

October 10, 2007

Mr. Ali Sleiman  
**ADC Energy Systems**  
P. O. Box 125787  
Dubai, U.A.E.

**Re: SHAM Project – Abu Dhabi**

Dear Ali:

WM Group Engineers (WMGE) is pleased to submit our proposal to provide engineering services for the design of the mechanical, electrical and plumbing (MEP) systems of the above referenced district cooling project as follows:

**A. Project Understanding and Scope:**

The project entails constructing a total of three 40,000 RT chiller plants in Abu Dhabi to serve the majority of the Shams Project on Reem Island in Abu Dhabi. These plants will be constructed on individual 50 meter x70 meter plots and connected to a common distribution network which will be installed by others. The power input will be at 22 kV and chillers will use 3.3 kV motors. There will not be chilled water storage tanks at the chiller plants.

ADC has retained Crang & Boake for the architectural and structural design. WMGE will provide the MEP design services in coordination with Crang & Boake. As the registered consultant in Abu Dhabi, Crang & Boake will be the design consultant-of-record for the entire project including the MEP work designed by WMGE. Crang & Boake will also be responsible for the filing and permit application with local authorities for the MEP design.

This proposal is for the design of the first of the three chiller plants. The deliverables for WMGE shall be as listed in the “List of Deliverables” (Attachment 1) with Clarifications and Exceptions as noted.

**B. Scope of Work**

WMGE will provide all engineering services as required to fulfill the responsibilities in the “List of Deliverables” (Attachment 1). The engineering services will be completed upon making the final Detailed Design Submission consisting of drawings, specifications and calculations that incorporate all comments from the Owner.

WMGE will lead the coordination with Crang and Boake in the design of the chiller plants and keep ADC informed of all correspondences and discussions.

WMGE will assign a design team to be stationed in Dubai for maximum duration of 2 weeks immediately before and through the Preliminary Design Submission and Detailed Design Submission dates. ADC will provide the design team with working spaces and office supports such as office furniture, copier, printer, phone, etc. WMGE will be responsible for computers, mobile phones, transportation and lodging.

WMGE will attend two separate meetings in Dubai in addition to the onsite design trips. Two senior WMGE engineers will be present at each meeting for a 3-day trip.

**C. Work Not Included:**

- Interface with the utility companies.
- Construction services

**D. Schedule**

Milestone dates for the design phase are as follows:

Item	Description	End Date
1	Finalize plant layouts, major equipment selection and process concept	November 1, 2007
2	Preliminary Design submission (reports, drawings and calculations)	December 10, 2007
3	Detailed Design submission	January 31, 2008
4	Owner review complete	February 8, 2008
5	Final submission with Owner's comments incorporated	February 15, 2008

**E. Engineering Fees and Payment Terms**

Basic Engineering Fee (for Deliverable Items):	US\$360,000
Additional Engineering Services:	
• Stress analysis of piping in the plant	(TBD)
• Tripping Discrimination Study	(TBD)
• Harmonic Analysis	(TBD)
• Motor Starting Study	(TBD)
Expenses:	
• Onsite Design for Preliminary Submission	US\$42,000
• Onsite Design for Detailed Design Submission	US\$42,000
• Two Additional Meetings	<u>US\$30,000</u>
Total	US\$154,000

Billing will be rendered monthly on a percent complete basis. The terms are net 30 days.

This proposal will remain valid for 30 calendar days from the above date.

We appreciate the opportunity to offer our services to you. If the proposal is entirely to your satisfaction, please sign in the space provided below and return one copy for our file.

Very truly yours,

**WM Group Engineers, P.C.**



Douglas Wen, P.E.  
Vice President

ACCEPTED BY: \_\_\_\_\_

DATE: \_\_\_\_\_

## List Of Deliverables

WM Group Engineers Proposal, dated

**ATTACHMENT 1**

Design and develop all works above and below ground included but not limited to the following

<b>1</b>	<b>General</b>	<b>Clarification and Exception</b>
	Liaise with, but not limited too the following authorities.	
a)	Main developer (M/S Sorouh). Liaison lead by M/S PAL Technology with ADC Energy Systems assistance.	WMGE to provide assistance and attend meetings as noted in the proposal
b)	Main developer (M/S Sorouh) (Associated Contractors). Liaison lead by M/S PAL Technology with ADC Energy Systems assistance.	Ditto
c)	Main Developer (M/S Sorouh) (Associated Contractors). Liaison lead by M/S PAL Technology with ADC Energy Systems assistance.	Ditto
d)	Abu Dhabi Municipality. Design NOC's by ADC	Not in WMGE Scope of Work
e)	ADDCC (Drainage Dept). Design NOC's by ADC	Ditto
f)	ADDCC (Electrical Dept). Design NOC's by ADC	Ditto
g)	ADDCC (Water Dept). Design NOC's by ADC	Ditto
h)	Provide all layout drawings required for the development of construction drawings	WMGE to provide
i)	All Drawings submitted under this project to be carried out in Auto Cad 2005	Ditto
j)	All information on Drawings shall be provided as, one copy AO/A1 size, one copy A3 size and one electronic copy	WMGE to provide electronic copy only in bond "DWG" format
k)	All other correspondence shall be passed over in a Microsoft office format (XP Professional)	WMGE to provide
l)	All calculations should be carried out using proprietary brand soft ware in an open format	WMGE to provide; hand calculations are acceptable.
m)	The ownership and Copy Right of the design and it development shall remain the property of ADC Energy Systems and shall not be used or provided to a third party.	WMGE to comply
n)	Provide all ADDCC information regarding submittals for Approval by the Authority.	WMGE to provide
o)	Provide a full Acoustic Study	To be done by Crang & Boake
p)	Provide a full Environmental impact study in accordance with current guide lines and practices.	To be done by Crang & Boake
q)	All calculations to comply with the current seismic regulations	To be done by Crang & Boake for structural (Not required for MEP

