LIGHTBRIDGE CORPORATION

2022 ANNUAL REPORT TO STOCKHOLDERS

DIRECTORS AND OFFICERS

BOARD OF DIRECTORS

Ambassador Thomas Graham Jr.
Chairman of the Board,
Lightbridge Corporation

Seth Grae
President and Chief Executive Officer,
Lightbridge Corporation

Daniel B. Magraw
Senior Fellow and Professorial Lecturer,
Foreign Policy Institute at the Johns Hopkins
School of Advanced International Studies

Jesse Funches
Former Chief Financial Officer
United States Nuclear Regulatory Commission

Sweta Chakraborty, Ph.D.
Chief Executive Officer
We Don't Have TimeUS

Mark Tobin
Chief Financial Officer
National Underground Group

Sherri Goodman
Vice-Chair
U.S. State Department International Security Advisory Board

EXECUTIVE OFFICERS

Seth Grae
President and Chief Executive Officer

Larry Goldman, C.P.A.
Chief Financial Officer and Corporate Secretary

Andrey Mushakov, Ph.D.
Executive Vice President –Nuclear Operations

CORPORATE INFORMATION

CORPORATE HEADQUARTERS

Lightbridge Corporation
11710 Plaza America Drive
Suite 2000
Reston, Virginia 20190 USA

INVESTOR RELATIONS

Copies of Lightbridge's 2022 Annual Report on Form 10-K are available at no charge. Please direct requests and other investor relations questions to:

Lightbridge Corporation
Attn: Investor Relations
11710 Plaza America Drive
Suite 2000
Reston, Virginia 20190 US
(347) 947-2093
IR@ltbridge.com

TRANSFER AGENT AND REGISTRAR

Computershare Trust Company
350 Indiana Street
Golden, Colorado 80401 USA
(800) 962-4284

AUDITORS

BDO USA, LLP
Philadelphia, Pennsylvania

OUTSIDE LEGAL COUNSEL

Hogan Lovells US LLP
Denver, Colorado

STOCK EXCHANGE LISTING

Nasdaq Capital Market
Symbol: LTBR

2023 ANNUAL MEETING

Thursday, May 18, 2023,
11:00 a.m. EDT

Online Access:

www.virtualshareholdermeeting.com/LTBR2023

Lightbridge Corporation
11710 Plaza America Drive
Suite 2000
Reston, VA 20190 USA
T: +1.347-947-2093
E: IR@ltbridge.com

To our Valued Shareholders,

Since our last shareholder meeting in 2022, Lightbridge has achieved significant milestones crucial to advancing Lightbridge Fuel and meeting our key objectives for the year.

We are proud to have entered landmark agreements with Idaho National Laboratory (INL), in collaboration with the U.S. Department of Energy (DOE), to support the development of Lightbridge Fuel™. The framework agreements use an innovative structure and consist of an "umbrella" Strategic Partnership Project Agreement and an "umbrella" Cooperative Research and Development Agreement, each with Battelle Energy Alliance, LLC, DOE's operating contractor for INL, with an initial duration of seven years.

The importance of these agreements and the work ahead for Lightbridge cannot be understated; these agreements will enable us to conduct irradiation testing of fuel material samples provided by the DOE in the Advanced Test Reactor. We will collect material performance data on uranium-zirconium material, which is the same material we will use in a Lightbridge Fuel rod. The data we collect from this testing will help support the fuel performance model to obtain and secure regulatory approval and share it with utilities so they can see how our fuel performs inside their respective reactors' core designs. The data we collect from these tests will apply to licensing, evaluation, and feasibility of our fuel in the various types of commercial reactors, such as CANDU-type pressurized heavy water reactors, light water small modular reactors, and large pressurized water reactors, and boiling water reactors.

We also announced the successful completion of our project at Pacific Northwest National Laboratory (PNNL) under the DOE's Gateway for Accelerated Innovation in Nuclear (GAIN) voucher program in February. This work advances a critical stage in the manufacturing process of Lightbridge fuel by demonstrating a casting process using depleted uranium-zirconium material. The total project value was approximately $663,000, with three-quarters of this amount funded by DOE for the scope performed by PNNL. The DOE and its national laboratories have helped validate Lightbridge fuel with our two GAIN voucher funding awards. The DOE considers awards larger than $500,000 in cases with a clear need involving a truly exceptional technology.

Overall sentiment and public acceptance for nuclear power is improving, with positive developments from the government, academia, municipalities, electric utilities, and now the capital markets. Nuclear power vendor companies have traditionally been government-owned, private, or a relatively small part of a much larger publicly traded company. Today, investors can have liquidity in investments in a diversified portfolio of pure-nuclear companies along the nuclear supply chain, with more to come. It is encouraging to see greater interest from institutional investors and other strategic entities to invest in advanced nuclear technologies across the supply chain, such as BNF Capital, which has become a 10.7% shareholder in Lightbridge. When approached by media outlets, BNF Capital's Portfolio Manager, Sean Benson, commented:

> *"Our strategic shareholding in Lightbridge Corporation reflects the belief that nuclear power will play an essential role in the energy transition away from fossil fuels. Small Modular Reactors (SMRs), where our investors have partnered with the leading UK technology, will drive this reality, and advanced nuclear technology must include the fuel that will power such reactors. Lightbridge Fuel clearly suits this investment thesis, as they rethink the nuclear fuel rod, making it safer, more efficient, and cost-effective while bringing operational benefits that current fuels cannot achieve. Their recent milestones with the American government have led us to believe that Lightbridge Fuel is progressing toward the goal of supplying batch reloads to existing large reactors as well as SMRs once commercially available."*

We wholeheartedly welcome Sean Benson and BNF Capital as an investor in Lightbridge and share his enthusiasm for nuclear power and its role in impacting the world's climate and energy security problems soon enough to make a difference. This greater interest in nuclear energy propels companies like Lightbridge to aggressively pursue our fuel development to meet the needs of the marketplace.

The benefits of nuclear energy have come into focus over the last year like never before. Accountability for achieving the net zero carbon targets set by countries and companies worldwide continues to drive the momentum toward more nuclear industry-friendly policy decisions. The war in Ukraine and the energy crises experienced in many parts of the world have raised the stakes regarding energy security. Russia's invasion of Ukraine has caused countries everywhere to seek to ensure their energy security from now on. Countries seem to realize they can only meet their national security, energy, and climate goals with a significant increase in nuclear power as part of the energy mix. And now, we're seeing this is starting to happen.

These unfortunate events have only amplified that energy security and infrastructure will be meaningful priorities, which bodes well for nuclear power. Only nuclear power can expand the availability of clean and reliable baseload electricity without carbon emissions in a responsible way, weaning countries off dependency on fossil fuels from countries that threaten their national security. Throughout the U.S., Canada, the E.U., and Asia, nations have taken steps to renew plant licenses and restart nuclear reactors and build new reactors. The European Commission took steps towards including nuclear power in its green energy taxonomy, which will help bring more money into projects that the E.U. considers sustainable and will slash greenhouse gas emissions. The recently enacted U.S. Inflation Reduction Act provides nuclear production tax credits to help preserve the existing fleet of U.S. nuclear plants and significant money for advanced reactors. Plants that keep operating will be able to use our fuel, providing economic and safety benefits. In addition, the law includes funding for national labs, which is important for testing new technologies such as ours. According to the Nuclear Energy Institute, 90 nuclear power reactors are on order or are being planned, and more than 300 reactors are in the proposal stages. In addition to commercial nuclear power plants, more than 200 research reactors operate in more than 50 countries, fostering innovation across the industry, including SMRs.

This is an exciting time for Lightbridge. As we embark on our Strategic Partnership Project, we have one of the strongest balance sheets in our history, with no debt. We remain focused on leveraging our technical expertise and industry relationships to advance our fuel development program and position Lightbridge for long-term growth.

I look forward to updating investors on our work at Idaho National Laboratory as we begin this important chapter for our company.

Very truly yours,

Seth Grae
President & CEO

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

(Mark One)

☒ ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended **December 31, 2022**

OR

☐ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

Commission file number: **001-34487**

LIGHTBRIDGE CORPORATION

(Exact name of registrant as specified in its charter)

Nevada	**91-1975651**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

11710 Plaza America Drive, Suite 2000 Reston, VA 20190
(Address of principal executive offices) (Zip Code)

(571) 730-1200
(Registrant's telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, $0.001 par value	**LTBR**	**The Nasdaq Capital Market**

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☐ No ☒

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes ☐ No ☒

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large Accelerated Filer	☐	Accelerated Filer	☐
Non-accelerated Filer	☒	Smaller reporting company	☒
		Emerging growth company	☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☐

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements. ☐*

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to §240.10D-1(b). ☐*

* The registrant is not yet required to have a recovery policy under the applicable exchange listing standard and has left the corresponding check boxes blank as a result.

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

At June 30, 2022, the aggregate market value of shares held by non-affiliates of the registrant (based upon the closing sale price of such shares on the Nasdaq Capital Market on June 30, 2022) was $49,899,793.

At March 30, 2023 there were 12,126,030 shares of the registrant's common stock issued and outstanding.

Documents Incorporated by Reference

Portions of the registrant's definitive proxy statement to be filed with the Securities and Exchange Commission in connection with its 2023 Annual Meeting of Stockholders are incorporated by reference into Part III of this Form 10-K.

LIGHTBRIDGE CORPORATION
FORM 10-K
FOR THE FISCAL YEAR ENDED DECEMBER 31, 2022
TABLE OF CONTENTS

FORWARD-LOOKING STATEMENTS

In addition to historical information, this Annual Report on Form 10-K, including, but not limited to, the sections entitled "Risk Factors," "Management's Discussion and Analysis of Financial Condition and Results of Operations" and "Business," contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. All statements other than statements of historical fact are statements that could be deemed forward-looking statements. We use words such as "believe", "expect", "anticipate", "project", "target", "plan", "optimistic", "intend", "aim", "will", or similar expressions, which are intended to identify forward-looking statements. Such statements include, among others:

- those concerning market and business segment growth, demand, and acceptance of our nuclear fuel technology and other steps to commercialization of Lightbridge Fuel™;
- any projections of sales, earnings, revenue, margins, or other financial items;
- any statements of the plans, strategies, and objectives of management for future operations and the timing and outcome of the development of our nuclear fuel technology;
- any statements regarding future economic conditions or performance;
- any statements about future financings and liquidity;
- the Company's anticipated financial resources and position; and
- all assumptions, expectations, predictions, intentions, or beliefs about future events and other statements that are not historical facts.

You are cautioned that any such forward-looking statements are not guarantees of future performance and involve risks and uncertainties, as well as assumptions that if they were to ever materialize or prove incorrect, could cause the results of the Company to differ materially from those expressed or implied by such forward-looking statements. Such risks and uncertainties, among others, include:

- our ability to commercialize our nuclear fuel technology, including risks related to the design and testing of nuclear fuel incorporating our technology and the degree of market adoption of the Company's product and service offerings;
- dependence on strategic partners;
- any adverse changes to our agreements or relationship with the U.S. government and its national laboratories;
- our ability to fund our future operations, including general corporate overhead and outside research and development costs, and continue as a going concern;
- the demand for our fuel for nuclear reactors and our ability to attract customers;
- our ability to manage the business effectively in a rapidly evolving market;
- our ability to employ and retain qualified employees and consultants that have experience in the nuclear industry;
- competition and competitive factors in the markets in which we compete, including from accident tolerant fuels;
- the availability of nuclear test reactors and the risks associated with unexpected changes in our nuclear fuel development timeline;
- the increased costs associated with metallization of our nuclear fuel;
- uncertainties related to conducting business in foreign countries;

- public perception of nuclear energy generally;
- changes in laws, rules, and regulations governing our business;
- changes in the political environment;
- development and utilization of, and challenges to, our intellectual property domestically and abroad;
- the trading price of our securities is likely to be volatile, and purchasers of our securities could incur substantial losses and;
- the other risks and uncertainties identified in Item 1A. Risk Factors included herein.

Most of these factors are beyond our ability to predict or control and you should not put undue reliance on any forward-looking statement. Future events and actual results could differ materially from those set forth in, contemplated by or underlying the forward-looking statements. Forward-looking statements speak only as of the date on which they are made. The Company assumes no obligation and does not intend to update these forward-looking statements for any reason after the date of the filing of this report, to conform these statements to actual results or to changes in our expectations, except as required by law.

PART I

ITEM 1. BUSINESS

When used in this Annual Report on Form 10-K, the terms "Lightbridge", the "Company", "we", "our", and "us" refer to Lightbridge Corporation together with its wholly-owned subsidiaries Lightbridge International Holding LLC and Thorium Power Inc. Lightbridge's principal executive offices are located at 11710 Plaza America Drive, Suite 2000, Reston, Virginia 20190 USA.

Overview

At Lightbridge we are developing the next generation of nuclear fuel to impact, in a meaningful way, the world's climate and energy security problems. Our nuclear fuel could significantly improve the economics and safety of existing and new nuclear power plants, large and small, enhance proliferation resistance of spent nuclear fuel, and have a meaningful impact on addressing climate change and air pollution, all while benefiting national security. We project that the world's energy and climate needs can only be met if nuclear power's share of the energy-generating mix grows substantially in the coming decades. We believe Lightbridge will benefit from a growing nuclear power industry, and we are developing our nuclear fuel to help enable that growth to happen.

We believe our metallic fuel will offer significant economic and safety benefits over traditional nuclear fuel, primarily because of the superior heat transfer properties and the resulting lower operating temperature of all-metal fuel. We also believe that uprating a reactor with Lightbridge Fuel™ will add incremental electricity at a lower levelized cost than any other means of generating baseload electric power, including any renewable, fossil, or hydroelectric energy source, or any traditional nuclear fuel.

Emerging nuclear technologies that many in the nuclear power industry believe have the potential to help drive growth in nuclear power include small modular reactors (SMRs), which are now in the development and licensing phases. We expect that Lightbridge Fuel™ can provide SMRs with all the same benefits our technology brings to large reactors, with such benefits being even more meaningful to the economic case for deployment of SMRs, including potential load following capability when included on a low-carbon electric grid with renewable energy sources. We expect Lightbridge Fuel™ to generate more power in SMRs than traditional nuclear fuels, which will help decarbonize sectors that are now powered by fossil fuels. We expect that our ongoing research and development (R&D) initiatives will lead to Lightbridge Fuel™ powering SMRs for multiple purposes. The first SMRs are expected to begin operations as early as 2029.

We have built a significant portfolio of patents reflecting years of R&D, and we anticipate testing our nuclear fuel through third party vendors and others, including the United States Department of Energy's (DOE) national laboratories. Currently, we are performing the majority of our R&D activities with the DOE's national laboratories.

Our Nuclear Fuel

Since 2008, we have been engaged in the design and development of proprietary, innovative nuclear fuels to improve the cost competitiveness, safety, proliferation resistance and performance of nuclear power generation. In 2010, we announced the concept of all-metal fuel (i.e., non-oxide fuel) for use in currently operating and new-build reactors. We have reimagined nuclear fuel from scratch, using advanced science and engineering. Our focus on metallic fuel was inspired by listening to the voices of prospective customers, as nuclear utilities expressed interest in the improved economics and enhanced safety that we believe metallic fuel will provide.

