

Asia Pacific Research Initiative for Sustainable Energy Systems 2012 (APRIS12)

**Office of Naval Research
Grant Award Number N00014-13-1-0463**

Crissy Field Center Wind Power Study Phase II: Stored Materials and Major Component Inventory

Task 7

Prepared For
Hawaii Natural Energy Institute

Prepared By
Golden Gate National Parks Conservancy

June 2018



HNEI
Hawai'i Natural Energy Institute
University of Hawai'i at Mānoa





Deliverable 2: Report on Recommendations for Wind Turbine Systems and Data Acquisition System

Crissy Field Center Wind Power Study Phase II, Report 2.1: Stored Materials and Major Component Inventory

Prime Award No. N00014-13-1-0463, HNEI Subaward No. MA160014

Background

Per the terms of the project contract between the Golden Gate National Parks Conservancy and the Hawaii Natural Energy Institute, dated May 6, 2016, and as outlined in the Statement of Work, The Golden Gate National Parks Conservancy (GGNPC) will plan, permit, install and operate four new vertical axis wind energy systems at the Crissy Field Center (CFC), an existing modular test platform manufactured by Project Frog. The GGNPC will modify existing infrastructure and the Data Acquisition System (DAS) from the prior wind study project to record wind speed, wind direction, and power generation for each wind energy system. Data from the DAS shall be made available to HNEI sufficient for industry standard analysis.

Report 2.1: Stored Materials Report, Major Components Inventory

As outlined in the Deliverables and Payment Schedule, Report 2.1 shall provide documentation of the project's receipt of major project components, including turbines, inverters and all appurtenant data acquisition equipment.

To date, all of the equipment associated with this project has been purchased and supplied to the site by the project contractors, subcontractors and GGNPC.

UGE Components

The majority of the components for the project were purchased by the project prime contractor, Luminalt Energy Corporation. Luminalt purchased the two UGE Vision AIR 3 turbines, 7 meter towers, associated electronics and adaptor plates (and required engineering) from Castle Energy LLC. Castle Energy is a registered distributor for UGE products.



8306 Ridge Rd
North Royalton, Oh 44133
440-390-1340
dlwalters@castleNRG.com

TO Luminalt Energy Corporation
1320 Potrero Ave
San Francisco, CA 94110
ATTN: August Goers

CUSTOMER PO: 2593

PAID IN FULL

Figure 1: Castle Energy Invoice to Luminalt confirming payment in full (with actual costs removed by contractor).

experience service technology
 1500 Doolittle Dr., San Leandro, CA 94577
 Telephone: (510) 618-1670
 www.stgusa.com

Invoice/Pickup Receipt

THIS INVOICE/PICKUP RECEIPT IS SUBJECT TO THE GENERAL TERMS AND CONDITIONS OF STG SERVICES, WHICH INCLUDE A LIMITATION OF LIABILITY. A COMPLETE COPY OF THE TERMS AND CONDITIONS IS AVAILABLE UPON REQUEST OR BY VISITING WWW.STGUSA.COM

Trucker : RENTERIA TRANSPORT Pickup Date : 23-MAR-2017 13:19 House B/L : LTJOK72755 Vessel : TRUCK Container/Chassis : 48 STATES Weight : 1223 kgs /2697 lbs Cube : 7.74 cbm / 273 cft Manifested Pcs : 6 PKG Desc : WIND TURBINE Marks : 2462387-07:URBAN GREEN:ENERGY	Invoice : 5000182242 Inv Date : 23-MAR-2017 Job No : 571857-04 IT No : 428049856 Cust Ref : 2463953-STGL Master B/L : 2463953 Stripped : 22-MAR-2017 11:15 Available at CFS: 22-MAR-2017 13:15 Last Free Day : 28-MAR-2017 Whse Loc : P3-6
--	---

****6 PKG SP: 6 PE: 0 ****

Charges	
RAMP FEES	75.00
PIER CONGESTION	17.42
DOCUMENTATION	5.00
FORKLIFT FEES	35.00
TERMINAL FUEL	15.48
RECV/LOAD FEE	58.05
OVERDIMENSION	116.10
GUARANTEE	-322.05
Total Amount Due (USD)	-0.00

Signature: X *[Signature]* Gate Pass No: 20395

Driver: JOSE REYES Plate: _____

Marks As Per Cargo: _____

Trucker's Verification: _____

Loader: _____ Checker: _____

MT Pallets In: _____ Pallets Out: _____

Pcs: _____ Time: _____ Door: _____

Circle if apply: EXCEPTIONS ☒ BAL ☐ OTHER ☐

Explanation: *Rec'd Com'dy*

This shipment is being picked up by trucker/courier on Collect basis. STG is NOT RESPONSIBLE for any pickup or delivery charges. Please insure that the agent hiring the here-in named trucking company is billed for drayage fees. (STG) shall not be liable for loss or damage to goods. The limit of liability under any circumstance is \$0.10 per 100Lbs, with the maximum of \$500.00 per report unless a set declared value is submitted to us in writing prior to receipt of goods.

STGO-571857-04

Figure 2: Acknowledgement of receipt for UGE Turbines and associated equipment.

The UGE equipment was delivered directly to a warehouse adjacent to the project site at Crissy Field.



Figure 3: UGE Turbines and Towers delivered to Crissy Field



Figure 4: UGE Turbines and towers being unloaded at Crissy Field



Figure 5: UGE Turbines and towers being unloaded at Crissy Field



Figure 6: UGE Turbines unpacked and stored for installation at site.

Omniflow Components

The Parks Conservancy contracted directly with Omniflow to purchase two turbines and associated electronics.

The purchase was initiated by a 50% deposit wired to Omniflow:

Page 1 of 2



Wires

Payment Information

SWIFT Confirmation # 160923WFBUS6SAXXX3098416910

Status **Successful**

Payment ID 2398

Modified 09/22/2016 01:19 pm ET by KBROWN

Type Wire

Template Name OMNIFLOW, S.A.

