

Enhance Energy Inc. and North West Redwater Partnership

KNOWLEDGE
SHARING
REPORT

DIVISION A:
SUMMARY REPORT
Calendar Year 2012

Submitted on:
March 28, 2013



Sun Ray Reflection, by Mathew Wong, a local Alberta painter



ACTL

**Government
of Alberta** ■



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Certification Letters



Certification on behalf of Enhance Energy Inc.

CERTIFIED on behalf of the Enhance Energy Inc., named in the "CCS Funding Agreement – The Alberta Carbon Trunk Line Project", to be true, accurate and complete, to the best of my knowledge, based on reasonable inquiry and due diligence, as of the date of this certification.

This Certification applies to the information supplied by Enhance Energy Inc. only and does not imply certification of information supplied by other Recipients.

A handwritten signature in blue ink, appearing to read "Susan Cole", is written over a horizontal line.

Per: Enhance Energy Inc.

Susan Cole
President
Enhance Energy Inc.

A handwritten date "May 15/12" in blue ink is written over a horizontal line.

Date



Certification on behalf of North West Redwater Partnership

CERTIFIED on behalf of the North West Redwater Partnership, named in the "CCS Funding Agreement – The Alberta Carbon Trunk Line Project", to be true, accurate and complete, to the best of my knowledge, based on reasonable inquiry and due diligence, as of the date of this certification.

The Certification applies to the information supplied by North West Redwater Partnership only and does not imply certification of information supplied by other Recipients.

Per: 
Larry Vador
Senior Vice President
Operations & Development

Date: May 15/2012

Part A – Executive Summary

Enhance Energy Inc. (“Enhance”) and North West Redwater Partnership (“NWR” or “NWRP”) are developing a fully integrated Carbon Capture and Storage (“CCS”) project, the Alberta Carbon Trunk Line (“ACTL”), incorporating:

- CO₂ capture from the existing Agrium Redwater fertilizer plant;
- CO₂ capture from the North West Sturgeon Refinery project under development using gasification and Rectisol[®] synthesis gas purification and conditioning technology;
- A 240 km CO₂ transportation trunk line; and
- Storage, including Enhanced Oil Recovery (“EOR”).

The ACTL project will provide critical CO₂ gathering and distribution infrastructure to enable the cost-effective management of CO₂ emissions. The project also represents an opportunity to showcase how the Province’s vast bitumen resources can provide competitive and environmentally sustainable energy amid tightening environmental standards.

This Summary Report will highlight the information contained in the attached Division B Detailed Report. The status and progress of each component (see Figure 1 below) of the ACTL will be summarized, as well as the relevant financial information.

Overall ACTL Project Schematic

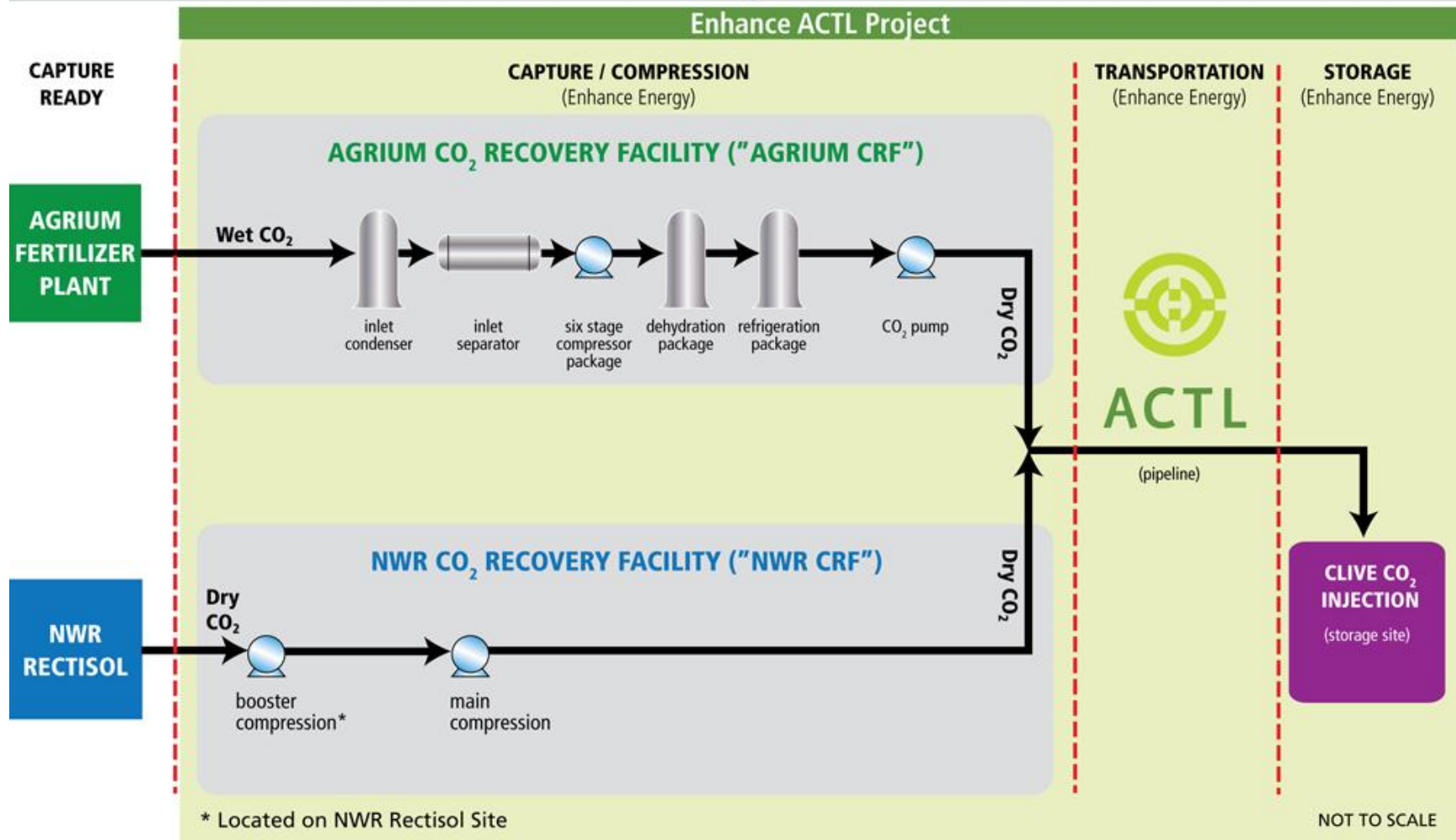


Figure 1 - Overall ACTL Project Schematic

Substantial progress has been made on the ACTL project. Due to delay in obtaining owner sanctioning of the NWR project, the operational phase of the project is now planned to begin in 2015.

Key activities achieved during the 2011 year include:

Agrium CO₂ Recovery Facility:

- Detailed Engineering and Design completed
- Tie-in of the CO₂ supply line within the Agrium fertilizer plant site
- Ordering of major equipment, including compressor
- Compressor manufacture significantly underway

NWR Rectisol:

- Completion of Design Basis Memorandum (“DBM”)
- Engineering Design Specification (“EDS”) nearing completion (as of April 2012)
- Transitioning to Detailed Engineering stage

NWR CO₂ Recovery Facility:

- CO₂ Booster Compression unit
 - Completion of DBM
 - EDS nearing completion (as of April 2012)
 - Transitioning to Detailed Engineering Design
- CO₂ Main Compression unit
 - Development of DBM
 - Preliminary cost estimates completed
 - Transitioning to Detailed Engineering Design
 -

Transportation:

- Approval of Energy Resources Conservation Board (“ERCB”) construction license
- 98% of Right of Way from landowners acquired
- Right of Way survey completed
- Environmental assessments completed
- Detailed alignment sheets significantly completed
- Horizontal Directional crossing designs significantly completed
- Pipe material testing completed

Storage:

- Pressure survey analysis completed
- Geological characterization of sedimentary succession above the oil reservoir underway

Key activities achieved during the 2012 year include:

Agrium CO₂ Recovery Facility:

- Delivery and receipt of major equipment, including:
 - Stainless steel piping and fittings
 - Two inlet condenser units
 - Inlet separator vessel
 - CO₂ transfer pump
 - CO₂ booster pump
 - Facility isolation valves
- Signed contract with Fortis Alberta to design and build dedicated power line for facility
- Signed contract with Coronado Gas Coop to provide fuel gas pipeline and metering for facility
- CO₂ Compressor manufacturing progress:
 - Completed manufacturing of bull gears, pinion shafts and impellers
 - Completed dynamic testing of all three rotor sets
 - Completed casting and machining of stage volutes and main gear box housing
 - Completed assembly and testing of lubrication oil package
 - Main drive motor assembled and ready for run test
 - Completed FAT (factory acceptance testing) for main control panel
- Vessel fabrication for the dehydration package has commenced
- Vessel fabrication and purchase of all major components for the refrigeration package has commenced, including purchase of ammonia compressor, main drive motor and ammonia condensers
- Glycol recirculation pumps are assembled and ready to ship from factory

NWR Rectisol:

- Announcement on November 8, 2012 of Owner's approval for construction of Phase 1 of North West Sturgeon Refinery
- Updated Engineering Design Specifications including Cost Estimate and Schedule
- Initiated Cost Containment review
- Adoption of Rectisol design modernization
- Contract awarded for Air Separation Unit (in support of Gasifier)

NWR CO₂ Recovery Facility:

- CO₂ Booster Compression unit
 - Finalized location of CO₂ facility within Gasifier unit
 - Finalized CO₂ discharge piping route within refinery
 - Finalized technical specification and data sheet for booster CO₂ compressor
 - Currently evaluating bids from four vendors for compressor
- CO₂ Main Compression unit
 - Drafting technical specification and data sheet for main CO₂ compressor

Transportation:

- 100% of the Right of Way landowners now acquired
- Delivery and receipt of major equipment, including:
 - Pipeline valves and actuators
 - Pipe for major river crossing

Storage:

- Completed fourth report on geological characterization of the injection field, conclusions from that report are currently being evaluated

Part B – Project Status Overview and Commentary

The project is still in its early execution phase, and as such there is little to report in regard to variations or significant problems and successes. As the project is further developed and achieves commercial operation there will be more to report.

