Supplement to Technical Report 324

A Study of the Probable Future Fishery Usage of the Ports Burghead, Buckie and Macduff

Technical Report No. 327

January 1988

SEA FISH INDUSTRY AUTHORITY
Industrial Development Unit

SUPPLEMENT TO TECHNICAL REPORT 324
A STUDY OF THE PROBABLE FUTURE FISHERY USAGE OF THE PORTS BURGHEAD, BUCKIE AND MACDUFF

Technical Report No. 327

January 1988

M.A. Myers

SEA FISH INDUSTRY AUTHORITY
Industrial Development Unit

Technical Report No. 327 January 1988

SUPPLEMENT TO TECHNICAL REPORT NO. 324
A STUDY OF THE PROBABLE FUTURE FISHERY USAGE OF THE PORTS OF BURGHEAD, BUCKIE AND MACDUFF

CONTENTS

1. BACKGROUND

2. BUCKIE ICE PLANT

3. BUCKIE FISH MARKET

4. MACDUFF MARKET

APPENDICES

APPENDIX I - F. & T. REFRIGERATION LTD. QUOTATION FOR INCREASING THE STORAGE CAPACITY OF BUCKIE ICE PLANT

APPENDIX II - STAL-LEVIN LTD. QUOTATION FOR NEW TUBE ICE PLANT FOR BUCKIE

APPENDIX III - REFRIGERATION (ABERDEEN) LTD. QUOTATION FOR INSULATION OF MACDUFF FISHMARKET

SEA FISH INDUSTRY AUTHORITY
Industrial Development Unit

Technical Report No. 327 January 1988

SUPPLEMENT TO TECHNICAL REPORT NO. 324
A STUDY OF THE PROBABLE FUTURE FISHERY USAGE OF THE PORTS OF BURGHEAD, BUCKIE AND MACDUFF

1. BACKGROUND

This supplement forms an Appendix to Technical Report No. 324 "A Study of the Probable Future Fishery Usage of the Ports of Burghead, Buckie and Macduff" and has been prepared at the request of Grampian Regional Council who commissioned the study. It concerns three issues raised in the main report: Buckie Ice Plant, Buckie Fish Market and Macduff Fish Market.

2. BUCKIE ICE PLANT

Problems of availability of ice reported by fishermen to the Seafish study team and mentioned in the main report arise either from a lack of ice or simply because the plant is not open at the time the ice is required. The existing plant can produce approximately 40 tonne of flake ice per 24 hours with storage for 60 tonne. In Technical Report 324 it was suggested that consideration be given to investment in the plant to improve its service. This report provides budget costs for two options; one to increase the storage of flake ice (but not production) and two, to provide increased storage and additional production of tube ice.

With regard to the hours of operation of the plant it is recognised by the plant owner that the plant is not operated with the flexibility that it might to service the requirements of its customers. It is partly a problem of attitude of the plant operator to working out of normal hours and partly financial. To employ a second operator at the plant would require an increase in the price of ice which is already £21 per tonne. By comparison Peterhead ice costs between £15-£17 per tonne which is not a reflection of respective margins but on the economics of the scales of production. Typical prices for ice from similar sized plants are £20-£26. The owner of the plant however has agreed that in the summer when demand is greatest he will employ a second man part-time in an attempt to improve service out of normal hours. He intends to discuss this with representatives of the fishermen to see if they can suggest a reliable individual who might be interested.

The problem of lack of availability caused by running out of ice arises from a combination of restricted storage capacity and uneven daily patterns of demand. It is not a problem of production capacity. The plant produces ice on a continuous basis at a rate equivalent to approximately 40 tonne/24hr but has storage capacity for only 60 tonne. During summer heavy demands by boats towards the end of the week can lead to shortages.

It is not feasible to increase the storage capacity within the existing plant so any additional storage would have to be provided external to the building. This would then require ice to be transferred from the existing ice-makers to the new store, or alternatively, to re-site two of the existing four ice-makers over the new store and run new suction and delivery lines back to the existing refrigeration plant. F&T Refrigeration of Neath who inspected the plant on a visit in December advise against trying to transfer ice from the existing ice-makers sited above the silo to a new store for technical and financial reasons outlined in their report attached in Appendix I. They suggest the second alternative as being the most cost-effective solution.

The budget cost for the erection of a new ice bunker to provide storage for an additional 40 tonne of ice complete with cooling and handling is estimated by F&T Refrigeration at £96,000. If additional allowance is made for the removal and installation of two existing ice-makers and some arrangement for the discharge of ice at a convenient point for shore users the total cost is likely to be in the region of £120,000.

Rough calculation would suggest that at this level of investment, assuming direct operating costs (electric, water and consumables) of £5/tonne and capital interest at 12% and repayment over 15 years it would require an additional sale of approximately 1,400 tonnes per annum at current sales price to break even.

The prospects of achieving this level of additional sales are doubtful unless a more positive approach to sales, and a more flexible response to meet the demands of the fleet out of normal hours, is adopted. Given a more aggressive attitude to sales the break-even level of additional sales (equivalent to 28 tonne per week) or greater could well be possible. Even so the investment and associated risk might not be over attractive to the present owner.

An increase in the available storage capacity for flake ice would certainly improve the supply situation at the busy weekend period when demand is high from local boats. However the Danish shrimping fleet indicate a preference for tube ice and therefore this market would not directly benefit. This demand is significant and estimated at about 2000 p.a. and is presently being met by other plants in Buchan ports. This necessitates vessels making separate calls at these ports for ice thus adding to inconvenience and additional costs.

To provide tube-ice would be a major investment as it would require both new ice-makers and store. Because tube-ice is harvested by means of a hot-gas defrost that leaves the ice wet on the surface, unlike flake ice that is harvested mechanically and is dry, it cannot be stored in the existing silo as it would likely fuse together and choke

the silo. Budget prices for an 18 tonne/24hr tube ice plant provided by Stal-Levin inclusive of a 50 tonne bunker, ice handling, store cooling and building works, total approximately £¼m, and are attached in Appendix II.

Rough calculation would suggest that at this level of investment; assuming direct operating costs of £5.00 per tonne, capital interest at 12%, capital repayment over 15 years and additional overhead costs of £17,000 (to cover one extra operator, insurance, maintenance, rent, rates etc) then it would require sales of tube ice, in addition to existing sales of flake ice, of at least the same level as the current sale of flake (i.e. to double the existing level of current sales in total). To more than double the total sales of ice would appear a considerable task but the quantities involved are really not that great and if the Danes and other boats making longer trips currently taking ice at Fraserburgh and Peterhead could be attracted back to Buckie it might well be possible as these boats take between 10 and 16 tonne per trip. The Danes alone could take as much as 2,000 tonnes/yr if recent patterns of extended fishing seasons are maintained, with local and visiting boats making up the remaining quantity of ice sales for the investment to be viable.