Debit Account

Debit Account 4121388888 (USD) Conservancy-OPERATING

Beneficiary

Beneficiary

OMNIFLOW, S.A.
RUA DELFIM FERREIRA
776C 4100 - 199 PORTO
IBAN PT50001000004660865000186

Beneficiary Bank

BANCO, BPI, S.A.
RUA TENENTE VALADIM
284 4100-476 PORTO
Portugal(PT)

Payment Details

Debit Currency USD - United States Dollar

Credit Currency USD - United States Dollar

Amount 5,443.00 USD

Value Date 09/23/2016

Cutoff time 05:30 pm ET

Wire Fee Assignment SHA

Figure 7: Wire confirmation of Omniflow deposit, Page 1.

References

Originator

GOLDEN GATE NATIONAL PARK CONSERVAN
FORT MASON BLDG 201
SAN FRANCISCO CA UNITED STATES 941

Payment References

ID or Acct # **4121388888**

Internal Reference

Customer Reference **INV FP 2016/97**
Payment Description **INVOICE - FP 2016/97**

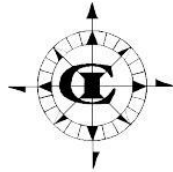
Intermediary Bank

Intermediary Bank

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Figure 7: Wire confirmation of Omniflow deposit, Page 2.

Customs and duty documentation for the Omniflow Units:



Customs Brokers
Transportation Consultants
Insurance Agents

CARMICHAEL INTERNATIONAL SERVICE INVOICE

REMIT PAYMENT TO:

CARMICHAEL INTERNATIONAL SERVICE
P.O. BOX 51025
LOS ANGELES, CA 90051-5325



Ocean and Air
Freight Forwarders
FMC # 118-NF
NVOCC

317900
GOLDEN GATE NATIONAL PK CONSERVANCY
FORT MASON, BLDG 201, 3RD FLOOR
SAN FRANCISCO, CA 94123

ATTN: SANDY CHU OR ANNETTE

INVOICE NUMBER SFO600501600
01302116000579000
INVOICE DATE 10/26/16
TELEPHONE (650)588-5424
ENTRY# 442-3132494-6
ENTRY DATE 10/21/16

CUSTOMER REFERENCE		* TERMS NET 10	CONSIGNEE GOLDEN GATE NATIONAL P	COMMODITY WIND TURBINE	
VESSEL BRITISH AIRWAYS		VOYAGE 287	DEPARTURE ARRIVAL SAN FRANCISCO INTL A		10/21/16 10/21/16
BILL(S) OF LADING BA 12532139240/00225597			B/L DATE 10/21/16	PIECES 4	WEIGHT KG 259.0
CODE	DESCRIPTION				AMOUNT
045	CUSTOMS ENTRY FEE				125.00
007	DUTY DEPOSIT-SUBJECT TO LIQUID U.S. CUSTOMS & BORDER PRO				309.86
THIS INVOICE IS DUE IN FULL ON 11/05/16.					
TOTAL					U.S. \$ 434.86

***TERMS:** I.C.C. regulations require inland freight charges to be paid within seven (7) days and ocean freight charges to be paid within forty-eight (48) hours, therefore, immediate payment is required by date specified by your terms. The greater of a minimum service charge of 1.5 % will be added to unpaid balances beyond due date and monthly thereafter.

Except for customs entries and duties, we are independent contractors. The submission of incomplete or inaccurate information related to an import entry, including but not limited to, descriptions, quantities, weights, purchase prices, discounts, commissions, changed selling prices at time of exportation, assists, country of origin, etc., makes you liable to severe government penalties or sanctions. In the event the information forwarded to us, or which accompanied the shipment, does not accurately reflect the entire transaction, it is essential that you immediately notify us so that we can take corrective action.

Do not dispose of any part of a shipment until you have received ALL packages held for Customs examination. If you are unable to redeliver to Customs on demand, severe penalties may result.

THE REVERSE SIDE CONTAINS IMPORTANT TERMS AND CONDITIONS OF SERVICE CONSTITUTING A LEGALLY BINDING CONTRACT INCLUDING A LIMITATION OF LIABILITY.
CIS-055 (rev. 02/03) EODPOST CUSTOMER COPY - 1

Figure 8: Customs Documentation for Omniflow, Page 1.

ENTRY SUMMARY

Ver #: 00100		CST #: 037	
8. Importing Carrier BA BRITISH AIRWAYS		9. Mode of Transport 40	
12. B/L or AWB No. 12532139240		13. Manufacturer ID	
16. I.T. No.		17. I.T. Date	
21. Location of Goods/G.O. No. W895 BRITISH AIRWAY		22. Consignee No. SAME	
25. Ultimate Consignee Name and Address			
City		State CA Zip	
27. 29. 28. Description of Merchandise 31.			
Line No.	A. HTSUS No. B. ADA/CVD Case No.	A. Gross Weight B. Manifest Qty.	Net Quantity in HTSUS Units
-----	Master Bills 12532139240 House Bills 00225597	4 C	
001	Invoice Seq. 1 WIND POWERED ELECTRIC GEN SETS	259	2NO
	OB502.31.0000		
	Merchandise Processing Fee (MPF)		
	Invoice Recap		
	Invoice Value 10886.00 USD		
	Adjusted Value 10886.00		
Other Fee Summary for Block 39 499 37.71		35. Total Entered Value \$ 10886.00 Total Other Fees 37.71 \$	
36. DECLARATION OF IMPORTER OF RECORD (OWNER OR PURCHASER) OR AUTHORIZED AGENT			
I declare that I am the <input type="checkbox"/> Importer of record and that the actual owner, purchaser, or consignee for CBP purposes is as shown above, OR <input checked="" type="checkbox"/> owner, purchaser, or agent thereof. I further declare that the merchandise <input checked="" type="checkbox"/> was obtained pursuant to a purchase or agreement to purchase and that the prices set forth in the invoices are true, OR <input type="checkbox"/> was not obtained pursuant to a purchase or agreement to purchase and the statements in the invoices as to value or price are true to the best of my knowledge and belief. I also declare that the statements in the documents herein filed fully disclose to the best of my knowledge and belief in the true prices, values, quantities, rebates, drawbacks, fees, commissions, and royalties and are true and correct, and that all goods or services provided to the seller of the merchandise either free or at reduced cost are fully disclosed. I will immediately furnish to the appropriate CBP officer any information showing a different statement of facts.			
41. DECLARANT NAME CARMICHAEL INT'L SERVICE ATTY-IN-FACT		DATE 10/21/2016	
42. Broker/Importer File No. 01302116000579		ACE	
SUMMARY HA			
43. Broker/Importer File No. 01302116000579		ACE	
SUMMARY HA			
LISAM LISAM LISAM Ref:			

