

EXECUTIVE COUNCIL

PUBLIC

Title: Emergency purchase of a liquid nitrogen generator

Paper Number: 125 / 17

Date: 03 August 2017

Responsible Director: Alexander Arkhipkin, Acting Director DNR

Report Author: Stephen Pointing, SVO

Portfolio Holder: MLA Phyl Rendell MBE

Reason for paper: This paper is submitted to Executive Council:
For policy decision (including budgetary policy)

Publication: Yes

Previous papers: No

List of Documents: 3 quotations for purchase of a liquid nitrogen generator.

1. Recommendations

Honourable Members are recommended to approve:

- (a) Funding for the purchase of a liquid nitrogen generator for use in the Department of Agriculture.
- (b) This ExCo paper is distributed by email to all MLAs to be considered as a matter of urgency and for approval by the same means.

2. Additional Budgetary Implications

Operating Budget	2017/18 £500	Annual Recurring £500	
Capital Budget	2017/18 £17,000	2018/19 0	Total Project £17,000

2.1 Operating budget estimated for annual use of electricity to power the machine, replacement filters and general maintenance.

3. Executive Summary

- 3.1 The Department of Agriculture is responsible for the storage and safe keeping of a considerable amount of genetic material in the form of semen and embryos for both cattle and sheep. Some of this material is owned by the DoA and the rest is owned by private farmers but kept in liquid nitrogen (LIN) tanks in the DoA building.
- 3.2 LIN naturally evaporates from the storage tanks and requires constant replenishment. DoA has traditionally sourced LIN from the MoD at Mount Pleasant at no cost (a by-product of liquid oxygen production on site). The MoD has recently advised the DoA that it is no longer able to supply LIN to the DoA. If an alternative LIN source is not engaged promptly all genetic material will be destroyed. Currently the value of the stock held is in the region £80,000 (DoA - £12,000; remainder – private farmers including £60,000 of genetic material in store for FLH).

4. Background

- 4.1 There has been a programme of genetic improvement taking place in the Falkland Islands for more than 10 years. The programme was initially directed at improving the quality of breeding animals within the National Stud Flock (NSF) and National Beef Herd (NBH) and has since expanded to include annual genetic improvement programmes on several farms throughout the Falkland Islands. By means of this genetic improvement the average fibre diameter in the NSF has reduced from 25 μ to 22 μ , representing a considerable increase in the value of the wool.
- 4.2 The majority of the sheep genetic material is imported from Australia. It is transported to the Falkland Islands by air in transport tanks containing liquid nitrogen. On arrival the tanks are stored in the DoA offices in Stanley, with the liquid nitrogen topped up as and when required.
- 4.3 We have been very fortunate to be able to acquire liquid nitrogen from the LOX (liquid oxygen) plant at MPA for many years now. Liquid nitrogen (LIN) is produced as a by-product of the LOX plant. The military have been very willing over the years to supply the DoA with liquid nitrogen whenever requested and at no charge.
- 4.4 Unfortunately we have just been contacted last week (w/c 24th July 2017) to be informed that the LOX plant can no longer supply us with LIN from this time on. The container at the LOX plant in which the liquid nitrogen is stored, prior to dispensing into DoA canisters, is no longer serviceable. The military cannot justify replacing this container as they have no need for LIN. The military have also advised that they will soon no longer require liquid oxygen either and the LOX plant will at that time close down completely.
- 4.5 A liquid nitrogen generator works by extracting nitrogen from the air and condenses it into liquid form at a temperature of -196°C. Quotes have been obtained from 3 different companies but we are particularly interested in the Elan 2 model manufactured by MMR Technologies in California, USA. This is a small machine which would produce

sufficient LIN for our needs and we are already aware that two of these machines have been operating successfully at BAS bases in Antarctica for a considerable period of time.

Quotes received

Company	Model	Cost (USD)
MMR technologies	Elan 2	21,496
Cryomech	LNP 10	46,120
Universal Boschi	UBLN 10	115,000

- 4.6 A decision on whether or not to proceed with the purchase of a LIN generator is urgent. Our current LIN stocks will run out by the end of September. If approved by ExCo then the order will be placed immediately with a view for delivery of the machine from California to Punta Arenas in Chile where it can be placed on the Concordia Bay for delivery back to the Falkland Islands. The Concordia Bay is currently in dry dock in Punta Arenas and is due to return to the Falkland Islands by the end of August.

