Group #1

PSN - Hibernia South Extension - Methanol Injection System

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Max Day
Ryan Jacobs
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D. Whiffen / R. Jerrett
Production Services Network
277 Water Street
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A1C 6L3

Subject: Hibernia South Extension – Methanol Injection System Project Work Plan

Dear Mr. Whiffen/Ms. Jerrett,

Sea-View Consultants would like to submit a project work plan for the structural design and vessel analysis of the structural housing for the Methanol Injection System to be installed in the Hibernia South Extensions. The work plan is a requirement of ENGI 8700 Project course and will be used as a guide to ensure all the aspects of this project are kept on track.

The project work plan outlines all the major tasks involved in this particular project and everyone on the design teams role in completing the project. It also includes a detailed scheduled that will be used to keep all the processes in the design and planning on track.

If you have any comments or concerns regarding the attached report please feel free to contact us at your convenience.

Yours truly,

Max Day
Project Manager – Sea-View Consultants

Attachment – Hibernia South Extensions – Methanol Injection System Work Plan

cc. Dr. S. Bruneau

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1.0 Project Description

A new methanol injection system is required for the Hibernia South Extension. The new equipment must be protected from the elements and potential dropped objects. A new enclosure module will provide this protection. The new module will also provide protection for the new methanol equipment during shipping to Hibernia on board a Maersk N-class supply vessel.

The project includes the design of a module to house the new methanol injection equipment. The new module will be designed to provide protection from the elements during shipping, and after installation. It will also provide protection from potentially dropped objects. The project will include the design of a lifting arrangement and installation to the existing Hibernia platform.

The deliverables for the project will be a set of design drawings for all structural elements of the new methanol injection module and a detailed report of the project execution, findings and conclusions.

Image #1 – Hibernia Platform

2.0 Statement of Project Requirement

Sea-view Consultants are required to design a protection module for new methanol equipment that is to be installed offshore on the Hibernia oilrig. This project requires a detailed design of the structural steel frame of the module complete with framing, lifting and sea-fastening drawings. In addition to the design, the Client requires a detailed construction plan and a cost estimate.

Since this is an offshore project, there are a number of unique requirements relating to the structural design, the transportation and the installation of the module in offshore conditions. These include:

1. A dropped object analysis due to potential falling objects on the Hibernia Platform (up to 30 tons).
2. A blast analysis for protection against potential explosions on the oilrig.
3. A study and analysis of the response of a N-Class Maersk transport vessel during various sea states.
4. Design using 350WT grade steel for offshore use.
5. Equipment must be protected from the elements without the use of HVAC.
6. The limited capacity of the lay-down area and the lifting crane must be considered throughout the design.

3.0 Methodology

3.1 Approach

Sea-view Consultants have developed a plan of work for the course of the project that begins with initial research on the major aspects of the project such as the study of:

1. Offshore codes
2. N-Class Transport Vessel
3. Offshore Materials
4. Crane Capabilities
5. Dropped object and Blast Analysis
6. Layout of the Methanol Equipment

Following this, Sea-view Consultants will begin the design of the module as per the project requirements and data obtained from the Client. Once design is underway, other aspects of the project such as the transport vessel response study, construction plan and cost estimate will also be conducted. Upon completing the design, construction plan and cost estimate, a final report and presentation will be prepared as per the course requirements of ENGI 8700. This will be a comprehensive report providing detailed information on all aspects of the project.

3.2 Group Organization and Meetings

Sea-view Consultants has designated each member with a specific role according to that person's skills in order for the project to be executed most efficiently. The team members are as follows:

- Max Day: Communications/Project Manager
- Jeremy Hill: Vessel Design and Analysis
- Ryan Jacobs: Calculations
- Chad O'Connell: Structural Design

The team regularly meets as required by the project schedule and deadlines. Client meetings will take place weekly on Friday afternoons. This typically consists of Sea-view Consultant meeting with both Dan Whiffen and Renee Jerett at the PSN office located on Water Street, St. John's, NL. Each week Sea-view Consultants will provide a progress update to PSN on recently completed work, discuss upcoming work, and address any issues there may be.

3.3 Design Principles

It is decided that the module will be constructed out of structural steel. The design will ensure that the module will safely protect the equipment from potentially large

dropped object and blast forces, as well as be able to withstand specified loadings as required by design codes. The codes to be used are CSA S471, CSA S473, CSA S16, Lloyds Register L.A.M.E CSA Z19902 and ISO 19900. Throughout the design, the Engineer must consider the limited lifting capacity of the on board crane, and the weight capacity of the lay-down area. It was suggested by the Client that if the lay-down area does not support the loading of the module and equipment, that Sea-view Consultants provide a recommendation stating that the lay-down area be reinforced and additionally supported before installation.

