

THE UNIVERSITY OF CALGARY
Management of Regulatory Issues
as it Pertains To Project Management

by

Nigel G. S. Costeloe

A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE
DEGREE OF MASTER OF ENGINEERING
DEPARTMENT OF CIVIL ENGINEERING

CALGARY, ALBERTA

AUGUST, 1992

© Nigel G. S. Costeloe 1992



National Library
of Canada

Bibliothèque nationale
du Canada

Acquisitions and
Bibliographic Services Branch

Direction des acquisitions et
des services bibliographiques

395 Wellington Street
Ottawa, Ontario
K1A 0N4

395, rue Wellington
Ottawa (Ontario)
K1A 0N4

Your file Votre référence

Our file Notre référence

The author has granted an irrevocable non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of his/her thesis by any means and in any form or format, making this thesis available to interested persons.

L'auteur a accordé une licence irrévocable et non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de sa thèse de quelque manière et sous quelque forme que ce soit pour mettre des exemplaires de cette thèse à la disposition des personnes intéressées.

The author retains ownership of the copyright in his/her thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without his/her permission.

L'auteur conserve la propriété du droit d'auteur qui protège sa thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

ISBN 0-315-83125-1

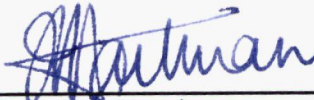
Canada

THE UNIVERSITY OF CALGARY
FACULTY OF GRADUATE STUDIES

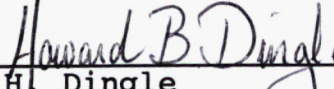
The undersigned certify that they have read and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "Management of Regulatory Issues as it Pertains To Project Management" submitted by Nigel G.S. Costeloe in partial fulfilment of the requirements for the degree of Master of Engineering.



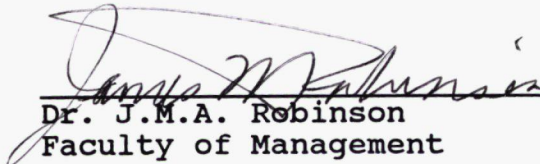
Dr. H.A.R. de Paiva (Supervisor)
Department of Civil Engineering



Mr. F. Hartman
Department of Civil Engineering



Mr. H. Dingle
Imperial Oil Resources Ltd.



Dr. J.M.A. Robinson
Faculty of Management

October 24, 1992

ABSTRACT

This thesis explores how external issues and regulatory obligations are managed by Project Managers. The study was undertaken through a review of the literature and interviews with project management staff on active projects. Collation of this information lead to a confirmation that existing industry practise is similar between diverse projects and is apparently successful.

Management success must focus on, 1) an accurate estimate of each stakeholder's agenda, 2) an assessment of the relative influence of each stakeholder, 3) an open dialogue must be maintained with the stakeholders, 4) gaining approval of any major environmental submissions, 5) the Project Manager clearly articulating the engineering and environmental standards for the Project, and 6) selecting contractors who are experienced in the particular jurisdiction and with the technology. Finally, the thesis provides a series of thought provoking questions intended for prospective Project Managers to reflect upon before undertaking a project.

ACKNOWLEDGEMENT

I would like to thank Professor H.A.R. de Paiva of the Department of Civil Engineering for his guidance and encouragement throughout the course of my work at the University of Calgary. His subtle ability to keep me motivated was essential in the successful completion of my courses and this thesis.

I would like to express my appreciation to my employer, Pan-Alberta Gas Ltd., whose financial assistance throughout my time at the University of Calgary permitted me to pursue this goal. In particular, I would like to thank Mr. R.E. Bowser who supported my efforts, tolerated my absences and expressed a genuine interest in the work I was undertaking.

I am indebted to the contributors to this paper whose involvement made it possible.

Special thanks to Mr. Cooke, of the Manitoba Hazardous Waste Management Corporation (MHWMC), who spent many hours discussing his project with me, and provided many of the ideas which I have attempted to develop in this thesis. Mr. Frank Mink, Energy Resources Conservation Board Vice-Chairman, provided many valuable comments from a regulator's perspective making it possible to have a more balanced approach to the thesis.

TABLE OF CONTENTS

	Page
CERTIFICATION	ii
ABSTRACT	iii
ACKNOWLEDGMENTS	iv
TABLE OF CONTENTS	v
LIST OF FIGURES	vi
GLOSSARY OF TERMS	vii
LIST OF CONTACTS	ix
CHAPTERS	
1 INTRODUCTION	1
2 LITERATURE REVIEW	10
3 ACTIVE PROJECT REVIEW	18
3.1 INTRODUCTION	18
3.2 NOVACORP INTERNATIONAL PIPELINE PROJECT	20
3.3 NOVACORP MALAYSIA PIPELINE PROJECT	26
3.4 HUSKY OIL BI-PROVINCIAL UPGRADER PROJECT	40
3.5 MANITOBA HAZARDOUS WASTE MANAGEMENT CORPORATION PROJECT	49
4 SUMMARY	58
5 CONCLUSIONS	71
6 PROJECT REGULATORY GUIDELINES	74
REFERENCES	90
APPENDIX	92

LIST OF FIGURES

	<u>Page</u>
1. Novacorp Malaysia Project	27

GLOSSARY OF TERMS

Phase(s) -

Are a general description of various stages of a project. The phases vary in number and duration for various projects and are intended to describe the type of activities being undertaken during the given phase. For a complete description see University of Calgary Course notes for ENCI 619.49, 1985.

Project -

Is the collection of activities which result in the realization of the Project Proponents concept; generally within the constraints imposed by the Project Proponent.

Project Manager -

Is the individual responsible for managing all people, resources and external issues associated with undertaking the Project.

Project Proponent(s) -

Is an individual, group of individuals or organizations who promote, financially or otherwise, the development of ideas for personal or corporate reasons, such that the ideas become a project.

Stakeholder(s) -

Are individuals, organizations or governments who are impacted by the Project due to their geography, legislative responsibilities, organizational mandate, or personal concerns. The stakeholders make themselves known to the Project Manager through various means and mitigation of the real or perceived impacts they will experience influence project management activities.

LIST OF CONTACTS

Barnes G., Project Manager, Husky Bi-Provincial Project

Cooke R., President and CEO, Manitoba Hazardous Waste
Management Corporation

Giesbrecht G., Manager Regulatory Affairs, Pan-Alberta Gas
Ltd.

Ramsvig D., Project Engineer, Novacorp International

Temoins P., Environmental Consultant, Husky Bi-Provincial
Project

Tonge R., Manager of Engineering-Malaysia, Novacorp
International

Turner R., General Manager-Malaysia, Novacorp International,

1. INTRODUCTION

The objective of a Project Manager and the project management team is to optimize all the resources available in order to complete the project within the expectations of the Project Proponents in terms of cost, time and quality. This requires development of a plan that integrates resource optimization with identification of, and procedures to control anticipated risks. The plan must be effective enough to reduce or eliminate the risks. The tasks involved in planning for, and then executing a project can be divided into two categories; 1) The strategic management tasks, and 2) The tactical management tasks.

Strategic management is the most critical of the two. It involves the development of policies which dictate how the tactical management will be undertaken. If the strategic management has been undertaken correctly the tactical management activities become routine and clerical.

Management of the Regulatory requirements, and related issues, comprise one area that a Project Manager must address and control if the project is to meet the expectations of the Project Proponents. The regulatory arena forms a very significant portion of the external factors affecting a project. The impact regulatory requirements place upon the project can vary from the completion of routine forms to being the subject of intense

public scrutiny, and even the promulgation of specific legislation (e.g. Northern Pipeline Act, 1985). The resources a project must commit to the regulatory requirements must be consistent with the degree of risk associated with those requirements. The risks must not be underestimated. The regulatory process, in most jurisdictions, encourages the involvement of the various stakeholders. It is quite conceivable that an individual stakeholder, or group of stakeholders, may use the regulatory process to promote their own agenda (Personal Communication, G.Giesbrecht). The stakeholders agenda may not necessarily be motivated solely by the project under review. For example, a community which feels it needs better drinking water or roads may use the regulatory process reviewing construction of a plant to draw political attention to their demands. The Project Manager must anticipate this type of eventuality, and where possible devise mitigative management plans. Managing these activities can consume a significant amount of the Project Manager's time (Personal Communication Mr. R.J. Cooke), particularly in the early stages of the project. The resource investment made by the Project Manager to prevent loss of control of the regulatory agenda must be consistent with the cost and schedule consequences of inadequate management.

The type of issues which must be addressed as part of strategic management include resource deployment, government

relations and involvement, stakeholder participation and selection of technological standards. The Project Proponent must choose what quality standards the project needs to attain in order to meet its anticipated economic objectives as well as whether those standards meet or exceed current and anticipated regulatory and community expectations. Ultimately, the strategic management activities set the tone for how the project will manage the regulatory agenda and are critical to the successful completion of the project.

Activities undertaken as part of tactical management include; development of contract language to assign responsibility for acquiring specific permits to contractors involved in the detail work; ensuring permitting is done on a timely basis, and ensuring relationships with regulators and stakeholders remain healthy and open.

Compliance with the law and its regulations does not necessarily guarantee an unencumbered right to proceed. The Project Manager must be in compliance and must also ensure the stakeholders expectations are being addressed. It is the regulators responsibility to approve or not approve requests by applicants. It is not the regulators responsibility to protect the Project Proponent from stakeholder objections, particularly where those objections fall outside the intent and parameters of the regulations. In fact, as indicated by Mr. Paul Temoin (Personal Communication) political situations, changing technology and

changing social values may result in the Project Manager being faced with the fact that there are no specific regulations pertaining to various aspects of the project. For unique projects, specific standards may have to be developed in consultation with the regulators, and subsequently monitored by the regulators. Alternately regulations may have to be created or existing regulations amended to address the uniqueness. In these situations, the Project Manager has little or no early information upon which to base preliminary cost, schedule and technical estimates. The Project Manager must openly discuss the unique aspects with the regulators and work towards feasible criteria for establishing legislation or specific rulings for the project. The Project Manager must include the stakeholders as part of the process of establishing regulations, or internal standards to prevent the subsequent development of regulations that are not responsive to the project or it's stakeholders.

Regulators do not want to adjudicate a project in which the stakeholders are objecting that they have not been consulted by the Project Proponent. Although such regulatory action is necessary periodically, the regulators would prefer it to be the exception. If the regulator feels that the Project Manager has not taken a consultative approach with the stakeholders prior to applying for regulatory approval, the regulator may suggest further preparatory work or place more conditions on the final permit (Mr. D. Ramsvig, Personal

Communication).

The Alberta Energy Resources Conservation Board ("ERCB") increasingly sees its role as one of a mediator between energy projects and the various stakeholders. Its goal is to overcome miscommunication and bring the parties to a reasonable consensus through compromise (De Sorcy 06/89). This process has put the ERCB in a position of being more of an active stakeholder and less of a quasi-judicial body and sets them apart from the more traditional regulatory role of adjudicating tribunals. It appears to be a much more successful and cost-effective strategy on the part of the ERCB and for the energy industry it serves. However, if mediation is unsuccessful the ERCB must convene a tribunal to adjudicate the issues. Despite ERCB policy that different staff be involved in the mediating process than the tribunal process the ERCB runs the risk of being perceived as not being impartial. The ERCB's evolution in this direction has been conscious, and as is discussed later in this thesis, worth the risk. The ERCB's mandate and history have allowed this relatively enlightened approach to develop. In comparison to similar regulatory bodies the ERCB has moved in the direction of mediation more rapidly than most. The literature suggests that such an evolution is common among most regulatory bodies (Heath 1959, Hout 1986). Ultimate responsibility for understanding who the stakeholders are, how much influence they have and their agenda lies with the Project Manager. The Project Manager, through such an

understanding, must ensure the stakeholder's agenda do not compromise the project's objectives of cost, schedule, quality and scope.

