Oklo Investment Research 2024

Oklo -- Pioneering the Future of Modular Nuclear Energy



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1 Company Overview

1.1 Company History

Oklo is a nuclear energy startup founded in 2013 and based in Sunnyvale, California. It specializes in advanced fission technology with further development of small modular reactors (SMRs) that provide the world with safe, reliable and sustainable power solutions. Oklo wants to fuel the clean energy needed to power data centers, off-grid communities, industrial facilities and military bases.

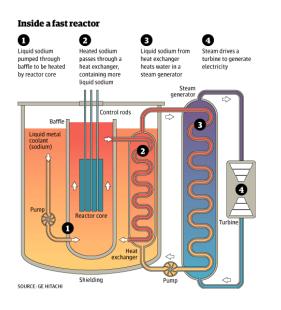
Aurora reactor, the company's flagship product, is a breakthrough in nuclear reactor design. By employing advanced fast-neutron technology and passive safety systems, Aurora can run up to 20 years without the need for refuelling. Not only does this groundbreaking design provide for safer operations, but the suspension of complex and energy-intensive moving parts offers potential for a simpler overall operation solution.

With its advanced technology, Oklo aims to be a major player in the clean energy transition equation addressing the worldwide demand for low carbon and scalable power generation. As this trend toward decarbonization and energy resilience unfolds across the broader energy sector, the company is pioneering its vision of next generation nuclear.

1.2 Core Technology and Products

Oklo's core technology revolves around advanced fast-neutron reactors and cutting-edge nuclear fuel recycling methods. The company's flagship product, the Aurora reactor, is a small modular reactor (SMR) engineered to provide safe, reliable, and efficient energy solutions. Aurora's design incorporates multiple groundbreaking features that distinguish it from traditional nuclear reactors. higher efficiency by utilizing fast neutrons in its fission process. This allows the reactor to use a broader range of nuclear fuels, including recycled materials, which significantly reduces nuclear waste. This capability makes Aurora a more sustainable alternative compared to conventional reactors. Aurora employs **liquid metal cooling**, which enhances operational safety and stability. Unlike traditional systems that rely on pumps and valves, Aurora's cooling system efficiently dissipates heat through natural physical processes. As a result, the reactor remains highly resilient even under highstress scenarios, reducing the likelihood of mechanical failure.

Another crucial innovation is its passive safety systems. These systems rely on natural phenomena such as gravity and convection to manage heat and prevent overheating. Consequently, Aurora eliminates the need for external power or manual intervention during emergencies, ensuring fail-safe operations. This design reflects Oklo's commitment to prioritizing safety in all operating conditions. In addition, the reactor utilizes high-assay lowenriched uranium (HALEU) as its fuel. This advanced metal fuel allows Aurora to operate continuously for up to 20 years without refuelling. As a result, operational downtime is minimized, and logistical challenges associated with fuel supply are significantly reduced. Aurora's modular and compact design offers unmatched flexibility. Its small size facilitates easy transportation and rapid installation, while its modularity allows for scalability to meet varying energy demands. Therefore, it is particularly suitable for deployment in remote or offgrid locations where traditional infrastructure is limited.



Aurora's versatility ensures its applicability across a wide range of industries. For instance, it can provide stable and consistent power to data centers, which are increasingly reliant on high-performance computing and AI model training. This ensures uninterrupted operations and supports the growing demands of data-intensive technologies. Additionally, the reactor is well-suited for remote communities. In regions with limited or unreliable access to conventional power grids, Aurora offers а dependable source of electricity, improving the quality of life and supporting local development. In the industrial sector, Aurora can support energyintensive manufacturing operations, enhancing productivity while reducing reliance on fossil fuels. Similarly, military bases can benefit from its secure and on-site energy solutions, ensuring energy independence for critical operations.

Oklo's Aurora reactor represents a significant advancement in nuclear energy technology. Its innovative features—ranging from fast-neutron technology to passive safety systems—address critical challenges in efficiency, safety, and scalability. **As a result**, Aurora is poised to meet diverse energy needs while driving the clean energy transition. **Ultimately**, Oklo's groundbreaking technology redefines the role of nuclear energy in a sustainable future.