The design will also include the appropriate framing, lifting, and sea-fastening calculations and drawings to ensure that the module will be fully protected during its transport to the platform. All structural design will be carried out using the structural design software S-Frame.

3.4 Cost Estimate

A cost estimate will be conducted that will provide the cost of fabrication and construction of the module, as well as the transport and installation of the module. The estimate will be completed by using RS Means estimating software and by contacting various local steel fabricators for prices of structural 350 WT steel.

3.5 Desired Outcomes and Deliverables

After this project is complete, Sea-view Consultants will have prepared a detailed report for the Client (PSN), which will provide a full structural design of the module, an in depth study of the transport vessel, calculations and drawings for framing, lifting and sea-fastenings, and a cost estimate. Additionally, a construction plan will be developed that will ensure that the module and equipment can efficiently be transported and installed to the Hibernia Platform.

Sea-view consultants hope to gain valuable experience in carrying out a design project from start to finish and intend to provide PSN with a complete study of the project to help them take this project to the next step.

3.6 Troubleshooting

No outstanding problems have been encountered as of yet during the course of the project. If any problems arise, the Consulting team has the benefit of seeking professional advice from Memorial University's Engineering Faculty Members to help with any issues. The Client can also provide helpful information in the case of any problems encountered during the project.

4.0 Tasks

1. Determination and understanding of project requirements and deliverables.
2. Group meetings to discuss project and questions for client.
3. Client meetings to give project updates.
4. Determine module dimensions by review of N-class vessel size restrictions and methanol equipment footprint.
5. Compilation of required design codes and N-class vessel response during various sea states.
6. Review and selection of structural materials and coatings.
7. Review of crane specifications and curves to determine capacity.
8. Calculation of design loads including dropped object analysis.
9. Structural design calculations and finite element analysis to size structural members.
10. Design module-lifting arrangement.
11. Structural Analysis of existing structure and recommendations for reinforcement as required.
12. Design module attachment/fastening to existing structure.
13. Develop CAD drawings of structural design.
14. Compilation of design work and deliverables into final report.

5.0 Schedule

Once a project is selected one of the preliminary tasks to take place is the careful consideration of the project schedule. This schedule consists of a detailed list of all the main elements of a project. To construct a project schedule, a project manager or a team of schedulers must have a work breakdown schedule, an effective estimate of each task and a resource list showing the availability of each resource. This project will consist of a series of main components that can be completed simultaneously with each other in order to effectively meet the project deadline. Before the design aspects of the project can be started, extensive research has to be completed relating to the main components of the project. Research for this project will include the study of N-Class Vessels and their serviceability is various sea states. This will help provide a guideline and set restrictions for the offshore module to be designed. Once adequate research is completed the actual design of the offshore module will commence and strictly follow the offshore codes provided. The design of the offshore module will take into account the maximum dimensions that can be safely shipped by N-Class vessels, and it will all consider crane capabilities for unloading the module. Additional design considerations will include effective fastening of the module to the platform.

Once the preliminary designs of the module are completed final drafts will be presented to the client along with the necessary hand calculations and software models that were developed throughout the project.

Once all design aspects of the project is completed a detained construction plan will be completed along with a detailed cost estimate. Relevant sources including RS Means and materials supplied by the client will be used to complete this task.

To produce a project schedule Sea-view Consultants decided to use Microsoft Project 2007. This schedule will be used as a timeline for this project and will provide a foundation to effectively meet upcoming milestones. This schedule will be updated weekly based on work complete and goals accomplished. A preliminary schedule can be seen in Appendix (1).

6.0 Costs

The costs associated with this project will be minimal and consist mainly of printing supplies and traveling cost for weekly client meetings. The consultants have set the budget for the project at $100. The following table provides a breakdown of expected expenditures.

Table #1 – Associated Costs

Items	Cost ($)
Printing / Stationary items	$ 20.00
Travel / Parking	$ 60.00
Additional expenses	$ 20.00

7.0 Deliverables

The deliverables that will be brought forth by Sea View Consultants will consist of hand calculations and software drawings. Hand calculations will include live load calculations, dropped object analysis and sea fastening calculations. A detailed construction plan and cost estimate will also be provided to the client. An extensive final report will be provided to the client and professor at the end of the semester along with digital copies.

All calculations and drawings presented will be of optimum quality and will strictly follow appropriate offshore codes and regulations.

8.0 Risks

The undertaking of any work in the Oil and Gas field is not without risk do to the level of uncertainty and varying weather conditions. The sea conditions that could be experienced during the shipment of this container may exceed what the design analysis has allowed for and cause havoc.

