

Appendix F: SBR Information

Saito, Bert

From: Tulang, Dennis
Sent: Monday, September 26, 2005 2:53 PM
To: Nakasone, Martin; Saito, Bert
Subject: FW: Honokaa - M & E Pacific
Attachments: Honokaa, HI Elev.dwg; Honokaa, HI Plan.dwg; Q50926 Fluidyne.Honokaa, HI-M and E.doc

-----Original Message-----

From: freddie leonor [mailto:promarkcorp@msn.com]
Sent: Monday, September 26, 2005 1:11 PM
To: Tulang, Dennis
Subject: Fw: Honokaa - M & E Pacific

Hello Mr. T,

See attached quote and lay-out for the 200,000 GPD ISAM. Budget price for 100,000 GPD and 650,000 GPD are shown below.

Have a nice trip! I hope you and your wife enjoy Rome and Mediterranean.

Regards,

Freddie Leonor
Tel. No. (808)-488-0599
Fax No. (808)-488-2909

----- Original Message -----

From: [Erick Mandt](mailto:ErickMandt)
To: promarkcorp@msn.com
Cc: Mike G Mandt
Sent: Monday, September 26, 2005 10:38 AM
Subject: Fw: Honokaa - M & E Pacific

Freddie,

We would have similiar scopes for the other flows as the 200,000 gpd plant.

Price for a 100,000 gpd plant would be \$185,000 FOB-factory with freight allowed to Hawaii.
Price for a 650,000 gpd plant would be \$495,000 FOB-factory with freight allowed to Hawaii. This design would require blowers which are included in this price.

Erick

FLUIDYNE CORPORATION

2816 West First Street Cedar Falls, IA 50613
Phone: (319) 266-9967 Fax: (319) 277-6034
<http://www.fluidynecorp.com>



FILE

PROPOSAL

FLUIDYNE CORPORATION (HEREINAFTER CALLED THE COMPANY) AGREES TO SELL TO THE PURCHASER AND THE PURCHASER AGREES TO BUY AND ACCEPT FROM THE COMPANY, THE ITEM (S) DESCRIBED HEREIN.

PROJECT: **Honokaa, Hawaii**
Fluidyne – ISAM™
Sequencing Batch Reactor System

PROPOSAL NO.: PRO 091905

DATE WRITTEN: September 19, 2005

WRITTEN BY: ERICK MANDT
FLUIDYNE CORPORATION
CEDAR FALLS, IOWA

Missing design info
design flow
BoD
TS
TKN
Volume of tanks
Layouts

**FLUIDYNE CORPORATION
2816 W. FIRST STREET
CEDAR FALLS, IOWA 50613
(319) 266-9967**

**PROPOSAL NO.: PRO 091905
PROJECT: Honokaa, HI
DATE: September 19, 2005**

Fluidyne propose to furnish Fluidyne ISAM™ - Sequencing Batch Reactor Equipment and technology for Honokaa, Hawaii wastewater treatment facility.

Fluidyne proposes to supply the following equipment:

ISAM™:

Two (2) ISAM™ Influent Diffusers

Four (4) ISAM™ Overflow Assemblies

SAM™

Four (4) 6" Diameter SAM™ Tank Influent Diffuser Assemblies with stainless steel support. Diffuser pipe to terminate with an 6" flange connection to mate to contractor supplied wall spool.

Two (2) Sets Float Level sensors with support bracket.

Four (4) 15 HP Submersible SBR Feed Pump/Jet Motive Pumps with discharge elbow, guide rail brackets, power cord and lifting.

Four (4) Sets of Liquid Feed piping from the jet motive pump to contractor supplied flange spool

Four (4) 2" Diameter Waste Sludge Control Valves

SBR:

Four (4) Fluidyne model # DM3JA2 Jet Aspirating Headers including all in-basin air and liquid piping and stainless steel supports.

Two (2) Fluidyne Model # FW-10 Overflow weirs / flow dispersion baffles. Overflow pipe to terminate with a 10" flange connection to mate to contractor supplied wall spool.

Two (2) Fluidyne Model # SED-16 Solids Excluding Decanters with withdrawal piping, wall support brackets and discharge flange connection. Liquid piping to terminate with a 10" flange connection to mate with contractor supplied wall spool.

