Best Practices Awards Nomination Form

FULL COMPANY NAME: Ledcor Industrial Limited

CEO/COO OR DESIGNEE:

Glen Warren _____
(Print/Type Full Name) (Signature)

Date: April 1, 2008

Address: 9910 -39 Avenue, Edmonton Alberta

Telephone: 780 462-4211 Fax: 780 450-1362

PREPARER:

Darril Brown _____
Print/Type Full Name (Signature)

Date: April 1, 2008

Address: Same as Above

Telephone: _____ Fax: _____

Email: Darril.brown@ledcor.com

This submission is for (please check one):

Use Separate Form for Each Submission

Award Category	Check
Safety Best Practices Implementation and Performance Improvement Award – **LARGE** COMPANY OR ORGANIZATION (see next page)	
Safety Best Practices Implementation and Performance Improvement Award – **SMALL** COMPANY OR ORGANIZATION (see next page)	
Safety Leadership and Innovation Award	
Best Practice Implementation Award	✓
Best Practice Innovation Award	

NOMINATION - BEST PRACTICE IMPLEMENTATION AWARD

Workface Planning: Leadership in the development, implementation and improvement / innovation of COAA Best Practices in 2007 directed at effective, productive project execution that improve workface planning.

By implementing this Best Practice in our Nisku Facility, Ledcor has seen a dramatic change in productivity with the associated advantage of reduced manpower to execute the work scopes in relation to what we have historically experienced.

Ledcor can provide statistics based on productivities using Work Face Planning that have:

- Increased our productivity that provide **OVERALL SAVINGS OF OVER 25%** from our historical records
- Increasing productivity of individual portions of work (eg. Hydro-testing) by over 100%
- Increasing productivity of installation of heat tracing by over 100%
- Increasing the time our foreman can remain directly involved with the work at the work face.

Another result is with this implementation we have been able to improve our safety statistics as we have been able to:

- Segregate work areas to minimize worker density and eliminate overlap of trades working in the same area.

- Minimize / eliminate scaffolding to minimize trades working on top of each other
- Maximize work done at ground level (insulation & heat tracing) at optimal designed elevations to minimize back strains / stress

Ledcor is pleased to have been chosen as a finalist for Suncor's prestigious Presidents Operation Excellence Award in a Team Category for the safety aspects of this Work Face Planning Best Practice.

Question #1

"Clearly describe which COAA Best Practices or other best practices you have effectively implemented. Include evidence (data) that illustrates and supports the level of performance and degree of program implementation. The evidence should indicate both the degree of pest practice implementation and the impact that this has had on improving project execution. For example, if you have implemented a program to improve workface planning, the submission should include data on the training and systems used and the effect this has had on the effectiveness of construction execution at the workface and/or productivity.

Ledcor fully implemented the Workface Planning Best Practice in our Nisku Modular Assembly Facility. Ledcor had provided resources to the COAA Workface Planning Committee and were anxious to pilot this Best Practice within our company and decided our Modular Assembly Facility was the most suitable location. We commenced by rolling out and discussing the Powerpoint Presentation that was available on the COAA website and then utilized the Workface Planning Scorecard as a basis to judge where we were relative to the recommended level. Our initial score was 75% (marginally below the COAA recommended level – where 80% determines "we follow the defined practice consistently and meet the requirement"). The value in

scoring ourselves was to identify factors where with minimal effort we could meet/exceed the requirements of the COAA Model.

We are pleased to have gone through a more formal 3rd party audit with one of our major clients in our Nisku facility (Suncor Energy Inc.). The results of this audit have indicated that we have improved over our first internal audit and are meeting the requirements of the COAA model. Ledcor have not provided the details of either the initial nor the audit details due to limitations of size of this submission but are prepared to send under separate cover if required.

During the implementation we have seen some fairly dramatic cost savings which have been demonstrated since the implementation of Work Face Planning in our Nisku Modular Facility. The most obvious one is the reduction in scaffolding manhours. Historically at this facility our scaffolding hours we about 18% of our overall direct manhours on modular assembly programs. Our new execution plan has reduced this to less than 10% and is even less than that when rework is factored out. Just the reduction in scaffolding has reduced our overall costs by approximately 10% which is a huge "WIN". Other factors were considered in our overall new execution plan and our savings overall are more than 20% from historical actual costs.

