CUSTOM CASTINGS

January 18, 2021

Director
Environmental Approvals Branch
Manitoba Sustainable Development
1007 Century Street
Winnipeg, Manitoba R3H 0W4

Dear Director,

This letter is to notify the director of Custom Castings' (License #3056, File# 5581.00) intention to proceed with upgrade project #18 and to close project #17.

In our upgrade plan, Table 5-1R2, project #18 (see attached) we wish to proceed with decommissioning of gas fired furnace #10 in February, 2021. The gas fired furnace will be decommissioned, removed, recycled and replaced by 2 Morgan MK V size 2 54Kw Electric Resistance Bail-Out (ERBO) aluminum melting furnaces (see attached). This is the last gas fired furnace to replace as per our upgrade plan. We will consider Project #18 complete after commissioning the replacement furnaces.

Also in our upgrade plan, Table 5-1R2, project #17 (see attached) we will consider this upgrade as completed as there will be no stacks left to raise to 5m. We shall take the former sand core smoke collector that is currently routed up that stack and shall re-route the smoke into our existing sand core exhaust system located next to the area. We will be removing the stack for the removed furnace (#10) and sealing the roof.

We look forward to your approval.

If you have any concerns or questions, please contact me at (204)663-9142 extension 245

Regards,

[redacted]

Roger Dack
Environment, Health & Safety Coordinator

Custom Castings
2015 Dugald Rd
Winnipeg, MB
Canada, R2J 0H3

P 204 663 9142
E orders@customcastings.com
customcastings.com

Project No.	Esitimated Completion Date	Project Description	Current Status	Comment	Completion Date
10	31-Aug-12	•Improve frequency of filter replacement in fume hoods. •Linked to Project No. 13 below.	**Complete**	Pre-licensing (2012) frequency of flat-filter replacement dictated by when they clogged sufficiently to increase opacity in air accumulated within the hood ** Post-licensing filter-change frequency (Photo 1) now monthly; mass of particulate filtered out of atmospheric emissions is tracked (Table 1).	Jun-14
11	31-Oct-12	•Improve emissions capture at source from sand-core stations; install new fume hoods.	**Complete**	High operating temperatures (1350°F) at furnaces causes highest rate of resin volatilization. Creating new fume hoods will increase capture from each casting station. **After investigation, it was decided to capture the fumes at source as localized collection is more effective than general collection. Fume-collection shrouds now installed on individual tooling (Fig. 5-2R1).	May-13
12	30-Nov-12	•Reduce number of open windows (and their room-air extraction fans).	**Complete**	Improved air supply to worker stations near heat sources (e.g., furnaces) has reduced need for these windows.	Oct-14
13	30-Nov-12	•Improve performance of station-specific air filters in fume hoods	**Complete**	1st trial proved ineffective. 2nd trial based on installation of filter boxes with replaceable filter media (Fig. 5-2R1). Mass of particulate filtered out of atmospheric emissions is tracked monthly (Table 1). •2 Mar 2015; filter change and tracking frequency increased to weekly (Table 1).	May-14
14	30-Nov-12	•Increase exit velocity of applicable stack emissions.	**Complete**	Have inserted on-line axial-flow booster fans at the base of applicable stacks. This improvement will increase atmospheric mixing and dispersion.	Sep-12

Project No.	Esitimated Completion Date	Project Description	Current Status	Comment	Completion Date
15	28-Feb-13	•Route "Smoke Eater" box flue at Furnace 10 into stack above gas-fired Furnace 9 to encourage oxidation of volatiles inside stack during ascent; decommission existing Smoke Eater stack.	**Complete**	Smoke Eater Box emissions at Furnace 10 that exited building in 2012 from smallest diameter and shortest stack, between two buildings (encouraging fumigation of northern neighbours) has been decommissioned and stack has been removed….	Feb-13
16	30-Nov-15	• Ensure emissions capture at source of new (Harrison) sand-core casting machine.	**Cancelled**	Low operating temperatures (400°F) at core making stations causes low rate of resin volatilization. Fume hoods at two existing stations capture emissions from each furnace. Decommission old SF-6 machine use the existing hood for the Harrison. **Old SF6 machine will be retained due to capacity requirements. Getting quotes on building and installing fume hood for the Harrison machine. ~~Project cancelled. Improved emissions capture will be rolled into and a component of Project #27	

Project No.	Esitimated Completion Date	Project Description	Current Status	Comment	Completion Date
17	31-Dec-16	• Increase the height of applicable roof-line stacks.	**Active**	Goal is to raise stack height by ~5 m. Will increase atmospheric mixing and dispersion. ** Moved forward from Phase 2 into Phase 1. **Increased the height of 3 stacks at the shell core process on May 30, 2013 (Fig. 5-2R1). **Furnaces 7 through 10 will not have stacks raised. (See Phase 4 Proj. No. 29) **General ventilation exhaust ports will not be raised. (See Phase 4 Proj. No. 30). **2 stacks, at M4 & M5, Will see their heights increased by Q4 2016. •Sep 2016; Furnaces M4 & M5 have been re-named T13-F1 and T13-F2. •Oct 2020; With the decomissioning of the last remaining gas fired furnace and subsequent replacement by Electric furnace no stack is required. All other stacks are completed. Move status to complete	Expected Completeion 2/28/2021