**FLUIDYNE CORPORATION
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**PROPOSAL NO.: PRO 091905
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Two (2) 10" electric operated effluent control valves (120/1/60 electrical service)

Two (2) Sets Float Level sensors with support bracket.

Two (2) HACH Dissolved Oxygen Analyzer and Probe (120/1/60 electrical service)

CONTROLS:

One (1) ISAM Control Panel housed in NEMA 12 enclosure with Allen-Bradley SLC 5/04 PLC, input cards, output cards, indicating lights, switches, relays, modem, UPS, and PanelView 550 operator interface to automatically control the ISAM™ system control functions.

The price for the above equipment is **\$235,000 USD** FOB-factory with freight allowed to the jobsite.

CLARIFICATIONS:

No blowers, blower enclosures, blower building or blower accessories are required with the Fluidyne system. We are utilizing jet aspirators that use atmospheric air.

SERVICE: Service is included in the amount of six (6) man-days provided in two (2) trips. Travel and living expenses are included with these trips. Additional service will be charged at a rate of \$850.00 / day plus travel and living expenses.

EXCLUSIONS: Not furnished by Fluidyne are the following; concrete tanks; any pipe, supports, fittings or valves except those specifically included above; out of basin or interconnecting piping, valving or supports; tank wall spools and interconnecting hardware and gaskets; waste sludge pump; waste sludge discharge piping or supports;; lift station pumps and accessories; VFD's; screening equipment; disinfection equipment; sludge disposal or handling equipment; sampler; access hatches; hoists; handrail; grating; explosion proof equipment; freeze protection; motor starters or accessories; remote panels, disconnects, junction boxes, conduit or wiring between mechanical equipment and the control panel; anchor bolts; electrical and mechanical installation labor; off-loading of equipment; jobsite testing; jobsite storage; taxes; duties; insurance and other items not specifically mentioned in the body of this proposal.

SHIPMENT: The price quoted is based on a target shipment date of 12 to 16 weeks after receipt of approved drawings.

TAXES: Any applicable duties, sales, use, excise or similar taxes are not included in the quoted price.

TERMS OF PAYMENT: **Warranties** shall apply only when payments are made in full and according to the following schedule:

**FLUIDYNE CORPORATION
2816 W. FIRST STREET
CEDAR FALLS, IOWA 50613
(319) 266-9967**

**PROPOSAL NO.: PRO 091905
PROJECT: Honokaa, HI
DATE: September 19, 2005**

100% Net 30 days from shipment

Unless other terms are specified, all payments shall be in United States Dollars and pro rata payments shall become due as deliveries are made. If date of delivery is delayed by purchaser, date of readiness for delivery shall be deemed date of delivery for payment purposes. If purchaser delays manufacture, a payment shall be made based on the purchase price and percentage of completion; balance payable in accordance with the terms stated.

If, at any time in Company's judgment, purchaser may be or maybe become unable or unwilling to meet the terms specified, Company may require satisfactory assurances or full or partial payment as a condition of commencing or continuing manufacture; or in advance of shipment, if it shipment has been made, recover the product(s) from the carrier.

DURATION: This proposal shall remain in effect for 60 days after proposal date, unless changed in the interim upon written notice.

**FLUIDYNE CORPORATION
TERMS OF SALE**

The conditions stated below shall constitute a part of the agreement resulting from the acceptance of an order for the whole or any part of the equipment covered by this quotation.

1. ACCEPTANCE:

All orders shall be made out to Fluidyne Corp., 2816 West First Street, Cedar Falls, Iowa 50613, and shall be subject to acceptance by Fluidyne. Orders may not be canceled without Fluidyne's written consent, and then only on terms indemnifying Fluidyne against loss. Fluidyne reserves the right to correct any typographical or clerical errors in the proposal, pricing, or specification. Acceptance of any contract by Fluidyne shall be contingent upon credit approval. Performance shall be subject to strikes, fires, accidents, or curtailments in manufacturing or due to delays unavoidable or beyond the control of Fluidyne. No direct or liquidated damages or penalties shall be accepted. Receipt of the original copy of this proposal, signed by the purchaser, shall constitute a purchase order. The drawings and bulletin illustrations submitted with this proposal shall be general type, arrangement and approximate dimensions of the equipment to be furnished. Fluidyne reserves the right to alter such details in design or arrangement of its equipment, which in its judgment would constitute an improvement in construction, application or operation. Fluidyne shall promptly forward all necessary engineering information for installation of its equipment to the purchaser upon receipt of this accepted proposal. Any changes in equipment, arrangement of equipment, or application of equipment requested by purchaser after acceptance of proposal will be made at purchaser's expense.

