



# PLANT MAINTENANCE and SHUTDOWN SCHEDULE MODEL



***Prepared by:***

***Nova Scotia Construction Sector Council –ICI***

***Co-funded by :***

Human Resources and Skills Development Canada

The Nova Scotia ICI Construction Industry

Representatives from major Nova Scotia companies

December, 2004

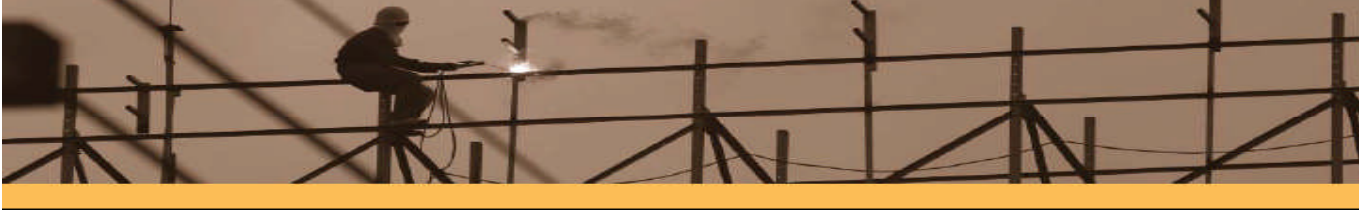


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## INTRODUCTION

The Nova Scotia Construction Sector Council, Industrial-Commercial-Institutional (NSCSC – ICI), is a not for profit organization established to communicate and consult with the founding Member Organizations:

- ▶ Cape Breton Island Building & Construction Trades Council,
- ▶ Construction Management Bureau,
- ▶ Mainland Nova Scotia Building & Construction Trades Council,

the construction sector and federal and provincial partners to identify

areas of concern related to human resource planning and skills development within the sector.

Working in partnership with the Member Organizations, NSCSC directors and staff will provide human resource and labour market information to industry partners including Human Resources and Skills Development Canada, the Province of Nova Scotia departments and agencies, national Construction Sector Council, public and private training institutions, associations, organizations, groups and individual Nova Scotians.



## REPORT to INDUSTRY STAKEHOLDERS

Project start date: April 6, 2004

Project end date: December 31, 2004

- Following discussions with industry employers and labour representatives, the Board of Directors of the Nova Scotia Construction Sector Council (NSCSC) identified the need to develop a plant maintenance and shutdown schedule model.
- As a result, the ICI construction industry will have a plant maintenance and shutdown schedule model that once implemented, will better align the available supply of qualified trades people to industry's demand for plant maintenance and shutdown work.
- With project funding from Human Resources and Skills Development Canada (HRSDC), in-kind contributions, expertise and time contributed by the industrial, commercial, institutional construction sector and key industry representatives, this project moved ahead.
- The project was researched in Canada, United Kingdom and Sweden resulting in agreement that a PMSSM in Atlantic Canada would be very worthwhile. Industry recommendations:
  - Develop the schedule,
  - Keep it simple,
  - Continuous update.
- NSCSC prepared a draft schedule for review by twenty industry representatives and received positive feedback.



The Member Organizations and Directors of NSCSC want to thank all those who contributed their expertise, time and travel to assist the PMSSM sub committee develop a workable model with special acknowledgement of Human Resources and Skills Development Canada for their funding contribution and interest in this project.

**With thanks to:**

*Steve Smillie*  
General Presidents'  
Maintenance Committee for Canada

*Neil Tidsbury*  
Construction Labour Relations,  
Alberta

*Ron Cherlet*  
BSV and Construction Labour Relations  
Alberta.

**With additional contacts in:**

- New Brunswick
- Newfoundland Labrador
- Prince Edward Island
- United Kingdom

And to all members of the PMSSM sub committee for their generous contribution of time, travel and expertise.

