

**FERROUS MINERAL COMMODITIES PRODUCED
IN THE REPUBLIC OF SOUTH AFRICA
2005**

DIRECTORATE: MINERAL ECONOMICS
(MINERALS BUREAU)



the dme

Department:
Minerals and Energy
REPUBLIC OF SOUTH AFRICA

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2005**

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(MINERALS BUREAU)

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The Director: Mineral Economics, Mineralia Centre,
234 Visagie Street, Pretoria 0001, Private Bag X59, Pretoria 0001
Telephone (012) 317-8538, Telefax (012) 320-4327
Website: <http://www.dme.gov.za>*



the dme

Department:
Minerals and Energy
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF MINERALS AND ENERGY

Director-General

Adv. S Nogxina

MINERAL PROMOTION CHIEF DIRECTORATE

Chief Director

VACANT

DIRECTORATE MINERAL ECONOMICS

Director

Ms N Van Averbek

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FOREWORD

The dynamic nature of the industry pertaining to the ferrous mineral commodities produced in South Africa necessitated a revision due to the expansion of the industry and usual changes of contact information of the companies. This is the Eighth revised edition of the directory, which was first published in 1983.

Listed information includes contact details of the producers of chrome ore, iron ore, manganese ore, vanadium and ferro-alloys. Also included are flow diagrams of individual commodities and website addresses of the various companies producing ferrous commodities.

The assistance of the industry in the compilation of the directory is acknowledged. It is hoped that this directory will prove useful to the producers, marketers and consumers of South Africa's ferrous commodities and assist in the promotion of South Africa's mineral industry and trade. Any comments or information that could lead to an improvement in this directory will be gratefully received.

JANUARY 2005

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ABBREVIATIONS

AFS	-	American Foundry sand
chem	-	chemical
conc	-	concentrate
DMS	-	dense media separation
HC	-	high carbon
ju	-	joint venture
kt	-	kiloton
kt/a	-	kiloton per annum
LC	-	low carbon
LG	-	lower Group
LHD	-	load haul dump
MC	-	medium carbon
Met	-	metallurgical
MG	-	middle Group
Mt	-	million tons
ROM	-	run of mine
RPC	-	rated plant capacity
SPC	-	solvent plant concentrate
UG	-	upper Group
t	-	tonnage
u	-	microns

PRODUCERS OF CHROME ORE - 1 and 2			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
Group Company 1. AFRICAN RAINBOW MINERALS LIMITED Controlling Company ASSMANG LIMITED PO BOX 782075 2146 SANDTON Tel: +27 (0) 11 7791000 Fax: +27 (0) 11 7791031			
Mine		Local & Export	
1.1 Dwarsrivier Chrome PO Box 567 1120 Lydenburg Tel: +27 (0) 13 230 5300 Fax: +27 (0) 13 230 5318 <i>Farm, Province</i> Dwarsrivier 372 KT Mpumalanga	Opencast LG6 RPC 900kt/a (Underground 2004/5) Metallurgical plant RPC 1200 kt/a Crush, wash, screen, DMS, Mill, Spirals	Metallurgical lumpy, Metallurgical chips, (Cr ₂ O ₃ 40,0% min; SiO ₂ 7% max) Met. Concentrates, Cr ₂ O ₃ 44% min; SiO ₂ 3% max) Chemical Concentrates, (Cr ₂ O ₃ 46% min, SiO ₂ <1 max)	Ore & Metal Company Ltd. Private Bag X03 2116 Northlands Tel: +27 (0) 11 770 6800 Fax: +27 (0) 11 268 6440
Group Company 2. AFRICAN MINING AND TRUST COMPANY LTD Controlling company ASSORE LIMITED PRIVATE BAG X 03 2116 NORTHLANDS Tel: +27 (0) 11 770 6800 Fax: +27 (0) 11 268 6440			
Mine		Local & Export	
2.1 Rustenburg Minerals Development Company (Pty) Ltd. POBox 57 0301 Boshhoek Tel: +27 (0) 14506 1002 Fax: +27 (0) 14506 1000 <i>Farm, Province</i> Grootfontein 138JP Tweelaagte 175JP (Vogelstruisnek 173JP) North-West	Opencast LG6 Tailings MG1 + MG4(ROM)	<u>Lumpy (R.O.M) %</u> Cr ₂ O ₃ 33,0-38,0 SiO ₂ 4,0 Al ₂ O ₃ 12,3 FeO 22,0 MgO 12,0 Cr:Fe 1,30-1,35:1 <u>Concentrate %</u> Cr ₂ O ₃ 43,0-45,0 SiO ₂ 3,0-4,0 Al ₂ O ₃ 12,5 FeO 22,0 MgO 10,6 Cr:Fe 1,60-1,65:1	Ore & Metal Company Ltd Private Bag X03 2116 Northlands Tel: +27 (0) 11 770 6800 Fax: +27 (0) 11 268 6440

PRODUCERS OF CHROME ORE - 3 and 4			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
Controlling Company 3. ASA METALS PTY LTD PO BOX 3952 0700 PIETERSBURG Tel: +27 (0) 15 291 4423 Fax: +27 (0) 15 291 4426			
<i>Mine</i>		<i>Local & Export</i>	
3.1 Dilokong Chrome PO Box 169 1150 Burgersfort Tel: +27 (0) 13 230 7600 Fax: +27 (0) 13 230 7610 <i>Farm, Province</i> Maandagshoek 254KT Limpopo Province	Underground, Bord and pillar LG6 Crushing, washing, screening and spirals Spirals	Lumpy, chips, metal. & chem. concentr. & foundry Sands <u>Typical fines</u> Cr ₂ O ₃ 47,5% max; SiO ₂ 0,5-1,5% Cr: Fe 1,55:1	ASA Metals (Pty) Ltd. PO Box 3952 0700 Pietersburg Tel: +27 (0) 15 291 4423 Fax: +27 (0) 15 291 4426
Group Company 4. BAYER AG, GERMANY Controlling Company BAYER (PTY) LTD PO BOX 143 1600 ISANDO Tel: +27 (0) 11 921 5911 Fax: +27 (0) 11 921 5186			
<i>Mine</i>		<i>Local & Export</i>	
4.1 Bayer (Pty) Ltd Rustenburg Chrome PO Box 8 0350 Kroondal Tel: +27 (0) 11 921 5911 Fax: +27 (0) 11 921 5186	RPC 450kt/a Underground, Board & pillar. LG6 & 6a Seam-scraping LHD Vehicles, Drive & shaft belt delivery Crush, screen, mill, DMS, spirals	<u>Met. Lumpy %</u> (about one quarter) Cr ₂ O ₃ 40,0 Cr:Fe 1,5-1,56:1 Size: -120mm+25mm <u>Chem. Concentr. %:</u> (about two-thirds) Cr ₂ O ₃ 40,0 SiO ₂ 1,1 FeO 25,0 MgO 10,0 CaO 0,2-0,3 Cr:Fe 1,5-1,56:1 Size: -1mm <u>Foundry sand %:</u> (remainder) Cr ₂ O ₃ 40,0 SiO ₂ 1,1 Cr:Fe 1,55:1 Size: AFS 48-52	Bayer (Pty) Ltd PO Box 143 1600 Isando Tel: +27 (0) 11 921 5911 Fax: +27 (0) 11 921 5186

PRODUCERS OF CHROME ORE - 5			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
<p>Group Company 5. BHP- BILLITON PLC (60%) & ANGLO AMERICAN PLC (40%) LISTED IN LONDON, UK Controlling Company SAMANCOR LIMITED PO BOX 8186 2000 JOHANNESBURG Tel: +27 (0) 11 376 9111 Fax: +27 (0) 11 376 3155</p>			
Mine		Local and Export	
5.1 Lannex Section (1) <i>Farm, Province</i> Grootboom 336KT Annex Grootboom 335KT Mpumalanga	Underground, Trackless Mining –MG1 Updip stoping, crushing, screening,DMS and spirals	<u>Refractory conc %</u> Cr ₂ O ₃ 46,0 min SiO ₂ 0,8 max Cr:Fe >1,55:1	Samancor Ltd Chrome Division PO Box 8186 2000 Johannesburg Tel: +27 (0) 11 376 9111 Fax: +27 (0) 11 376 3155
5.2 Lannex Section (2) <i>Farm, Province</i> Annex Grootboom 335KT Mpumalanga	Opencast MG 1 and 2 Crushing and Screening	Sizes: 25- mesh 20%max 25+ mesh 80%min 25+ mesh 18% max 70- mesh 15% max <u>Chemical %</u> Cr ₂ O ₃ 46,2 min SiO ₂ 0,8 max Cr:Fe >1,50:1	
5.3 Eastern Chrome mines PO Box 3 1133 Steelpoort Tel: +27 (0) 13 230 7074 Fax: +27 (0) 13 230 7003	RPC 2,0Mt/a (marketable)	<u>Metallurgical lumpy</u> <u>Metallurg. Concentr</u> <u>Refractory concentr.</u> <u>Foundry sands</u> Cr ₂ O ₃ 38,0-45,0 Cr:Fe 1,40-1,60:1 (unbeneficiated)	