The fuel in a nuclear reactor generates energy in the form of heat. That heat is then converted through steam into electricity that is delivered to the transmission and distribution grid. We have designed our innovative, proprietary metallic fuels to be capable of significantly higher burnup and power density compared to conventional oxide nuclear fuels. Burnup is the total amount of electricity generated per unit mass of nuclear fuel consumed and is a function of the power density of a nuclear fuel and the amount of time the fuel operates in the reactor. Power density is the amount of heat power generated per unit volume of nuclear fuel. Conventional oxide fuel used in existing commercial reactors is nearing the limit of its design and licensed burnup and power density capability. As a result, further optimization is needed to (i) increase power output from the same core size to improve the economics, and (ii) enhance the safety of nuclear power generation where using conventional oxide fuel technologies is limited. A new fuel is needed to bring enhanced performance to reactors large and small. We are working to develop Lightbridge Fuel™ to meet that goal.

As the nuclear power industry prepares to meet the increasing global demand for electricity production, nuclear utilities are seeking longer operating cycles and higher reactor power outputs for current and future reactor fleets. We believe our proprietary nuclear fuel designs have the potential to improve the nuclear power industry's economics by:

- enabling increased reactor power output via a power uprate (potentially up to a 30% increase) or a longer operating cycle without changing the core size in new build pressurized water reactors (PWRs), including SMRs; or

- providing an increase in power output of potentially up to 10% while simultaneously extending the operating cycle length from 18 to 24 months in existing PWRs, including in Westinghouse-type four-loop PWR plants, which are currently constrained to an 18-month operating cycle by oxide fuel enriched up to 5% in the isotope uranium-235, or increasing the power potentially up to 17% while retaining an 18-month operating cycle.

We believe our fuel designs will allow current and new build nuclear reactors to safely increase power production and reduce operations and maintenance costs on a per kilowatt-hour basis. New build nuclear reactors could also benefit from the reduced upfront capital investment per kilowatt of generating capacity in the case of implementing a power uprate. In addition to projected electricity production cost savings, we believe our technology may allow utilities or countries to deploy fewer new reactors to generate the same amount of electricity (in the case of a power uprate), resulting in significant capital cost savings. For utilities or countries that already have operating reactors, we expect that our nuclear fuel could be utilized to both increase the power output of those reactors as well as enable them to load follow with electric grid demands, which have become increasingly variable with large additions of intermittent renewable generation.

Nuclear Industry and Addressable Market

Overview of the Nuclear Power Industry

According to the U.S. Energy Information Administration, nuclear power provided approximately 4.6% of the world's total energy from all sources in 2020, including approximately 10.5% of global electricity generation. According to the World Nuclear Association (WNA), as of January 2022 there were 438 operable nuclear power reactors worldwide, mostly light water reactors, with the most common types being PWRs, including Russian-designed water-cooled, water-moderated energetic reactors (VVERs), and boiling-water reactors (BWRs). Nuclear power provides a non-fossil fuel, low-carbon energy solution that can meet baseload electricity needs.

Of the world's reactors currently in operation, PWRs account for approximately 70% of the net operating capacity, with BWRs being the second most prevalent and accounting for approximately 14%. Of the nuclear reactors currently under construction, approximately 70% are PWRs with a rated electric power output of 1,000 megawatts or greater.

Almost all the new build reactors currently under construction are either Generation III or Generation III+ type reactors. The primary difference from second-generation designs is that many Generation III or Generation III+ reactors incorporate passive or inherent safety features, which require no active controls or operational intervention to avoid accidents in the event of malfunction. Many of these passive systems rely on a combination of gravity, natural convection, and/or resistance to high temperatures.

We are developing our fuel technology for application in various types of water-cooled reactors, including existing or future light water reactors, which include water-cooled small modular reactors, as well as for Canada Deuterium Uranium (CANDU)-type pressurized heavy water reactors. The existing U.S. fleet of nuclear reactors represents a large market segment for which Lightbridge Fuel™ could provide significant economic and safety benefits through a power uprate up to 10%, along with an anticipated operating cycle extension from 18 to 24 months, or a power uprate of 17%, as described below, without extending the cycle length.

We believe that Lightbridge Fuel's™ most significant economic benefit may be its ability to provide a 30% power uprate. However, the existing large reactors cannot realize that benefit because their systems are not designed to handle that much of an increase in power. The most additional power existing large PWRs could take from Lightbridge Fuel™ is estimated at approximately 17%. Only newly designed large reactors may benefit from the full 30% greater power available from Lightbridge Fuel™. While we believe that only a limited number of new, large reactors will be built, we expect that much larger numbers of SMRs that can utilize our fuel will be deployed in the future.

Target Market for Lightbridge Fuel™

Our target market segments include water-cooled commercial power reactors, such as PWRs, BWRs, VVERs, CANDUs heavy water reactors, water-cooled SMRs, as well as water-cooled research reactors.

Nuclear Power as Clean and Low Carbon Emissions Energy Source

Nuclear power provides clean, reliable baseload electricity. According to the WNA, nuclear reactors produce no greenhouse gas emissions during operation, and over the course of their lifecycles, nuclear power plants produce about the same amount of CO2 equivalent emissions per unit of electricity as wind. The WNA further notes that almost all proposed pathways to achieving significant decarbonization suggest an increased role for nuclear power, including those published by the International Energy Agency, Massachusetts Institute of Technology Energy Initiative, U.S. Energy Information Administration, and World Energy Council.

We believe that deep cuts to CO2 emissions are only possible with electrification of most of the transportation and industrial sectors globally and powering them, and the current electricity needs of the world, with non-emitting or low-emitting power or no-carbon liquid fuels. We believe this can be done only with a large increase in nuclear power, several times the amount that is generated globally today. We believe that our nuclear fuel technology will be an essential element of reaching this goal, for electricity generation and potentially to produce hydrogen for zero-carbon liquid fuels.

Influence of the Accident at Fukushima, Japan and New International Nuclear Build

The accident at the Fukushima Daiichi nuclear power plant in Japan following the strong earthquake and destructive tsunami that occurred on March 11, 2011, increased public concerns related to nuclear power, resulting in a slowdown in, or in some cases, a complete halt to, new construction of nuclear power plants as well as the early shut down of existing power plants in certain countries. As a result, some countries that were considering launching new domestic nuclear power programs before the Fukushima accident have delayed or cancelled preparatory activities they were planning to undertake as part of such programs. The Fukushima accident appears to have shrunk the projected size of the global nuclear power market in 2025-2030 as reflected in the most recent reference case projections published by the WNA. At the same time, the event has brought a greater emphasis on safety to the forefront that may be beneficial to us because our metallic fuel provides improved safety and fuel performance during normal operation and design-basis accidents.

Growing Importance of Energy Security

We believe that Russia's invasion of Ukraine has made clear the need for countries to wean off dependency on fossil fuels from countries that can threaten their national security. Oil and natural gas prices have increased significantly since Russia commenced its invasion in early 2022 and many countries have imposed sanctions upon Russia in response. European countries are responding by rethinking their plans for nuclear energy by either keeping existing nuclear power plants running or moving ahead with plans for new plants or both. The United Kingdom is deploying new nuclear power plants. Belgium has decided to reverse its decision to close all of its nuclear plants in the wake of Russia's invasion of Ukraine. It has become clear that a stable domestic energy supply ensures energy security and provides the strongest protection against energy price volatility. Increasingly, policymakers view nuclear energy as critical to a secure energy future.

Anticipated Safety Benefits of Lightbridge Fuel™

The expected safety benefits of Lightbridge Fuel™ are as follows:

- operates at lower operating temperatures than current conventional nuclear fuel, contributing to lower stored thermal energy in the fuel rods; it is therefore not expected to generate explosive hydrogen gas under design-basis accidents when there is a loss of coolant in the reactor;
- enhances structural integrity of the nuclear fuel rods; and
- has lighter and stiffer fuel assembly, which may contribute to improved seismic performance;

Due to the significantly lower fuel operating temperature and higher thermal conductivity, our metallic nuclear fuel rods are expected to provide major improvements to safety margins during certain off-normal events. The US Nuclear Regulatory Commission (NRC) licensing processes require engineering analysis of a large break loss-of-coolant accident (LOCA), as well as other scenarios. The LOCA scenario assumes failure of a large water pipe in the reactor coolant system. Under LOCA conditions, the fuel and cladding temperatures rise due to reduced cooling capacity. Preliminary analytical modeling shows that under a design-basis LOCA scenario, unlike conventional uranium dioxide fuel, the cladding of the Lightbridge-designed metallic fuel rods would stay at least 200 degrees below the 850-900 degrees Celsius temperature at which steam begins to react with the zirconium cladding to generate hydrogen gas. Build-up of hydrogen gas in a nuclear power plant can lead to a hydrogen explosion, which contributed to the damage at the Fukushima Daiichi nuclear power plant. Lightbridge Fuel™ is designed to mitigate hydrogen gas generation in design-basis LOCA situations. This is a major safety benefit.

Lightbridge Spent Fuel - Proliferation Resistance

The April 2018 issue of Nuclear Engineering and Design, a technical journal affiliated with the European Nuclear Society, included a peer-reviewed article stating that after analyzing Lightbridge's fuel, the authors concluded that any plutonium extracted from Lightbridge's spent fuel would not be useable for weapon purposes. We anticipate the following proliferation resistance advantages for our metallic fuel:

- one-half of the amount of plutonium produced and remaining in the spent fuel as compared to conventional uranium dioxide fuels; and
- lower Plutonium-239 fraction compared to uranium dioxide fuel; therefore, our spent fuel would be unsuitable as a source for weapon purposes.

Our fuel potentially could be used to dispose of plutonium from reprocessed used reactor fuel, utilizing the plutonium to generate electricity. Our fuel potentially also could be used to dispose of plutonium from nuclear weapons.

Development of Lightbridge Fuel™

Recent Developments

HALEU Consortium Membership

To support establishment of domestic high-assay low-enriched uranium ("HALEU") infrastructure, the DOE announced on December 7, 2022 the creation of a HALEU Consortium. According to the DOE, the purposes of the HALEU Consortium include: (i) Provide the Secretary of Energy HALEU demand estimates for domestic commercial use, (ii) Purchase HALEU made available to members for commercial use under the Program, (iii) Carry out demonstration projects using HALEU under the Program, and (iv) Identify actionable opportunities to improve the reliability of the HALEU supply chain. On December 15, 2022, the Company submitted a formal request to the DOE to join the HALEU Consortium to mitigate HALEU supply risk. On January 12, 2023, the Company received written confirmation from the DOE of Lightbridge's membership in the HALEU Consortium.

Idaho National Laboratory Agreements

In the second half of 2022 Lightbridge entered into agreements with Idaho National Laboratory (INL), in collaboration with the DOE, to support the development of Lightbridge Fuel™. The framework agreements use an innovative structure and consist of an "umbrella" Strategic Partnership Project Agreement (SPP) and an "umbrella" Cooperative Research and Development Agreement (CRADA), each with Battelle Energy Alliance, LLC (BEA), the DOE's operating contractor for INL, with an initial duration of seven years.

We anticipate that the initial phase of work under the two agreements that has been released will culminate in irradiation testing in the Advanced Test Reactor (ATR) of our fuel material samples, known as fuel material coupons, using enriched uranium supplied by the DOE. The initial phase of work aims to generate irradiation performance data for Lightbridge's delta-phase uranium-zirconium alloy relating to various thermophysical properties. The data will support fuel performance modeling and regulatory licensing efforts for commercial deployment of Lightbridge Fuel™.

We anticipate that subsequent phases of work under the two umbrella agreements that have not yet been released may include post-irradiation examination of the irradiated fuel material coupons, loop irradiation testing in the ATR, and post-irradiation examination of one or more uranium-zirconium fuel rodlets, as well as transient experiments in the Transient Reactor Test Facility (TREAT) at INL.

MIT Study - Lightbridge Fuel™

In June 2022, the DOE selected Lightbridge Fuel™ to participate in a study led by the Massachusetts Institute of Technology (MIT) to investigate the performance and economics of accident tolerant fuels for light water cooled SMRs. Amongst other objectives, one of the objectives of this project is to simulate the fuel and safety performance of Lightbridge Fuel™ in an SMR designed by NuScale Power and provide a scoping analysis of longer-term advanced fuel forms to improve the safety and economics of SMRs. The DOE's Nuclear Energy University Program awarded $800,000 to MIT with the goal of bringing collaborative teams together to solve complex problems to advance nuclear technology and understanding. The duration of this work is expected to be approximately 3 years. The amount of financial benefit to Lightbridge from this DOE grant to MIT cannot be quantified.

Second DOE Award from the Gateway for Accelerated Innovation in Nuclear

The DOE awarded us a second voucher from the Gateway for Accelerated Innovation in Nuclear (GAIN) program to support development of Lightbridge Fuel™ in collaboration with Pacific Northwest National Laboratory (PNNL). The scope of the project was to demonstrate Lightbridge's nuclear fuel casting process using depleted uranium, a key step in the manufacture of Lightbridge Fuel™. On July 14, 2021, the Company executed a CRADA with the Battelle Memorial Institute, Pacific Northwest Division, the operating contractor of the PNNL, in collaboration with the DOE. The project commenced in the third quarter of 2021. In December 2022, PNNL signed a one-month contract extension with the Company to complete the final report related to this PNNL GAIN voucher, which extended the period of performance to January 31, 2023. The work under this contract was completed in 2022, and a final report was issued by PNNL on January 31, 2023. The total project value was $0.7 million, with three-quarters of this amount provided by the DOE for the scope performed by PNNL.

Under this GAIN Voucher, we worked with PNNL to develop a casting process utilizing its existing equipment. As part of the scope, several castings were performed and the cast ingots analyzed. In an iterative process, the casting methodology was modified based on the characterization results as part of process demonstration to achieve acceptable results with PNNL's existing equipment. The results of this work will help to inform a final process suitable to produce fuel material coupons for our upcoming irradiation tests.

Future Steps Toward Our Fuel Development and Timeline For The Commercialization of Our Nuclear Fuel Assemblies

We anticipate fuel development milestones for Lightbridge Fuel™ over the next 2-3 years will consist of the following:

- kick off SPP/CRADA work at INL leading to irradiation testing in the ATR of our fuel material coupons using enriched uranium supplied by INL.
- conduct a feasibility study for the use of our nuclear fuel in CANDU heavy water reactors.
- conduct a front-end engineering and design (FEED) study for a Lightbridge pilot-scale fuel fabrication facility.
- demonstrate extrusion with our uranium-zirconium fuel alloy and produce fuel material coupons for irradiation testing.

The long-term milestones towards development and commercialization of nuclear fuel assemblies include, among other things, irradiating nuclear material samples and prototype fuel rods with enriched uranium in test reactors, conducting post-irradiation examination of irradiated material samples and/or prototype fuel rods, performing thermal-hydraulic experiments, performing seismic and other out-of-reactor experiments, performing advanced computer modeling and simulations to support fuel qualification, designing a lead test assembly (LTA), entering into a lead test rod/assembly agreement(s) with a host reactor(s), demonstrating the production of lead test rods and/or lead test assemblies at a pilot-scale fuel fabrication facility and demonstrating the operation of lead test rods and/or lead test assemblies in commercial reactors.