Ideally, the regulations affecting a project should encompass the general public's sentiments and obviate any further public input. However, many regulations are written intentionally to allow the regulator the ability to interpret them with a significant degree of discretion. The regulator must view the required criteria which allow granting or denial of the Project Proponent's request in light of many factors. Included in these are: recent advances in science and technology which bear upon the particular regulation; public perception of the type of project being reviewed; the efforts the applicant has made to reach a consensus with the project stakeholders; and the political and social dynamics surrounding the project. The regulator has to be sensitive to the different dynamics of these factors and others, and apply the legislation accordingly.

The Project Manager must therefore know not only the applicable regulations and which jurisdictions have authority over the project, but also the recent history of the regulating bodies in applying the regulations and the current political environment as it relates to the regulations. The Project Manager must also become aware of those issues upon which there is jurisdictional doubt, ENCI

619.54, (1986), for example where both Federal and Provincial levels of government have, or perceive themselves as having, jurisdiction. Where no regulations are seen to apply to project activities or items, it is the judgment of the Project Manager that will dictate whether to engage in an open discussion with the regulators in order to properly cover the issue, or presume it falls under an existing piece of legislation, or determine no legislation is applicable, and proceed accordingly (Mr. P. Temoin, Personal Communication). It must always be considered a very risky course of action to proceed without discussing the options and implications with the appropriate regulators. The risk to the project of continuing without a regulators input is something the Project Manager must evaluate and be willing to assume (R.S. Madenburg 1986). It is usually not a preferred course of action. Mr. R. Turner (Personal Communication) recounted how the project team he was involved with were subcontracting to large, experienced, international engineering firms who assumed that the virtually non-existent regulatory situation they had recently come from in Nigeria also applied to Malaysia and thus intended to bid their contracts on that basis. This could have been an enormous error in judgment as the two countries had completely different levels of sophistication with respect to their regulations. The net result would have been that these firms could have potentially lost a significant amount of money due to a lack of thorough research and understanding of the new jurisdiction's

standards. However; the Project Manager, in this example Novacorp International, who was issuing the contract, correctly took responsibility for doing the necessary research and avoided the worst possible outcome of the contractors lack of preparation. Although the Project Manager does not control the political, social, or legal environments surrounding the project, the Project Manager must nevertheless assume responsibility for managing them, as they pertain to the project, with the resources available. Those resources include the experience of the Project Management team, the experience of the regulators, and the input of the project stakeholders. The course work of the Project Management Specialization emphasised the importance of the Project Manager's planning process and the anticipation of potential problems. The strategic plans and associated procedures must be carefully and thoughtfully prepared and then consistently followed so that as the project proceeds it can respond to all eventualities.

From this introduction it is apparent that the Project Manager's responsibilities go well beyond management of the project team and its contractors and subcontractors. During ENCI 619.50, (1985), Project Human Resources and Organizational Effectiveness, it was indicated that the successful manager's skills were in the areas of facilitator, influencer and motivator, not one of an autocrat and dictator. The ability of the Project Manager to succeed in this area cannot be understated. If the

Project Manager, or a senior member of his staff, is not a skillful facilitator and negotiator it is very difficult for projects to successfully overcome the least amount of public objection.

The purpose of this thesis is to understand how the regulatory issues affecting project work are managed. The study draws from both the literature and field experiences of active project participants. From this study, it is possible to identify a small number of very important management principles which are critical to the successful management of external issues on any project. These general principles are based on the assumption there are no distinctions between various regulatory jurisdictions. The Project Manager's objective is to achieve the project objectives. Properly managing the external factors which potentially affect those objectives must then necessarily be a responsibility of the Project Manager. Regardless of the jurisdiction and its regulations, the general principles which guide the Project Manager's actions are unlikely to vary significantly from project to project.

If these management principles are ignored or are inadequately addressed, the external issues will negatively impact on the achievement of the major project objectives.

2. LITERATURE REVIEW

There is a limited amount of literature on the subject of managing the regulatory risks in project work. This is surprising, particularly in light of the regulatory issues associated with nuclear power plant construction in the 60's and 70's, and with the large projects that have had significant social impact since the last war. A number of excellent speeches made by Energy Resources Conservation Board (ERCB) members, which have been kept in their library, give a comprehensive view of where regulators in general have come from in the last twenty years and what they anticipate their role to be in the future (Millard 1985, Millard 1987, DeSorcy 06/1989, DeSorcy 05/1990, DeSorcy 12/1990).

In DeSorcy 06/1989, he describes how the public, up until the last twenty years, had little interest in what was taking place. The ERCB was mainly interested in their role of conservation, protecting public interest, and encouraging development. Their interaction was almost exclusively with industry. This was an era when the general population confidently relied on regulators to ensure the public interest was being represented. In the last twenty years this has changed significantly. The reasons DeSorcy gives are the following;

"i) The public are better educated,

- ii) There is much greater awareness of the potential impacts of industrial and other developments,
- iii) There is greater concern for the environment, due in part to the modern media,
- iv) There is greater prosperity, and as the standard of living increases, people can generally afford to give greater attention to matters such as their quality of life."

To Mr. DeSorcy's list it might be appropriate to add the following;

- v) The public are better informed, with respect to news in general and their individual rights,
- vi) The public are less trusting of public institutes and are therefore not prepared to unquestioningly accept the word of public servants or of corporate entities,
- vii) Public interest groups have a greater diversity of methods to raise funds and direct public attention.

This changing social setting has had a marked influence on how the ERCB interacts with industry and the public. The ERCB has consciously attempted to move away from the

adversarial procedure of hearings to a more participatory role. If the Board is successful in bringing the parties together at private meetings to resolve issues, it saves money, time and the almost inevitable consequence of a hearing with one party feeling it won and the other party feeling it lost. In De Sorcy 06/1989 he states;

"I believe we are passing through a transition period. We seem to be moving from a situation of high reliance on the quasi-judicial hearing process to one where co-operative problem solving will become the norm, not the exception, and the hearing process will be used primarily to settle those issues which an effective communications effort could not resolve."

Although the ERCB may have reached this position relatively quickly in relation to other regulatory bodies the trend is typical of regulatory bodies in general. All indications are that this trend has occurred throughout the developed world in the recent years. Heath, (1989) and Hout, (1986) describe the increasing degree of energy expended by projects on public participation and interactions with government agencies. The ERCB differs from most in that since its creation in 1938 it was set up to be a participant in the oil and gas industry, not just a referee. This has given it the policy position and credibility within the Province of Alberta to adapt with the changing social scene more easily than some other regulating bodies. This has

definite implications for Project Managers and the type of resources they must employ in order to successfully complete their projects. Rather than have lawyers working with engineers to demonstrate before a regulator that their project meets the legislated requirements, the ERCB has encouraged project teams to meet with the stakeholders and be prepared to resolve contentious issues before they become problems. The Project Manager must therefore be prepared to be more conciliatory, open, and accepting of public input in order to build the broadest consensus possible. This will demand a greater time commitment from senior project personnel. However, it maybe more cost effective than hiring lawyers to present evidence at regulatory hearings.

A term coined in the literature is "Alternate Dispute Resolution" (ADR) which is discussed by F.W. Kerr (1989). He maintains that Project Managers should become familiar with the techniques of mediation, due to the fact that court proceedings are expensive, time consuming and permit little or no control over results. ADR allows for a "win-win" result within the control of the mediating parties. Due to the reasons given earlier by DeSorcy, more and more projects will have to deal directly with stakeholder objections. Litigation is no longer the most successful path to resolution, nor the one preferred by regulators.

Hout (1986) argues that since the 1970's there has been an incentive, due to economies of scale, for undertaking very

large industrial and commercial projects. He refers to them as "macro-projects" and defines them as being those projects that are larger than \$1 Billion. They are often funded by government and generate the greatest amount of public reaction, and hence regulatory interface. Hout states;

"MACRO-Engineering projects are the subject of public debate and difference of opinion (and too often, of backlashes from the so-called extremist environmental groups)...".

It seems clear from this type of opinion that the project Manager in general, but particularly the Project Manager of large projects, must have a well defined plan for dealing with outside influences. In the current era, the fact that a project is not being built within an individual's neighbourhood or jurisdiction does not necessarily mean that that individual cannot influence the project's outcome either through regulators, politicians or as a consumer. There is an increasingly widely held view in the western world that the globe is small and everything done on, or to it affects everyone. Such a view makes the smooth completion of macro-projects very difficult as the number of potentially important stakeholders can be very large and diverse. Hout goes on to suggest;

"It would be a serious error to underestimate the amount of education and public relations necessary to

lay the groundwork for solid political support of publicly financed vital projects,...."

Although Hout is specifically referring to large projects the same is true for smaller projects, depending on the situation in the jurisdiction and the degree of controversy surrounding the project and it's potential impact on the local economy and environment. Hout also maintains that due to economies of scale and research, very large projects will become the best means to overcome global problems facing the world, such as food production, global warming, and energy production. Without a thorough understanding of the implications such projects will have with respect to public perception, they will go nowhere. Hout uses the term "education" before "public-relations" which is interesting, as it is probably the more important term. Education implies a two-way process, from the project proponents to the general public and the regulators, and vice versa. Only with this type of dialogue is it possible to reach a general consensus on the relative value of the project among the stakeholders, and thus permit the project to proceed in whole, a modified form, or not to proceed at all.

Consistent with the above thinking in ENCI 619.54 External Project Issues, (1986), R.J. Cooke proposed the thought that the government/regulatory influence is significant, particularly at the early stages of a project. He maintained that, historically this aspect of project

management has not been well managed and is characterized by;

- " - conflict
- misunderstanding
- schedule delay
- increased project cost
- lost opportunity cost
- more complicated execution
- project termination"

He further suggests that more sophisticated Project Managers should view the government interface with the following attitudes;

- " - manage and understand conflict
- acceptance of legitimacy of government involvement
- early strategic management
- integration of government influence with project priorities as part of overall project execution strategy"

These considerations reflect firstly, the historic situation regulators were responsible for adjudicating, and secondly the more updated role they attempt to fulfill. The move from the former to the latter is an evolutionary process that requires considerable trust by all parties involved. Government and industry must establish a dialogue that builds confidence and trust so that all the underlying principles upon which the regulations were based are

maintained within a streamlined process. Similarly, as various jurisdictions are moving to common economic policies and reducing tariff boundaries, regulatory bodies must remove the doubt and uncertainty from their regulatory processes so that project proponents are enthusiastic about undertaking project work within the jurisdiction. Without a clear definition of the regulatory parameters, projects will seek more manageable jurisdictions. This does not mean that regulating bodies have to capitulate on their standards and principles, rather they must clearly define what they are, and they should be defensible within the current scientific knowledge and social standards.

3. ACTIVE PROJECT REVIEW

3.1 INTRODUCTION

In light of the limited literature available, a review of on-going projects and their relative success was undertaken in order to research the subject area more thoroughly. Four different projects were selected based on several factors.

The factors were:

- i) Diversity in technological sophistication,
- ii) Diversity in cost and schedule magnitude,
- iii) Diversity in jurisdiction,
- iv) Diversity in regulatory involvement,
- v) Diversity in stage of project, and
- vi) Accessibility of information.

A questionnaire was developed (Appendix) which was intended to draw out information on the project. The areas of specific interest were: technical information on the project; management approach to dealing with regulators and government; resources expended on managing the regulatory agenda; and the relative success of the project from a regulatory perspective. The respondents were not restricted to addressing the questions as asked but were encouraged to address the whole issue of regulatory management from their perspective. It was hoped that in this manner the philosophy of the respondent, and presumably the companies they represented, would be transparent by the way they chose to respond. It was also intended that the respondents,

being at different levels in their organisations, would have different perspectives and sets of priorities, and this would be reflected in the responses.