<i>PRODUCERS OF CHROME ORE - 5 cont.</i>			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
<i>Mine</i>		<i>Local and Export</i>	
5.2.1 Steelpoort section <i>Farm, Province</i> Winterveld 293 KT Doornbosch 294 KT Mpumalanga	Underground, Breast scraper stopping- LG6 crushing, screening DMS, and spirals	<u>Met. Lumpy %</u> Cr ₂ O ₃ 38,0 SiO ₂ 10,0 typical Cr:Fe >1,46:1 Size: +15mm-80mm <u>Small Lumpy % :</u> Cr ₂ O ₃ 38,0 SiO ₂ 8-12,0 Cr:Fe >1,40:1 Size: +6mm-15mm <u>Chips %</u> Cr ₂ O ₃ 38,0 SiO ₂ 8-12,0 Cr:Fe >1,40:1 Size: +1mm-6mm <u>Metallurgical concentrates %:</u>	Samancor Ltd Chrome Division PO Box 8186 2000 Johannesburg Tel: +27 (0) 11 376 9111 Fax: +27 (0) 11 376 3155
5.2.2 Doornbosch section <i>Farm, Province</i> Doornbosch 294 KT Onverwacht 292 KT Mpumalanga <i>mined closed</i>	Underground, Breast scraper stopping- LG6 crushing, screening DMS, and spirals	<u>Chips %</u> Cr ₂ O ₃ 38,0 SiO ₂ 8-12,0 Cr:Fe >1,40:1 Size: +6mm-15mm <u>Metallurgical concentrates %:</u>	
5.2.3 Montrose section <i>Farm, Province</i> Hendriksplaats 281 KT Mpumalanga <i>sold to Madwika Mining</i>	Underground, Breast scraper stopping- LG6 crushing, screening DMS, and spirals	<u>Metallurgical concentrates %:</u>	
5.2.4 Tweefontein section (1) <i>Farm, Province</i> Tweefontein 360 KT Mpumalanga	Underground, MG1 crushing, screening DMS, and spirals	Cr ₂ O ₃ 44,0 min SiO ₂ 5,8 max Cr:Fe >1,45:1 Size: 95% @<2mm <u>Foundry sand %:</u>	
5.2.5 Tweefontein section (2) <i>Farm, Province</i> Tweefontein 360 KT Mpumalanga	Opencast MG1 and 2 crushing, screening	Cr ₂ O ₃ 44,0 min SiO ₂ 0,8 max Cr:Fe >1,50:1 Size: AFS 45/49	

PRODUCERS OF CHROME ORE - 5 cont.			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
<i>Mine</i>		<i>Local and Export</i>	
5.3 Western chrome PO Box 245 0325 Mooinooi Tel: +27 (0) 14 574 6000 Fax: +27 (0) 14 574 3255	RPC 1,8Mt/a (marketable)	<u>Met. Lumpy %</u> <u>Met. Conc. Chem. Concentrates.</u> <u>Foundry sands</u> Cr:Fe >1,46:1 Cr ₂ O ₃ 36-39 unbeneficiated	Samancor Ltd Chrome Division PO Box 8186 2000 Johannesburg Tel: +27 (0) 11 376 9111 Fax: +27 (0) 11 376 3155
5.3.1 Millsell section <i>Farm, Province</i> Waterkloof 305JQ Waterval 306JQ North- West	Underground, mechanised rib and pillar - LG6,6a Trackless LHD vehicles, all-belt Delivery crushing, screening DMS, and spirals	<u>Metal. Lumpy %</u> Cr ₂ O ₃ 39,0 min SiO ₂ 10 typ Cr:Fe >1,48:1 Size: +15mm-120mm <u>small lumpy %</u> Cr ₂ O ₃ 38,0 min SiO ₂ 10,0 Cr:Fe >1,46:1 Size: +6mm-15mm	
5.3.2 Elandsdrift section <i>Farm, Province</i> Elandskraal 467JQ North- West <i>Mine Closed</i>	Underground, Updip scraper stoping MG1	<u>chips %</u> Cr ₂ O ₃ 38,0 min SiO ₂ 10,0 Cr:Fe >1,46:1 Size: +1mm-6mm	
5.3.3 Mooinooi section (1) <i>Farm, Province</i> Elandskraal 469JQ North- West	Underground, updip scraper Stoping – MG 1	<u>metal. conc. %</u> Cr ₂ O ₃ 45,0 min SiO ₂ 3,0 max Cr:Fe >1,50:1 size: 95% @ < 2mm <u>chem. conc. %</u> Cr ₂ O ₃ 46,0 min SiO ₂ 0,8 max Cr:Fe >1,50:1 size: 100% @ < 1mm AFS 65 typ	
5.3.4 Elandskraal section <i>Farm, Province</i> Elandskraal 469JQ North- West	Opencast MG 1 and 2 Crushing, screening	<u>foundry sand %</u> Cr ₂ O ₃ 46,0 min SiO ₂ 0,8 max Cr:Fe >1,50:1 AFS 48/60	

PRODUCERS OF CHROME ORE - 6			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
Controlling Company 6. HERNIC FERROCHROME (PTY) LTD PO BOX 4534 0250 BRITS Tel: +27 (0) 12 381 1100 Fax: +27 (0) 12 381 1111			
Mine		Local and Export	
6.1 Heric Ferrochrome Pty Ltd PO BOX 4534 0250 Brits Tel: +27 (0) 12 381 1100 Fax: +27 (0) 12 381 1111 Farm, Province De Kroon 444 JQ Elandsfontein 440 JQ <i>North-West</i>	Opencast (MG1 and 2) Crushing, DMS, screening, spirals	<u>Lumpy</u> % Cr ₂ O ₃ 38,0 SiO ₂ 7,5-9,5 Al ₂ O ₃ 14,9 FeO 23,5 MgO 11,5 CaO 1,6 P 0,002 S 0,004 Cr:Fe 1,48:1 size -150mm+6mm <u>Metallurgical conc.%</u> Cr ₂ O ₃ 45,0 SiO ₂ 2,5 Al ₂ O ₃ 15,3 FeO 26,0 MgO 8,7 CaO 0,3 P 0,002 S 0,003 Cr:Fe 1,48:1 <u>Chemical conc.%</u> Cr ₂ O ₃ 46,0 SiO ₂ 1,0 Al ₂ O ₃ 15,2 FeO 26,0 MgO 8,7 CaO 0,3 P 0,002 S 0,003 Cr:Fe 1,55:1	Heric Ferrochrome (Pty) Ltd PO Box 4534 0250 Brits Tel: +27 (0) 12 381 1100 Fax: +27 (0) 12 381 1111

PRODUCERS OF CHROME ORE - 9			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
<p>Group Company 9. XSTRATA A.G. LONDON, UK</p> <p>Controlling Company XSTRATA ALLOYS PRIVATE BAG 82288 0300 RUSTENBURG Tel: +27 (0) 14 590 6000 Fax: +27 (0) 14 590 6002</p>			
Mine		Local and Export	
<p>9.1 Xstrata Alloys Mining Division PO Box 310 0350 Kroondal Tel: +27 (0) 14 536 0075 Fax: +27 (0) 14 536 0002 <i>Farm, Province</i></p> <p>Kroondal Section Kroondal 304 JQ Rustenburg section Waternal small holdings Waternal section Waternal small holdings Wonderkop section Brakspruit 299 JQ Spruitfontein 341 JQ North-West</p> <p>Thorncliffe section Thorncliffe 374 Kt Mpumalanga</p>	<p>Underground Bord & pillar LG6 and 6y Load Haul Dumper Vehicles Drive & Shaft belt delivery Crush, screen, DMS & spirals Opencast Opencast & underground LG6</p>	<p>Metallurgical Lumpy Metallurgical chips Met. Concentrates Chem. Concentrates Foundry sands Cr: Fe 1,5-1,55:1</p>	<p>Xstrata Alloys Mining Division PO Box 310 0350 Kroondal Tel: +27 (0) 14 536 0075 Fax: +27 (0) 14 536 0002</p>

