



## Feasibility Study

# Merchant Pig Iron Plant – Saguenay

Pure Fonte Ltée

## Étude de faisabilité

# Projet d'usine de fonte en gueuse – Saguenay

Pure Fonte Ltée

CD-335 – April 2018



Pure Fonte Ltée

# Feasibility Study Merchant Pig Iron Plant – Saguenay

Pure Fonte Ltée

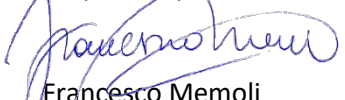
## Étude de faisabilité Projet d'usine de fonte en gueuse – Saguenay

Pure Fonte Ltée

Study N. CD-335

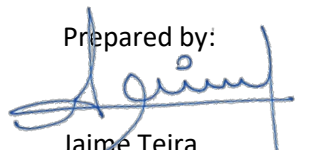
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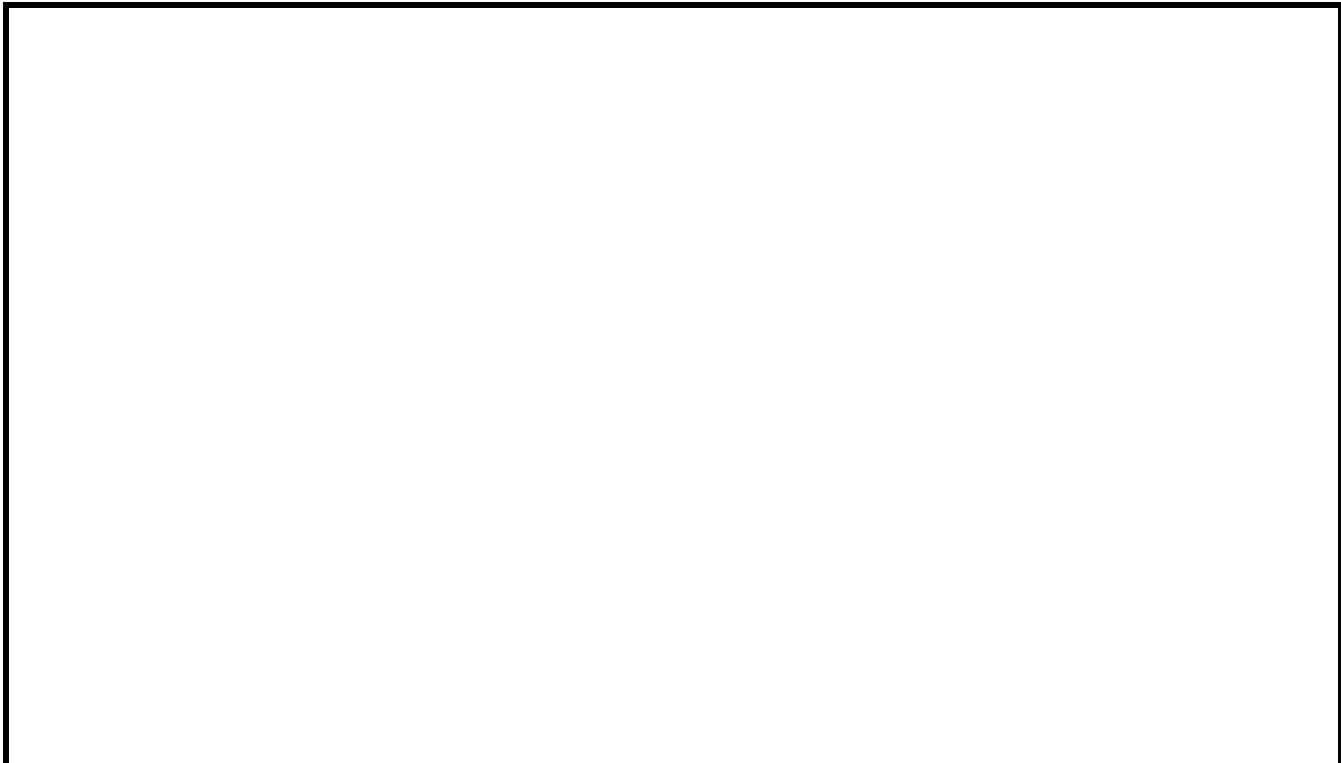
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**PURE FONTE LTÉE**  
**PIG IRON PRODUCTION PLANT – FEASIBILITY STUDY**  
**CUSTOMER N°: 1821**