There are inherent uncertainties in the cost and outcomes of the many steps needed for successful deployment of our fuel in commercial nuclear reactors, which makes it difficult to accurately predict the timing of the commercialization of our nuclear fuel technology. However, based on our best estimate and assuming adequate R&D funding levels, we expect to begin demonstration of lead test rods (LTRs) and/or possibly LTAs with our metallic fuel in commercial reactors in the 2030s and begin receiving purchase orders for initial fuel reload batches from utilities 15-20 years from now, with deployment of our nuclear fuel in the first reload batch in a commercial reactor taking place approximately two years thereafter. We are exploring ways of shortening this timeframe that may include securing access to expanded irradiation test loop capacity in existing or new research reactor facilities.

Certain Challenges and Uncertainties

1. U.S. government funding support

Presently, our ability to fund our fuel development program at a level necessary to adhere to our projected fuel development timelines is severely limited due to funding constraints. This is in addition to our corporate overhead and other fixed costs, such as in-house project management and project control personnel. As a result, we believe seeking and securing significant U.S. government funding to support our fuel development program is essential for us to be successful in our fuel development and commercialization efforts. We expect significant government funding opportunities to go toward SMRs in the coming years, which may help accelerate our projected fuel development timelines by up to a few years for SMR applications.

2. Availability of suitable test loops in the ATR

After the Halden research reactor was shut down in 2018, we embarked on a global search for an alternative for loop irradiation testing of our metallic fuel rods. Ultimately, we chose the ATR at INL and applied to the DOE for and won two GAIN Vouchers. Our initial understanding was that we would have access to a government funded PWR water test loop in the ATR to generate sufficient data to support our LTA testing and potentially eliminate the need for LTR testing in a large commercial reactor.

However, availability of irradiation test loops for fuel in the ATR has become limited and highly competitive, limiting how much nuclear fuel can be inserted into the reactor as well as its duration in the reactor.

If new test loops are not added to the ATR, loop irradiation testing in the ATR may not provide sufficient data to justify regulatory approval for LTA testing in a large commercial PWR in a commercially feasible timeframe. This would likely necessitate an extra fuel development step of LTR testing in a large commercial PWR in addition to the ATR loop testing before LTA testing could commence. As a result, our fuel development timelines are 15-20 years before we expect to secure our first orders for fuel batch reloads in large commercial PWRs, unless we can access significantly increased test loop capacity. Consequently, the projected fuel development costs make it unfeasible for Lightbridge to fund this fuel development effort on its own.

3. Partnerships with fuel vendors and nuclear utilities

The ability to design and fabricate the LTAs and engagement with a nuclear utility that is willing to accept our LTAs, is required to demonstrate our nuclear fuel in a commercial reactor. In the U.S., the nuclear fuel fabricator and the nuclear utility will be primarily responsible for securing the necessary regulatory licensing approvals for the LTA operation. We plan to also build relationships with SMR reactor and fuel vendors, as well as existing and/or potential SMR utility customers.

4. Supply chain infrastructure for HALEU

Establishment of required supply chain infrastructure to support high-assay low-enriched uranium metallic fuel is a necessary step in the commercialization of our nuclear fuel. Existing commercial nuclear infrastructure, including conversion facilities, enrichment facilities, de-conversion facilities, fabrication facilities, fuel storage facilities, fuel handling procedures, fuel operation at reactor sites, used fuel storage facilities and shipping containers, were designed and are in most cases currently licensed to handle uranium in oxide form with enrichment up to 5% in the isotope uranium-235. Our fuel designs for light water reactors are expected to use uranium metal with uranium enrichment levels up to 19.75% and would therefore require certain modifications to existing commercial nuclear infrastructure to enable commercial nuclear facilities to receive and handle our fuels. Those nuclear facilities will need to complete a regulatory licensing process and obtain regulatory approvals in order to be able to process, handle, or ship uranium metal with enrichment levels up to 19.75% and operate commercial reactors and spent fuel storage facilities using our metallic fuel.

5. Need for experimental data on our metallic fuel

There is a lack of publicly available experimental data on our metallic fuel. We will need to conduct various irradiation experiments to confirm fuel performance under normal and off-normal reactor conditions. Loop irradiation in a test reactor environment prototypic of commercial reactor operating conditions and other experiments on unirradiated and irradiated metallic fuel samples will be essential to demonstrate the performance and advantages of our metallic fuel. We are planning loop irradiation testing of our metallic fuel samples in the ATR at INL as part of this effort.

6. Need for development of new analytical models to support our metallic fuel

Existing analytical models may be inadequate to fully analyze our metallic fuel. New analytical models, capable of accurately predicting the behavior of our metallic fuel during normal operation and off-normal events, may be required. Experimental data measured from our planned irradiation demonstrations will help to identify areas where new analytical models, or modifications to existing ones, may be required.

7. Need to develop and demonstrate a qualified fabrication process for our metallic fuel rods

Demonstration of a qualified fabrication process both for semi-scale irradiation fuel rod samples and subsequently for full-length (12-14 feet) metallic fuel rods for large PWR LTAs and shorter length for SMRs (~6 feet) is required. Past operating experience in icebreaker reactors with differently shaped fuel rods with a similar metallic fuel composition involved fabrication of metallic fuel rods up to 3 feet in length. Fabrication of full-length (approximately 12 to 14 feet) PWR metallic fuel rods for large PWRs has yet to be fully demonstrated. In 2021, we demonstrated the co-extrusion of full-length rods using surrogate materials (i.e., rods which replaced the uranium component with a suitable physical analogue). Coextrusion is the primary forming operation in the manufacturing of our fuel and this demonstration was an important milestone on the path to developing and qualifying the full manufacturing process for actual fuel rods with enriched uranium. We plan to commence a FEED study for a Lightbridge pilot-scale fuel fabrication facility in 2023.

Please see Item 1A. *Risk Factors* in this Annual Report on Form 10-K for a discussion of certain risks that may delay or impair such developments including without limitation the availability of financing and the many risks inherent in developing a new type of nuclear fuel.

Future Potential Collaborations and Other Opportunities

In the ordinary course of business, we engage in periodic reviews of opportunities to invest in or acquire companies or units within companies to leverage operational synergies and establish new streams of revenue. We will be opportunistic in this regard and may also partner or contract with entities that could be synergistic to our fuel business or present an attractive stable business and/or growth opportunity in the nuclear space.

Competition

Currently, competition with respect to the design of commercially viable nuclear fuel products is limited to conventional uranium dioxide fuels, which are reaching the limits in terms of their capability to provide increased power output or longer fuel cycles. We believe that the industry needs fuel products that can provide these additional benefits. While we believe conventional uranium dioxide fuel may be capable of achieving power up-rates of up to 10% in existing PWRs or extending the fuel cycle length from 18 to 24 months, doing so would require uranium-235 enrichment levels above 5% (as is also the case with our metallic fuel), higher reload batch sizes, or a combination thereof. The alternative route of increasing reload batch sizes while keeping uranium enrichment levels below 5% for power uprates up to 10% using conventional uranium dioxide fuel would raise the cost and reduce the efficiency of each fuel reload, resulting in a significant fuel cycle cost penalty to the nuclear utility. The cost penalty could have a dramatic adverse impact on the economics of existing plants whose original capital cost has already been fully depreciated, which includes most U.S. nuclear power plants.

In addition to conventional uranium dioxide fuel, potential competition to our metallic fuel technology can come from so-called Accident Tolerant Fuels (ATF). We regard ATF as part of a series of relatively small changes to conventional uranium dioxide fuel over time. ATF uses uranium dioxide with added substances and/or changes to the cladding tube. After the accident at the Fukushima Daiichi nuclear power plant in March 2011, the U.S. Congress directed the DOE to investigate every aspect of nuclear plant operation including the existing uranium dioxide fuel pellets contained in zirconium-based alloy tubes (cladding). According to the February 2019 Nuclear Energy Institute technical report on ATF titled “Safety and Economic Benefits of Accident Tolerant Fuel”, advanced fuel design concepts (such as ATF) were accelerated by combining recent operating experience with worldwide research and development. Over the past several years, the ATF program has received significant DOE funding support and initial interest from utility customers seeking ATF demonstration programs in their operating reactors. For example, in January 2022, Southern Nuclear agreed to load four lead test assemblies with a chromia and alumina doped ATF design. Similar ATF concepts are being tested by GE Nuclear, and others.

When the DOE originally launched the ATF program, the program was focused solely on achieving enhanced safety benefits, such as extra “coping time” during severe accidents. Over the past year, many ATF vendors concluded that the unexpectedly small accident tolerance benefits their ATF fuel concepts offered (such as several extra hours of coping time during severe accidents rather than their original goal of approximately 72 hours) were not enough of an incentive for nuclear utilities to adopt ATF designs, which would cost more and have reduced the efficiency relative to conventional uranium dioxide fuels. As a result, ATF vendors have begun exploring opportunities for extending the operating cycle length from 18 to 24 months in existing PWRs by going to higher enrichments (i.e., from approximately 5% to 7-8% enrichments) with ATF designs. If they are successful in extending the cycle length to 24 months in a cost-effective way, this could give sufficient economic incentive for nuclear utilities to switch to the ATF designs in the coming years. This recent shift in positioning by many ATF vendors represents a competitive threat to Lightbridge for use in existing large PWRs, as ATF vendors are now trying to encroach into a critical element of Lightbridge’s value proposition, i.e., the ability of Lightbridge Fuel™ to extend the cycle length from 18 to 24 months in existing large PWRs. While it is not certain that the ATF vendors will be successful in this approach, if ATF could provide for two-year cycles, it could severely weaken or undermine our economic value proposition in existing large PWRs. That said, we believe Lightbridge Fuel™ remains the only advanced light-water reactor fuel in development that can provide power uprates, cycle length extensions, improved safety, and load following in a single product as desired by the utilities.

Nuclear power faces competition from other sources of electricity as well, including natural gas, which at times in recent years has been the cheapest option for power generation in the U.S. and has resulted in some utilities abandoning nuclear initiatives. Other sources of electricity, such as renewables like wind and solar, may also be viewed as safer than nuclear power, although we believe that generating nuclear energy with Lightbridge Fuel™ is the safest way to produce baseload electricity. To the extent demand for electricity generated by nuclear power decreases, the potential market for our nuclear fuel technology will decline.

Raw Materials

We do not plan to utilize any raw materials directly in the conduct of our operations (except for potential purchases of certain raw materials in small quantities for testing and demonstration efforts). Fuel fabricators, which will ultimately fabricate fuel products incorporating our nuclear fuel technology, will acquire the zirconium and uranium, and additional raw materials that are required for the production of nuclear fuel assemblies that go into the reactor core. Uranium and zirconium are available from various suppliers at market prices. However, the availability of uranium metal enriched to 19.75% in the isotope uranium- 235 is currently limited to small quantities sufficient only for research and testing purposes. Deployment of our fuel in light water reactors will necessitate increasing enrichment level from 5% up to 19.75% at enrichment facilities, as well as deployment of de-conversion/metallization capability at a commercial scale, and the design and licensing of a shipping container capable of accommodating fuel assemblies with uranium metal enriched up to 19.75%. We expect that utilities will contract with nuclear fuel fabricators to order nuclear fuel assemblies, and then ship the completed nuclear fuel assemblies to the reactor sites.

Government Support/Approvals Needed, Relationships with Critical Development Partners/Vendors and Other Government Regulation

Due to our long fuel development timelines to commercialization and the significant amount of R&D funding required to bring our next generation nuclear fuel technology to market, substantial U.S. government funding and political support will be essential to the success of our nuclear fuel development program. Without significant U.S. government funding and cost sharing contributions toward our fuel development activities, it will be unfeasible for the Company to fund all of its future fuel development efforts on its own.

The Biden administration's energy policy includes proposals for advanced nuclear as part of "critical clean energy technologies." We understand that the administration is prioritizing advanced nuclear technologies, including advanced fuels and SMRs, as part of its nuclear energy policy. President Biden has brought the U.S. back into the Paris Agreement on climate change, with the goal that the U.S. electricity sector be carbon neutral by 2035, just 12 years from now. We believe Lightbridge Fuel's™ coupling with SMRs can enhance the already strong case for SMRs and attract more private and government investment.

In addition to U.S. government funding, political support for our project is similarly important. The sales and marketing of our services and technology internationally may be subject to U.S. export control regulations, including 10 C.F.R. Part 810 and 10 C.F.R. Part 110, and the export control laws of other countries. Governmental authorizations may be required before we can export our services or technology or collaborate with foreign entities. NRC regulations at 10 C.F.R. Part 110 govern the export and import of nuclear equipment and material. Part 810 generally governs the exports of technology for development, production, or use (see 10 C.F.R. §810.3 for definitions of these terms) of reactors, equipment and material subject to Part 110. If authorizations are required and not granted, our international business could be materially affected. Furthermore, the export authorization process is often time consuming and any delays could impact our fuel development and commercialization timelines. Violation of export control regulations could subject us to fines and other penalties, such as losing the ability to export for a period of years, which would limit our revenue growth opportunities and significantly hinder our attempts to expand our business internationally.

The testing, fabrication and use of nuclear fuels by our future partners, licensees and nuclear power generators will be heavily regulated. The test facilities and other locations where our fuel designs may be tested before commercial use require governmental approvals from the host country's nuclear regulatory authority. The responsibility for obtaining the necessary regulatory approvals will lie with our research and development contractors that conduct such tests and experiments. Nuclear fuel fabricators, which will ultimately fabricate fuel using our technology under commercial licenses from us, are similarly regulated. Utilities that operate nuclear power plants that may utilize the fuel produced by these fuel fabricators require specific licenses relating to possession and use of nuclear materials as well as numerous other governmental approvals for the ownership and operation of nuclear power plants.

Our Intellectual Property

Our intellectual property rights include multiple U.S. and international patents and patent applications, trade secrets, trademark rights, and contractual agreements. Our patent applications are directed to our proprietary nuclear fuel technology and we seek additional patent protection for our fuel designs, development, and related alternatives by filing patent applications in the U.S. and other countries as appropriate.

We received 4 new patents in 2022 and currently have 13 pending patent applications. As of December 31, 2022, we held 5 U.S. patents and more than 140 foreign patents. The expiration dates of these patents, unless it's a divisional patent filing, are generally 20 years from their application dates. Our U.S. patents begin to expire in 2027.

We ensure that we own intellectual property created for us by employees, independent contractors, consultants, companies, and any other third party by signing agreements with them that assign any intellectual property rights to us.

We have established business procedures designed to maintain the confidentiality of our proprietary information, including the use of confidentiality agreements with employees, independent contractors, consultants and entities with which we conduct business.

In addition to our patent portfolio, we also own trademarks to the Lightbridge corporate name and the Lightbridge logo.

Human Capital Management

As of December 31, 2022, we had five full-time employees and utilized a network of independent contractors, outside agencies and technical facilities with specific skills to assist with various business functions including, but not limited to, corporate, financial, personnel, research and development, and communications. This allows us to draw upon resources that are specifically tailored to our internal and client needs. The Company's headquarters is in Reston, Virginia.

Our Culture

Our mission is to help the world combat climate change and meet energy goals. We are passionate about understanding the needs of our society, and we work hard to develop our next generation nuclear fuel. We also believe that supporting our team with a wonderful work environment supports and empowers us to accomplish our goals. The Company's human resource professional is a resource available for employees regarding the development of their careers and training. We also have physical and mental health programs that are available to our employees. We believe that our relationship with our employees and contractors is satisfactory.