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*Brian Fairley*  
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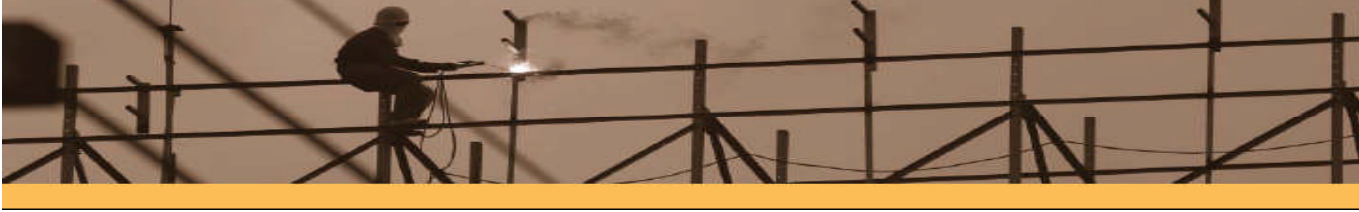
*J. Marc Gallant*  
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Sayers & Associates Limited.



## METHODOLOGY

- The NSCSC sub committee met initially to decide methodology, timelines and identify major industry representatives who would assist in the development of this project.
- This sub committee and industry representatives met nine (9) times over a period of nine (9) months to draft, review, evaluate and finalize the schedule model.
- NSCSC Staff provided the researched material and project management required to generate the information needed to move the project forward.
- The sub-committee identified nine major players in Nova Scotia who would benefit from a Plant Maintenance Shutdown Schedule (PMSSM).
- The decision was made to initially contact four plant managers to assist in the schedule development then completion of phase I of the project additional contact will be made with plant managers throughout Atlantic Canada.





The sub committee reviewed questions asked by industry on a need to know basis:

- Timeline requirements for each plant maintenance shutdowns?
  - Number of trades people required for each shutdown?
  - Skills required?
  - Qualifications required to adequately carryout the work?
  - Safety training – current certification?
  - How to better align the supply and demand of trades?
- Access to a list of current and future major I-C-I projects would be an asset.
  - How will a plant maintenance shutdown schedule assist management and labour?
  - How will the model be implemented?
  - Who will sustain the model?
  - Model credibility requires continuous update.



*A number of these questions can be addressed within this phase of the project additional questions will have to be addressed and researched on Phase II.*



## COMMENTS and CONCERNS

- Two or three major maintenance shutdowns scheduled at the same time will seriously impact the pool of available qualified trades people in general.
- This will also impact commercial employment opportunities.
- Support for this project was evident from comments from industry stakeholders and further verified by letters of support.
- Industry recommended that Plant Maintenance and Shutdown Schedule information be kept current - then this would be useful to them.
- Overall result would provide coordinated scheduling of shutdowns.
- Employers need current skills and safety trained trades on the job site.
- All employers are concerned about the safety factor as many experienced trades people are moving directly from one shutdown to the next with insufficient down-time in between, consider a two or three day down time for shutdown journey persons.
- Comment from a plant Safety Manager: "A tired trades person can make mistakes".
- Refinery shutdown Manager commented that there is a need for more skilled trades people for refinery shutdowns.
- Industry representatives agreed that, as the project develops, the industry would participate when they understand the advantages offered by the schedule.
- When one or two major construction projects begin at the same time in the province access to qualified labour will be a supply problem.



“Ensure trades people have the necessary skills to enable them to take advantage of provincial construction employment opportunities”.

- This schedule would be attractive to the small and medium companies and their need to know when the major companies were planning a shutdown.
  - There is always the potential that a competitor will search the schedule site and schedule shutdowns before their competition to get a jump on them! The use of a password system will help alleviate this problem.
  - Trades people may switch employers during a shutdown for more money.
  - A few companies may be reluctant to share competitive intelligence.
- Develop ways and means to encourage companies to provide the shutdown information.
  - Encourage companies to review the schedule and stagger shutdowns to ensure access to qualified maintenance trades people.
  - Industry and sub-committee members agree there is a need to identify the availability of trade set skills for shutdowns. For example, if a refinery needs 200 boilermakers and 150 welders for a three week shutdown, they “need to know” the ability of the local market to supply them at that time.



“If a capital project is underway and requires certified trades people it is necessary to know how many skill sets are available overall, in some cases this can determine the need to revise scheduled shutdowns by one or two weeks, or in some cases, arrange an alternate data”.

