

Ipma level b report essay



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Page 2 of 16 FULL SURFACE FIRE FIGHTING FACILITIES PROJECT AT DAS ISLAND Revision 0 June 2006 PROJECT REPORT TABLE OF CONTENTS Section 1. 0 2. 0 3. 0 4. 0 5. 0 6. 0 7. 0 8. 0 9. 0 10. 0 11. 0 12. 0 13. 0 Description / Title Introduction Definitions and Salient Points Employer’s Background Project Background Project Context and Scope of Work Project Objectives Project Organization Project Complexity and Interfaces Project Risks Project Management Challenges Role and Responsibilities of the Project Manager Post-Project Appraisal Lessons Learnt Page 3 3 4 5 6 7 7 8 12 13 15 16 16 ATTACHMENTS Attachment 1 Attachment 2 Attachment 3 Attachment 4 Attachment 5 Attachment 6 Attachment 7 Attachment 8 Attachment 9 Attachment 10 Attachment 11 Attachment 12 Attachment 13 Attachment 14 Project Scope Simplified diagram Employer’s Organization Chart Project Organization Chart Project Execution Plan Project Coordination Procedure Project document Register (first page only) Project Procurement Register (first page only) Project Schedule and Sample Progress Reports Project Risk Assessment (print-out) Variation Orders 01-02-03 Project Contribution Report Client Appreciation Letter and PM’s Response Client Safety Award Client Bulletin of October 2003 Page 3 of 16 FULL SURFACE FIRE FIGHTING FACILITIES PROJECT AT DAS ISLAND Revision 0 June 2006 PROJECT REPORT 1. 0 Introduction This report is written along the guidelines required by the International Project Management Association in support of author’s application for IPMA’s Level “ B” accreditation.

In accordance with these guidelines, the report will touch on the technical aspects of the project in a brief manner and would give more emphasis on its management challenges, complexity, and risk augmented by its Oil and Gas

environment. The project in question resulted in the installation and commissioning of Full Surface Fire Fighting Facilities in the Crude Oil tank farm of Das Island (shown on the cover page of this Report), a concept implemented for the first time in the oil industry worldwide. The Project Background and Scope of Work sections of the Report will address the problem that led to the implementation of the project and the solution offered by the Project.

The Report will also try to familiarize the reader with the various components encompassed within the sphere of the project: the interested parties, client and contractor in particular, project organization, the Project Manager and his role, and the project constraints. The Project Manager, author of this report and representative of the contractor, was assigned on the job three months after its commencement, following Employer's decision to replace the initially assigned PM. The Report will focus on the complexity elements of the project, its prime risk factors and the way they were managed, and will refer to the various project management tools that were deployed throughout its life cycle. It will also attempt to reflect the competencies that were applied towards managing the project in an optimal manner.

Also addressed in this Report are the Project Objectives, Post-Project Appraisal, Lessons Learnt, and selected documents are attached for the purpose of supporting narrated contents or providing further information. 2. 0 Definitions and Salient points Project : Full Surface Fire Fighting Facilities (consisting of a scope mutually agreed between the client and the contractor) : Engineering, (EPC). Procurement, and Construction Project Type Client and Project Owner : Abu Dhabi Marine Operating Company

