



FERRO-ALLOY
RESOURCES GROUP

公司介绍
2020年10月

公司概况——一家哈萨克斯坦钒生产商

拥有世界上最具勘探前景的矿床

公司：

- 在伦敦证券交易所和阿斯塔纳国际交易所上市
- 总部：根西岛
- 运营地点：哈萨克斯坦

业务活动

- 现有业务处于盈利中——目前正在将每年产能扩大到1500吨（五氧化二钒）
- 巴拉索斯坎迪克（Balasausqandiq）钒项目——每年22400吨

钒市场

- 属于快速增长的传统市场
- 作为电池金属，也是巨大的新市场



钒市场

钒

这种金属用于成熟产业和新兴绿色技术

用途：



全球钢铁工业消耗90%



钒液流电池



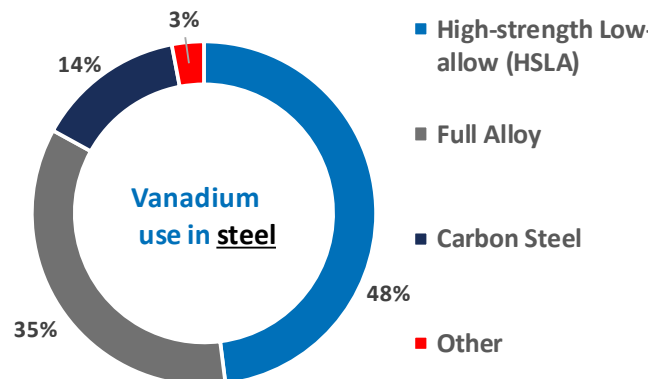
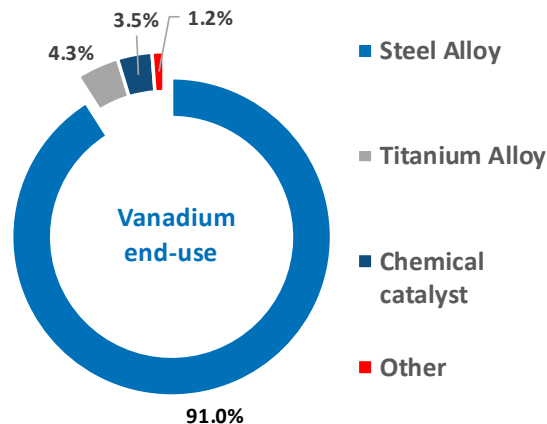
钛合金-例如喷气发动机和飞机