- Companies attempt to keep the maintenance schedule on time but, as in all construction, parts availability or other unexpected circumstances can delay a shutdown by one or two days.
  - A shutdown overrun of one company can affect the availability of qualified shutdown trades people for another company.
  - Industry employer: We need more trained journeyman but also need sustained level of employment in order for Apprentices to successfully complete their apprenticeship training.
  - Our company strongly supports the apprenticeship program.
- It is imperative we address the issues of impending skills and labour shortages. This applies to all sectors, provincially, nationally and internationally.
  - European employers are already in Canada trying to entice trades people, young and older workers, to work in Europe and they bring benefit packages.
  - Based on past experience all it takes is one or two shutdowns scheduled at the same time and one or two commercial projects to come on stream and the available qualified journey person pool is depleted. To help alleviate this problem, journey person skills must be continually upgraded.

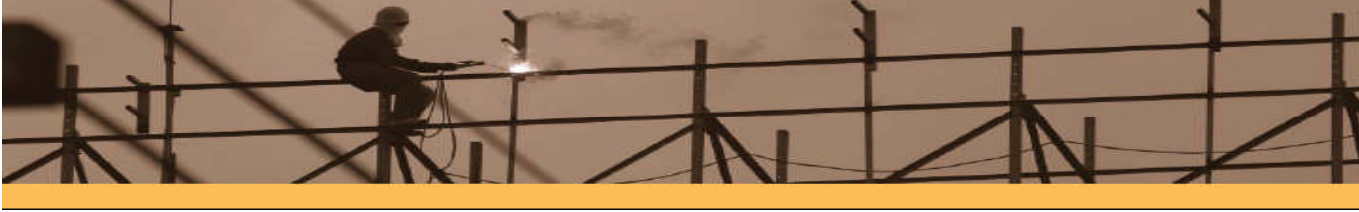


“Plant equipment is not static. It is upgraded or replaced by new technology. New skills will be required to maintain new technology”.

- It is imperative we address the issues of impending skills and labour shortages. This applies to all sectors, provincially, nationally and internationally.
- Industry is also very aware of the impending exodus of baby-boomer trades people many of whom are the trades required to perform maintenance shutdown work.
- Plant maintenance and ICI construction will place a strain on the availability of qualified trades people over the next two to five years.
- Expected Liquefied Natural Gas construction will also place a strain on availability of qualified trades people in Nova Scotia and New Brunswick over the next three years.
- Irving Oil, Imperial Oil and Irving Pulp Mill have already indicated they plan major maintenance during 2005 and 2006.



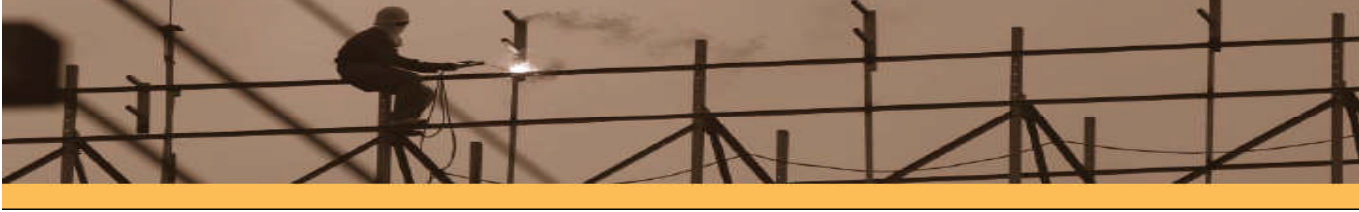
*The proficiency of industry's workforce affects the quality of workmanship, project schedule constraints, frequency of health and safety incidents and cost of workers compensation insurance.*



## TRADES PEOPLE

Trades people required for Plant Maintenance and Shutdowns include the following:

- Boilermakers
- Carpenters
- Elevator – Wire rope inspection
- Electrical Workers
- Operating Engineers
- Insulators - (asbestos is still present in many mills) Asbestos removal and cleanup is often necessary and re-insulating is needed after removal
- Bridge workers/ Ironworkers – bridges need inspection
- Labourers - site cleanup, prep work, the quarantine of areas for cranes, delivery equipment and scaffolding, (when boilermakers are doing the work, they do scaffolding, otherwise it is erected by scaffold companies)
- Millwrights – assemble and dismantle and erect things like gears in cranes etc. for non-destructive testing
- Painters – coating inspections and repair – pressure vessels – piping
- Plumbers, Steamfitters and Pipe fitters
- Sheet Metal Workers