** IMAGE INDEX SHEET FOR SCANNING **



CUSTOMER NAME : GOLDEN GATE NATIONAL PK CONSERVANCY

FILE # : 01302116000579000

ENTRY # : 44231324946

CUSTOMER # : 317900

CUSTOMER REFERENCE:

MBOL/MAWB : 12532139240

MELINDAG

Figure 8: Customs Documentation for Omniflow, Page 3 .

OMNIFLOW, SA

Pág. 1/1

Contribuinte N.º: 509895948
Rua Delfim Ferreira, 776C
Porto
4100-199 Porto
Telef. 351 225 322 000 Fax.

Omniflow

Capital Social 215.755,09 EUR
Cons. Reg. Com. Porto
Matricula N.º 509895948
Info@omniflow.pt
www.omniflow.pt

Bill To: / Exmo.(s) Sr.(s)
Golden Gate National Parks Conservancy
201 Fort Mason, 3rd floor

San Francisco, CA
94123 USA

Original

Factura FA 2016/59

NIF-Vat Number	Requisição/Requint	Moeda/Currency	Câmbio/Exchange	Data/Date			
94-2781708		USD	1.05	2016-10-20			
Desc. Cl./Com. Disc.	Desc. Fin./Fin. Disc.	Vencimento/Due Date	Cond. Pag./Pay. Cond.				
0,00	0,00	2016-10-20	50% with order + 50% with shipment				
Artigo/Code	Descrição/Description	Qtd/Qty	Un	Pr. Unit/Unit Pr.	Desc./Disc.	IVA/VAT	Tot. Lq./Tot. Net
OM12	ECL 2016/Nº18 de 29/08/2016 Wind Turbine OM1.2 with controller Nº de Serie: OM12 16 0006 OM12 16 0005	2,0000	UN	5.443,00	0,00	0,00	10.886,00
DIV.002	Packaging and shipping	1,0000	UN	0,00	0,00	0,00	0,00
Note: Omniflow will handle packaging and shipping Remit to: Rua Delfim Ferreira 776C 4100-199 Porto PORTUGAL							
HS Code 85023100 Incoterms: DDU							

8502.31.0000

RJSG-Processado por Programa Certificado n.º 0030/AT / FA 2016/59 / © PRIMAVERA BSS /

Os artigos facturados foram colocados a disposição do cliente nesta data.

Taxa/Valor	Incid./Quant.	Total	Motivo Isenção	Mercadorias/Serviços/Goods/Servi	10.886,00
IVA (0,00)	(09)	10.886,00	0,00	Isento-Ex.Art.14CIVA	
				Desc.Comercial/Com.Disc.	0,00
				Desc. Fin./Fin. Disc.	0,00
				Portes/Shipping	0,00
				Outros Serv./Other Services	0,00
				Adiantamentos/Advances	0,00
				ICC/Outras Contribuições	0,00
				IVA/VAT	0,00
				Acerto/Adjustment	0,00

Loading/Carga:
Address - 2016-10-20 / 11:21
Rua Delfim Ferreira
Porto
4100-199 Porto
Portugal

Ship To/Descarga:
Address - 2016-10-20
643 Old Mason Street
San Francisco, CA
94123 USA
E. Unidos da América

Total (USD) 10.886,00

Remit To: BPI
NIB: 0010 0000 46608650001 86
IBAN: PT50 0010 0000 4660 8650 0018 6
SWIFT/BIC: BBPIPTPL

Figure 8: Customs Documentation for Omniflow, Page 4 .

PACKING LIST

Exportador

Omniflow SA (NIF 509895946)
Rua Del'ím Ferreira 775C 4100 - 199 Porto
Tel +351 223 219 239

Destinatário:

Golden Gate National Parks Conservancy
643 Old Mason Street
San Francisco, CA 94123 USA

Volume	Descrição	Dimensões	Peso	Obs
1	2 Difusores embalados numa só paleta	130 x 140 x 140 cm		Paletizado
2	Asses (2 volumes que podem ser encaixados um no outro - o que permitirá poupar cerca de 15cm na medida mais pequena)	195 x 100 x 60 cm	259,50 kg	Não paletizado
3				
4	2 Contraluzes embalados numa só paleta	78 x 68 x 30 cm		Paletizado

Os elementos descritos nesta Packing List foram 'feituados por meio do documento FA 2016.55

Omniflow

Figure 8: Customs Documentation for Omniflow, Page 5.

MSDS
MATERIAL SAFETY DATA SHEET
VALVE REGULATED LEAD-CRYSTAL BATTERY
Sealed AGM
(General version for International Trade)

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Valve Regulated Sealed Lead Crystal Battery
OTHER PRODUCT: Lead Crystal: Absorbed Electrolyte Sealed; Valve-Regulated Non-Spillable Battery;
NAMES: Battery Non-Spillable 49 CFR 173.159a
MANUFACTURER: The Light of Heaven Earth Battery Manufacturing Co. Ltd.
DIVISION: Betta Batteries
ADDRESS: Shangqiang Industrial Zone, Zhejiang Province, P. R. China
EMAIL: info@bettabatteries.com

EMERGENCY TELEPHONE NUMBERS: SA: Betta Batteries +27 82 780 2370 CN: Betta Batteries +86 1376 179 4709

NON-EMERGENCY HEALTH/SAFETY INFORMATION: +86 572 3827978

CHEMICAL FAMILY: This product is an absorbed electrolyte type lead crystal storage battery.