Diversity and Inclusion

To truly help the world combat climate change, we need to work with a diversity of partners as well as have a diverse workforce. We also must operate with a high degree of awareness of evolving social conditions and social justice and create policy accordingly. We acknowledge that these measures evolve over time and we are committed to improving our policies as awareness of social inequities or injustice arise. We believe an equitable and inclusive environment with diverse teams produces more creative solutions and results in better outcomes for our employees and stakeholders. We strive to attract, retain and promote diverse talent at all levels of the organization.

Available Information

We make available, free of charge on our website, www.ltbridge.com, our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, including exhibits, and amendments to those reports filed or furnished pursuant to Sections 13(a) and 15(d) of the Securities Exchange Act of 1934, as amended, as soon as reasonably practicable after such reports are electronically filed with, or furnished to, the Securities and Exchange Commission (SEC). The SEC also maintains an internet site that contains reports, proxy and information statements and other information regarding issuers that file electronically with the SEC at www.sec.gov. The information posted on our website is not incorporated into this Annual Report on Form 10-K, and any reference to our website is intended to be inactive textual references only.

ITEM 1A. RISK FACTORS

Our business faces significant risks. You should carefully consider all the information set forth in this annual report and in our other filings with the SEC, including the following risk factors which we face, and which are faced by our industry. Our business, financial condition, and results of operations could be materially and adversely affected by any of these risks. In that event, the trading price of our common stock would likely decline, and you might lose all or part of your investment. This report also contains forward-looking statements that involve risks and uncertainties. Our results could materially differ from those anticipated in these forward-looking statements, as a result of certain factors including the risks described below and elsewhere in this report and our other SEC filings. See also "Forward-Looking Statements" above.

Risks Related to Our Business

We will need to raise significant additional capital in the future to expand our operations and continue our R&D activities and we may be unable to raise such funds when needed on acceptable terms, or at all. Any capital raises may cause significant dilution to our shareholders.

As of December 31, 2022, we had $28.9 million in cash and cash equivalents. We have experienced substantial and recurring losses from operations, which has created an accumulated deficit of $144.5 million as of December 31, 2022. We will continue to incur losses because we are in the early development stage of commercializing our nuclear fuel.

We will need to raise significant additional capital (up to several hundred million dollars) in order to continue our R&D activities and fund our operations through the commercialization of our nuclear fuel. Our current plan is to maximize external funding from third party sources, including the DOE, to support the remaining development, testing and demonstration activities relating to our metallic nuclear fuel technology.

When we elect to raise additional funds or additional funds are required, we may raise such funds from time to time through public or private equity offerings, debt financings or other financing alternatives. Additional equity or debt financing, or other alternative sources of capital may not be available to us on acceptable terms, if at all. If we are unable to meet our future financial obligations, we could be forced to delay, reduce, or cease our operations, including substantially decrease or suspend our R&D activities, or otherwise impede our ongoing business efforts, which could have a material adverse effect on our business, operating results, financial condition, and long-term prospects, and, investors may lose their entire investment in the Company. In addition, if we are unable to demonstrate meaningful progress to further the development of our fuel products, it may be difficult for us to raise additional capital on terms acceptable to us or at all.

When we raise additional funds by issuing equity securities, our stockholders will experience dilution. Sales of substantial amounts of our common stock may cause the trading price of our common stock to decline in the future. New investors may have rights superior to existing securityholders. Debt financing, if available, would result in substantial fixed payment obligations and may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures, or declaring dividends. Any debt financing or additional equity that we raise may contain terms, such as liquidation and other preferences, which are not favorable to us or our stockholders. If we are unable to raise additional capital in sufficient amounts or on terms acceptable to us, we may not be able to fully develop our nuclear fuel designs, our future operations will be limited, and our ability to generate revenues and achieve or sustain future profitability will be substantially harmed. In particular, we may be required to delay, reduce the scope of or terminate one or more of our research projects, sell rights to our nuclear fuel technology or license the rights to such technologies on terms that are less favorable to us than might otherwise be available.

We are dependent upon significant U.S. government funding and political support for nuclear power in order to complete our fuel development efforts and commercialize our nuclear fuel technology.

Our projected fuel development timeline is dependent upon significant funding from the U.S. government to not only support our ongoing R&D efforts, but to provide confidence to our investors and reduce the need to raise funds through the issuance of additional dilutive equity securities. Government funding of R&D is subject to the political process, which is inherently unpredictable and highly competitive. The funding of government programs is dependent on budgetary limitations, congressional appropriations and administrative allotment of funds, all of which are uncertain and may be affected by changes in U.S. government policies resulting from various political developments. If political support for the prioritization of the development of nuclear energy decreases, including due to policy changes by the Biden administration and future administrations and changing congressional funding priorities, it may affect our ability to secure government funding which would adversely affect our business, fuel development timeline, financial condition, and results of operations.

Changes to, or termination of, any agreements with the U.S. government national laboratories, or deterioration in our relationship with the U.S. government, could adversely affect our research and development activities.

We are a party to agreements and arrangements with U.S. national laboratories that are subject to review and approval by the DOE and which are important to our R&D activities. Termination, expiration, or modification of one or more of these or other agreements could adversely affect our future prospects to develop our fuel and/or commercially deploy it. In addition, deterioration in our relationship with the U.S. national laboratories that are parties to these agreements and/or the DOE could impair or impede our ability to successfully implement these agreements, which could adversely affect our R&D activities. Also, a COVID-19 outbreak, including the emergence and spread of variant strains of the virus or other pathogens, may affect future operations of the U.S. national laboratories.

The amount of time and funding needed to bring our nuclear fuel to market may greatly exceed our projections.

The development of our nuclear fuel will take a significant amount of time and funding, and any shortfall in R&D funding levels or a delay in achieving fuel development milestones, or uncertainty in regulatory licensing timelines could result in significant delays and cost overruns. We cannot at this stage accurately predict the amount of funding or the time required to successfully manufacture and sell our nuclear fuel in the future. However, our best estimate at this time is that our metallic fuel development program is expected to take 15-20 years and cost several hundred million U.S. dollars before we can secure our initial commercial order for a batch reload. The actual cost and time required to commercialize our fuel technology may vary significantly depending on, among other things, the results of our research and product development efforts; the cost of developing or licensing our nuclear fuel; changes in the focus and direction of our research and product development programs; access to test reactor loops and/or other test facilities; competitive and technological advances; the cost of filing, prosecuting, defending and enforcing claims with respect to patents; the regulatory approval process; fuel manufacturing process; availability of metallic high assay low enriched uranium, and marketing and other costs associated with commercialization of these technologies. Because of this uncertainty, even if financing is available to us, we may need significantly more capital than anticipated, which may not be available on terms acceptable to us or at all, and the expected revenues and other expected benefits from our nuclear fuel technology may be delayed or never realized.

Our current economic model for selling our nuclear fuel may prove to be inaccurate and subject to competition and our nuclear fuel technology products may not be cost effective.

Although our preliminary economic model concludes that our nuclear fuel technology may provide a significant payback to utilities, it is based upon a number of assumptions that may not prove to be accurate. If our model is inaccurate, our nuclear fuel product may not provide nuclear utility customers with sufficient economic incentive to switch from existing nuclear fuels, and we could lose or fail to develop customers. For example, if ATF is successful in extending the cycle length from 18 to 24 months in existing PWRs, it could severely weaken or undermine the anticipated economic value of our nuclear fuel for large PWRs.

Separately, our economic model for SMRs is in the development stage and its viability is subject to favorable wholesale power prices in the markets in which our nuclear fuel may be used, the necessary upfront capital investment to enable a 30% power uprate in future SMRs using our nuclear fuel and the future costs of uranium metallization and fabrication of our fuel rods and fuel assemblies at commercial scale, all of which are inherently unpredictable.

Additionally, we believe our metallic fuel can be used in CANDU heavy water reactors. However, we have yet to conduct a feasibility study to confirm our fuel's suitability for those types of reactors. As a result, we do not yet have an economic model for CANDU-type reactors and are uncertain at this time as to potential economic benefits, if any, our metallic fuel could provide in those types of reactors.

A failure of our current and future economic models, or a failure to find a strategic alternative, such as a potential business combination partner, would adversely affect our business, financial condition, and results of operations and may result in the failure of the Company.

Development of our nuclear fuel technology is dependent upon the availability of a test reactor.

Our fuel designs are still in the research and development stage and further research, development, and demonstration will be required in test facilities. We had intended to conduct further testing of our fuel designs at the Halden research reactor located in Halden, Norway. However, the Halden research reactor, which became operational in 1958, was shut down in June 2018 and will not reopen. The Company has identified alternative options to generate the irradiation data we need to support regulatory licensing of our LTA operation in a commercial reactor but pursuing such alternatives to the Halden research reactor may significantly delay further testing of our fuel designs. We may not be able to contractually secure another reactor in which to test our fuel designs. As a result, commercialization of our nuclear fuel technology may be significantly delayed, perhaps indefinitely, which would adversely affect our business, financial condition, and results of operations.

Our current R&D plan includes the use of research reactors made available by the U.S. government and the DOE, including but not limited to the ATR at INL. These reactors are limited in terms of technical capabilities, operating cycles, and prior reservations for similar research and development services. While the ATR may have enough space for additional flow loops where fuel rods can be irradiated, the reactor currently has only one such loop available, limiting how much fuel rod material that can be inserted into the reactor as well as its duration in the reactor. If new loops are not added to the ATR, loop irradiation testing in the ATR may not provide sufficient data to justify regulatory approval for LTA testing in a large commercial PWR in a commercially feasible timeframe. This would likely necessitate an extra fuel development step of LTR testing in a large commercial PWR in addition to the ATR loop testing before LTA testing could commence.

Funding for any improvement of capabilities or continued operations of these reactors is subject to the priorities of the U.S. government, as well as the appropriation of funding by the U.S. Congress, and cannot be assured. Changes in these factors are outside of the Company's control and could cause significant delays and/or cost increases in our R&D programs.

Our fuel designs have never been tested in an existing commercial reactor and actual fuel performance, as well as the willingness of commercial reactor operators and fuel fabricators to adopt a new design, is uncertain.

Nuclear power research and development entails significant technological risk. New designs must undergo extensive development and testing necessary for regulatory approval. Our fuel designs are still in the research and development stage and, while certain testing on our fuel technologies has been completed, further testing and experiments will be required in order to achieve commercialization. For example, our proposed metallic fuel uses a helical multi-lobe form to increase its surface area and shorten the distance for heat generated in the fuel rod to reach water, resulting in an improved ability to cool the fuel. However, this proposed shape may also result in non-uniform distribution of heat flux that may have an adverse impact on the critical heat flux and limit power uprate capabilities of our metallic fuel. Additional testing and development may result in changes to the design of our proposed metallic fuel, which could decrease its realizable benefits and impair the ability of nuclear utilities to utilize nuclear fuel incorporating our technology.

Furthermore, the fuel technology has yet to be sufficiently demonstrated in operating conditions equivalent to those found in an existing commercial reactor. Until we are able to successfully demonstrate operation of our fuel designs in commercial reactor conditions, we cannot confirm the ability of our nuclear fuel to perform as expected, including its ability to enable a power uprate, a longer operating cycle, or other anticipated performance and safety benefits. In addition, there is also a risk that suitable testing or manufacturing facilities may not be available to us on a timely basis or at a reasonable cost, which could cause development program schedule delays and/or cost overruns.

There is also a risk that fuel fabricators that manufacture and supply commercial nuclear fuel assemblies to nuclear utility customers may not enter into a commercial arrangement with us relating to our metallic nuclear fuel designs. A failure to enter into a commercial arrangement with one or more of existing nuclear fuel fabricators could adversely affect our business, financial condition, and results of operations and may result in the failure of the Company.

If our fuel designs do not perform as anticipated in commercial reactor conditions, we will not realize revenues from licensing or other use of our fuel designs.

Existing commercial nuclear infrastructure in many countries is limited to uranium material in dioxide form with enrichments limited to 5%. Our nuclear fuel will be in a metallic form and will be enriched to higher levels, which will require modifications to existing commercial nuclear infrastructure and could impede commercialization of our technology.

Existing commercial nuclear infrastructure, including conversion facilities, enrichment facilities, fabrication facilities, fuel storage facilities, fuel handling procedures, fuel operation at reactor sites, used fuel storage facilities and shipping containers, were in most cases designed and are currently licensed to handle uranium in oxide form with enrichment up to 5% of the isotope uranium-235. Our fuel designs are expected to use uranium metal with uranium enrichment levels up to 19.75% and would therefore require certain modifications to existing commercial nuclear infrastructure to enable commercial nuclear facilities to handle our fuels. Those nuclear facilities will need to complete a regulatory licensing process and obtain regulatory approvals to be able to process, handle, or ship uranium metal with enrichment levels up to 19.75% and operate commercial reactors using our metallic fuel. There is significant risk that some relevant entities within the nuclear power industry may be slow in making any required facility infrastructure modifications or obtaining required licenses or approvals to enable enrichment to 19.75%, de-conversion to metallic uranium, fabrication of metallic fuel rods and assemblies, shipment of fresh and irradiated metallic fuel assemblies, interim storage of fresh and irradiated fuel assemblies in spent fuel pools or dry cask storage facilities at reactor sites, or permanent disposal of spent metallic fuel at a high-level repository, or may not make the necessary modifications at all. There is also a risk associated with possible negative perception of uranium enrichment greater than 5% that could potentially delay or hinder regulatory approval of our nuclear fuel designs.

Our nuclear fuel designs rely on fabrication technologies that in certain material ways are different from the fabrication techniques presently utilized by existing commercial fuel fabricators. In particular, our metallic fuel rods must be produced using a co-extrusion fabrication process. Presently, most commercial nuclear fuel is produced using a pellet fabrication technology, whereby uranium dioxide is formed into small pellets which are stacked and sealed inside metallic tubes. Our co-extrusion fabrication technology involves co-extrusion of a composite solid fuel rod from a metallic matrix containing uranium and zirconium alloy. Fabrication of full-length (approximately 12 to 14 feet) PWR metallic fuel rods for large reactors and shorter length for SMRs or CANDUs has yet to be sufficiently demonstrated for our uranium-zirconium fuel. There is a risk that the fuel fabrication process utilized to date to produce our metallic fuel rods may not be feasibly adapted to the fabrication of full-length metallic fuel rods usable in commercial reactors.

The cost of production of our nuclear fuel could be prohibitively expensive.

In order for our metallic fuel to succeed, we will need to be able to produce our nuclear fuel at a price that is economically viable. We have received estimates that production of our nuclear fuel could be achieved at a commercial scale for approximately $5,000 to $10,000 per kilogram using known metallization/de-conversion technologies. To bring the cost of metallization/de-conversion further down, we estimate that it would require a new government-funded research and development program that could take 15-20 years or longer and cost several billion dollars. There can be no assurance that we will be able to produce our nuclear fuel at a price that is economically feasible or that future research efforts will lower the cost of production. If we are unable to produce our nuclear fuel at a price that is economically viable, the market for our nuclear fuel may never develop and our current business model will fail.

We are part of the nuclear power industry, which is highly regulated. Our fuel designs differ from fuels currently licensed and used by commercial nuclear power plants. The regulatory licensing and approval process for nuclear power plants to operate with our nuclear fuels may be delayed and made more costly, and industry acceptance of our nuclear fuels may be hampered.

