

Eco-Efficiency Application  
to  
**IMPROVING GAS PLANT  
EFFICIENCY**



**“What You Measure, You Can Manage”**

CETAC-WEST  
Workshop

April 13 -15, 2003  
Kananaskis, Alberta

## Thought for the Day

*What you Measure*

*You can Manage*



Joe Lukacs

## Thought for the Day

*“A Small Group of Committed  
People can Change the World.*

*In Fact, it’s the ONLY THING  
that ever has...”*

Margaret Mead

## INTRODUCTION

The Eco-Efficiency concept has been applied to the Upstream Oil and Gas Industry in Alberta through a program that offers a tool to further improve energy and environmental efficiency. The program consists of several components, including Integrated Audits of natural gas processing facilities, technology demonstrations, and the study of performance indicators. The program is funded by industry and various provincial and federal supporters and was initiated by CETAC-WEST in 2000.

The first “*Improving Operational Efficiency*” workshop was held in March 2002 to provide information on improvement opportunities in gas plants, and *provided valuable input from industry to develop the Eco-Efficiency program.*

The second workshop had the following objectives:

- \* to report *observations and results* of the Pilot Audit program to industry participating in audits, other interested industry representatives and various stakeholders.
- \* to *solicit input into the program* from a broad industry representation, plant operating staff and stakeholders group to *maximize* the value of the program to all concerned.

This report outlines the format and highlights of this year’s session.

## PARTICIPANTS

The majority of participants were from the industry and included plant operators, operational and environmental engineers, foremen, and managers. There was also good representation from companies that provide engineering and environmental consulting services or technologies to the oil and gas industry. PTAC provided promotional and logistical support for the workshop.

32	Oil and Gas Industry Representatives
29	Service Industry
11	Infrastructure and Government Representatives
8	CETAC-WEST and PTAC Staff
<b>80</b>	<b>Total Attendees</b>



## Thought for the Day

*Knowledge is Power  
Sharing of Knowledge is  
Progress*



## Thought for the Day

*“Eco-Efficiency  
- Doing More with Less”*

Ashley Nixon



*Mike Ekelund, Alberta Energy*

## PROGRAM

### OVERVIEW

The workshop was a two-day event, starting with an introductory session on Sunday evening.

The first day introduced the **application of the Eco-Efficiency concept to Improving Gas Plant Efficiency**. A panel of experts presented **results of the first three audits**, and industry guests gave their perspectives on **challenges and solutions for continuous improvement**.

The second day started with presentations and discussions on issues relating to **benchmarking and proposed performance indicators**. This was followed by a panel session on **practical constraints and realities at the operational level**. Additional presentations probed into other opportunities including **future technology needs, risk management, and maintenance practices**. The workshop concluded in the afternoon with a summary of key points from each session and the importance of implementing initiatives that will see plants realize an improvement in their efficiency.

### RECOGNITION

Energy and Environmental Efficiency Leadership awards were presented this year to several individuals to acknowledge early action at their plants:

- Shelley Hittel, BP
- Skip Desaulniers, BP
- Barb Bryden, Husky
- Don Gabruck, Nexen
- Brian McAusland, Nexen



*Shelley Hittel receiving award*

### ECO-EFFICIENCY CONCEPT AND PRACTICE

Joe Lukacs, President of CETAC-WEST, gave a short overview of the eco-efficiency concepts and the practical application of the integrated audit to the gas processing industry. He was joined by Jamie Urquhart, Vice President – Foothills Region, KeySpan Energy, who shared some of the industry drivers and challenges for being eco-efficient, and Mike Ekelund, Acting Assistant Deputy Minister, Alberta Energy who shared government’s commitment to the program.



## The Innovation

*Systematic and Integrated  
Audit of production facilities,  
and a detailed evaluation of  
all unit operations within the  
entire plant*

## Integrated

*Optimizing SYNERGY from  
careful diagnostics performed  
concurrently by a  
MULTIDISCIPLINARY  
EXPERT TEAM*

## Systematic

*Prioritization of  
Opportunities for the entire  
Plant with a Long-Term  
Economic, Environmental  
and Continuous  
Improvement Perspective*



## CASE STUDIES FROM SYSTEMATIC AND INTEGRATED AUDITS

A panel of six Audit Team experts presented opportunities to *cost-effectively improve energy and environmental efficiency* based on the results of the first three pilot audits.