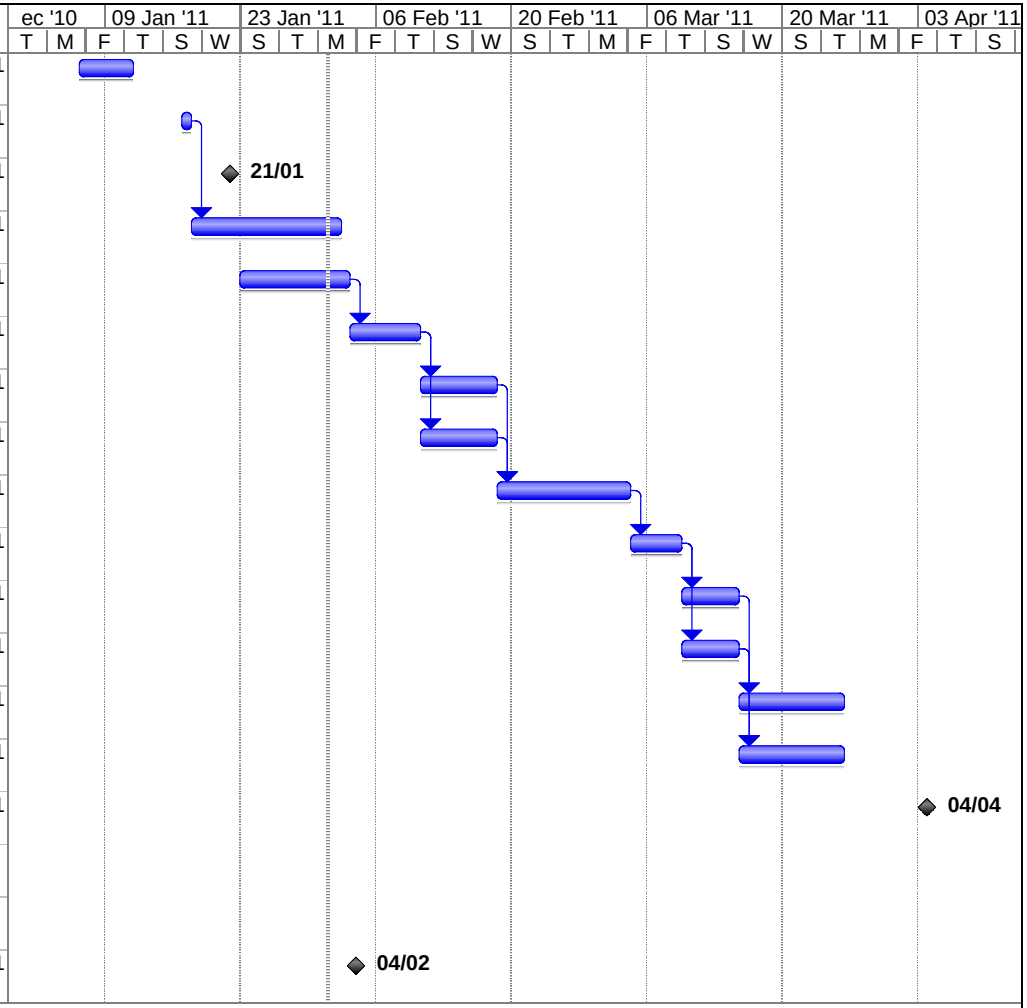
The design code provided by the client is over ten years old from the original construction of the Hibernia oilrig, and there may be inconsistencies due to modern enhancements to older codes and research.

The module container is to be placed on a platform that wasn't designed for this particular application and could potentially fail if the load of the container exceeds the design load of the platform.

There maybe a catastrophic failure (i.e. explosion) that will exceed all design loads incorporated in the design of the module.

Appendix #1 – Project Schedule

ID	Task Name	Duration	Start	Finish
1	SOQ	5 days	Thu 06/01/11	Tue 11/01/11
2	match night	1 day	Mon 17/01/11	Mon 17/01/11
3	Client Kickoff Meeting	0 days	Fri 21/01/11	Fri 21/01/11
4	Work Plan	14 days	Tue 18/01/11	Wed 02/02/11
5	Relevant Research	10 days	Sun 23/01/11	Thu 03/02/11
6	Layout Desion	7 days	Thu 03/02/11	Thu 10/02/11
7	Load Calculations	7 days	Thu 10/02/11	Fri 18/02/11
8	Dropped Object Analysis	7 days	Thu 10/02/11	Fri 18/02/11
9	Structural Design	12 days	Fri 18/02/11	Fri 04/03/11
10	Crane Load Analysis	5 days	Fri 04/03/11	Wed 09/03/11
11	Sea State Analysis	5 days	Wed 09/03/11	Tue 15/03/11
12	Connections Design	5 days	Wed 09/03/11	Tue 15/03/11
13	Detail Construction Plan	10 days	Tue 15/03/11	Sat 26/03/11
14	Cost Estimate	10 days	Tue 15/03/11	Sat 26/03/11
15	Final Report Due	0 days	Mon 04/04/11	Mon 04/04/11
16				
17				
18	Meeting #2 with client	0 days	Fri 04/02/11	Fri 04/02/11