The nuclear power industry is a highly regulated industry. All entities that operate nuclear facilities and transport nuclear materials are subject to the jurisdiction of the NRC or its counterparts around the world. Our fuel designs differ significantly in some aspects from the fuel used today by commercial nuclear power plants. These differences will likely result in more prolonged and extensive review by the NRC and its counterparts around the world that could cause fuel development program delays and delays in commercialization. Entities within the nuclear industry may be hesitant to be the first to use our nuclear fuel, which currently has no history of commercial use. Furthermore, our fuel development timeline relies on the relevant nuclear regulator to accept and approve technical information and documentation about our nuclear fuel that is generated during the fuel qualification program. There is a risk that regulators may require additional information regarding the fuel's behavior or performance which necessitates additional, unplanned analytical and/or experimental work which could cause program schedule delays and require more research and development funding.

Successful execution of our business model is dependent upon public support for nuclear power and overcoming public opposition to nuclear energy.

Successful execution of our business model is dependent upon public support for nuclear power in the United States and other countries. Nuclear power faces strong opposition from certain competitive energy sources, individuals, and organizations. The accident that occurred at the Fukushima nuclear power plant in Japan beginning on March 11, 2011 increased public opposition to nuclear power in some countries, resulting in a slowdown in or, in some cases, a complete halt to new construction of nuclear power plants, early shut down of existing power plants, or dampening of the favorable regulatory climate needed to introduce new nuclear technologies. As a result of the Fukushima accident, some countries that were considering launching new domestic nuclear power programs have delayed or cancelled preparatory activities they were planning to undertake as part of such programs. Furthermore, nuclear fuel fabrication and the use of new nuclear fuels in reactors must be licensed by the NRC and equivalent governmental authorities around the world. In many countries, the licensing process includes public hearings in which opponents of the use of nuclear power might be able to cause the issuance of required licenses to be delayed or denied.

Our nuclear fuel fabrication process is dependent on outside suppliers of nuclear and other materials and any difficulty by a fuel fabricator in obtaining these materials could be detrimental to our ability to eventually market our nuclear fuel through a fuel fabricator.

Production of fuel assemblies using our nuclear fuel designs is dependent on the ability of fuel fabricators to obtain supplies of nuclear material utilized in our fuel assembly design. Our proposed nuclear fuel products require HALEU in metallic form, enriched between 5% and 19.75% in the isotope uranium-235, with presently no commercial supply of HALEU available in the U.S. Currently HALEU can only be sourced in limited quantities from the DOE.

Fabricators will also need to obtain metal for components, particularly zirconium or its alloys. These materials are regulated and can be difficult to obtain or may have unfavorable pricing terms. Any difficulties in obtaining these materials by fuel fabricators could have a material adverse effect on their ability to market fuel based on our technology.

Labor shortages and supply chain disruptions could prevent us from meeting our R&D timelines and have a negative impact on our financial results.

Shipping delays exist worldwide, as there is much greater demand for shipping and reduced capacity. Additionally, certain material and equipment prices are expected to remain at historically high levels in 2023 due to inflationary cost pressures and global transportation complexities. We may experience supply chain disruptions related to third-party vendors negatively impacted by the availability of qualified labor, restrictions on employees' ability to work, facility closures, disruptions to ports and other shipping infrastructure, border closures and other travel or health-related restrictions. These disruptions may impact our supply chain and delay the development of our nuclear fuel technology, which could negatively impact our financial results and our ability to execute timely on our R&D strategy, should they persist.

If the price of non-nuclear energy sources falls, whether as the result of government policy or otherwise, there could be an adverse impact on nuclear energy, which would have a material adverse effect on our operations.

In certain markets with a diversified energy base, decisions on new build power plants are largely affected by the economics of various energy sources. If prices of non-nuclear energy sources fall, it could limit the deployment of new build nuclear power plants in such markets. This could reduce the size of the potential markets for our nuclear fuel technology.

In addition, the U.S. federal government and many states have adopted a variety of government subsidies and utility incentives to allow renewable energy sources, such as biofuels, wind and solar energy, to compete with conventional sources of energy that have historically been less expensive, such as fossil fuels and nuclear power. We may face additional indirect competition from providers of renewable energy sources, particularly in wind and solar energy, if government subsidies and utility incentives for those sources of energy remain or increase or if such sources of energy are mandated. Additionally, the availability of subsidies and other incentives from utilities or government agencies to install alternative renewable energy sources may negatively impact our potential customers' desire to purchase our products and services, or may be utilized by our existing or new competitors to develop a competing business model or products or services that may be potentially more attractive to customers than ours, any of which could have a material adverse effect on our results of operations or financial condition.

We rely upon our senior management and other highly skilled personnel, and if we are not successful in retaining or attracting highly qualified personnel, we may not be able to successfully implement our business strategy.

Our success depends, in significant part, upon our senior management, including Seth Grae, our Chief Executive Officer, Andrey Mushakov, our Executive Vice President - Nuclear Operations, and Larry Goldman, our Chief Financial Officer. Mr. Grae's and Dr. Mushakov's knowledge of the nuclear power industry, their networks of key contacts within that industry and in governments and, in particular, their expertise in the potential markets for our technologies, are critical to the implementation of our business strategy. Mr. Grae, Dr. Mushakov, and Mr. Goldman are likely to be significant factors in our future growth and success. Our success also depends on our ability to attract, motivate, develop, and retain a sufficient number of other highly skilled personnel, including consultants, managers, and nuclear engineers. Competition for employees and consultants in the nuclear industry is intense, partially as a result of a recent resurgence in the nuclear industry after decades of relative decline, and we may not be successful in attracting and retaining such personnel. For example, a senior nuclear engineer recently resigned from the Company and became a consultant to the Company. The Company may be unsuccessful in finding a replacement for this senior nuclear engineer on comparable terms. In addition, while we intend to partner with other entities in developing and commercializing our nuclear fuel technology, such other entities may also have difficulty in attracting and retaining nuclear engineers and other personnel and may not have adequate resources to dedicate to our joint projects.

The loss of services by any of Mr. Grae, Dr. Mushakov, or Mr. Goldman, or the inability of us or our partners to retain or attract highly skilled personnel, could delay or suspend development and commercialization of our nuclear fuel technology, adversely affect our ability to meet customer needs, or increase our expenses, any of which could have a material adverse effect on our business, results of operations or financial condition.

Competition for highly qualified technical personnel is intense in our industry.

Our future success depends in part on our ability to contract with, hire, integrate, and retain engineers and scientists, and other qualified personnel with a focus in our nuclear fuel technology and products. Competition for these skilled professionals is intense. If we are unable to adequately anticipate our needs for certain key competencies and implement human resource solutions to recruit or improve these competencies, our business, results of operations and financial condition would suffer. In addition, a loss of the service of any of our existing skilled employees or contractors could have a significant negative effect on our ability to operate.

We may not be able to receive or retain authorizations that may be required for us to sell or license our technology internationally.

The sales and marketing of our technology internationally may be subject to U.S. export control regulations and the export control laws of other countries. Governmental authorizations may be required before we can export our technology. If authorizations are required and not granted, our international business could be materially affected. The export authorization process is often time consuming. Violation of export control regulations could subject us to fines and other penalties, such as losing the ability to export for a period of years, which would limit our revenue growth opportunities and significantly hinder our attempts to expand our business internationally.

Potential competitors could limit opportunities to license our technology.

Other companies may develop new nuclear fuel designs that can be used in the same types of reactors as those that we target. These nuclear fuel designs include, but are not limited to, the ATFs currently being developed and tested by several U.S. and international nuclear fuel suppliers, some with the support of the DOE, which could undermine our nuclear fuel's economic value proposition if ATFs are proven to extend the operating cycle length from 18 to 24 months. Some of these companies have existing long-term commercial contracts with nuclear power utilities that we do not have. If another company were to successfully develop a new nuclear fuel that competes with our nuclear fuel design technology, opportunities to commercialize our technology would be limited, and our business would suffer.

Moreover, many of these other companies have substantially greater financial, technological, managerial and research and development resources and experience than we do. These larger companies may be better able to handle the corresponding long-term financial requirements to successfully develop new nuclear fuel and bring it to market.

If the DOE were to successfully assert that an invention claimed within our 2007 or 2008 Patent Cooperation Treaty, or PCT, patent applications was first conceived or actually reduced to practice under a contract with the DOE, then our intellectual property rights in that invention could become compromised and our business model could become significantly impeded.

Work on finite aspects and/or testing of some subject matter disclosed in our 2007 and 2008 Russian PCT patent applications was done under a government contract with the DOE. If the DOE asserted that an invention claimed in the 2007 and/or 2008 Russian PCT applications was first conceived or actually reduced to practice under such a contract, and a U.S. court agreed, the DOE could gain an ownership interest in such an invention outside of the Russian Federation and our intellectual property rights in that claimed invention could become compromised and our business model may then be significantly impeded.

If we infringe or are alleged to infringe intellectual property rights of third parties, our business, financial condition, and results of operations could be adversely affected.

Our nuclear fuel designs may infringe, or be claimed to infringe, patents or patent applications under which we do not hold licenses or other rights. Third parties may own or control these patents and patent applications in the United States and elsewhere. Third parties could bring claims against us that would cause us to incur substantial expenses and, if successfully asserted against us, could cause us to pay substantial damages. If a patent infringement suit were brought against us, we could be forced to stop or delay commercialization of the fuel design or a component thereof that is the subject of the suit. As a result of patent infringement claims, or in order to avoid potential claims, we may choose or be required to seek a license from the third party and be required to pay license fees, royalties, or both. These licenses may not be available on acceptable terms, or at all. Even if we were able to obtain a license, the rights may be nonexclusive, which could result in our competitors gaining access to the same intellectual property. Ultimately, we could be forced to cease some aspect of our business operations if, as a result of actual or threatened patent infringement claims, we are unable to enter into licenses on acceptable terms. This could significantly and adversely affect our business, financial condition, and results of operations. In addition to infringement claims against us, we may become a party to other types of patent litigation and other proceedings, including interference proceedings declared by the United States Patent and Trademark Office regarding intellectual property rights with respect to our nuclear fuel designs. The cost to us of any patent litigation or other proceeding, even if resolved in our favor, could be substantial. Some of our competitors may be able to sustain the costs of such litigation or proceedings more effectively than we can because of their greater financial resources. Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings could have a material adverse effect on our ability to compete in the marketplace. Patent litigation and other proceedings may also absorb significant management time.

We are exposed to risks related to cybersecurity and protection of confidential information.

We retain highly confidential information in our systems and databases on third party network providers. Although we maintain security features in our systems designed to protect proprietary information and prevent data loss and other security breaches, such measures cannot provide absolute security and our operations may be susceptible to breaches on our third party networks, including from circumvention of security systems, denial of service attacks or other cyber-attacks, hacking, computer viruses or malware, technical malfunction, employee error, malfeasance, physical breaches, system disruptions or other disruptions. We outsource certain functions, including IT functions, and these relationships allow for the storage and processing of our information, as well as customer, counterparty, and employee information. While we engage in actions to reduce our exposure resulting from outsourcing, ongoing threats may result in unauthorized access, loss, exposure or destruction of data, or other cybersecurity incidents, with increased costs and other consequences, including those described below.

Disruptions from cybersecurity events may jeopardize the security of information stored in and transmitted through our systems or the systems of outsourcing parties. An increasing number of websites, including those owned by several other large internet and offline companies, have disclosed breaches of their security, some of which have involved sophisticated and highly targeted attacks on portions of their websites or infrastructure. The techniques used to obtain unauthorized access, disable, or degrade service, or sabotage systems, change frequently, may be difficult to detect for a long time, and often are not recognized until launched against a target. Certain efforts may be state sponsored and supported by significant financial and technological resources and therefore may be even more difficult to detect. We may not anticipate these techniques or implement adequate preventive measures. We currently expend and may be required to expend significant additional capital and other resources to protect against such security breaches or to alleviate problems caused by such breaches. Our insurance coverage may be inadequate to compensate us for any related losses we incur.

These issues are likely to become more difficult as we expand our operations. Any breach of our security measures, or even a perceived breach of our security measures, could cause us to lose potential customers and governmental approvals; suffer material harm to our business, financial condition, operating results and reputation; or be subject to regulatory actions, litigation, sanctions or other statutory penalties.

Technological changes could render our technology and products uncompetitive or obsolete, which could prevent us from achieving market share and sales.

Our failure to refine or advance our fuel technologies could cause our nuclear fuel to become uncompetitive or obsolete, which could prevent us from achieving market share and sales. We may need to invest significant financial resources in research and product development to keep pace with technological advances in the industry and to compete in the future; we may be unable to secure such financing. A variety of competing alternative technologies may be in development by other companies that could result in lower manufacturing costs and/or higher fuel performance than those expected for our fuel products. Our development efforts may be rendered obsolete by the technological advances of others, and other technologies may prove more advantageous for commercialization.

We may acquire other companies or technologies, which could divert our managements' attention, result in dilution to our stockholders and otherwise disrupt our operations and adversely affect our operating results.

We may in the future seek to acquire or invest in businesses, applications and services or technologies that we believe could complement or expand our Company, enhance our technical capabilities or otherwise offer growth opportunities. The pursuit of potential acquisitions may divert the attention of management and cause us to incur various expenses in identifying, investigating and pursuing suitable acquisitions, whether or not they are consummated.

If we acquire additional businesses, we may not be able to integrate the acquired personnel, operations and technologies successfully, or effectively manage the combined business following the acquisition. We also may not achieve the anticipated benefits from the acquired business due to a number of factors, including:

- inability to integrate or benefit from acquired technologies or services in a profitable manner;
- unanticipated costs or liabilities associated with the acquisition;
- difficulty integrating the accounting systems, operations and personnel of the acquired business;
- diversion of management's attention from other business concerns;
- adverse effects to our existing business relationships with business partners as a result of the acquisition;
- the potential loss of key employees;
- use of resources that are needed in other parts of our business; and
- use of substantial portions of our available cash to consummate the acquisition.

In addition, a significant portion of the purchase price of companies we acquire may be allocated to acquired goodwill and other intangible assets, which must be assessed for impairment at least annually. In the future, if our acquisitions do not yield expected returns, we may be required to take charges to our operating results based on this impairment assessment process, which could adversely affect our results of operations.

Acquisitions could also result in dilutive issuances of equity securities or the incurrence of debt, which could adversely affect our operating results. In addition, if an acquired business fails to meet our expectations, our operating results, business and financial position may suffer.

If we are unable to obtain or maintain intellectual property rights and trade secrets relating to our technology, the commercial value of our technology may be adversely affected, which could in turn adversely affect our business, financial condition, and results of operations.

Our success and ability to compete depends in part upon our ability to obtain protection in the United States and other countries for our nuclear fuel designs by establishing and maintaining intellectual property rights relating to or incorporated into our fuel technologies and products. We own a variety of patents and patent applications in the United States, as well as corresponding patents and patent applications in several other jurisdictions. We have not obtained patent protection in each market in which we plan to compete. We do not know how successful we would be should we choose to assert our patents against suspected infringers. Our pending and future patent applications may not issue as patents or, if issued, may not issue in a form that will be advantageous to us. Even if issued, patents may be challenged, narrowed, invalidated, or circumvented, which could limit our ability to stop competitors from marketing similar products or limit the length of term of patent protection we may have for our products. Changes in patent laws or in interpretations of patent laws in the United States and other countries may diminish the value of our intellectual property or narrow the scope of our patent protection, which could in turn adversely affect our business, financial condition, and results of operations.