To decide whether an investment, either in an expansion of the storage facility, or in a supply of tube-ice, is an attractive or viable proposition requires a study in depth of the potential for increased sales by identifying potential customers and quantifying their requirements over the year. It is considered doubtful however that the existing owner will undertake any major investment (other than maintenance) although such an investment could be considered of great benefit to the port as a whole. As the owner of a private company he is not eligible for grant aid under the Ministry scheme, which is limited to non-profit co-operatives or the like. It is a suggestion that the Grampian Regional Council and local fishermen might consider buying out the present owner to form a non-profit organisation and apply for grant aid in support of any new investment. Grant aid from DAFS and EEC may be available and could amount to at least 33% of the capital investment

under the new regulation 4028/86 presently being prepared. It might be possible also that Scottish Development Agency funds could be available for such a development.

Note that no grant aid is assumed in the foregoing calculations and that they would therefore look that much more attractive if grants were secured. If Grampian Regional Council and local interests were to buy the plant it is a further suggestions that the plant could be leased back to the current owner to operate on a long lease.

3. BUCKIE FISH MARKET

In the main body of the report Buckie fish market was criticised on the grounds of hygiene and problems of access. The building is some 160m x 7m although part is given over to net repair and gear storage at the western end and to a small cafe at the eastern end. It is of rendered block and steel frame construction with corrugated asbestos roof. The structure itself although serviceable is of antiquated design and construction and inadequate by modern standards of quality control and food hygiene for the handling and holding of fish.

The Commission of the European Communities is currently drafting regulations relating to the conditions under which fishery products may be produced and marketed. This is part of the programme to harmonise trade in Europe by 1992 and to which the U.K. will be fully committed. A working paper has already been produced, part of which relates specifically to standards of hygienic design, construction and operation of auction halls. Following initial comments from member countries the paper is being re-drafted but the intention is clear: the conditions under which fish is landed and handled are going to be subject to much greater and more stringent control. This is particularly true where shellfish is involved.

A recommendation of the Seafish report was that the GRC give consideration to utilising part of the reclaimed land in the West Basin for a new fish market building and box storage compound. There would

appear no alternative site although it is recognised that this would require a reallocation of cargo vessels berthing allied to additional dredging. The following provides outline detail, in terms of location and areas required for the construction of a new market with budget costings as requested by GRC.

Following discussions with the harbour master and other users of the market facility it is recommended that any new design be based on handling a maximum of 1,100 boxes. It is unlikely that this would often be exceeded and if it were they could cope by double stacking boxes. An approximate estimation of market floor area required for display of 1,100 boxes can be based on an area for boxes plus an allowance for handling and access.

1,100 boxes x 0.85 x 0.483 (per box) x 1.5 (handling factor) = $\underline{650m^2}$ (excluding allocation for offices, washrooms and cafe etc).

If we consider building on pier number 1 leaving an apron on the quayside of 3m and a loading bay to the rear of 2m then the maximum width of building would be in the order of $\underline{13m}$ as the pier width measures 18m. The length of market required therefore would be 650 ÷ 13 = $\underline{50m}$.

A new market would best be sited toward the shore-end of the pier in order to provide access along the length of the rear of the market on the reclaimed west basin. A loading bay could be formed by reducing the height of infill to suitable height (approx. 1.0m). If the market were located right up to the corner formed by pier No. 1 and the fish market quay it could cause problems for vessels manoeuvring to land. No. 1 pier forms an angle of about 60^{o} to the existing fish market quay and vessels that like to land port-side-on could find the acute angle awkward. A compromise would be to locate the market part way up the pier and accept that access to the very far end might be restricted.

Budget costing for a new insulated and hygienic design of market hall of 650m2 plus allowance for associated offices and washrooms etc., is estimated at approximately £200,000 (inclusive of chilled section). It would be eligible for grant assistance. Grant assistance may be possible from UK and/or EC sources. The relevant sources are DAFS (MAFF) fishery harbours act of 1955 and EC legislation, yet to be implemented 4028/86.

4. MACDUFF MARKET

At the request of Grampian Regional Council, Seafish has sought a budget price for insulation of Macduff fish market. To insulate the walls and ceiling of the market with insulation panels, having a hygienic white p.v.c. plastisol finish and to replace existing doors, back and front, with insulated ones would cost in the region of £50,000 plus VAT based on a budget quotation supplied by Refrigeration (Aberdeen) Ltd., and attached in Appendix III.

APPENDIX I

QUOTATION FOR INCREASING THE ICE STORAGE CAPACITY OF BUCKIE ICE PLANT

APPENDIX I

F. & T. REFRIGERATION LTD.

REPORT ON VISIT TO BUCKIE ICE PLANT TO EXAMINE FEASIBILITY OF INSTALLING AN ICE STORAGE BUNKER IN PARALLEL WITH EXISTING STORAGE SYSTEM.

The existing system is an Atlas Storage Silo with a central rotating flail chain to assist in ice removal. From the Storage Hopper, ice leaves via a slide gate mounted on the bottom of the Hopper and discharges onto a weighbelt before feeding into screw conveyors external to the Ice House, which can feed to the L.H. Quayside or R.H. Quayside with an alternative ice discharge into road vehicles.

The complete Ice Storage Hopper is mounted inside an insulated structure which is cooled by means of air coolers, thus keeping the hopper and contents below 0°C.

In the room above the Ice Store, and directly above the Ice Hopper are mounted 4 Atlas V316 Ice Makers. These drop ice directly into the hopper below.

The refrigeration plant for the ice makers is mounted at ground floor level with the evaporative condenser external to the building at Mez. floor level.

The new requirement is for a 40 ton Ice storage bunker and Ice delivery system to be linked into the existing system and fed with ice from the existing ice makers.

Whilst it is easy to install a refrigerated ice storage bunker with a fully automatic ice handling system so as to link into the existing conveying system, it does not appear possible to transfer ice into the new bunker from the existing plant for the following reasons.

1.1. To transfer ice from beneath the ice makers at high level and deliver it into the new bunker at low level would involve the installation of belt conveyors and chutes which would be costly to supply and install, would involve major building modifications and the ice would tend to melt in the transit period between collection and delivery points and this would then freeze into blocks once it enters the new storage bunker with its efficient bin cooling system.

1.2. To transfer ice at low level via belt conveyors mounted at weighbelt level would again be costly and unsatisfactory, as the ice would not be distributed over the width of the bunker so bunker loading would be uneven, and the ice would also tend to melt in the transition period between bunkers and this would then refreeze once in the new refrigerated bunker.