PRODUCERS OF CHROME ORE - 10			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
<p>Group Company 10. VEREENIGING REFRACTORIES (PTY) Ltd Controlling Company VEREENIGING REFRACTORIES (PTY) Ltd PO BOX 117 1930 VEREENIGING Tel: +27 (0) 16 450 6111 Fax: +27 (0) 16 450 6036</p>			
Mine		Local and Export	
10.1 Marico Chrome Corporation Ltd 2874 Nietverdiend Tel & Fax: +27 (0) 18 3672 1109 Ask for 11 or 19 <i>Farm, Province</i> Goudini 30 JP Driekop 14 JP Strydfontein 12 JP (Allewynspoort 290 JP) North-West Province	Opencast (LG1 and 2) Crushing, washing, Screening, spirels and diamond pans	<u>Solvent Plant Concentrate %</u> Cr ₂ O ₃ 46,8% SiO ₂ 5,0 FeO 20,0 Cr:Fe 2:1 Size -30mm+10mm <u>Refractory-grade Concentrate %</u> Cr ₂ O ₃ 49,0% SiO ₂ 0,7 FeO 22,0 Cr:Fe 2,03:1	Vereeniging Refractories (Pty) Ltd PO Box 117 1930 Vereeniging Tel: +27 (0) 16 450 6111 Fax: +27 (0) 16 450 6036

PRODUCERS OF IRON ORE - 1 and 2			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
<p>Group Company 1. ANGLO AMERICAN PLC Controlling Company HIGHVELD STEEL & VANADIUM CORPORATION LTD PO BOX 111 1035 WITBANK Tel: +27 (0) 13 690 9911 Fax: +27 (0) 13 699 7561</p>			
Mine		For own use:	
<p>1.1 Highveld Steel & Vanadium Corp. Ltd PO Box 111 1035 Witbank Tel: +27 (0) 13 690 9911 Tel: +27 (0) 13 699 7561 Mapochs Mine Division <i>Farm, Province</i> Mapochgronde 509, 510, 511 Js Schoongezicht 308 Js Mpumalanga</p>	<p>Opencast RPC 2Mt/a (lumpy) 450kt/a (fines) crushed, washed & Screened Magnetic separation of the fines</p>	<p>Vanadiferous Magnetite – lumpy & fines <u>Average grade %</u> Fe 54,3 V₂O₅ 1,6 TiO₂ 14,2</p>	<p>For own use: Production of iron & steel, vanadium bearing slag, vanadium pentoxide, ferrovanadium, and vanadium chemicals</p>
<p>Group Company 2. AFRICAN RAINBOW MINERALS Controlling company ASSMANG LIMITED PO BOX 782058 2146 SANDTON Tel: +27 (0) 11 634 9111 Fax: +27 (0) 11 634 0038</p>			
Mine		Local & Export	
<p>2.1 Iron Ore Division PO BOX 187 SANTOY 8419 Tel: +27 (0) 53 311 6666 Fax: +27 (0) 53 311 4642 <i>Farm, Province</i> Beeshoek 448 Northern Cape</p>	<p>Opencast RPC 4,5Mt/a Crushing, washing & Screening and the newly DMS (Jig)plant</p>	<p>Haematite Fe 66% typical</p>	<p>Ore & Metal Company Ltd Private Bag X03 2116 Northlands Tel: +27 (0) 11 770 6800 Fax: +27 (0) 11 268 6035 Tinusb@assmang.co.za</p>

PRODUCERS OF IRON ORE - 3 and 4			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
Group Company 3. ECO-BAT TECHNOLOGIES Plc, MATLOCK, UK Controlling Company G & W BASE & INDUSTRIAL MINERALS (PTY) LTD			
Mine		Local & Export	
3.1 G &W Base & Industrials Industrial Minerals Pty Ltd PO Box 14052 1422 Wadeville Tel: +27 (0) 11 842 2710 Fax: +27 (0) 11 824 2721 <i>Farm, Province</i> Waterval 388 North West	Opencast RPC 100t/a Crush & grind	Specularite (a micaceous iron product) For paint industry 85% Fe ₂ O ₃ 85% @-63 μ	G&W Base and Minerals (Pty) Ltd PO Box 14052 1422 Wadeville Tel: +27 (0) 11 842 2710 Fax: +27 (0) 11 824 2721
Controlling Company 4. IDWALA INDUSTRIAL HOLDINGS PRIVATE BAG X93 BRYANSTON, 2021 Tel: +27 (0) 11 706 0000 Fax: +27 (0) 11 706 0044			
Plant		Local & Export	
4.1 Idwala Magnetite PO Box 1914 1390 Palabora <i>Plant</i> Mpumalanga	RPC 110kt/a Drying, Magnetic Separation, Milling, and classification to three size Grades	Magnetite purchased from Foskor Used in coal HMS 1. 75% @-45 μ 2. 85% @-45 μ 3. 95% @-45 μ typical 95% Fe ₃ O ₄	Idwala Magnetite PO Box 6056 1508 Dunswart Tel: +27 (0) 11 914 2600 Fax: +27 (0) 11 914 1293

PRODUCERS OF IRON ORE - 5 AND 6			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
Controlling Company 5. INDUSTRIAL DEVELOPMENT CORPORATION OF SA (PTY) LTD PO BOX 784055 2146 SANDTON Tel: +27 (0) 11 269 3000 Fax: +27 (0) 11 269 3116			
Mine		Local & Export	
5.1 Foskor Limited PO Box 1 1390 Palabora Tel: +27 (0) 11 269 3000 Fax: +27 (0) 11 269 3116 <i>Farm, Province</i> Loole 38 Lu Wegsteek 30 Lu Limpopo	Opencast RPC 1,1Mt/a Magnetically separated from crushed & milled phosphate rock. Magnetite accumulates on 35Mt dumps) 16000t/week @52% Fe ~850000t/a @ 52% Fe	<u>Magnetite %</u> Fe @ 52% Also Phosphate Baddeleyite Zirconia Copper	Foskor Limited PO Box 1 1390 Palabora Tel: +27 (0) 15 789 2000 Fax: +27 (0) 15 789 2066
Group Company 6. KUMBA RESOURCES LIMITED Controlling company KUMBA RESOURCES LIMITED PO BOX 9229; 0001 PRETORIA Tel: +27 (0) 12 307 3000 Fax: +27 (0) 12 307 3032			
Mine		Local & Export	
6.1 Sishen Iron ore Mine Private Bag X506 8446 Kathu Tel: +27 (0) 53 739 2911 Fax: +27 (0) 53 739 2000 <i>Farm, Province</i> Sishen 543 Lyleveld 178 Vrq Gamagara 541 Sacha 468 Sekgame 461 Simms 462 Northern Cape	Opencast RPC 28,0Mt/a Crushing, washing, screening & beneficiation	<u>Haematite %</u> Fe 65,0-66,5%	Kumba Resources Iron Ore Division PO Box 9229 0001 Pretoria Tel: +27 (0) 12 307 3060 Fax: +27 (0) 12 307 3032

PRODUCERS OF IRON ORE - 6 and 7			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
6.2 Thabazimbi Iron Ore Mine Private Bag X534 0380 Thabazimbi Tel: +27 (0) 14 777 3000 Fax: +27 (0) 14 777 1327 <i>Farm, Province</i> Buffelshoek 351 Kq Donkerpoort 344 Kq Kwaggashoek 345 Kq Wachteenbietjiesdraai 750 Kq Northern Cape	Opencast RPC 2,4Mt/a Crushing, washing, screening & beneficiation	<u>Haematite %</u> Fe 62,0-64,0%	Kumba Resources Iron Ore Division PO Box 9229 0001 Pretoria Tel: +27 (0) 12 307 3060 Fax: +27 (0) 12 307 3032
Group Company 7. RIO TINTO Controlling Company PALABORA MINING COMPANY LIMITED PO BOX 65 1390 PALABORA Tel: +27 (0) 15 780 2911 Fax: +27 (0) 15 780 2446			
Mine		Local & Export	
7.1 Palabora Mining Company Ltd PO Box 65 1390 Palabora Tel: +27 (0) 15 780 2911 Fax: +27 (0) 15 780 2448 <i>Farm, Province</i> Laaste 24LU Wegsteek 30LU Loole 31LU Limpopo	Opencast RPC 5Mt/a Crushing, Milling, Flotation for Cu, Magnetic separation of magnetite from the tail. Magnetite accumulated on 190Mt dumps HMS grades for coal separation are processed by Milling and Class. (RPC @150kt/a)	Magnetite <u>Export grade %</u> Fe 64,0 min Cu 0,06 max P 0,12 max MgO 3,2 CaO 0,06 SiO ₂ 0,06 Al ₂ O ₃ 0,5 <u>Local Grades HMS</u> <u>Coarse</u> Size: 75% @-45u Magnetics: 95% <u>Fine</u> Size: 90% @-45u Magnetics: 95%	Palabora Mining Company Ltd PO Box 65 1390 Palabora Tel: +27 (0) 15 780 2774 Fax: +27 (0) 15 780 2611