5. Options and Reasons for Recommending Relevant Option

- 5.1 Purchasing a liquid nitrogen generator for our own use appears to be the most cost-effective means of having liquid nitrogen in the Islands. If we do not go down this route then we will need to import liquid nitrogen at regular intervals (every 2 or 3 months) from either Uruguay or Chile and the logistics and expense of doing this are both considerable. Although LIN itself is not a particularly expensive commodity it is considered to be a dangerous good and, as such, has to be handled and transported under certain conditions which adds considerably to the expense of getting it here. In order to meet our current requirements we would need to import LIN from Uruguay every 8 weeks or so at a cost of approximately USD 5,000 for each importation. By purchasing our own LIN generator its cost would be recovered within the first year of operation.

6. Resource Implications

- 6.1 Financial Implications: The DoA has not budgeted for this capital expenditure in the current financial year because it was anticipated that supplies of LIN would continue to be available from the LOX plant at MPA. Failure to engage a suitable alternative LIN source will result in the loss of approximately £80,000 of genetic material in the coming 3 months.
- 6.2 Human Resource Implications: Any additional work associated to the operation of the machine will fall within the normal duties of existing staff. All staff required to operate the machine will undergo appropriate training in its use along with training on the associated Health and Safety arrangements.
- 6.3 Other Resource Implications: The equipment will require routine maintenance and occasional spare parts but these should not add significantly to the running costs. Spare parts are available from the manufacturer and maintenance should be able to be undertaken by the engineering section of the KEMH.

7. Legal Implications

FIG may be liable for losses, should an alternative LIN source not be identified in an appropriate timeframe and losses of genetic material occur. Historically private owners have signed a disclaimer saying that the DoA would not be held responsible for any losses but this practice has not been continued with more recent acquisitions of genetic material.

8. Environmental & Sustainability Implications

8.1 None

9. Significant Risks

9.1 None

10. Consultation

10.1 Within department, major stakeholders, acting CE, acting Governor, Treasury, Legal department, Human Resources, Policy section and portfolio holder.



*Create Your Own Liquid Nitrogen....
...From Thin Air...*

Quotation #

Date Issued:
Expires: 90 Days

Issued By: Maria Reeves MMR Technologies, Inc. 41 Daggett Drive San Jose CA, 95134 Phone : (650) 962-9620 Fax : (650) 962-9647 Email : sales@elan2.com DUNS# 03-989-1429	Issued to: Phone : Fax : Email : CAGE# 1YAQ5
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FOB :	Terms :
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Estimated Shipping (ARO) :	Method : Best Way
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NOTE: SHIPPING DATES ARE ESTIMATES AS OF THE DATE OF THIS QUOTATION, BASED ON CURRENT ORDER AND STOCK STATUS. THESE ARE SUBJECT TO CHANGE. WHEN AN ORDER IS RECEIVED, A MORE ACCURATE ESTIMATE FOR SHIPPING TIMES WILL BE GIVEN.
 PRICES ARE ALL IN US DOLLARS. SUBTOTALS DO NOT INCLUDE TAX, SHIPPING AND HANDLING, CUSTOMS AND DUTY CHARGES, OR THE COST OF EXPORTATION AND IMPORTATION DOCUMENTATION. THESE ARE ADDITIONAL CHARGES THAT WILL BE ADDED TO THE FINAL INVOICE OR BILLED DIRECTLY TO THE RECIPIENT WHERE APPROPRIATE. SUBTOTALS ONLY INCLUDE THE ITEMS DESCRIBED OR LISTED ABOVE THE SUBTOTAL. TRAINING AND INSTALLATION ARE NOT INCLUDED IN THE ITEM PRICING UNLESS OTHERWISE SPECIFIED. THESE ARE AVAILABLE AT AN ADDITIONAL COST, UPON REQUEST. SHIPPING INTERNATIONALLY IS DONE USING CIF TERMS ONLY UNLESS OTHERWISE REQUESTED BY WRITING BY MMR TECHNOLOGIES, AND THEN ONLY IF THOSE TERMS ARE ACCEPTED BY MMR TECHNOLOGIES.

Model	QTY	Unit Price	Amount
Sub Total			
Additional Accessories (2nd Page)			
Shipping & Handling (if Requested)			
Total (Excluding Any Applicable Taxes)			

Limited Warranty

Standard warranty of two years covers the Elan2 Liquefier only.
 Air compressor warranty is one year. Air compressor will require service/refurbishment after 18-30 months continuous use. Air compressor refurbishment kits are available for purchase.