We consider the best alternatives to be:-

2.1. Remove 2 of the existing Ice Makers from above the existing Ice Storage Hopper, and blank the suction and liquid lines to these ice makers, and install them over the new bunker and run new suction and delivery lines back to the existing refrigeration plant. This alternative gives the lowest capital cost for the project, but will only give you the same ice capacity as currently installed, but the flexibility of 2 separate ice storage systems.

2.2. Install 2 new Ice Makers over the ice bunker and we would recommend 2 - M40CS machines, the capacity curves being attached to this report. These machines could then be piped into your existing refrigeration system and only brought into use when the main ice storage hopper is shut down due to faults or maintenance on the Ice Hopper, Bunker Cooling Plant or Ice Makers. This scheme gives you greater flexibility but no additional ice making capacity.

2.3. Fit 2 new Ice Makers over the new bunker and a new refrigeration plant either independent of the existing plant or in common with. This scheme obviously increases your ice making and storage capacity, your flexibility, and if linked to your existing refrigeration system, standby facilities for your total ice installation, but obviously involves the highest initial capital costs.

Should this project proceed, then Scheme 2-3 we feel, is the best option for although the plant is maintained in exceptional condition and works well, the machinery has been installed for a number of years, and newer, more efficient machines are now available, which would require less space and a lower maintenance requirement.

Attached to this report is a bunker specification, Ice Handling system specification, Outline Drawings and Capacity Curves.

SPECIFICATION FOR INSULATED ENCLOSURE

One insulated ice storage bunker to contain 42 tons of Flake Ice when stored at a depth of 9'6".

The Bunker to be fitted with an air cooling system designed to maintain the bunker temperature at -5°C, and thus maintain the ice in a free flowing condition.

BUNKER DIMENSIONS

External: 20'O" wide x 29'O" long x 16'O" high, with 10'O" high Penthouse over ice maker, bin door hoist and rake hoist.

WALLS AND CEILING:

4" thick polystyrene panels finished internally and externally with galvanised sheet steel.

We will form an air passage from 4" x 2" timbers finished with 1/2" plywood on one long and two short walls. All heavy timbers for hoist, door pivots and frame are included.

We will construct a 4'O" wide corridor which will house the air coolers, elevating screw and rotary valve.

The partition wall will be formed from 4" x 2" vertical studding with all heavy timbers for door and hoist included. Constructed into the partition wall will be the support steel for the Ice Makers. The studding will be finished on the ice side with 1/2" thick plywood, up to 12'O" level.

A timber inspection walkway will be constructed in the passageway to give access to the air coolers, elevating screw and a visual inspection area into the Bunker.

FLOOR:

A concrete plinth, 6" thick would need to be cast on the Quay, and we would then vapour seal and lay 4" thick Styrofoam floor insulation.
12" x 2" spreader beams laid on top of insulation running length of bunker.

6" x 2" joists run crossways to form air passage. This is then finished with 3/4" thick plywood floor tanked with galvanised sheet, including 4" upturn to walls and all joints sealed.

DOORS AND HATCHES:

1 - Access Door for equipment installation into Bunker area.
1 - Hatch in roof (Emergency escape).
1 - Door into corridor.

SPECIFICATION FOR MISCELLANEOUS ITEMS

1. STEELWORK

We will supply and erect the supporting steelwork for the Ice Makers, Rake Hoist and Bin Door Hoist.

All steelwork will be galvanised.

2. ICE CHUTES

We will provide the ice chute between elevating screw conveyor and the existing conveyors, manufactured from galvanised sheet.

3. ELECTRICAL CONTROL PANEL

We will provide an electrical control panel to operate the Ice Handling System in the correct sequence during the fill and discharge cycles, the complete system being controlled by a P.L.C. The Control Panel would house all the necessary starters, contactors, relays and fuses for the motors.

The Control Panel would also house the starters and controls for the bunker cooling plant.

4. INSTRUCTION BOOKS AND DIAGRAMS

We will provide 2 copies of the Instruction Manual/Maintenance Manual for the plant.

Electrical wiring diagrams for the system will be provided, together with Sequence of Operation Schedules.

PRICE

The Budget price for the supply and installation of the Ice Storage Bunker and associated plant detailed above would be .....£36,000.00.
(Thirty six thousand pounds).

ICE PLANT EQUIPMENT SPECIFICATIONS

FOR

RECTANGULAR BIN DELIVERY VIA CONVEYOR SYSTEM

REFERENCE: NORTH STAR DRAWING: - SD 65 - S. TYPICAL

We propose to furnish the following equipment and services for the storage and conveying of North Star Ice. The characteristics of the system are as follows:-

Bin Storage Capacity: 42 tons in refrigerated bin at 9'O" ice depth.

Delivery rate: 15 tons per hour maximum.

Equipment to be furnished:

1. One (1) North Star Ice Rake assembly, designed to fit inside ice storage bin, complete with drive. The ice rake frame would be completely match marked. Drive unit complete with zero speedsensor and fluid drive coupling.

   Rake size: 15"
   Approximate inside dimensions: 15'O" wide x 26'0" long.
   Rake drive: 5 H.P.
   Rake finish: Galvanised

2. One (1) Ice Rake hoist assembly complete with geared drive unit. The hoist assembly includes four cable sheaves, four hoist cables, and necessary cable clamps and thimbles to attach the hoist cables to both the Ice Rake and the hoist assembly. Included separately for field attachment are the upper and lower limit switches.

   Hoist drive: 1/2 h.p.
   Hoist finish: North Star Blue Enamel.

3. One (1) set of thrust and wear plate assemblies. Consists of two thrust plate assemblies and two wear plate assemblies, each with a hoist cable sheave. Sufficient lag bolts are included to mount the assemblies to wood posts in the side walls of the bin through pre-drilled holes.

   Assembly finish: Galvanised.

4. One (1) motorised bin door assembly. Assembly includes a pre-drilled steel door frame for field mounting of the plastic faced exterior plywood withthe bolts provided. Included is a motorised winch assembly with open and close limit switches, operator cable with counterweight device, six door actuator arm assemblies, and two door seal and stop assemblies.

   Winch motor: 1 h.p.
   Winch assembly finish: North Star Blue Enamel.
   Components within ice bin finish: Galvanised.

5. One (1) 9" dia. twin screw assembly. Consists of one length of right hand and one length of left hand pitched screw, one idle end ball bearing assembly, intermediate ball bearing assemblies as required, idle end and coupling shafts, coupling bolts, and necessary lag bolts to secure bearing assemblies in place.

   Length : Approximately 13'O".
   Assembly finish: Galvanised.

6. One (1) twin screw drive assembly, consisting of metal trough to support the end of the screws that extend through the bin wall and the gear motor drive on top. Also includes an oil bath hopper on the end to enclose the sprockets and roller chain drive.