陶瓷化工

主要产品：

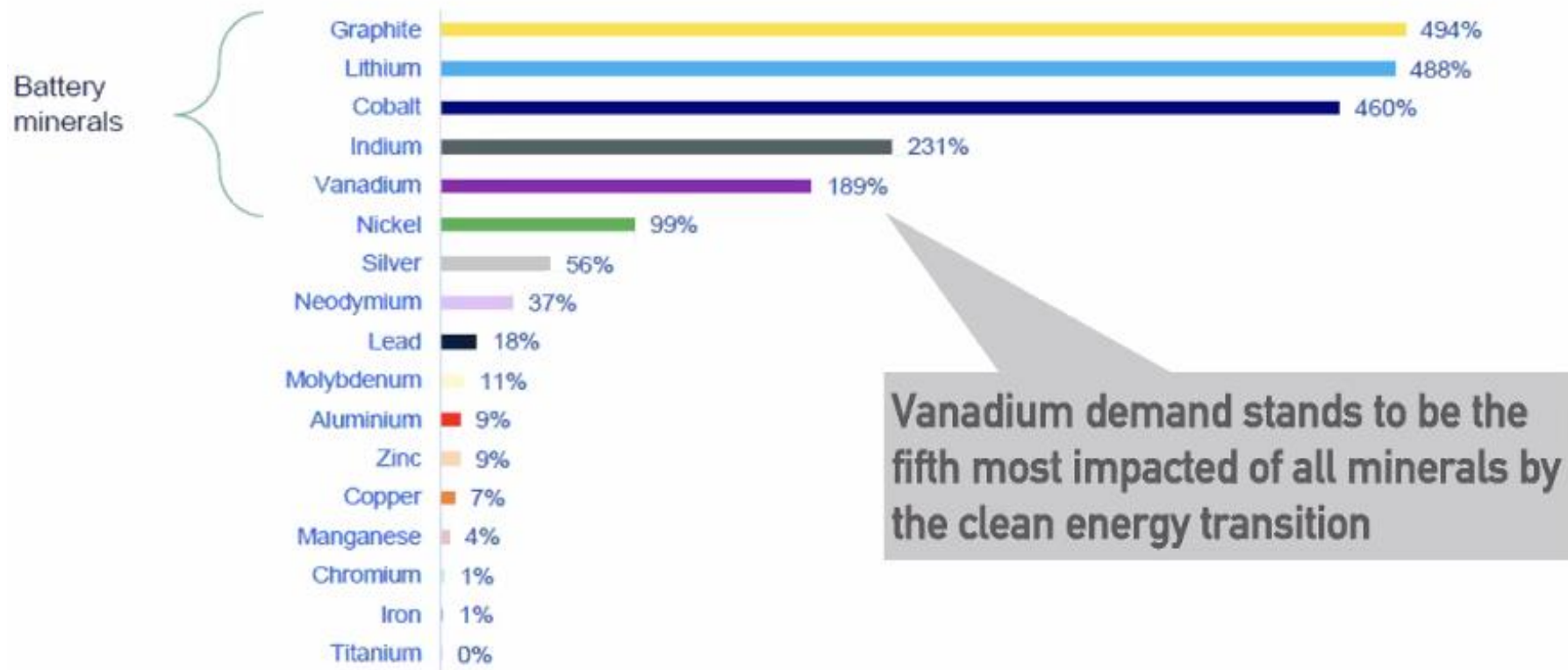
- 五氧化二钒 (V_2O_5)
- 钒铁合金(FeV)
- 蓄电池电解液



钒是一种电池金属

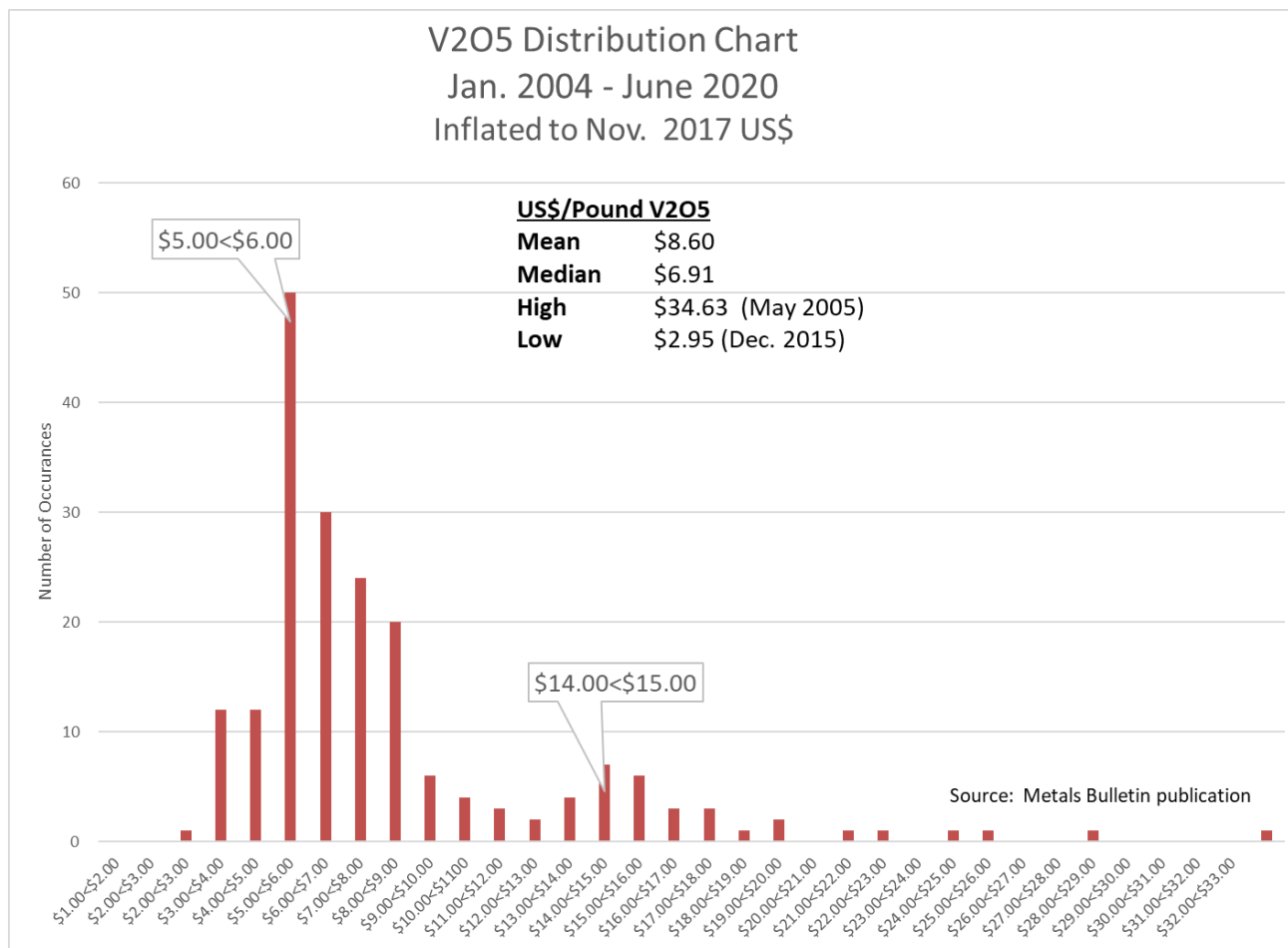
对于钒金属来说，这是一个全新的主要市场

Projected Annual Demand in 2050 for Energy Technologies as a Percentage of 2018 Production Levels under 2DS



钒价波动很大

平均价格比通常价格高很多



资料来源：英国金属通报，TTP Squared公司。

世界钒市场增长强劲

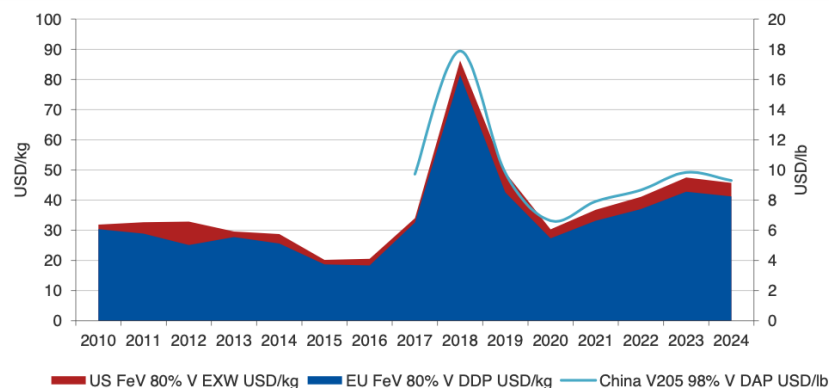
全球每年都需要像巴拉索斯坎迪克一期工程这样的新项目，才能满足需求

Table 2 Vanadium demand by end-use 2018-2030, tonnes V

	2018	2019	2020	2022	2024	2026	2028	2030	2019-2030 CAGR	Delta 2019- 2030
Steel	88,918	91,423	91,705	98,957	104,592	110,010	115,304	121,243	2.6%	29,820
Batteries	1,505	1,804	2,638	4,946	6,403	13,206	26,155	34,060	30.6%	32,256
Aerospace	4,171	4,044	4,420	4,821	5,263	5,764	6,175	6,614	4.6%	2,570
Chemicals	4,498	4,563	4,664	4,912	5,129	5,367	5,620	5,889	2.3%	1,326
Total	99,092	101,834	103,426	113,636	121,387	134,347	153,254	167,806	4.6%	65,972