2. TAXES

The prices quoted are subject to any addition, which may be necessary to cover any tax charge now existing or hereafter imposed by Federal, State, or Municipal authorities upon equipment or services herein described or the production, sale, distribution or delivery thereof, or upon any feature of this transaction.

3. BINDING RESPONSIBILITIES:

Sales representatives are not authorized to bind us. Typographical errors are not binding.

4. CANCELLATION:

After acceptance, an order shall not be subject to cancellation unless cancellation charges are borne by the Purchaser for work done by the Seller up to the time of receipt of cancellation notice; nor shall such orders be subject to change unless price increases are born by the Purchaser.

5. SHIPMENT AND DELIVERY:

All deliveries quoted are estimates based on Fluidyne's best judgment at the time of this proposal, but shipment on these dates is not guaranteed. Deliveries are figured from date of receipt in Cedar Falls, Iowa of approved order and technical data. Fluidyne will not accept any claims caused by delay in shipment or delivery. It is further understood that storage charges of 1 percent per month will apply commencing 30 days from date of equipment completion if purchaser

asks the delivery be delayed after production is started. Billing will be made at time of completion of equipment and paid per standard terms.

6. TERMS OF PAYMENT:

Terms of payment are 100% Net 30 days from shipping unless stipulated otherwise in the body of this proposal. Accounts not paid on net cash due date bear interest at the rate of 1.5 percent per month not to exceed the maximum permissible by law. Title shall not pass to purchaser or end user until all payments including final payment and any retention for all goods and services have been received in full by Fluidyne.

7. INSTALLATION AND INITIAL OPERATION:

All equipment shall be installed by and at the expense of the Purchaser unless otherwise stipulated. The Seller will furnish at its option, engineers to supervise the installation and starting up of the equipment. Field service will be provided by a factory-trained representative at a per diem rate of \$ _____ plus travel and expenses on any additional period not stated in this contract.

8. WARRANTY:

Fluidyne warrants the equipment proposed and described herein against defects in material and workmanship under normal service for a period of one year after date of start-up, not to exceed eighteen months from date of shipment. Parts of products manufactured by others and provided by Fluidyne are warranted only to the extent of the original manufacturers warranty. This warranty is valid provided that the installation operation and maintenance of the equipment is made in accordance with Fluidyne's instructions. The purchaser must promptly give written notice of any equipment defects to Fluidyne. Under warranty, Fluidyne will provide, without cost to the purchaser, such replacement parts as may be required to repair or replace the defective equipment. All labor as may be required to make such replacements must be made by purchaser unless stated otherwise in this proposal. Qualified Fluidyne personnel or its agents must perform all startup service, or this warranty is void. Fluidyne will not warrant nor replace any material involved when repairs are made without prior written authorization from Fluidyne.

THIS IS FLUIDYNE'S SOLE WARRANTY. FLUIDYNE MAKES NO OTHER WARRANTY OF ANY KIND, IMPLIED OR EXPRESSED: ALL IMPLIED OR EXPRESSED WARRANTY MADE BY ANY PERSON, AGENT OR REPRESENTATIVE WHICH EXCEEDS FLUIDYNE'S AFOREMENTIONED OBLIGATION ARE HEREBY DISCLAIMED BY FLUIDYNE AND EXCLUDED FROM THIS WARRANTY.

9. PATENTS:

The equipment provided by Fluidyne may be covered by patents pending or issued. Fluidyne grants the right to use this equipment with further charges. Fluidyne does not grant rights to use, royalties, or protection against patent litigation arising from use of this equipment in patented processes controlled by others unless otherwise listed above.