TENOVA  
 TECHINT ENGINEERING & CONSTRUCTION

**FEASIBILITY STUDY**  
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**REVISION 2**  
 REVISION

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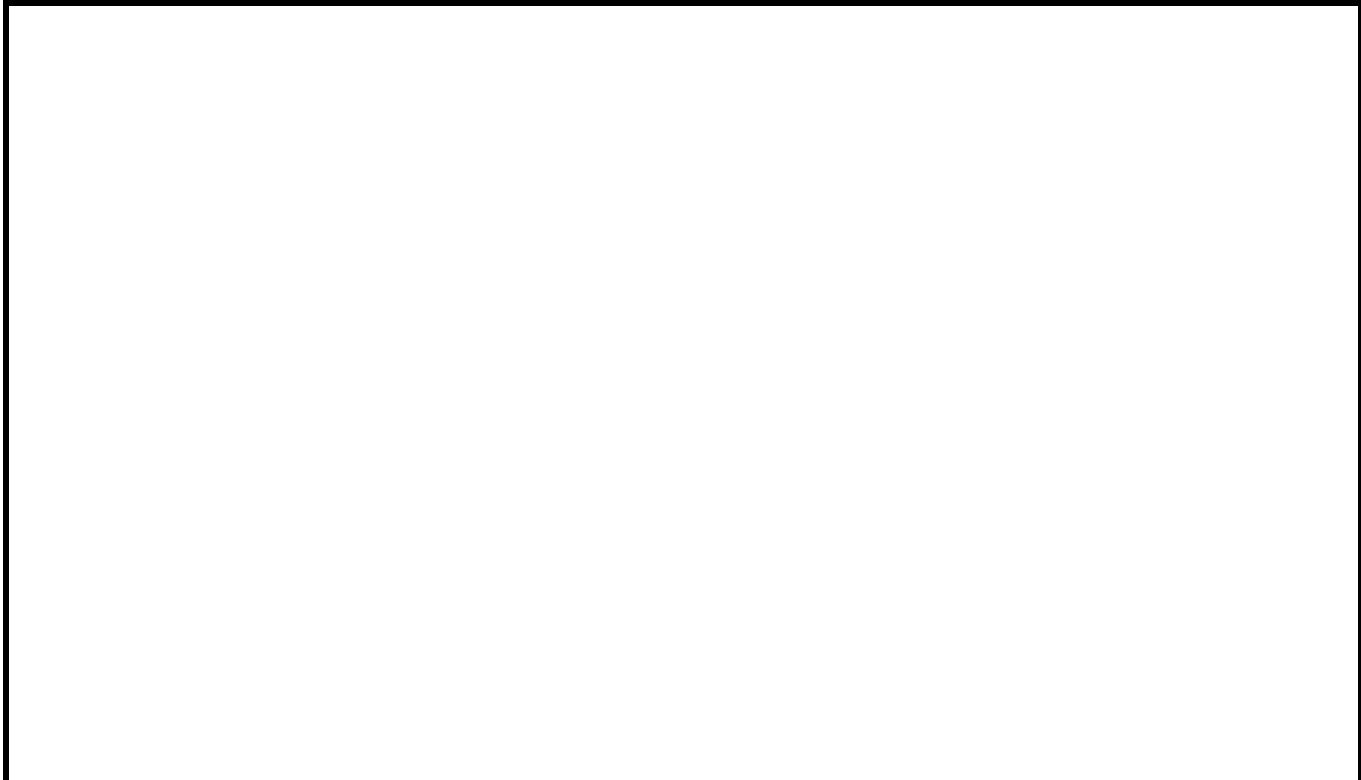
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2	ISSUED	4/4/18	-	SAG	KJS	MES
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<b>REV.</b>	<b>DESCRIPTION</b>	<b>DATE</b>	<b>PROJ.</b>	<b>EXEC.</b>	<b>CHECK.</b>	<b>APPR.</b>

 Pure Fonte Ltée	<b>PURE FONTE LTÉE</b> <b>PIG IRON PRODUCTION PLANT – FEASIBILITY STUDY</b> <b>CUSTOMER N°: 1821</b>
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	<b>FEASIBILITY STUDY</b> <b>II - LIST OF FIGURES</b>