PRODUCERS OF MANGANESE ORE 1 & 2			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
Group Company 1. AFRICAN RAINBOW MINERALS & ASSORE LIMITED Controlling Company ASSMANG LIMITED PO BOX 782075 2146 SANDTON Tel: +27 (0) 11 779 1000 Fax: +27 (0) 11 7791031			
<i>Mine</i>		<i>Local & Export</i>	
1.1 Manganese Mines 8423 PO Mancorp Mine Tel: +27 (0) 53 311 6665 Fax: +27 (0) 53 311 4642 Farm, Province Belgravia 264 Santoy 230 N'Chwaning 267 Gloria 266 Northern Cape	Opencast & underground	Mn 43%	Ore & Metal Company Ltd Private Bag X03 2116 Northlands Tel: +27 (0) 11 770 6800 Fax: +27 (0) 11 268 6440
Group Company 2. BHP-BILLITON PLC & ANGLO AMERICAN PLC Controlling Company SAMANCOR LIMITED PO BOX 8186 2000 MARSHALLTOWN Tel: +27 (0) 11 376 9111 Fax: +27 (0) 11 376 3338			
<i>Mine</i>		<i>Local & Export</i>	
2.1 Samancor Limited PO Box 1 8490 Hotazel Hotazel Mine Mamatwan/ Smartt Mine Wessels/Dibiagomo Mine Tel: +27 (0) 53 742 2000 Fax: +27 (0) 53 741 1326 Farm, Province Mamatwan 431/1952 GR Wessels 6/1947 GR Northern Cape	Opencast & Underground	Mn 43-48%	Samancor Limited PO Box 8166 2000 Johannesburg Tel: +27 (0) 11 376 9111 Fax: +27 (0) 11 376 3338

PRODUCERS OF MANGANESE ORE 3 & 4			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
Controlling Company 3. METOREX (PTY) LTD PO BOX 823 1610 EDENVALE Tel: +27 (0) 11 974 1240 Fax: +27 (0) 11 974 1348			
Mine		Local	
3.1 Metmin (Pty) Ltd PO Box 216 1740 Krugersdorp Tel: +27 (0) 11 954 4476 Fax: +27 (0) 11 954 4516 Farm, Province Ryedale 751 Q North West	Opencast	<u>Chemical Grade %</u> MnO ₂ 35-50 MnO ₂ 35-45 Size -19mm (oxidising agent)	Various clients in South Africa
Controlling Company 4. NATIONAL MANGANESE MINES (PTY) LTD PO BOX 3472 2121 PARKLANDS Tel: +27 (0) 11 646 7050 Fax: +27 (0) 11 646 1725			
Mine		Local & Export	
4.1 National Mang. Mines Pty Ltd PO Box 3472 Parklands 2121 Farm, Province Morokwa 672 Northern Cape	Opencast production	<u>Lumpy %</u> Mn 40-42 Fe 15-18 SiO ₂ 1,6 Al ₂ O ₃ 2,6 CaO 0,50 MgO 0.10 P 0,02 – 0,05 SIZING 6-100mm	Head Office PO Box 3472 2121 Parklands Tel: +27 (0) 11 646 7050 Fax: +27 (0) 11 646 1725 E-mail Natmang@mweb.co.za

PRODUCERS OF VANADIUM – 1			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
<p>Group Company 1. ANGLO AMERICAN CORPORATION PLC, LONDON Controlling Company HIGHVELD STEEL & VANADIUM CORPORATION PO BOX 111 1035 WITBANK Tel: +27 (0) 13 690 9911 Fax:+27 (0) 11 690 9033</p>			
Mine		Local & Export	
1.1 Highveld Steel & Vanadium Corp. PO Box 111 1035 Witbank Tel: +27 (0) 13 690 9111 Fax:+27 (0) 13 699 7561 <i>Farm, Province</i> Mapochs mine Roossenekal Mapochsgronde 500JS Mpumalanga <i>Iron and steel plant</i> Witbank, Mpumalanga	Opencast RPC 2Mt/a (Lumpy) 450 kt/a (Fines) Crushed, washed and screened	Vanadiferous magnetite Typical ore Fe 54,5% TiO ₂ 14,2% V ₂ O ₅ 1,6% Vanadiferous- bearing slag RPC 72kt/a (gross) or 17,5 kt/a V ₂ O ₅ 24% V ₂ O ₅ typical	Highveld Steel & Vanad. Corporation - Steel div. PO Box 111 1035 Witbank Tel: +27 (0) 13 690 9911 Fax:+27 (0) 13 640 9033

PRODUCERS OF VANADIUM - 2			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
Controlling Company 2. STRATEGIC MINERALS CORPORATION DANBURY, CONNECTIUT, USA Tel: +1 (203) 790 1555 Fax:+1 (203) 790 5750			
Mine		Local & Export	
2.1 Vametco Minerals Corporation PO Box 595 0250 Brits Tel: +27 (0) 12 318 3200 Fax: +27 (0) 12 318 3201 <i>Farm, Province</i> Krokodilkraal 426 JQ Uitvalgrond 431 JQ North-West	Opencast mine 180kt/a concentrate plus purchased slag to Roaster Roast/Leach RPC 5,0kt/a V ₂ O ₅ Electric Furnaces RPC 3,3kt/a (gross)	Vanadiferous Magnetite Vanadium Pentoxide V ₂ O ₅ 99,9% min; fused flakes	Vametco Minerals Corporation PO Box 595 0250 Brits Tel: +27 (0) 12 318 3200 Fax:+27 (0) 12 318 3201

PRODUCERS OF VANADIUM - 3			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
<p>Group Company 3.XSTRATA A.G, Zug, Switzerland</p> <p>Controlling Company XSTRATA SOUTH AFRICA (PTY) LTD PRIVATE BAG 82288 0300 RUSTENBURG Tel: +27 (0) 14 590 6000 Fax: +27 (0) 14 590 6002</p>			
Mine		Local & Export	
<p>3.1 Xstrata SA Vanadium Division Vantech Mine PO Box 218 1133 Steelpoort Tel: +27 (0) 13 230 5000 Fax: +27 (0) 13 230 3108 <i>Farm, Province</i> Mine and plant Kennedy's Vale 361 KT Mpumalanga</p>	<p>Opencast mine 580kt/a (gross ore) 380kt/a (95% concentrate)</p> <p>Roast/ Leach RPC 6,2kt/a V₂O₅</p>	<p>Vanadiferous Magnetite</p> <p>Vanadium Pentoxide V₂O₅ 99,0% min. fused flakes</p>	<p>Xstrata SA (Pty) Ltd Jeff Mc Laughlan Private Bag 82288 Rustenburg Tel: +27 (0) 14 590 6000 Fax: +27(0) 14 590 6002</p>
<p>3.2 Xstrata SA Vanadium Division Rhovan Mine PO Box 3620 0250 Brits Tel: +27 (0) 12 318 0700 Fax: +27 (0) 12 318 0702 <i>Farm, Province</i> Ba Magopo Mine, Bethanie Barseba 397 JQ Losperfontein 405 JQ (Waalkraal 396 JQ) North West</p>	<p>Opencast mine 1500kt/a (gross ore) 400kt/a (95% concentrate)</p> <p>Roast/ Leach RPC 7,0kt/a V₂O₅</p> <p>Aluminothermic RPC 6,0kt/a (gross)</p>	<p>Vanadiferous Magnetite</p> <p>Vanadium Pentoxide V₂O₅ 99,0% min. fused flakes</p> <p>Ferrovandium 80% V typical</p>	