Additionally, sanctions or other restrictions on payments made to Russia imposed by the United States government in response to Russia's invasion of Ukraine may make it more difficult for us to maintain patent protection in certain foreign jurisdictions. Certain of our patents are maintained by the Eurasian Patent Office and the Russian patent office, Rospatent. Each of the Eurasian Patent Office and Rospatent use the Russian Central Bank to process patent annuity payments. The U.S. Office of Foreign Assets Control (OFAC) has identified the Russian Central Bank as a sanctioned entity. Paying a Russian firm or agent to make payments that will be processed by the Russian Central Bank could be deemed an act of evading or avoiding sanctions. On May 5, 2022, OFAC published General License 31, which created an exemption to such sanctions for payments made to maintain intellectual property rights. However, there can be no assurance that this exemption will be made permanent, and if it is rescinded, we may be unable to make the required annuity or other maintenance payments with respect to our Russian and Eurasian patents. If we are unable to make the required annuity or other maintenance payments, there can be no assurance that our Russian and Eurasian patents will continue to receive adequate protection in the applicable jurisdictions, which could have a material adverse effect on our patent portfolio.

Further, in response to the sanctions imposed by OFAC, the Russian government issued a decree in March 2022 stating that patent holders associated with foreign states that commit "unfriendly actions against Russian legal entities and individuals" will be entitled to no renumeration from the unsanctioned use of such patent holders' intellectual property. While the impact of this decree has yet to be determined, it may significantly undermine intellectual property protection in Russia. Because of this significant uncertainty with respect to the treatment of foreign owned patents maintained in Russia, there can be no assurance that we will be able to maintain adequate protection of our Russian patents.

We intend to apply for additional patents for our nuclear fuel technologies as we deem appropriate. We may, however, fail to apply for patents on important technologies or products in a timely fashion, if at all. Our existing patents and any future patents we obtain may not be sufficiently broad to prevent others from practicing our technologies or from developing competing products and technologies. In addition, in general the patent positions of energy technology companies are highly uncertain and involve complex legal and factual questions for which important legal principles remain unresolved. As a result, the validity and enforceability of our patents cannot be predicted with certainty.

We also rely on trade secrets to protect some of our technology, especially where it is believed that patent protection is undesirable for the Company or unobtainable. We generally require our employees, consultants, advisors, and collaborators to execute appropriate agreements with us regarding the safeguarding of confidential information. If any of these agreements are violated, or if any of our employees, consultants, advisors or collaborators unintentionally or willfully disclose our proprietary information to competitors, we may not be able to fully perfect our rights to the technologies in question, and in some instances, we may not have an appropriate remedy available for the damages that we may incur as a result of any such violation. Enforcement of claims that a third party has illegally obtained and is using trade secrets is expensive, time consuming and uncertain. In addition, courts outside the U.S. are sometimes less willing than U.S. courts to protect trade secrets. If our competitors independently develop equivalent knowledge, methods, and know-how, we would not be able to assert our trade secrets against them and our business could be harmed.

Applicable Russian intellectual property law may not protect some of our intellectual property, which could have a material adverse effect on our business.

Intellectual property rights have been evolving in Russia, and are trending towards international norms, but are still developing. We have worked closely with employees in Russia and other Russian contractors and entities to develop some of our material intellectual property. Some of our earlier intellectual property rights originate from our patent filings in Russia. Our worldwide rights in some of this intellectual property, therefore, may be affected by Russian intellectual property laws, including laws adopted in response to international sanctions against Russia or otherwise. In particular, in response to the sanctions imposed by OFAC as a result of Russia's invasion of Ukraine, the Russian government issued a decree in March 2022 stating that patent holders associated with foreign states that commit "unfriendly actions against Russian legal entities and individuals" will be entitled to no renumeration from the unsanctioned use of such patent holders' intellectual property. If the application of Russian laws to some of our intellectual property rights proves inadequate, or if the rights of foreign holders of intellectual property in Russia adversely change as a result of hostilities between Russia and other countries or otherwise, we may not be able to fully avail ourselves of all of our intellectual property, and our business model may be impeded.

The laws of certain foreign jurisdictions do not protect intellectual property rights to the same extent as the laws of the United States, and many companies have encountered significant challenges in protecting and defending such rights in such foreign jurisdictions. The legal systems of certain countries, particularly developing countries, do not favor the enforcement of patents and other intellectual property protection, which could make it difficult for us to stop the infringement of our patents. Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial cost and divert our efforts and attention from other aspects of our business.

We have identified a material weakness in our internal control over financial reporting.

Management, including our Chief Executive Officer and our Chief Financial Officer, assessed the effectiveness of our internal control over financial reporting as of December 31, 2022 and concluded that we did not maintain effective internal control over financial reporting. Specifically, management identified a material weakness relating to recording accounts payable invoices.

See Part II. Item 9A, Controls and Procedures, below for additional information about the material weakness.
While certain actions have been taken to implement a remediation plan to address this material weakness and to enhance our internal control over financial reporting, if this material weakness is not remediated, it could adversely affect our ability to report our financial condition and results of operations in a timely and accurate manner, which could negatively affect investor confidence in our Company, and, as a result, the value of our common stock could be adversely affected.

Risks Related to the Ownership of Our Common Stock

We may issue preferred stock with rights senior to our common stock.

We can issue preferred stock in one or more series and can set the terms of the preferred stock without seeking any further approval from the holders of our common stock. Any preferred stock that we issue may rank ahead of our common stock in terms of dividend priority or liquidation premiums, may have greater voting rights than our common stock, and may have consent rights over certain fundamental transactions. The interests of the holders of the preferred stock may as a consequence be different from the interests of the holders of our common stock, including in certain fundamental transactions in which the preferred stockholders would receive distributions before any distributions may be made to our common stockholders. In addition, such preferred stock may contain provisions allowing it to be converted into shares of common stock, which could dilute the value of our common stock to then current stockholders and could adversely affect the market price of our common stock.

There may be volatility in our stock price, which could negatively affect investments, and our stockholders may not be able to resell their shares at or above the value they originally purchased such shares.

The market price of our common stock may fluctuate significantly in response to a number of factors, some of which are beyond our control, including:

- trading volume of our common stock;
- quarterly variations in operating results;
- actual or anticipated variations in our results of operations or those of our competitors;
- failure to obtain or maintain analyst coverage of our common stock, changes in earnings estimates or recommendations by securities analysts, or our failure to achieve analyst earnings estimates;
- future sales of our common stock or other securities by us or our stockholders;
- general market conditions and other factors unrelated to our operating performance or the operating performance of our competitors; and
- the risks discussed elsewhere in this Annual Report on Form 10-K.

The stock market may experience extreme volatility that is often unrelated to the performance of particular companies. These market fluctuations may cause our stock price to fall regardless of the Company's performance.

If we are unable to comply with the listing requirements of the Nasdaq Capital Market, it would result in our common stock being delisted, which could affect its market price and liquidity and reduce our ability to raise capital.

If we fail to maintain compliance with, or otherwise fail to comply with, all applicable continued requirements, Nasdaq may determine to delist our common stock, which could substantially decrease trading in our common stock and adversely affect the market liquidity of our common stock and cause the market price of our common stock to decline. In addition, our ability to raise additional capital, including through future at-the-market offerings and other offerings utilizing short-form registration statements on Form S-3, would be substantially impaired.

The issuance of additional stock in connection with financings, acquisitions, investments, our stock incentive plans or otherwise will dilute all other stockholders.

Our amended and restated certificate of incorporation authorizes the Company to issue up to 25,000,000 shares of common stock and up to 10,000,000 shares of preferred stock with such rights and preferences as may be determined by our board of directors. Subject to compliance with applicable rules and regulations, we may seek to expand the number of authorized common shares, and issue shares of common stock or securities convertible into our common stock from time to time in connection with a financing, acquisition, investment, our stock incentive plans or otherwise. Any such issuance could result in substantial dilution to our existing stockholders and cause the trading price of our common stock to decline.

Our ability to utilize our net operating loss carryforwards to offset future taxable income will be limited.

Our ability to fully utilize our existing net operating losses (NOLs) generated after the tax year 2017 will be limited and the use of our NOLs generated prior to the 2018 tax year are severely limited, due to ownership changes in prior years as defined under Section 382 of the Internal Revenue Code. An "ownership change" is generally defined as a greater than 50% change in equity ownership by value over a rolling three-year period. Future NOLs generated will be limited if (i) we undergo an "ownership change" as described under Section 382, (ii) we do not reach profitability or are only marginally profitable, or (iii) there are changes in U.S. government laws and regulations. We did not perform a complete Section 382 study to determine the limitation on prior year NOLs, due to the long timeline for developing our nuclear fuel to commercialization to generate taxable income. Further, based on the results of our phase I Section 382 study, it's likely our NOLs generated prior to the 2018 tax year will expire unused given the 20-year carry forward period for these NOLs. Future ownership changes, some of which may be beyond our control, as well as differences and fluctuations in the value of our equity securities may adversely affect our ability to utilize our current and future NOLs and could reduce our flexibility to raise capital in future equity financings or other transactions, or we may decide to pursue transactions even if they would result in an ownership change and impair our ability to use our NOLs. We also may decide to pursue transactions even if they would result in an ownership change and impair our ability to use our NOLs. In addition, any changes to tax rules and regulations or the interpretation of tax rules and regulations could negatively impact our ability to recognize any potential benefits from our NOLs or net unrealized built-in losses.

Shareholder activism could cause us to incur significant expense, hinder execution of our business strategy and impact our stock price.

Shareholder activism, which can take many forms and arise in a variety of situations, could result in substantial costs and divert management and our board's attention and resources from our business. Additionally, such shareholder activism could give rise to perceived uncertainties as to our future, adversely affect our relationships with our employees or service providers and make it more difficult to attract and retain qualified personnel. Also, we may be required to incur significant fees and other expenses related to activist shareholder matters, including for third-party advisors. Our stock price could be subject to significant fluctuation or otherwise be adversely affected by the events, risks and uncertainties of any shareholder activism.

ITEM 1B. UNRESOLVED STAFF COMMENTS

Not applicable.

ITEM 2. PROPERTIES

Our office space is located at 11710 Plaza America Drive, Suite 2000 Reston, VA 20190 USA. The term of the lease extends through December 31, 2023. We are obligated to pay approximately $8,000 per month for office rent. This space is used by our executives, employees, and contractors for administrative purposes, consulting work, and research and development activities.

ITEM 3. LEGAL PROCEEDINGS

From time to time, we may become involved in various lawsuits and legal proceedings, which arise in the ordinary course of business. However, litigation is subject to inherent uncertainties, and an adverse result in these or other matters may arise from time to time that may harm our business. To its knowledge, the Company does not have any current pending legal issues or proceedings. For a description of legal proceedings that were resolved by the Company, see the information set under Litigation in Note 5. Commitments and Contingencies of the Notes to our Consolidated Financial Statements in Part II. Item 8. *Financial Statements and Supplementary Data,* of this Annual Report on Form 10-K.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS, AND ISSUER PURCHASES OF EQUITY SECURITIES

Our common stock is quoted on the Nasdaq Capital Market under the symbol "LTBR".

Holders

As of March 2, 2023, our common stock was held by approximately 53 stockholders of record, including Cede & Co., the nominee for the Depository Trust & Clearing Corporation, and consequently that number does not include beneficial owners of our common stock who hold their stock in "street name" through their brokers.

Dividends

We have never paid dividends. While any future dividends will be determined by our board of directors after consideration of the earnings and financial condition of the Company and other relevant factors, it is currently expected that available cash resources will be utilized in connection with our ongoing operations for the foreseeable future.

Transfer Agent

Our transfer agent and registrar for our common stock is Computershare Trust Company, 6200 S. Quebec Street, Greenwood Village, CO 80111. Its telephone number is 800-962-4284 and facsimile is 303-262-0604.

Recent Sales of Unregistered Securities

None.

ITEM 6. [RESERVED]

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following Management's Discussion and Analysis of Financial Condition and Results of Operations, or MD&A, is intended to help the reader understand Lightbridge Corporation, our operations, and our present business environment. MD&A is provided as a supplement to, and should be read in conjunction with, our Consolidated Financial Statements and the accompanying Notes thereto, which are contained in Part II. Item 8. *Financial Statements and Supplementary Data*, of this report. This discussion contains forward-looking statements that are based on our management's current expectations, estimates, and projections for our business, which are subject to a number of risks and uncertainties. Our actual results may differ materially from those anticipated in these forward-looking statements as a result of many factors, including those set forth under "Forward-Looking Statements" and Part I. Item 1A. *Risk Factors.*

This MD&A consists of the following sections:

- Overview of Our Business and Recent Developments – a general overview of our business and updates;
- Critical Accounting Policies and Estimates – a discussion of accounting policies that require critical judgments and estimates;
- Operations Review – an analysis of our consolidated results of operations for the periods presented in our consolidated financial statements; and
- Liquidity, Capital Resources, and Financial Position – an analysis of our cash flows, and an overview of our financial position.

As discussed in more detail under "Forward-Looking Statements" immediately preceding this MD&A, the following discussion contains forward-looking statements that are based on our management's current expectations, estimates, and projections, which are subject to a number of risks and uncertainties. Our actual results may differ materially from those discussed in these forward-looking statements because of the risks and uncertainties inherent in future events.

Overview of Our Business and Recent Developments

Our Business

Our Company's goal is to impact in a meaningful way the world's climate and energy problems. We are developing and plan to commercialize innovative, proprietary nuclear fuel designs, which we expect will significantly enhance the nuclear power industry's economics due to higher power output and longer fuel cycles, and we also expect the fuel will provide improved safety margins. We are an early-stage technology company in the product development phase and are pre-revenue. Our ongoing operations are currently being financed primarily by raising new equity capital.

Recent Developments

In the second half of 2022, we entered into agreements with Idaho National Laboratory (INL), in collaboration with the United States Department of Energy (DOE) to support the development of Lightbridge Fuel™. The framework agreements use an innovative structure and consist of an "umbrella" Strategic Partnership Project Agreement (SPP) and an "umbrella" Cooperative Research and Development Agreement (CRADA), each with Battelle Energy Alliance, LLC (BEA), the DOE's operating contractor for INL, with an initial duration of seven years. We anticipate that the initial phase of work under the two agreements that has been released will culminate in irradiation testing in the Advanced Test Reactor (ATR) of our fuel material coupons, using enriched uranium supplied by the DOE. The initial phase of work aims to generate irradiation performance data for Lightbridge's delta-phase uranium-zirconium alloy relating to various thermophysical properties. The data will support fuel performance modeling and regulatory licensing efforts for the commercial deployment of Lightbridge Fuel™. We anticipate that subsequent phases of work under the two umbrella agreements that have not yet been released will include post-irradiation examination of the irradiated fuel material coupons, loop radiation testing in the ATR, and post-irradiation examination of one or more uranium-zirconium fuel rodlets, as well as transient experiments at Transient Reactor Test Facility (TREAT) at INL.

The DOE's Office of Nuclear Energy has established the Gateway for Accelerated Innovation in Nuclear (GAIN) program to provide the nuclear community with access to the technical, regulatory, and financial support necessary to expedite moving new or advanced nuclear technologies toward commercialization, while ensuring the continued safe, reliable, and economic operation of the existing nuclear reactor fleet.