(ADMAOPCO), representing the shareholders (Asset Owners). Page 4 of 16

FULL SURFACE FIRE FIGHTING FACILITIES PROJECT AT DAS ISLAND Revision 0
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(ADNOC) 60% & British Petroleum (BP) – 14. 67% & Total – 13. 33% & Japan
Oil Development Co. (JODCO) – 12% : National (NPCC). Petroleum
Construction Company Contractor Das Island : UAE’s primary offshore oil &
gas storage and processing center, shared by two operating companies:
ADMA-OPCO and ADGAS (Abu Dhabi Gas Liquefaction Company). : A single
network of water piping covering the entire island, operated by ADGAS and
serving both ADMA-OPCO and ADGAS. The Project has upgraded the ADMA-
OPCO side of the network. : The sector of the island where the crude oil
storage tanks of ADMA-OPCO are located, storing a peak volume of 9. 5
million barrels and supplying the international market with about 30% of
UAE’s crude oil production. All these tanks are of the floating roof type. :
December 2000 : May 2002 : August 2002 (covered by a variation order) :
UAE Dirhams 20. 73 million. : UAE Dirhams 21. 30 million (covered by
variation orders) Fire Fighting System Tank Farm Month of Award Original
Completion Month Actual Completion Month Original Contract Value Value at
Completion 3. 0 Employer’s Background The National Petroleum Construction
Company (NPCC) started its business in 1973 as a contractor performing the
construction and installation of offshore steel structures for the oil and gas
industry of Abu Dhabi Emirate. It has subsequently Page 5 of 16

FULL SURFACE FIRE FIGHTING FACILITIES PROJECT AT DAS ISLAND Revision 0
June 2006 PROJECT REPORT grown to become one of the major oil & gas EPC
contractors in the region, in both onshore and offshore sectors, extending its

area of operation to other Emirates of the UAE, Kuwait, Qatar, Saudi Arabia, India, and Iran. More information about NPCC can be found on www.npcc.ae. Though considered as a private company, 70% of NPCC was owned by Abu Dhabi National Oil Company, ADNOC, until 2004 when this ownership was transferred to other governmental bodies. ADNOC's share in NPCC had created strong ties between NPCC and all other oil & gas operating companies in Abu Dhabi.

NPCC is basically a matrix organization and its organization chart is shown in Attachment 2. The matrix is adversely affected by few factors: increased number of managers reporting directly to the functional head (namely in Projects Department), and the tendency of some sections to occasionally act in isolation of the matrix, particularly in matters related to section's own interest, strength, and power. The isolation is augmented, in few cases, by the personal views of the section heads. However, the organization proved to be extremely efficient and coherent in crisis management or in matters having direct and considerable effects on company's global interest.

Though most of the projects are matrix operated, some projects adopt the task force concept, in part or in full, depending on project size and/or contract requirements.

4. 0 Project Background British Petroleum (BP) had performed a Quantified Risk Assessment (QRA) for the crude oil storage tanks of Das Island. The outcome of the QRA revealed a high potential for a full surface fire to occur (full surface means that the entire floating roof area will burn, not only the roof periphery). Due to tank farm congestion, the fire on one tank is likely to propagate to adjacent tanks if not extinguished in less than one hour. If it propagates, the fire would become uncontrollable.

The QRA also highlighted that the existing fire fighting facilities are not adequate to fight a fire of this magnitude, even before it propagates, and the need for a system upgrade was therefore identified. Another study was performed to identify the requirements necessary to mitigate the risk, and the study led the Front End Engineering Design (FEED) of this Project. An EPC package was subsequently prepared by ADMA-OPCO and floated for competitive bidding. NPCC negotiates jobs for ADMA-OPCO and ADGAS on Das Island and rarely bids for such jobs on competitive basis, since small competitors having a better commercial edge are normally invited to bid. However, NPCC took the strategic decision to bid for the job with just a 5% profit margin in the tender estimate, after having made many cost reducing assumptions. The risk was augmented by accepting an imposed tight schedule. NPCC won the job with marginal price difference. It is to be noted that ADMA-OPCO is one of NPCC's most important and regular offshore clients. ADMA-OPCO's GM is a member of NPCC's Board of Directors.

5. 0 Project Context and Scope of Work

In brief, the project scope consisted of the provision of a new fire water piping network within and around the tanks, internally lined with cement (before installation) to prevent corrosion, then mix the water with special chemicals inside special equipment to produce foam (foam is the fire fighting agent).