*Create Your Own Liquid Nitrogen....
...From Thin Air...*

Additional Accessories

<i>Elan2 Digital Auto Transfer Accessories</i>				
Item Number	Description	QTY	Unit Cost	Amount
1003520-001	Extra 20L Dewar			
5092306-001	Extra Withdrawal Tube			

<i>Elan2 Digital Office Accessories</i>				
Item Number	Description	QTY	Unit Cost	Amount
1130041-001	Brymill Cry-Ac B700 (RFID enabled to allow use with Elan2 Digital Office)			

<i>Universal Accessories</i>				
Item Number	Description	QTY	Unit Cost	Amount
1130041-001	Extra Filters (12 Pack)			
1230869-001	MMR Dewar Scale			
1003420-010	Air Compressor (115V)			
1003420-020	Air Compressor (230V)			
1030832-001	Air Compressor Refurbishment Kit (115V)			
1030832-002	Air Compressor Refurbishment Kit (230V)			

<i>Extended Warranty Options (Liquefier Only)</i>				
Item Number	Description	QTY	Unit Cost	Amount
N/A	One Year (Three Years Total)			
N/A	Two Years (Four Years Total)			
N/A	Three Years (Five Years Total)			

To: Sarah Bowles
Falkland Islands Government
Veterinary Service
Bypass Road
Stanley
Falkland Islands
Tel: (+500) 27366
Fax: (+500) 27352
E-mail: sbowles@doa.gov.fk

PREPARED BY: Katherine Applebee
Sales/Customer Service Representative
TERMS: 100% Pre-Pay - 25% down when placing order;
remaining balance due prior to shipping. Lead time is
contingent upon receipt of down payment.
LEAD TIME: **16 Weeks after receipt of order**
SHIP COMMENTS:
VALID FOR: 90 Days
REF: Artificial insemination & embryo transfer programmes

COUNTRY OF OPERATION: Falkland Islands

Order Instructions

Please write the above QUOTE NUMBER on your written order

Please email order to cryosales@cryomech.com

Please note that this quote does not include shipping costs

If you would like to receive a revised quote including freight, please provide us with your preferred destination airport or address

If you would prefer to arrange the shipment independently, please include your freight forwarder information on your purchase order

A BIS 711 Form must be completed for all international orders

This completed form must be forwarded to Cryomech when order is placed

The ship date offered on this quotation is an approximation of the production time under standard conditions

A firm ship date will be given upon receipt of your order

If you require a specific ship date, please provide us with this information

Cryomech can only accept Visa or MasterCard payments for purchases under \$2,000

Please contact us if you have any questions regarding method of payment

Local duties and taxes will be the responsibility of the customer and are never covered by Cryomech

LNP10 Liquid Nitrogen Plant

Qty	Description	Part Number	List Price	Ext Price
	<u>LNP10 Liquid Nitrogen Plant</u>	LNP010035	\$27,355	\$27,355
	Cyorefrigeration System			
	<u>AL60 Cold Head</u>	CH10060Y05		
	<u>Helium Compressor Package</u>			
	CP820, Water Cooled, 200VAC; 1 Ph; 50 Hz	CP0802W3AFY04		
	<u>Step Down Transformer</u>	ETR106	\$660	\$660
	(Necessary if 50 Hertz voltage supply is greater than 220VAC)			
	<u>Stainless Steel Helium Flexible Lines</u>			
	1/2" ID, Standard, 1/2" Aeroquip both ends, 10 Ft. Long	FL08S-0808-10		
	1/2" ID, Standard, 1/2" Aeroquip both ends, 10 Ft. Long	FL08S-0808-10		
	<u>Cold Head Motor Cord, 10 Ft. Long</u>	MC-6808-10		
	<u>LNP Control Cable, 10 Ft. Long</u>	CA-68100-10		
	<u>Dewar Assembly</u>	NDA035		

Qty	Description	Part Number	List Price	Ext Price
	35 Liter, Stainless Steel, Liquid Nitrogen Dewar fitted with: Fully Automatic Liquid Nitrogen Level Indicator & Level Probe Pressure Regulating and Safety Devices			
	<u>Extraction Line, Liquid Nitrogen, Vacuum Jacketed, Stainless Steel</u>	LNP172		
	4 Ft. Long Flexible Line, 3/8" Female NPT Tip			
	<u>Nitrogen Generator Assembly</u>	NGA001		
	Wall Mountable Panel fitted with: Nitrogen Generator and Compressed Air Filter Bank and Inlet Pressure Regulator			
	Stainless Steel Nitrogen Flexible Line, 10 Ft. Long	FL04S-76156-10		
	Electric Automatic Drain Valve (Please select electrical configuration)			
	Auto Drain Valve (compact 120v coil)	LNP213		
	Auto Drain Valve (compact 230v coil)	LNP212		
	<u>Spare Parts Kit: Compressed Air Filter Bank</u>	SPK008		
	Complete 1st year of operation			
	<u>Installation and Operation Manual</u>	IMN001		
	<u>Installation Spare Parts Kit</u>	SPK005		
	<u>Installation Tool Kit</u>	ITK006		
	<u>Floor Stand for Nitrogen Generator Assembly</u>	51-22	\$410	\$410
	<u>Air Compressor, Standard</u>		\$6,700	\$6,700
	220 VAC; 1 Ph; 50 Hz	LNP194		
	Supplied With:			
	Vibration Isolator Mounting Pad Kit	LNP249		
	50' Roll of 3/8" O.D. Copper Tubing	MPR114		
	Installation Tool Kit	ITK007		
	Spare Parts Kit (Complete 1st year of operation)	SPK024		
	Instruction Manual			
	<u>Refrigerated Air Dryer, Compressed Air Supply to Nitrogen Generator Assembly</u>		\$1,920	\$1,920
	230 VAC; 1 Ph; 50 Hz	LNP193		
	Supplied with:			