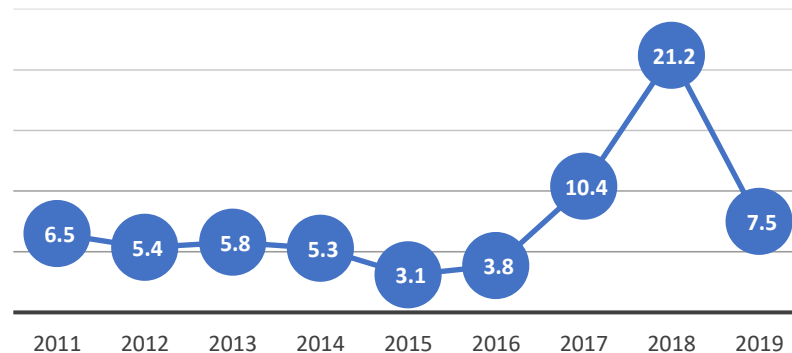
CRU

Figure 4 Medium term vanadium pricing 2010-2024, nominal \$/kg & \$/lb



CRU

**五氧化二钒价格，美元/磅，金属通报中间价平均值
荷兰鹿特丹**



目前拥有两项业务

A: 现有的选矿业务

B: 巴拉索斯坎迪克项目

两项业务

两项业务位于同一地点运营：

A、 现有业务

- 处理外购二次材料，回收五氧化二钒
- 现有产能700吨/年
- 目前正在将五氧化二钒产能扩大到1500吨/年
- 拥有150名员工

B、 巴拉索斯坎迪克项目

- 一座拥有经济潜力的巨大矿床
- 正在将现有研究深度提高至西方银行级标准
- 净现值20亿美元
- 有望成为世界上成本最低的生产项目
- 具有成为世界最大生产商的潜力



现有业务

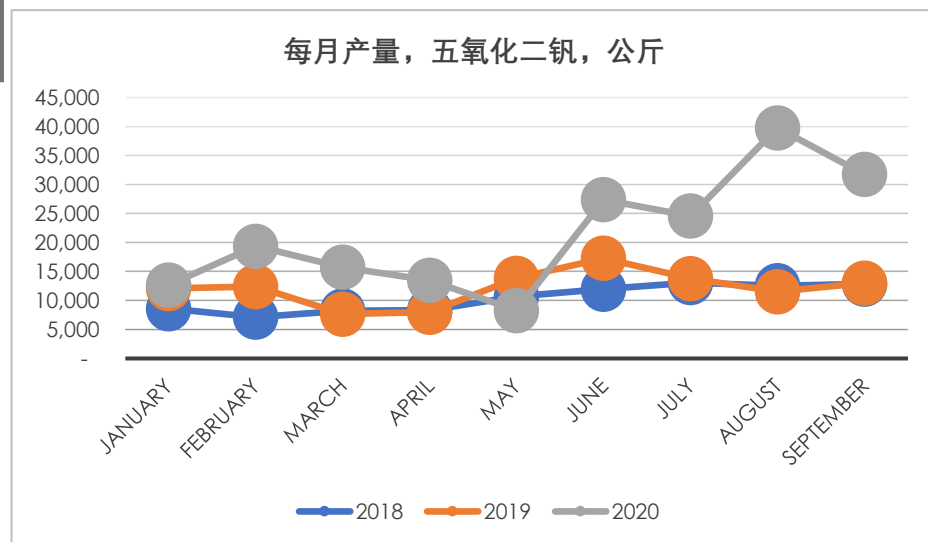
现有选矿厂——现状



- 拥有湿法冶金生产线和火法冶金生产线
- 钒和钼均可以回收
- 目前的合并生产能力约为每月60吨五氧化二钒，计划在2021年期间，增至每月125吨
- 道路交通良好
- 距离现场70公里建有Shieli高速公路和铁路
- 已经并网供电，并连接到相邻的高压输电线路

现有生产状况

现有工艺生产产品为五氧化二钒：



- 对外购的精矿和二次物料进行处理，以偏钒酸铵（AMV）的形式提取五氧化二钒
- 目前，产能已达到每月60吨，而且还在不断增长
- 目前正在安装一台转换设备，将AMV转换为五氧化二钒，大约在2020年12月完成安装工作
- 计划在2021年安装电弧炉，将产能提高到每月125吨

现有选矿厂：湿法冶金生产线



现有选矿厂：火法冶金生产线

烘炉



试验室

铁合金实验室设备齐全，技术力量雄厚

技术总监A A Fofanov先生是世界上最重要的钒专家之一





巴拉索斯坎迪克矿床

巴拉索斯坎迪克矿床：拥有独特的矿石类型——钒石 英岩



巴拉索斯坎迪克项目——为什么与其他生产商和项目相比拥有巨大的成本优势？

最重要的是，它并非钒钛磁铁矿（“TVM”）矿床

为什么这一点如此重要：

- 无需高温焙烧
- 无需对矿石进行预选
- 拥有更高的回收率
- 可产出有价值的副产品



- 可将资本和运营成本降低约60%
- 可将运营成本降低约60%
- 注定要成为世界上成本最低的生产项目



巴拉索斯坎迪克项目——拥有的其他优势

地质条件有利

- 地表已经露头，可以露天矿开采，
- 矿床规模巨大
- 总资源量加上勘探潜力，高达1.26亿吨（取估计范围的中间值）
- 地质边界品位明显，剥采比低

现有基础设施和运输线路

- 从Shieli镇到现场有道路可通（70公里）
- Shieli镇位于连接西欧和中国东海岸的高速公路和铁路线上
- 现场附近的高压（110千伏）输电线路——现在正在连接
- 水陆交通俱备