SUBMITTED BY: FLUIDYNE CORPORATION

DATE: September 19, 2005

PROJECT: Honokaa, HI

ACCEPTED BY: _____
(Sign and Title)

(Company Name)

DATED: _____

FLUIDYNE SEQUENCING BATCH REACTOR CALCULATIONS

PROJECT: ISAM™ Honokaa

ENGINEER: M & E Pacific

PROJECT #:

DATE & TIME:

9/14/05 12:32

ISAM™200

ISAM™200

INFLUENT CONDITIONS

Flow (m3/d)	757	757
Flow (lps)	8.8	8.8
Flow (mgd)	0.200	0.200
Flow(gpm)	139	139
Peak hour flow (mgd)	0.40	1514 cmd
Peak instantaneous flow (gpm)	239	15 lps
BOD (mg/l)	250	250
(lb/d)	417	189 kg/d
TSS (mg/l)	250	250
(lb/d)	417	189 kg/d
TN-N (mg/l)	30	30
(lb/d)	50	23 kg/d

OXYGEN REQUIREMENTS

Pounds TKN required for synthesis	15	7 kg
Pounds of NO3-N produced	35	16 kg
Pounds O2 recovered/pound NO3-N reduced	2.6	2.6 kg/kg
Pound of Oxygen/ pound of BOD	1.2	1.2 kg/kg
Pound of Oxygen/pound of TKN	4.6	4.6 kg/kg
Actual Oxygen Demand (lb O2/d) Total	638	290 kg O2/hr
Alpha	0.9	0.9
Beta	0.95	0.95
Theta	1.024	1.024
Operating Dissolved oxygen (mg/l)	1	1
Clean Water oxygen sat. at op. temp (mg/l)	9.09	9.09
Clean Water oxygen sat. at std. temp (mg/l)	9.09	9.09
Clean water O2 sat, std temp,mid depth(mg/l)	10.84	9.62
Std. condition ambient pressure (psia)	14.7	14.7
Oper. condition ambient pressure (psia)	14.5	14.5
Wastewater temperature (c)	20	20
SOR/AOR ratio	1.32	1.33
Standard Oxygen Demand (lb O2/d) total	840	386 kg O2/d
Standard Oxygen Demand (lb O2/hr)	56	25.8 kg O2/hr
Specific oxygenation rate (mg/l-hr)	50	50
Pounds of oxygen/pound of air	0.23	0.23
Clean water efficiency (%)	15	15
Pounds of air/cubic foot of air	0.075	0.075
Aeration hours per day	15.00	15.00
Air flow rate (scfm/tank)	180	182

NITRIFICATION/DENITRIFICATION

Required alkalinity for nitrification (mg/l)	152	152
Alkalinity recovered, denitrification (mg/l)	64	64
Net alkalinity required (mg/l)	88	88
Mixed liquor temperature, C	15	15
ML dissolved oxygen (mg/l)	1	1
Max. nitrifier growth rate, day-1	0.204	0.204
Minimum SRT required for nitrification, days	4.89	4.89
Actual SBR SRT, days	9.19	9.20
Total SRT, days	13.78	13.79