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<b>1</b>	<b>General</b>	<b>Clarification and Exception</b>
		work)
r)	Drawings to be provided to the following scale. 1) General Layouts 1:100 2) Details 1:50 3) AHU Plant room Areas 1:100 4) Switch Rooms 1:100 5) Plant Details 1:100 6) Typical Details: NTS	WMGE to comply

<b>2</b>	<b>Structural</b>	<b>Clarification and Exception</b>
a)	Interpretation of the soil reports and site surveys provided by the client.	By Crang & Boake; Not in WMGE Scope of Work
b)	Interpretation of the soil reports and site surveys provided by an independent party.	Ditto
c)	Make recommendations to the needs of the below ground structure.	Ditto
d)	Provide Specification & steel bar bending Schedules.	Ditto
e)	Provide Specifications & all intersection and pile cap details.	Ditto
f)	Provide Specification & all water proofing details.	Ditto
g)	Provide Specifications & details and method of back filling.	Ditto
h)	Provide all calculations	Ditto
i)	Provide a full Bill of Quantities	Ditto
j)	Provide Building Sections @ grid reference both east to west and north to south	Ditto
k)	Provide Floor plans by level	Ditto
l)	Provide Building Elevations	Ditto

<b>3</b>	<b>Civil &amp; Architectural</b>	<b>Clarification and Exception</b>
a)	Provide Specifications & a schedule of finishes	By Crang & Boake; Not in WMGE Scope of Work
b)	Provide Specifications a schedule of Doors	Ditto
c)	Provide Specifications a schedule of Windows	Ditto
d)	Provide Specifications & a schedule of Wall Tiles	Ditto
e)	Provide Specifications & a schedule of Floor Tiles	Ditto
f)	Provide Specifications & a schedule of Ceiling Tiles	Ditto
g)	Provide Specifications & a schedule of Paint Finishes	Ditto

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h)	Provide Specifications & a schedule of Precast Elements	Ditto
i)	Provide a schedule of Elements to be Water Proofed	Ditto
j)	Provide Fire Compartment Drwgs.	Ditto

<b>4</b>	<b>Electrical</b>	<b>Clarification and Exception</b>
a)	Carry out Space/Plant & Equipment Coordination & provide section plus layout drwg.	By WMGE
b)	Provide Specifications & Single line plus layout drwg for the MV System	By WMGE
c)	Provide Specifications & Single line plus layout drwg for the LV System	By WMGE
d)	Provide Specifications & Single line plus layout drwg for the CCTV System	By WMGE
e)	Provide Specifications & Single line plus layout drwg for the Fire Alarm, and Sprinkler	By WMGE
f)	Provide Specification & Single line plus layout drwg for the Telephone System	By WMGE
g)	Provide Specifications & Single line plus layout drwg for the Gas Detection System	By Others If required
h)	Provide Specifications for the BMS System	By WMGE
i)	Provide Specifications & Single line plus layout drwg for the Process Controls	By WMGE
j)	Provide Specifications & Single line plus layout drwg for the Emergency Lighting	By WMGE
k)	Provide Specifications & Single line plus layout drwg for the Emergency Generator System	By WMGE
l)	Provide Specification & Single line plus layout drwg for the Emergency Generator Fuel System	By WMGE
m)	Provide Specifications & Single line plus layout drwg for the Thermal Storage Tank Controls.	Not required for this project
n)	Provide Specifications & cable size schedule,	By WMGE
o)	Provide Specification & Single line plus layout drwg for the Earthing System	By WMGE
p)	Provide Specifications & Single line plus layout drwg for the Lightning Protection System	By WMGE
q)	Carry out a short circuit study	By WMGE
r)	Carry out a tripping Discrimination Study	By WMGE under Extra Services
s)	Carry out a Motor Starting Study	By WMGE under Extra Services