The network consisted of about 5, 000 meters of 30" and 16" steel pipes, partly underground, and is illustrated in Attachment 1. The network delivers water from 360 outlets, strategically located in the tank farm, and the water flow rate had to be large enough to supply the water demand needed by the

largest mobile foam-making equipment manufactured by a company in USA called Williams (known to have extinguished numerous fires in Kuwait after the war). Client wrote an article about the Project in one of its monthly bulletins (Attachment 14). The detailed engineering works were subcontracted. PENSPEN (who became NPCC's engineering subcontractor and having their base in the UK) had an office in Abu Dhabi and this is where they performed their detailed engineering scope.

The Hydraulic Analysis part of this scope was in turn subcontracted by PENSPEN to a specialist company in the Netherlands. The remaining engineering works as well as the procurement part were performed by NPCC at its Abu Dhabi Base, where the mechanical fabrication works took place. Purchased and fabricated items were sea-freighted to Das Island where the construction works were executed. In addition to the detailed engineering, the main works subcontracted by NPCC were the internal cement lining of the pipes, the civil construction, and the marine transportation.

Subcontractors were local or locally represented companies operating in the UAE, and are more detailed in section 7.0 of this report.

Under the procurement scope, 77 purchase orders were placed, and vendors were either local or overseas stockists/manufacturers. Overseas purchase orders were placed on foreign suppliers based in the UK, the Netherlands, France, USA, Spain, Germany, India, and Italy. The construction part of the scope included demolition works and took place within existing live hydrocarbon facilities of remarkable congestion. Page 7 of 16 FULL SURFACE FIRE FIGHTING FACILITIES PROJECT AT DAS ISLAND Revision 0 June 2006 PROJECT REPORT Project Document Register (first page), Procurement

Register (first page), and Project Schedule & Sample Progress Reports are respectively enclosed in Attachments 6, 7, &8.

6. Project Objectives

The main objectives of the client were: – Zero accident – No serious health or environmental issues – Acceptable quality (verified by audits) – Meet the overall life-cycle budget – Commission the Project before the end of 2003

The main objectives of NPCC were: – Zero accident – No serious health or environmental issues – High quality – Target a profit margin of 10% (only 5% actually allowed in the tender estimate) – Complete the Project by contractual completion date – Serve the corporate marketing function by delivering a successful project meeting client satisfaction

Client and NPCC have both achieved their objectives as addressed under section 12.0 of this Report.

7.0 Project Organization

A project management team led by the Project Manager was assigned by NPCC to execute the project. The Project Manager reported to the Assistant General Manager (Technical). Two revisions of the organization chart are enclosed in Attachment 3. The first one (Rev. 3) was meant to formally document the PM replacement without making changes to its previous structure. However, the writer of this Report had to issue another revision shortly afterwards (Rev. , also enclosed in Attachment 3) to correct the reporting/communication anomalies of the previous revisions, where some PM and DPM subordinates (other than HSE and QA/QC) were shown to be reporting to their functional departments/sections. A dedicated Project Procurement Manager was also added in view of foreseen procurement work load. Accordingly, PMT's first layer consisted of full-time dedicated personnel reporting directly to the Project Manager. Personnel in the layers below were either dedicated or shared within the matrix. Key positions are shown in the organization chart

following the lines of disciplines, functions, and work structures. The organization chart also illustrates the lines of reporting as well as the correct interface and relationship between the PMT and NPCC's functional

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Revision 0 June 2006 PROJECT REPORT departments/sections. The number of PMT personnel was in the range of 35, including shared resources from the functional sections, and the manpower deployed for construction reached 150. More details can be found in the Project Execution Plan enclosed in Attachment 4. The lines of communication with the client are described in the Project Coordination Procedure enclosed in Attachment 5.