   Twin screw drive: 3 H.P.
   Assembly finish: Galvanised.

7. One (1) feed reservoir to enclose idle end of the twin screws and the feed end of the elevating feed screw. Includes a level control switch to prevent the overfeed of ice into the feed screw.

   Assembly finish: Galvanised.

8. One (1) elevating feed screw complete with drive assembly. The first 4' of screw is one-half pitch and the remaining is standard pitch. The one-half pitch screw mounts in the metering hopper and shroud of feed reservoir. Remaining portion of conveyor consists of standard trough with shrouded covers, intermediate ball bearing assemblies, idle end and coupling shafts and coupling bolts. Trough has ice lump breaker and grilled discharge outlet to feed the existing screw conveyers for boat delivery. Wiper bars are attached to the screw at the factory to maintain the grill clear of ice. At the most convenient point along the trough will be fitted a 1/2 horsepower motorized curved slide gate outlet with open and closed limit switches to allow ice to be discharged through the side of the bunker to deliver ice to vehicles on the quayside.

   Conveyor length: 34'O" approximately.
   Conveyor diameter: 12"
   Conveyor drive: 5 H.P.
   Conveyor finish: Galvanised.

9. One (1) Bin-O-Matic ice level control to mount over discharge hopper.

10. One (1) six wire power cable and automatic take-up reel with bracket for mounting on either end of the hoist assembly. The length of the power cable is sufficient to reach from the cable reel to the ice rake drive throughout its vertical travel.

PRICE

Budget price for the supply and installation of the Ice Handling system would be .....£45,000.00.
(Forty five thousand pounds).

TECHNICAL SPECIFICATION

for

NORTH STAR ICE MAKERS

1. All Ice Makers are fitted with built in Refrigerant accumulator.

2. All Ice Makers are Factory insulated with polyurethane foamed in place, and completely covered with moulded glass reinforced plastic.

3. Evaporator constructed to A.S.M.E. Code for 150 p.s.i.g. working pressure.

4. All Ice Makers come furnished with the following equipment:-

   Stainless Steel Ice Removal Tools
   Stainless Steel Drip Shield
   Stainless Steel Water Tank and Salt Tank
   Drive Motor, Pulley Belts and Belt Guard
   Inspection Hatch Guard
   Load Limit Switch
   Jog Switch
   Low Pressure Gauge and Shut-off Valve
   Oil Drain Valve
   Pressure Relief Valve
   Refrigerant Control Valve
   Water Float Valve
   Water Pump complete
   Operating Manual

5. M40CS. Ice Maker would produce approximately 20 tons Ice per day and to give even running and loading on the Bunker rake system we would recommend 2 Machines.

PRICE

A budget price for the supply and installation of 2 North Star Model 40 CS Ice Makers, excluding modifications to existing Ice Plant or supply of new Refrigeration Plant, would be .....£40,000.00.
(Forty thousand pounds).

SPECIFICATION

for

BUNKER COOLING PLANT,

INSULATED BUNKER. 40 T. CAPACITY.

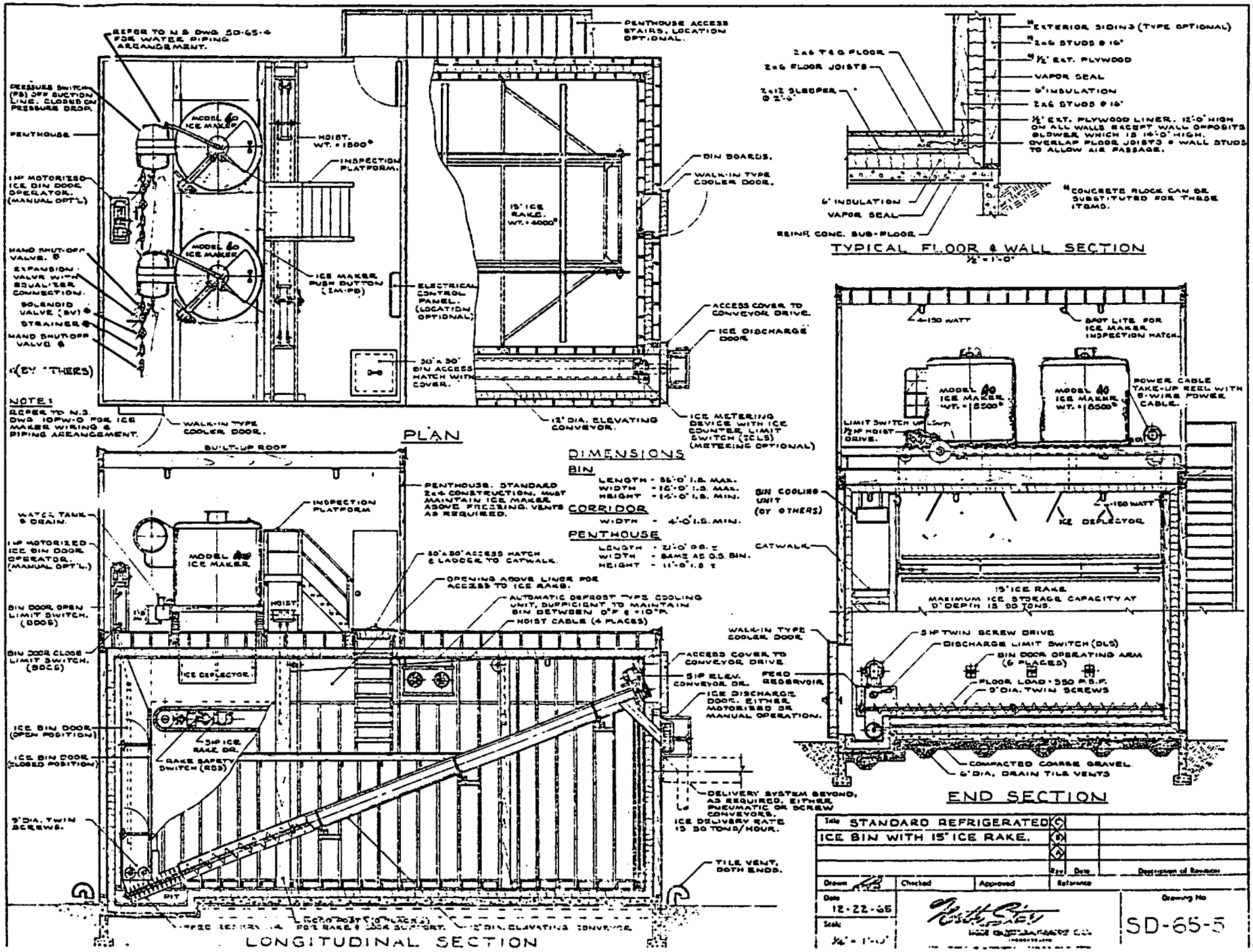
The insulated Ice Storage Bunker would be kept at -3/-5°C by circulating cold air around the Ice Storage area - see Drg. SD-65-5.