The ACTL project will employ technologies that are commercially mature. The primary innovation of the project is its scope and integration of various existing technology to demonstrate an economic carbon solution for Alberta.

Section 1: Facility Design

A) AGRIMUM CO₂ Recovery Facility (“Agrium CRF”)

Design of the CRF Facility (to date)

The design basis for the new Agrium Capture Facility is for economic recovery of CO₂ from the fertilizer plant’s CO₂ emission streams. The streams pass through inlet cooling, separation, compression, dehydration, and refrigeration. This process produces liquefied CO₂ that is then pumped into the Alberta Carbon Trunk Line (“ACTL”) at a pressure of 17,926 kPag [2,600 psig], which transports the CO₂ to EOR fields at the end of the line for permanent storage.

The facility was designed to recover the highest percentage of CO₂ from the incoming feed stream. Various process options were discussed before arriving at the proposed process design. This current design utilizes a “fit for purpose” philosophy by incorporating typical oilfield/industrial technology, sourced and serviced locally.

Plot Plan and Facility Location

The plot plan (shown below) illustrates the layout of the CRF, which is located just outside the boundaries of Agrium’s fertilizer plant in the Alberta Industrial Heartland.

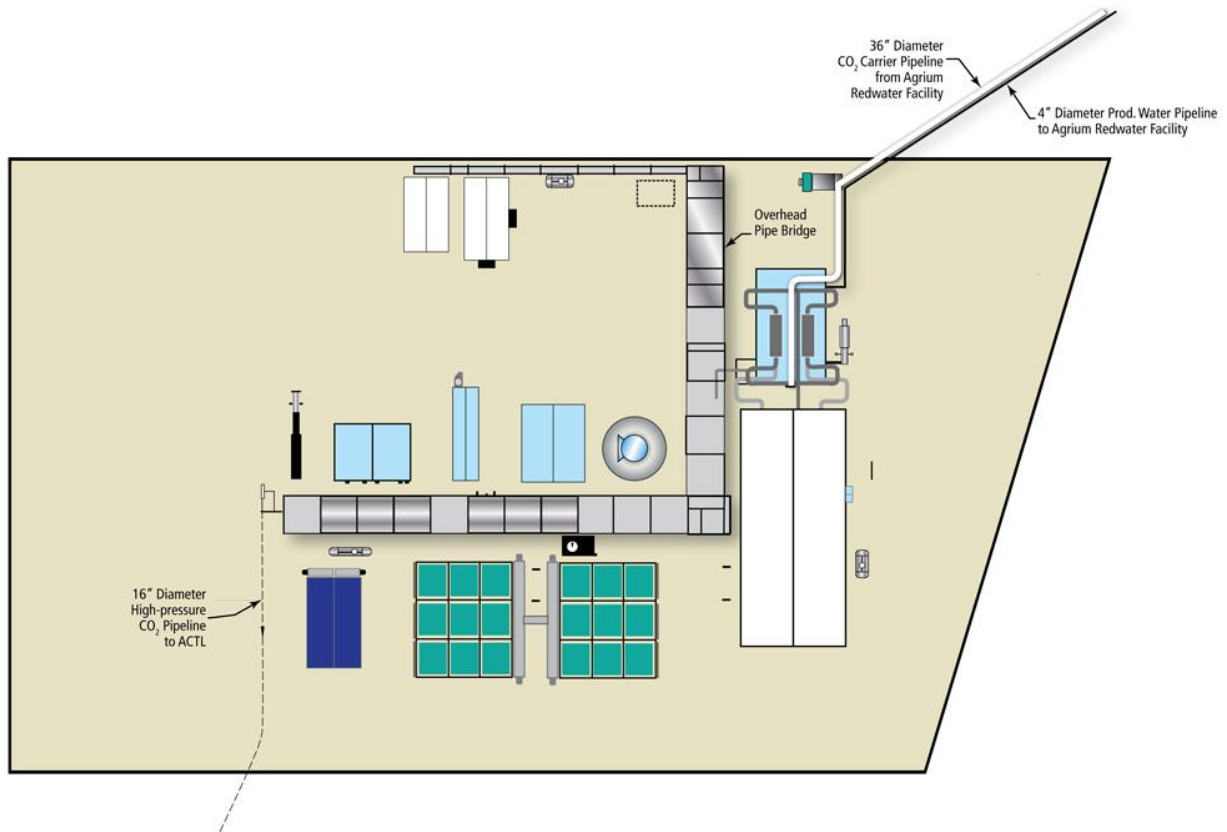


Figure 2 - Agrium CRF Plot Plan

* A higher resolution plot plan with more detail is available in Appendix vi of the Detailed Knowledge Sharing Report

Separation Process Type and Description

As the CO₂ Enhance receives from Agrium is wet, a separation process is needed at the Agrium CRF before the CO₂ can be put into the pipeline. Accordingly, the cooled two-phase stream flows into a carbon steel inlet separator that separates the condensed water from the wet CO₂ gas stream. One electric driven produced water pump maintains the level in the inlet separator and pumps the condensed water to a waste drain at the Agrium site. Produced water disposal volumes will be metered. The produced water will be disposed through the Agrium facility into their existing deep disposal well system.

B) NWR Rectisol®

The NWR CO₂ capture system is heavily integrated into the design of the refinery's Gasification hydrogen supply unit. The Gasification unit uses the unconverted petroleum bottoms (asphaltene) generated in upgrading as a feedstock to produce synthesis gas (syngas). The technology selected to condition the syngas is the Rectisol® acid gas removal process licensed from Lurgi, a German engineering and construction firm. When operational, the Rectisol® unit will produce over 3,600 tonnes per day of pure CO₂. Rectisol® is a physical absorption process carried out at low temperatures and high pressures using cold methanol as an absorption

medium. The Rectisol® process is a mature technology that has been used for decades in the coal gasification, fertilizer and refinery industries. Increased demand for products derived from synthesis gas since 2000 has led to resurgence in Rectisol® installations around the world.

The NWR refinery will be built in the industrial heartland of Sturgeon County, approximately 45 km north-east of Edmonton. The plot plans shown below indicate the location of the gasification unit and Rectisol® unit within the refinery.