Project No.	Esitimated Completion Date	Project Description	Current Status	Comment	Completion Date
18	31-May-19	• Replace last four gas-fired furnaces with new electric furnaces, and in so doing, reduce the number of point sources at the roof.	**Active**	Will occur as part of the continuing replacement of gas-fired ceramic-crucible furnaces, at a rate of approximately 1 per year. Gas-fired furnaces lose 1.3 M BTU/hr each, cause 11% evaporative loss of molten aluminum, have larger footprint and make more noise. ** Furnace #6 decommissioned June 30 2014. Electric replacement furnace is awaiting installation. •Feb 18, 2016; Gas furnace #8 decommissioned. Three gas fired furnaces remain, next replacement scheduled for Q3 2017 •Feb 22, 2017; Gas furnace #9 decommissioned. Two gas fired furnaces remain, next decommissioning possibly Q2 or Q3 of 2017. •June 6, 2018; Gas furnace #7 to be decommissioned. •October 27, 2020; Approval to proceed with furnace replacement. Roger to file NoA with MB Conservation, 2 Morgan ERBO Size 2 aluminum melting furnaces to be purchased. Expected arrival January 2021. Expected instalation completion January 2021.	Expected Completeion 2/28/2021
19		•Add stack-top venturi (Bernoulli) collars to all raised stacks, to increase emissions exit velocities.	**Complete**	Increased exit velocities increases atmospheric mixing and dispersion. **Moved forward from Phase 2 into Phase 1. **Three raised stacks have had stack-top venturis installed.	
20	31-May-15	•Install two Filtermist “S” series oil mist filter on Mazak CNC lathes. One located in the pulley cell and one in CNC department.	**Complete**	To reduce oil mist emissions from applicable CNC equipment.	Jun-14

Project No.	Esitimated Completion Date	Project Description	Current Status	Comment	Completion Date
21	TBD	•Recycle all/most spent sand now being disposed of by BFI.	**On Hold**	Seeking opportunities for recycling into asphalt, roadbed materials, landfill daily soil cover, etc. ** Seeking/evaluating opportunity with municipal landfill operator.	
22	31-May-17	• Use localized inert-gas blanket as constraint on air access to the molten aluminum.	**Cancelled**	Very expensive, and incremental improvement over current constraints of air access (needed for product quality) would be minimal. Easier and more logical to capture emissions at source than to deny air access to molten metal bath. ** Moved forward from Phase 4 **May be possible on Schaefer furnace ~~Upon further review the project is impractical and is cancelled.	
23		• Use emissions-dispersion model to benchmark current airshed quality and predict extent of improvement from potential mitigation measures.	**Cancelled**	Could be used to quantify extent of benefit from increased stack heights, but such quantification is less important than increasing the heights. ** Moved to Phase 4. ~~Cancelled	
24		• Install wet scrubbers to capture waste heat, TSP and soluble aromatics.	**Cancelled**	Adds complexity to address extreme thermodynamics of the heat-recovery loop, and is very expensive. Creates additional challenges for storage and disposal of captured solids/sludge. Adds to noise dissemination. ** Moved to Phase 4. ~~Cancelled	
25		• Treat all/most emissions (after heat exchange) in BioFilter.	**Cancelled**	Successful year-round (low-temperature) system operating at nearby Palliser Furniture, but heat-removal requirements to allow this type of emissions treatment would be complex and expensive. ** Moved to Phase 4. ~~Cancelled	

Project No.	Esitimated Completion Date	Project Description	Current Status	Comment	Completion Date
26		• Install Thermal Oxidizers to oxidize aromatic hydrocarbons in emissions.	**Cancelled**	Very expensive, but could fit with plan to install new furnace, fired by adjacent furnace emissions (T=1700°F) to briquet and melt aluminum shavings (now sold to recyclers; Chisick) for recovery in ingot. ** Plan to remove gas-fired furnaces eliminates this action as a possibility. Moved to Phase 4. ~~Cancelled	
27	30-Dec-19	• Reconfigure shop floor to facilitate improved manifolding of all point sources of malodorous emissions.	**Active**	Expensive, very disruptive to already stressed production, and less likely to be effective than other measures now committed to. ** Moved to Phase 4. ~~Upon review this project may have a significant positive effect on our neighbours concerns. Currently determining cost and time line to implement. +Created cellular transition plan (CTP). CTP will allow us to group all of our sand core processes to improve our capture of emissions.	
28		• Install dosimeters upstream and downstream of site to supplement indoor air monitoring.	**Cancelled**	Certainty of access, vulnerability to vandalism and multiple other sources makes this problematic. ** Moved to Phase 4. ~~Cancelled	
29		• Improve sealing of entire building.	**Cancelled**	Expensive, and less likely to be effective than other measures now committed to, and largely irrelevant as the essential exothermy of the plant means it is under negative pressure most of the year. ~~Cancelled	