PRODUCT USE: Industrial/Commercial electrical storage batteries.

This product has passed the vibration test, pressure differential test and leakage test at 55 °C according to Recommendations on the TRANSPORT OF DANGEROUS GOODS Model Regulations SPECIAL PROVISION 238. It is not restricted to IATA DGR according to special provision A67 and is not restricted to IMDG CODE according to special provision 238

SECTION 2: HAZARDS IDENTIFICATION

Hazard identification:

This product has passed the vibration test, pressure differential test and leakage test at 55 °C according to Recommendations on the TRANSPORT OF DANGEROUS GOODS Model Regulations SPECIAL PROVISION 238. It is not restricted to IATA DGR according to special provision A67 and is not restricted to IMDG CODE according to special provision 238

Emergency overview:

The internal materials may cause severe irritation to eyes and skin, may cause burns

Additional information

No health effects are expected related to normal use of this product as sold

Figure 8: Customs Documentation for Omniflow, Page 6.

MSDS
MATERIAL SAFETY DATA SHEET
VALVE REGULATED LEAD-CRYSTAL BATTERY
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SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENTS (Chemical/Common Names):	CAS No.:	% by Wt:	EC No.:
Lead, inorganic	7439-92-1	60-75 (average: 67)	231-100-4
Lead dioxide	1309-60-0	25-30% (average: 27)	215-174-5
Sulfuric acid	7664-93-9	1.75-3% (average: 2)	231-639-5
Water	7732-18-5	2.8-4.5% (average 3)	231-791-2
Silicone dioxide	7631-86-9	1.4-3% (average 2)	231-545-4
Chemical additives	/NA	0.07-0.165%(average: <0.1)	/NA
ABS Shell	9003-56-9	10-24% (average: 15)	/NA

NA: Not applicable; ND: Not determined

Additional Information

These ingredients reflect components of the finished product related to performance of the product as distributed into commerce.

SECTION 4: FIRST AID MEASURES

EYE CONTACT: Flush eyes with large amounts of water for at least 10-15 minutes. Seek immediate medical attention if eyes have been exposed directly to acidic electrolyte.

SKIN CONTACT: Flush affected area(s) with large amounts of water using a deluge emergency shower, if available, shower for at least 10-15 minutes. Remove contaminated clothing. If symptoms persist, seek medical attention.

INGESTION: If swallowed, give large amounts of water. Do NOT induce vomiting or aspiration into the lungs may occur and can cause permanent injury or death.

INHALATION: If breathing difficulties develop, remove person to fresh air. If symptoms persist, seek medical attention.

SECTION 5: FIRE-FIGHTING MEASURES

Dry chemical, carbon dioxide, water, foam. Do not use water on live electrical circuits.

SPECIAL FIREFIGHTING PROCEDURES & PROTECTIVE EQUIPMENT:

Use appropriate media for surrounding fire. Do not use carbon dioxide directly on cells. Avoid breathing vapors.

Use full protective equipment (bunker gear) and self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Batteries evolve flammable hydrogen gas during charging and may increase fire risk in poorly ventilated areas.

Figure 8: Customs Documentation for Omniflow, Page 7.

MSDS
MATERIAL SAFETY DATA SHEET
VALVE REGULATED LEAD-CRYSTAL BATTERY
Sealed AGM
(General version for International Trade)

near sparks, excessive heat or open flames.

SPECIFIC HAZARDS IN CASE OF FIRE:

Thermal shock may cause battery case to crack open. Containers may explode when heated.

Additional Information

Firefighting water runoff and dilution water may be toxic and may cause environmental impact.

SECTION 6: ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS:

Avoid Contact with Skin. Neutralize any spilled electrolyte with neutralizing agents, such as soda ash, sodium bicarbonate, or very dilute sodium hydroxide solutions.

ENVIRONMENTAL PRECAUTIONS:

Prevent spilled material from entering sewers and waterways.

SPILL CONTAINMENT & CLEANUP METHODS/MATERIALS:

Add neutralizer/absorbent to spill area. Sweep or shovel spilled material and absorbent and place in approved container. Dispose of any non-recyclable materials in accordance with local, state, provincial or federal regulations.

Additional Information

Lead Crystal batteries and their plastic cases are recyclable. Contact your Beta Batteries or authorized distributors for recycling information.

SECTION 7: HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING AND STORAGE:

- ? Keep containers tightly closed when not in use.
- ? If battery case is broken, avoid contact with internal components.
- ? Do not handle near heat, sparks, or open flames.
- ? Protect containers from physical damage to avoid leaks and spills.
- ? Place cardboard between layers of stacked batteries to avoid damage and short circuits.
- ? Do not allow conductive material to touch the battery terminals. A dangerous short-circuit may occur and cause battery failure or fire.

OTHER PRECAUTIONS (e.g.: Incompatibilities):

Keep away from combustible materials, organic chemicals, reducing substances, metals, strong oxidizers and water.

Figure 8: Customs Documentation for Omniflow, Page 8.

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MATERIAL SAFETY DATA SHEET
VALVE REGULATED LEAD-CRYSTAL BATTERY
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(General version for international Trade)

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS/SYSTEM DESIGN INFORMATION:

Charge in ventilated area.

VENTILATION:

General ventilation is acceptable.

RESPIRATORY PROTECTION:

Not required for normal conditions of use. See also special firefighting procedures (Section 5).

EYE PROTECTION:

Wear protective glasses with side shields or goggles.

SKIN PROTECTION:

Wear chemical resistant gloves as a standard procedure to prevent skin contact.

PROTECTIVE CLOTHING OR EQUIPMENT: None required under normal-use conditions for absorbed electrolyte-type batteries.

Wash hands after handling.