Over 70 opportunities were identified through the three pilot audits, representing potential energy savings ranging from 5 – 27 MW and potential CO<sub>2</sub>E savings of up to 63,000 tonnes per year. The potential for improvement ranged from 10 –25% of the energy consumption at a facility. Over 90% of the saving potential is associated with fuel gas savings and fugitive emission reductions.

The opportunities were presented through case studies and covered:

- **Amine Process Management** - Mike Sheilan, Amine Experts
- **Process Equipment Optimization** - Nev Hircock, NC Hircock Process Consulting Ltd.
- **Sulphur Removal Management** - Jamie Swallow, Sulphur Experts
- **Electrical Energy Management** - Brian Tyers, Optimum Energy Management Inc.
- **Emissions Reduction Opportunities at Oil and Natural Gas Facilities – Common and Unaccounted Natural Gas Losses** - David Picard, Clearstone Engineering
- **Dehydrator Operations Optimization** - Rod Leland, RCL Environment Group

Audit tools and the synergistic benefits of the team approach to a whole plant audit were also discussed.

## What You Measure



*You Can Manage*

***“Plants Don’t Change  
Themselves”***

**- Marlo Raynolds**



*Marlo Raynolds  
Pembina Institute*

**Achievement of sustainable improvement has more to do with *people, motivation and learning* than *systems, procedures and equipment*.**

**Most valuable:  
“Panel discussion on challenges for eco-efficiency and suggestions for how to implement and manage change.”**

**- Participant**

**INDUSTRY CHALLENGES FOR CONTINUOUS IMPROVEMENT**

An evening panel had the objective of exploring some of the challenges to implementing eco-efficiency practices from a corporate perspective.

Guest panelists included *Eric Lloyd - PTAC, Maya Owens - Central Alberta Midstream, Marlo Raynolds - Pembina Institute, and Ashley Nixon - Sustainability Advisor, Shell Canada,*



Eric identified three challenges for continuous improvement: ***prioritization*** at executive level, ***capability development***, and the need for teamwork, technical expertise, coordination and project and risk management capability to successfully innovate.

Marlo presented some benefits other than ‘being eco-efficient’ that may gain support from various stakeholders (CFO, PR, HR) within the corporate office. He also identified ***key conditions for success*** at the plant level that may increase the likelihood of opportunities being implemented.

Ashley offered several ***reasons why companies may not perform audits or act on findings***. Suggestions to overcome these included ensuring that the audit was used as a tool in an overall package of improving efficiency.

Common themes that came out of this panel discussion included:

- ***Teamwork and setting personal targets backed up with incentives*** are large success factors.



*Ashley Nixon, Shell Canada*

- ***Communicating small successes*** help prove that these initiatives are beneficial in improving energy/environmental efficiency and reducing costs.
- ***Upper level management*** needs to reinforce that Eco-efficiency is a ***priority*** and will be ***resourced***. Some companies are not committing to this until uncertainty surrounding implementation of the Kyoto Protocol and the Alberta plan is resolved.

**Goal is to provide a Tool for Industry**

**To: Measure Where We Are**

**To: Plan Where We Want To Be**

**To: Track Our Performance**



***“Insights of panels and participants was particularly valuable”***

**- Participant**

### **PERFORMANCE INDICATORS – a Tool for Measuring Results and Tracking Continuous Improvement**

The focus of this session was selecting and effectively *applying appropriate performance indicators* to monitor and track performance of facilities, processes and equipment, with a broad representation from industry, the service sector and other stakeholders.

Don Colley, DGC Consulting, gave an overview of the *purpose of benchmarking* and introduced a *proposed set of indicators* for future discussion and feedback. Saybry Inc. presented their *simulations* of what could be theoretically possible at the plant level. Roy Kanten, Shell Canada, presented the difference between *Intensity* (comparing to other plants) vs. *Efficiency* (comparing to theoretical optimum).

The participants were then split into groups to discuss issues surrounding benchmarking and performance indicators for the industry.