Project No.	Esitimated Completion Date	Project Description	Current Status	Comment	Completion Date
30		• Raise stacks at furnaces 7 through 10	**Cancelled**	Expensive and conflicts with the plan to eliminate all gas-fired furnaces. **Moved to Phase 4. ~~Cancelled	
31		• Raise general ventilation ports ~5 m	**Cancelled**	Very expensive. Easier and more logical to capture emissions at the source. **Moved to Phase 4. ~~Cancelled	
32	11-Feb-16	•Improve particulate capture by using improved filter media.	**Complete**	New Project (25 Aug 2015) Previous filter material is PS100D with a Arrestance of 75-80% Proposed filter media is PROTEK BLUE with a Arrestance is 80%-85% •21 Sep 2015; Conservation MB was notified of testing improved filter media. •17 Nov 2015; Testing complete. •11 Feb 2016; NoA sent to MB Conservation.	11-Feb-16
33	31-Aug-16	•Evaluate reduced emissions sand core sand.	**Complete**	New Project (5 May 2016) Aquire HA International's Custom Coat E-Series sand, conduct operational testing. •5 May 2016; CWS was notified of our intent to conduct operational testing of this new sand. •29 Jun 2016; Testing concluded, operational testing sucessful. Decision made to switch to E-Series sand. •6 Jul 2016; CWS notified of successful testing and of our decision to proceed with the new E-Series sand.	08-Aug-16

MMP
MOLTEN METAL PRODUCTS

MORGAN MKV
ELECTRIC RESISTANCE BALE OUT FURNACE

FURNACE DESCRIPTION

The MK V Electric Resistance Bale Out Furnace suitable for metal temperatures up to 850ºc, has been designed to have a high level of thermal efficiency, hence keeping energy costs low.

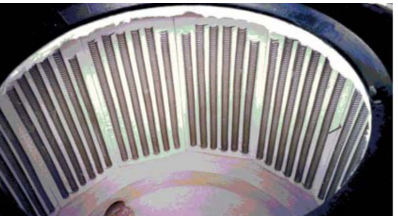
Radiation losses from the metal are minimised through the use of a well insulated, swing aside cover that can cover the crucible when no baling is needed.

The superb insulation provides excellent melting performance from the semi-embedded heater panels.

The advanced insulation materials used in the furnace lining also result in low casing temperatures, providing comfortable working conditions.

HEATER ASSEMBLIES

Twelve high alumina electric resistance heater panels surround the crucible and generally extend to the full depth of the furnace chamber. The self-supporting and interlocking design provides easy removal, should a panel require changing.



- Energy Efficient
- Good Crucible Life
- Silent Operation
- Environmentally Friendly

HIGH EFFICIENCY

The combination of semi-embedded heater panels optimising radiant heat transfer and the use of advanced insulating materials, provide a melting and holding furnace of high efficiency with comfortable working conditions.

SIZE RANGE

The MK V Electric Resistance Bale Out is available in the size range 85kg - 1327kg aluminium. Other crucible patterns than those shown in the table are available to provide the capacity span indicated for each size reference.

Also Available:
Zinc applications. H.T. versions up to size 3, for brass, to 1000ºc.

ELECTRIC SUPPLY

400/415/480v
3 Phase 50/60hz.

MMP
MOLTEN METAL PRODUCTS

MORGAN MKV
ELECTRIC RESISTANCE BALE OUT FURNACE

MMP Ltd
Unit 7
Crucible Business Park
Woodbury Lane
Norton
Worcester WR5 2BA

t: +44 (0) 1905 728200
f: +44 (0) 1905 767877
e: sales@moltenmetalproducts.com

MMP
MOLTEN METAL PRODUCTS

KEY **FEATURES**

HEATER PANELS

The furnace has twelve, semi-embedded, FeCrAl wire heaters surrounding the crucible. Designed with low surface watt loadings and freely radiating coils the heaters give excellent life. Should a panel fail, it can easily be changed and, if absolutely necessary, in a hot condition without metal removal.

