REQUEST FOR PURCHASE IN EXCESS OF $20,000/CHANGE ORDER

To: MAYOR AND CITY COUNCIL

Agenda Item #: V.T.

The Recommended Bid is

☒ Within Budget

☐ Not Within Budget

From: Susie Miller, Braemar Arena General Manager

Date: January 6, 2015

Subject: Request for Purchase – REAL**ice** Ice Water Treatment, Braemar Arena, Cypress, Ltd.

Date Bid Opened or Quote Received:
December 3, 2014

Bid or Expiration Date:

Company:
Cypress, Ltd.

Amount of Quote or Bid:
$27,500

Recommended Quote or Bid:
Cypress, Ltd.

General Information:

REAL**ice** is a water treatment system for ice rinks that has been specifically designed and manufactured using 3-D printing process. The system creates a controlled, yet intense and structured, vortex as the water flows through it. The vortex creates hydrodynamic cavitation and increases the velocity of the water to promote the separation of dissolved air and impurities from the water. Impurities and dissolved air act like an insulator when the water changes to ice. Removing impurities and dissolved air from the water allows the water to freeze at a higher temperature, saving energy. This system was installed in the South Resurfacer Room in September 2014. That system serves the South, East and Backyard rinks.

Staff recommends adding REAL**ice** in the West Arena. The system in the South Resurfacer Room is working very well and staff has received many compliments of the fast, solid ice in the South, East and Backyard rinks. The arena will see a reduction in the amount of gas used due to using less hot water. This enables us to maintain a warmer ice temperature due to the strength and hardness of the ice treated by REAL**ice**. The arena no longer uses hot water to make ice in the South, East and Backyard rinks, significantly helping with quick set up of the ice. Electricity costs will be reduced because the compressors won't have to run as much.

The arena received a $7,326 rebate from Xcel Energy and $4,700 from CenterPoint for the REAL**ice** system that was installed in September. Applications have already been submitted for rebates for adding this system in the West Arena pending City Council approval. This is a 2015 CIP approved project.

This is a sole source bid.

Attachments:
Proposal to Purchase – REAL**ice,** Cypress, Ltd.

PROPOSAL TO PURCHASE: REALice AT THE BRAEMAR ARENA, EDINA MN

PHASE I SINGLE UNIT FOR 2 RINKS – COMPLETED SEPTEMBER 2014

PHASE II SINGLE UNIT FOR 1 RINK - PROPOSED

Submittal Date: December 3, 2014
Revision 2

A WATER-ENERGY NEXUS TECHNOLOGY

CYPRESS LTD

Presented By: Cypress, Ltd.
Customer Service: 855 892 3861
e-mail: support@realice.us
Web: www.cypress-ltd.com and www.realice.us
CA Location: 949 888 0255 tjs@cyp-res.com

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I. EXECUTIVE SUMMARY

Cypress Ltd. is pleased to have the opportunity to propose an additional installation and use of the REAL**ice** technology at the Braemar Arena. When fully implemented all your rinks will reduce energy use, ensure hard and clear ice and contribute to a sustainable environment. This proposal is for a single added unit to serve and additional rink. Our proposal describes our assumptions concerning the technology's basis for savings; estimates the gas and electric utility savings for your location; and specifies related costs, financial benefit, and next steps.

A. Description of REAL**ice**

Background

The proposed technology for your additional rink has been evaluated by utilities in the US[1] and Canada has documented savings at over 300 rinks worldwide. The existing installation at Braemar of a single REAL**ice** unit at two rinks has been operating for a few months and helping your rink operations produce excellent ice quality and save costs. Ice rinks traditionally have used heated water to build and resurface ice. This has been needed because heated water removes micro-bubbles and also lowers the viscosity of the water, meaning that if flows more easily and transfers heat better[2]. However, now there is technology that changes past energy wasting practices.

REAL**ice** technology now allows rinks to use un-heated water that delivers very clear and hard ice much more efficiently than traditional methods and realize significant gas and electric savings. REAL**ice** has empirically documented savings in the US, Canada and the EU and has been used by the NHL, endorsed by the International Ice Hockey Federation and has been vetted by multiple utilities[1] who are willing to commit public goods funds and pay rebates.