North West Sturgeon Refinery Plot Plan

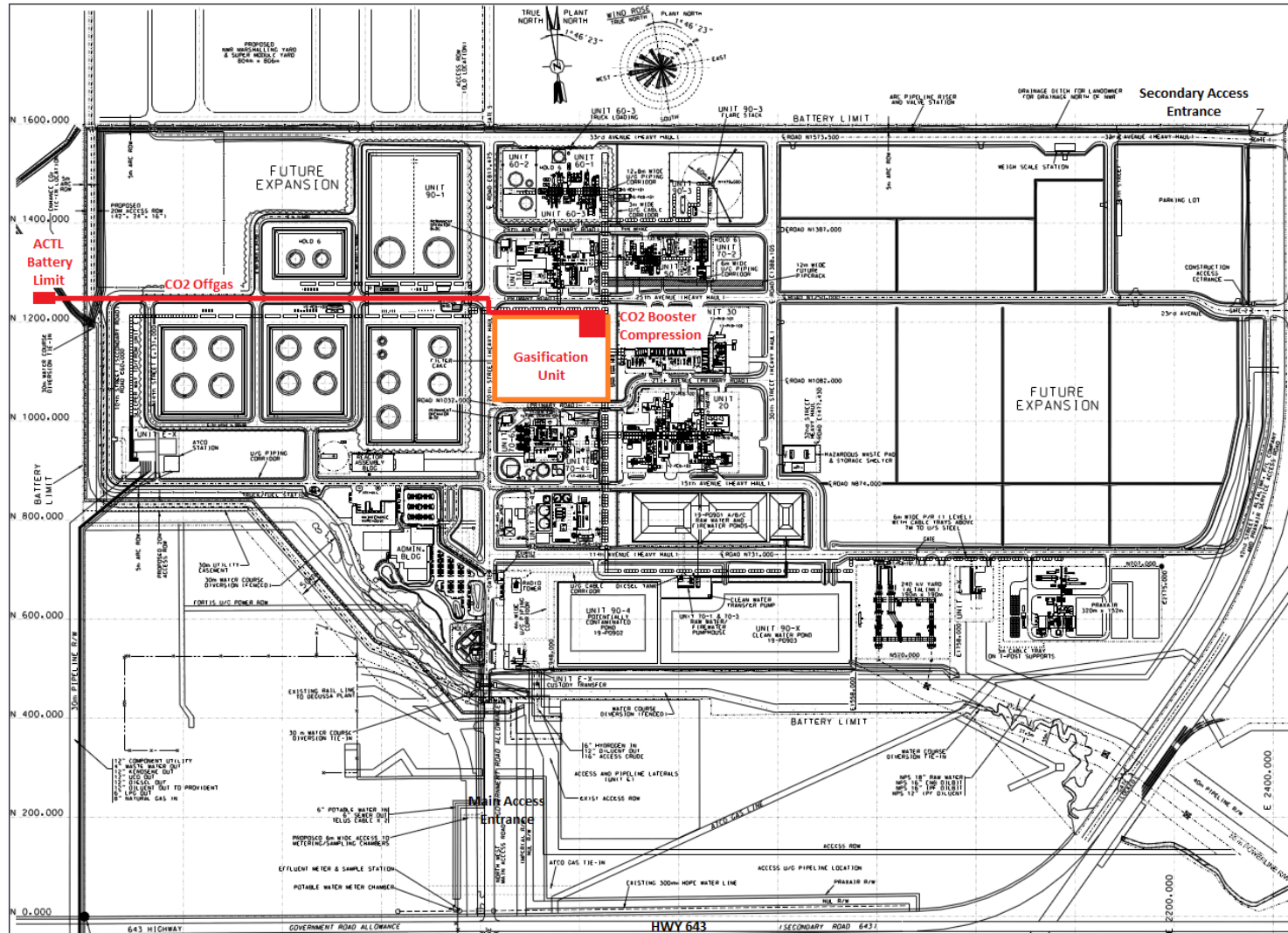


Figure 3 – North West Sturgeon Refinery Plot Plan

Gasifier Unit Plot Plan

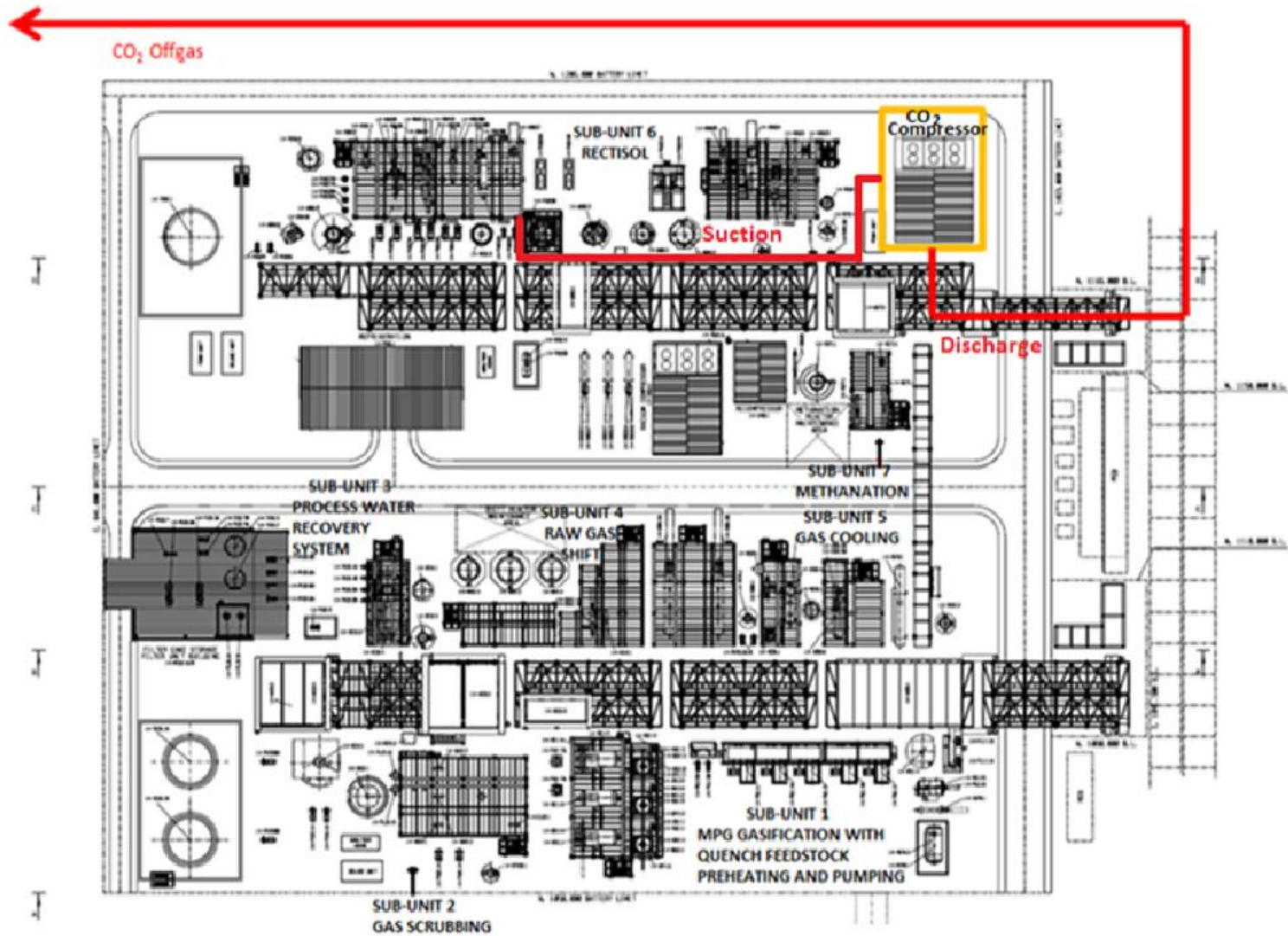


Figure 4 – Gasifier Unit Plot Plan

Rectisol® 3D South View

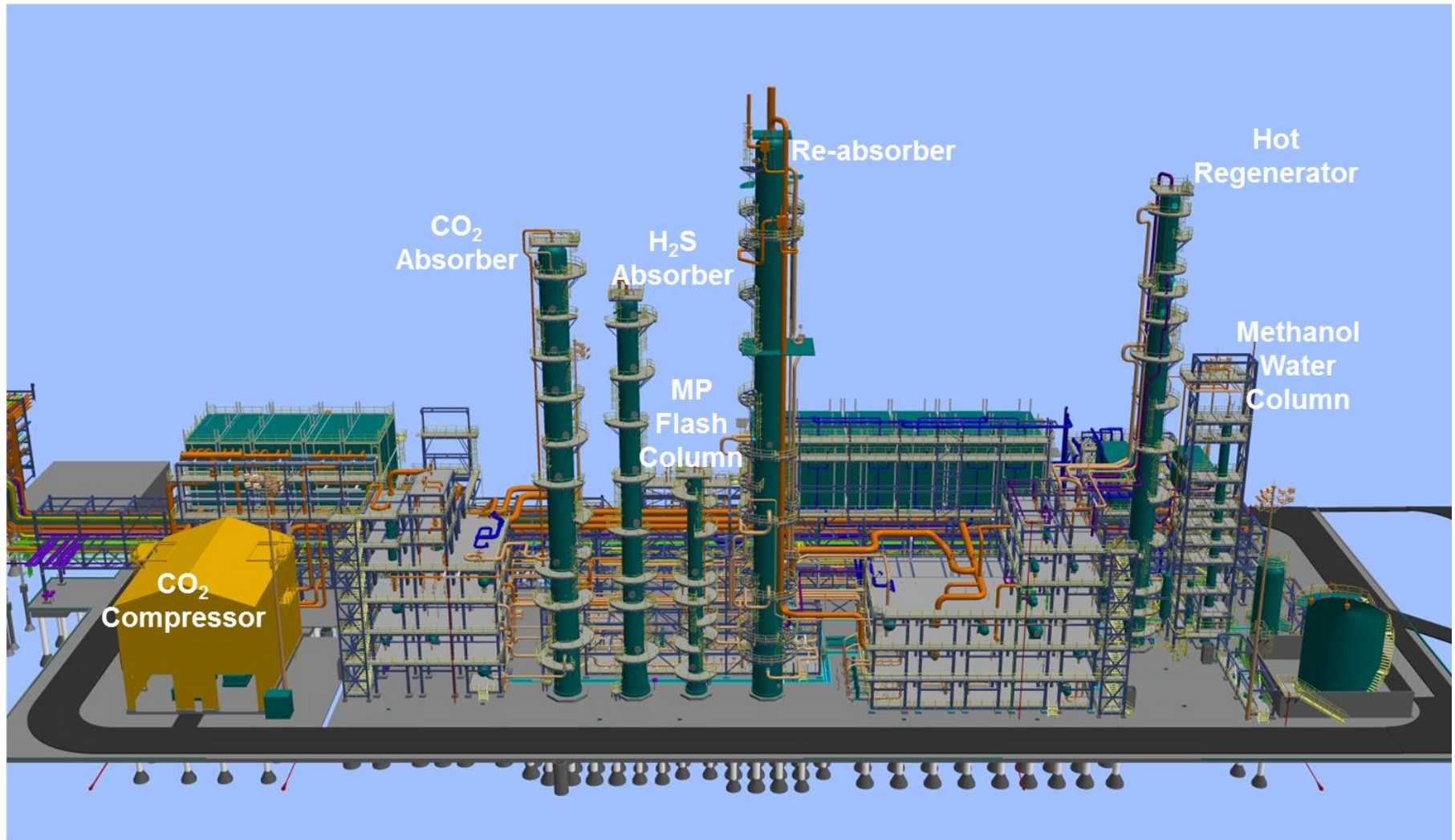


Figure 5 – Rectisol® 3D South View

C) NWR CO₂ Recovery Facility (“NWR CRF”)

The NWR CRF consists of a three stage CO₂ booster compressor unit to be located in the north-west corner of the Gasifier site and a six stage main compressor unit which will be located outside the refinery in proximity to the Agrium plant. The booster compressor raises the NWR CO₂ from close to atmospheric pressure to approximately 1,400 kPag (203 psig) while the main compressor further increases the pressure of the CO₂ to a dense fluid state necessary for pipeline transportation.