The responses did not fall into set categories as anticipated, but upon reflection and consideration of who the respondents were and what their responsibilities are within the organizations, some of the anticipated results were achieved. Only one project (two respondents) answered the questions more or less as they were asked. In the other cases, although the responses were not directly related to the questions, they addressed the issues. This has resulted in more interpretation than originally intended but the end result has provided practical insight on how projects deal with the governing regulations. This in turn has helped in the guideline development. Upon further discussion with the respondents the type of responses should have been expected. Mr. R. J. Cooke suggested that no two projects are identical in all aspects and hence a statistical analysis of results is very difficult, if not impossible to achieve.

Accepting some of the shortcomings of such a questionnaire, it is the premise of this thesis that similar principles and management techniques are utilized in the more successful projects. The questionnaire directed at extracting these principles and techniques. The results of the questionnaire are are presented below.

3.2 NOVACORP INTERNATIONAL PIPELINE PROJECT

Project: Small Scale Pipeline Project in Alberta
Respondent: Novacorp International Consulting
Inc. (Novacorp)
Contact: Dave Ramsvig - Project Engineer
Description: Engineer, Procure and Construct (EPC) two
Notional Pipe Size (NPS) 6 pipelines for
hydrogen and oxygen of approximately 6Km.

This could be considered a "Routine" project (ENCI 619.49, Project Planning and Control) as it "involves additions and/or major revisions with essentially proven technology and of a nature consistent with current corporate/institutional activities and capabilities". This type of project is typically undertaken by Novacorp International Consulting Inc. (Novacorp) on contract to clients.

Canadian Liquid Air are building an air separation plant on the west side of Edmonton, Alberta. Two of the byproducts are hydrogen and oxygen which will be sold to a nearby Celanese plant. The most economic method of transporting the products is by pipe. As is typical in these processes the project owner, Canadian Liquid Air, has contracted the project out to Novacorp from the engineering phase to commissioning of the pipeline. There are no particularly unique aspects to the project and Novacorp is very familiar with this type of project, particularly in Alberta. Part of

Novacorp's contractual responsibility involves acquiring all necessary regulatory permits, which is something that Novacorp has done on numerous occasions in Alberta.

Depending on the magnitude of the pipeline being built it is either considered a "regulated" or "non-regulated" pipeline. If it is regulated, the Energy Resources Conservation Board (ERCB) leads the regulation process and ultimately will issue a Leave to Construct permit. If it is non-regulated, then the ERCB is only involved by the fact a simple submission must be made by the Project Manager. However, other government agencies may require specific permits be granted under their governing legislation. This is a non-regulated pipeline and as such a filing must be made to the ERCB to approve the construction and operation of the pipeline after consultation with other government departments such as Environment, Surface Rights Board, Transportation etc. Novacorp, through its affiliation with NOVA Corporation of Alberta (NOVA), has had a very long working relationship with the ERCB. Weekly meetings are held between Novacorp and the ERCB to discuss all projects currently being undertaken and any schedule changes, project deficiencies or stakeholder problems that have arisen. This process has streamlined both the ERCB's and Novacorp's work with respect to issuing permits to construct and operate pipelines for the former and maintain a tight project schedule for the latter. It should be pointed out that companies such as Canadian Liquid Air select contractors

like Novacorp not only for their skills as EPC contractors, but also for their long-standing rapport with regulatory bodies such as the ERCB. Such a rapport comes after many similar projects have been undertaken. Novacorp's ability to navigate the regulatory process without delays has a tremendous appeal to owners such as Canadian Liquid Air who rarely, if ever, go through this particular regulatory process themselves. Similarly, the understanding that has been built up between Novacorp and the ERCB at the working level significantly reduces the regulatory risk to the project. This type of reputation helps Novacorp sell its services to potential customers.

According to Mr. Ramsvig, pipeline applications are broken into different categories based on the size and length of pipe. As this particular project is non-regulated, a very simple submission is made to the ERCB which describes the project and declares that the necessary land has been acquired. There is little risk in this type of application. The only potential area of risk is in acquiring land. If a landowner is not prepared to allow a construction right-of-way across his/her property as a result of issues other than compensation, there would have to be a hearing. If it is merely a matter of the magnitude or type of the compensation it would be dealt with by the Surface Rights Board. The Surface Rights Board will hear the compensation issue separately and without impacting the project schedule. Again, a company such as Novacorp has a long history of

dealing with landowners for access to construct pipelines, and is very experienced in assessing reasonable compensation and negotiating with landowners. This again is a marketable service to inexperienced, or infrequent project proponents. Acquiring, through negotiation, all the necessary landowner approvals expeditiously is significantly cheaper than appearing before the Surface Rights Board. Similarly, the experience Novacorp has with both the ERCB and the Surface Rights Board leads to a more accurate cost estimate for regulatory management of the project at an early stage.

Regulatory approval on this type of project is neither critical for schedule completion nor a major cost component. Although landowner negotiations are often lengthy they can be done in parallel with the engineering, and often construction phases, and hence rarely impact the schedule. However, if the project proponent does not wish to proceed prior to regulatory approval, activities must be done sequentially and hence every schedule item has the potential to delay the project.

Mr. Ramsvig concluded his remarks by suggesting that over the years the ERCB and industry have managed to reduce the application process for this type of pipeline project to the very simple process now in place. This evolution is a testimony to the flexibility the ERCB has in interpreting the legislation and applying it. Through experience and consultation with industry they have reached a practical

method of addressing the legislation.

Summary of Novacorp's Management Techniques:

The techniques employed by Novacorp to successfully manage the regulatory activities on this project were:

- i) Vast experience with the regulatory body having jurisdiction,
- ii) Very limited number of regulatory requirements resulting in easily manageable undertaking,
- iii) Very experienced regulatory body (ERCB) which precludes unexpected legislative interpretation and has reduced the permitting process to a very simple form,
- iv) Very experienced populous and municipal government, making interfaces with these stakeholders very straight forward.

The Novacorp project described above was the simplest project reviewed in terms of cost, technical complication, and regulatory complication. For this reason it should have been the easiest project to manage from a regulatory perspective; and it was. The ease with which it was managed is in sharp contrast to the subsequent projects. This seems to indicate that repetitive commonplace projects evolve such that both the regulators and Project Managers undertake the

permitting procedures with minimal impact on the costs or schedules of the project. However, the ease with which this project was managed does not do justice to the effort historically made by both Novacorp, its parent company Nova, and the ERCB. After many years of experience the regulator and the industry it regulates have modified the regulatory process and largely eliminated the regulatory risk of undertaking this type of project.

The management lesson to be derived from this example is, that through repetition, cooperation and a willingness to improve the process, the gas pipeline industry in Alberta, including the ERCB, has reduced the regulatory requirements to the absolute minimum, making management of this activity very simple. This simplicity may not be possible in more complicated, unique projects, but is the type of situation both industry and regulators should be striving to achieve particularly as this type of project makes up the majority of pipeline work done in Alberta.

3.3 NOVACORP MALAYSIA PIPELINE PROJECT

Project: Major Pipeline Project in Malaysia

Respondent: Novacorp Malaysia

Contact: Ron Turner - Manager Planning & Controls
Roger Tonge - Manager of Engineering

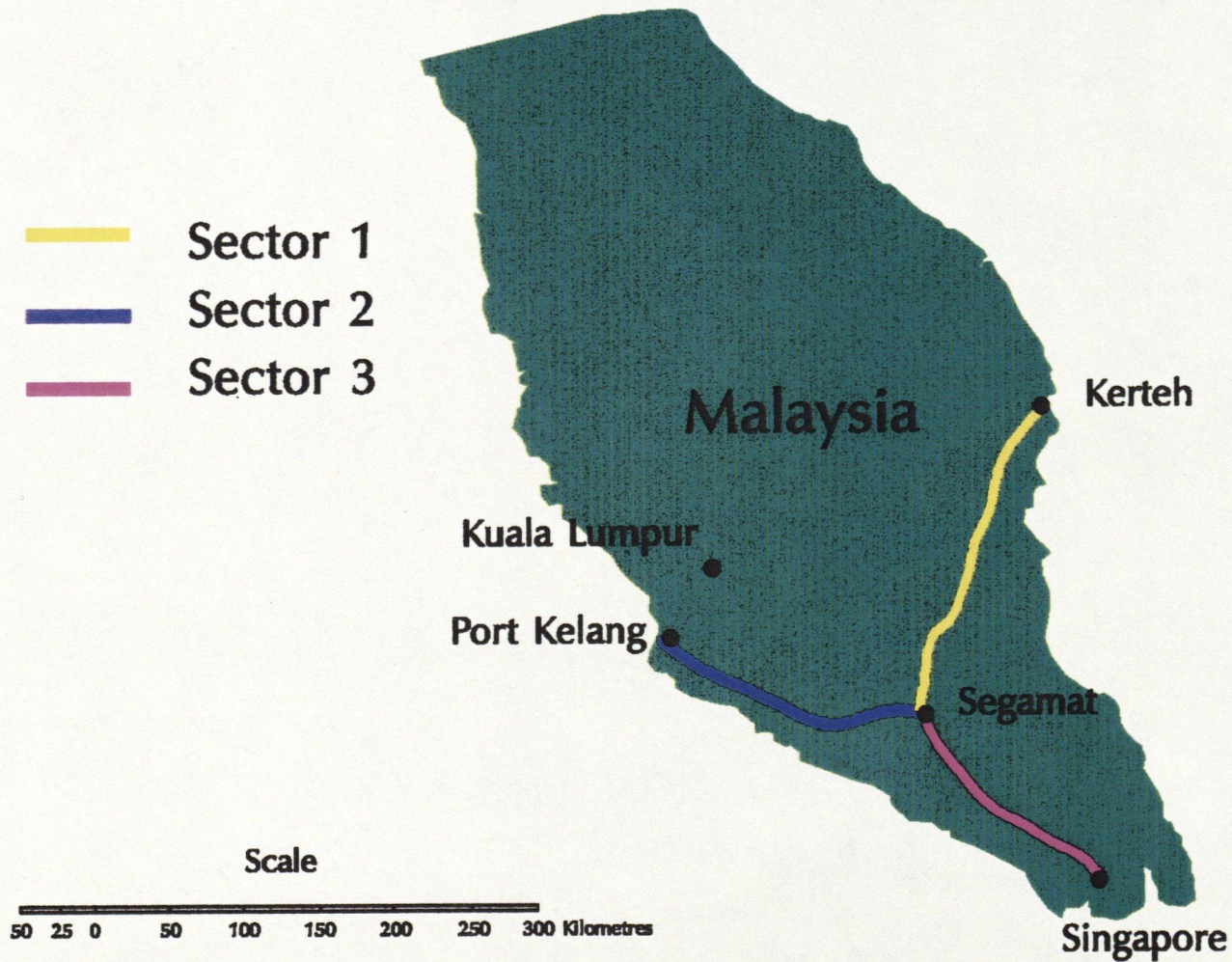
Description: Novacorp was appointed Project Management Consultant for the on-shore pipeline portion of a multi-faceted project. The on-shore pipeline consists of 740 Km. of 30" and 36" diameter pipe, seven (7) metering and regulating stations, one (1) compressor station and a supervisory control system for monitoring operations from a control centre. The project took place on the Malaysian peninsula originating near Kerteh on the east coast, going south to Segamat, Sector 1, where it branched into two legs one to Port Kelang on the west coast, Sector 2, and the other further south to Singapore, Sector 3 (Figure 1).