### **PRACTICAL CONSTRAINTS AND REALITIES AT THE OPERATIONAL LEVEL**

The first panel was comprised of industry representatives who had participated in the audit program or were considering an audit. The objectives were to *explore the benefits* of an integrated/systematic audit and how to *maximize the benefits* to all concerned. The panel also addressed their intentions to implement the recommendations and some of the challenges they faced. Major constraints on implementation included difficulty in gaining *partner approval* for costs to do audits and/or implement recommendations, the need to schedule follow-up work with turnaround, internal resources, Head Office approval and capital.



The second part of the discussion involved several presentations and discussions on maximizing opportunities for applying **new technologies, risk management, and maintenance management**. Bruce Peachey, New Paradigm Engineering Ltd. presented Bio Processing, cogen potential, Rankine Cycle cooling options and Organic Rankine Cycle (ORC) power generation as some of the potential technologies that could help to improve energy and environmental efficiency at plants.



*Zoli Lukacs*

***“Maintenance is a Process  
Not a Function”***



*Rod Leland and Brian Tyers*

***“The gap between where  
you are today and where  
you want to be represents  
your opportunity.”***



*Blaine Lee*

Zoli Lukacs, Hatch Consulting, presented the concept of *Asset Life Cycle Management* and approaches to *maintenance management*. He described benefits that other industries are finding from implementing maintenance tactics, including *Reliability Centered Maintenance*, and discussed some of the opportunities that may be realized.

Bart Koppe of Cantox Environmental addressed *considering public health risk assessment* with Eco-Efficiency. He highlighted the benefits of *proactive risk management* and presented feedback from the general public of their expectations of the oil and gas industry in addressing environmental and health issues in the community.

#### **CONCLUSIONS AND FOLLOW-UP**

The panel identified the key opportunities for energy, cost and GHG savings from the pilot audits as:

- *Incinerator and stack temperature optimization*
- *Aerial coolers efficiency*
- *Heat exchangers/in-house focus on refrigeration*
- *Amine circulation and plant optimization*
- *Fugitive emissions reduction*
- *Compressor optimization*
- *Electric motor power optimization*

**Most attendees found the information from the Pilot Audit Results most valuable and wanted to see more feedback from industry on what works, what didn't, and why.**

The Performance Indicators discussion indicated that Efficiency was more meaningful, but also more complex. The breakout groups reported back that:

- *Benchmarking, if used, must include a complexity index so that plants are not inappropriately compared.*
- Keep it simple!
- Benchmarking indicators can be useful at a Plant level but real control must take place at the process unit level.
- Need to clarify objectives of Benchmarking to develop appropriate indicators – who will use the information?
- Further clarification is needed in this area to achieve objectives.

***Over 95% of respondents indicated their intention to attend the next workshop to be held in the spring of 2004.***

#### **FACILITATION**

Dr. Blaine Lee acts as the Workshop facilitator. Dr. Lee is a seasoned management consultant who assisted in developing the MBA Program at the University of Calgary, has instructional experience at the MBA level and at the Banff School of Advanced Management, and has worked with the management of many operating companies over the past 30 years.



CETAC-WEST

# Energy and Environmental Efficiency Program

an initiative jointly supported by:



Government  
of Canada

Natural Resources  
Canada

Gouvernement  
du Canada

Ressources naturelles  
Canada



Environment  
Canada

Environnement  
Canada



Western Economic  
Diversification Canada

*Promotional Partner*



PETROLEUM  
TECHNOLOGY  
ALLIANCE  
CANADA

PTAC

## **ALBERTA ENERGY – ACKNOWLEDGEMENT AND DISCLAIMER**

The project for which this report was submitted was funded (in part) by Her Majesty the Queen in right of Alberta, as represented by the Minister of Energy.

This report and its contents, the project in respect of which it is submitted and the conclusion and recommendations arising from it do not necessarily reflect the view of the Government of Alberta, its officers, employees or agents.

The Government of Alberta, its officers, employees or agent, and consultants make no warranty, express or implied, representation or otherwise, in respect of this report or its contents.

The Government of Alberta, its officers, employees and agents and consultants are exempted, excluded and absolved from all liability for damage for injury, howsoever caused, to any person in connection with or arising out of the use by that person for any purpose of this report or its contents.