Additional Information

Batteries are housed in ABS cases which are regulated as total dust or respirable dust only when they are ground up during recycling. The OSHA PEL for dust is 15 mg/m³ as total dust or 5 mg/m³ as respirable dust. May be required to meet Domestic Requirements for a Specific Destination(s).

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Industrial/commercial lead crystal battery, Black ABS plastic shell

ODOR: Odorless

ODOR THRESHOLD: NA

PHYSICAL STATE: Diluted Sulfuric Acid, Crystallized/ Lead, solid

pH: 1-2

BOILING POINT: NA

MELTING POINT: 300°C

FREEZING POINT: NA

VAPOUR PRESSURE: NA

VAPOUR DENSITY (AIR = 1): NA

SPECIFIC GRAVITY (H₂O = 1): 1.27

EVAPORATION RATE (n-BuAc=1): NA

SOLUBILITY IN WATER: 100% (as diluted sulfuric acid)

FLASH POINT: Below room temperature (as hydrogen gas)

Figure 8: Customs Documentation for Omniflow, Page 9.

MSDS
MATERIAL SAFETY DATA SHEET
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AUTO-IGNITION TEMPERATURE: NA

LOWER EXPLOSIVE LIMIT (LEL): 4% (as hydrogen gas)

UPPER EXPLOSIVE LIMIT (UEL): 74% (as hydrogen gas)

PARTITION COEFFICIENT: NA

VISCOSITY (poise @ 25° C): Not Available

DECOMPOSITION TEMPERATURE: Not Available

SECTION 10: STABILITY AND REACTIVITY

INCOMPATIBILITY (MATERIAL TO AVOID):

This product is stable under normal conditions at ambient temperature up to 65 °C.
Strong bases, combustible organic materials, reducing agents, finely divided metals and strong oxidizers.

HAZARDOUS DECOMPOSITION OR BY PRODUCTS:

Thermal decomposition will produce sulfur dioxide, sulfur trioxide, carbon monoxide, sulfuric acid mist, and hydrogen.

HAZARDOUS POLYMERIZATION:

Will not occur

CONDITIONS TO AVOID:

Continuous overcharging and sources of ignition

SECTION 11: TOXICOLOGICAL INFORMATION

ACUTE TOXICITY (Test Results Basis and Comments):

Toxicity Data:

Not available

Irritation Data:

The internal battery materials may cause severe irritation to eyes and skin.

Carcinogenicity:

The international agency on cancer (IARC) has classified "strong inorganic acid mist containing sulfuric acid" as a category 1 carcinogen (inhalation), a substance that is carcinogenic to humans. This classification does not apply to the diluted sulfuric acid contained within the lead crystal batteries. Misuse of the product such as constant overcharging may result in the generation of sulfuric acid mist.

SECTION 12: ECOLOGICAL INFORMATION

PERSISTENCE & DEGRADABILITY:

Lead is very persistent in soils and sediments. No data available on biodegradation.

Figure 8: Customs Documentation for Omniflow, Page 10.

MSDS
MATERIAL SAFETY DATA SHEET
VALVE REGULATED LEAD-CRYSTAL BATTERY
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BIOACCUMULATIVE POTENTIAL (Including Mobility):

Mobility of metallic lead between ecological compartments is low. Bioaccumulation of lead occurs in aquatic and terrestrial animals and plants, but very little bioaccumulation occurs through the food chain. Most studies have included lead compounds, not solid inorganic lead.

AQUATIC TOXICITY (Test Results & Comments):

24-hour LC50, fresh water fish (*Brachydanio rerio*): 82 mg/l

96-hour LOEC, fresh water fish (*Cyprinus carpio*): 22 mg/l (lowest observable effect concentration)

Lead (metal) No data available

Additional Information

No known effects on stratospheric ozone depletion.

Volatile organic compounds: 0% (by Volume)

Water Endangering Class (WGK): NA

SECTION 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL

METHOD:

Lead crystal batteries are recyclable when sent to a secondary lead smelter. Following local, State/Provincial, and Federal/National regulations applicable to end-of-life characteristics will be the responsibility of the end-user.

HAZARDOUS WASTE

CLASS/CODE:

US - Not applicable to finished product as manufactured for distribution into commerce.

CN - Not applicable to finished product as manufactured for distribution into commerce.

EWG - Not applicable to finished product as manufactured for distribution into commerce.

Not Included - Recycle or dispose as allowed by local jurisdiction for the end-of-life characteristics as-disposed.

SECTION 14: TRANSPORT INFORMATION

This product has passed the vibration test, pressure differential test and leakage test at 55 °C according to Recommendations on the TRANSPORT OF DANGEROUS GOODS Model Regulations SPECIAL PROVISION 238

AIRCRAFT - ICAO-IATA:

Not regulated as a Hazardous Material, transported as normal goods

VESSEL - IMO-IMDG:

Not regulated as a Hazardous Material, transported as normal goods

Figure 8: Customs Documentation for Omniflow, Page 11.

MSDS
MATERIAL SAFETY DATA SHEET
VALVE REGULATED LEAD-CRYSTAL BATTERY
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Additional Information

Transport requires proper packaging and paperwork, including the Nature and Quantity of goods, per applicable origin/destination/customs points as-shipped. Origin/destination/customs points as-shipped.

Each battery and the outer packaging must be plainly and durably marked "Non-spillable" or "Non-spillable Battery"

SECTION 15: REGULATORY INFORMATION

Chemical CAS #

None NA

CERCLA (COMPREHENSIVE RESPONSE COMPENSATION, AND LIABILITY ACT)

Chemicals present in the product which could require reporting under the statute:

Chemical CAS #

Lead 7439-92-1 Sulfuric acid 7664-93-8

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

The finished product contains chemicals subject to the reporting requirements of Section 313 of SARA Title III.

Chemical	CAS #	% wt
Lead	7439-92-1	70
Diluted Sulfuric acid	7664-93-8	3

CERCLA SECTION 311/312 HAZARD CATEGORIES: Note that the finished product is exempt from these regulations, but lead and sulfuric acid above the thresholds are reportable on Tier II reports.