D) Pipeline Facility

The ACTL pipeline will be 240 kilometers in length, and will begin in the Alberta Industrial Heartland, by the Agrium and NWR CRFs, and go south ending at the Clive storage field (shown in Figure 3). The detailed alignment sheets for the pipeline are 99% complete as are the construction plans and Horizontal Directional Drill (“HDD”) crossing designs. 100% of the Right of Way (“ROW”) has been acquired from landowners. Procurement of materials is underway. Pipe specifications have been finalized and pipeline valves and actuators have been delivered.

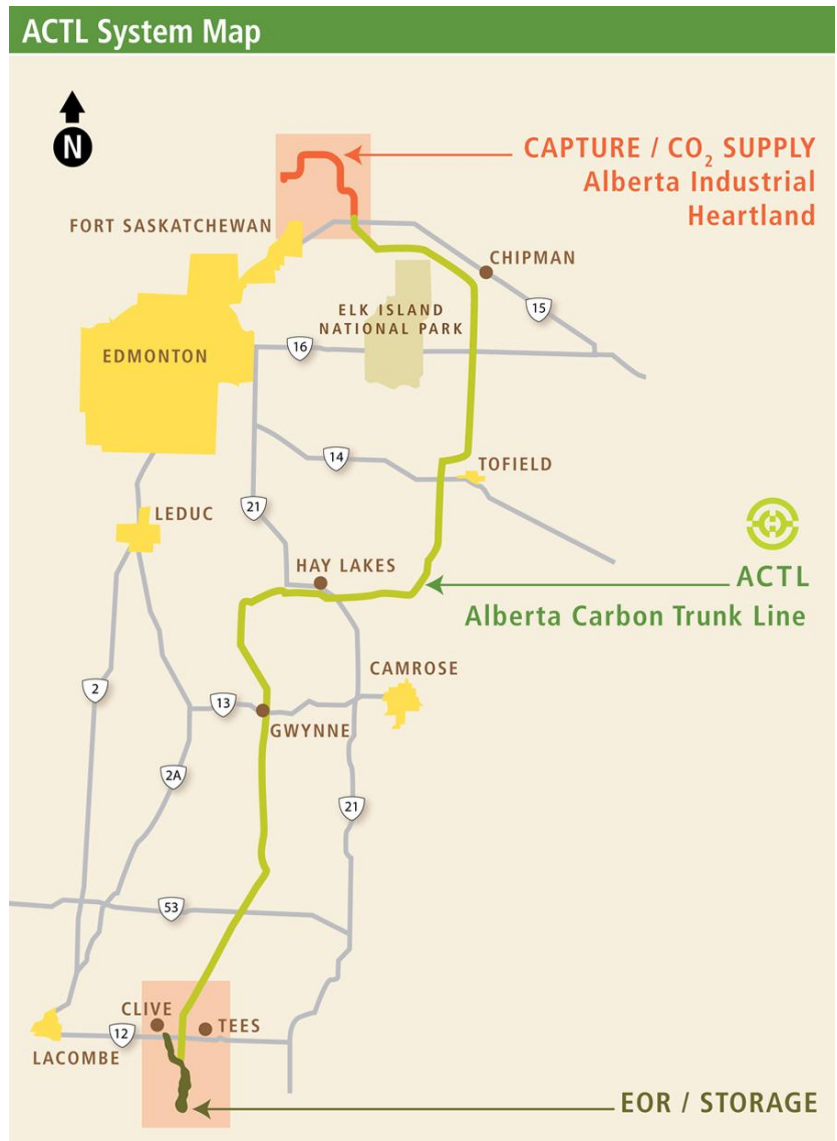


Figure 6 - ACTL Route Map

E) Injection Facility

The injection facility will be located at the end of the ACTL pipeline at the Clive storage site (shown in Figure 6). The exact location and number of the wells for the site is being finalized.

Section 2: Facility Construction

A) Agrium CO₂ Recovery Facility (“Agrium CRF”)

Enhance completed the tie-ins on the existing Agrium plant in June of 2011, during a scheduled shutdown of the plant for maintenance. This timing was strategically planned to minimize any inconvenience to Agrium.

The construction of the Agrium CRF site has yet to begin, but is scheduled to start in the fourth calendar quarter of 2013.

B) NWR Rectisol®

Construction of the Gasifier unit, including Rectisol®, is expected to start in the fourth calendar quarter of 2013. The Gasifier will be among the first refinery process units to be brought on stream. However, the construction schedule and in-service date are interdependent on the overall refinery project development with other process units proceeding in parallel.

C) NWR CO₂ Recovery Facility (“NWR CRF”)

Construction and operation of the Enhance CO₂ Booster Compressor is tied to the construction of the NWR Rectisol® unit, as it is located within the Gasifier boundary limits. Construction and operation of the Enhance Main Compressor is also tied to the construction of the Rectisol® unit, but will be located outside the NWR fence line. Accordingly, construction on the NWR CRF will begin in the third calendar quarter of 2013 to coordinate with the construction at the NWR Rectisol® site.

D) Pipeline Facility

Major equipment with long lead times, such as valves and actuators, has been purchased and delivered. Initial construction scoping along the pipeline route is set to begin in the first calendar quarter of 2013, including the major horizontal directional crossing and initial clearing and timber removal of portions of the line. The main construction for the ACTL will begin in the second calendar quarter of 2014.

E) Injection Facility

Well location and facility design is still being finalized. The construction of the injection facility is set to begin in the first calendar quarter of 2014.

Section 3: Geological Formation Selection

Storage for Enhance's ACTL project will take place at the depleted hydrocarbon reservoir at Clive.

Summary of reasons for selecting the final site

Practical suitability

There are many practical reasons which make Clive a suitable storage site for CO₂. The Clive reservoirs are mature waterflooded oil reservoirs. In this context, they provide:

- Containment for CO₂ due to the fact that they have contained hydrocarbons for millions of years,
- Capacity for CO₂ storage due to significant production of oil and gas providing voidage,
- Injectivity for CO₂ due to substantial water injection operations for five decades, and
- Residual oil production to provide for economic support of large scale CO₂ sequestration.

The Clive reservoirs are also unitized, enabling common ownership and royalty interests across the reservoirs. This provides the opportunity to take advantage of the unique geology, with minimal complications due to competitive ownership interests, in order to maximize oil recovery and maximize sequestration of CO₂.

Geographical suitability

The storage site was also attractive due to its geographic location. As Clive is not adjacent to large residential developments, it makes it easier for surface access to design, build and operate a CCS EOR project with minimal disruptions to residents.

Potential EOR benefits

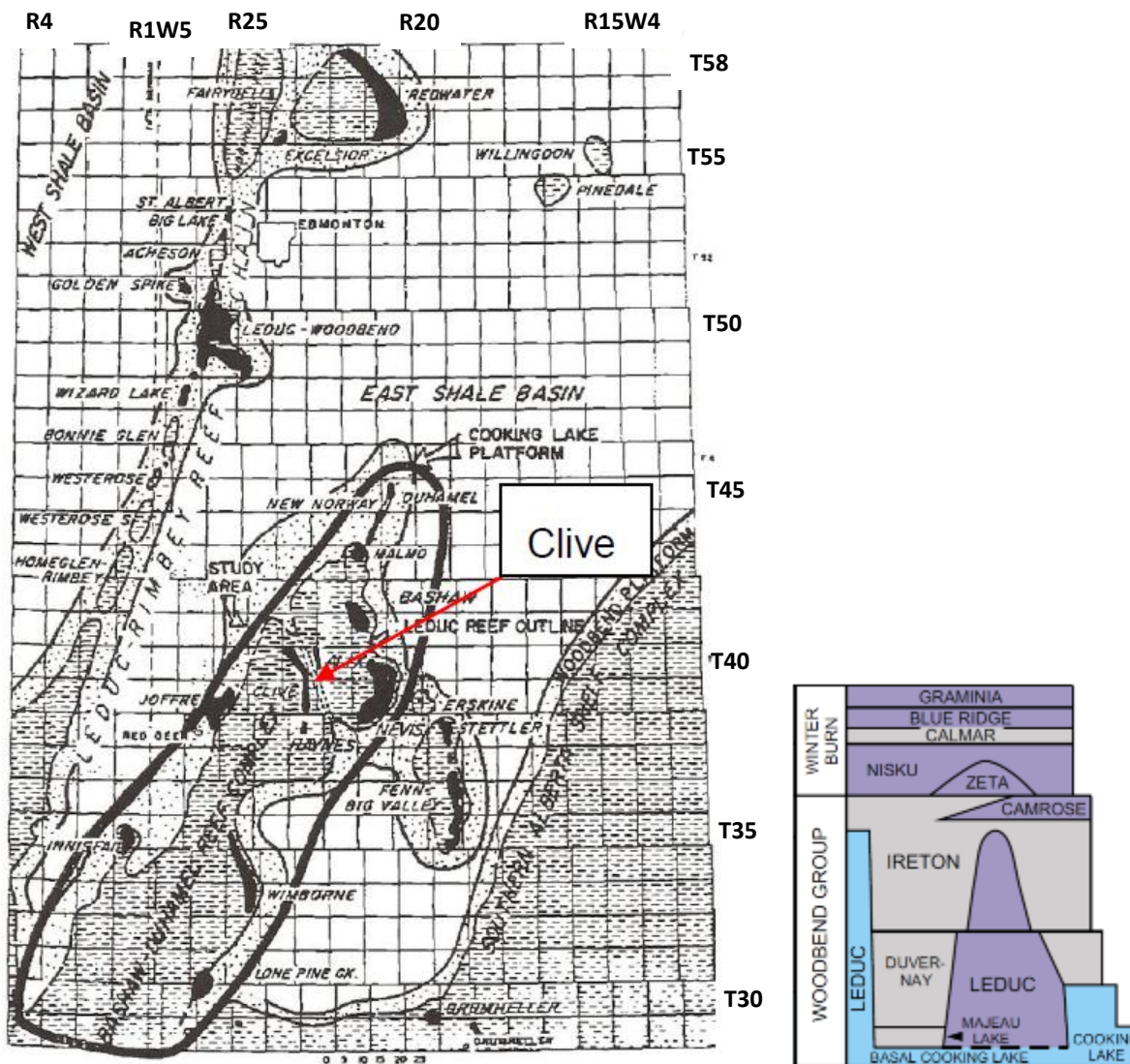
The potential EOR benefits of CO₂ sequestration sites are important criteria for consideration in the site selection process. This is due to the fact that the economic gains associated with EOR, and specifically the sale of incremental oil production, will financially support the cost of an expensive CCS scheme.