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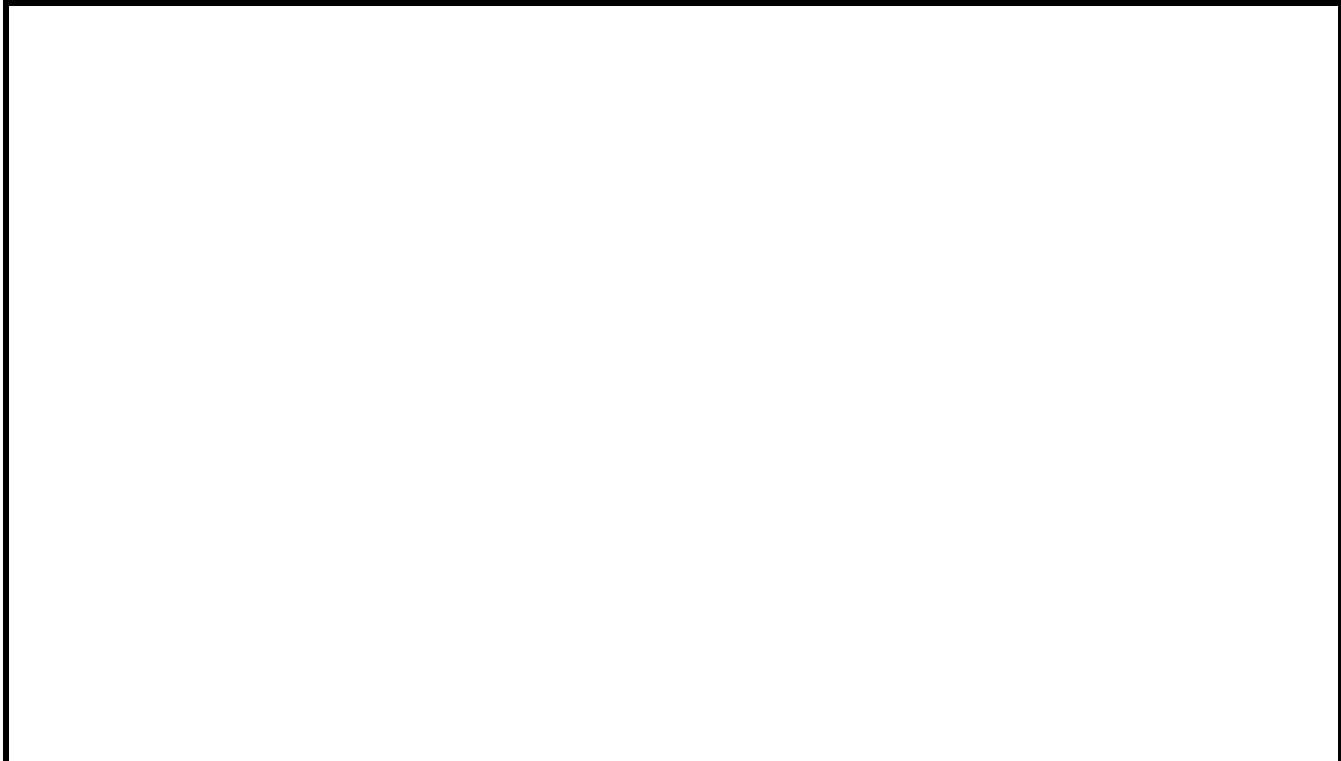
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**PURE FONTE LTÉE**  
**PIG IRON PRODUCTION PLANT – FEASIBILITY STUDY**  
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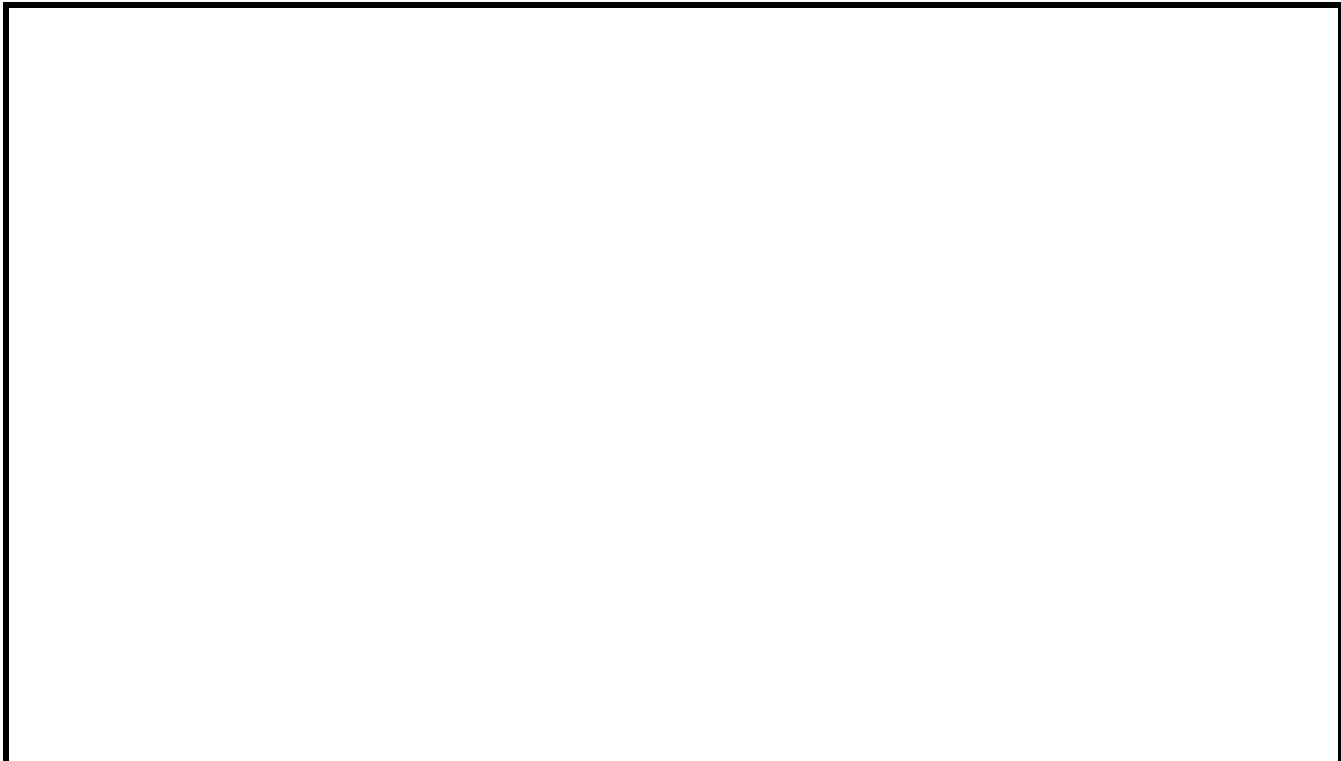
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REV.	DESCRIPTION	DATE	PROJ.	EXEC.	CHECK.	APPR.
3	ISSUED	4/4/18	SAG	SAG	MES	MES
2	FOR INFORMATION	8/14/16	SAG	SAG	MES	MES
1	FOR REVIEW	7/30/16	SAG	SAG	KJS	MES
0	PRELIMINARY	6/9/16	SAG	SAG	KJS	MES