We were awarded our first GAIN voucher in 2019 for the experiment design for irradiation of fuel material coupons of Lightbridge metallic fuel in the ATR at INL. On April 22, 2020, we entered into a CRADA with BEA, the DOE's operating contractor at INL. The project commenced in the second quarter of 2020 and was originally expected to be completed in the second quarter of 2021. However, because of project staffing issues at INL related to the laboratory's COVID-19 restrictions and U.S. export control matters, the project was completed during the third quarter of 2021. The total project amount recorded as contributed services – research and development was approximately $0.5 million. This experiment design forms the basis of our current and future efforts with the INL.

The DOE awarded us a second voucher from the GAIN program to support development of Lightbridge Fuel™ in collaboration with Pacific Northwest National Laboratory (PNNL) on March 25, 2021. The scope of the project is to demonstrate Lightbridge's nuclear fuel casting process using depleted uranium, a key step in the manufacture of Lightbridge Fuel™. On July 14, 2021, the Company executed a CRADA with the Battelle Memorial Institute, Pacific Northwest Division, the operating contractor of the PNNL, in collaboration with the DOE. The project commenced in the third quarter of 2021. In December 2022, PNNL completed a contract extension with the Company for one month to complete the final report related to this PNNL GAIN voucher. The period of performance was extended to January 31, 2023. The work under this contract was completed in 2022, and a final report was issued by PNNL on January 31, 2023. The total project value was $0.7 million, with three-quarters of this amount provided by the DOE for the scope performed by PNNL. Under this GAIN voucher, we worked with PNNL to develop a reliable and repeatable casting process utilizing its existing equipment. As part of the scope, several castings were performed and the cast ingots analyzed. In an iterative process, the casting methodology was modified based on the characterization results as part of process demonstration to achieve acceptable results with PNNL's existing equipment. The results of this work will help to inform a final process suitable to produce fuel material coupons for our upcoming irradiation tests.

In June 2022, Lightbridge Fuel™ was selected to participate in a study led by the Massachusetts Institute of Technology (MIT to investigate the performance and economics of accident tolerant fuels for light water cooled small modular reactors (SMRs). Among other objectives, the project will simulate the fuel and safety performance of Lightbridge Fuel™ in an SMR designed by NuScale Power and provide a scoping analysis of longer-term advanced fuel forms to improve the safety and economics of SMRs. The DOE's Nuclear Energy University Program awarded $800,000 to MIT with the goal of bringing collaborative teams together to solve complex problems to advance nuclear technology and understanding.

We have incurred net losses and negative cash flows from operations and expect this to continue for the foreseeable future. In 2023, we will continue to evaluate spending with the overall goal of commercializing our nuclear fuel with the lowest research and development (R&D) cost, in order to maximize our shareholders' value. Our only source of funding in 2022 and 2021 was our at-the-market (ATM) financing arrangement with Stifel, Nicolaus & Company. Although we expect this ATM facility to continue to be a significant source of working capital for the Company in 2023, there is no assurance that an ATM financing arrangement will be available to us in the future (see liquidity outlook section below). Please also see Note 8. Stockholders' Equity and Stock-Based Compensation of the Notes to the Consolidated Financial Statements included in Part II. Item 8. *Financial Statements and Supplementary Data*, of this Annual Report on Form 10-K for information regarding our ATM and prior financings.

Fuel Development Strategy

We believe our metallic fuel can be used in different types of water-cooled commercial power reactors, such as pressurized water reactors (PWRs), boiling-water reactors (BWRs), Russian-designed water-cooled, water-moderated energetic reactors (VVERs), CANDUs, water-cooled SMRs, and water-cooled research reactors.

We have obtained patent validation in key countries (in our judgement) and will continue to seek patent validation in countries that either currently operate or are expected to build and operate a large number of nuclear power reactors compatible with our fuel technology.

Below is a brief description of each key fuel development step leading up to a lead test assembly (LTA) operation in a commercial reactor.

a. Fuel Fabrication

In the short to medium term, we expect the development of the fabrication processes for Lightbridge Fuel™ to be performed utilizing existing facilities and equipment within the DOE national laboratory complex and other facilities. Discussions are currently ongoing with the INL and PNNL to perform process development activities and establish the capability to manufacture development quantities of fuel rods for irradiation testing.

Fabrication of LTAs will require a dedicated pilot-scale fuel fabrication facility. We estimate the major scopes of work to establish a manufacturing capability for LTAs would take 5-8 years to complete. Expanding that pilot-scale fuel fabrication facility from LTA capability to batch reload quantities would require a substantial additional capital investment in the manufacturing facility and equipment. These estimates assume sufficient funding availability and that the project receives prioritization by the DOE and US Nuclear Regulatory Commission (NRC).

b. Nuclear Material/Coupon Sample Irradiation Test

Lightbridge's irradiation testing program includes coupon irradiation of material samples of its uranium-zirconium fuel alloy which will allow characterization of the underlying thermophysical behavior of the fuel alloy. This project is currently underway, and we expect insertion of fuel material coupons in the ATR in 2025 and completion of irradiation testing to full burnup and post-irradiation examination of the fuel material coupons in approximately four years thereafter. The data obtained from this program will be a fundamental component of Lightbridge's accelerated fuel qualification approach described below as it will be used to inform and develop the physics-based models and simulations of the fuel rod behaviors.

c. Loop Irradiation Testing

The purpose of the loop irradiation testing of Lightbridge's metallic fuel rod is to demonstrate the performance and behavior of the fuel rod under prototypic commercial reactor operating conditions typical of PWRs at a power level and burnup accumulation higher than the fuel would experience in normal operation in a commercial power plant. This will provide a physical demonstration of the capabilities of the fuel rod in order to ensure reactor safety. Such testing is expected to provide information of sufficient detail to validate the performance of individual fuel rods such that their behavior in normal operating conditions of a regulated nuclear power plant would be sufficiently well understood to request a license amendment from the NRC for operation of a lead test assembly.

We expect execution of such a loop irradiation test to be performed in the ATR at INL. The ATR currently has limited irradiation loop test facilities and the performance of the above-mentioned test for Lightbridge Fuel™ may require installation of a new test loop with increased heat removal capability to enable the desired test conditions.

We expect the performance of the irradiation test to take three years of in-reactor time plus an additional one year for post-irradiation examination (PIE), wherein analysis of the fuel rod performance and behavior is performed, from the time when the additional test loop becomes available.

d. Preparation for Lead Test Assembly Operation

Insertion of an LTA with Lightbridge's fuel rods in a nuclear power plant requires the power plant owner to obtain approval from the NRC based on a safety evaluation and justification that the LTA will not be detrimental to the plant's licensed operations. This justification must address numerous technical areas (e.g. neutronics design, mechanical design, thermal hydraulic design, materials science, reactor operations, etc.) and include considerations of the performance of the LTA itself as well as its interaction with other fuel assemblies in the reactor core which may be impacted by the presence of the LTA. The safety evaluation must result in confirmation that the plant's ability to ensure plant worker and public safety is not compromised due to the operation of the LTA. This safety justification will require cooperation between Lightbridge, the fuel manufacturer, and the power plant owner.

With historical approaches, the development and qualification of a nuclear fuel system can take 20-30 years as the approach has been driven largely by a cycle of physical testing and design changes based on the results of those physical tests. Computer modeling and simulation has increasingly been used in support of fuel qualification efforts, but the cyclical approach continues to be the default methodology.

In order to shorten the timeframe for fuel qualification, advanced nuclear fuel developers are now taking an approach that leverages significant improvements in computational capability in a methodology referred to as Accelerated Fuel Qualification (AFQ). The AFQ approach combines physics-informed modeling and simulation coupled with targeted physical testing such that the overall fuel qualification effort is reduced in terms of cost and time, with a goal of fuel qualification taking approximately 15 years. Lightbridge intends to leverage the AFQ methodologies to qualify its advanced fuels.

Along with leveraging the AFQ approach, uranium-zirconium (U-Zr) fuel technology has the benefits of being previously demonstrated in operating icebreaker reactors and several aspects of the performance of the fuel have been demonstrated. This enables Lightbridge to begin designing an LTA and developing the necessary computer models of the fuel behavior, prior to obtaining the results of the loop irradiation testing of the fuel rod.

Along with the irradiation testing and computer simulations, some physical testing of the fuel assembly design will be required. Lightbridge anticipates that such 'out-of-pile' testing to justify the LTA performance will take approximately four years.

We expect that the LTA design effort, development of computer modeling and simulation capabilities, and performance of the LTA safety justification will take 8 years. The NRC review and approval of the license amendment for LTA insertion is expected to require two years after the license amendment is submitted.

Based on these activities and time estimates, Lightbridge expects to have LTAs of its fuel ready for insertion in a commercial reactor in the 2030s.

The above fuel development strategy is based on the following key assumptions:

- funding requirements are met with U.S. government providing most of the necessary fuel development costs;
- time estimates for irradiation loop design and construction at ATR can be achieved by the national laboratory complex;
- partnership with nuclear power plant and fuel manufacturer for LTA demonstration purposes is achieved in a timely manner and does not delay the assumed start of work;
- accelerated fuel qualification methodology developed for Lightbridge Fuel™ is accepted by the NRC as sufficient for the safety justification of the LTAs;
- execution of out-of-reactor fuel development activities can be performed in parallel with LTA design;
- facilities and personnel for completion of the fuel development work are available when necessary and do not delay the execution of our research and development activities;
- by implementation of accelerated burn-up techniques, the irradiation loop at ATR is capable of 50% reduction in irradiation time compared to operating commercial reactor fuel cycle; and
- the pilot-scale fuel fabrication facility will be capable of manufacturing LTA quantities of metallic fuel rods to the desired rod length and specification.

Operations Review

Consolidated Results of Operations

The following table presents our operating results as a percentage of revenues for the years indicated (rounded to millions):

	Years Ended December 31,		Increase (Decrease) Change $	Increase (Decrease) Change %
	2022	2021		
Operating Expenses				
General and administrative	$ 7.5	$ 7.1	$ 0.4	6%
Research and development	$ 0.7	$ 1.4	$ (0.7)	(50)%
Total Operating Expenses	$ 8.2	$ 8.5	$ (0.3)	(4)%
Other Operating Income				
Distribution from joint venture	$ —	$ 0.1	$ (0.1)	(100)%
Contributed services – research and development	$ 0.4	$ 0.5	$ (0.1)	(20)%
Total Other Operating Income	$ 0.4	$ 0.6	$ (0.2)	(33)%
Total Operating Loss	$ (7.8)	$ (7.9)	$ (0.1)	(1)%
Other Income	$ 0.3	$ 0.1	$ 0.2	200%
Net loss before Income Taxes	$ (7.5)	$ (7.8)	$ (0.3)	(4)%
Net Loss	$ (7.5)	$ (7.8)	$ (0.3)	(4)%

Operating Expenses

General and Administrative Expenses

General and administrative expenses consist mostly of compensation and related costs for personnel and facilities, stock-based compensation, finance, human resources, information technology, and fees for consulting and other professional services. Professional services are principally comprised of legal, audit, strategic advisory services, and outsourcing services.

Total general and administrative expenses increased by $0.4 million for the year ended December 31, 2022, as compared to the year ended December 31, 2021. This increase was primarily due an increase in directors' fees of $0.2 million due to the increase of the number of board members, an increase in dues and subscriptions of $0.1 million, increase in patent expenses of $0.2 million and an increase in insurance expense, promotion, and travel expenses of $0.3 million. These increases were offset by a decrease in professional fees of $0.4 million relating to fees incurred in connection with the arbitration matter that was settled in 2021, that were not repeated during the year ended December 31, 2022.

Total stock-based compensation included in general and administrative expenses was $0.8 million for the years ended December 31, 2022 and 2021.

Research and Development

Research and development expenses consist primarily of compensation and related fringe benefits including stock-based compensation and related allocable overhead costs for the research and development of our fuel and contributed services - research and development for the R&D work performed under the GAIN vouchers.

Total R&D expenses decreased by $0.7 million for the year ended December 31, 2022, as compared to the year ended December 31, 2021. This decrease was primarily due to a decrease in outside R&D expenses of $0.3 million, a decrease in allocated employee compensation and employee benefits of $0.1 million and a decrease in other research and development expenses of $0.3 million.

We currently expect to invest a total of approximately $6.5 million in the research and development of our nuclear fuel over the next 12 to 15 months.

Due to the nature of our R&D expenditures, cost and schedule estimates are inherently uncertain and can vary significantly as new information and the outcome of these R&D activities become available. Our future business operations are dependent on budgetary constraints due primarily to market conditions and the uncertainty of future liquidity and capital resources available to us to conduct our future R&D activities.

Other Operating Income

Total other operating income decreased $0.2 million for the year ended December 31, 2022, as compared to the year ended December 31, 2021. There was a decrease of $0.1 million in the distribution from joint venture due to the final cash distribution from the dissolved Enfission joint venture that occurred in 2021. There was contributed services - research and development from the GAIN program of $0.4 million and $0.5 million for the years ended December 31, 2022 and 2021, respectively, with a charge to R&D expenses and a corresponding amount recorded to contributed services - research and development.

Other Income

There was an increase in other income of $0.2 million due to an increase in interest income generated from the interest earned from the purchase of treasury bills and from our bank savings account for the year ended December 31, 2022, as compared to the year ended December 31, 2021.

Provision for Income Taxes

On March 27, 2020, the Coronavirus Aid, Relief, and Economic Security Act (CARES Act) was enacted in response to the COVID-19 pandemic. The CARES Act, among other things, permits net operating loss (NOL) carryovers and carrybacks to offset 100% of taxable income for taxable years beginning before 2021. In addition, the CARES Act allows NOLs incurred in 2018, 2019, and 2020 to be carried back to each of the five preceding taxable years to generate a refund of previously paid income taxes. The Company has evaluated the impact of the CARES Act and does not expect that the NOL carryback provision of the CARES Act will result in a material cash benefit. We incurred a pre-tax net loss for both 2022 and 2021. We reviewed all sources of income for purposes of recognizing the deferred tax assets and concluded a full valuation allowance for 2022 and 2021 was necessary. Therefore, we did not have a provision for taxes for both years ended December 31, 2022 and 2021. Prior period ownership changes, coupled with the Company's projections of taxable income for the foreseeable future, will substantially limit any future benefit to be derived from our NOLs.

See Note 7. Income Taxes of the Notes to our Consolidated Financial Statements included in Part II. Item 8.*Financial Statements and Supplementary Data*, of this Annual Report on Form 10-K for information regarding our income taxes and the limitations on the utilization and amount of our net operating loss carry-forwards.

Liquidity, Capital Resources and Financial Position

Liquidity Outlook

We measure liquidity in terms of our ability to fund the cash requirements of our R&D activities and our general and administrative expenses, including our contractual obligations and other commitments. We believe that based on our current level of operating expenses and currently available cash resources, we will have sufficient funds available to cover our business activities and operating cash needs for the next 12 months. Our long-term cash requirements are currently projected to be an average of $10 million of outside R&D expenditures per year over the next 10-15 years. These long- term cash requirements for future planned operations to develop and commercialize our nuclear fuel, including any additional expenditures that may result from unexpected developments, will require us to receive government support in the future.