The EOR benefits extend beyond Enhance. Albertans benefit from this project through increased royalties to the Province and job creation. It is estimated that the project will create \$19 billion in royalty revenue for the Alberta government over the next 30 years.

Additional social benefits are created through revitalization of economic activity in an oil and gas field that is near abandonment. Job creation for the initial ACTL project is estimated at 2,000 direct jobs during peak construction and an additional 8,000 indirect jobs over the life of the project. To date, it is estimated that approximately 132,000 man-hours have been expended by suppliers, contractors and internal efforts. Ongoing job creation as the ACTL system expands is forecast to run in the tens of thousands.

Key characteristics of the geological formation

Location of injection reservoir: CO₂ will be injected into Clive, as shown in Figure 7.



Source: Tsang, G. and Springer, S.J. — *Innisfail-Clive-Nevis Reef Chain Revisited*, CIM Paper 83-34-24, presented at the 34 ATM of the Petroleum Society, May 10-13, 1983, Banff.

Figure 7 - Relative Location of Clive Reservoirs and its Stratigraphy

Depth and thickness of the reservoir

Comprehensive maps showing an interpretation of the storage formation's porosity tops, which also illustrate depth and thickness at the reservoir, are found in section 3.4 of the detailed report.

Injectivity of reservoir

Injectivity of CO₂ is derived from historical performance of water injection. The Clive reservoirs have shown tremendous capacity for water injectivity. Typical determination of injectivity is based on equivalent volumes at the same reservoir pressure and reservoir temperature.

Water injection wells for the Clive reservoirs have not seen any rate limitations as they have been able to take water on vacuum. Thus, CO₂ injectivity at any Clive reservoir is not expected to be constrained by reservoir parameters but may be impacted by wellbore configuration or surface facility design.

Porosity and permeability of the reservoir

Enhance contracted a study of the Clive reservoirs (Nisku and Leduc) in 2008 and in part, an examination was undertaken to determine the porosity, permeability and its interdependence for the Nisku and Leduc reservoirs. The following two graphs are a representation of this analysis.

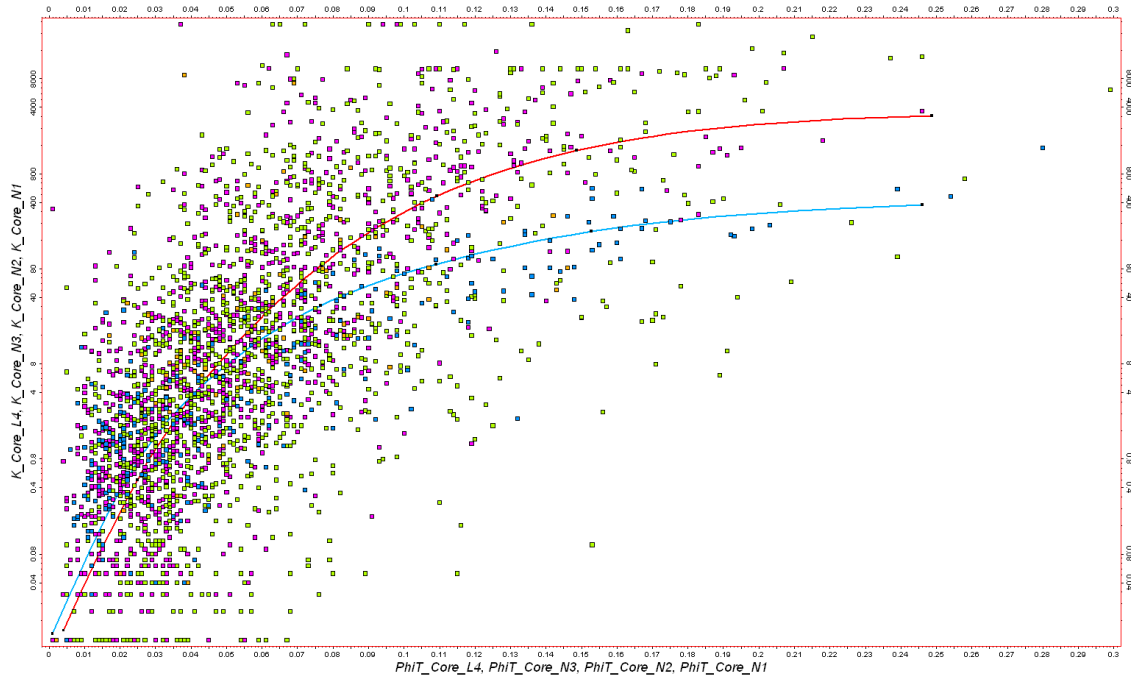


Figure 8 - Graph of Porosity, Permeability and its Interdependence at Nisku

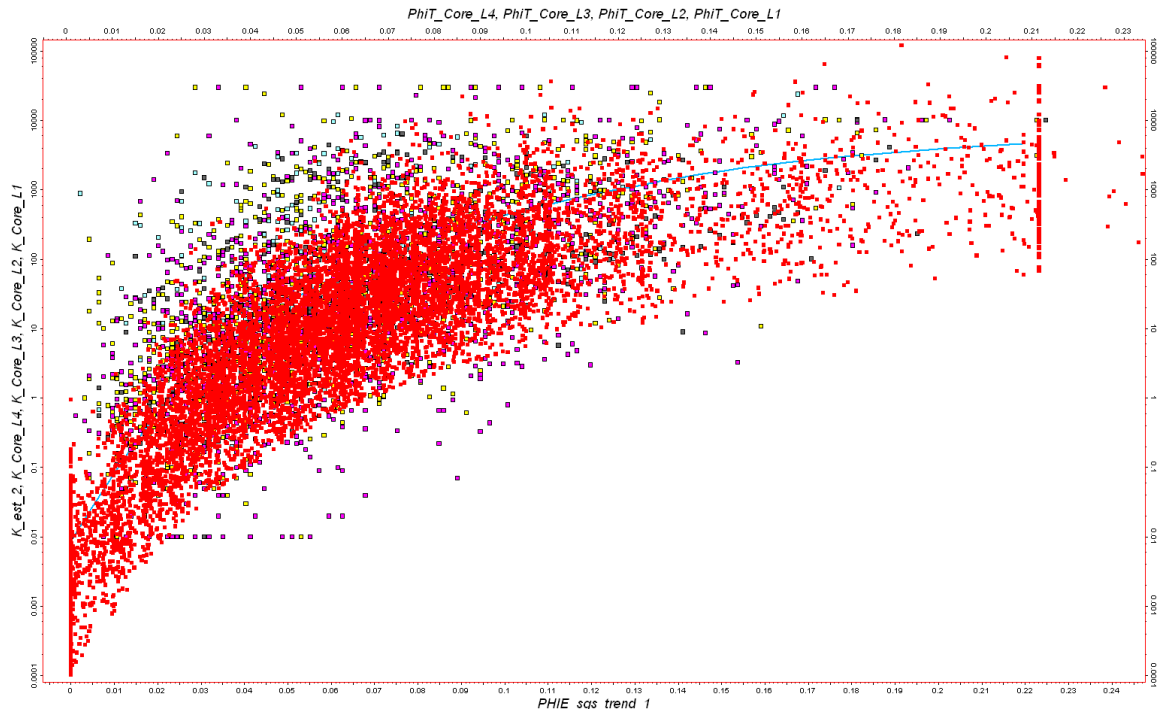


Figure 9 - Graph of Porosity, Permeability and its Interdependence at Leduc

Initial pressure and temperature: The temperature at the Clive reservoirs is 69°C (156°F) and its pressure 1,813 psig (12,500 kpa).