1.3 Company Shareholders

As of Nov 2024, Oklo's holdings are as follows:

Top Mutual Fund Holders

Holder	Shares	Date Reported	% Out	Value
Global X Fds-Global X Uranium ETF	4.61M	Sep 30, 2024	3.77%	\$112,738,939
Vanguard Extended Market Index Fund	1.08M	Jun 30, 2024	0.89%	\$26,473,382
Vanguard Total Stock Market Index Fund	1.05M	Jun 30, 2024	0.86%	\$25,615,195
ARK ETF Tr-ARK Autonomous Technology & Robotics ETF	1.03M	Sep 30, 2024	0.84%	\$25,155,208
VanEck ETF Trust-VanEck Uranium+Nuclear Energy ETF	486.4k	Sep 30, 2024	0.40%	\$11,902,183
Fidelity Extended Market Index Fund	418.85k	Sep 30, 2024	0.34%	\$10,249,283
Schwab Strategic Tr-Schwab U.S. Small Cap ETF	328.71k	Aug 31, 2024	0.27%	\$8,043,655
Fidelity Total Market Index Fund	131.17k	Sep 30, 2024	0.11%	\$3,209,778
Fidelity Series Total Market Index Fund	96.97k	Sep 30, 2024	0.08%	\$2,372,757
iShares Core S&P Total U.S. Stock Market ETF	79.49k	Sep 30, 2024	0.07%	\$1,945,071

Source: yahoo finance

Top Institutional Holders

Holder	Shares	Date Reported	% Out	Value
Data Collective IV GP, LLC	6.92M	Jun 30, 2024	5.67%	\$169,352,069
Encompass Capital Advisors, LLC	5.72M	Jun 30, 2024	4.68%	\$139,876,413
HITE Hedge Asset Management LLC	3.92M	Jun 30, 2024	3.21%	\$95,932,650
Tiger Global Management, LLC	3.06M	Jun 30, 2024	2.50%	\$74,804,592
Vanguard Group Inc	2.2M	Jun 30, 2024	1.80%	\$53,904,985
Balyasny Asset Management LLC	1.39M	Jun 30, 2024	1.14%	\$33,956,210
Blackrock Inc.	1.33M	Jun 30, 2024	1.09%	\$32,506,828
Millennium Management LLC	1.29M	Jun 30, 2024	1.05%	\$31,461,591
Van Eck Associates Corporation	1.13M	Sep 30, 2024	0.92%	\$27,625,430
ARK Investment Management, LLC	1.03M	Sep 30, 2024	0.84%	\$25,155,208

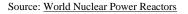
Source: yahoo finance

2. Industry Analysis

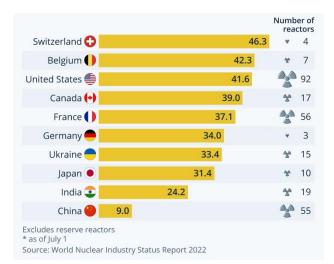
2.1 Market Trends and Opportunities

Nuclear energy has played a vital role in global electricity generation for decades. As countries seek sustainable and reliable energy sources, nuclear power has been a cornerstone of their efforts to reduce carbon emissions. However, the nuclear energy market is undergoing significant changes, driven by shifting priorities, technological advancements, and emerging market dynamics. Since its inception in the 1950s, nuclear energy production has seen remarkable growth. The 1970s to the 1990s marked a period of rapid expansion as countries invested heavily in nuclear infrastructure. According to the International Energy Agency (IEA), global nuclear energy generation in 2021 reached approximately 2,591 terawatt-hours (TWh), accounting for 10.1% of the world's total electricity generation. However, since the early 21st century, growth has plateaued, reflecting a more cautious approach due to safety concerns, rising costs, and competition from renewable energy sources.





A handful of countries dominate global nuclear energy production. The United States leads with an annual generation of 789.88 TWh, representing 19.5% of its total electricity supply. France, heavily reliant on nuclear power, generates 379.50 TWh, covering a staggering 68.5% of its electricity demand. China, a relatively new player, has rapidly expanded its nuclear capacity, producing 366.30 TWh, or 4.8% of its electricity. Other significant contributors include Russia (215.75 TWh, 21.0%) and South Korea (152.33 TWh, 27.7%). These countries' varying reliance on nuclear energy reflects differences in their energy policies, resource availability, and infrastructure.