Question #2

Clearly describe any improvements your company or organization made to the best practices during or after implementation of the best practice. How have these improvements been incorporated into the COAA Best Practice documents or shared with the industry.

Once Ledcor implemented the Best Practice, we discovered that many productive work practices had been potentially overlooked because we had not had a real good tool to use as a basis for discussion and we had continued "doing things as we had before and how others in our industry were doing them". This Best Practice allowed us to rethink:

- How we execute each phase of the work
- Why we executed these items of work in the manner we had
- Analyze and brainstorm how we could execute them more productively
- Analyze and brainstorm how we could improve the safety
- Analyze and brainstorm new procedures or work practices.
- Analyze and brainstorm how to minimize and/or eliminate scaffold requirements
- Provide continuous improvement of the Best Practice

The following are improvements we have implemented and some of the results that we have shown in this facility.

1. Scaffolding – With our new execution strategy at this facility, our scaffolding has been greatly reduced as mentioned above. The new execution plan in general forces most of the work that previously had been done on scaffold platforms on the upper levels to be completed on the ground such as:
    - Hydro-testing of spools
    - Heat tracing installation on piping
    - Insulation of piping
    - Estimated reduction in scaffolding - **10% savings per module**

OLD METHOD – MUCH SCAFFOLDING REQUIRED

NEW METHOD – DESIGNATED AREAS ON GROUND FOR INSTALLATION OF HEAT TRACING AND INSULATION

2. Increasing foreman's time at the workface. Ledcor procured special foreman's shacks that are designed on skids and are placed at the workface. With the FIWP's, all of the information (and planning tools) the foreman needs is now available at these strategically placed shacks that now allow the foreman to maximize the time spent at the workface with the crew performing the work.
    - Estimated gain in time for foreman at the workface = 25 %

3. Increasing tool time at the workface. Implementing work face planning has shown significant increase in the tool time for the

workers as this virtually eliminates the historical waiting for material, tools, equipment etc. Also with the foreman providing continuous supervision, the workers do not wait for instructions as well.

- Estimated gain in tool time for workers = **5 - 10% savings per module**

4. Decreased welding of spools at workface. Traditionally spools were produced in 60 – 80 ft lengths which required some additional field welds in position on the module during assembly process. Utilizing an engineered lifting device and changing our fabrication execution plan, we now fabricate spools to full length of the module (up to 120 ft lengths). This effectively means that for each 120 ft spool installed on a module we save one field weld per length. Shop welds are approximately one third (1/3) the cost of a field weld. With each module averaging 25 spools and average diameter of 14", (13hrs per weld in field @$120/hr vs. 7 hrs per weld in shop @ $90/hr
    - Estimated savings for shop vs. field welds = $23,250. With modules averaging from $500K to $750K, this equates to anywhere from **3 % to 4.5 % savings per module.**

5. Alternate Hydro-testing Execution Plan. Traditionally we did some hydro-testing of pipe spools on the ground next to the modules and in many cases waited until the pipe spools were installed in position on the module as some welding had been required. Now the majority of hydro-testing is done on a specially designed rack in a central designated area adjacent to where completed spools come directly out of our fabrication facility. This is very efficient compared to traditional methods. This virtually removes the cost of scaffolding to access the ends of all the spools to install / remove test plugs and hydro-test lines. As well the execution plan eliminates the movement of test media material (tanks) and test manifolds throughout the facility as the tanks are centralized. As previously mentioned, this new execution is done at less than half the actual hours we historically had used.

- Estimated savings due to efficiency is **5 % savings per module**

6. New technology for Hydro-testing. Traditionally it was necessary to have spare end caps to weld onto spools to facilitate hydro-testing. This required spools to be fabricated slightly longer than design to allow for cut-offs after hydro-testing to designed length. This also required additional planning for the hydro-test program, additional material for pipe and/or end caps, additional welding, additional time for cut-off and end prep of spools after hydro. We now utilize a combination of new technology (high pressure) hydraulic test plugs designed specifically for this purpose in addition to traditional test plugs. For large lines, we normally had to weld test caps on in the shop and then remove these at the completion of the test. The welded test caps provided extra material to allow for appropriate cutting at completion of the test so finished spools were the correct length. We thus save the additional cost of the cutting off of the test caps and the machining / end prep. These were only required for larger diameter lines tested at high pressure where normal test plugs were not feasible. The average size of these high pressure lines is 24 inch and what we save is 2 shop welds for the test caps, and cut-offs. For the basis of this calculation, we assume there is one large diameter, high pressure line on each module that requires this procedure. The machining cost and cost for rental of hydraulic plugs is approx equal and balance each other off.
   - Estimated savings of $ 5,000 or approx **1 % savings per module**