环境与社会

- 矿石和回收利用作业的所有成分都可以作为产品进行出售
- 现场不存放永久性废弃物或尾矿
- 不扰动耕地
- 现场距离最近的居民点16公里，不会有人搬迁或受到干扰

巴拉索斯坎迪克项目——经济效益

这些成本优势将使该项目注定要成为世界上成本最低、利润最高的钒生产项目

世界上成本最低的生产项目

- 巴拉索斯坎迪克项目的预测生产现金成本：
 - 预计1.54美元/磅（成本分摊到各个产品）
 - 如果计入副产品收入的话，成本为负（1.2美元/磅）

相比而言：

- 仅次于成本最低的生产商——铁合金资源公司（Ferro-Alloy Resources）的3.48美元/磅水平

特殊财务统计指标（第一阶段和第二阶段工程合并）

- 净现值20亿美元（10%折现率，税后现金流）
- 经营利润率79%（为特许权出售或产品融资提供了充足的空间）
- 内部收益率89%
- 年经营现金流税后每年4.3亿美元（仅第一阶段开始每年就达1.03亿美元）



开发计划

开发计划

当前	将现有运营规模扩大至1500吨/年， 并对巴拉索斯坎迪克项目进行可行性 研究	进行中
第一 阶段	每年开采和加工100万吨矿石 产量5600吨/年 (由现有业务、债务和其他非股权来源提供建设资金)	资本支出 1亿美元
第二 阶段	将处理能力扩大至每年400万吨矿石 产量增至22400吨/年 (由项目收益提供建设资金)	资本支出 2.25亿美元

五氧化二钒 (V2O5) 产量数字，以吨计

- 第1阶段的建设资金将由现有业务的收益加上债务、特许权出售和产品融资方式（有限或无需发行股票）提供帮助
- 第2阶段的建设资金将来自第1阶段的经营收入



附录

哈萨克斯坦

拥有具吸引力的经营环境

- 属于中等偏上收入国家（世界银行）
- 2019年顺利过渡到新总统（世界银行）
- 其营商便利度在191个经济体中排名第25位（世界银行2020报告）
- 所得税10%，利得税20%
- 无需政府免费股权或本地所有权
- 根据国际惯例，2018年更新了底土使用法

政府大力支持

- 与政府签订有投资激励协议
- 选矿业务的主要激励措施：
 - 2026年前税率为0%
 - 2024年前免征矿产税



Minister arriving on site

附录： 有价副产品

有价副产品是作为单一选矿工艺的一部分而产出的

碳硅混合物

富集后用于制造炭黑，用于橡胶制造（全球市场价值120亿美元），可将碳硅混合物压块，制成硅铁冶炼的理想原料

铀/钼

黄饼精矿作为核反应燃料。Kazatomprom拥有在哈萨克斯坦购买铀产品的法定优先权

明矾

可以在中国销售或分解成氧化铝和化肥

稀土精矿

由于市场低迷，该副产品目前排除在基本方案之外，但未来有潜力

产品名称	每吨矿石预计收入 (美元/吨)
钒 (V2O5) @7.50美元/磅	93
碳硅混合物	26
铀	3
铝/钾	10
钼	4

附录：董事会和管理层

团队经验丰富、能力明显

董事会

尼古拉斯·布里根 (Nicholas Bridgen)，首席执行官
注册会计师，居住在哈萨克斯坦，会说俄语。在力拓集团 (Rio Tinto group) 担任各种职务14年，在前苏联经营的公司拥有26年董事会级别的工作经验，包括担任Hambleton矿业公司的首席执行官。

安德烈·库兹涅佐夫 (Andrey Kuznetsov)，运营总监
工程师，数理逻辑博士，母语为俄语，会说英语。曾在中央青年委员会负责科学部、康塔克研究与开发部和TOO Firma Balausa公司。拥有十多项钒处理技术专利。

