries.
3. Electric power available at all facility boundaries
4. Raw or processed water available at all facility boundaries

LIMITATIONS

SNC-Lavalin will be doing conceptual design and Class 5 cost estimating. The results of the Study are intended for project evaluation purposes and determining future actions and decisions to carry out more detailed engineering. Extensive further work would be required to reach a level of confidence commensurate with project sanction or actual construction. As with any conceptual engineering work, the results need to be used judiciously and with an understanding of their limitations.

Payment Terms

- 30% mobilization payment upon signing of the contract
- 30% ~~July 30~~ August 30 S.A.
- 30% upon submission of draft report
- 10% upon submission of final report.

Payments due within 1 week of invoice.