Estimate of storage potential: The total CO₂ storage capacity at Clive due to replacement of produced oil and gas is estimated at 18.8 million tonnes (“MT”) (a more detailed calculation of this estimate is found in section 3.2 of the detailed report.)

Risks of storage into the geological formations and the measures implemented to manage and reduce such risks:

Storage for Enhance’s ACTL project will take place at the depleted hydrocarbon reservoir at Clive. As depleted hydrocarbon reservoirs have securely contained fluids for millions of years, these reservoirs are very well suited for containment and safe storage of injected CO₂ and pose very minimal risk of leakage. Depleted hydrocarbon reservoirs in Alberta have typically undergone waterflood operations whereby water has been used to replace produced hydrocarbons. The injectivity of CO₂ is typically estimated to be the same as injectivity of water at reservoir conditions. Such waterfloods have been conducted at Clive, again minimizing any risk of storage in this field.

Enhance is currently conducting comprehensive geological and geomechanical studies on the rock (from the bottom of the well to the well head). Once these studies have been completed and analyzed, Enhance will be able to finalize its comprehensive monitoring, measurement and verification (“MMV”) plan for the storage site.

Section 4: Facility Operations – Capture

As the project is still in its design phase, the CO₂ capture facilities have yet to start-up. Information regarding the efficiency of each step, impact upon the operating efficiency of the base facility, and purity of the CO₂ is not available at this time.

Section 5: Facility Operations – Transportation

In its first phase, the pipeline will transport captured, compressed CO₂ from the Agrium fertilizer plant and the North West Sturgeon Refinery plant to selected EOR fields at the end of the pipeline.

Flow capacity: The maximum flow capacity of the pipeline, once filled to its full capacity, is 14.6 million tonnes of CO₂ a year.

Pipeline diameter: The pipeline will be 16” in diameter.

Design pressure and temperature: The maximum operating pressure is 17,926 kPag (2,600 psig). The operating temperature design of the pipeline is between -18°C to 60°C.

Wall thickness: The line pipe is a Nominal Pipe Size (“NPS”) Grade 448 at 14.3 mm wall thickness.

Length: The pipeline will be 240 kilometers long.

Material: The 16” ACTL pipeline will be made of welded-body carbon steel.

Expected lifetime: The pipeline has an expected lifetime of 100 years or more

Cathodic protection: A cathodic protection system will be installed as part of the corrosion reduction program. The design of this system is underway as a part of the detailed design for the project. The system will incorporate the following considerations:

- Length of system and segments
- Coating specifications
- Locations of block valves
- Soil analysis and resistivity data
- Water table
- Proximity to other utilities

The pipeline will require cathodic protection test stations to be installed along the route of the pipeline at regular intervals. The pipeline will be fitted with insulating flanged gaskets at each end of the system.

The carbon dioxide water dew-point specification is less than 162mg/m³ (10 lbs/MMscf); therefore, free water is not present during normal operating conditions, and corrosion due to the formation of Carbonic acid cannot occur. Post hydrostatic testing procedures will be incorporated to ensure the pipeline is dry prior to commissioning and operation. In the event the water dew-point is exceeded at the source, an on-line hydrometer signals an emergency shutdown valve (“ESDV”) to close diverting the off-spec gas to vent.

Section 6: Facility Operations – Storage and Monitoring

No CO₂ has been injected and stored, as the project is still in its design phase. Therefore there is no data regarding the injection and storage of CO₂ and its direct monitoring to report at this time.

The planned CO₂ injection rate is the entire available CO₂ supply volume currently estimated at 4,300 tonnes of CO₂ per day. The CO₂ injection stream composition, pressure and temperature are provided in Section 3.8 of the attached Division B Detailed Report.

Monitoring techniques that will be employed at the injection site are storage site specific and are still being developed with the assistance of technical experts and this work is currently underway. Injection rates and CO₂ recycle rates will be finalized as project moves into operations. Atmospheric CO₂ emissions in the scheme are limited to screwed connections for pipe 2” and smaller and flanged connections for pipe 3” and larger. Some emissions to the

atmosphere will also occur during facility shutdowns and start-up. However, these emissions are considered to be fugitive emissions and are negligible.

Section 7: Facility Operations – Maintenance and Repairs

As the ACTL is not yet operational, there are no maintenance and repair activities to report at this time.

Section 8: Regulatory Approvals

Enhance Approvals

No unusual hurdles were encountered throughout the application and approval process. The following table indicates approvals obtained by Enhance for the ACTL project:

Consent/Permit	General Timeline of Approval Receipt	Additional Hurdles Encountered
Canadian Environmental Assessment Agency (“CEAA”)	Submitted: January 2010 Approved: September 7 th , 2010	None
Development Permit (County Level)	Currently finalizing submission for Agrium Typically two months from submission for review and approval	None
Alberta Historical Resources Foundation (“AHRF”)	Preparing application Typically three months from submission for review and approval	Ongoing routing changes delayed application process
ERCB Directive 56 Pipeline Installation Approval (incorporates Alberta Environment approval)	Public consultation process: October 2008 – March 2009 Applied: March 20, 2009 Approved: April 26, 2011 License Number: 53252	On-going consultation required after approval
Conservation Reclamation Plan (Alberta Environment)	Submitted: March 18 th , 2009 Approved: April 17 th , 2013	None

Table 1 - Enhance Regulatory Approvals Table

NWR Approvals

All necessary regulatory approvals have been obtained to proceed with the construction and operation of the North West Sturgeon Refinery project. The table below describes the approvals obtained by NWR.

BODY/ACT/REGULATION	APPROVAL/PERMIT/DESCRIPTION	UPDATE/NOTES
Energy Utilities Board (now ERCB)/Oil and Gas Conservation Act	Upgrader Approval No. 10994 dated September 6, 2007 / For construction and Operation of an oil sands bitumen upgrader, no expiry	Approval has been transferred to North West Redwater Partnership Holdings Corp. from North West Upgrading Inc.
Energy Utilities Board (now ERCB)/Oil and Gas Conservation Act	Decision 2007-058 dated August 7, 2007 / Application to Construct and Operate an Oil Sands Upgrader in Sturgeon County. NOTE that this is a DECISION document respecting public interest determination, and is NOT an approval, so transfer to NWR - Newco should not be required	None
Alberta Environment and Sustainable resource Development/Environmental Protection and Enhancement Act	Approval No. 217118-00-00 as amended by Approval No. 00217118-00-01 dated February 13, 2008 and 00217118-00-02 dated December 4, 2012 / Amending Limited Scope Approval to now encompass construction, operation and reclamation of upgrader, expires September 1, 2017	Amendment application submitted Dec 2013 for administrative matters and minor technical updates. DRAFT Approval received as at March 13, 2014. Approval is being transferred to North West Redwater Partnership Holdings Corp from North West Upgrading Inc.
Alberta Environment and Sustainable resource Development /Water Act	Water Licence Approval No. 00227771-00-00 as amended by Approval No. 00227771-00-01 dated November 15, 2012 amending limited scope site preparation as amended by Approval No. 00227773-00-00 dated February 13, 2008 / Approving diversion of water from site precipitation and NSR for process, expires September 1, 2017	Amendment application submitted Dec 2013 for increase to Phase 1 water use (no increase over 3 phases), as well as groundwater management procedures. Approval expected summer 2014

<p>Sturgeon County/Land Use Bylaw 819/96</p>	<p>Development and Building Permits</p> <p>305-07-D0347 305-07-D0399 305-07-D0609 305-07-D0610 305-08-D0001 305-07-D0611 305-07-D0631</p>	<p>Development Permits numbered 305-07-D0611 and 305-07-D0631 have been relinquished as no longer required. All other Development Permits have been initiated and remain valid through to completion of Phase 1</p>
<p>Sturgeon County/The Inspections Group Inc/Safety Codes Act and Codes</p>	<p>Permit No. 305305-11-E0300 as issued Nov 24, 2011 for temporary electrical connection of construction trailers and facilities. Expires upon removal of temporary facilities</p>	<p>North West Redwater Partnership applied for and is approved by the Safety Codes Council to administer Safety Codes Act approvals required for the Project as at May 2013</p>
<p>Alberta Transportation/Highways Development and Protection Act</p>	<p>Roadside Development Permit 2511/049/10. Expires one year from issue, and has been extended as required per project delay. Note that there is another Roadside Development Permit applicable to Range Road 220 modifications, but that has been issued to Sturgeon County as the 'owner' of the road allowance</p>	<p>RDP 2511/049/10 has been extended as required to complete the approved scope. Alberta Transportation has issued RDP 2511/310/13 in respect of the complete construction and operation of Phase 1 of the Project</p>
<p>Alberta Capital Region Wastewater Commission</p>	<p>Wastewater Discharge Permit dated April 11, 2012 for sewer and treated process effluent discharge to municipal sewer system</p>	<p>No Change</p>
<p>Alberta Sustainable Resource Development/Public Lands Act</p>	<p>Temporary Field Authorization for water course realignment</p> <p>TFA 074346, TFA 082441, and TFA 126500</p>	<p>TFA 134963 was issued Jul 22 2013 extending water course realignment authorization to June 30 2014, by which time the scope is scheduled to be</p>

		complete
Alberta Community Development/ Historical Resources Act	<p>Clearance Letter (note that his resulted in the ERCB Public Interest Determination, and these clearance letters should not require re-issue to NWR – Newco)</p> <p>Release Date: February 1, 2006</p> <p>Release Date: November 29, 2006</p>	No Change
Industry Canada/Radio Communication Act and Regulations	Mobile radio licence for use by construction workforce – Such Licences are already issued to NWR, not NWU, as they were issued recently enough to be done through the Partnership	No Change
Energy Resource Conservation Board	Pipeline licences for lines across North Saskatchewan River as per recent Bennett Jones assistance re applications. Have been issued to NWU	All required Pipeline Licences have been transferred to North West Redwater Partnership Holdings Corp. from NWU

Table 2 - NWR Regulatory Approvals Table

Note: Permits with expiry dates prior to initialization will be reapplied for as required to meet the construction schedule

Section 9: Public Engagement

Enhance

Enhance has undertaken an extensive and open public engagement program working with all directly or potentially impacted landowners and occupants, local authorities, industry stakeholders, and provincials regulators. Open houses were held in eight locations along the proposed pipeline route. A detailed account of Enhance’s public engagement is found in Appendix xii of the detailed report.