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<b>4</b>	<b>Electrical</b>	<b>Clarification and Exception</b>
t)	Provide Specifications & a Schedule of Light Fittings	By WMGE
u)	Provide Specifications & Single line plus layout drw for the Emergency Battery System	By WMGE
v)	Provide Specifications and typical details for cable support systems.	By WMGE
w)	Provide a full Harmonic Study	By WMGE under Extra Services
x)	Provide Distribution Schedules	By WMGE
y)	Provide a fire Strategy	By WMGE

<b>5</b>	<b>Mechanical</b>	<b>Clarification and Exception</b>
a)	Carry out Space/Plant & Equipment Coordination & provide section plus layout drw.	By WMGE
b)	Provide Sections and layout drawing for the selected Chiller plant	By WMGE
c)	Provide Sections and layout drawing for the selected Cooling Towers	By WMGE
d)	Provide Specifications & a Process pipe work single line plus Layout drawings	By WMGE
e)	Provide Specifications & a Blow Down Water pipework single line plus Layout drawings	By WMGE
f)	Provide Specifications & a Sprinkler pipework single line plus Layout drawings	By WMGE
g)	Provide Specifications & a Hose Reel pipework single line plus Layout drawings	By WMGE
h)	Provide Specifications & a FM200 pipe-work single line plus Layout drawings	By WMGE
i)	Provide Specification & CO2 and Extinguisher Layout drawings	By WMGE
j)	Provide Specifications & a Domestic Chilled Water pipe-work single line plus Layout drawings	By WMGE
k)	Provide Specifications & a Domestic Hot & Cold Water pipework single line plus Layout drawings	By WMGE
l)	Provide Specifications & a Drainage pipework single line plus Layout drawings	By WMGE
m)	Provide Specifications & a Rain Water pipework single line plus Layout drawings	By WMGE
n)	Provide Specifications & a Gas Detection pipework single line plus Layout drawings	By WMGE
o)	Provide Specifications & a Supply Air single line plus Layout drawings	By WMGE

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<b>5</b>	<b>Mechanical</b>	<b>Clarification and Exception</b>
p)	Provide Specifications & a Return Air single line plus Layout drawings	By WMGE
q)	Provide Specifications & a Extract Air single line plus Layout drawings	By WMGE
r)	Provide Specifications & a Generator Exhaust single line plus Layout drawings	By WMGE
s)	Provide Specifications & a Generator Fuel single line plus Layout drawings	By WMGE
t)	Provide Specifications & Emergency Generator Layout drawings	By WMGE
u)	Provide Specifications & Condenser water pumps Layout drawings	By WMGE
v)	Provide Specifications & Primary Chilled water pumps Layout drawings	By WMGE
w)	Provide Specifications & Secondary Chilled water pumps Layout drawings	By WMGE
x)	Provide Specifications & Domestic Chilled water pumps Layout drawings	By WMGE
y)	Provide Specifications & Sump pumps Layout drawings	By WMGE
z)	Provide Specifications & Sweeper System Layout drawings	By WMGE (for cooling tower basin cleaning)
aa)	Provide Specifications & Side Stream Filter System Layout drawings	By WMGE (side stream filter for condenser water only; temporary strainer for chilled water)
bb)	Provide Specifications & Pressurization Unit Layout drawings	By WMGE
cc)	Provide Specifications & Process Control P&ID drawings	By WMGE
dd)	Provide Specifications & Process Controls Philosophy	By WMGE
ee)	Carry out a full System Stress Analysis	By WMGE under Extra Services (WMGE's piping design will account for the stress from thermal variation)
ff)	Carry out Thermal Degradation Study of the Plant & Thermal Storage Tank	Not Required
gg)	Provide Specifications & Detailed drawings for all support brackets both electrical & mechanical equipment.	By WMGE
hh)	Provide Specifications & Detail Drawings for the overhead cranes.	By WMGE

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<b>5</b>	<b>Mechanical</b>	<b>Clarification and Exception</b>
ii)	Provide a detail study & drawing for the Maintenances ingress and egress of plant and equipment.	Will be incorporated in the plant design; no study will be provided.
jj)	Grille Schedule	By WMGE
kk)	Diffuser Schedule	By WMGE
ll)	Valve Isolating Schedule	By WMGE
mm)	Control Valve Schedule	By WMGE
nn)	DRV Schedule	By WMGE
oo)	AAV schedule	By WMGE
pp)	Pump Schedule	By WMGE
qq)	Fan Schedules	By WMGE
uu)	FCU Schedule	By WMGE
vv)	AHU Schedule	By WMGE
ww)	Fire Damper Schedule	By WMGE
xx)	VCD Damper Schedules	By WMGE
yy)	Smoke Damper Schedule	By WMGE
zz)	Control Schedule	By WMGE
aaa)	Gauge Schedule	By WMGE
bbb)	Hydraulic calculation of chilled water distribution network for the purpose of sizing secondary pumps in the plant	By WMGE
ccc)	Review the ETS design prepared by building designers	By WMGE