Unlike the first project reviewed, this project is definitely "unique" as defined in ENCI 619.49 (Project Planning and Control). It was unique from the owners perspective (Petronas¹) because they had little experience

¹ Petronas is a Malaysian crown corporation with specific interest in oil and gas.

Figure 1

Novacorp Malaysia Project



in pipeline projects of this magnitude. It was unique from Novacorp's perspective because they had never managed a project of this magnitude in this jurisdiction, with such a diversity of nationalities among the subcontractors, and an owner (Petronas) with relatively little experience. As described in Section 4.3 Novacorp has had considerable experience in pipeline construction work. This experience has been gained almost exclusively in Alberta with only a limited exposure to projects in foreign countries. The project itself had four components all with different project proponents. These were:

1. Development of gas gathering and off-shore pipelines (ESSO)
2. Gas processing plant on-shore (Petronas)
3. On-shore pipeline system (Petronas)
4. Conversion of existing power plants to gas-firing and construction of new plants (National Electricity Board of Malaysia).

Novacorp's responsibility was to work with Petronas in the management of the on-shore portion of the project. Particular responsibility for estimate preparation, contracting, and cost and schedule control fell to Novacorp. After altering the original outdated preliminary estimate and schedule, and establishing a contracting strategy determined by Petronas, the project was contracted lump-sum, fixed price, Engineer, Procure (except pipe procurement),

and Construct in the following packages to the respective contractors:

- | | |
|-----------------------------|---|
| 1. Pipe Supply | sectors 1 & 3 to a Japanese Consortium, sector 2 to Confab of Brazil. |
| 2. Pipeline
Construction | all sectors to MMC Gas (a consortium of Malaysian Mining Corp, Entrepouse SA of France, International Management and Engineering Group, (IMEG), of the U.K.). |
| 3. Stations | Niigata of Japan and ISM Corp. of Malaysia |
| 4. SCADA ² | Westinghouse U.K. and Dectra of Malaysia |

The experience of the various parties was described as follows;

Petronas: Gained a nominal amount of experience in 1984 with the construction of a preliminary stage of 40 Km of pipeline. The staff were unfamiliar with the

²SCADA - Supervisory Control and Data Acquisition.

type of contracts required for this type of project and were generally inexperienced in project management techniques for pipeline construction of this scale. Petronas, as a whole, had some experience in construction of world scale LNG fertilizer plants and gas processing plants.

Pipeline Company: The French shareholder was very experienced with the installation of pipelines. However, they took longer to fully assume their responsibilities for items such as regulatory liaison, Quality Assurance (Q.A.), safety and commissioning. The U.K. partner was also experienced, as their qualifications indicated, and completely fulfilled their contract obligations. At times, the construction contractor and the design contractor appeared to be at odds. This was largely due to differing contractual objectives between the two rather than poor performance. The designer wanted to have absolutely complete drawings and the construction contractor wanted to meet his schedule in order to avoid late penalty provisions.

Stations: Niigata was an experienced process plant EPC contractor, however they were not as experienced in the area of rotating equipment and measurement. ISM was an experienced, publicly traded Malaysian construction company.

SCADA: Other than the fact that Westinghouse are considered a major participant in this field, nothing was mentioned. Dectra was a relatively new and inexperienced company.

Regulators: Essentially no experience in high pressure gas pipeline systems. The only similar types of regulations are in the areas of electrical transmission lines and water pipelines. The agency with overall responsibility for the pipeline was the Factory and Machinery Dept. of the Malaysian Government, whose experience was largely in pressure vessels and lifting equipment. The legislation governing the pipeline portion of the project was the National Petroleum Safety Act (1985) which was based on U.S. codes and standards for construction of pipelines. As is typical of large pipeline projects, many separate agencies were involved including Public Works, Land Dept. of Drainage and Irrigation, Dept. of Federal Highways and Municipal Districts.

Contractually, Petronas included the responsibility of acquiring necessary government permits in Novacorp's scope of work. Novacorp, in turn, passed this responsibility onto the contractors, due to the fact most agencies required drawings which were being done by the individual contractors. Neither of these contractual arrangements are unusual, in fact they are

common in this type of project. It should be emphasised that Petronas took an active role in regulatory liason and their participation assisted both Novacorp and the contractors in completing their responsibilities expeditiously. Also, as with other Project Management contracts, Novacorp wanted the responsibility for acquiring the working permit approvals with the contractor performing the work related to those permits e.g. drawing approvals, site approvals etc.

Novacorp, in conjunction with Petronas, attempted in the feasibility stage of the project to define the regulatory obligations. The individual regulators were reluctant to commit the necessary resources to the development of new regulations before the project actually started, which made Novacorp's and Petronas's proactive efforts less successful than anticipated. The coordination between jurisdictions and departments could have been better from Novacorp's perspective. However, due to the fact pipeline projects necessarily encompass a large geographic area, it is inevitable that numerous jurisdictions will be involved. This makes coordination difficult. The general response to Novacorp's overtures varied from totally unhelpful, to the suggestion of excessively conservative and onerous guidelines. In addition, although Petronas had previously met with some of the regulatory bodies, they

did not make the minutes of those meetings available to Novacorp until after the contract was awarded. The underlying message from those meetings was that the regulations were going to be quite onerous. Petronas recognised that the project was the first of its kind in Malaysia and that regulations would have to be developed specifically as a result of the project. Petronas, with Novacorp as Project Manager, attempted to identify the regulatory requirements and the associated cost and schedule risk prior to bidding the work. Having made a reasonable, but not detailed, estimate of these factors Novacorp bid the work, including language which made it the responsibility of the respective contractor to acquire the working permits related to their work. Novacorp, as representative of the owner, recognised that the contractors being "experts" in their field should be able to estimate and quantify risk in their bid and hence accepted the subsequent bids accordingly. In their bids, the contractors would factor in the various contractual risks, including the scope of regulatory requirements and the possibility of any new regulations or changes to existing regulations, and bid accordingly. It is a fact that the party issuing the bid and the bidders recognise this allocation of risk and the work is awarded and undertaken with this knowledge.

Novacorp recognised at an early stage that the regulatory risks were major and consisted mainly of;

- lack of guidelines and procedures
- no one government department responsible for assisting the project to acquire the necessary permits. As a result, the contractors were required to seek permit approval from many departments, often with overlapping responsibility. Novacorp attempted to assist the contractors through this process.

Much work was done to mitigate the regulatory risk. Meetings were held between Petronas and regulatory officials prior to issuance of the management contract and subsequent to Novacorp being awarded the contract. The pipeline contractor invited engineers from the pertinent regulatory departments to work in the contractor's offices in order to familiarize themselves with procedures and design. However, due to the lump-sum nature of the pipeline contract it was not financially feasible for each contractor to spend much time educating the regulators.

Novacorp, Petronas and the contractors worked hard to build a good relationship with the various regulators. Due to this effort, and despite the fact the regulators

and Petronas were relatively inexperienced in this type of project, Novacorp believes the relationship prevented the regulatory activities from becoming unmanageable. Novacorp's very rough estimate of the cost of building and maintaining a healthy relationship with the regulators was less than 1% of their contract costs.

As discussed earlier, the work was awarded with the unwritten understanding that the contractor accepted reasonably incurred risks on the work about to be undertaken. The risk the contractor is prepared to accept is somewhat related to the competitiveness of the submitted bid and hence the profitability of the contractor's company. However, during design and construction the contractors were obligated to conform to regulatory standards that they had not anticipated and are currently seeking compensation from Petronas for the work required by the regulations. In Novacorp's view, the contracts leave Petronas contractually clear from this type of claim. The issue of the claim is still being negotiated between Petronas/Novacorp and the involved contractor. It is interesting to note that the assumption of risk discussed earlier is subjective as to what is reasonably anticipated and what is not.

Possible ways to avoid a similar situation would be to

recognize that, despite the fact that the contractors were experienced, the owner/managing contractor should ensure that the contractors understand thoroughly the implications of the regulations, or lack of them, during the bidding process. Contradicting this argument is the fact that the contractors are competing in a very competitive industry and that all participants responsibly completed their bids. Had Novacorp insisted on a full assessment of the regulatory requirements the owners costs would have increased as a result of the contractors obligation to thoroughly research and subsequently mitigate the regulatory requirements without discretion. Although Novacorp was aware that there were potential problems with the regulatory requirements they were unclear on the extent of the problem. As a result they highlighted this issue in the bid package and left it to the discretion of the bidders to assess the work required to meet regulatory standards. Thus the contractor could bid based on his experience as to the cost of completing this task.

Neither strategy is risk free but the latter one is based on the premise that the contractors are experienced and in the business of assuming such risks. By adopting this latter strategy there is a greater chance the owner will get lower bids but also a greater risk of contractors underestimating that risk and

consequently initiating litigation against the owner.

Summary of Novacorp Malaysia's Management Techniques:

The following management techniques employed by Novacorp assisted in the overall management of the regulatory issues;

- i) Being Project Manager for a crown corporation reduced the likelihood that regulatory issues would seriously jeopardize project viability,
- ii) Engineers prepared work which anticipated the requirement of regulatory approval. The contractors therefore automatically have this responsibility passed to them in their scope of work,
- iii) Regular meetings with the regulators ensured a good working relationship and reduced the potential consequences of misunderstandings,
- iv) By reviewing the regulations that the contractors would have to meet Novacorp was in a position to assist the contractors in the event that they had underestimated their extent and complexity.

The following issues on this project had the potential to negatively impact the project but were mitigated by

the management activities summarized above:

- i) Relatively inexperienced proponent, regulators, and the respondent (in the particular jurisdiction) with this type of project undertaking,
- ii) Too many jurisdictions having requirements of the project made management of the regulations difficult. Ideally, a single window approach for dealing with regulations would be the most efficient method,
- iii) Novacorp not having the benefit of the minutes of Petronas' meetings with the regulatory bodies prior to contract award.

Petronas and Novacorp potentially had a very difficult regulatory agenda to manage. They were able to overcome this for three main reasons: firstly, the project proponent was a crown corporation who was willing to assist in managing this area, which would tend to mitigate any unnecessary cross jurisdictional risk; secondly, Petronas and Novacorp approached the regulators openly and worked with them to educate them in this type of project and its complications, as did the pipeline contractor; and thirdly, Petronas and Novacorp passed the responsibility of gaining permit

approvals to the contractors. By these actions, Novacorp was able to manage the regulatory requirements and prevent them from becoming serious threats to the project's viability. Nevertheless the regulatory management of this project required considerable time and effort. Novacorp recognized this at the outset and prepared for, and managed the regulatory risks accordingly.

The management lesson from this project is that when undertaking projects in jurisdictions where there is little or no previous project experience to draw upon, the Project Manager must thoroughly study the implications of the risks, use local knowledge and assistance where possible, and contract the risk to more experienced parties.

3.4 HUSKY OIL BI-PROVINCIAL UPGRADER PROJECT

Project: Husky Oil's Bi-Provincial Upgrader

Respondent: Husky Oil Ltd.