8. 0 Project Complexity and Interfaces

The project was complex because of the following:

- ? The Project was an EPC one, from detailed engineering phase up to 'ready for commissioning', encompassing procurement, subcontracting, and construction. The Project was a fast track one, driven by a client attempt to have it commissioned six months before client's own target. This complexity was augmented by the fact that numerous parties (within and outside NPCC) were involved, thus increasing the interfaces and increasing the probability of schedule delays.
- ? The Project budget was tight, thus restraining time saving maneuvering (e. g. air freight of long-lead procured material instead of sea freight could no longer be considered).
- ? The stringent safety regulations implemented by the client on Das Island adds to the complexity and slows down the construction work progress. This aspect is inherent to construction works inside live flammable facilities. The stringent health regulations imposed by the client for the mobilization of workforce members to Das Island was another obstacle. Workers had to be young, healthy, and

subjected to thorough medical examination before mobilization. ? The engineering works were diversified and covered all disciplines: civil, process, piping, electrical, instrumentation, structural, corrosion & cathodic protection, and preparation of commissioning procedures & operating manuals. Procurement-related engineering was also included, covering pre and post material ordering activities. ? Multi-discipline construction activities were performed: structural, civil, piping, electrical, instrumentation, cathodic protection, and coating. The workforce was multi-national with different social backgrounds (more than 10 nationalities were involved), necessitating care in assigning supervision and special arrangement for food and accommodation. Page 9 of 16 FULL SURFACE FIRE FIGHTING FACILITIES PROJECT AT DAS ISLAND Revision 0 June 2006 PROJECT REPORT ? The geographical factor was a predominant complexity element: ? Detailed engineering was performed by a subcontractor in Abu Dhabi who, in turn, had subcontracted a part thereof to a specialist company in Holland. Construction activities included fabrication works at Abu Dhabi (NPCC and subcontractors), and field erection works on Das island (NPCC and subcontractors).

Material was procured from various vendors in Europe (France, UK, Germany, Holland, Spain, & Italy), USA, India, and UAE, and field expediting had to be undertaken at those locations. Items ordered on CFR basis were delivered either to Abu Dhabi or Dubai, and items ordered on EXW / FOB basis were collected by NPCC's freight forwarding subcontractor and delivered to Abu Dhabi. Material / construction equipment transportation from NPCC to site destination was by sea freight, using marine vessels operating between Abu

Dhabi seaport and Das Island. Manpower movement between Abu Dhabi and Das Island was by air, using flights operating from Abu Dhabi airport.

The reliance on marine transportation made the project weather-sensitive, for client regulations forbid marine movement near the island during windy conditions. Delay probability is therefore increased, and exposure to stand-by cost of the marine vessels is also increased. ? ? ? ? ? The main parties (other than those within NPCC) that were involved and had to be interfaced with were: The client (ADMA-OPCO) ? Owner and custodian of the fire fighting network on Das Island (ADGAS) ? ? Detailed engineering subcontractor subcontractor and its hydraulic analysis Civil construction subcontractor ? Piping internal cement lining subcontractor ? Non-destructive testing (NDT) subcontractors at Abu Dhabi and Das island ?

Material suppliers / vendors (for 77 purchase orders) ? ? Third party material expediting and inspection agencies – TPI (Bureau Veritas, Germanischer Lloyds, and Velosi) The freight forwarding subcontractor ? The road transportation subcontractor ? Marine transportation subcontractors ? Abu Dhabi Aviation (service provider for air transport to/from Das island) ? Page 10 of 16 FULL SURFACE FIRE FIGHTING FACILITIES PROJECT AT DAS ISLAND Revision 0 June 2006 PROJECT REPORT Cooperative societies (for the hire of vehicles and equipment) ? Third Party Warranty Surveyors for marine transportation ? Insurance companies ? Civil Defense (for authorization of radioactive equipment movement & use) ? UAE’s Oilfield Protection Authorities (Government body) for authorizing personnel and equipment access to Oil & Gas installations Das Island Police Department for authorizing import of goods into the island Contracts section ? ? Engineering section

(verifying the work of engineering subcontractor and performing construction engineering) Procurement section ? Subcontracts section ? Planning and cost control section ? Fabrication section (performing fabrication works at Abu Dhabi's base) ? ? Onsite construction section (in charge of performing the construction works on the island) Plant section (in charge of mobilized construction equipment) ? Coating section (painting at Abu Dhabi's base and at site) ? NPCC's Offshore department, coordinating marine transportation ? Quality Assurance and Quality Control (QA/QC) section ?