PRODUCERS OF FERROALLOYS – 2			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
<p>Group Company 2. AFRICAN RAINBOW MINERALS & ASSORE LIMITED Controlling company ASSMANG LIMITED PO BOX 782058 2146 SANDTON Tel: +27 (0) 11 634 9111 Fax:+27 (0) 11 634 0038</p>			
Ferroalloys operations		Local & Export	
2.1 Cato Ridge Works PO Box 21 3880 Cato Ridge Tel: +27 (0) 325 78 Fax:+27 (0) 325 78 Including: Cato Ridge Alloys (JV) Kwazulu- Natal	Smelting RPC 240 kt/a (gross) Converter	<u>Ferromanganese %</u> Mn 78,5 C 7,0 Si 0,05 P 0,07 S 0,013 <u>Refined Ferromanganese %</u> Mn 80,0 C 1,5 max	Ore & Metal Company Ltd Private Bag X03 2116 Northlands Tel: +27 (0) 11 770 6800 Fax:+27 (0) 11 268 6035
2.2 Machadodorp Works PO Box 152 1170 Machadodorp Tel: +27 (0) 325 78 Fax:+27 (0) 325 78 Mpumalanga	Smelting & slag Recovery RPC 270 kt/a (gross)	<u>HC Ferrochrome %</u> Cr 51-52 C 7,6 Si 3,0 P 0,03 S 0,03	Ore & Metal Company Ltd Private Bag X03 2116 Northlands Tel: +27 (0) 11 770 6800 Fax:+27 (0) 11 268 6035

PRODUCERS OF FERROALLOYS – 3			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
<p>Group Company 3. BHP BILLITON PLC & ANGLO AMERICAN CORPORATION PLC Controlling Company SAMANCOR LIMITED PO BOX 8186 Tel: +27 (0) 11 376 9111 Fax: +27 (0) 11 376 3155</p>			
Ferroalloys operations		Local & Export	
3.1 BathlakoFerrochr PO Box 5 1150 Burgersfort Tel: +27 (0) 14 552 1208 Fax: +27 (0) 14 552 1208 <i>Operations mothballed</i>	Smelting RPC 25kt/a	<u>HC Ferrochrome %</u> Cr 52 Si 3-6 C 6,5 max P 0,02 max S 0,05 max	Samancor Limited Chrome Division PO Box 8186 2000 Johannesburg Tel: +27 (0) 11 376 9111 Fax: +27 (0) 11 376 3155
3.2 Ferrometals Private Bag X7228 1035 Witbank Tel: +27 (0) 13 693 7217 Fax: +27 (0) 13 696 2800 <i>Including:</i> Poschrome jv, Chrometals jv	Smelting RPC 485kt/a (gross) pelletising, pre-heating smelting and slag Recovery Converter	<u>HC Ferrochrome %</u> Cr 52 Si 3-6 C 6,5 max P 0,02 max S 0,05 max <u>MC Ferrochrome %</u> Cr 54 Si 1,5-5 C 6,5 max P 0,02 max S 0,05 max	Samancor Limited Chrome Division PO Box 8186 2000 Johannesburg Tel: +27 (0) 11 376 9111 Fax: +27 (0) 11 376 3155
3.3 Middelburg Ferrochrome PO Box 133 1050 Middelburg Tel: +27 (0) 13 247 9111 Fax: +27 (0) 13 247 2394	Smelting and slag Recovery RPC 300kt/a (gtoss)	<u>HC Ferrochrome %</u> Cr 50-54 Si 6-9 C 1,5-6,5 max P 0,03 max S 0,05 max <u>LC Ferrochrome %</u> Cr 60-65 C 0,1 max N 0,4 max Si 1,0 max P 0,03 max S 0,05 max <u>Silicochrome %</u> Cr 27-31 C 0,1 max Si 45-50 typical Fe 18-22 Al 18-22 Al 1,5 max	Samancor Limited Chrome Division PO Box 8186 2000 Johannesburg Tel: +27 (0) 11 376 9111 Fax: +27 (0) 11 376 3155

PRODUCERS OF FERROALLOYS - 3 continued			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
3.4 Palmiet Ferrochrome PO Box 658 1740 Krugersdorp Tel: +27 (0) 11 953 2040 Fax: +27 (0) 11 247 1272 <i>operations mothballed</i>	Smelting RPC 120kt/a (gross)	<u>HC Ferrochrome %</u> Cr 50-54 Si 6-9 C 1,5-6 max P 0,03 max S 0,05 max	Samancor Limited Chrome Division PO Box 3952 2000 Johannesburg Tel: +27 (0) 11 376 9111 Fax:+27 (0) 11 376 3155
3.5 Tubatse FerroChrome PO Box 46 1133 Steelpoort Tel: +27 (0) 13 230 7600 Fax: +27 (0) 13 230 7610	Smelting RPC 120kt/a (gross)	<u>HC Ferrochrome %</u> Cr 50-54 Si 6-9 C 1,5-6 max P 0,03 max S 0,05 max	Samancor Limited Chrome Division PO Box 3952 2000 Johannesburg Tel: +27 (0) 11 376 9111 Fax:+27 (0) 11 376 3155
3.6 Metalloys PO Box 66 1960 Meyerton Tel: +27 (0) 13 230 7600 Fax: +27 (0) 13 230 7610 Including: Advalloy (Pty) - jv	Smelting & slag Recovery RPC 560kt/a (gross) Converter and Refining plant	<u>HC Ferromanganese %</u> Mn 76 C 7,5 Si 0,5 max P 0,1 max S 0,02 max <u>Silicomanganese %</u> Mn 65 C 1,8 Si 16 max P 0,1 max S 0,02 max Dense Medium Ferrosilicon (13-17% Si, atomised or milled) MC Ferromanganese Ultra-low Carbon Ferromang. Silico-Manganese	Samancor Limited Chrome Division PO Box 3952 2000 Johannesburg Tel: +27 (0) 11 376 9111 Fax:+27 (0) 11 376 3338

PRODUCERS OF FERROALLOYS - 3 continued			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
3.7 Manganese Metal Company Krugersdorp and Nelspruit Refer to section on prod. of Manganese for details		Manganese metal, flakes, powder alloy briquettes and chemicals	Samancor Limited Manganese Division PO Box 8186 2000 Johannesburg Tel: +27 (0) 11 376 9111 Fax: +27 (0) 11 376 3338
3.8 Silicon Smelters Sold to Aluminium Pechiney Refer to section on prod. of silicon for details		Silicon Metal	Samancor Limited MMTS Division PO Box 8186 2000 Johannesburg Tel: +27 (0) 11 376 9111 Fax: +27 (0) 11 376 3338
PRODUCERS OF FERROALLOYS - 4			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
Group Company 4.HERNIC FERROCHROME PTY LTD Controlling Company 4.HERNIC FERROCHROME PTY LTD PO BOX 4534 0250 BRITS Tel: +27 (0) 12 381 1100 Fax: +27 (0) 12 381 1111			
Plant		Local & Export	
4.1 Hernic Ferrochrome PO Box 4534 0250 Brits Tel: +27 (0) 12 381 1100 Fax: +27 (0) 12 381 1111	RPC 220kt/a (gross) Pelletising, pre-heating, smelting	<u>HC Ferrochrome</u> Cr 50 min C 8,0 min Si 3,0-7,0 max P 0,025 max	Hernic Ferrochrome PO Box 4534 0250 Brits Tel: +27 (0) 12 381 1100 Fax: +27 (0) 12 381 1111