This Air Cooler would be mounted at high level in the walkway area and be piped back to its own condensing unit mounted in the Penthouse of the Ice Bunker.

The Condensing Unit would be fitted with an air cooled condenser, and the complete system would be installed on Site during the erection of the Ice Bunker.

PRICE

The Budget price for the supply and installation of a suitable Bunker Cooling Plant would be .....£15,000.00.
(Fifteen thousand pounds).


REFER TO N.S. DWG. SD-65-4 FOR WATER PIPING ARRANGEMENT.
PENTHOUSE ACCESS STAIRS, LOCATION OPTIONAL.
PRESSURE SWITCH (PS) OFF SUCTION LINE, CLOSED ON PRESSURE DROP.
PENTHOUSE
MODEL 60 ICE MAKER
HOIST, WT. = 1500#
INSPECTION PLATFORM.
BIN BOARDS.
WALK-IN TYPE COOLER DOOR.
1 HP MOTORIZED ICE BIN DOOR OPERATOR. (MANUAL OPT'L)
15' ICE RAKE, WT. = 4000#
MODEL 60 ICE MAKER
HAND SHUT-OFF VALVE
EXPANSION VALVE WITH EQUALIZER CONNECTION.
SOLENOID VALVE (SV)
STRAINER
HAND SHUTOFF VALVE
ICE MAKER PUSH BUTTON (IM-PB)
ELECTRICAL CONTROL PANEL. (LOCATION OPTIONAL)
ACCESS COVER TO CONVEYOR DRIVE.
ICE DISCHARGE DOOR
(BY OTHERS)
30" x 30" BIN ACCESS HATCH WITH COVER.
NOTE: REFER TO N.S. DWG. 10PW-0 FOR ICE MAKER WIRING & PIPING ARRANGEMENT.
WALK-IN TYPE COOLER DOOR.
12" DIA. ELEVATING CONVEYOR.
ICE METERING DEVICE WITH ICE COUNTER LIMIT SWITCH (ICLS) (METERING OPTIONAL)
PLAN
BUILT-UP ROOF
PENTHOUSE. STANDARD 2x4 CONSTRUCTION. MUST MAINTAIN ICE MAKER ABOVE FREEZING. VENTS AS REQUIRED.
INSPECTION PLATFORM
WATER TANK & DRAIN.
MODEL 60 ICE MAKER
1 HP MOTORIZED ICE BIN DOOR OPERATOR. (MANUAL OPT'L.)
HOIST
30"x30" ACCESS HATCH & LADDER TO CATWALK.
OPENING ABOVE LINER FOR ACCESS TO ICE RAKE.
AUTOMATIC DEFROST TYPE COOLING UNIT, SUFFICIENT TO MAINTAIN BIN BETWEEN 0°F & +10°F.
HOIST CABLE (4 PLACES)
BIN DOOR OPEN LIMIT SWITCH. (BDOS)
BIN DOOR CLOSE LIMIT SWITCH. (BDCS)
ICE DEFLECTOR
ACCESS COVER TO CONVEYOR DRIVE.
SHP ELEV. CONVEYOR DR.
FEED RESERVOIR
ICE DISCHARGE DOOR, EITHER MOTORIZED OR MANUAL OPERATION.
ICE BIN DOOR (OPEN POSITION)
5HP ICE RAKE DR.
RAKE SAFETY SWITCH (RSS)
ICE BIN DOOR CLOSED POSITION
9" DIA. TWIN SCREWS.
DELIVERY SYSTEM BEYOND, AS REQUIRED, EITHER PNEUMATIC OR SCREW CONVEYORS.
ICE DELIVERY RATE IS 30 TONS/HOUR.
TILE VENT, BOTH ENDS.
PIT
LONGITUDINAL SECTION
DIMENSIONS
BIN
LENGTH - 35'-0" I.S. MAX.
WIDTH - 15'-0" I.S. MAX.
HEIGHT - 14'-0" I.S. MIN.
CORRIDOR
WIDTH - 4'-0" I.S. MIN.
PENTHOUSE
LENGTH - 21'-0" O.S. =
WIDTH - SAME AS O.S. BIN.
HEIGHT - 11'-0" I.S. =
EXTERIOR SIDING (TYPE OPTIONAL)
2x6 STUDS @ 16"
½" EXT. PLYWOOD
VAPOR SEAL
6" INSULATION
2x6 STUDS @ 16"
½" EXT. PLYWOOD LINER, 12'-0" HIGH ON ALL WALLS EXCEPT WALL OPPOSITE BLOWER WHICH IS 14'-0" HIGH. OVERLAP FLOOR JOISTS & WALL STUDS TO ALLOW AIR PASSAGE.
2x6 T & G FLOOR
2x6 FLOOR JOISTS
2x12 SLEEPER @ 2'-6"
CONCRETE BLOCK CAN BE SUBSTITUTED FOR THESE ITEMS.
6" INSULATION
VAPOR SEAL
REINF. CONC. SUB-FLOOR
TYPICAL FLOOR & WALL SECTION
½" = 1'-0"
4-150 WATT
SPOT LITE FOR ICE MAKER INSPECTION HATCH.
MODEL 60 ICE MAKER, WT. = 1500#
MODEL 60 ICE MAKER WT. = 1500#
POWER CABLE TAKE-UP REEL WITH 6 WIRE POWER CABLE.
LIMIT SWITCH UP
½ HP HOIST DRIVE.
BIN COOLING UNIT (BY OTHERS)
2-150 WATT
ICE DEFLECTOR
CATWALK
15' ICE RAKE
MAXIMUM ICE STORAGE CAPACITY AT 0' DEPTH IS 90 TONS.
WALK-IN TYPE COOLER DOOR
5 HP TWIN SCREW DRIVE
DISCHARGE LIMIT SWITCH (DLS)
BIN DOOR OPERATING ARM (6 PLACES)
FLOOR LOAD - 350 P.S.F.
9" DIA. TWIN SCREWS
COMPACTED COARSE GRAVEL
6" DIA. DRAIN TILE VENTS
END SECTION
Title STANDARD REFRIGERATED ICE BIN WITH 15' ICE RAKE.
Rev. Date Description of Revision
Drawn
Checked
Approved
Reference
Date 12-22-65
Scale ½" = 1'-0"
Drawing No SD-65-5

APPENDIX 2

QUOTATION FOR NEW TUBE ICE MAKING PLANT FOR BUCKIE

STAL
LEVIN

APPENDIX II

Dealt with by: E Bjorge

Date: 11th December 1987

Our reference: 87/SF46/EB.j/JEE

Buckie Ice Company
Wood Park
Findrassie
Elgin
IV30 2PP

For the attention of: Mr Dennis Thompson

Your reference:

Dear Sirs

RE: PROPOSALS TO IMPROVE ICE PLANT - BUCKIE

We refer to recent telephone conversations and further to our letter dated 2nd September 1987 we submit the following proposals with budget prices.