Looking ahead, the nuclear energy market is poised for transformation. The International Atomic Energy Agency (IAEA) projects that global nuclear capacity could grow 2.5 times by 2050 under high-growth scenarios, driven largely by the deployment of Small Modular Reactors (SMRs). SMRs offer cost-effective and flexible solutions for electricity generation and are particularly appealing to developing countries and regions with limited grid capacity. Their ability to be deployed incrementally, coupled with enhanced safety features, positions them as a vital technology for the future.

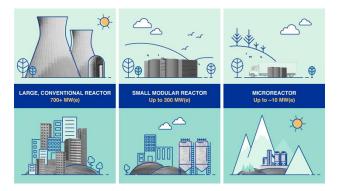
The United States, as the largest producer of nuclear energy, is central to this transformation. As of 2024, it operates 93 commercial nuclear reactors across 28 states, with a total installed capacity of approximately 96.5 gigawatts (GW). These reactors contribute nearly 19% of the nation's electricity, making nuclear power the third-largest source after natural gas and coal. However, the U.S. nuclear fleet is aging, with most reactors built between the 1970s and 1990s now averaging 40 years old. This aging infrastructure presents significant challenges, as maintenance and operational costs rise while safety upgrades become increasingly necessary.



Source: World Nuclear Power Reactors

The financial burden of maintaining aging reactors often falls on utility companies, which must decide between costly upgrades or early decommissioning. Building new large-scale nuclear plants is equally challenging due to high capital costs, long construction timelines, and regulatory hurdles. Projects like the Vogtle Electric Generating Plant in Georgia have faced significant delays and cost overruns, underscoring the economic risks of traditional nuclear projects.

To address these challenges, the nuclear industry is turning to innovative solutions like SMRs. These reactors are designed for factory fabrication and onsite assembly, reducing both costs and construction timelines. SMRs' modular design allows utilities to add capacity incrementally, making them ideal for regions with localized energy needs, such as remote or off-grid areas and industries like mining. Their smaller size and lower power output enhance their adaptability, while advanced safety features such as passive cooling systems and below-ground reactor designs bolster their safety profile.



Source: International Atomic Energy Agency

Despite their promise, SMRs face notable challenges. Regulatory frameworks remain a significant hurdle. While the U.S. Nuclear Regulatory Commission (NRC) has made strides in adapting its processes for SMRs, licensing remains time-consuming and costly. Developing a streamlined, standardized regulatory pathway is essential but requires balancing safety with innovation. Public perception and trust also pose challenges. Historical nuclear accidents like Chernobyl and Fukushima have left a lasting impact on public sentiment, leading to skepticism about new nuclear technologies. Communities near proposed SMR sites may express concerns about safety, radioactive waste management, and environmental impacts, potentially delaying projects.

Waste management remains a critical issue. Although SMRs generate less nuclear waste than traditional reactors, the safe storage and disposal of radioactive materials continue to be a challenge. Long-term solutions for waste storage and strategies to address public concerns about transportation and environmental risks are crucial for the broader acceptance of SMRs.

In conclusion, nuclear energy is at a pivotal moment, with its role in the global energy mix evolving in response to technological advancements and shifting market dynamics. SMRs offer a promising path forward, addressing many of the economic, logistical, and safety challenges of traditional reactors. However, realizing their full potential will require overcoming regulatory hurdles, addressing public concerns, and developing sustainable waste management solutions. With robust policy support and continued innovation, SMRs could play a crucial role in securing a sustainable, low-carbon energy future, both in the United States and globally.

2.2 Operating Model and Supply Chain

Leveraging its innovative "Build, Own, Operate" business model, Oklo is redefining how nuclear energy is delivered, focusing on sectors that demand reliable and sustainable power. By emphasizing modularity, efficiency, and strategic partnerships, Oklo's operating model and supply chain work in tandem to ensure the successful deployment of its flagship product, the Aurora Reactor. This comprehensive strategy not only streamlines operations but also positions the company as a leader in providing flexible, low-carbon energy solutions.

A central feature of Oklo's model is the Aurora Reactor, an advanced fast reactor capable of operating for up to 20 years without refueling. This groundbreaking reactor utilizes High-Assay Low-Enriched Uranium (HALEU), sourced through partnerships with entities like the Idaho National Laboratory (INL). HALEU enables extended operational cycles, significantly reducing the complexity and costs associated with frequent refueling. The reactor's passive safety systems rely on natural processes such as gravity and convection to maintain operational security, eliminating the need for external power or active intervention. Furthermore, its underground design provides enhanced resilience against natural disasters and external threats, ensuring safety and operational reliability.