Health, Safety, and Environment (HSE) section ? Medical section ?

Administration and Human Resources department ? Finance section ?

Quantity surveying section ? Legal section ? These interfaces are illustrated in a schematic on page 11 of this report. ? ? The main parties that were

involved within NPCC were: FULL SURFACE FIRE FIGHTING FACILITIES

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REPORT Oilfield Protection authority Civil Defense Insurance companies Third party warranty surveyors Cooperative societies Abu Dhabi Aviation Marine transportation subcontractors (2) Road transportation subcontractor Freight forwarding subcontractor Das Island Police ADGAS

Vendors (77 POs) Client (ADMA-OPCO) Detailed Engineering subcontractor

Civil construction subcontractor Cement lining subcontractor NDT

subcontractor (Das) NDT subcontractor (Abu Dhabi) TPI – Germanischer

Lloyds Coating Plant Onsite construction Offshore Engineering QA/QC Medical

Finance Quantity survey PMT Planning & cost control Admin. & HR Contracts

HSE Legal Subcontracts Fabrication Procurement PMT's internal interfaces

(within NPCC) TPI – Velosi TPI – Bureau Veritas PMT's external interfaces with

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stakeholders Page 12 of 16 FULL SURFACE FIRE FIGHTING FACILITIES

PROJECT AT DAS ISLAND Revision 0 June 2006 PROJECT REPORT 9. 0 Project

Risks Project-specific risk areas were identified at various stages of the Project.

Few of these risks are cited below: – The detailed engineering was subcontracted. From past experience, it was expected that the engineering subcontractor would attempt to perform a design consuming low manhours to meet its budget, while subsequent phases (procurement, construction) may suffer as a result (NPCC's budget in this case). – A major cost element was the civil subcontract. Like any other EPC job, there were no firm quantities at the early stages because the detailed engineering was yet to be done. The initial intention was to award the subcontract on a lumpsum basis based on assumed quantities (civil works cost estimate was performed accordingly at tender stage).

This approach had advantages and disadvantages, and uncertainties had to be explored to see if awarding the subcontract on unit rate basis would yield cost savings. – Safety during construction works was a high risk element. Performing flammable works inside live hydrocarbon Plants is dangerous, and clients tend to impose tight regulations for safe work, resulting in slow work progression. Lack of cooperation from the contractor would make the regulations more stringent. The site work risks had therefore to be assessed systematically and jointly with the End User to prevent the occurrence of adverse eventualities and to demonstrate a high level of cooperation from the contractor. – The time element was a constraint and the probability of completing the Project on schedule was low.

This is mainly linked to the fact that 21 roads on the island had to be closed for excavation, one at a time as required by End User, to allow access for fire trucks during emergencies. This was the longest activity on the critical path, and a collaborative approach with End User was required to mitigate this risk. The above, among other elements, were the subject of a dynamic Project Risk Assessment performed at contractor's PMT level. A Risk Assessment file was electronically shared by the participants & directly updated by the concerned, and meetings were periodically convened to review the status. A print-out of the last and final status is enclosed in Attachment 9.

The file was used as an internal tool to distribute the risk mitigation responsibilities among the PMT members, encourage their interaction, and monitor risk mitigation / reduction online. It was not meant to be a formal document but can be referred to for more detailed information on the subject. Page 13 of 16 FULL SURFACE FIRE FIGHTING FACILITIES PROJECT AT DAS ISLAND Revision 0 June 2006 PROJECT REPORT 10. 0 Project Management Challenges Difficulties of different nature had also to be managed during the Project. Some of these difficulties related to corporate matters within NPCC while some related to the client. The main difficulties were: The concept of performing Project Risk Assessments was not adopted within NPCC.