UTILIZATION OF HIGH PRESSURE TEST PLUGS IN HYDRO-TEST AREA OF FACILITY

7. Revised Program for Electrical Heat Tracing (EHT) Installation. Traditionally, the EHT was installed after the spools were hydrotested in position on the modules. This required massive amounts of scaffolding to provide access and platforms to install the tracers. Ledcor has now installed engineered supports on the ground adjacent to each module to place the spools after they have been hydrotested in our central hydo area. These supports allow the spools to be at an ergonomically designed height so that the workers are installing these tracers at approximately waist height. The installation is not only more efficient, it has eliminated many of the strains and sprains of workers' backs due to the height of the spools using traditional methods. The savings is realized with the increased efficiency as the workers do not have to move all their

material from ground level up onto the scaffold platforms and all of the time spent climbing and moving around on these platforms. The spools on the ground are also laid out with more room for the installers to work which increases their efficiency.

- Efficiency of tracer installation **3 % savings per module**

8. Revised Insulation Program. Traditionally the insulation was installed on the spools in position on the modules after the hydrotesting and EHT was completed. In some cases the scaffolding and platforms utilized for these programs required some alterations for the insulators. Our execution plan now is to have the insulation installed on the ground prior to the spools being installed on the modules at the same ergonomically designed height on the supports we installed for the EHT. Similar to the heat tracing program, the insulators do not have to move their material from ground level up onto the module platforms, spend time climbing and moving around the platforms. The spools are laid out with more room for the insulators to work which also increases their efficiency.

    1. Estimated savings for insulation **3% savings per module**

UTILIZATION OF ERGONOMICALLY DESIGNED SUPPORTS FOR INSTALLATION OF HEAT TRACING AND INSULATION

9. Alternate Rigging / Transportation of Spools. With the revised execution programs in the facility, it was also required to rethink the manner in which up to 120 ft long spools were handled throughout the process including:
    - Within the confines of the fabrication facility
    - Moving spools from fabrication facility to the hydrotesting area
    - Moving spools from hydrotest area to supports located beside modules
    - Moving spools once EHT and insulation is complete onto modules.

    To this end, we have utilized radically different equipment that is much more functional and efficient. We needed engineered spreader bars (fit for purpose) and in addition used a

UTILIZATION OF SHUTTLELIFT FOR TRANSPORT AND RIGGING OF SPOOLS

(Note use of specifically designed spreader bar for full 120 foot long spools)

(Also note the absence of scaffolding)

10. Other safety issues resolved due to new execution plan
    - Eliminating or minimizing the potential of the hazard of falling objects onto workers below with almost all the work being done on the ground to the side of the modules vs. being done on the modules with other workers above.
    - Mitigating potential safety issues by eliminating manhours of work – ie. By eliminating/minimizing scaffolding.
    - Mitigating potential safety issues by minimizing congestion – ie. By eliminating scaffolding resources

The efficiencies of the Workface Planning have not only been implemented on the Firebag Module Program, but is now in operation for a similar module program for Albian in our Nisku Facility.

To our knowledge, our clients that have been seeing the clear results of the effectiveness of our program at our Nisku Facility are encouraging other similar facilities to utilize the execution strategies that have made our program very productive on other scopes of work.

References:

Please provide at least two external / third party references that the adjudicators can contact.

Name: Mr. Walt Butler
Suncor Energy Inc.
112 – 4th Ave S.W.
Calgary, AB T2P 2V5

Name: Mr. Todd Adams
Suncor Energy Inc.
112 – 4th Ave S.W.
Calgary, AB T2P 2V5

Name: Mr. Don Mousseau
Suncor Energy Inc.
c/o Jacobs Canada Inc.
400 S, 8500 Macleod Trail South
Calgary, AB T2H 2N7