CRYOMECH

Quote No: 1708020D

Date: 8/2/2017

113 Falso Drive - Syracuse, NY 13211 - USA

TEL: 315.455.2555 FAX: 315.455.2544 EMAIL: cryosales@cryomech.com

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Qty	Description	Part Number	List Price	Ext Price
	50' Roll of 3/8" O.D. Copper Tubing	MPR114		
	Installation Spare Parts Kit	SPK007		
	User Manual			
	<u>Electrical Protection for Helium Compressor</u>	EPD-001	\$1,465	\$1,465
	<u>LNP Equipment Service Kit</u>	ESK005	\$6,410	\$6,410
	Additional 2 years of continuous operation			
	Kit Includes:			
	(Qty 1) Charcoal Adsorber			
	(Qty 2) Cold Head Seal Kit			
	(Qty 1) Rotary Valve			
	(Qty 1) Valve Plate			
	<u>Air Compressor Equipment Service Kit, Standard</u>	ESK042	\$200	\$200
	Additional 1 year of continuous operation			

Total Cost of Goods		\$45,120
Packing/ Handling/ Documentation		\$1,000
Total FCA 113 Falso Drive Syracuse NY 13211 USA (2010 Incoterms)		\$46,120

Important: Cryomech cannot be bound to revisions to customer orders received via an email message. All changes to customer orders must be accompanied by a purchase order and be confirmed by an order acknowledgement. Please note some revisions may result in additional costs. Thank you.

From: [Steve Pointing](#)
To: [Cherie Clifford](#)
Subject: FW: Liquid nitrogen plant query
Date: 03 August 2017 08:46:32
Attachments: [image001.png](#)

Hi Cherie,

Please refer to the email from Danilo Santos below indicating that the price of the Universal Boschi liquid nitrogen plant would be in the region of USD 115,000. We are still awaiting a formal quote for this product.

Regards,
Steve

From: Sarah Bowles
Sent: 03 August 2017 08:39
To: Steve Pointing
Subject: FW: Liquid nitrogen plant query

Hi Steve

Nothing back from Danilo this morning, but I did only write to him yesterday afternoon pressing him for the quote. Email below with his first suggested quote. Danilo is the South American rep for the company.

You asked were there no other companies offering Ln2 production plants in the US or UK – I've looked fairly extensively and these were the only three that I could get responses from, I wrote to quite a few others. I didn't get any from UK.

Cheers

Sarah
Mrs Sarah Bowles
Practice Manager
Falkland Islands Government Veterinary Service

Tel: (+500) 27366 Fax (+500) 27352

Email: sbowles@doa.gov.fk

Website: www.fig.gov.fk/agriculture/

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From: Danilo Santos [<mailto:gassolutionbr@gmail.com>]
Sent: 31 July 2017 11:17
To: Sarah Bowles
Cc: Aditya UNIVERSAL BOSCHI; Customer support
Subject: Re: Liquid nitrogen plant query

ok

In advance i say to yo one UBLN 10 price list is USD 115000 FOB India

In my 30 years worldwide companies experience i suggest you play attention

1- In quality plant construction. In internal parts. The plants i have been working are full stainless steel made at the column. More expensive otherwise top secure. Be carefull. The plant produces oxygen in his internal process

2- We are here in South America with technical support

3- You can visit our manufacturing factory in India.

I invite you to come with us. I am going from August 17th to Sept 10th to New Delhi. I am piking up two clients. One from Argentina and other from Chile. The first one is for testing his own plant in our testing facilities unit.

We will send to you our official quote

Kindly suggest your budget preview. We will try to adapt.
regards

Danilo Santos

Ejecutivo de Negócios (*International Business Department*)

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