## INDUSTRY RECOMMENDATIONS

- Need to identify the current active skills supply, qualifications and OH&S certifications
- Need a list of current and future Major Projects
- Need continued development of the Plant Maintenance and Shutdown Schedule Model
- The Plant Maintenance and Shutdown Schedule Model phase II should include the following information:
  - The number of trades people qualified in plant maintenance and shutdowns available
  - Current trade certifications and qualifications of available trades people including current safety qualifications and updates
  - Identification of available “active” trades people not attached full time to one specific employer
  - Identification of trades with Red Seal tickets
  - Apprentices registered with Department of Education
  - The number of trades people and identification of the trade classifications required per shutdown
  - Maintenance and shutdown schedule dates and timelines listed by individual company.
  - This information would be gathered by an update to NSCHRSC - 2001 Labour Market Assessment document.



## ACTION ITEMS

Based on the current schedule spreadsheet, the information will include:

- individual plants listed by province,
- peak workforce and scheduled plant maintenance and shutdown dates/durations.

Additional details and information will be added in accordance with future needs and requirements.

The identification of Major Projects both scheduled and tentative will be added, to identify demand side.

Industry representatives and sub committee members agree there is a need for password access to protect the integrity of the information.

Information must also be kept current and accurate, based on bi-monthly or monthly updates confirmed by established contacts.

The importance of having the right contact for each company was stressed.



*The cooperative efforts and Human Resource initiatives undertaken by industry and its representatives prove that the value of Nova Scotia's ICI workforce is one of the province's best assets.*



## BENEFITS

- *Effective shutdown management is critical to the safety of Trades people who execute the work, and to the overall operation of facilities. Without the allocation of a two or three day down time for journey persons between work schedules, not only is the safety of the worker at risk, quality of workmanship suffers and the risk of error is increased.*
  - *Trades people will have the ability to better align work schedules around the cyclical nature of this industry.*
  - *Safety is considered to be a key factor in the scheduling of the shut downs to avoid having workers too tired to function safely. With these considerations*
- in mind, the reduction in the number of safety incidents that occur and errors to equipment maintenance will ultimately increase overall plant productivity and operation.*
- *Shutdown schedule information can be made available twenty - four hours a day, seven days a week.*
  - *Companies are able to change previously scheduled shutdown dates in order to avoid schedule overlaps with other companies.*
  - *The larger Nova Scotia employers have already agreed that sharing this information is an advantage.*



Knowledge of major players shutdown schedules will assist other employers and developers select their shutdown dates.

➤ *Knowledge of predetermined trade supply requirements provide employers and trades people with substantial mutual benefits, such as the opportunity for trades people to upgrade necessary skills based on future*

*known job requirements and opportunities.*

➤ *Companies will have access to highly skilled trades people qualified in Plant Maintenance and Shutdown work.*



### 2004 Maintenance Shutdown man-hours

**Canada – eleven million**  
**Nova Scotia – 350,000**

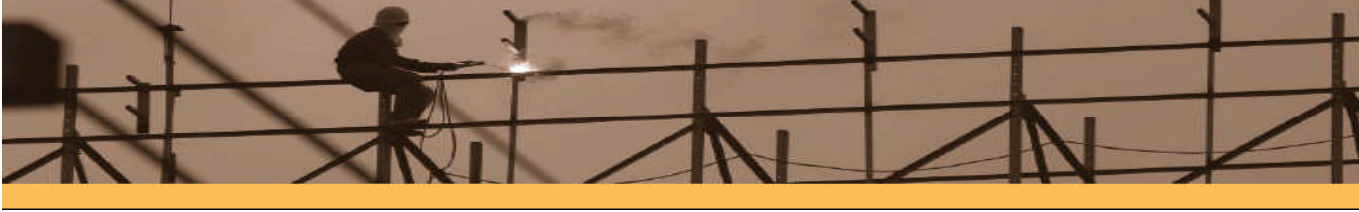


## CONCLUSIONS

- Industry support for this project is evident from the contacts made throughout Nova Scotia and their volunteer commitment to develop this model.
- Copies of the schedule have been distributed by mail to the participating committee members and industry representatives and response has been positive.
- The project sub-committee concluded that the Plant Maintenance and Shutdown Schedule Model must be further developed to include the anticipated number of each skill required for the maintenance shutdown.
- The project sub committee recommended that a list of future major projects for Atlantic Canada be added to the PMSSM website.
- Once established the Plant Maintenance Shutdown Schedule Model will grow to include all four Atlantic Provinces.
- To address the need for secure information this will require an area on the NSCSC website accessible by password only.
- The NSCSC will maintain the website for an initial period, then the services of a part time person will be required to continue to maintain and preserve the site integrity.