Contact: Greg Barnes - Project Manager
Paul Temoins - Environmental Consultant

Description: To build a heavy oil upgrader capable of converting heavy oil into 46,000 Barrels/day of synthetic crude. The facility is in the process of being built in the Rural Municipality of Wilton on the Saskatchewan side of the Alberta/Saskatchewan border near the town of Lloydminster. In addition to diluted Heavy Oil, straight run distillate products from the existing Husky asphalt plant on the Alberta side of Lloydminster will feed the facility. Peak on-site workforce is estimated to be 3500 persons. The engineering was broken into six (6) major contracts as follows:

Project and Construction Management: Husky Oil with a joint venture of Monenco, Colt Engineering, Kilborn and Bantrel,

Utilities & Offsites: Kilborn & Bantrel,

Primary Upgrader (Hydrocracker and Gas Recovery Unit):

PCL Braun Simons,

Secondary Upgrader (Hydrotreaters): Bantrel

Hydrogen & Delayed Coker: SNC/Foster Wheeler

Sour Water Stripper/Amine/Sulphur/Tail Gas: Monenco

This once again would be considered a "unique" project as defined in ENCI 619.49 Project Planning and Control, (1985), for several reasons; the cost at project initiation (Sept. 1988) was estimated to be approximately \$1.267 Billion; the main proponent (Husky Oil) had never attempted a facility of this magnitude before. The primary upgrading unit uses a relatively new technology developed by a subsidiary of Texaco. The Project Proponents are a diverse group with relative ownership as follows: Canadian Government 31.67%, Alberta Government 24.17%, Saskatchewan Government 17.5% and Husky Oil 26.67%.

Husky Oil took responsibility for all major project permits including preparation and approval of conceptual design; preparation and approval of the Environmental Impact Statement; interface with Environment, Health and Safety, Boilers Branch, and Electrical Branch; and acquiring operating permits. Through contracts, Husky ensured the contractors acquired permits for such items as design approval and fabrication approval.

The Environmental Impact Statement was the most significant project regulatory process. The final document, which amounts to four volumes, had to cover everything from employment opportunities to technical specifications of the plant. As part of the process, Husky, in conjunction with the three governments involved, agreed that Saskatchewan Environment would be the lead regulator in this process and approval by it would constitute approval by the Federal Government. Reaching agreement for this process was a major undertaking because the different jurisdictions have different perceptions of their abilities and each other's agenda, and the agenda of their respective political masters. The process was a delicate and time consuming undertaking for all parties.

Despite reaching agreement on this process Husky still had to overcome the effect external events had upon the arrangement. During the course of engineering the Bi-Provincial Project, the courts ruled that the Federal Government could not abdicate its regulatory responsibility to the Saskatchewan Government in the case of the Alameda Dam. As a consequence of this decision the regulators revisited the EIS process to ensure each level had fulfilled their obligations as clarified in the ruling. This was complicated by design changes Husky had made between the time the original EIS had been approved (1984) and detailed design (1989). During the time the project took from first discussions with stakeholders to actual construction and

commissioning, legislation and regulations changed. As a result of this it took a great deal of flexibility on Husky's part and significant trust between Husky and the regulators to continually update the major project permits without impacting the project costs or schedule. This type of situation is not unusual and one which has to be anticipated prior to the project commencing. One way of attempting to ameliorate the consequences political and regulatory changes have on lengthy projects, and one which Husky adopted, is to chose a policy of always designing to ensure "better than required technology". This reduces the possibility that the above changes will result in redesign work mid-project. By adopting this policy Husky was able to develop a rapport with the regulators which tended to be supportive rather than adversarial. Potentially contentious issues such as waste water disposal, air emissions, and sulphur stock-piling were all granted permit approval without impact on the project costs or schedule. As a result of Husky's technology policy, Saskatchewan Environment attempted to rewrite their air emissions standards based on those achievable by the Bi-Provincial Upgrader.

As mentioned above, the EIS layed out the basic design philosophy and the processes to be used. The EIS was largely undertaken before the engineering contracts had been issued and hence design modifications were made as design progressed. Husky found that communicating all these design

modifications, even where they entailed environmental improvements was a challenging process because of the requirement to amend the EIS.

Husky had several regulatory advantages which it gained by design and by circumstance. The area around the city of Lloydminster was going through an economic depression at the conceptual stage and hence the Chamber of Commerce and other city groups were positive proponents of the project. Husky involved them where practical and encouraged their support. Because the three major governments were supporting the project it provided more than one avenue for communication between Husky and the regulators and vice versa if the permitting process ever became intractable. This ability to involve distant third parties to help the permitting process never became necessary. However, it is useful to have a third party with which both sides are willing to discuss issues should the need arise. On the negative side, Husky and its partners ran the risk in the prevailing political climate of being perceived to be too close and hence circumventing the normal procedures. Husky is justifiably proud that despite the fact the Saskatchewan government reached a very low point in public opinion mid-project, Husky's actions and their relationship with the stakeholders and provincial regulators meant that the project was never perceived as having been given favoured regulatory treatment.

Another sensible management technique employed by Husky was to contract some of the work to companies with local Saskatchewan knowledge. Most particularly Husky chose Kilborn to be one of the Off-Sites contractors. Kilborn had just recently finished a major refinery upgrade and refurbishment in Regina (Newgrade Project), and hence were very experienced with the Saskatchewan process and the regulatory bodies involved.

Summary of Husky's Management Techniques:

The following management techniques employed by Husky assisted in the overall management of the regulatory issues;

- i) As Project Proponent and Project Manager Husky took it upon itself to acquire all the major project permits. This not only helped in coordination and relationship building with the regulators at an early stage, but also meant that the contractors had a guideline on the project objectives, philosophy and policies;
- ii) Contracting out the requirement for regulatory compliance on items where the contractor had more expertise and local knowledge reduced the amount of coordination Husky had to undertake and the risk of delaying contractors with the resultant cost and schedule implications;

- iii) Regular meetings with the regulators ensured a good working relationship and reduced the potential consequences of misunderstandings,
- iv) Checking the regulations being contracted out in order to understand their extent and complexity prior to issuing the engineering contracts, resulted in Husky being in a position to assist the contractors in areas in which they had contractually assumed responsibility.

The following issues on this project had the potential to negatively impact the project but were mitigated by management activities summarized above;

- i) The multi-jurisdictional potential. Both the Canadian Federal and the Saskatchewan Provincial Government have the authority to demand that an environmental report be prepared. During the course of the project the hands-off regulatory approach taken by the Federal Government for the Alameda Dam was successfully challenged before the courts. Although this type of challenge was never attempted with respect to the Bi-Provincial Project the successful Alameda challenge could have significantly altered the EIS. However, there was no challenge to Husky's project and hence no impact on project costs or schedules;

- ii) The multiple engineering contracts being undertaken by different companies had the potential to confuse and slow the approval process for engineering drawings,
- iii) The political climate turned very pro-environment during the course of the project, which slowed or stopped several other projects at various stages of development,
- iv) The environmental branch of the Saskatchewan Government had no previous experience with this scale or type of project, and in fact had no formal regulatory policies for various processes Husky required,

Husky developed a very good relationship with the local population by the efficient operation of an existing facility for many years. Hence, the most significantly affected stakeholder was a strong project advocate. Through the years Husky has prided itself on its community involvement. The implications and benefits derived from such a policy were enjoyed by the project as witnessed in the tremendous support Husky received in the local community for the Bi-Provincial Project. Husky was able to manage the regulatory issues far more effectively due to this situation than might otherwise have been the case. This is a good

example of the type of policy instituted by companies with a long term commitment to a given community by demonstrating it's concern for the local stakeholder.

Husky's objective of "better than required technology" proved to be a sound strategic decision. Although this may have required more work, Husky and it's contractors have, to date, managed the regulatory arena without any threat to the project costs or schedules, and possibly with enhancements to the quality.

The management lesson from Husky's project is three-fold: 1) in a multi-jurisdictional situation the Project Manager must be a leading participant in the allocation of jurisdictional responsibility. By guiding that decision process Husky set the framework for mitigating jurisdictional challenges later in the project. 2) by choosing "better than required technology" for the facility meant that Husky had the goodwill of the government agencies when design changes were required. 3) Husky's long-term commitment to the Lloydminster community provided significant stakeholder support from local citizens and politicians from the outset.

3.5 MANITOBA HAZARDOUS WASTE MANAGEMENT CORP. PROJECT

Project: Manitoba Waste Management Facility

Respondent: Manitoba Hazardous Waste Management Corp. (MHWMC)

Contact: Rick Cooke - President & CEO

Description: Mandate from the Province of Manitoba to construct a commercial hazardous waste management system capable of managing (handling) Manitoba's hazardous wastes in an environmentally sound manner. The system is in the Planning/Design Phases of its life. The major capital component of this system is a central maintenance facility which will cover an area of approximately 14 Hectares in or near the City of Winnipeg. The facility consists of a physical and chemical treatment plant designed to treat organic and inorganic wastes such as spent industrial acids, oily wastes, and industrial waste water, with organic handling, bulking and transfer capabilities. In addition the MHWMC provides consulting services to various industry and government bodies throughout Canada and a public awareness campaign within the Province of Manitoba.

As in the previous two projects this could be defined as a "unique" project as defined in ENCI 619.49 (Project Planning and Control). The reasons for this uniqueness is that the project management company, MHWMC, was set up by the Government of Manitoba but at arms length to the government and the regulators. Further it involves the latest technology with respect to hazardous waste disposal methods and is employing a "systems approach" to waste disposal, which is relatively novel in this industry. The type of facilities and services contemplated and the political reasons for its development were relatively untested at it's conceptual stage. Finally, the process of siting and constructing this type of plant with public support is unusual if not unique.

The project has reached the stage of preliminary design and final site selection. Considering that the Corporation was founded in 1987 to undertake this project, it seems to have taken a long time to have reached this stage. However, from the outset it was understood that public support and acceptance was essential to ensure the project's success. The Project has its origins in a long term public policy initiative dating from the early 1980's and having the following phases;

Phase I - Develop an information base

Phase II - Design and propose a system, and

Phase III - Implement and operate the system.

The role of the MHWMC is in the latter two phases. The second phase was intended to define the parameters of the hazardous waste problem in the province, plan the overall system, and start the siting of its major components. In this regard the MHWMC had to be cognizant, in designing and executing a facility siting process, of the Manitoba Environmental Commission's statement on this subject, which was:

"Public acceptance of the management system components and the location of facilities is essential.

Experience elsewhere has demonstrated that, without such public approval, the actual siting of facilities is difficult or impossible. Therefore, public participation in the entire process has been and will continue to be a key feature of all steps in the development of the Hazardous Waste Management Program."
(Clean Environment Commission, May 1987).

The siting process and a determination of the scope of the hazardous waste situation in Manitoba has taken MHWMC approximately three years. However, it was important for them to gain public credibility and general acceptance of the project concept. Going to the field prematurely would have had potentially disastrous results, both economically and because the community ultimately needs such a facility.

This type of project has a history of failure during this phase of activity. The method of site selection often employed is to choose a site based on sound economic and engineering criteria with little or no public consultation, and after the site has been purchased start to inform the neighbouring communities. This was exactly what MHWMC wanted to avoid. Having invited interested communities to participate in a "co-managed" investigation of whether their community is suitable and whether the project is acceptable to the community ensures, as the short list of potential sites is reached, that they have been involved and interested in being the chosen location. The process also offers the MHWMC the opportunity to learn more about what criteria the general public are most concerned with, which can ultimately feed into the design and operating cycles. Over sixty communities expressed an interest in pursuing the development of the physical components within their jurisdiction. In early 1990, a short list of five communities was established and a collective investigation through a Community Advisory Committee was initiated. Of these five, two withdrew prior to completion of the joint siting investigation. One was dropped by MHWMC due to failure to meet environmental standards, and two (Winnipeg and Montcalm) proceeded through the detailed site evaluation and environmental impact assessment.

The success of this strategy resulted from good communication with the public on issues of project content,

community concerns regarding hazardous waste management, and the consequences of not implementing such a program. The process indicates to the general public that they are part of the problem, and must therefore accept their responsibility as part of the solution. The project then builds a reputation as being a community participant rather than an outsider only partaking for financial gain. Besides media contact and public meetings the MHWMC provided a household hazardous waste service whereby the MHWMC provided technical support as well as staff during hazardous waste collections in the City of Winnipeg and throughout the Province. Their involvement indicates MHWMC support for the community as well as enhanced MHWMC's position as a Corporation charged with the undertaking of a broader consultative process.