Below is a table of the main questions and concerns raised at meetings and open houses along with Enhance’s responses.

QUESTION	ENHANCE RESPONSE
<i>How deep in the ground does the pipeline get constructed?</i>	Typical construction practice of 1.2 meters unless special conditions warrant a change to cover depth.
<i>What is the operating pressure of the pipeline?</i>	<p>In response this concern Enhance shared the following information with interested parties:</p> <ul style="list-style-type: none"> - The proposed line pressure, which is 2600 psi; - The proposed wall thickness; and - The planned corrosion protection plan, including the intended inspection of the pipeline regulatory requirements.
<i>How is the post construction vegetation going to be managed?</i>	The Right of Way and Temporary Work Space lands will be fenced on pasture lands or lands identified by a landowner for a two year growing season to ensure proper regrowth.
<i>Regarding fencing on the quarter section boundary line (existing and new), would Enhance clean up the brush on fence lines and establish new fence boundaries?</i>	Fence lines would be established by way of survey and new fence will be constructed during final clean up if required.
<i>What will be the means of access across the Right of Way during construction?</i>	The necessary measures will be put in place (gates, plugs etc.) as required and arranged during initial acquisition process, and would also be discussed with the landowner during the pre-construction meeting.
<i>Are there going to be Above Ground Structures?</i>	No installation of any above ground structures required unless previously communicated and negotiated and accepted by the landowner.
<i>What are the setbacks from the pipeline Right of Way?</i>	The pipeline does not have any regulated setbacks other than the Right of Way boundary and outside of the regulated 30 meter safety zone.
<i>What are the conditions of the Right of Way through a treed area/bush land?</i>	The Right of Way will be left in a condition that would allow the landowner to work the land as with the adjoining lands on the quarter. Pasture land would be

	left as pasture, with the exception of any grazing lease lands, which under current regulations, have less stringent cleanup requirements but are still governed by best use land policy.
<i>How is trespassing managed – What measures are in place to keep the workers within the area of construction activities?</i>	All boundaries are staked out by the survey team, workers are informed of the work area limits and under normal circumstances workers will not be outside of the staked area. Landowners were advised that they (the landowners) are another set of eyes to monitor the situation, and if the workers are beyond the staked limits, the landowners should be contacting a company representative.
<i>How much restriction will I (the landowner) endure with respect to moving farming equipment across the pipeline after it's in the ground?</i>	Normal/Typical farming practises will be permitted to cross the pipeline Right of Way.

Table 3- Main Questions and Concerns

NWR

A commitment to extensive public consultation by NWR for use in project decision making was made in 2005 at the outset of the environmental impact assessment (“EIA”) and regulatory application process. At that time, CCS solutions for the project were not well advanced. Subsequently, the project was described in regulatory applications and communications with stakeholders as being carbon capture ready with the view that reducing the CO₂ emissions for the project was an important goal.

NWRP conducted personal consultations with all stakeholders within the local area, as well as with any person or organization that expressed a direct interest in the project. A confidential stakeholder contact list was prepared and is maintained to facilitate stakeholder communications.

Open houses in Redwater, Alberta were held in February 2005 upon public disclosure of the project and in November 2005, after collection of environmental data. The two open houses were attended by over 300 persons representing a range of interests and which generated hundreds of questions and comments.

Issues and concerns expressed by stakeholders were primarily in regards to government policy including the need for new regulatory requirements, municipal land use planning, and civil and other social infrastructure including roads that support anticipated development in the industrial heartland area. NWR has committed to constructively participate with stakeholders, residents, industry and governments in the region to understand their ongoing issues concerns and develop workable solutions.

The ERCB Decision Report 2007-058 (August 7th, 2007) notes that “The Board considers North West’s participant involvement program to be extensive. North West was proactive in its approach to involve the public at the early stages of project development and included both those potentially affected by the proposed project and others who expressed an interest in the project.... The board concludes that North West has met and exceeded the Board’s public consultation requirements.”

Since receiving ERCB approval to build the project in 2007, Project personnel have continued stakeholder consultation through personal consultations, participation in community advisory panel meetings, public information sessions and periodic public newsletters.

NWR is also a participant in multi-stakeholder committees facilitated by Alberta Environment and Sustainable Resource Development related to Cumulative Effects Management in Alberta generally, and the Industrial Heartland area specifically. CCS is one of the topics discussed, along with other emissions and project effects.

Section 10: Costs and Revenues

Costs

Enhance

Operating Cost

Compression	Annual Average Cost
Agrium CRF	
Electricity (\$/MWh)	\$ 81
Total Variable (\$/tonne CO ₂ captured)	\$ 10
Total Maintenance and Turnaround (\$/tonne CO ₂ captured)	\$ 4
Total Fixed (\$/tonne CO ₂ captured)	\$ 5
NWR CRF (Booster and Main Compression)	
Electricity (\$/MWh)	\$ 83

Total Variable (\$/tonne CO ₂ captured)	\$ 10
Total Maintenance and turnaround (\$/tonne CO ₂ captured)	\$ 1
Total Fixed (\$/tonne CO ₂ captured)	\$ 1
Pipeline	
Electricity (\$/MWh)	\$ 81
Total Variable (\$/tonne CO ₂ captured)	\$ 0.4
Total Maintenance (\$/tonne CO ₂ captured)	\$ 1
Total Fixed (\$/tonne CO ₂ captured)	\$ 5
Clive	
MMV (\$/tonne CO ₂ captured)	\$ 2
Injection Well Maintenance (\$/tonne CO ₂ captured)	\$ 1

Table 4 - Enhance Operating Costs

The project is not yet operational, so there is no operational expenditure made to date data available yet.

Capital Costs

Capital Cost Estimates	CAD \$MM
Agrium CRF	\$ 45
NWR CRF (Booster and Main Compression)	\$ 60
Pipeline	\$ 245
Clive CO ₂ Injection	\$ 100
Total	\$ 450

Table 5 - Enhance Capital Costs

Enhance has made \$62.5 Million of eligible expenditures under the CCS funding Agreement to date (December 31st, 2012).

The project is not yet operational, so there is no operational expenditure made to date.

NWR Rectisol®

NWR Rectisol® Unit

The Rectisol® cost estimate prepared in 2012 is shown in Table 6 and 7.

CAPEX

The Rectisol® cost estimate prepared in 2012 is shown in Table 6.

Table 6 – Rectisol® CAPEX Estimate

Rectisol® Cost Estimate 2012 (\$MM)	
Major Equipment	\$ 58.9
Material	\$ 39.7
Sub-Contracts	\$ 49.2
Labour	\$ 55.3
Engineering	\$ 30.8
Commissioning	\$ 16.4
Owners	\$ 23.7
Contingency	\$ 24.9
Total	\$ 298.7

Table 6 - Rectisol® Capital Costs

Canadian Content

The local socio-economic activity from on-site construction of the gasifier unit and off-site module fabrication is expected to be significant. An international firm with significant operations and history in Alberta has been selected to bring integrated engineering, design, procurement, module fabrication, construction and site management services to the project. A forecast of Canadian content for the Rectisol® unit will be prepared as construction planning progresses.

OPEX

The operating cost of the Rectisol® unit is provided for informational purposes and should not be used for comparing or benchmarking against other CCS projects.

Table 7 – Rectisol® OPEX Estimate (not for inclusion in carbon capture cost profile)

Categories	\$/tonne CO ₂	Percent
Direct Operating Costs		
Steam and Electricity ²	5.67	45
Solvent	0.12	1
Total Direct Costs	5.79	46
Indirect Operating Costs		
G&A	2.44	20
Maintenance	2.91	23
Turnaround	1.04	8
Water Services	0.35	3
Total Indirect Costs	6.74	54
Total Operating Cost	12.53	100

- 1) Based on forecast avoided emissions of 1,195,306 tonnes/year.
- 2) Assumed cost of electricity is \$60/MWh.

Table 7 - Rectisol® Capital Costs

Revenues

No industry benchmarks are available at this time. There is no revenue to report at this time.

NWR Timeline

The NWR schedule of project milestones is shown below.