Project: Project Schedule
Date: Tue 01/02/11

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline

Appendix #2 – Group SOQ

Group #1

Jeremy Hill (709 – 764 - 6035)
Max Day (709 – 746 – 1857)
Ryan Jacobs (709 – 728 – 8394)
Chad O' Connell (709 – 468 – 4379)

Mandate

Sea-view consultants company policy is to provide a timely, professional, and unique services to our clients in the civil engineering field.

Services

Sea-view consultants offer a range of engineering consultant services in specialty construction. With a combination of experiences in project management, building construction, heavy civil, water and waste water treatment, and ferry terminal construction.

Our Team

Sea-view consultants is a proprietorship of four senior civil engineering students in Memorial University's Faculty of Engineering and Applied Sciences.

Project Involvement

- Torbay Road Bypass Curve Establishments and Alignment
- Portugal Cove Road Realignment
- Long Harbour Processing Plant Project Management
- Legion Road, CBS commercial park water cp-2
- Cuslett, NL Steel Girder Bridge Design
- Portugal Cove Ferry Dock Construction Project Management
- RNC Campus Redevelopment
- Construction Survey for Churchill Falls Service Road
- Subsea Pipeline Analysis for Various Off Shore Projects
- Project Management for Roof Rehabilitation Project in Labrador City
- Structural Design for Various in-plant projects
- Burgeo, NL Water Treatment Plant Construction and Commissioning
- Terra Nova Park, NL Water Treatment Plant Construction and Commissioning
- Torbay, NL Waste Water Treatment Plant Design
- Structural Audit for Iron Ore Pellet Plant in Labrador City, NL

Jeremy Hill

Jeremy is a senior civil engineering student at Memorial University. Throughout his previous work terms he has gained valuable experience in a wide variety of work environments. Jeremy has field experience relating to civil projects including preliminary surveying of the Torbay Bypass, and also site inspection for a wide range of projects including roadway rehabilitation and water main installation. He has also been involved in the preliminary design for engineering projects including establishing vertical and horizontal alignments. Other office tasks including formatting excel templates and conducting cost estimates. Jeremy has also worked in an office setting relating to project management for large scale civil projects including the Long Harbour Processing Plant. Jeremy excels in a team orientated environment and his diverse work experience is essential for Sea-view Engineering.

Max Day

Max is a senior civil engineering student at Memorial University. Throughout his work terms he has gained valuable experience in a wide variety of construction environments. Max has field experience relating to civil projects including construction of large scale water treatment plants, and water pilot testing. He has also been involved in the preliminary design for waste water treatment plants. Other professional skills include calculating town water usage, filter sizing, and computer aided drafting. Max has also been involved with project management in various construction projects. In a previous career Max worked as a Heavy Equipment Technician at a local firm. Max is also a member of Scouts Canada for 20 years now, serving on the local board of directors and as an active member of the Rovers Ground Search and Rescue. Max also founded the Memorial University Concrete Toboggan Team and served as the Team Captain and Logistics Manager for the last two years.

Ryan Jacobs

Ryan is a senior civil engineering student at Memorial University. Throughout his work terms he has been exposed to a range of civil engineering projects. Ryan has field experience including a construction survey for a service road in Labrador as well as a number of plant engineering field investigations for a mine facility in Labrador City. He has been involved in a structural audit of the same mine facility. Ryan has also been involved in some aspects of building design. He also has experience working in his family business, Jacobs' Meats as a meat cutters assistant. He is an active member of the Memorial University Concrete Toboggan Team serving as the teams organizer. Ryan also has experience working hands on in the heavy civil field working with a commercial paving outfit in Eastern Newfoundland.

Chad O'Connell

Chad is a senior Civil Engineering Student at Memorial University. He is a highly motivated and dedicated individual with innovative and creative problem solving skills. Through past work experiences, he has gained valuable experience in a number of Civil Engineering fields. He has experience with bridge design calculations and drafting using AutoCAD. He was involved in the on-site supervision of a ferry terminal rehabilitation project in which he gained supervisory and project management skills and conducted quantity take-offs for contractor payment. Further, Chad is experienced with multi-discipline building construction from field work on the local RNC Campus Redevelopment project. From this he has gained extensive knowledge of building systems and project co-ordination from daily interaction with contractors, consultants and clients.