PRODUCERS OF FERROALLOYS - 5			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
<p>Group Company 5. XSTRATA A.G. LISTED IN LONDON, UK & ZUG, SWITZERLAND</p> <p>Controlling Company XSTRATA SOUTH AFRICA PTY LTD PRIVATE BAG 82288 0300 RUSTENBURG Tel: +27 (0) 14 590 6000 Fax: +27 (0) 14 590 6002</p>			
Ferrochrome operations		Local and Export	
5.1 Xstrata SA Chrome Division Rustenburg works Private Bag 82288 0300 Rustenburg	Smelting and slag Recovery RPC 425kt/a (gross)	<u>HC Ferrochrome %</u> Cr 47- 50 C 8,0 min Si 1,5-4,5 P 0,03 max S 0,05 max	Xstrata SA Chrome Division Private Bag 82288 0300 Rustenburg Tel: +27 (0) 14 590 6000 Fax: +27 (0) 14 590 6002
5.2 Xstrata SA Chrome Division Wonderkop works Private Bag 82288 0300 Rustenburg	Pelletising and Smelting RPC 450kt/a (gross)	<u>HC Ferrochrome %</u> Cr 47- 50 C 8,0 min Si 1,5-4,5 P 0,03 max S 0,05 max	Xstrata SA Chrome Division Private Bag 82288 0300 Rustenburg Tel: +27 (0) 14 590 6000 Fax: +27 (0) 14 590 6002
5.3 Xstrata SA Chrome Division Lydenburg works Private Bag 82288 0300 Rustenburg	Pelletising and Smelting RPC 400kt/a (gross)	<u>HC Ferrochrome %</u> Cr 50-53 C 8,0 min Si 1,5-6,0 P 0,025 max S 0,035 max	Xstrata SA Chrome Division Private Bag 82288 0300 Rustenburg Tel: +27 (0) 14 590 6000 Fax: +27 (0) 14 590 6002
Ferrovanadium operations		Local and Export	
5.4 Xstrata SA Chrome Vanadium Division PO Box 3620 0250 Brits Tel: +27 (0) 14 590 6000 Fax: +27 (0) 14 590 6002	Pelletising and Smelting RPC 400kt/a (gross)	<u>Ferrovanadium</u> also Vanadium pentoxide	Xstrata SA Chrome PO Box 3620 0250 Brits Tel: +27 (0) 12 318 0700 Fax: +27 (0) 12 318 0702

PRODUCERS OF FERROALLOYS- 6, 7,8 and 9			
PRODUCER	TYPE OF OPERATION	PRODUCT AND SPECIFICATION	MARKETING
Controlling Company 6. GLENCORE INTERNATIONAL A.G. BAAR, SWITZERLAND			
Ferrosilicon operation		Local and Export	
6.1 Silicon Technology Pty Ltd PO Box 1 2942 Ballengeich Tel: +27 (0) 34 377 7210 Fax: +27 (0) 34 377 7012	Smelting RPC 55kt/a (gross)	<u>Ferrosilicon %</u> Si 75-80 C 0,2 max Al 2,0 max P 0,05 max S 0,02 mx	Silicon Technology Pty Ltd PO Box 1 2942 Ballengeich Tel: +27 (0) 34 377 7210 Fax: +27 (0) 34 377 7012
Controlling Company 7. SA CHROME & ALLOYS JOHANNESBURG, SOUTH AFRICA			
Ferrochrome operation		Local and Export	
7.1 SA Chrome PO Box 5486 2106 Johannesburg Tel: +27 (0) 11 478 1112 Fax: +27 (0) 11 478 1115	Smelting RPC 235kt/a (gross)	<u>Ferrochrome %</u> Cr 50-51 C 0,2 max Al 2,0 max P 0,05 max S 0,02 mx	SA Chrome PO Box 5486 2106 Johannesburg Tel: +27 (0) 11 478 1112 Fax: +27 (0) 11 478 1115
Controlling Company 8. STRATEGIC MINERALS CORPORATION DANBURY, CONNECTUIT, USA			
Ferrovanadium operation		Local and Export	
8.1 Vametco Minerals Corporation PO Box 595 0250 Brits Tel: +27 (0) 12 318 3200 Tel: +27 (0) 12 318 3200 Fax: +27 (0) 12 318 3201		<u>Ferrovanadium and Nitrovan</u> also mixed oxides	Vametco Minerals Corp. PO Box 595 0250 Brits Tel: +27 (0) 12 318 3200 Fax: +27 (0) 12 318 3201
Controlling Company 9. ASA METALS (PTY) LTD PO BOX 3952 0700 PIETERSBURG Tel: +27 (0) 15 291 4423 Fax: +27 (0) 15 291 4426			
Ferrochrome operation		Local and Export	
9.1 Dilokong Ferrochrome PO Box 169 1150 Burgersfort Tel: +27 (0) 13 230 7600 Fax: +27 (0) 13 230 7610	Smelting RPC 55kt/a (gross)	<u>Charge chrome</u>	ASA Metals (Pty) Ltd PO Box 3952 0700 Polokwane Tel: +27 (0) 15 291 4423 Fax: +27 (0) 15 291 4426

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USEFUL ADDRESSES

DEPARTMENT OF MINERALS AND ENERGY

HEAD OFFICE

The Director - General
Private Bag X59
0001 Pretoria

www.dme.gov.za

Mineralia Centre
391 Andries Street
Pretoria

Tel: +27 12 317 9000

Fax: +27 12 320 4327

MINERAL DEVELOPMENT REGIONAL DIRECTORATES

The Director: Mineral Development - Eastern Cape
Private Bag X6076
6000 Port Elizabeth

Auto and General Towers 13th Floor
190 Govan Mbeki Street
Port Elizabeth

Tel: +27 41 585 3862/4/6

Fax: +27 41 585 3881

The Director: Mineral Development - Free State
Private Bag X33
9460 Welkom

Prestasi Building
cnr Ryk and De Kaap Streets
Welkom

Tel: +27 57 352 8235

Fax: +27 57 357 1241

The Director: Mineral Development – Gauteng
Private Bag X5
2017 BRAAMFONTEIN

209 Smit Street
Braamfontein

Tel: +27 11 339 4414

Fax: +27 11 339 1858

The Director: Mineral Development - KwaZulu/Natal
Private Bag X2014
3000 Dundee

Talana Building
26 Beaconsfield Street
Dundee

Tel: +27 34 212 2111

Fax: +27 34 212 2721

The Director: Mineral Development - Mpumalanga
Privatebag X7279
1035 Witbank

Receiver of Revenue Building
cnr Paul Kruger and Botha Streets
Witbank

Tel: +27 13 656 1448

Fax: +27 13 690 3288

The Director: Mineral Development - Northern Cape
Private Bag X6093
8300 Kimberley

Standard Bank Building
43 Chapel Street
Kimberley

Tel: +27 53 830 0800

Fax: +27 53 832 5631

The Director: Mineral Development - Limpopo Province
Private Bag X9467
0700 Pietersburg

Koos Smit Building
61 Biccard Street
Pietersburg

Tel: +27 15 291 5208/9

Fax: +27 15 291 1757

The Director: Mineral Development - North-West
Private Bag A1
2570 Klerksdorp

no.1 Charl de Klerk Street
Senwes Building
Klerksdorp

Tel: +27 18 464 1631
Fax: +27 18 462 9039

The Director: Mineral Development - Western Cape
Private Bag X9
8012 Roggebaai

Customs House
Lower Heerengracht
Foreshore
Cape Town

Tel: +27 21 419 6105
Fax: +27 21 419 6260

DEPARTMENT OF TRADE AND INDUSTRY

HEAD OFFICE

www.dti.gov.za

Department of Trade and Industry
Private Bag X84
0001 Pretoria

House of Trade and Industry
226 Prinsloo Street
Pretoria

Tel: +27 12 310 9791
Fax: +27 12 322 0298

PARASTATAL ORGANISATIONS

Council for Geoscience
Private Bag X112
0001 Pretoria

www.geoscience.org.za

280 Pretoria Road
Silverton
Pretoria

Tel: +27 12 841 1911
Fax: +27 12 841 1221

CSIR
PO Box 395
0001 Pretoria

www.csir.co.za

Meiring Naude Road
Brummeria
Pretoria

Tel: +27 12 841 2911
Fax: +27 12 349 1153

CSIR – Mining Technology (Miningtek)
P O Box 91230
2006 Auckland Park

www.csir.co.za/miningtek

cnr Landau Terrace &
Kew Road
Richmond
Johannesburg

Tel: +27 11 358 0000
Fax: +27 11 482 1214

Eskom
PO Box 1091
2000 Johannesburg

www.eskom.co.za

Megawatt Park
Maxwell Drive
Sunninghill Ext 3
Sandton

Tel: +27 11 800 8111
Fax: +27 11 8004299

Mintek
Private Bag X3015
2125 Randburg

www.mintek.ac.za

200 Hans Strijdom Drive
Randburg

Tel: +27 11 709 4111
Fax: +27 11 793 2413

PetroSA PO Box 307 7499 Parow	www.soekor.co.za	151 Frans Conradie Drive Parow Tel: +27 21 938 3911 Fax: +27 21 938 3144
Atomic Energy Corporation of South Africa Ltd (AEC) PO Box 582 0001 Pretoria	www.aec.co.za	Pelindaba Tel: +27 12 316 4911 Fax: +27 12 316 3111
The Industrial Development Corporation of SA Ltd (IDC) PO Box 784055 2146 Sandton	www.idc.co.za	19 Fredman Drive Sandton Tel: +27 11 269 3000 Fax: +27 11 269 3116
The South African Diamond Board PO Box 16001 2028 Doornfontein		5th Floor SA Diamond Centre 240 Commissioner Street Johannesburg Tel: +27 11 334 8980 Fax: +27 11 334 8898