CONTROL PANEL

A modern high quality control panel provides the following features:

- Protective circuit breaker, door interlocked
- Heavy duty contactors or Thyristor power control*
- Programmable time clock.
- Fully proportional digital temperature controller
- Policeman lining protection pyrometry
- Crucible and heater operational hour meters
- Heater operation LED mimic display
- Temperature depression selection switch

* Optional at extra cost

OPTIONAL FEATURES AVAILABLE

- 'In range' temperature beacons
- Low temperature alarm
- Spilt metal detector
- Pneumatic crucible cover
- Kwh. meter
- Thyristor power control
- Communications
- Metal temperature overshoot control

Control and Mimic Display

Data based on optimum foundry conditions and practices.

For typical foundry operations a performance factor of 90% of performance ratings should be assumed.

Data for zinc alloys available on request.

ADVANCED DESIGN

The MK V Electric Resistance Bale Out furnace is compact, of robust design and with the exception of the control panel, has no separate stand alone components. High reliability is obtained by the use of high quality components and well proven semi-embedded heater panel technology.

TEMPERATURE DEPRESSION

This energy saving and safety feature enables a lower holding temperature to be automatically selected during periods of non-use.

The control panel's real time clock can be programmed to select reduced temperature and to return to operational value when required.

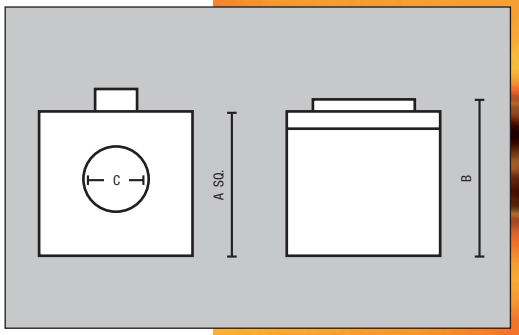
The time clock can also be set to switch the furnace on and off at pre-set dates and times.

METAL TEMPERATURE CONTROL

The temperature can be sensed from a floating, fixed or crucible pyrometer. The dual display programmable digital controller maintains close control, by regulating the power input to the heaters, relative to actual metal temperature and set value.

MkV HE ELECTRIC RESISTANCE BALE OUT		ALUMINIUM TO 720c													
MkV Furnace Size Reference		Size 1		Size 2			Size 3			Size 4		Size 5		Size 6	
Working Capacity		119	165	233	271	327	444	575	575	815	1024	762	1327	1290	1327
Max Power Rating	kW	46	46	46	46	54	72	72	96	120	120	120	120	150	150
Power Consumption	Covered	2.8	2.8	4	4	4.5	6.6	7	7	10.2	11	14	15	15	16
kWh/hr Holding	Uncovered	7.5	7.5	9.5	9.5	10	14.5	15	15	20	22	34	35	38	40
Melt Time (Mins)	1st Heat	144	173	216	260	252	300	380	280	330	395	310	420	400	430
	Subsequent Heats	94	113	151	181	185	215	278	208	216	258	202	275	265	290
Power Requirement KvA		50	50	50	50	60	80	80	105	130	130	130	130	170	170

Typical specific energy consumption: subsequent heat, 0.55kWh/kg* Throughput melting, 0.41kWh/kg* *Variances subject to crucible pattern.
Brass melting and other furnace sizes available.



	SIZE 1	SIZE 2	SIZE 3	SIZE 4	SIZE 5	SIZE 6
Capacity by Crucible	**Capacity Range Kg Al. 85 - 172**	**Capacity Range Kg Al. 163 - 327**	**Capacity Range Kg Al. 310 - 575**	**Capacity Range Kg Al. 595 - 1135**	**Capacity Range Kg Al. 762 - 1327**	**Capacity Range Kg Al. 950 - 1327**
	Pattern Kg	**Pattern Kg**	**Pattern Kg**	**Pattern Kg**	**Pattern Kg**	**Pattern Kg**
	BX166/BU100 85	BX202/BU210 163	BX1264 310	BX850/BN600 595	52100 762	60815 950
	BX167/BU125 103	BX302/BU250 233	BX847/BN500 441	BX851/BN800# 810	52330 860	60990 1200
	BX168/BU150 119	BX401/BU300 271	BX247/BU500 444	BX852/BN1100* 930	52370 1100	61050 1327
	BX169/BU175 144	BX402/BU350 327*	BX263/BU600 557*	BX853 1135	52770 1300	
	BX171/BU200 165					
	BX177/BU202 172					
Furnace Dimensions (mm) A	1190	1190	1420	1526	1651	1740
B	900	900 - 980*	1130 - 1270*	1330# - 1520*	1125 - 1395	1280 - 1490
C	433	510	660	735	864	940
Shipping (approx) Net Weight Kg	900	900	1300	2500	3000	3500
Gross Weight Kg	1100	1100	1500	2750	3300	3800
Volume M3	3.7	3.7	5.35	10	7	8

* Increased furnace height

t: +44 (0) 1905 728200 • f: +44 (0) 1905 767877 • e: sales@moltenmetalproducts.com www.moltenmetalproducts.com