1.0 CONDENSER REPLACEMENT

1.1 - Replace Existing Condenser - Price £16,150.00

Supply and install one STAL KERA431 Evaporative Condenser including necessary valves and piping. Capacity based on existing equipment only.

1.2 - Condenser with more capacity - Price £18,300.00

Supply and install one STAL KERA651 Evaporative Condenser including necessary valves and piping. Capacity increased to cover the requirement for an additional compressor. (Based on STAL RVA53 MINI-screw to operate a STAL FAE15 Tube Ice machine capable of producing 18 tonnes tube ice per 24 hours).

2.0 COMPRESSOR REPLACEMENT

2.1 - Compressor Cap for One Ice M/C - Price £19,850.00

Supply and install one RVA53 - STAL Mini-Screw compressor including necessary valves, piping and electrical control panel.

This compressor may be set to operate with alternative conditions and suit the following requirements:

A. Compressor Data: Q = 140kW, N = 38 kW at -10°C/+30°C, enable STAL FAE15 to produce 18 tonnes tube ice per 24 hours.
i.e. Power Consumption - 50 kW per tonne

./...

B. Compressor Data: Q = 65 kW, N = 37 kW at -26°C/+30°C, enable Atlas V316 to produce 11 tonnes flake ice per 24 hours.
i.e. Power Consumption - 80 kW per tonne

2.2 - Compressor Cap. for Two Ice Machines - Price £22,460.00

Note: This would assume replacement of one of the existing compressors.

Supply and install one RVA57 STAL Mini-screw compressor including necessary valves, piping and electrical control panel.

This compressor may also be set to operate with alternative condition and suit the following requirements:

A. Compressor Data: Q = 210 kW, N = 54 kW at -10°C/+30°C, and would enable two STAL FAE15 to produce a total of 32 tonnes of tube ice per 24 hours.
i.e. Power Consumption 40 kW per tonne

B. Compressor Data: Q = 114 kW, N = 52 kW at -24°C/+30°C and would enable two Atlas V316 to produce a total of 20 tonnes of flake ice per 24 hours.
i.e. Power Consumption 63 kW per tonne

The above prices have been based on individual installation as follows:-

Phase 1	- KERA651	Condenser	£18,200.00
Phase 2	- RVA53	Compressor	£19,850.00
Phase 3	- FAE15	Tube Ice m/c	£38,400.00
		TOTAL COST	£76,450.00

3.0 ICE MAKING PLANTS

3.1 - 18 Tonnes/Day - STAL Tube Ice Plant - Price £72,360.00

Based on installation as one operation for the following:

Equipment

ONE - FAE15 - STAL LP Tube Ice Machine
ONE - RVA53 - STAL Mini-screw compressor
ONE - KERA651 - STAL Evaporative Condenser

STAL
LEVIN

APPENDIX II (CONTD)

4.0 ICE HANDLING

4.1 - 50 Tonnes Ice Bunker c/w Ice Handling - Price £85,000.00

Equipment

ONE - STAL Pendular Rake 6m wide x 6.8m long
ONE - STAL Open Top Screw Conveyor 7m long
c/w built in ice crusher if required.
ONE - 50 tonnes insulated Ice Bunker
o/all dimensions 6.3m wide x 7.0m long x 7.0m high
ONE - Belt Conveyor with electronic weighing
device - 6m long.
ONE - Electronic Control Desk

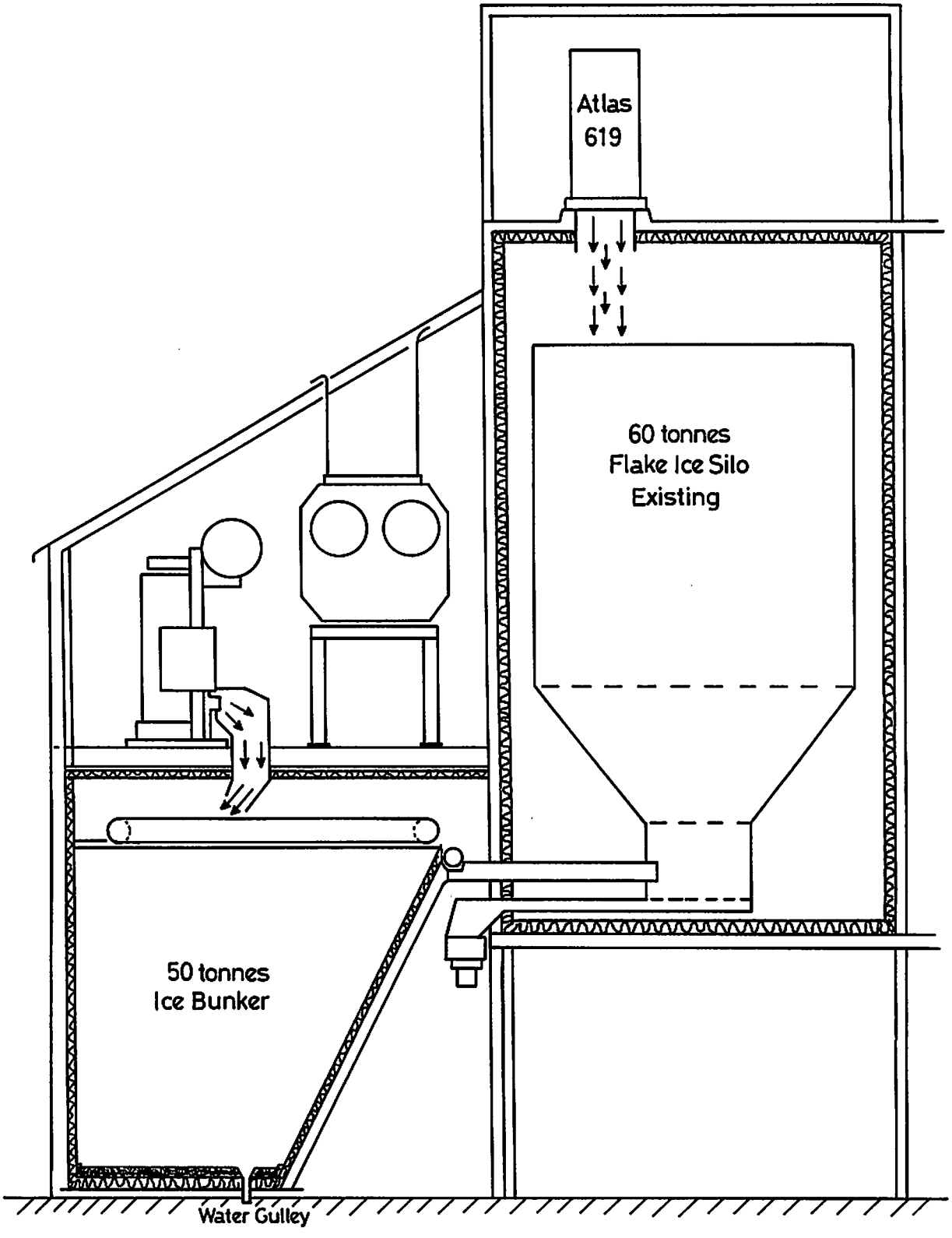
Price Summary for Complete Project Proposed