OTHER MINERAL-RELATED ORGANISATIONS

Chamber of Mines of South Africa PO Box 61809 2107 Marshalltown	www.bullion.org.za	5 Hollard Street Marshalltown Johannesburg Tel: +27 11 498 7100 Fax: +27 11 834 1884
Ferro Alloy Producer's Association (FAPA) PO Box 1338 2000 Johannesburg		Metal Industries House 42 Anderson Street Johannesburg Tel: +27 11 833 6033 Fax: +27 11 838 1522
Metal Recyclers Association of South Africa P O Box 413299 2024 Graighall Park		Tel: +27 11 788 9587 Fax: +27 11 788 9587
South Africa Stainless Steel Development Association (SASSDA) PO Box 4479 2128 Rivonia	www.sassda.co.za	Mutual Place Building Mutual Road Rivonia Tel: +27 11 803 5610 Fax: +27 11 803 2011
Steel & Engineering Industries Federation of SA (Seifsa) PO Box 1338 2000 Johannesburg	www.seifsa.co.za	Metal Industries House 42 Anderson Street Johannesburg Tel: +27 11 833 6033 Fax: +27 11 838 1522

The Institute of Mine Surveyors of SA
P O Box 62339
2107 Marshalltown

11 Burnham Drive
Mulbarton
Johannesburg

Tel: +27 11 432 2687
Fax: +27 11 432 0873

The Association of Industrial Minerals, Metals and Mining (AIMMM)
P O Box 91575
2006 Auckland Park

jweldon@mweb.co.za

214 Barry Hertzog Avenue
Greenside
Johannesburg

Tel: +27 11 621 4000
Fax: +27 11 486 1928

The South African Institute of Mining and Metallurgy
P O Box 61127
2107 Marshalltown

SA Eagle House, 4th Floor
70 Fox Street
Johannesburg

Tel: +27 11 834 1273
Fax: +27 11 838 5923 / 833 8156

SELECTED SOUTH AFRICAN MINING COMPANIES

Anglo American Plc (South African Corporate Office)
PO Box 61587
2107 Marshalltown

www.angloamerican.co.za

44 Main Street
Marshalltown
Johannesburg

Tel: +27 11 638 9111
Fax: +27 11 638 3558

African Rainbow Minerals Limited
PO Box 62379
2107 Marshalltown

www.arm.co.za

P.O Box 782058
Sandton
2146

Tel: +27 11 634 9111
Fax: +27 11 634 0038

The Associated Manganese Mines
of South Africa Limited
P O Box 62379
2107 Marshalltown

www.avmin.co.za

56 Main Street
Johannesburg

Tel: +27 11 634 9111
Fax: +27 11 634 0038

Associated Ore and Metal Company Limited
P O Box 61042
2107 Marshalltown

www.assore.com

6 St Andrews Road
Parktown
Johannesburg

Tel: +27 11 484 7212
Fax: +27 11 484 2754

BHP-Billiton plc (African Regional Office)
PO Box 61820
2107 Marshalltown

6 Hollard Street
Marshalltown
Johannesburg

Tel: +27 11 376 9111
Fax: +27 11 838 4716

Foskor Limited
P O Box 1
1390 Phalaborwa

27 Selati Road
Phalaborwa

Tel: +27 15 789 2000
Fax: +27 15 789 2066

G & W Base and Industrial Minerals (Pty) Ltd
P O Box 14052
1422 Wadeville
www.gwbase.co.za

155 Immeman Road
Wadeville
Johannesburg

Tel: +27 11 824 2710
Fax: +27 11 824 2721

Hernic Ferrochrome (Pty) Ltd
P O Box 4534
0250
www.hernic.co.za

103 De Kroon
Brits

Tel: +27 12 381 1100
Fax: +27 12 381 1111

Kumba Resources
PO Box 9229
0001 Pretoria
www.kumbaresources.co.za

Roger Dyason Road
Pretoria West
Pretoria

Tel: +27 12 307 3000
Fax: +27 12 307 3367

Palabora Mining Company Ltd
P O Box 65
1390 Phalaborwa
www.pmc.co.za

Copper Road
Phalaborwa

Tel: +27 15 780 2911
Fax: +27 15 780 2813

Samancor
P O Box 8186
2000 Johannesburg
www.samancor.co.za

Samancor House
88 Marshall Street
Johannesburg

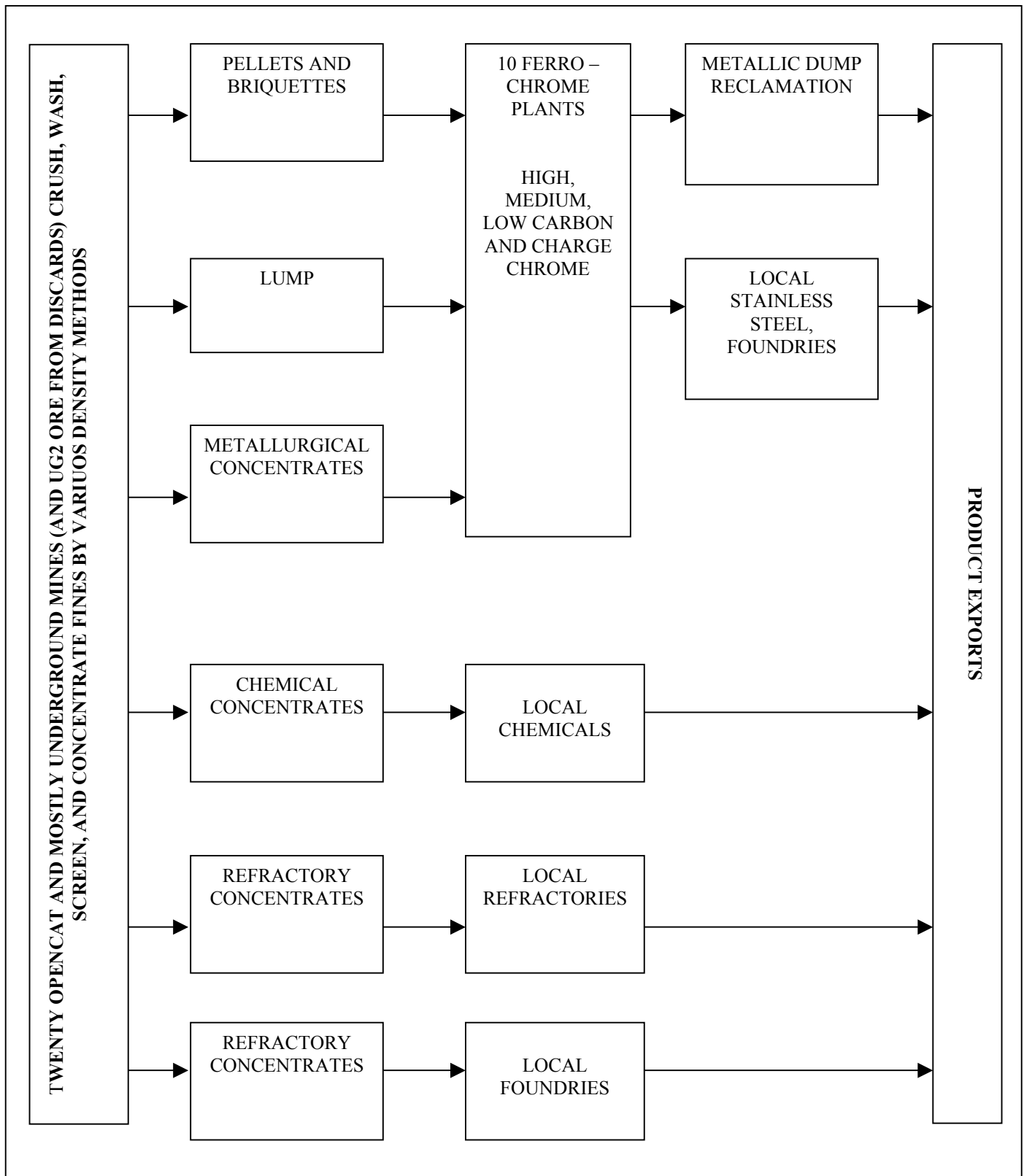
Tel: +27 11 376 9111
Fax: +27 11 838 4359