Your Savings Phase II – One Unit / 1 Rink

We have taken a conservative approach to estimating savings and if operated with using un-heated water and resetting the brine temperature up by at least 4F we are confident in our estimated savings.

ASSUMPTIONS:

Rink Size (NHL, Small, Medium Drop Down List)	NHL
Type of Usage for Rink	Sports
Number of days per week the rink is in operation	7
Number of Resurfaces per day	9
Number of Shut Down Weeks per year	2
Approximate Gallons of Resurfacing Machine	175
Incoming Water Temp	60
Resurfacing Water Temp	140
Chiller Plant Type	CFC
Age of Chiller Plant	>15
Electric Utility Company (if known)	Xcel
Average Blended Electric Utility Rate ($/KWH) (if known)	0.08
Gas Utility Company (if known)	CenterPointe
Gas Utility Rate ($/Therm) (if known)	0.57

[1] *CenterPoint Energy and Xcel will approve rebates for Edina, New Product Development and Launch (NPDL) Division of Southern California Edison Company, rebates offered by SoCal Gas, SDG&E, SCE, Xcel Energy, Centerpointe, Fortis BC and more.*
[2] *ASHRAE Refrigeration Manual 2010*

SAVINGS SUMMARY

Description	Rink 1	Rink 2	Rink 3	Total
Estimated Electric Savings (KWH)	100,915	-	-	100,915
Estimated Water Heater Savings (Therms)	6,685	-	-	6,685
Estimated Water Heating Savings (KWH)	-	-	-	-
Estimated Electric Savings YR 1	$8,073	$-	$-	$8,073
Estimated Gas Savings YR 1	$3,811	$-	$-	$3,811
Estimated Total Gas and Electric Savings YR 1				**$11,884**
Electric Estimated Rebate ($)				$5,046
Gas Estimated Rebate ($)				$2,340
Total Estimated Rebate				$7,386
Total Estimated Rebate and Total Savings YR 1				**$19,269**

Cash Flow and Payback – Purchase

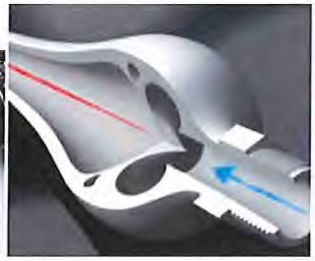
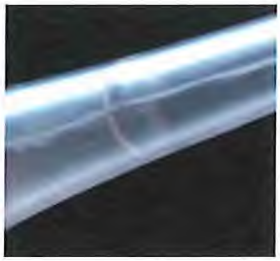
Costs vs Benefits	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Total Cost	$ 27,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Benefits											
Annual benefit flow	($27,500)	$19,269	$12,062	$12,243	$12,427	$12,613	$12,802	$12,994	$13,189	$13,387	$13,588
Cumulative Benefit Flow	($27,500)	($8,231)	$3,831	$16,074	$28,501	$41,114	$53,916	$66,911	$80,100	$93,487	$107,075

Benefits

- Significant reduction in annual rink utility costs – improves cash flow
- Harder and clearer ice
- Reduced gas consumption for heating the water used for resurfacing
- Reduced electric consumption due to raised brine temperature and lower energy needed to freeze un-heated water
- Resetting brine from at least 4F higher
- Reduction of usage of dehumidifier due to less evaporation from un-heated resurfacing water
- Reduced CO2 emissions due to less usage of electricity and gas

II. TECHNOLOGY DESCRIPTION

The REAL ice unit removes micro bubbles in the water due to the sub pressure in the center of a vortex that it creates based years of research and also maintains a world-wide patented design. The hydrodynamic cavitation created and the shape of the unit removes and separates micro-bubbles and impurities from the water This large sub pressure is generated by the vortex (as in a tornado) due to the dynamic forces inside and the design of the unit. This is related to the dynamic between the inertia forces and the centripetal forces that in the rotation created make the pressure higher at the periphery and so it goes down to much lower pressure in the center. This means that a (strong) pressure gradient is created in the vortex. The micro-bubbles that are present in the un-heated water, will in this case migrate towards the center where the lowest pressure is (Archimedes principle) and this is accelerated due to the high pressure gradient. On the way the bubbles will expand due to a lower pressure and they will combine with other bubbles. After a while they will end up in the center in the shape of a string of air with a very low pressure.