Oklo's supply chain strategy plays a pivotal role in advancing its SMR technology. The **upstream supply chain** focuses on securing critical components and materials essential for reactor construction. In addition to HALEU, Oklo sources **high-temperature alloys** and **radiation-resistant materials** from certified suppliers to meet stringent safety and performance standards. Key components like control rods and cooling systems, which are vital for reactor efficiency, are procured from high-quality vendors. Strategic partnerships with companies such as **Siemens Energy**, which provides power conversion systems, and **Centrus Energy**, a supplier of advanced fuel components, further enhance the efficiency and quality of reactor production. These collaborations streamline construction processes, reduce lead times, and support Oklo's mission of delivering high-quality reactors efficiently.

The downstream supply chain focuses on energy distribution and waste management, ensuring that Oklo's SMRs meet the diverse energy demands of critical sectors. Data centers, which require continuous and stable power for high-performance computing and artificial intelligence (AI) operations, benefit from the Aurora Reactor's ability to provide consistent baseload power, reducing reliance on fossil fuels and enhancing sustainability. Similarly, industrial facilities leverage the reactor's reliable energy output to support energy-intensive manufacturing processes, maintaining production efficiency while lowering their carbon footprint. Additionally, military installations in remote or critical defense locations capitalize on the reactor's capabilities, off-grid gaining secure and independent power sources that enhance operational readiness and reduce vulnerabilities.

In addition to energy delivery, Oklo places significant emphasis on **waste management**, a critical component of nuclear energy. The Aurora Reactor is designed to minimize waste generation, producing less radioactive waste compared to traditional reactors. Furthermore, Oklo explores innovative recycling methods to repurpose spent fuel, transforming potential waste into valuable resources. This forward-thinking approach not only enhances the sustainability of Oklo's operations but also addresses public concerns, increasing acceptance of nuclear energy.

To maintain adaptability in a dynamic energy market, Oklo engages potential customers through **non-binding intent agreements**. These agreements enable the company to secure a pipeline of future projects while remaining responsive to shifting market demands. This strategic flexibility allows Oklo to optimize resource allocation and scale its operations efficiently, ensuring a strong and sustainable market presence.

The **"Build, Own, Operate" model** provides Oklo with several advantages. By retaining ownership of its reactors, Oklo secures a steady revenue stream through long-term **power purchase agreements (PPAs)**. This recurring income enhances financial predictability and reinforces operational control. Centralized ownership allows Oklo to implement uniform safety and performance standards across its fleet, ensuring consistency and reliability. Additionally, direct engagement with regulatory bodies simplifies the approval process, expediting compliance and facilitating the timely deployment of reactors.

Oklo's innovative operating model and robust supply chain strategy represent a transformative approach to nuclear energy deployment. By integrating advanced technology with strategic flexibility, the company is well-positioned to meet the growing demand for clean, reliable energy. Through its Aurora Reactor and commitment to sustainability, Oklo is revolutionizing the nuclear energy sector while contributing significantly to global efforts to combat climate change. As the world transitions to a lowcarbon future, Oklo's model offers a compelling blueprint for the next generation of nuclear energy.

3. Financial Analysis

Oklo Inc., a nuclear reactor module company, is currently in a challenging financial position but shows potential for future growth through significant investments in research and development (R&D). In this essay, we will explore the company's market valuation, revenue and profit growth, R&D expenditure, financial metrics, stock performance, and outlook for the future.

As of June 30, 2024, Oklo's market capitalization stands at \$2.92 billion, reflecting the total value of the company's equity. The enterprise value, which

accounts for both the company's debt and cash, is slightly lower at \$2.68 billion. Despite the relatively high market capitalization, Oklo is not yet profitable, as evidenced by the lack of price-to-earnings (P/E) ratios. For the trailing twelve months (ttm), the company reported a substantial net loss of \$564.29 million, with diluted earnings per share (EPS) of -\$0.12. This indicates that Oklo is facing significant financial challenges, as it has yet to generate positive returns for its shareholders.

Oklo's operating performance further reflects its current struggles. The company reported an operating loss of \$12.5 billion, highlighting its inability to generate profit from core operations. In addition, the company's earnings before interest, tax, depreciation, and amortization (EBITDA) stands at -\$36.92 million, which indicates that even before factoring in non-cash expenses, Oklo is still incurring substantial losses.