Xstrata SA (Pty) Ltd
Private Bag X82288
0300 Rustenburg
www.xstrata.com

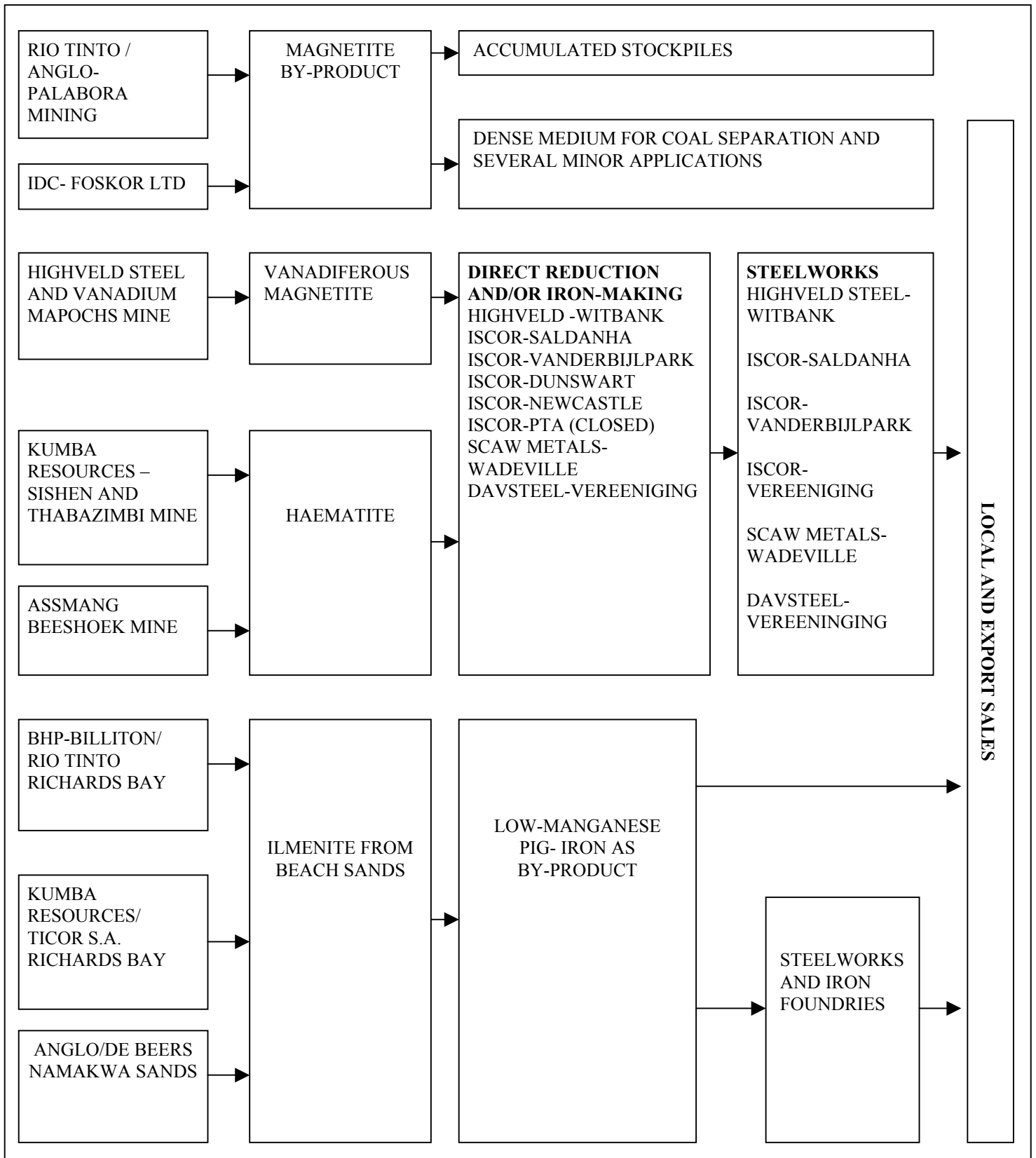
44 Vanadium Street
Rustenburg
0300

Tel: +27 14 590 6000
Fax: +27 14 590 6002

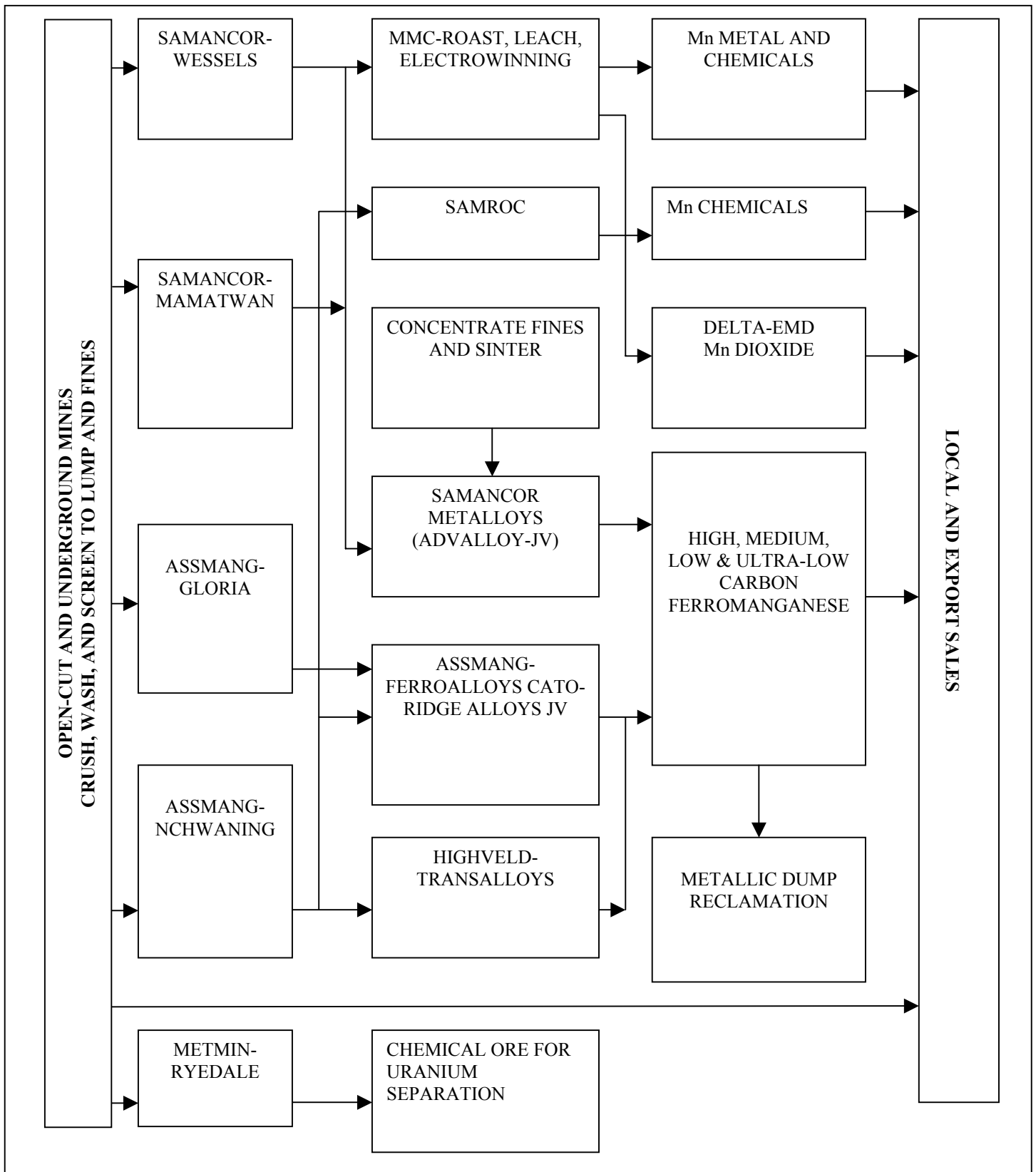
FLOW DIAGRAM – CHROME



FLOW DIAGRAM – IRON



FLOW DIAGRAM – MANGANESE



FLOW DIAGRAM – VANADIUM

