



City of Homer

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Port and Harbor

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Memorandum 22-180

TO: HOMER CITY COUNCIL AND MAYOR CASTNER
THRU: ROB DUMOUCHEL, CITY MANAGER
FROM: BRYAN HAWKINS, HARBORMASTER
DATE: OCTOBER 11 2022
SUBJECT: ICE PLANT- DEFERED MAINTENANCE AMMONIA (NH₃) REPLACEMENT

Water contamination of ammonia refrigerant is common in many refrigerating systems. The solubility characteristics of ammonia in water allows an aqueous ammonia solution to be formed which replaces the anhydrous ammonia refrigerant. In many systems this change occurs over a period of time and the effects go unnoticed until the resulting penalties experienced in coping with these changing conditions become continuous and increasingly greater.

The effects of water contamination of ammonia refrigerant are many. The pressure-temperature relationship is impaired. Chemical changes occur to the compressor oil organic acids and sludge's are formed. Pump operation, piping pressure drop, and evaporator performance are adversely affected. Also the addition of ammonia breakdown due to heat and age cause a decrease in efficiency.

Since its inception, the City's ice plant has received "top offs" of liquid NH₃ approx. every two years to make up for use loss through the system, and this has mitigated some of those build-up performance inefficiencies, but for the past 40 years of operation the whole ammonia refrigerant store has never been fully removed, replaced, or exchanged for new. It's time. It's actually way past time.

Sole Source Justification

Our local supplier of NH₃ cannot meet our needs in this case. The "top offs" of NH₃ have been supplied by the liquid gas supplier out of Kenai, Matheson Tri-Gas Inc, (approx. 150 gallons per delivery). These are delivered via truck, by roadway, on prescheduled routes per federal and state guidelines/requirements for hazardous substance transport. There is a 300 gallon maximum for this kind of transport. The Ice Plant's tank is 1000 gallons. Also, Matheson Tri-Gas Inc. is a supplier of liquid gases, but provides no service for the removal or disposal of those gases. They are a supplier ONLY.

For this one time exchange event, staff recommend a sole source contract with Multifrost out of Washington for the replacement of the Ice Plant's ammonia refrigerant for several reasons:

- Multifrost has the ability to transport bulk quantities of NH₃ via shipping vessel transport in the amounts needed.
- They also provide pump out and disposal services, services not available by any chemical supplier within AK.
- Additionally, their company uses the “disposed of” aqueous ammonia solution as fertilizer for crops. It becomes an inert useful byproduct and recycles nitrogen back into the soil.

Recommendation

Adoption of Ordinance 22-71 amending the FY23 budget by appropriating \$20,250 from the port reserve fund for the pumping, disposal, and replacement of the city ice plant’s ammonia refrigerant stores and authorizing the City Manager to execute the appropriate documents for a sole source contract with Multifrost.

Attached : Bid quote from Multifrost
 Lynden Northbound Shipping Quote
 Lynden Southbound Shipping Quote