Results of removing micro air bubbles:

Results in a decrease in viscosity of from 5-18%. A lower viscosity means that the water flows more easily over the ice and has better heat transfer. This changes the ice crystals, producing an ice that is more homogenous, hard and clear, and has a higher heat capacity leading to less energy usage in ice rinks. Temperate or un-heated water can therefore be used avoiding water heated to the typical 120 – 160 degree F range. Hot water as mentioned is typically used to remove air bubbles.

Again the reason water is heated in most rinks is because the typical way to remove these micro-bubbles is to heat the water[3]. This takes lots of natural gas energy and chiller energy since hot water is takes more energy to freeze than colder water.

- This allows the chiller system to operate at a higher brine temperature, reducing the overall compressor run time reducing energy consumption. The REALice system allows other ice rink facilities4 to raise the brine temperature from 4°F to 6°F.
- Also, it takes much more energy to reduce 140F water to 32F than to reduce 60F to 32F. This results in savings.

[3] ASHRAE: 2006 Refrigeration Handbook
Water quality affects energy consumption and ice quality. Water contaminants, such as minerals, organic matter, and dissolved air, can affect both the freezing temperature and the ice thickness necessary to provide satisfactory ice conditions. Proprietary treatment systems for arena floodwater are available. When these treatments are properly applied, they reduce or eliminate the effects of contaminants and improve ice conditions.

Reduces lime scale:

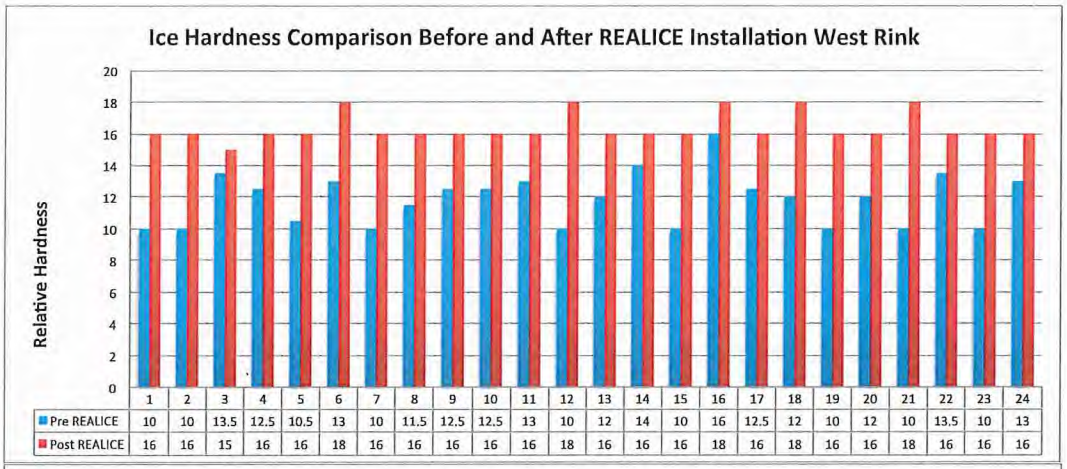
In water treated using the REAL**ice** system, calcite is transformed into aragonite, which has a more rounded shape and consequently does not attach itself to other lime scale crystals, pipes, nozzles or other surfaces or cloud the ice.

a. *Scale control*
   i. Removes micro bubbles (air, CO2) from the water by a vacuum in the middle of the vortex – controlled cavitation due to the design of the unit
   ii. Calcium bicarbonate (CaHCO3)2 in the water is forced to precipitate out in the form of calcite (CaCO3) – primarily aragonite crystals which have minimal scaling properties – does not precipitate on surfaces