Fire Hazard No

Pressure Hazard No

Reactivity Hazard No

Immediate Hazard Yes (Internal acid gel is Corrosive)

Delayed Hazard No

Sulfuric Acid is regulated as an Extremely Hazardous Substance

European inventory of Existing Commercial Chemical Substances (EINECS)

All ingredients remaining in the finished product as distributed into commerce are exempt from, or included on, the European Inventory of Existing Commercial Chemical Substances

European Communities (EC) Hazard Classification according to directives 67/548/EEC and 1999/45/EC.
R-Phrases S-Phrases 36, 37

Additional Information

This product may be subject to Restriction of Hazardous Substances (RoHS) regulations in Europe and China, or may be regulated under additional regulations and laws not identified above, such as for uses other than-

Figure 8: Customs Documentation for Omniflow, Page 12.

MSDS
MATERIAL SAFETY DATA SHEET
VALVE REGULATED LEAD-CRYSTAL BATTERY
Sealed AGM
(General version for International Trade)

described or as-designed/as intended by the manufacturer, or for distribution into specific domestic destinations.

SECTION 16: OTHER INFORMATION

OTHER INFORMATION:

Distribution into Quebec to follow Canadian Controlled Product Regulations (CPR) 24(1) and 24(2).

Distribution into the EU to follow applicable Directives to the Use, Import/Export of the product as-sold

SOURCES OF INFORMATION:

International Agency for Research on Cancer (1987), *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans: Overall Evaluations of Carcinogenicity. An updating of IARC Monographs Volumes 1-42, Supplement 7*, Lyon, France. Ontario Ministry of Labour Regulation 654/86. Regulations Respecting Exposure to Chemical or Biological Agents. RTECS - Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health

MSDS/SDS PREPARATION INFORMATION:

DATE OF ISSUE: 10 January 2012 SUPERCEDES: 20 July 2011

DISCLAIMER:

This Material Safety Data Sheet is based upon information and sources available at the time of preparation or revision date. The information in the MSDS was obtained from sources which we believe are reliable, but are beyond our direct supervision or control. We make no Warranty of Merchantability, Fitness for any particular purpose, or any other Warranty, Expressed or Implied, with respect to such information, and we assume no liability resulting from its use. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use of, or disposal of the product. It is the obligation of each user of the product to determine the suitability of this product and comply with the requirements of all applicable laws regarding use and disposal of this product. For additional information concerning Betta Batteries International (Pty) Ltd. products or questions concerning the content of this MSDS please contact your Betta Batteries International representative

END

Figure 8: Customs Documentation for Omniflow, Page 13.

HAWB: 0022 5597

ORIGINAL 3 (FOR SHIPPER)/(PARA O EXPEDIDOR)

Figure 8: Customs Documentation for Omniflow, Page 14.

Receipt of Omniflow Equipment



Figure 9: Omniflow Cowling with PV cells partially unpacked



Figure 10: Omniflow main housing and rotor unpacked



Figure 11: Omniflow controller unpacked.

Data Acquisition System Components

All components and equipment for upgrading the DAS system for Phase II was sourced by project sub-consultant Loisos and Ubbelohde. Purchase receipts from the various suppliers are included as attachments to Loisos and Ubbelohde's invoice #1, below.

LOISOS + UBBELOHDE

ARCHITECTURE . ENERGY

1917 Clement Ave Building 10A • Alameda, CA 94501-1315

510 521 3800 PHONE • 510 521 3820 FAX

INVOICE #1617-1104-1 Monitoring Services Tax ID 33-0576678

DATE 4 November 2016

CLIENT Tom Odgers, Project Manager
Golden Gate National Parks Conservancy

PROJECT Crissy Field Center Turbine Monitoring Update

PERIOD July 1 - September 30, 2016

Task	Task Value	% Complete	Total Due
1. Finalize installation plan	\$9,660	85%	\$8,211.
2. Order, prepare , install equip	\$18,515	15%	\$2,777.
3. Update syste software/interface	\$14,490	--	
4. Maintain data delivery	\$24,240	--	
5. System performance reports	<u>\$ 6,440</u>	--	
TOTAL	\$73,345		\$ 10,988.

Optional:

6. System Maintenance Extension \$24,240

Reimbursable Costs: EQUIPMENT (receipts follow this page)

Western Weather monitoring	\$7,464.84
Dent Instruments power monitoring	\$ 1,078.00
One Workplace - controller	\$ 949.43
Continental Control Systems - power	\$ 678.00
Jameco - power supply	<u>\$ 18.01</u>

TOTAL **\$10,188.28**

Total Base Fee Billings	\$ 21,176.28
Less Previous Billings	<u>\$ 0.</u>
Total Base Fee Due This Invoice	\$ 21,176.28.

TOTAL DUE THIS INVOICE **\$21,176.28.**

Figure 14: L&U Invoice 1



686 Rio Lindo Ave.
CHICO, CA 95926
Tel: 530.342.1700 billing@westernwx.com

INVOICE

Due Date	Date	Invoice #
10/29/2016	9/29/2016	13535

Bill To

Loisos & Ubbelohde
Nathan Brown
1917 Clement Ave., Building 10A
Alameda, CA 94501

Ship To

Nathan Brown
1917 Clement Ave., Building 10A
Alameda, CA 94501

☐ Please check box if address is incorrect or has changed, and indicate change(s) on reverse side. Send with your payment.