When it was introduced to the PMT, difficulties were faced in implementing it as it was treated as a change. Although benefits were explained, reluctance in pursuing the day-to-day implementation by the PMT members persisted until the process started yielding actual positive results. The PMT of the

client did not have the required strength. The Project lacked qualified management personnel on the client side, and this created a problem because many actions requiring client resolution/decision were not getting processed in a timely manner. Contractor's PMT had to invest time and effort in assisting the client where needed, though not contractually bound to do so, with a view to secure prompt outcomes.

The approach proved to be beneficial to the contractor. NPCC's internal procedures are complicated when it comes to approvals (financial ones in particular), thus impeding prompt decision making and adversely affecting the efficiency. The levels of financial approval authority granted to Project Managers, Departments Heads, and even to the GM, are low when viewed in conjunction with the work volume undertaken by NPCC. The adverse effects become more visible in fast track projects. Shortcuts had to be resorted to in certain cases (such as splitting a purchase order to reduce the individual value so that higher financial approving authorities need not be approached).

In other cases, the bureaucratic delays had to be pre-empted and actions had to be initiated much earlier than required, knowing that time will eventually be lost at the financial approval juncture. NPCC has been undergoing a management restructuring since 1998, including the appointment of a new GM and Department Heads. The restructuring also covered the grading system of the employees. This caused some instability and led to numerous resignations affecting all projects. Work load had eventually increased on some individuals, and incentives had to be offered to sustain required level of production (promotions, bonuses, etc.). The low

profit margin allowed in the tender estimate was aggravated by missing numerous cost elements, particularly in procurement.

The procurement side had to be subjected to close monitoring, and a Project Procurement Manager was appointed for this purpose, although not budgeted. NPCC's matrix is influenced (unbalanced) by the varying individual strength and level of authority of the Department Heads. This cascades down to corporate matters and, when conflict of interest arises, resolution normally – – – – Page 14 of 16 FULL SURFACE FIRE FIGHTING FACILITIES PROJECT AT DAS ISLAND Revision 0 June 2006 PROJECT REPORT goes in favor of the department having the stronger influence edge. For instance, some of NPCC's corporate Procurement Procedure aspects are tailored to serve the interest of the Procurement Section on the account of Projects Department needs, which is uncommon in a project oriented company.

When conflicts at projects level are not resolved by conventional communication / negotiation means, the Project Manager occasionally relies on augmenting his PMT resources to cater for the deficiencies arising from the lack of support from other service sections or departments. The number of additional works requested by the client was high (clubbed in 3 variation orders, Attachment 10). Control of these additional works and pursuing their commercial settlement required vigilance and persistence, knowing there is a weakness in client's organization, particularly in decision making. The Project was completed in August 2002, and client's formal endorsement of variation orders 02 and 03 was not obtained till March 2003 and July 2004 respectively.

The following measures were also adopted by the PMT towards mastering project difficulties and challenges: A high level of coordination and follow-up was constantly maintained with all involved parties, securing a smooth and timely flow of information. This was mandatory in view of Project's fast track, rapidly changing picture, and considerable number of involved parties. Progress and cost were closely monitored throughout the Project, using NPCC's planning system (Primavera) and cost control system (developed inhouse), initiating early warnings whenever potential areas of concern are foreseen. Part of this control was to ensure the timely availability of resources (manpower and equipment) and developing contingency plans where obstacles are expected.

Time and effort were invested towards optimizing the solutions of encountered problems, including resorting to brain storming sessions and encouraging creative ideas. Team spirit was promoted and team members were motivated to optimize their performance, using known team building techniques. In general, this is perhaps the most important factor contributing to the success or failure of projects. Close and open relationship was maintained with the client even at the time of disputes. This, in turn, helped maintaining a healthy Project atmosphere and averted the creation of tension and counter-productive environment. – – – Page 15 of 16 FULL SURFACE FIRE FIGHTING FACILITIES PROJECT AT DAS ISLAND Revision 0 June 2006 PROJECT REPORT 11. Role and Responsibilities of the Project Manager

The Project Manager, author of this Report, was Employer's representative vis-avis all external parties involved in this Project, mainly the client, vendors, & subcontractors. He was also the focal point of NPCC's Projects

Department within NPCC's organization on all matters related to this Project. The PM responsibilities encompassed the administration and management of all Project aspects, from its early stages till hand-over and close-out, going through the various stages of the life cycle. The responsibilities also included the achievement of the corporate management objectives set internally within NPCC. In broad terms, the PM was responsible for the safe and timely execution of the Project, and for attaining a profit equal to that depicted in the budget as a minimum.