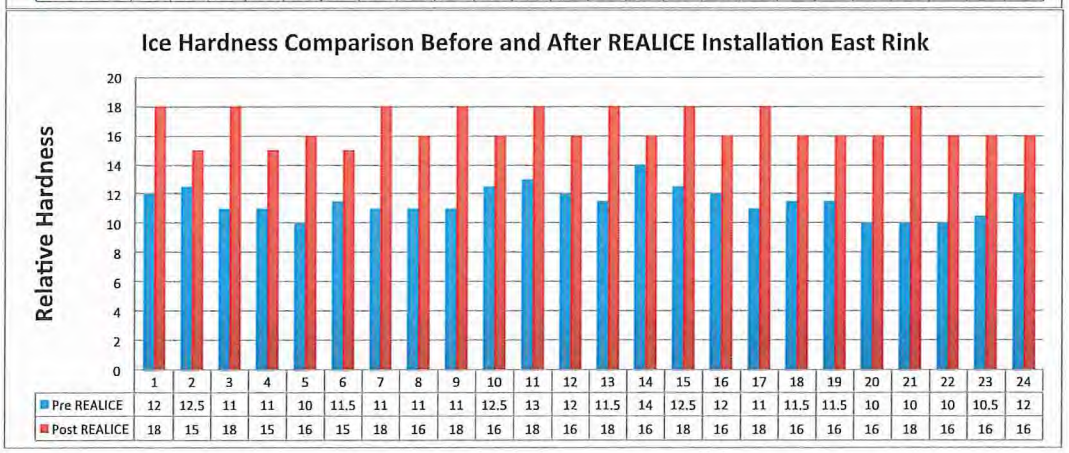
HARDER AND MORE UNIFORM ICE:

Southern California Edison (SCE) completed testing on the REAL**ice** technology on two rinks to verify that ice made using the technology would be of better quality after installation. The ice quality of the base case and the post install case (after installation) was measured by testing surface strength of contact using a Schmidt Hammer.

Figure 1 Ice Hardness Results for Each Test



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Pre REALICE	10	10	13.5	12.5	10.5	13	10	11.5	12.5	12.5	13	10	12	14	10	16	12.5	12	10	12	10	13.5	10	13
Post REALICE	16	16	15	16	16	18	16	16	16	16	16	18	16	16	16	18	16	18	16	16	18	16	16	16



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Pre REALICE	12	12.5	11	11	10	11.5	11	11	11	12.5	13	12	11.5	14	12.5	12	11	11.5	11.5	10	10	10	10.5	12
Post REALICE	18	15	18	15	16	15	18	16	18	16	18	16	18	16	18	16	18	16	16	16	18	16	16	16

- **The conclusion is that the rebound or hardness numbers are as good or better after the installation of the REAL**ice** system, which meets the intent of the measurement and verification process.**

- **For Rink A the ice was on average 39% harder post installation of REALice with a high of 80% and low of 11 %.**
- **For Rink B the ice was on average 46% harder post installation of REALice with a high of 80% and a low of 14%.**
- **The overall uniformity of ice strength is much better after the installation of the REALice system. This means that the ice was more consistent in hardness across the entire rink after installation.**

Installation

- From 1-2 hours by certified plumber
- Installed in cold water line
- ISO 17025 certified & tested: Pressure, temperature and food safety

A. Selected References

http://realice.us
http://realice.us/real-ice/references/
http://realice.us/real-ice/references/testimonials-on-real-ice/
REAL ice Market Brochure
http://realice.us/real-ice/top-10-faqs/

Iowa State University Since 2010 "We have been using the Watreco REALice System for over 4 years. We have been collecting data for all of the 2 years plus prior to the installation. It has been saving over $1,500 per month. Because the refrigeration temperature can run about 3 degrees higher, there is less wear and tear on the compressors and pumps. Since we flood and resurface with cold water there is less humidity and the dehumidifiers work less and there is less rusting on the metal beams. The ice is harder. Players skate faster, pass better and shoot better. It contributes to a better quality hockey game. All visiting coaches and players agree that it is one of the best surfaces in the country to play on. We are in operation 12 months a year and the savings is definitely significant."

Al Murdoch 515 290 0399 http://www.ahcahockey.com/news/0405/1222mur.html

Spartan Arena, Castleton Vermont Since 2011 "We have been very impressed with the product for the short time we have had it. The quality of the ice has been tremendous. We are fine tuning the surface temp when the arena is full and the heaters are on in the stands. We are running our compressors about 25% less. Our gas reduction is down significantly because we are not heating our water to resurface the ice. I would give a ballpark estimate in savings of about $1,200 – $1,500/month

Energy Study Report download @
http://realice.us/wp-content/uploads/2014/02/Castleton-Spartan-Arena-copy.pdf

Steven Wolf http://www.castleton.edu/spartanarena/rental.htm
Phone: (802)775-3100 steven.wolf@castleton.edu

FortisBC has invested $300,000 to fund a pilot program to test the technology partnering with 10 ice rinks in cities and towns across the province and funding 100 percent of the associated costs.