**PURE FONTE LTÉE**  
**PIG IRON PRODUCTION PLANT – FEASIBILITY STUDY**  
**CUSTOMER N°: 1821**



TENOVA  
 TECHINT ENGINEERING & CONSTRUCTION

**FEASIBILITY STUDY**  
**V – ACRONYMS, UNITS, SYMBOLS**

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**REVISION 3**  
 REVISION

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## ACRONYMS

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1	AACE	Association for the Advancement of Cost Engineering ( <a href="http://www.aacei.org/">http://www.aacei.org/</a> )
2	AMMC	ArcelorMittal Mining Canada G.P. ( <a href="http://www.transformerlavenir.com/en/">http://www.transformerlavenir.com/en/</a> )
3	APS	Administration portuaire du Saguenay - Saguenay Prot Authority
4	BF	Blast Furnace
5	BFS	Bankable Feasibility Study
6	BH	Pulse-jet bag house or bag filter
7	BP	Briquetting Plant
8	BPI	Basic Pig Iron
9	BWG	Birmingham Wire Gauge
10	CAD	Canadian dollars
11	CAGR	Compounded Annual Growth Rate
12	Capex	Capital Expenditure
13	CFR	Cost and Freight ( <a href="http://www.incotermsexplained.com/">http://www.incotermsexplained.com/</a> )
14	Cliff	Cliffs Natural Resources ( <a href="http://www.cliffsnaturalresources.com">www.cliffsnaturalresources.com</a> )
15	CLTC	Consolidated Terminals and Logistics Co. ( <a href="http://www.cltconline.com/">http://www.cltconline.com/</a> )
16	COG	Coke oven gas
17	CRU	CRU Group ( <a href="http://www.crugroup.com/">http://www.crugroup.com/</a> )
18	CSE	Canadian Securities Exchange
19	CSL	Canada Steamship Lines ( <a href="https://www.cslships.com">https://www.cslships.com</a> )
20	CWT	
21	D&A	Depreciation and Amortization
22	DAT	delivered at terminal
23	DMDS	Dimethyl disulfide, molecular formula CH <sub>3</sub> SSCH <sub>3</sub>
24	DOB	Drop Out Box
25	DRI	Direct-reduced iron (DRI), also called sponge iron
26	DS	Dust Silo
27	EAF	Electric Arc Furnace
28	EBITDA	Earnings before interest, taxes, depreciation and amortization
29	EI	Employment Insurance
30	EIA	Environmental Impact Analysis
31	EIA	Energy Information Administration
32	FOB	Free On Board ( <a href="http://www.incotermsexplained.com/">http://www.incotermsexplained.com/</a> )
33	FPI	Foundry Pig Iron

34	FS	Feasibility Study
35	FTP	Fumes Treatment Plant
36	FX	Foreign Exchange
37	Gcal	Giga calories
38	GHG	Green House Gasses
39	GIIC	Gulf Industrial Investment Co. ( <a href="http://www.giic.com.bh">www.giic.com.bh</a> )
40	GJ	Giga Joule
41	GM	Gaz Metro
42	GRI	Grand Rivers Ironsands ( <a href="http://www.iron sands.ca/">http://www.iron sands.ca/</a> )
43	GT	Gross Ton
44	HBI	Hot Briquetted Iron
45	HHV	higher heating value
46	HP-MPI	High Purity Merchant Pig Iron
47	HQ	Hydro-Québec
48	HYL	Tenova HYL ( <a href="http://www.hyltechnologies.com/home.php">http://www.hyltechnologies.com/home.php</a> )
49	IIMA	International Iron & Metallics Association ( <a href="http://metallics.org.uk/">http://metallics.org.uk/</a> )
50	IO	Iron Ore
51	IOC	Iron Ore Company of Canada ( <a href="http://www.riotinto.com/">http://www.riotinto.com/</a> )
52	IRR	Internal rate of return
53	JSE	Johannesburg Stock Exchange limited, the largest stock exchange in Africa
54	kPa	kilo Pascal
55	L/C	Letter of Credit
56	LKAB	Luossavaara-Kiirunavaara AB ( <a href="http://www.lkab.com/">http://www.lkab.com/</a> )
57	LME	London Metal Exchange
58	masl	meters above sea level
59	MDEA	Methyl diethanolamine, Chemical formula $C_5H_{13}NO_2$
60	MMI	Metal Manufacturing Inc. ( <a href="http://www.metalo.ca/">http://www.metalo.ca/</a> )
61	MPI	Merchant Pig Iron
62	MPP	Manual of Project Procedure
63	MT	Metric Ton
64	MTO	Material Take Off
65	Mtpy	Million tons per year, metric
66	PURE FONTE LTÉE	North Atlantic Iron Corporation
67	NG	Natural Gas
68	NOLA	New Orleans, Louisiana
69	NOx	NOx is a generic term for the mono-nitrogen oxides NO and NO2
70	NPI	Nodular Pig Iron
71	NPV	Net present value
72	NS	Norda Stelo ( <a href="http://www.norda.com/en/">http://www.norda.com/en/</a> )
73	NYSE	New York Stock Exchange