Oklo's cash flow situation is similarly concerning. The company has a negative operating cash flow of -\$26.22 million and a levered free cash flow of -\$12.17 million, suggesting that Oklo is burning cash rather than generating it. This is typical for early-stage technology companies or those heavily invested in long-term research and development, but it also raises concerns about the company's ability to sustain operations without additional funding. Research and Development Investment

Despite these financial challenges, Oklo is heavily investing in its future. The company allocated \$7.272 billion to R&D in the most recent period, which constitutes a significant portion of its operating expenses. This reflects Oklo's focus on developing cutting-edge nuclear reactor modules, positioning itself as a potential leader in the nuclear energy sector. The R&D spending indicates Oklo's long-term strategy of driving innovation in nuclear technology, with the hope that these investments will eventually lead to commercial success. However, this commitment to R&D also means that the company's short-term financial performance remains weak.

Oklo's stock price has shown considerable volatility over the past year, with a 52-week range from \$5.35 to \$28.12. As of the latest trading session, the stock is priced at \$18.35, reflecting a significant drop of 23.14% from the previous trading day. The volatility in Oklo's stock price can be attributed to both the company's financial struggles and the speculative nature of investments in early-stage companies with high R&D costs.

The company has 122.1 million shares outstanding, with 66.43 million shares available for public trading (the float). Oklo's shares also have a relatively high short interest, with 12.4% of shares outstanding being shorted. This suggests that many investors are betting against the stock, reflecting skepticism about the company's ability to achieve profitability in the near term.

Analysts are generally optimistic about Oklo's future, despite its current financial difficulties. The stock is rated as a Strong Buy, with an average price target of \$18.27, slightly below its current price of \$18.35. The target range provided by analysts varies from a low of \$10 to a high of \$27, indicating that while the stock has growth potential, there is considerable uncertainty surrounding its future performance.

Earnings estimates for Oklo suggest that the company will continue to post losses for the foreseeable future. For the current quarter, analysts expect Oklo to report an EPS of -\$0.09, and for the full year, the loss is expected to be -\$4.35 per share. However, the growth estimates for the company in the next year are positive, with analysts forecasting a potential 91.25% increase in earnings for 2025. This optimism is based on the expectation that Oklo's investments in R&D will eventually lead to successful commercialization of its nuclear technologies.

Oklo's focus on nuclear reactor module development sets it apart from other companies in the energy sector. The nuclear energy industry is experiencing growing interest due to the global push for cleaner, more sustainable energy solutions. Oklo's investment in R&D positions it to capitalize on this trend, though it faces significant competition from other players in the nuclear and renewable energy markets.

While the company is facing financial difficulties and is not yet profitable, its long-term strategy of technological innovation could eventually pay off if Oklo is able to scale its technologies and successfully bring its products to market. The company's R&D spending, while detrimental to its current financial health, may ultimately lead to breakthroughs that enable Oklo to achieve commercial success and profitability.

Oklo Inc. is currently in a challenging financial position, with significant operating losses, negative cash flow, and no immediate path to profitability. However, the company's substantial investment in research and development reflects its long-term strategy to become a leader in the nuclear energy sector. While the stock shows considerable volatility and analysts have mixed expectations, Oklo's commitment to R&D could result in significant growth can transition from development if it to commercialization. Investors should approach Oklo with caution, recognizing both the high risks and the potential for future rewards as the company continues to innovate in the nuclear energy industry.

4. Risk Analysis

As Oklo Inc. leads the development and deployment of Small Modular Reactors (SMRs), it navigates a complex landscape of risks that could impact its operations and growth. These risks span regulatory, operational, financial, market, and societal dimensions, all of which are critical to the success of both Oklo and the broader adoption of SMR technology. Understanding and mitigating these risks is essential to ensuring Oklo's long-term viability and contribution to the global transition to sustainable energy.

One of the most significant risks faced by Oklo is the stringent **regulatory** environment that governs the nuclear energy industry. The nuclear sector is one of the most heavily regulated industries globally, and for good reason: the potential risks associated with nuclear power, including radiation exposure, environmental contamination, and catastrophic failures, demand rigorous oversight. However, the complexity and rigidity of this regulatory framework present substantial challenges, especially for companies like Oklo that are introducing innovative technologies.