Other Examples:
Complex Arena, Castlegar - Home of the Castlegar Rebels
http://www.realice.ca/complex-park-castlegar.html

Endorsed by: Swedish, Finnish and International Ice Hockey Federation. Used by NHL for Winter Classics since 2011-2014.

III. APPROVAL, NEXT STEPS AND COST

A. Authorization to Proceed Phase II – (Single Unit for Single Rink)

This proposal and scope outline provided to the Braemar Arena –City of Edina is in response to mutual discussions regarding the REAL**ice** application and Braemar Arena's desire to purchase, install and use REAL**ice.** This proposal is subject to acceptance or Purchase Order by the City authorizing Cypress ltd to proceed with delivery of the REAL**ice** technology.

The undersigned agrees, if this proposal is accepted by signature and/or approved purchase order, to remit payment for delivery of REAL**ice.**

Cypress Ltd. will provide the listed professional services, equipment (REAL**ice)** to complete in accordance with this offer for the price proposed.

IN WITNESS WHEREOF, the duly authorized representatives of the parties have each executed this Agreement, effective as of the date first above written.

NATIONAL SPORTS CENTER	**Cypress Ltd.**
By: Susie Miller or City of Edina	By: Tom Smolarek
Date:	Date: 12/31/2014
Signed:	Signed:

Phase II – 1 unit for 1 rink cost

Deliver to the National Sports Center a one (1) REAL**ice** unit and handheld - Invoice for single unit: Attached

QTY	DESCRIPTION	Model	TAXED (X) or EXEMPT (Blank)	UNIT PRICE	LINE TOTAL
1	REALICE Unit and Hand Held	r10x Base, Hand r1x		27,500.00	$ 27,500.00
					$ -
					$ -

Note: If your business is tax exempt, please provide exempt certification documentation

	SUBTOTAL	$ 27,500.00
Other Comments or Special Instructions	TAXABLE	$ 27,500.00
Product will be shipped upon receipt of payment	TAX RATE	0.000%
For other payment arrangements, please call our	TAX	$ -
Customer Services Director, Ruby Irigoyen, at (855) 892-3862	S & H	$ -
If you prefer to order using your own form, please email to	OTHER	$ -
support@realice.us	TOTAL	$ 27,500.00

PHASE II INVOICE

REALICE®

INVOICE: ORDER FORM **Purchase Order #**

Customer: **City of Edina, MN**

INV. # : **9625917**
INV Date : 12/31/14

Cypress, Ltd.
380 N San Jacinto St
Tel: (855) 892-3861
Email: support@realice.us
Order Processing Manager: Ruby M. Irigoyen

CYPRESS LTD

Requested By :	Susie Miller
Customer ID :	City of Edina
Phone	952-833-9502
e-mail	smiller@EdinaMN.gov

SOLD TO	
Attention:	Susie Miller
Company Name	**Braemar Arena**
Street Address	**7501 Ikola Way**
City, ST ZIP	**Edina, MN 55439**
Phone	**952 833 9500**

SHIP TO (if different)	
Attention:	
Company Name	
Street Address	
City, ST ZIP	
Phone	

QTY	DESCRIPTION	Model	TAXED (X) or EXEMPT (Blank)	UNIT PRICE	LINE TOTAL
1	REALICE Unit and Hand Held	r10x Base, Hand r1x		27,500.00	$ 27,500.00
					$ -
					$ -
					$ -
					$ -
					$ -
					$ -

Note: If your business is tax exempt, please provide exempt certification documentation

Other Comments or Special Instructions
Product will be shipped upon receipt of payment
For other payment arrangements, please call our
Customer Services Director, Ruby Irigoyen, at (855) 892-3862
If you prefer to order using your own form, please email to
support@realice.us

SUBTOTAL	$	27,500.00
TAXABLE	$	27,500.00
TAX RATE		0.000%
TAX	$	-
S & H	$	-
OTHER	$	-
TOTAL	**$**	**27,500.00**

Comments/Notes:

City of Edina PO #
Account Code 5521.6180

Warranty:

H2oVortex warrants to The Buyer that all Products supplied will be of sellable quality at the time of delivery and that the Products will comply with any specification agreed for them. All Products are sold with a 5 (five) year manufacturer warranty for the end-user. In the event of any breach of this warranty (whether by reason of defective materials, production faults or otherwise) H2oVortex shall be responsible to replace the Products in question. H2oVortex shall under no circumstances be liable for any consequential loss or damage (whether for loss of profit or otherwise) arising out of or in connection with any act or omission of Disclaimer. EXCEPT FOR THE WARRANTIES SET FORTH IN THIS DOCUMENT AS SETFORTH HEREIN:, EACH PARTY HEREBY DISCLAIMS ANY AND ALL WARRANTIES, WHETHER EXPRESS OR IMPLIED, RELATING TO ITS PERFORMANCE UNDER THIS AGREEMENT, TO THE EXTENT THAT SUCH WARRANTIES ARE APPLICABLE OR EXISTING IN THE JURISDICTION GOVERNING THIS AGREEMENT

Force Majeure

Neither Party shall be deemed to be in breach of this Agreement to the extent that performance of its obligations is delayed or prevented by circumstances beyond its reasonable control provided that each Party gives the other Party prompt written notice and uses its good faith efforts to cure the breach.
Limitation of Liability. IN NO EVENT WILL PROVIDER BE LIABLE FOR ANY INCIDENTAL, INDIRECT, SPECIAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES (INCLUDING WITHOUT LIMITATION LOST PROFITS OR GOODWILL) ARISING FROM PERFORMANCE OF OBLIGATIONS UNDER THIS AGREEMENT REGARDLESS OF THE THEORY OF RECOVERY AND REGARDLESS OF WHETHER IT HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

PLEASE DETACH AND RETURN THIS PORTION WITH PAYMENT

Mail Payments to:

Cypress Ltd
Payment Processing Center
380 N San Jacinto St
Hemet, CA 92543-3112

For Wire Transfer

Bank:
Wells Fargo Bank
22371 Antonio Pkwy
Rancho Santa Margarita, CA

Routing: 121042882
Acct # 0804338812

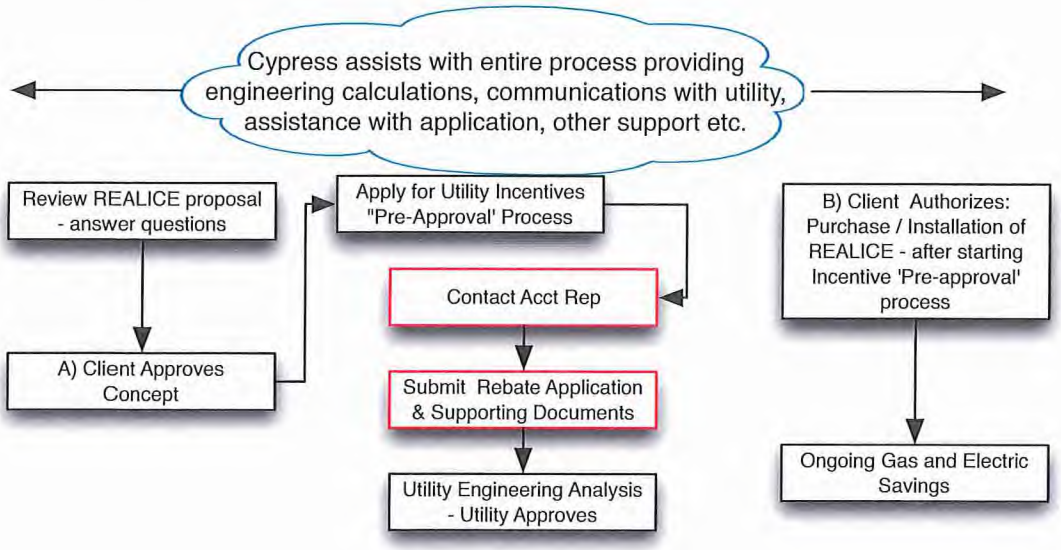
Invoice Date	Bill Date
12/31/14	08/15/2014
9625917	$ 27,500.00

make checks payable to: Cypress Ltd

B. Support Services

Cypress has been in consultation with the Braemar Arena's gas and electric utility of CenterPoint Energy and Xcel Energy in order to begin the process of obtaining any available utility incentives. We have reached out to both utilities to begin the utility rebate process.
Our activities will include:

- Calculate estimated gas and electric cost avoidance based on required utility guidelines
  - **Will require added input, data and discussion** from the Braemer rink facility operations to Cypress, Ltd
- With input from rink facility management, determine, the existing schedule[5] of resurfacing activity for each rink in order to estimate annual water usage and gas savings. Example of information needed:
  - Averages for each rink annually
  - Gallons/ Resurfacing Machine
  - Resurface/Day
  - Days/Week
  - Weeks/Yr
  - Supply Temperature of Water
  - Heated Temperature of Water
  - Heater Efficiency and Tank Type
- Current refrigeration equipment metrics
  - Size, capacity, efficiency – kW/ton, IPLV, refrigerant type, load shape or EFLH, brine temp control set points (old and new), etc.
- In order to receive a utility rebate all required utility rebate applications, documentation and data requests to secure existing rebates
- Access to Cypress Ltd. 24/7 Customer Services for ongoing support and questions
- Installation and initial operational consultations as required to educate rink operators in the use of REALice and assist with project commissioning



[5] *Current schedule and rink operational assumptions are included in this document under 'assumptions'*

IV. ABOUT CYPRESS LTD.

Operating since 1990

Market Focus:	• Electric, Gas and Water Utilities Efficiency and Demand Program Management and Implementation • Emerging Technologies Analysis • Utility Rebate Administration Services and Processing • Energy Advisor Services for Commercial, Industrial, Education, Healthcare, Government, and Residential Markets to assist customer reduce costs		
Locations:	CA, WA, NV, MN 24/7/365 Bilingual Customer Service Center (CSC) in Hemet, California		
Corporate:	Coto de Caza	**State:** CA	**Zip Code:** 92679
Phone Customer Services:	(877) 811-8700	**Direct:** (949) 888-0255	
Web & Email:	www.cyp-res.com	support@cyp-res.com	
Key Contact:	Tom Smolarek, President	tjs@cyp-res.com	
Example Clients	Pacific Gas & Electric, Southern California Edison, San Diego Gas & Electric, Southern California Gas Company, Xcel Energy, Boulder County CO, Chelan County PUD, Imperial Irrigation District, NVEnergy, Cal Poly SLO, AT&T, LACC and others		

ENERGY ADVISOR SERVICE

Cypress, Ltd. helps clients stay at the forefront of energy efficiency and demand innovations through our research and engineering work with emerging technologies (ET) for major utilities (electric, water, and gas) and technology innovators. We assess the technology's potential savings and fit into a customer's specific requirements. Subsequently, through our Energy Advisor Service, we will suggest appropriate, proven, and cost effective products to our clients that we have vetted in the ET Program.

Our Energy Advisor Service examines the client's strategic and tactical goals, establishes realistic milestones, and creates a portfolio of utility cost saving measures in order to achieve their goals. We are committed to acting on behalf of our clients to recommend and help deliver their efficient and sustainable energy goals. The primary outcome of our Energy Advisor process is to provide business solutions that deliver results that are focused on sustainability, lower utility costs, operational improvements, and most importantly, the right technology.

As a trusted energy advisor, we have been delivering efficiency, demand management and sustainable programs, technical and business consulting, and customer support services for the past 25 years.

We support:

- Investor and municipal owned utilities, associations, and special utility districts
- The commercial, industrial, institution/government, education, and residential customer markets
- Energy value chain participants such as emerging technology manufacturers, distributors, contractors, and the building design community

Key Attributes:

- Cypress has been involved in the energy and related technology markets since 1990.
- Cypress maintains a California-based, bilingual, 24/7/365, and utility-centric Customer Service Center (CSC).
- We utilize a database technology platform called CyNET™ to handle all program administration, data reporting, customer services, communications and dispatch, program applications, and rebate processing.
- Cypress understands the best practices of administering utility programs and applying emerging energy technologies