74	OEM	Original Equipment Manufacturer
75	Opex	Operating Expenditure
76	PADEM	Programme d'assainissement des eaux municipales
77	PAEQ	Programme d'assainissement des eaux du Québec
78	Petmin	Petmin Limited ( <a href="http://www.petmin.co.za/">http://www.petmin.co.za/</a> )
79	PGH	Process Gas Heater
80	QPP	Quebec Pension Plan
81	QSL	Quebec Stevedoring Company Ltd.
82	RHF	Rotary Hearth Furnace
83	SEDAR	System for Electronic Document Analysis and Retrieval
84	SG&A	Selling, General and Administrative Expenses
85	SI	Système international d'unités or International System of Units
86	SNC	SNC Lavalin ( <a href="http://www.snclavalin.com/en/">http://www.snclavalin.com/en/</a> )
87	TCM	Total Cost Management
88	TEIC	Techint Engineering and Construction
89	TS	Tenaris
90	TX	Ternium
91	UDS	US dollars
92	VOCs	Volatile Organic Compounds
93	VPSA	Vacuum Pressure-Swing Adsorption
94	WA	Western Australia
95	WBS	Work Breakdown Structure
96	WTP	Water Treatment Plant
97	ZR	Zero Reformer

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## UNITS

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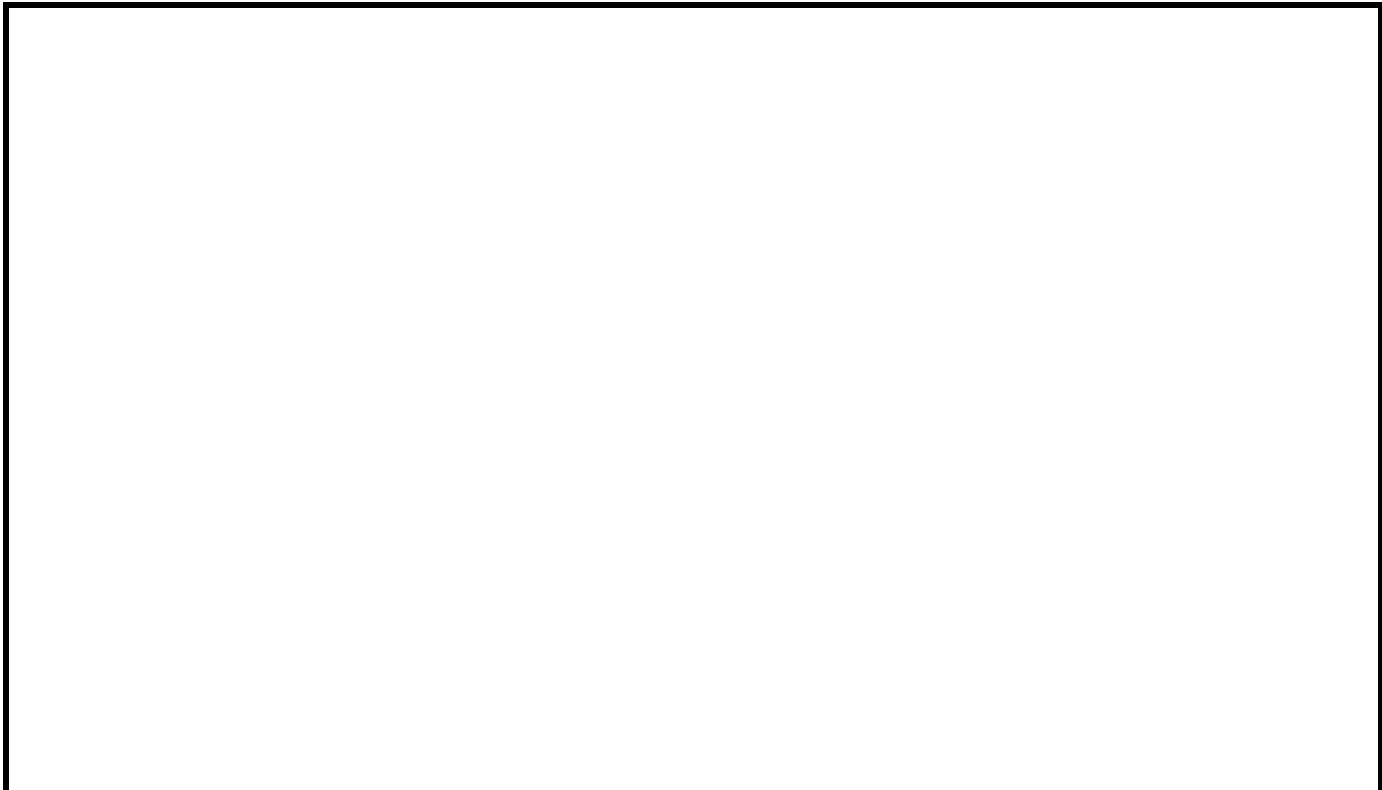
1	bcf	billion cubic feet
2	Btu	British thermal unit
3	dBa	A-weighted decibels
4	g/kmV	gram per kilometer per vehicle
5	kg/h	kilogram per hour
6	km	kilometer
7	kPa	kilo Pascal
8	kV	kilovolt
9	m	linear meters
10	m <sup>2</sup>	square meters
11	m <sup>3</sup>	cubic meters
12	m <sup>3</sup> /d	cubic meters per day
13	m <sup>3</sup> /h	cubic meters per hour
14	mg/l	milligram per liter
15	MJ	Mega Joule
16	MJ	Mega Joule
18	MMBtu	million Btu
19	MMI	Metalo Manufacturing Inc. ( <a href="http://www.metalo.ca/">http://www.metalo.ca/</a> )
20	Mt/a	Million ton per annum
21	MVA	Mega Volt Ampere
22	MW	Mega Watts
23	Nm <sup>3</sup>	normal cubic meter
24	Nm <sup>3</sup> /h	Normal cubic meters per hour
25	ppb	parts per billion
26	ppm	parts per million
27	ppmvs	parts per million per dry volume
28	t	metric ton
29	t/h	tons per hour
30	tpy	ton per year, metric
31	µg/m <sup>3</sup>	micrograms per cubic meter