The availability of a skilled and ready workforce is a major consideration for industry when making investment decisions.



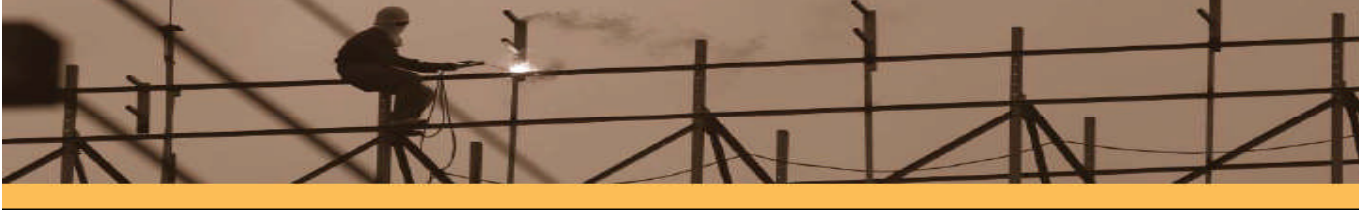
As a project NSCSC will continue to update the present schedule until the NSCSC Board of Directors determine the need for a part time administrator to take on the project.

The Administrator will be required to:

- Contact company representatives on a regular basis to confirm and update schedule information,
- Promote benefits of Plant Maintenance and Shutdown Schedule information to employers in the Atlantic region.



*The risks associated with an unprepared workforce due to overlapping work schedules can have major financial and reputable consequences.*



## REFERENCES

- Maintenance Shutdowns in Alberta & Western Canada 2004 & 2005, <http://www.shutdownsalberta.com>
- Practical Management for Plant Turnarounds, by John a McLay, P. Eng., R.E.T., P.E., [http://www.reliabilityweb.com/art04/plant\\_turnarounds.htm](http://www.reliabilityweb.com/art04/plant_turnarounds.htm)
- Article: Reliability and Maintenance Implementation Model, <http://www.idcom..com/articles/reliabilitymaintenance.htm>
- Plant Maintenance Strategy: Key for Enhancing Profitability, by Hisham Bin Jabar, <http://www.maintenanceresources.com/referencelibrary/ezine/chemclean/htm>
- PEM-Plant Engineering and Maintenance magazine online, <http://www.industrialsourcebook.com>
- Preparing and planning a plant shutdown, by George M. Williams, GE Plastics, Burkville, Alabama, <http://www.plantservices.com>
- Maintenance Tips, <http://www.maintenancetalk.com>
- Process Industry Maintenance 2003 – The annual Pan-European Plant Maintenance And Reliability Conference., <http://www.wbresearch.com>
- Primavera, <http://www.primavera.com/solutions/index.html>
- ISIS Cycle Dates & LOQ Schedule, <http://www.isis.rl.ac.uk/largescale/loq/cycles.htm>
- Plant Maintenance Resource Center, Shutdown Management Software Directory, <http://www.plant-maintenance.com>
- ATC Professional White Paper; Turnaround Project Planning Primer – Shutdown Schedule (Operations) <http://www.interplansystems.com/turnaround-project-planning-primer/shutdown-schedule.html>
- Lincoln Technology Corporation, <http://www.lincolntechnology.com>
- An untapped opportunity, by Issam Karkkoutli, vice-president, marketing, INOVx., Oil Review Middle East Issue Three 2001.
- Shutdown Management for Coal handling plant of thermal power station – A New Approach, by Makarand Joshi.
- Cutting Maintenance Cost Through Better Planning and Scheduling, by David Krings, <http://www.maintenanceworld.com/articles/kringsd/cuttingmaintenance/html>