克里斯·托马斯 (Chris Thomas)，非执行董事
日本I&S BBDO董事长，曾任BBDO美洲以及亚洲、中东和非洲分公司的首席执行官。

詹姆斯·图里安 (James Turian)，非执行董事
拥有会计和信托管理背景，证券协会投资管理资格分会 (IAQ) 特许会员和董事协会会员。You公司会计总监。

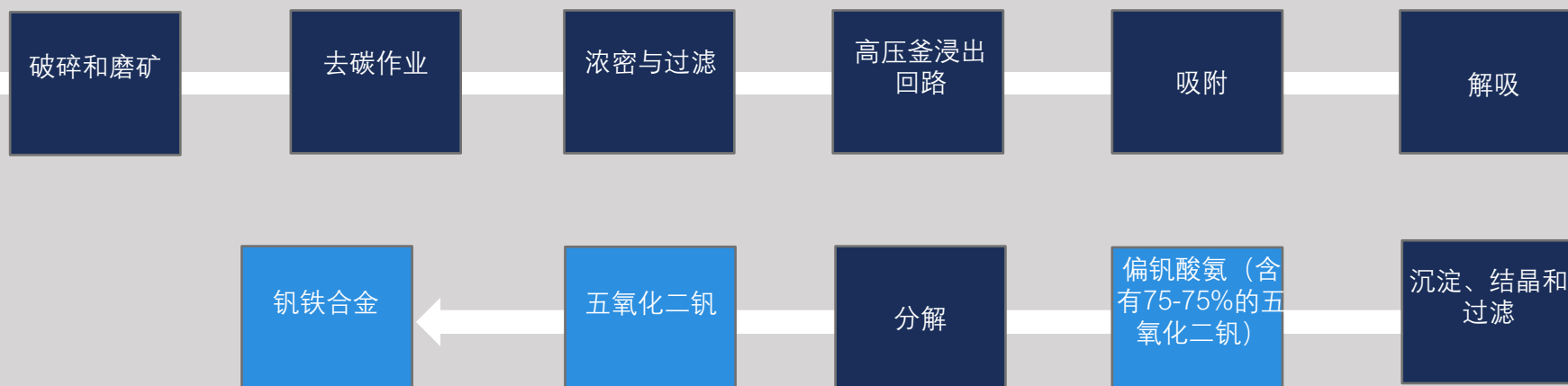
管理层

亚历山大·福法诺夫 (Alexandar Fofanov)，技术总监
化学工程师，钒提取工艺博士。曾经在莫斯科中央冶金研究所任职，也曾任图拉钒业公司 (Tula Vanadium) 的总经理和埃夫拉兹集团 (Evraz Group) 钒业技术总监。

奥列格·舒勒波夫 (Oleg Shulepov)，生产总监
机械工程师，职业生涯主要在图拉钒业公司和埃夫拉兹集团工作，最近担任项目管理部总经理。

附录：简化工艺流程

处理能力达15000吨/年中试装置的工艺流程图



附录：巴拉索斯坎迪克矿床

资源和潜力

仅对一个矿体按照JORC规范进行了资源估算

矿体	类别 (JORC 2012年)	吨位 (百万吨)	五氧化二钒 (%)	五氧化二钒 (吨)
矿体1	原生矿控制资源 ¹	21.4	0.67	143,380
矿体1	氧化矿推断资源 ²	1.3	0.89	11,570
矿体1	原生矿推断资源 ¹	1.6	0.67	10,720
合计		24.3	0.68	165,670
矿体2-矿体5	勘探目标 ³	85.5	0.68	581,400
合计		109.8	0.68	747,070