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## SYMBOLS



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1	$\text{Al}_2\text{O}_3$	Aluminum Oxide
2	C	Carbon
3	$\text{CaCO}_3$	Calcium Carbonate
4	CaO	Calcium Oxide
5	$\text{CH}_4$	Methane
6	$\text{CO}_2$	Carbon dioxide
7	$\text{CO}$	Carbon Monoxide
8	Fe	Iron
30	Fe tot	total iron
9	$\text{Fe}_2\text{O}_3$	Hematite, Iron(III) oxide or ferric oxide
10	$\text{Fe}_3\text{C}$	Iron carbide
11	$\text{FeCl}_3$	Iron Chloride
12	FeO	Wüstite, Iron(II) oxide or ferrous oxide
13	$\text{H}_2$	Hydrogen
14	$\text{H}_2\text{O}$	Water
15	$\text{H}_2\text{S}$	Hydrogen sulfide
33	$\text{K}_2\text{O}$	potassium oxide
16	MgO	Magnesium Oxide
17	Mn	Manganese
18	$\text{N}_2$	Nitrogen
19	$\text{Na}^+$	sodium ions
34	$\text{Na}_2\text{O}$	Sodium oxide
20	NaCl	salt, sodium chloride
21	$\text{NO}_2$	nitrogen dioxide
22	$\text{NO}_3$	Nitrate
23	NOx	Nitrogen oxides
24	$\text{O}_2$	Oxygen
25	$\text{O}_3$	Ozone
31	Ored	reduced oxides
26	P	Phosphorous
27	S	Sulfur
28	Si	Silicon
29	$\text{SO}_2$	Sulfur dioxide
32	$\text{TiO}_2$	titanium oxide



1	ISSUED	4/4/18	GAM	GAM	TEI	MES
0	FOR REVIEW	8/14/16	GAM	GAM	TEI	MES
A	PRELIMINARY	6/7/16	GAM	GAM	TEI	TEI
<b>REV.</b>	<b>DESCRIPTION</b>	<b>DATE</b>	<b>PROJ.</b>	<b>EXEC.</b>	<b>CHECK.</b>	<b>APPR.</b>

	<p><b>PURE FONTE LTÉE</b>  <b>PIG IRON PRODUCTION PLANT – FEASIBILITY STUDY</b>  <b>CUSTOMER N°: 1821</b></p>
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 	<p>TENOVA          TECHINT ENGINEERING &amp; CONSTRUCTION</p> <p><b>FEASIBILITY STUDY</b>  <b>VI - LIST OF DRAWINGS</b></p>
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## SECTION 8

### METAL PLANT

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### ARCHITECTURE

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