The community support earned through this siting process means the project has valuable and proactive stakeholders who have been involved in the site selection process and support the EIS application. If the environmental review were to turn up design inadequacies, the selected community would presumably work with MHWMC in order to find acceptable solutions instead of acting as project critics.

Summary of Manitoba Hazardous Waste Management Corp.'s Management Techniques:

The following management techniques employed by

Manitoba Hazardous Waste Management Corporation assisted in the overall management of the regulatory issues;

- i) Being a Crown Corporation with a mandate from an elected government to construct a facility to responsibly manage Manitoba's hazardous wastes provides the MHWMC with initial credibility. While having the potential to cause some confusion for the regulators it also provided MHWMC with the mandate to properly approach the difficult task of gaining public support without unnecessary haste,
- ii) Properly identifying the extent of the facility requirements based on the waste situation increased the credibility of the project and its objectives,
- iii) Building a rapport with the communities actively expressing an interest in being the host community allows both the community and the project to assess the strength and weaknesses of each other, and hence there are no surprises at the time of site selection,
- iv) Regular meetings with the regulators ensures a good working relationship and reduces the potential consequences of misunderstandings,

- v) Having the strong support of the host community and the Provincial government at the time the project sought approval of its major regulatory permit lends political credibility before the regulators.

The following issues on this project had the potential to negatively impact the project but were mitigated by management activities summarized above:

- i) This type of project historically is one in which gaining an acceptable site is critically important and one in which the process can often ruin the project before it ever really gets started,
- ii) This was a unique project for this particular jurisdiction and one that is relatively unique world wide. The potential of dealing with inexperienced regulators who are concerned about approving something they are unfamiliar with could lead to project delays.

As appears to be the case on other large projects, the government was involved as a stakeholder in this project. Their role was significant as the MHWMC was created by the government as a Crown Corporation whose express responsibility was to seek suitable methods of dealing with the hazardous waste created within the Province. This

involvement meant the MHWMC was advantaged by the fact that they were not perceived by the general public as being in the business for profit, and had the financial resources to approach the regulatory agenda with a reasonable plan of execution.

The management lesson from this project was that MHWMC took advantage of the benefits government involvement bestowed upon them. They took a significantly long time, in relation to the overall project schedule, to reach the point of filing an Environmental Impact Statement. But, having reached the point of filing, the MHWMC was confident that they would get approval to proceed, due to the overwhelming support they had developed with a broad spectrum of stakeholders, most particularly the community in which the project was to be sited. Having recognized the greatest risk to the project's success was acquiring a willing host community, the MHWMC planned and undertook a strategy of community involvement from the outset. By working with this community through the planning stage and preparation of the environmental documents, the MHWMC was able to almost entirely remove the siting risk.

Although the MHWMC has not yet started construction, it is their opinion that they will not have problems with opposition during this critical phase. The overall strategy of developing a public consensus prior to seeking formal regulatory approval was in MHWMC's opinion less prone to

being adversial and does not allow the project to fall short of political and public expectations. This strategy is very consistent with that promoted by the Energy Resources Conservation Board as described earlier.

From an economic perspective it is far less expensive to take the length of time MHWMC took, with a relatively small staff and no contracts issued, than to deal with disgruntled stakeholders after construction has started. Regardless of the economic rational, MHWMC managed the difficult site selection process in an exemplary manner from an ethical and business practice perspective.

4. SUMMARY OF MANAGEMENT TECHNIQUES EMPLOYED

IN THE ACTIVE PROJECT REVIEW

Several observations can be drawn from the Active Project Review. The observations tend to be concentrated on the strategic side of regulatory management. This was anticipated due to the influence strategic management has on the project's success. Several observations were also drawn from the information as it relates to tactical management. The major observations were:

- i) Management of regulatory issues is best achieved through management of stakeholder issues,
- ii) Management of regulatory issues is governed by the practices and policies instituted early in the project,
- iii) Management of major regulatory submissions is the responsibility of the Project Manager,
- iv) In jurisdictions where repetitive projects are being undertaken it is possible to streamline the regulatory process,
- v) Tactical management is best undertaken by the contractors who have the greatest experience with the jurisdiction's regulations.

4.1 Discussion

- i) Management of regulatory issues is best achieved through management of stakeholder issues

It is apparent from personal communications with project personnel that the issuance of permits by regulators does not then exempt the project from further external influences. In fact, there may be specific legislation that requires the Project Manager to inform the general public about the project activities. Permits can be revoked as a result of external pressures and even if the permits are not revoked, legal arguments can be made that question the validity of the permit (Husky's Bi-Provincial Upgrader). The external events may have arisen without the specific project in mind, as in Husky's Project, and the court decision on the Alameda Dam, or as a direct result of the project negatively impacting stakeholders. The ultimate consequence to the project is schedule delays, usually in conjunction with cost overruns which could conceivably render the project uneconomic if delays occur at critical phases of the project. Prevention of this eventuality is the responsibility of the Project Manager. In order to mitigate the potential consequences of external parties negatively impacting the project, the Project Manager must

understand who the stakeholders are, what issues are motivating them and how entrenched they are in their positions. The Project Manager must consult with all stakeholders. The media should not be overlooked as a potential stakeholder. It is the objective of the Project Manager to try and reach a position whereby all parties agree to the value of the project and need only discuss how to mitigate the negative consequences. Nevertheless, the Project Manager must anticipate actions taken by objecting parties that will impact the project objectives, and prepare a plan for their prevention or mitigation.

The Manitoba Hazardous Waste Management Corp. took a relatively unique approach in that they identified the scope of the problems they would have to deal with, then identified the type of plant that would be required to handle the wastes, and finally identified the siting requirements. In parallel with research and engineering activities, MHWMC also sought out communities interested in the facility being sited within their jurisdiction and which met the siting criteria. By involving potential communities in the research and preliminary engineering phases, MHWMC gained their confidence. MHWMC had several communities who were openly seeking the project

and were disappointed at not being the final selection. This was an sensible method of managing the very delicate question of siting a hazardous waste management facility. Selecting only one site and then attempting to get regulatory approval would have left the Project Manager in a poor negotiating position. Having several sites under review simultaneously allowed the Project Manager much greater negotiating flexibility. Through this technique MHWMC successfully managed the most contentious and risky part of the project. As a result gaining regulatory approval will be simpler and the regulator does not have to worry about approving a project that does not have stakeholder approval.

The Husky Bi-Provincial Project, which had several governments as financial participants, overcame the potential problem of overlapping jurisdictions by obtaining the mutual agreement of the jurisdictional participants that Saskatchewan Environment would be the single regulatory window. Although the Federal Government subsequently chose to undertake an independent review, the single window approach saved excessive duplication and confusion. The government agencies, partially as a result of their financial involvement, were as interested as Husky in simplifying the regulatory

process and minimizing the regulatory risk.

Novacorp Malaysia was similar to Husky in that the state-owned petroleum company was the project proponent. In conjunction with Petronas, Novacorp was able to work well with the regulators and in general prevent any regulatory issues negatively impacting the project. The one area that was an acknowledged risk was the contractor's research of the regulations in Malaysia. As a result the contractors had more costs complying with the regulations than anticipated.

Finally the Novacorp pipeline project is so routine that Novacorp and the ERCB have established regular meetings to review on-going projects, thus reducing the risk of project delays. Also, the ERCB process for granting project approval for a pipeline of this magnitude is very streamlined.

- ii) Management of regulatory issues is governed by the practices and policies instituted early in the project

Again the example projects demonstrate the need for the Project Manager to have a clear understanding of the regulatory issues affecting

the project and the procedures necessary to mitigate the likelihood of those issues negatively affecting the project. The greatest opportunity to control the possible consequences of regulatory issues is in the early phases. In fact, it is preferable to have a reasonable understanding of the regulatory implications in the conceptual phase as one variable in deciding the viability of the overall project.

The Manitoba Hazardous Waste Management Corp. is the best example of a Project Manager that recognized that the greatest risk to the project's success was the site approval. A parallel process was undertaken. Firstly, the identification of the magnitude of the disposal problem and secondly, the identification of communities willing to host the facility. The Corporation was founded in 1987 with the objective of building a waste treatment and disposal facility. It is now 1992 and no ground has been broken. A relatively small amount of money has been spent reaching the execution stage with virtually no risk to the project sponsors' capital. This is a good example of where a government's financial resources and concern about the stakeholders has allowed a contentious project to proceed without a time consuming and expensive regulatory arbitration

process. It demonstrates that Project Managers attempting contentious projects should approach the public openly and as early as possible in order to avoid serious problems with the public and the regulators. It is particularly important to avoid problems that may occur late in the project when their impact is more significant. As suggested by Hout (1986) many future large projects will be non-profit in nature and undertaken for humanitarian or environmental reasons by governments. The MHWMC is a good example of how governments can create private companies to undertake such projects successfully.

In a similar fashion both the Husky project and the Novacorp Malaysian projects sought regulatory understanding early in the projects and built a rapport with the regulators that, although challenging at times, helped them avoid costly field stoppages or rework. In the Novacorp Malaysian example, the contractors were in trouble due to inadequate appreciation of the scope of the regulations despite the fact that Novacorp had warned them and had taken steps to avoid such an eventuality.

The management of regulatory issues as demonstrated by these projects is consistent with

the direction the ERCB has urged industry to go. As discussed in the literature review, the ERCB suggests that due to changes in society, project proponents cannot expect to interface solely with the regulators. Project Managers must also manage the project stakeholders. An authority such as the ERCB is prepared to facilitate such management but ultimately the responsibility rests with the Project Manager. Without adequate stakeholder agreement the ERCB can deny, or grant, a permit to construct or operate with conditions attached. Those conditions might be items aimed to satisfy the ERCB that the project is being constructed and operated in a manner consistent with generally accepted public tolerances. If such a conditioned permit is issued, the Project Manager has lost some of his ability to use discretion during design and construction and has usually lost the good will of the affected stakeholders. Proper management of the stakeholders at an early stage in the project is the preference of the regulator. This leaves the Project Manager the ability to undertake the project in a flexible manner, and within the understanding arrived at with the project stakeholders.

iii) Management of major regulatory submissions is the responsibility of the Project Manager

Permits requiring submissions and certification are prepared by contractors with the necessary expertise. However, the major project submissions are normally made early in the project and by the Managing Contractor or the Project Proponent. In North America, for most engineering projects this is an Environmental Impact Assessment, or Review, or Statement. This document is a description of the project and the mitigative measures to be undertaken to meet all required environmental, engineering and socio-economic standards and regulations. A significant amount of the information contained in the document is non-regulated but of interest to individuals or organizations that are affected by the project. Preparation of such a document is time consuming and difficult due to the number of different groups that must be involved in its preparation and the diverse audience reviewing it. Early in the project, process engineers must more or less commit to the specific type of process; environmental engineers must commit to types of technology and control processes; and construction engineers must commit to construction techniques and workforce numbers and components.

It is essential that the technological and environmental standards are clear to the project team and any contractors involved at a very early stage of the project. As shown by the projects reviewed the strategic management included an acknowledgment of the regulatory responsibility and a declaration of the policies by which they were to be undertaken. The environmental engineer must clearly understand what authority is commensurate with the position. Other members of the project team must also be aware of the input required by the environmental engineer. During the early stages of the project, at least until engineering contracts are issued, the environmental engineer should report directly to the Project Manager.