In the United States, the Nuclear Regulatory Commission (NRC) is the primary authority responsible for ensuring the safety and compliance of nuclear projects. The NRC's licensing process involves several phases, including detailed design reviews, safety assessments, and environmental impact evaluations. Each phase requires extensive documentation, technical analysis, and often multiple rounds of revision and resubmission. For companies like Oklo, this process can take years to complete, even with advanced reactor designs that incorporate significant safety improvements.

For Oklo's Aurora Reactor, the regulatory process is particularly challenging as it represents a new class of reactor technology. Unlike traditional light-water reactors, the Aurora Reactor is a fast reactor with advanced features such as passive safety systems and long operational cycles without refueling. These innovations, while enhancing safety and efficiency, also require the NRC to adapt its regulatory framework to accommodate technologies that do not fit neatly within existing standards. This adaptation process can result in additional delays as regulators and the company work to establish a shared understanding of the reactor's unique safety case.

Delays in obtaining regulatory approvals can have a cascading impact on Oklo's operations and financial performance. Prolonged timelines increase the company's development costs, as resources must be allocated to ongoing regulatory engagement, design revisions, and compliance activities. These extended costs can strain Oklo's budget, particularly for a company still in the growth phase. Additionally, regulatory delays can lead to missed market opportunities. Energy markets are highly dynamic, with evolving customer needs and competitive pressures. If Oklo's projects are delayed, potential customers, such as data centers or industrial facilities, may seek alternative energy solutions, including renewable sources or other nuclear providers. This could result in lost revenue opportunities and reduced market share.

Delays in project deployment can also affect investor confidence. Oklo relies on funding from private investors, grants, and government programs to finance its operations and reactor development. Prolonged regulatory uncertainty may deter future investments, as investors could perceive the risks as outweighing the potential returns. This combination of increased costs, lost opportunities, and diminished investor confidence highlights the significant challenges posed by the regulatory environment. For Oklo to succeed, it must navigate these complexities efficiently, ensuring compliance while minimizing delays and maintaining stakeholder trust.

Another critical operational risk for Oklo stems from its reliance on a complex global supply chain to procure essential components for its Small Modular Reactors (SMRs). These components include specialized materials such as High-Assay Low-Enriched Uranium (HALEU) fuel, high-temperature alloys, and advanced cooling systems. Each of these materials plays a vital role in the construction and operation of Oklo's reactors, and their availability is limited to a small number of suppliers worldwide. HALEU fuel is a cornerstone of Oklo's reactor design. Unlike conventional nuclear fuel, HALEU offers a higher concentration of uranium-235, enabling longer operational cycles and greater efficiency. However, the production and supply of HALEU are still in their infancy, with only a few facilities globally capable of manufacturing it at the scale and quality required for commercial SMRs. This limited supply chain poses a significant risk, as any disruption—whether due to political instability, sanctions, or technical setbacks could delay fuel delivery, halting reactor deployment and operation.

Similarly, high-temperature alloys and radiationresistant materials are essential for ensuring the structural integrity and safety of reactor components exposed to extreme heat and radiation. These materials must meet stringent specifications, and the pool of suppliers capable of producing them is small. As demand for advanced nuclear technologies grows, competition for these materials could intensify, leading to price increases and longer lead times.

Logistical challenges further exacerbate supply chain risks. Transporting nuclear materials like HALEU involves strict regulatory oversight and specialized handling to ensure safety and security. Any delays in transportation due to regulatory hold-ups, inadequate infrastructure, or geopolitical tensions can disrupt project timelines. Additionally, global events such as pandemics, natural disasters, or trade disputes could impact the broader supply chain, causing delays in the delivery of critical components and escalating costs. Geopolitical risks are another significant factor. Given the strategic importance of nuclear technology and its materials, international relations and policies can heavily influence supply chain stability. For instance, tensions between major geopolitical players could lead to trade restrictions or export controls, limiting Oklo's access to essential resources. Such restrictions could force the company to seek alternative suppliers, potentially at higher costs and with longer procurement times.

In conclusion, Oklo Inc. operates at the cutting edge of nuclear innovation, but its success hinges on effectively managing a range of critical risks. The stringent regulatory environment, while ensuring safety and compliance, poses significant challenges in terms of prolonged timelines and increased costs, potentially delaying market entry and impacting financial performance. Simultaneously, Oklo's reliance on a specialized global supply chain for materials like HALEU fuel and high-temperature alloys exposes the company to geopolitical tensions, logistical bottlenecks, and supply disruptions.