Sales Rep		P.O. No.	Terms ²	Quote No.	Ship Via ³
DS		Crissy-1	NET 30	6223	Best Way
Li	Description	Qty	Unit	Exp Price	
	BASE STATION WITH 4 WIND SPEED AND DIRECTION SENSORS - USER TO SUPPLY 12-VOLT POWER SOURCE				
1	ENC12/14 Weather-Resistant 12X14 inch Enclosure	1	245.00	245.00T	
2	-MM Tripod Mast Mounting	1	60.00	60.00T	
3	-SC 1 Conduit for Cables	1	0.00	0.00T	
4	CR800 Measurement & Control Datalogger	1	1,100.00	1,100.00T	
5	RS-485 Multidrop Interface	1	260.00	260.00T	
6	DATALOGGER PROGRAMMING FOR MODBUS APPLICATION USING RS-485 COMMUNICATIONS	1	600.00	600.00	
7	Sensor Crossarm w/one CM210 Mounting Kit, 4ft	4	88.00	352.00T	
8	3/4 x 1 Inch Nurail Crossover Fitting	8	22.00	176.00T	
9	014A WIND SPEED SENSOR	4	285.00	1,140.00T	
10	024A WIND DIRECTION SENSOR	4	385.00	1,540.00T	
11	1805 - TEN FOOT WIND SPEED SENSOR CABLE FOR 014A	1	55.00	55.00T	
12	1806 - TEN FOOT WIND DIRECTION SENSOR CABLE FOR 024A	1	55.00	55.00T	
13	1805 - 200 FOOT WIND SPEED SENSOR CABLE FOR 014A	3	150.00	450.00T	
14	1806 - 200 FOOT WIND DIRECTION SENSOR CABLE FOR 024A	3	150.00	450.00T	
15	1805 - 76 FOOT WIND SPEED SENSOR CABLE FOR 014A	1	105.00	105.00T	
16	1806 - 76 FOOT WIND DIRECTION SENSOR CABLE FOR 024A	1	105.00	105.00T	
17	Shipping	1	193.00	193.00	



Online payment option via Credit Card:
<http://www.westernweathergroup.com/pay>



Total
Sales Tax
Payments/Credits
Balance Due

FED ID #26-1624781

Certified CA Small Business No. 43541

1. Applicable sales tax is based on ShipTo Address & current sales tax rate at date of invoice.
2. Terms & Conditions are governed by the terms found at <http://www.westernweathergroup.com/terms-and-conditions>.
3. F.O.B.: Ship Point



686 Rio Lindo Ave.
CHICO, CA 95926
Tel: 530.342.1700 billing@westernwx.com

INVOICE

Due Date	Date	Invoice #
10/29/2016	9/29/2016	13535

Bill To

Loisos & Ubbelohde
Nathan Brown
1917 Clement Ave., Building 10A
Alameda, CA 94501

Ship To

Nathan Brown
1917 Clement Ave., Building 10A
Alameda, CA 94501

☐ Please check box if address is incorrect or has changed, and indicate change(s) on reverse side. Send with your payment.

Sales Rep	P.O. No.	Terms	Quote No.	Ship Via
DS	Crissy-1	NET 30	6223	Best Way

LI	Description	Qty	Unit	Exp Price
	FedEx Package 1 Tracking #: 574592015101372			
	FedEx Package 2 Tracking #: 574592015101389			
	FedEx Package 3 Tracking #: 574592015101396			
	FedEx Package 4 Tracking #: 574592015101402			
	FedEx Package 5 Tracking #: 574592015101419			
	FedEx Package 6 Tracking #: 574592015101426			
	FedEx Package 7 Tracking #: 574592015101433			

Total	\$7,464.84
Sales Tax ¹	\$578.84
Payments/Credits	\$0.00
Balance Due	\$7,464.84



Online payment option via Credit Card:
<http://www.westernweathergroup.com/pay>



FED ID #26-1624781
Certified CA Small Business No. 43541

1. Applicable sales tax is based on ShipTo Address & current sales tax rate at date of invoice.
2. Terms & Conditions are governed by the terms found at <http://www.westernweathergroup.com/terms-and-conditions>.
3. F.O.B.: Ship Point

DENT Instruments, Inc.

TIN# 93-1118853
925 SW Emkay Drive
Bend, OR 97702
(541) 388-4774



Invoice

Customer No.: LOISOS+UBBEL
Invoice No.: 76361

Loisos+Ubbelohde

Attn: Nathan Brown
1917 Clement Ave Bldg 10A
Alameda, CA 94501

Ship To:

Loisos+Ubbelohde
Attn: Nathan Brown
1917 Clement Ave Bld 10A
Alameda, CA 94501

		Tracking Number:	
		1Z97392X0365159011	
Date	Ship Via	F.O.B.	Terms
09/16/16	UPS-Grnd	Origin	CREDIT CARD
Purchase Order Number		Order Date	Sales Person
Quote 3033		09/12/16	FACTORY
Quantity		Our Order Number	
		120933	
DENT Part Number		Description	Unit Price
Required	Shipped	B.O.	Amount
1	1	60PS24DS	PS24DS
			PS24 Serial in Enclosure
1	1	65VPSW	VP-SW
			DENT ViewPoint SW V4.0.38
			USB FLASH DRIVE
			1063.00
			0.00
			1063.00

Estimated Shipping GROUND 1 box \$15.00

Nathan Brown
nathan@coolshadow.com
510-521-3800

Invoice subtotal	1063.00
Freight	15.00
Total in U.S. Dollars	1078.00
Less payments received	1078.00
Net Due in U.S. Dollars	0.00

Visit our website www.DENTinstruments.com

These commodities, technology, or software were exported from the United States in accordance with the Export Administration Regulations. Diversion contrary to U.S. law is prohibited.

Your order is greatly appreciated! Thank you!