The strategic management of the environmental document starts very early in the project. As demonstrated by the active projects, very large and complex projects usually had some form of government involvement, either financially or through a crown corporation. It is usually the large projects that have the greatest degree of regulatory complexity and risk. If a major stakeholder is also a partner in the project, utilizing the self interest of that stakeholder to ease the development and approval of such a

document is a legitimate secondary benefit. This should not be construed as being a method of avoiding legally required permits but simply provides a method of streamlining the process. Acknowledging how and to what degree such involvement may ease the regulatory management, is something the Project Manager should consider very early on in the project.

Finally, hiring capable, experienced contractors to assist the project staff in the development of the environmental document is an effective way to ensure the final product is acceptable in form and content to the reviewers. Qualified staff working closely with the regulators throughout the preparation of the documents will reduce the likelihood of rejection upon submission.

- iv) In jurisdictions in which repetitive projects are being undertaken it is possible to streamline the regulatory process

As seen in the Novacorp Pipeline project undertaken in the Province of Alberta, small scale repetitive projects should be able to reach a very light handed level of regulation. This unobtrusive type of regulatory involvement has

been accomplished after many years of cooperation between the regulators and industry. Through regular meetings and a history of exemplary business practice, the Energy Resources Conservation Board and the industry it oversees have reduced the regulatory risk to pipeline construction in the Province of Alberta to an insignificant level.

- v) Tactical management is best undertaken by the contractors who have the greatest experience with the jurisdiction's regulations

As discussed above and in the active project review, it is common tactical practise to include the general permitting responsibility as part of the contractors scope of work. In the case of Novacorp building pipeline projects generally, and in the Province of Alberta in particular, their experience in dealing with the regulatory processes required to undertake a pipeline project makes them an attractive choice for a prospective project proponent. Similarly, Husky's choice of Kilborn as the contractor largely responsible for Offsites & Utilities for the Bi-Provincial project was sensible in light of their recent experience managing a very similar project in the Province of Saskatchewan. Developing the necessary expertise

in companies that are unfamiliar with jurisdictional requirements and the regulatory processes could be expensive. It would expose the project to a degree of risk and ultimately be less cost effective unless the company has aspirations to continue working in the jurisdiction. Because of this, industry practise indicates that the most cost effective, least risky, form of management is to include regulatory responsibility as part of the contract scope of work to the companies with the most experience.

5. CONCLUSIONS

From both the literature review and a review of the active projects several major conclusions that pertain to regulatory management can be drawn. These conclusions are critical for prospective Project Managers to be aware of as they begin to undertake a project. The conclusions can be summarized as follows:

- i) In an increasingly sophisticated world, with people having an increasing focus on environmental issues, properly estimating the impact that external stakeholders have on the ultimate success of a project is critical.
- ii) Understanding the agenda and influence that each of the project stakeholders has, is critical to the successful management of the project.
- iii) Having understood the agenda of the various stakeholders and planned how to manage them, it is essential to maintain an open dialogue with each of the stakeholders in order to avoid managerial surprises at the critical project phases (procurement, construction and commissioning) that most seriously threaten the success of the project.

- iv) During the preliminary engineering phase of a large project, one of the highest management priorities for the Project Manager is the successful approval of the Environmental Impact Document,
- v) It is the responsibility of the Project Manager to clearly and unequivocally declare the environmental and technological standards of the project at a very early stage.
- vi) Selecting contractors experienced in the jurisdiction in which the project is sited and with the technology being employed, is the best means of successfully managing the tactical aspects of regulatory issues.

The above conclusions are verification from the information gathered in the work of this thesis. As indicated in the Introduction, one of the purposes of this study was to draw out the most important management principles for Project Managers to be aware with respect to regulatory management. Without careful consideration of the implications of these principles, the Project Manager runs a significant risk of not achieving the project cost, schedule and quality objectives.

As indicated above, this thesis provides verification that

companies who regularly interface with regulators and stakeholders as part of their business environment have developed procedures consistent with those espoused by the literature and regulatory bodies such as the ERCB. This thesis is an academic review and verification of those procedures and thus is available to any party interested in this area of study.

Further work to gain an increased knowledge of the most appropriate methods of managing this area of project work could be undertaken. This study did not include the views of various stakeholders other than one regulatory body. Organisations like the Sierra Club, Green Peace, and native bands could provide a valuable perspective of their dealings with project interfaces. A specific study could be undertaken in this area. Due to the background of the writer and the business community in Calgary there is a propensity to concentrate on energy projects. Further study of the methods employed in other industries could provide a more diverse perspective. As opposed to this study which attempted to identify the similarities in management techniques in very different projects, further studies could be made on very similar projects undertaken by different companies to learn whether there are differences. As the relative success of various companies techniques is somewhat guarded, any method of learning candidly about their failures would be very beneficial to the whole area of studying Project Management techniques.

6. PROJECT REGULATORY GUIDELINES

6.1 Introduction

Having reviewed the literature and questioned in depth various people actively involved in projects, it is possible to develop guidelines to assist prospective Project Managers in adequately addressing the regulatory issues. These guidelines are broken out by project phase and divided into a general heading and, where appropriate, headings for cost, schedule and quality. These guidelines are intended to be comprehensive enough to provide any Project Manager or contractor with the questions that should be asked prior to starting a project. They are not intended to be exhaustive, rather they are intended to provide the reader with the thought processes required to formulate subsequent questions specific to his/her project.

The format is designed to allow an individual with interests in specific phases or areas of the project to go directly to the relevant area. The reader should be aware that responses to the first questions and the policies and actions they precipitate will have a direct bearing on the later actions. As a result, reviewing the later questions in isolation maybe slightly misleading.

6.2 Conceptual/Feasibility Phases

Most of the guidelines in these phases can be addressed by the project proponent either through their own knowledge or after consulting a relatively small number of people. It is essential that there is an accurate understanding of the issues behind the following questions in order for the project objectives to be successfully achieved. Sound, thoughtful responses at the early stages of a project make the later phase questions more routine and result in less likelihood they will negatively impact the project.

6.2.1 Conceptual/Feasibility Phases - General

1. What jurisdictions are involved? e.g. Federal, Provincial, Municipal.
2. What stakeholders are likely to be involved? e.g. Board of Directors, Shareholders, Federal, Provincial and Municipal Governments, Natives, Chamber of Commerce, Landowners, Environmentalists.
3. With respect to jurisdictional involvement; what is the current political standing of involved elected bodies with their electorate and when are they next due to go to the polls?

4. With respect to all stakeholders, identify your understanding of what their position with respect to the project is likely to be? Identify whether their positions are entrenched or negotiable? For uncommitted stakeholders or parties, that you believe should be stakeholders, plan for your mutual education and aim for their support as early as possible in the the project. A sound grasp of all the participant's positions is essential at this point in the project.
5. What has been the recent history of public reaction to similar projects within the jurisdiction?
6. What is the proponents view of the public's acceptability of the project? Identify the positive and negative aspects of the project from the stakeholders perspective.
7. Outline a strategy for gaining public and political acceptance through whatever means you believe to be the most appropriate, e.g. meetings with Chambers of Commerce, Unions, fish and wildlife groups, landowners, newspaper announcements, open houses, mail outs etc. Do not cut corners in these activities. Recognize that in todays environment encouraging the stakeholders

to become involved in the project decisions impacting them is often the best way to gain their support. Building trust and communication at this stage is more cost effective than trying to establish it later in the project. Involve the media where it is appropriate.

6.2.2 Conceptual/Feasibility Phase - Cost

1. What are the estimated costs to undertake the regulatory and public interfacing activities? Include everything from community hall meetings to permit fees and manpower requirements. Even if it seems that much of the work will be part of the contractors' responsibilities you should have a reasonable knowledge of these costs in order to assess the quality of the bids.
2. Draft a budget for these items including executive time required in the early phases and costs associated with mitigating public/political concerns.
3. Obtain an engineering evaluation of the anticipated costs the quality standards the proponent requires will precipitate.

6.2.3 Conceptual/Feasibility Phase - Schedule

1. What are the potential impacts of the regulatory

issues on the project schedule? Concentrate on the potential unknowns and assess the worst possible, and the most likely scenarios. Recognise that a delay due to public debate or regulatory misunderstanding during the construction and commissioning phases can impact the financial viability of the project. If these situations impact the hurdle rate of return, considerably more time should be spent mitigating their occurrence.

2. This is not the time to include regulatory permit approval into the milestone schedule, but an assessment of how the project will be regulated and whether that will affect the schedule is probably worthwhile.

6.2.4 Conceptual/Feasibility Phase - Quality

1. What policies are appropriate for the project?
 - Meets existing regulations?
 - Exceeds existing regulations?
 - Best available technology?
2. What are the cost, schedule and risk impacts of the above decision?
3. Understand the long and short term implications of each regulation. Having decided what policy is

appropriate ensure that as more staff and contractors are brought onto the project they are properly informed. What are the costs of having to upgrade equipment during operation in order to meet increasingly more stringent standards versus paying for technology that goes beyond the requirements today?

4. What quality standards do the regulators require in the current environment?

6.3 Planning Phase

At this stage of the project the Project Proponent should have Project Management staff on the project with a small number of engineering, procurement, construction and operations staff. If it is the intent of the Project Proponent to contract out to a Project Management firm this should have been done. The amount of work required at this stage is beyond the ability of a few executives with seconded staff. In addition the project should have a budget and milestone schedule at least to a "go/no-go" decision point. At this stage a contracting strategy, milestone dates, design estimate, and technological standards should be chosen or completed.

6.3.1 Planning Phase - General

1. Having decided on a contracting strategy develop contract language which details the responsibility of the individual contractors with respect to regulatory obligations.
2. Identify the specific regulations pertinent to the project and have some knowledge of the technical aspects of the submissions required, timing of the submissions and sophistication of the regulators. For example, the magnitude of the Bi-Provincial Project is probably greater than the Saskatchewan Boilers Branch is accustomed to and there may not be the necessary staff to check and approve all the drawings in a timely manner.
3. Identify specific jurisdictions, branches or departments and individuals responsible for the permits the project requires. Make contact at the appropriate level with the regulators and gain an understanding of what they will be expecting and how they like the submissions presented. Find out if new legislation is pending which will affect the regulations as currently drafted. Even if this work is eventually passed on as part of a contractors package, it is important to know the expectations.

4. Identify and contact the various stakeholders. Find out what their positions are with respect to the project and what issues they would like clarified or where assurances are required. For different groups of stakeholders, different techniques should be used to communicate, from news-letters to private meetings. Ensure there is an accurate understanding of the issues concerning and pleasing the stakeholders, and feed that back into the design and management philosophy of the project.
5. Ensure jurisdictional duplication is minimized or eliminated by discussing with respective jurisdictions how they want to manage the permitting process. Although a one-window approach to regulatory processes is desirable, it is important to understand what takes place behind the window. If the window is merely a conduit to a multitude of departments it maybe more useful to actually have contact with the individual departments. Most importantly, do not get involved in inter-departmental or inter-jurisdictional disputes.

6.3.2 Planning Phase - Cost and Schedule

1. From a preliminary identification of the required permits and approvals, determine the associated

costs. The major project submissions are usually by far the most significant regulatory budget item. Further responsibilities being passed on as part of contractors packages need only be rough estimates of costs.

2. Identify on the schedule only those activities that will take time and potentially impact the project schedule. At this stage it is necessary to understand how much time preliminary submissions for major project approvals will take, and what bearing that will have on the project schedule. The types of things to schedule are;
 - EIS development & preparation
 - Public meetings
 - Government meetings
 - Agency record in time taken to render a decision

This type of information will identify for the project manager the schedule parameters that the activities will encompass and hence the resources they may require and the risks inherent in them.

3. It may be necessary for tax reasons or for project shareholders to identify those activities that may be required as a result of regulatory preconditions after commissioning is complete.