He was also responsible for achieving the quality levels expected by the client and meeting client's overall satisfaction. He was authorized and empowered by the Employer to take and execute the decisions deemed necessary in his view to achieve the targets, all in line with Employer's corporate procedures and guidelines. Project-specific procedures stemming from the corporate ones were developed by the PM for this purpose (Execution, Invoicing, Coordination, Procurement, Subcontracting, Construction, Quality Plan, HSE Plan, Project Control and Scheduling, etc.). In more specific terms, the role and responsibilities of the PM can be summarized under three main categories as follows: ?

With his PMT, the PM was a team leader and a decision maker. He led his subordinates by delegation and empowerment, communicating the instructions and targets in a clear manner, availing adequate resources to the team, providing incentives, recognizing and rewarding good performance, providing assistance and training when performance is substandard, regularly interacting with the team (at both work and personal levels), holding Project review/appraisal meetings and brainstorming

sessions at regular intervals, supporting the subordinates in overcoming difficulties when required, encouraging their initiatives, reinforcing the concept of teamwork in general, and leading by example. With the client, the PM analyzed the capabilities of his counterpart and leveled with him, understood client's ultimate goals and acted sincerely towards their achievement, demonstrated dedication towards quality and HSE, adopted a transparent approach to the extent required to earn client's confidence, performed negotiations with integrity and firmness in a collaborative atmosphere, safeguarded NPCC's interest without generating irreversible tension with the client, established communication channels between his subordinates and those of his client counterpart, and shared the successful achievement of interim Project milestones with the client in social gatherings. Page 16 of 16 FULL SURFACE FIRE FIGHTING FACILITIES PROJECT AT DAS ISLAND Revision 0 June 2006 PROJECT REPORT With vendors and subcontractors, the PM understood that the relationship is a form of partnership and acted accordingly. Win-win scenarios were given preference with vendors and subcontractors that proved to be sincere and reliable, and justifiable shortfalls were not penalized. A record of vendor and subcontractor performance on the Project was maintained for future reference. 12. 0 Post-Project Appraisal As mentioned under section 6. 0 of this Report, Client and NPCC have both achieved their objectives. Client: ADMA-OPCO had initially set high ceilings for its budget and project commissioning date. The cost and time variations did not therefore have adverse effects on these objectives.

NPCC: NPCC did remarkably well as far as budget is concerned, as reflected in Project Contribution Report, Attachment 11. Achieved profit was 18%, and this was a major success to NPCC. Regarding the schedule, there were delays in work execution, partly due to the variations. The timely completion objective was however met by revising project completion date in one of the variations to encompass all the delays (variation order 02, Attachment 10). Client satisfaction was expressed in a formal letter (refer to Attachment 12), and the clean safety record of the Project earned a safety award from the client (refer to Attachment 13). 13. 0 Lessons Learnt Important lessons were learnt from this Project, some of which were of a technical nature.

For the purpose of this Report, two main lessons can be cited: ? NPCC's earlier conviction of not being able to bid competitively for jobs on Das Island, win projects, and perform satisfactorily was a mere misconception. NPCC's Management has subsequently issued directives to participate in the bidding process when invited to bid for jobs on Das Island by ADMA-OPCO. ? In EPC projects, civil subcontracts should preferably be awarded on unit rate basis (i. e. re-measured), since a considerable part of Project's profit was credited to this factor. This recommendation was supported by previous similar experience and was hence adopted by NPCC Management.