1. 氧化矿以1.7的体积密度计算

2. 原生矿以2.4的体积密度计算

3. 根据铁合金资源公司 (FAR) 独立地质学家估计的范围所得出的平均值。GBM CPR, 2018年11月12日

4. 基于矿体1控制资源量得出的储量 (JORC 2012年规范) 仅为2300万吨。此外, 上表中推断的原生矿材料位于规划露天矿的轮廓内。

Disclaimer

This document (the “Document”) has been prepared by Ferro-Alloy Resources Limited (the “Company”) based on Company information and publicly available information provided by sources that the Company believes to be reliable. This Document is for distribution in the UK only to persons who: (a) fall within the exemptions contained in Articles 19 and 49 of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005 (including certain investment professionals, high net worth companies, unincorporated associations or partnerships and the trustees of high value trusts and other persons as specified therein); and (b) are “qualified investors” (within the meaning of section 86(7) of the Financial Services and Markets Act 2000) and (c) any other persons who may lawfully receive it. In addition this Document is directed only at persons having professional experience in matters relating to investments and any investment or investment activity to which this Document relates is only available to such persons. Persons who do not have professional experience in matters relating to investments should not rely or act on this Document. Persons who do not fall within any of these definitions should not rely on this Document nor take any action upon it, but should return it immediately to the Company’s registered office. The Document is being made available in the UK to a limited circle of selected investors only, as described above. The prospective investors will be individually approached by the Company from time to time. The securities are not being offered to the public in or from the UK, and neither this Document, nor any other offering materials relating to the securities may be distributed in connection with any such public offering. Each copy of this Document is addressed to a specifically named recipient and shall not be passed on to a third party. This Document does not constitute or form any part of any offer to sell or an invitation to subscribe for, underwrite or purchase any shares or securities in the Company. This Document will not form the basis or a part of, or be relied on in any way in connection with, any investment or financing decision or any decision to enter into any agreement for the acquisition of any shares or other securities. None of the information in this Document has been independently verified and it is subject to updating, expansion and amendment. This Document does not purport to contain all information that recipients may require. No obligation is accepted by or on behalf of the Company to provide recipients with any additional information.

Neither the Company, nor any of its respective partners, directors, employees, agents or advisers, affiliates or representatives makes any express or implied representation or warranty, or gives any undertaking, and no responsibility or liability is accepted by any of them, as to the accuracy or completeness of the information or opinions contained in this Document and to the fullest extent permitted by law no responsibility or liability is accepted by any of them for any such information or opinions or for any errors, omissions, misstatements, negligence or otherwise for any other communication written or otherwise or for any loss, cost or damage suffered or incurred howsoever arising, directly or indirectly, from any use of this Document or its contents otherwise in connection with the subject matter of this Document or any transaction. Furthermore, none of such persons undertakes or agrees to any obligation to update or correct this Document, or to provide the recipient with access to any further information. Notwithstanding the foregoing, nothing in this paragraph shall limit or exclude liability for any undertaking, warranty or other assurance made fraudulently.

Each interested party must make its own independent assessment after undertaking such investigations as it sees fit before entering into any written agreement relating to any shares or securities in the Company and is recommended to seek its own professional and financial advice. Any recipient of this Document who intends to acquire shares or securities in the Company shall make such acquisition(s) solely on the basis of its own assessment and investigations and of any express warranties and representations and other conditions which may be included in any written agreement, as and when the same is executed by the Company, and subject to such limitations and restrictions as may be specified therein, and on no other basis whatsoever. A prospective investor should be aware of the potential risks in investing in the Company. Such an investment is speculative, involves a material degree of risk and may expose an investor to a significant risk of losing his entire investment. The information contained in this Document is confidential and is being supplied to you solely for your information and may not be reproduced, re-distributed or passed to any other person or published in whole or in part for any purpose. A recipient shall, upon request, promptly return or destroy all material received from the Company (including without limitation this Document) and associated documentation, without retaining any copies. The attention of potential investors is drawn to the fact that this communication is not a recommendation to sell or purchase any investment. In the interests of providing potential investors with information regarding the Company, the Document includes statements that are, or may be deemed to be, “forward-looking statements”. These forward looking statements can be identified by the use of forward-looking terminology, including the terms “believes”, “envisages”, “estimates”, “anticipates”, “projects”, “expects”, “intends”, “may”, “will”, “could”, “seeks” or “should” or, in each case, their negative or other variations or comparable terminology, or by discussions of strategy, plans, objectives, goals, future events or intentions. These forward-looking statements include matters that are not historical facts and speak only as of the date of the Document. They appear in a number of places throughout the Document and include statements regarding the Company and the directors and proposed directors of the Company’s current intentions, beliefs or expectations concerning, amongst other things, investment strategy, financing strategy, performance, results of operations, financial condition, liquidity, prospects, growth, strategies and the industry in which the Company operate.

By attending the presentation to which this Document relates and/or accepting a copy of this Document, you agree to be bound by the foregoing limitations and, in particular, will be taken to have represented, warranted and undertaken that you have read and agree to comply with the contents of this notice including without limitation the obligation to keep this Document and its contents confidential