For tax and budget reasons it maybe preferable to allocate these costs to the project budget rather than the operations budget or vice versa.

6.3.4 Planning Phase - Quality

1. Ascertain how the quality standard set out as policy in the Conceptual Phase will be received by the regulators and stakeholders. What are the potential implications of that decision on project costs, schedules and public input? Does that choice need to be revisited?

6.4 Execution Phases

At this stage of the project all major contracts have been or are in the process of being issued, including all engineering, equipment procurement and construction contracts. The Project Proponent should have a skeleton operations staff working with the project giving the necessary advise for start-up budgets, schedules and operating criteria. By this stage any major project submissions, e.g. Environmental Impact Statement, ERCB Leave To Construct should have been made and approved. The responsibility for further permit submissions e.g. siting of camps, road allowances etc. becomes the responsibility of the individual contractors.

6.4.1 Execution Phases - General

1. Although contracts will be written with responsibility for regulatory permits being passed to the contractor, the Project Manager should have a good general knowledge of the permit requirements. The Project Manager should also be aware of who the main regulatory personnel are in order to assist the contractors if required. The research required in order to provide this assistance should have been done prior to issuance of the engineering contracts.

2. Although the major project regulatory submissions should have been made and approved by this stage, it is the responsibility of the Project Manager and the Project Proponent to keep the regulators informed of any design and schedule changes. Such changes may alter the content of the major project submission and may therefore require a further approval. Having received approval for the major submission, it is good practise to keep the regulators informed about the project's progress and, within reason, problems so that the regulators maintain their sense of being stakeholders. Regular updates by project management staff are useful in this regard. It also gives the regulators a forum to express any concerns they may have about the contractors work. Initial contact and rapport with key regulatory

staff should have taken place during the planning phase which enables the Project Manager to continue an open dialogue throughout the Project.

3. The project stakeholders must be kept informed about the project for various reasons. Municipal Mayors and Chambers of Commerce representatives need to know if construction seasons are being shifted in order to inform local businesses and social services about numbers of migrant workers and when they will be coming and going. Environmentalists need similar information to assess the relative impact the changes will make. If there is flexibility in the project plans, it is far better to discuss options with these groups before decisions are made, thus continually building their trust, than after decisions are made resulting in an erosion of trust. The Project Manager should bear in mind the fact that the project will become a permanent part of the community in which it is sited and hence good relations must exist with the project stakeholders after construction is completed.
4. Work must be started in this phase on the commissioning schedule and ensuring that the regulators responsible for having inspectors on site are aware of their work load and schedule so

there are no undue delays during this critical phase of the Project.

6.4.2 Execution Phases - Cost and Schedule

1. The notes and minutes from both the regular meetings with contractors and regulators must be kept in the event a contractor submits a claim based on a regulatory issue. Such claims should be minimized or eliminated as a result of the meetings, however back-up from the Project Manager's notes is essential should claims be submitted.
2. Depending on the contracting strategy chosen, it is important that the Project Manager knows roughly what is required of the contractors to maintain regulatory compliance. From the research done in previous phases of the project an estimate of the cost and time required to undertake the regulatory requirements should be available to compare against those submitted by the contractors. Hence there is some basis to evaluate the legitimacy of the contractors costs.
3. Depending on the degree of involvement the Project Manager wants with each of the individual contractors, the time required to gain permit approvals should be included in the project

schedule. This is essential, as it is often not possible to continue working while waiting for a permit to be approved. The time between submission and approval should therefore be included in the schedule. Although this type of scheduling falls within the responsibility of the contractor, the Project Manager is justified in reviewing the schedules and commenting on their accuracy.

6.4.4 Execution Phases - Quality

1. At this stage quality standards should be clear to all project participants. It is possible, however that the regulators may through the normal course of their work amend standards mid-project. This makes the informational sessions between project staff and regulators important in order to anticipate regulatory amendments. Also, it is essential to know whether the facilities will be fall under the new standards or be grandfathered under the existing standards. If the changes are easily accommodated, this should not become a problem. If the proposed changes require major design changes it may be necessary for the Project Manager and the Project Proponent to approach the regulators for exemptions and if necessary garner stakeholder support in this effort. The key with this type of unforeseen problem is to have

knowledge of what is being proposed as early as possible and good relations in order to deal with them.

6.5 Commissioning Phases

Throughout this phase it is important that operations staff work closely with project staff to exchange pertinent information. Project staff should introduce operations staff to those regulators whose permits have a bearing on the operating standards required of the facility.

6.5.1 Commissioning Phase - General

1. The complete documentation of permit requirements for operating standards and tolerances should be reviewed by the Project and Operating groups, and where necessary, in conjunction with the regulators. Any operating modifications should be discussed with the regulators in order to ensure it falls within the scope of the major project submission. If permit approvals were conditional upon operating standards or equipment retrofits, project staff must notify operations staff of the commitments that were made.

6.5.2 Commissioning Phase - Cost and Schedule

1. It is the contractors' responsibility to ensure the work is completed with the required permits in

place. During the commissioning phases of a project, however so many contractors may be asking for inspections that overall control may be required by the Project Manager. A comprehensive inspection schedule drawn up with a review from the inspecting regulators mitigates the possibility of conflicting schedules and consequent schedule delays.

6.5.4 Commissioning Phase - Quality

1. The quality of the facility at this stage cannot be greatly influenced by the Project Manager. The policies put in place at the early stages have been executed by this time and should receive approval from the inspecting bodies. The quality criteria set down for the project should have been fully discussed and approved by the operations staff, during the planning phases of the project, whose responsibility it will be to operate the facility within the permit conditions.

REFERENCES

Clean Environment Commission.(1984)Report on Public Hearings: Hearings on Hazardous and Special Wastes, (Stage 1 of Phase 1). Winnipeg, Manitoba.

Cooke, R.J., External Project Issues, Course Notes for University of Calgary, Civil Engineering Course ENCI 519.54.

DeSorcy, G.J., The ERCB Approach to Public Involvement In The Development of Energy Resources, Petroleum Joint Venture Association, 22 June 1989.

DeSorcy, G.J., The Changing Environmental Scene, Presentation to the Planning Forum, Calgary Chapter, 9 May 1990.

DeSorcy, G.J., Regulation Of The Energy Industry In The 1990's, Petroleum Society of CIM, 18 December 1990.

Heath, D.L., Electrification of British Railways' East Coast Mainline: The Project And Its Management, International Conference on Main Line Railway Electrification: University of York, U.K., 25-28 September 1989.

Hout, J-C, Macro Engineering Projects And The Dilemma of Size, Ninth International Cost Engineering Congress: SAS Scandinavia Hotel, Oslo, Norway, 18-22 August 1986.

Kerr, F.W., Mediating Disputes: Land Development And Construction, Journal of Professional Issues in Engineering, Vol. 115, No. 4, October 1989.

Madenburg, R.S., and Humphrey, M.C., Assessing and Managing Project Risks, American Association of Cost Engineers, 1986 Transactions.

Millard, V., The Alberta Regulatory System For Energy Developments, Workshop Notes, Sponsored by Arctic Petroleum Operators Association and Canadian Petroleum Association, 14 May 1985.

Millard, V., Recent Experience In Alberta With Public Involvement And Environmental Negotiation In The Energy Industry, ERCB-REPR-Millard-1987-R21.

Northern Pipeline Act, R.S.C. 1985, c. N-26 as amended.

University of Calgary, W.E. Allen, ENCI 619.49, Project Planning and Controls: Course Outline, 1985.

University of Calgary, R.J. Cooke, ENCI 619.54, External Project Issues: Course Outline, 1986.

APPENDIX

Managing the Regulatory Constraints

Questionnaire

Introduction

The purpose of this project is to assess how, in practise, the regulatory constraints affecting a project are managed and to identify the similarities between various different projects. My intention is specifically a description of the philosophy of your management with respect to maintaining regulatory compliance and how this philosophy is translated into project procedures and responsibilities.

Below I have listed a number of thoughts and questions that provide a guideline on the types of issues I would like you to address. Please feel free either to address each of these questions as they appear or, discuss them in whatever manner you feel is appropriate in the context of your specific project. Wherever you feel your project has attempted to do something unique, or has had problems, please discuss these features and why either, in the former they succeeded or, in the latter could have been handled more effectively. If there are any project policies, documents, schedules, etc. which will help me understand how your project has managed its regulatory environment I would appreciate their inclusion.

1. Project Description

Questions regarding the following topics:

Project Statistics: Physical description
 Cost estimate
 Timing
 Location
 Engineering uniqueness
 Ownership
 Contracting strategy
 Position of respondent
 Labour force
 Experience of - owner
 respondent
 work force
 contractors
 regulators
 financiers

Regulatory Specifics - Planning the Project:

Is there legislation to cover this type of project, type and how much?

How many regulatory bodies/departments are/could be involved?

At what stage was a regulatory plan developed?

What were/are the regulatory risks?

How were/are the regulatory risks perceived at the beginning?

Were the regulatory people part of the project management team or were they placed within each project discipline; ie. Engineering, Procurement, Construction?

What steps were taken to mitigate the risks?

How successful have those steps been?

What type of relationship did project personnel have with the regulators?

How long did it take to develop this relationship?

At what cost in time, personnel and money?

Was/is this investment worthwhile or could the regulatory risks be adequately covered without such time and cost investments?

In retrospect what could have been done better?

How did the project management decide to allocate the regulatory responsibility between the owner, managing contractors, consultants, fabricators, construction contractors, etc.?

How were such allocations handled contractually? Could you include typical contract language?

Was this allocation successful or did it lead to contract disputes and regulatory hold ups?

In the event the regulatory responsibilities were contested by contractors, did your contracts stand up as intended?

Did you philosophically chose to help contractors in regulatory difficulty despite the contract, in order to maintain your project and keep your contractors whole?

Time/Cost/Quality

Questions regarding the following topics:

Time:

How much impact did the regulatory activities have upon the project schedule?

Were the regulatory activities integrated with the project schedule?

Were the regulatory activities scheduled separately? If so how were the two schedules coordinated?

How difficult was it coordinating regulatory activities with other scheduled activities?

Were/are regulations clear enough to estimate the length of time required to gain regulatory approval?

Cost:

How much impact did the regulatory activities have on the project costs?

Were the regulatory costs properly budgeted?

Did the regulatory activities vary from budget significantly?

Was the respondent's group specifically responsible for regulatory work? If not how was this activity organized within the project?

If there was significant budget variance, was it due more to poor estimating; other project issues impacting the regulatory work or; to events in the regulatory arena that could not reasonably be anticipated?

Quality:

How much did the regulatory activities impact on the project quality?

Were any changes in project quality due to the regulators requirements? In the opinion of the respondent, were those requirements minimal, modest or excessive, taking into account the responsibility of the regulator to the public?

Did the regulators provide useful, constructive advice, that resulted in improved project quality without confrontation?

Did the project management team actively engage in a consultative process with the regulators at an early stage which resulted in a positive effect on any of the above three parameters?

If the project team did engage in a consultative process with the regulators was the experience positive or frustrating and would the respondent advocate repeating such a process?

Execution Mitigation:

Questions regarding the following topics:

Problems:

What type of regulatory/external problems did the project team anticipate in the field?

Did the project team meet with the regulators to discuss mitigation of these problems?

Were procedures put into place to react to field regulatory/external problems?

If procedures were in place, down to what level were field staff aware of the procedures and been briefed in their implementation?

Did regulatory problems occur in the field?

If so, how much more impact did they have on the schedule/cost/quality aspects of the project than problems prior to field work?

Was the relationship with the regulators sufficiently healthy to ensure regulatory assistance during a field crisis or were the regulators part of the problems?