NWR Project Schedule - CO₂ Capture																
Milestone	2013				2014				2015				2016			
	JFM	AMJ	JAS	OND	JFM	AMJ	JAS	OND	JFM	AMJ	JAS	OND	JFM	AMJ	JAS	OND
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Detailed Design	█				█				█							
Post Eng. Construction Support				█				█				█				
Construction First Phase		█	█				█				█					
Piling Complete - Rectisol					▼											
Construction 50% complete- Rectisol							▼									
Mechanical Completion											▼					
Start-up First Phase														█		
COD - CO ₂ Compression															▼	

Figure 11 - NWR Project Timeline

Section 12: General Project Assessment

Successes and learnings arising from the project

The ACTL project is expected to encourage the development of an eco-industrial petrochemical cluster of additional value-added upgrading, refining, and petrochemicals projects that take advantage of sustainable and cost-effective solutions for CO₂ emissions. Once operational, the ACTL is strategically positioned to launch an integrated CCS sector and establish Alberta as a globally recognized leader for CCS and EOR technology. To date, the project has been successful in passing through key commercial, public consultation, regulatory, financial and design hurdles. Enhance and NWR will build on these successes as the project moves into its construction and operation phases.

Landowner acceptance

There are approximately 400 landowners along the ACTL who have been externally supportive of the project. This is a significant achievement and it highlights public support for the ACTL. Enhance's strong commitment to community engagement is evident in the fact that landowners readily accept the pipeline being built underneath their land. This level of acceptance occurs once all community questions and concerns have been adequately addressed and risks have been shown to be minimal.

Procurement of major equipment

Significant pieces of equipment have been purchased for both the Agrium facilities and the pipeline. The inlet condenser, inlet separator, six stage compressor, dehydration package, and refrigeration package (shown in Figure 12) have been purchased and delivered.

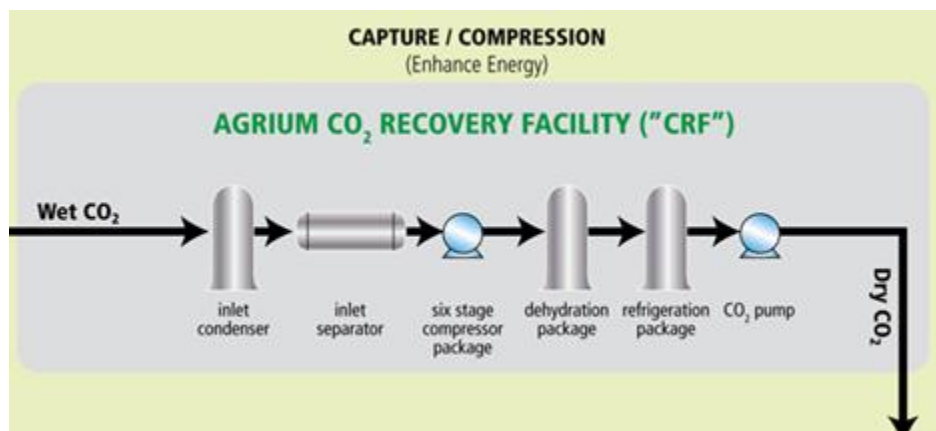


Figure 12 - Agrium CRF Equipment Diagram

Pipeline valves and actuators have also been delivered. These equipment purchases and receipts show Enhance's progress on the project's development and commitment to its completion.

Regulatory approvals in place for pipeline

Enhance received its CEAA approval on September 7, 2010 and its ERCB permit to construct on April 26, 2011. A major accomplishment was receiving the ERCB permit. The Board granted the ACTL a permit as the project met all of the requirements of Directive 56, and there were no relevant outstanding issues or concerns. This is very significant for a large-scale project. It stresses Enhance's compliance to regulations pertinent to CO₂ transportation and storage.

Achievement of the project's first milestone

Enhance met its first project milestone, "Issue of Construction Drawings for the Agrium Capture Facilities", in early 2012. Meeting this milestone was a large undertaking, resulting in over 850 detailed issued for construction drawings and required more than 30,000 engineering man-hours. Approximately 26,000 of those man-hours were expended in Alberta. Completing this aspect of the project helped finalize the front end engineering stage of the project and acts as an important stepping stone as the ACTL proceeds with the project.

Knowledge sharing

Enhance and NWR have committed to provide updates and deliver presentations to the community, industry and government in order to promote awareness about the ACTL project and highlight its benefits to a wide audience. As part of this commitment, Enhance and NWR have spent considerable time preparing knowledge sharing reports for the provincial and federal governments and the general public.

Government funding

The ACTL project has benefited from both the Province of Alberta and Government of Canada funding. While Province of Alberta funds are paid once specific milestones are met, the Government of Canada funds are released on a quarterly basis as the project progresses (The Project will have incurred sufficient eligible costs such that the full contribution of \$63.2 million (less 10% holdback) will be received from Natural Resources Canada by March 31st). The opportunity to access Federal funds early in the project has been critical to moving the project forward during an economic downturn in capital markets. Having access to the capital early in the project has supported the purchase of equipment and helped move the project from its design phase towards construction.

Electricity Power Requirements

Acquiring power for a project in Alberta from the Alberta Interconnected Electrical System ("AIES") can be a very long process, and usually takes a minimum of two years. Understanding the long lead time for this aspect of the project, and proactively ensuring that the ACTL project remains on track, Enhance has begun to work closely with the local power distribution service

provider. The Enhance engineering team is currently working with Fortis Alberta to finalize the power delivery infrastructure required for both the Agrium and NWR sites.

Direct economic benefits to Alberta

The ACTL has already had a direct economic impact in Alberta, through the creation of jobs and procurement of equipment, even though the project is still in its design stage. These benefits are measured in terms of man-hours expended and equipment manufactured in the Province. Approximately 132,000 man-hours have been expended to date in Alberta on the project. 26,000 of those hours are engineering work done in 2011 to complete the first milestone “Issuance of Construction Drawings for the Agrium Capture Facilities.” An additional 14,000 man-hours were required to complete the Agrium CRF tie-ins in June 2011, and over 40,000 man-hours have been expended to date on the pipeline. Being a small Alberta based company; Enhance has always been committed to supporting more Alberta businesses. Direct efforts have been made to keep the majority of work in the Province. As shown in the two tables below, the majority of equipment for the pipeline and the large of the equipment for the Agrium CRF were procured for the project within the Province.

ACTL Pipeline Procurement

Equipment/Service	Vendor	Location
Engineering	SAW Engineering	Alberta
Environmental Assessment	Worley	Alberta
Environmental Planning	BOSS Environmental	Alberta
Regulatory	CH2M Hill	Alberta
Valves	KTI Limited	Alberta
Survey	Focus Surveys	Alberta
Geotechnical Assessment	Surface Search	Alberta
Land Acquisition	LandSolutions	Alberta

Table 8 - ACTL Pipeline Procurement List

Agrium CRF Procurement

Equipment/Service	Vendor	Location
Inlet Separator	Bilton Welding	Alberta
Inlet Piping	Comco	Alberta
Pipe, Valves, Fittings	Comco & Pinnacle	Alberta
Dehydration Skid	Ensign/Opsco	Alberta
Air Cooled Exchangers	Exchanger Industries	Alberta
Glycol Pump	Smith Cameron Pump	Alberta
Refrigeration Skid	Startec	Alberta
CO ₂ Transfer Pump	National Process Equipment	Alberta
Environmental Planning	BOSS Environmental	Alberta
Regulatory	CH2M Hill	Alberta
Inlet Condenser	Alfa Laval	Ontario
CO ₂ Booster Pump	Clyde Union Canada	Ontario
Compressor	Siemens	Germany
Electrical Engineering and Controls	Beta Tech Inc.	Alberta

Table 9 - Agrium CRF Procurement List

Economic benefit to Canada

Enhance bought two pieces of equipment not manufactured in Alberta from Ontario. Unable to find manufacturers for the inlet condenser and the CO₂ Booster Pump in Alberta, Enhance preferred to have a Canadian supplier for these pieces so as to extend as much benefit as possible to Canadians.

Opportunity to build expertise

One piece of equipment that Enhance has had to order for the project from outside of Canada is the six-stage compressor for the Agrium CRF, which is being designed in Germany by Siemens. A Canadian manufactured compressor would have been preferred, however the technology and manufacturing capability has been built up in Germany over 50 years, and is hard to replicate here in a short time frame.

Indirect economic benefits of the project for Alberta and Canada

Enhance commissioned the Canadian Energy Research Institute to conduct a study on the economic impact of the ACTL project. The study concluded that the estimated economic value of the overall integrated project, at design capacity, could increase Canada's total economic output by \$231 billion (approximately 80% of the impact in Alberta) and provide an additional 848,800 person-years of employment (approximately 70% of the impact in Alberta).

Section 13: Next Steps

The North West Sturgeon Refinery Project is currently in the pre-construction execution phase. NWR is progressing towards completion of the Engineering Design Specification stage and start of detailed design. Initial construction activities are scheduled to start in the spring of 2013 including site grading, installation of underground piping, building of heavy haul roads and laydown areas. Construction of the main process units, including the Gasifier is scheduled to commence in the fall of 2013.

Changes in the project timeline

NWR commercial operation is currently forecast to begin in the third calendar quarter of 2016. ACTL will initially start-up with Agrium volumes, but it will be more efficient to run the pipeline with both Agrium and NWR volumes, and so the final NWR sanctioning date must be taken into consideration in scheduling overall start-up.

Changes in the project plan

Since the project's inception, the only changes to the project plan have been minor timeline changes. The most up to date schedules are shown in Figures 10 and 11 above.