HEADQUARTERS
2500 DE LA CRUZ BLVD.
SANTA CLARA, CA 95050
T 669. 800. 2500
F 669. 800. 2501

NORTH BAY
475 BRANNAN ST., STE. 210
SAN FRANCISCO, CA 94107
T 415. 357. 2200
F 415. 357. 2201

EAST BAY
7220 EDGEWATER DR.
OAKLAND, CA 94621
T 510. 729. 7800
F 510. 729. 7801

www.oneworkplace.com

Quotation

Page 1 / 1

Quote	Quote Date	Customer Order	Customer	Account Representative	Project
456234	8/30/2016		VIS001	Audio Visual	151049

Quote To

Tom Odgers
Golden Gate National Parks Con
201 Fort Mason Bldg 37
San Francisco, CA 94123-1307

Ship To

Nathan Brown
Loisos + Ubbelohde
1917 Clement Ave
BLDG 10 A
Alameda, CA 94501-1315

nathan@coolshadow.com

Terms Cash or Charge Sale

Line	Quantity	Catalog Number / Description	Unit Price	Extended Amount
1	1	FG2106-01 NX-1200 NetLinx NX Integrated Controller with 512 MB RAM, 1600 MIPS Processor, 4 UK of FLASH, 2 Serial Ports, 2 IR Ports, 4 I/O Ports, and IPv6	832.06	832.06
QUOTATION TOTALS				
Sub Total				832.06
Shipping and Handling				35.00
ALAMEDA-DIST TAX (BART/ACTI/ACHC/AC				17.34
ALAMEDA				10.84
CALIFORNIA				54.19
Grand Total				949.43
End of Quotation				

CLIENT SIGNATURE _____

PRINT NAME _____ TITLE _____ DATE _____

From: One Workplace L Ferrari notifications@paytrace.com
Subject: One Workplace L Ferrari transaction receipt. 9/12/2016 1:16:20 PM Pacific
Date: September 12, 2016 at 1:16 PM
To: creditcard@oneworkplace.com, nathan@coolshadow.com



One Workplace L Ferrari

2500 De La Cruz Blvd
Santa Clara, CA 95050
<http://www.oneworkplace.com>
creditcard@oneworkplace.com

Your transaction was approved! Please retain this message as a receipt.

Order ID: 449595 VIS001
Transaction ID: 129048171
Date/Time: 9/12/2016 1:16:19 PM

Payment Details:

Total: \$949.43
Card Type: American Express
Card Number: xxxxxxxxxxx4006

(RECEIPT; See previous page for product description)

Billing Address:

George A Loisos
1091 Calcot Pl #106
Oakland
CA
94606
US

nathan@coolshadow.com

Additional Details:

Continental Control Systems, LLC**Invoice**

3131 Indian Road, Suite A, Boulder CO, 80301 USA - Tel: (303) 444-7422 Fax: (303) 444-2903, Toll Free (888) 928-8663 sales@ccontrolsys.com
Remit Payment To:

Vendor #
Continental Control Systems, LLC.
3131 Indian Road
Boulder, CO 80301
Phone: 303-444-7422

Invoice No: 2161917
Invoice Date: 2016-10-18
Customer PO No: GGNPC_CRISSY_UPDATE
Terms from Ship Date: Credit Card
Ship Via: UPS GROUND
Tracking No: 1ZA477F70360630460
Amount Due: \$0.00

Bill To:

LOISOS UBBELOHDE
1917 CLEMENT AVENUE
BLDG 10A
ALAMEDA, CA 94501

Shipped To:

LOISOS UBBELOHDE
ATTN: NATHAN BROWN / 510-521-3800
1917 CLEMENT AVENUE
BLDG 10A
ALAMEDA, CA 94501

Part Number/Item Description	Ord	B/O	Ship	Price	Amount
MARK FOR: TOM ODGERS GOLDEN GATE NATIONAL PARK CONSERVANCY BUILDING 37, FORT MASON SAN FRANCISCO, CA 94123					
• ACTL-0750-020 UL Listed Accu-CT® Opening Current Transformer, 0.75" opening, 20 Amp/0.333 Vac, Tariff Code 8504.31.40.35	14	0	14	47.00	658.00
Shipping Costs (Prepay and Add)	1		1	20.00	20.00

ORDER CANCELLATION & REDUCTION POLICY: Once ordered, items marked "NC/NR" are non-cancellable and non-returnable. Notwithstanding any provisions in the customer's purchase order, orders for other items may be reduced or cancelled only with the prior written approval of Continental Control Systems, LLC (which may be withheld in its sole discretion) at least 60 days before the expected date of shipment.

RETURN POLICY: 90 day return period with approval. See website @ (www.ccontrolsys.com/w/Warranty#Return_Policy) for full details.

LATE FEES: Payment for all product is due as stated in the Terms net from the date of the invoice. Any payment which is not received within such payment period on the invoice shall include a service charge equal to two (2%) percent of the past due amount per month. See website @ (www.ccontrolsys.com/w/General_Terms_and_Conditions_of_Sale) for full terms & conditions.

Thank you
for your
order!

Subtotal: \$678.00
Sales Tax: (0.00) \$0.00
Payments/Credits: -\$678.00
Amount Due: \$0.00

Payment to be made in **United States Dollars**



Ship to: Nathan Brown\Loisos + Ubbelohde
1917 Clement Ave, Bld 10A
Alameda, CA 94501
United States

Bill to: Loisos + Ubbelohde
Nathan Brown
1917 Clement Ave, Bld 10A
Alameda, CA 94501
United States
Contact Nathan Brown

Jameco Electronics
1355 Shoreway Road
Belmont, CA 94002
United States
Telephone
Fax
Web

1-800-831-4242
1-800-237-6948
www.jameco.com

Page 1 of 1

Invoice

Number	20119130
Invoice date	10/14/2016
Tracking number	9400110200793160202614
Sales order	20119130
Your reference	
Our reference	
Payment terms	Cash
Invoice account	3067790
Net due	10/14/2016
Mode of delivery	USPS 1st Class

Item number	Description	Quantity	Unit	Unit price	Amount
2225553	TRANS,WALL,SW,12V@2.08A,25W,F2 2.1mmX5.5mm,90-264VAC,47-63HZ 25 Watt AC-DC	1	EA	12.4900	12.49

Sales subtotal amount	Total discount	Freight charges	Other charges	Total charges	Net amount	Sales tax	Total
12.49	0.0000	4.58	0.00	4.58	17.07	0.94	18.01 USD

Payment Information

Payment Type	Status	Credit Card Number	Amount
Visa	Charged	*****3603	18.01



DAS Equipment Delivered to Project Site