50 Tonne Ice Bunker c/w Ice Handling	£85,000.00
Stores Cooling Plant (-3° Room Temp)	£ 7,500.00
Building Work - approx.	£60,000.00
TOTAL COST OF BUNKER	£152,500.00
18 Tonnes/day Tube Ice Plant	£ 72,360.00
TOTAL COST:	£224,860.00

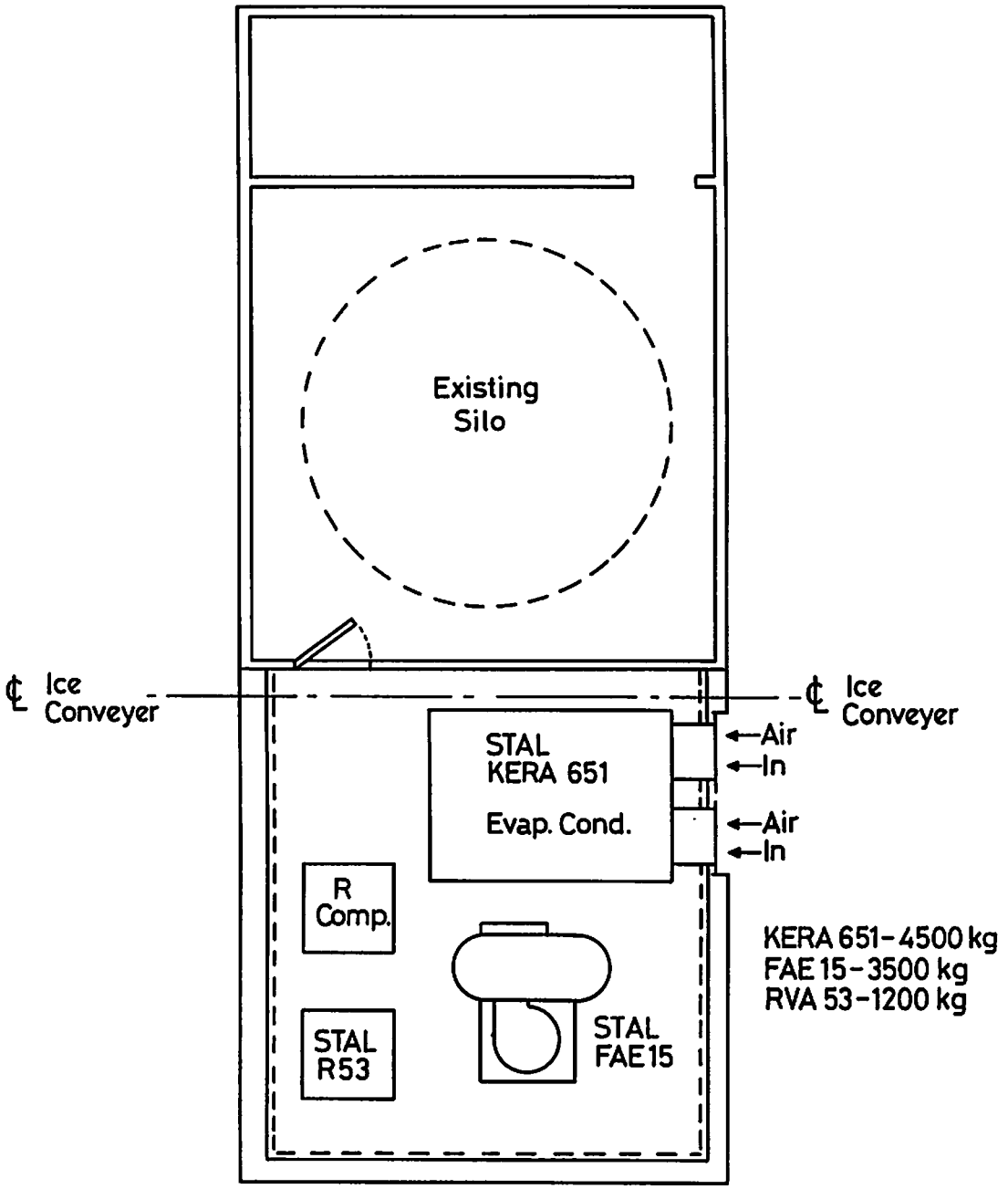
The above prices are budget only, but as such include for installation and commissioning. Should you find it to be of any interest to you, we will be pleased to carry out a survey and give you a comprehensive tender and specification.