PROJECT: ISAM™ Honokaa

Kn, half velocity constant (mg/l)	0.40	0.40
Design growth rate for heterotrophs/nitrifiers	0.1089	0.1087
Projected effluent soluble NH ₃ -N, mg/l	0.46	0.46
Specific utilization rate, lbs BOD ₅ /lb mlvss	0.29	0.29
lbs. mlvss required for BOD & NH ₃ removal	1444	656 kg
mlvss (mg/l)	1500	1500
Tank volume req. for BOD & NH ₃ removal (MG)	0.115	437 m ³
Denitrification rate (g/g/day)	0.047	0.047
lbs mlvss required for denitrification	753	342 kg
Tank volume required for NO ₃ removal (MG)	0.060	228
Total tank volume required (MG)	0.176	665
SBR/SAM™ TANK CONFIGURATION		
No. of SBR tanks	2	2
Length SBR + SAM™ (ft)	39.36	12.00 m
Length SBR (ft)	26.24	8.00 m
Length SAM™ (ft)	13.12	4.00 m
Width (ft)	26.24	8.00 m
Bottom water level (ft)	9.84	3.00 m
Top water level (ft)	13.12	4.00 m
Cycle water level (ft)	9.84	3.00 m
SAM™ HBWL	9.18	2.80 m
SAM™ LBWL	8.75	2.67 m
No. Decanters/tank	1	1
SBR Tankage Volume @ TWL(MG)	0.135	512 m ³
SBR HRT (hrs)	16.22	16.22
SAM™ Tankage Volume	0.068	256 m ³
SAM™ HRT (hrs)	8.11	8.11
SBR + SAM™ Volume @ TWL(MG)	0.203	768 m ³
SBR + SAM™ HRT (hrs)	24.33	24.33
Total Tankage Volume (MG)	0.270	1024 m ³
Total HRT (hrs)	32.43	32.43
CYCLE TIMES/CAPACITY CALCULATIONS		
Total decant volume (cubic feet)	4,517	128 m ³
Total decant volume (gallons)	33,786	957
Decant volume per tank (gallons)	16,893	64 m ³
Number of cycles per day/tank	5.92	5.92
Total time per cycle (minutes)	243	243
Fill rate (gpm)	1409	89 lps
Fill time (minutes) SBR	12	12
Feed rate (gpm)	139	8.8 lps
Fill time SAM™ (minutes)	110	110
Interact Period (minutes)	176	176
React Period (minutes)		
Settle period (minutes)	45	45
Settle fill (minutes)		
Average decant rate (gpm/ft decanter)	100	1.25 cmm/m
Decanter length (feet)	16	4.9 m
Decanting time (minutes)	10.6	10.5
Decanting rate (gpm)	1600	6.1 cmm
Peak decanting rate (gpm at start of decant)	1760	6.7 cmm
Idle period time (minutes)	0	0
Maximum aeration period available (hours/day)	18.52	18.52
EQUIPMENT SELECTION		
Air flow per nozzle (scfm)	60	60
Number of nozzles required (per tank)	3.00	3.04
Number of nozzles provided (per tank)	4	4
Actual airflow per nozzle (scfm)	45.07	45.61
Blower capacity provided (scfm)	0	0

PROJECT: ISAM™ Honokaa

POWER CONSUMPTION CALCULATIONS

Pump efficiency	0.75	0.75
Blower efficiency	0.6	0.6
Pump horsepower, BHP/tank	13	13
Mixing BHP/MG	190	190
Blower horsepower, BHP/tank	0	0
Total horsepower, BHP/tank	13	13
Aeration BHP/MG	190	190
Total design equivalent horsepower, BHP	16	16
Estimated power consumption kwh/day	319	319

SLUDGE PRODUCTION

Sludge Yield Factor	0.70	0.70
Net Sludge Yield (lbs/d)	263	119 kg/d
Sludge Concentration (%) from SBR	0.21	0.21
Sludge Wasting Rate (gpd)	14712	56 cmd
Waste Sludge /cycle (gal)	1243	4.7 cm
WAS Pumping Rate (gpm)	100	0.4 cmm
Waste Sludge Cycle Time (min)	12.4	12.4
Thickened Sludge Concentration (%)	5	5
Thickened Sludge (gpd)	630	2.4 cmd

MLSS (mg/l) @ TWL	2143	2143
Sludge inventory total (lbs)	3623	1646 kg
Sludge inventory in SBR (lbs)	2415	1097 kg
SRT (1/days)	13.78	13.79
SRT in SBR (1/days)	9.19	9.20
F/M	0.12	0.11
SVI (ml/g)	150	150
Sludge blanket level (ft)	4.22	1.29 m
Organic loading (lbs BOD/1000 ft3)	15.39	0.25 kg/m3

TRASH TRAP

Surface Area Required	400	38 m2
Number of tanks	2	2
Length required (ft)	7.62	2.37 m
Length (ft) provided	13.12	4.00 m
Width (ft)	26.24	8.00 m
TWL (ft)	13.12	4.00 m
Total volume (gal) available	67,571	256 m3
Days sludge storage available undigested	107	107
Total sludge age including SBR (days)	116	116
Pounds sludge destroyed	173	79 kg
% sludge reduction	66	66
Thickened, digested sludge (gpd)	215	0.8 cmd
Inerts accumulation (gal/d)	100	0.4 cmd
Days sludge storage available after digestion	107	108