Yours faithfully
STAL-LEVIN LIMITED

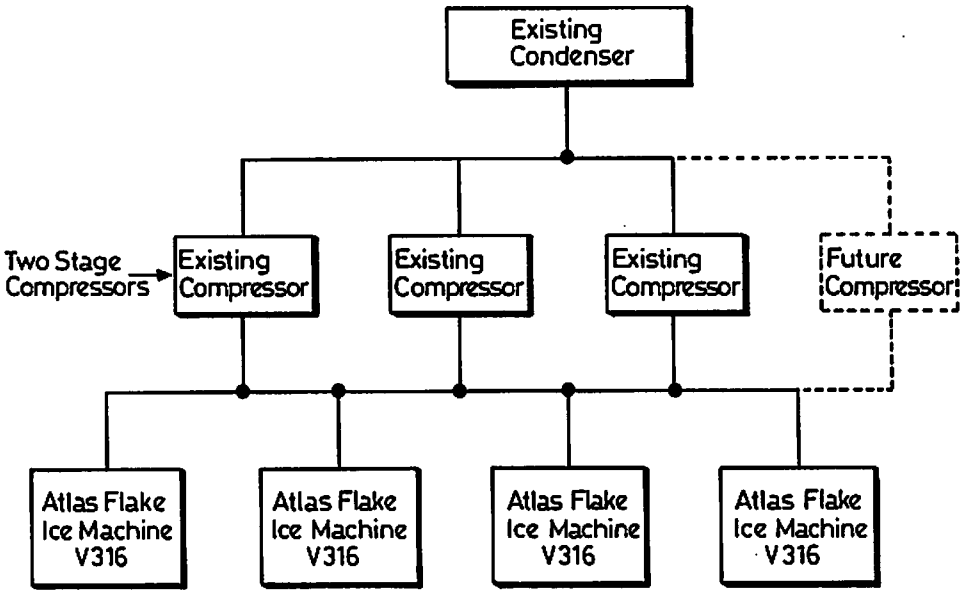
Einar Bjorge



Elevation of Stal Tube Ice Plant Proposal

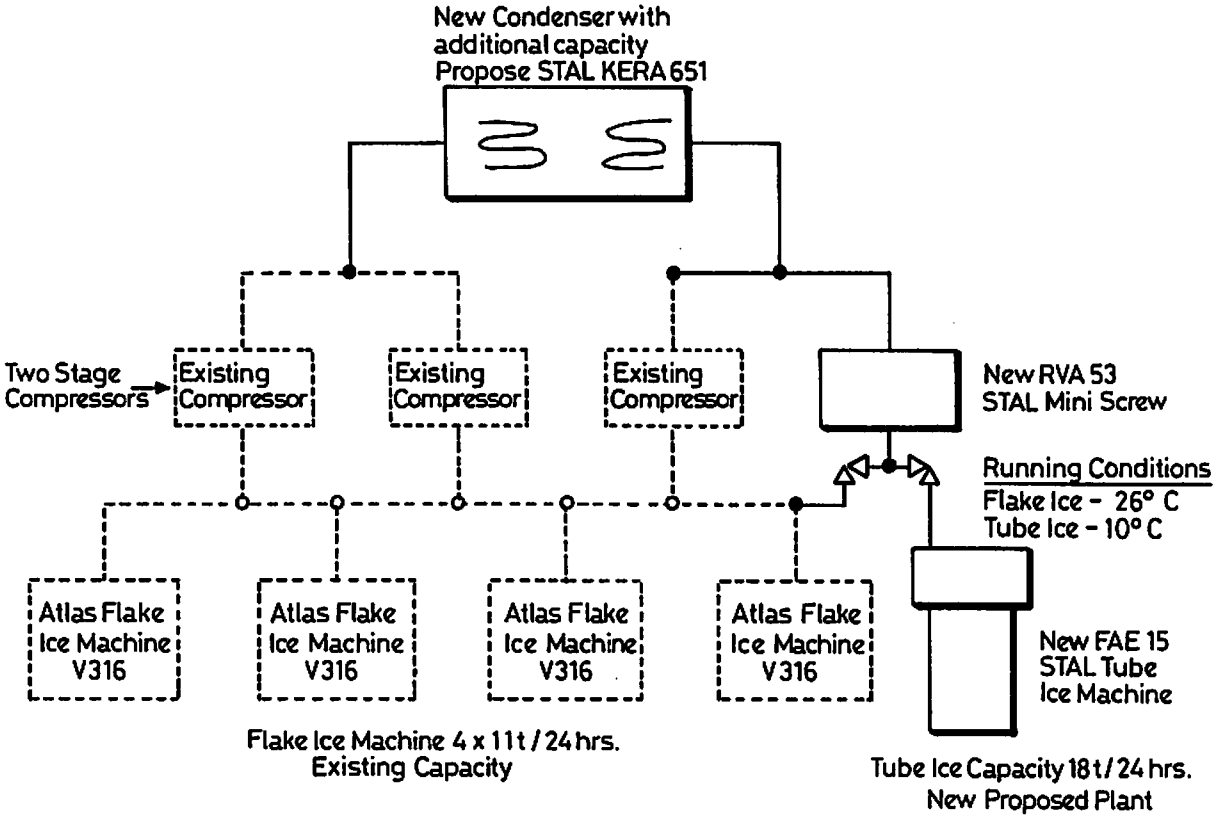


Plan of Stal Tube Ice Plant Proposal



Existing Flake Ice Plant

Proposed Extension to Existing Ice Making Plant.
i.e. Replace Condenser - Add / Replace Compressor



New Proposed Ice Plant

APPENDIX 3

QUOTATION FOR INSULATION OF
MACDUFF FISHMARKET

Sea Fish Industry Authority 07/12/87

Quotation No. KM/2425/MQ27

Walls

To the walls we have allowed our standard Scotcold panels 1.2 m wide x 75 mm thick. These have a core of injected polyurethane foam at a density of 40 kg/m^3. The facings are of non-corroding metals with those internal to the market having a decorative and hygienic finish of white P.V.C. Plastisol. We have allowed for boxing around the columns and for flashings around the door openings. The panels are joined top and bottom with a positive locking mechanism and the joints are sealed by closed cell gasket and mastics to prevent ingress of moisture or dirt.

We recommend that the wall panels are located on a concrete kerb to offer protection from damage we have not allowed for these kerbs.

Ceiling

The ceiling will have the same specification as the walls except that they will be supported off the timber purlins and that we have not allowed for boxing around the concrete beams. The ceiling panels will be keyed on to the top of the wall panels and flashed with matching angles.

Doors

We have allowed for 14 No. new insulated up and over doors complete with new tracks and furniture. These will be by Lowland Doors and will form insulated sections. The joint between each section has special gasketing arrangements to ensure a good seal in the closed position.

Glazed sections are available if requested.

The existing personnel doors will be retained after having been faced with metal to match the walls. The window will be flashe around.

Cont.....

APPENDIX III (CONTD)

Sea Fish Industry Authority

07/12/87

Quotation No. KM/2425/MQ27

Installation

We have allowed for the installation to be carried out on a clear, prepared site, unhindered and during normal working hours with overtime being worked at our discretion. We have assumed that the building walls and ceiling will be cleared of obstructions.

PRICE

Our Budget Price for the above will be:-

£49,875.00
(Forty Nine Thousand, Eight Hundred and Seventy Five Pounds)

The above price included estimated price increased for 1988.

Exclusions

Floorwork or kerbs.
Removal and replacing wall or ceiling fixtures.
Anything not specifically mentioned.

Terms of Payment

Our normal terms are 25% with order, 65% on delivery of main materials to site, 10% on completion, or as agreed.

Conditions of Sale

Our standard Conditions of Sale apply.

We trust the above is in accordance with the requirement and that if you have any query or comment that you will not hesitate to contact us when you can be assured of our very best attention.

We look forward to hearing further.

Yours faithfully,

K. Morrice, M. Inst. R.
DIRECTOR SALES/PROJECTS
REFRIGERATION (ABERDEEN) LTD.