At December 31, 2022, we had cash and cash equivalents of $28.9 million, as compared to $24.7 million at December 31, 2021, an increase of $4.2 million. We raised $11.0 million from the sale of approximately 1.9 million shares of common stock during the year ended December 31, 2022. Our net cash used in operating activities for the year ended December 31, 2022 was $6.7 million and our cash flow projections indicate that we will have continued negative cash flows for the foreseeable future. We are not profitable, and we cannot provide any assurance that we will become profitable in the future. We will continue to incur losses because we are in the early development stage of commercializing our nuclear fuel.

We have approximately $28 million of working capital as of the date of this filing. We currently project a negative cash flow from our operations for both our general and administrative and R&D expenses, for total expected expenditures of $13.1 million to $15.7 million for the next 12 to 15 months, respectively. Our R&D expenses are expected to increase over the next 12-15 months. Our cash balance at December 31, 2022 and as of the date of this filing exceeds our anticipated cash requirements for the next 12 months. There are inherent uncertainties in forecasting the future required R&D or other expenditures in the future. Once other anticipated agreements are finalized or other future R&D agreements are entered into and the future R&D costs are known, we expect to forecast a significantly higher level of future required R&D expenses and higher negative monthly cash flows from operations in the future.

If sufficient funding becomes available to us, our R&D activities may significantly increase in the future. This funding is needed to continue our nuclear fuel development project and to achieve our future R&D milestones. The actual amount of cash we will need to operate is subject to many factors, including, but not limited to, the timing, design and conduct of the R&D work at the DOE's national laboratories for our fuel along with cost to commercialize our nuclear fuel. Accordingly, there is high potential for budget variances in the current cost projections and fuel development timelines of our current planned operations over the fuel development period. We will continue to utilize our ATM (as defined below) to finance our future R&D and corporate activities.

We will also need to receive substantial U.S. government support in the form of grants throughout our nuclear fuel R&D period in order to fund our R&D efforts in the future. If we are unable to obtain government funding that meets our future R&D cash requirements, we will need to seek other funding, which may include the issuance of additional shares of the Company's common stock, if available. This will result in dilution to our existing stockholders. If we can raise additional funds through the issuance of preferred stock, other equity or convertible securities, these securities could have rights or preferences senior to those of our common stock and could contain covenants that restrict our operations in the future. There can be no assurance that we will be able to obtain additional equity or debt financing on terms acceptable to us, if at all.

The primary source of cash available to us for the next 12 months, in addition to cash and cash equivalents on hand, is the potential funding from equity issuances from ATM equity offering sales agreement, as amended, with Stifel, Nicolaus & Company, Incorporated. The Company has an effective shelf registration statement on Form S-3 that was filed with the Securities and Exchange Commission, or SEC, on March 25, 2021, registering the sale of up to $75 million of the Company's securities and declared effective on April 5, 2021. We may be limited on the amount of funding available under this Form S-3 shelf registration statement in the future. We filed a prospectus supplement dated April 9, 2021 with the SEC pursuant to which we offered and sold shares of common stock having an aggregate offering price of $9.0 million through the ATM. We filed a second prospectus supplement, dated November 19, 2021, with the SEC pursuant to which we offered and sold shares of common stock having an aggregate offering price of up to $20.0 million, through the ATM. We filed another prospectus supplement, dated November 9, 2022, with the SEC pursuant to which we may offer and sell shares of common stock having an aggregate offering price of up to $20.0 million from time to time, through the ATM. Under current SEC regulations, if at any time our public float is less than $75.0 million, and for so long as our public float remains less than $75.0 million, the amount we can raise through primary public offerings of securities in any twelve-month period using shelf registration statements is limited to an aggregate of one-third of our public float, which is referred to as the baby shelf rules. As of the date of this filing, our calculated public float is below $75.0 million and we will be subject to the baby shelf rules for any offerings conducted on our current shelf registration statement.

We have no debt or lines of credit and we have financed our operations to date through the sale of our preferred stock and common stock. Management believes that public or private equity investments may be available in the future, however adverse market conditions, in our common stock price and trading volume, as well as other factors could substantially impair our ability to raise capital in the future and continue developing our nuclear fuel.

Short-Term and Long-Term Liquidity Sources

As discussed above, we will seek new financing bringing us additional sources of capital, depending on the capital market conditions of our common stock. There can be no assurance that these additional sources of capital will be made available to us. The primary potential sources of cash that may be available to us are as follows:

- equity or debt investment from third party investors in Lightbridge;
- collaboration with potential industry partners; and
- strategic investment and U.S. government funding to support the remaining R&D activities required to continue the development of our fuel products and move them to a commercial stage.

In support of our long-term business with respect to our fuel technology business, we endeavor to create strategic alliances with other parties to support the remaining R&D activities that is required to further enhance and complete the development of our fuel products to a commercial stage. We may be unable to form such strategic alliances on terms acceptable to us or at all.

See Note 8. Stockholders' Equity and Stock-Based Compensation of the Notes to the Consolidated Financial Statements included in Part II. Item 8. *Financial Statements and Supplementary Data*, of this Annual Report on Form 10-K for information regarding our prior financings.

The following table provides detailed information about our net cash flows for the years ended December 31, 2022 and 2021:

Cash Flow

	Year Ended December 31,	
	2022	**2021**
	(rounded in millions)	
Net cash used in operating activities	$ (6.7)	$ (11.0)
Net cash used in investing activities	$ —	$ —
Net cash provided by financing activities	$ 10.9	$ 14.2
Net cash inflow	$ 4.2	$ 3.2

Operating Activities

Cash used in operating activities decreased by $4.3 million in 2022 as compared to 2021. This decrease was primarily due to an arbitration settlement payment of $4.2 million in 2021, and a decrease of $0.1 million in reported net loss, adjusted for non-cash charges such as stock-based compensation and changes in operating assets and liabilities.

In 2022 operating cash flows reflect our net loss of $7.5 million, adjusted for non-cash charges totaling $0.9 million (consisting of non-cash adjustments for stock-based compensation of $0.8 million and common stock issued to directors of $0.1 million) and a net increase in our operating assets and liabilities of $0.1 million. Decreases in operating cash flows due to the net increase in operating assets and liabilities include an increase in prepaid project costs of $0.3 million offset by a net increase in accounts payable and accrued expenses of $0.2 million.

Investing Activities

Net cash used in our investing activities was insignificant for the years ended December 31, 2022 and 2021.

Financing Activities

Cash provided by financing activities decreased by $3.3 million. This decrease was due to a decrease in cash provided by our ATM facility of $3.8 million, a decrease in cash provided by the exercise of stock options of $0.2 million, offset by decrease in net share settlement of equity awards for the payment of withholding taxes of $0.7 million.

Cash provided by our ATM facility was $11.0 million (sale of approximately 1.9 million common shares) and $14.8 million (sale of approximately 2.0 million common shares) for the years 2022 and 2021, respectively. Cash used during years 2022 and 2021 relating to the payment of withholding taxes on the net share settlement of equity awards was $0.1 million and $0.8 million, respectively.

Contractual Obligations and Commitments

On December 9, 2022, we entered into initial project task statements with BEA, the operating contractor of INL, in collaboration with the DOE, which releases set forth the initial scopes of work and funding commitments under the umbrella agreements, each dated September 27, 2022, between the Company and BEA. At December 31, 2022, we had approximately $3.4 million in outstanding project task statement obligations to BEA relating to the research and development being conducted under the SPP and CRADA at INL.

Critical Accounting Policies and Estimates

Patent Costs

Patent filing fees with patent granting agencies and legal fees directly relating to those filings, incurred to file patent applications are expensed as the Company believes that there is not a high likelihood that there will be a future economic benefit associated with the patents, due to the uncertainties in the current fuel development timelines and the patents being commercialized.

Contributed Services - Research and Development

The Company concluded that its government grants were not within the scope of ASC Topic 606 as they did not meet the definition of a contract with a customer. Additionally, the Company concluded that the grants met the definition of a contribution, as the grants were a non-reciprocal transaction. As such, the Company determined that Subtopic 958-605, Not-for-Profit-Entities-Revenue Recognition applies for these contributed services, even though the Company is a business entity, as guidance in the contributions received subsections of Subtopic 958-605 applies to all entities (NFPs and business entities).

The Company has adopted Accounting Standards Update 2020-07 which amends Subtopic 958-605 which further clarifies the presentation and disclosure about contributions.

Subtopic 958-605 requires that nonfinancial assets, which includes services, such as the research and development services provided under the GAIN vouchers described in Note 6. Research and Development Costs, should be shown on a gross method at the fair value of the services contributed, with the contributed services - research and development shown as other operating income and the related costs as a charge to research and development expense, rather than depicting the contributed services - research and development as a reduction of research and development expense. The fair value of contributed services was determined by the cost of professional time and materials which were charged by the subcontractor who fulfilled the services contributed under the grant award.

Accounting for Stock-Based Compensation, Stock Options and Stock Granted to Employees and Non-employees

We adopted the requirements for stock-based compensation, where all forms of share-based payments to employees or non-employees, including stock options and stock purchase plans, are treated the same as any other form of compensation by recognizing the related cost in the consolidated statement of operations.

Under these requirements, stock-based compensation expense for employees is measured at the grant date based on the fair value of the award, and the expense is recognized ratably over the award's vesting period.

The stock-based compensation expense incurred in connection with our employees is based on the employee model of ASC 718. Under ASC 718 an employee is defined as "An individual over whom the grantor of a share-based compensation award exercises or has the right to exercise sufficient control to establish an employer-employee relationship based on common law as illustrated in case law and currently under U.S. tax regulations." The stock-based compensation expense for our consultants is accounted for under ASU 2018-07, which allows us to account for options issued to consultants in the same manner as they are issued to our employees. For all service-based grants made, we recognize compensation cost under the straight-line method.

We measure the fair value of service-based stock options on the measurement date using the Black-Scholes option-pricing model, which requires the use of several estimates, including:

- the volatility of our stock price;
- the expected life of the option;
- risk free interest rates; and
- expected dividend yield.

We use the historical volatility of our stock price over the number of years that matches the expected life of our stock option grants or we use the historical volatility of our stock price since January 5, 2006, the date we announced that we were becoming a public company, to estimate the future volatility of our stock. At this time, we do not believe that there is a better objective method to predict the future volatility of our stock. The expected life of options is based on internal studies of historical experience and projected exercise behavior. We estimate expected forfeitures of stock-based awards at the grant date and recognize compensation cost only for those awards expected to vest. The forfeiture assumption is ultimately adjusted to the actual forfeiture rate. Estimated forfeitures are reassessed in subsequent periods and may change based on new facts and circumstances. We utilize a risk-free interest rate, which is based on the yield of U.S. treasury securities with a maturity equal to the expected life of the options. We have not and do not expect to pay dividends on our common shares for the foreseeable future.

We use the Monte Carlo valuation model to determine the fair value of market-based and performance-based stock options at the date of grant, which requires us to make assumptions, including:

- expected term;
- volatility;
- dividend yield;
- risk-free interest rate; and
- forfeiture rates.

These assumptions are based on historical information and judgment regarding market factors and trends. If actual results differ from our assumptions and judgments used in estimating these factors, future adjustments to these estimates may be required.

Research and Development Costs

Research and development expenses are expensed when incurred. Research and development expenses consist primarily of wages and related payroll benefits, non-cash stock-based compensation, materials, testing, consulting and other outside research and development services, related to the development of the Company's nuclear fuel.

Recent Accounting Standards and Pronouncements

Refer to Note 1. Basis of Presentation, Summary of Significant Accounting Policies, and Nature of Operations of the Notes to our Consolidated Financial Statements in Part II. Item 8. *Financial Statements and Supplementary Data*, of this Form 10-K for a discussion of recent accounting standards and pronouncements.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURE ABOUT MARKET RISK

The Company is not required to provide the information required by this Item as it is a "smaller reporting company," as defined in Rule 12b-2 of the Exchange Act.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

The full text of our audited consolidated financial statements as of and for the years ended December 31, 2022 and 2021 begins on page 41 of this Report.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None

ITEM 9A. CONTROLS AND PROCEDURES

Conclusion Regarding the Effectiveness of Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, has evaluated the effectiveness of the design and operation of our disclosure controls and procedures as of December 31, 2022 (as such term is defined in Rule 13a-15(e) under the Exchange Act). Our disclosure controls and procedures are designed to provide reasonable assurance that the information required to be disclosed in our reports filed or submitted under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms, and that such information is accumulated and communicated to management, including our Chief Executive Officer and Chief Financial Officer, as appropriate to allow timely decisions regarding required disclosure. Any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives.

Based upon this evaluation, our management concluded that, as of December 31, 2022, our disclosure controls and procedures were not effective due to the material weakness described below.

Management's Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) under the Exchange Act. Our internal control over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with GAAP and includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the Company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with GAAP, and that receipts and expenditures of the Company are being made only in accordance with authorizations of management and directors of the Company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the Company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Management has assessed the effectiveness of the Company's internal control over financial reporting as of December 31, 2022, utilizing the criteria in the Committee of Sponsoring Organizations of the Treadway Commission's *Internal Control-Integrated Framework* (2013). Based on its assessment, our management determined that, as of December 31, 2022, the Company's internal control over financial reporting was not effective due to the material weakness described below.

A material weakness is a deficiency, or combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of annual or interim financial statements will not be prevented or detected on a timely basis. In management's assessment of the effectiveness of internal control over financial reporting as of December 31, 2022, management determined that there were control deficiencies concerning the accounting procedures that support the financial reporting process related to recording accounts payable invoices that were received and approved for payment, and such control deficiencies aggregated to a material weakness.

Remediation Plan

The Company's management, with the oversight of the Audit Committee, has evaluated the material weakness described above and designed a remediation plan to address this material weakness. The Company intends to remediate the material weakness by (i) implementing multiple reviews of the accounting mailbox where accounts payable invoices are received from vendors, which the multiple reviews of the accounting mailbox was first established in 2022 before the identification of the control deficiency (ii) multiple reviews of the weekly accounts payable schedules and activity reports from the Company's accounting system, and (iii) contacting vendors on a quarterly basis regarding outstanding invoices. The material weakness will not be considered remediated until the applicable remedial controls operate for a sufficient period of time and management has concluded, through testing, that these controls are designed and operating effectively.

Changes in Internal Control Over Financial Reporting

Except as noted above, there was no change in our internal control over financial reporting identified in connection with the evaluation required by Rule 13a-15(d) of the Exchange Act that occurred during the quarter ended December 31, 2022 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

ITEM 9B. OTHER INFORMATION

None

ITEM 9C. Disclosure Regarding Foreign Jurisdictions That Prevent Inspections

Not applicable.

PART III

Item 10. Directors and Executive Officers of the Registrant

The information required by Item 10 of Part III will be included in our Proxy Statement relating to the 2023 Annual Meeting of Stockholders and is incorporated herein by reference.

Item 11. Executive Compensation

Information required by Item 11 of Part III will be included in our Proxy Statement relating to the 2023 Annual Meeting of Stockholders and is incorporated herein by reference.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Shareholders

Information required by Item 12 of Part III will be included in our Proxy Statement relating to the 2023 Annual Meeting of Stockholders and is incorporated herein by reference.

Item 13. Certain Relationships and Related Transactions, and Director Independence

Information required by Item 13 of Part III will be included in our Proxy Statement relating to the 2023 Annual Meeting of Stockholders and is incorporated herein by reference.

Item 14. Principal Accountant Fees and Services

Information required by Item 14 of Part III will be included in our Proxy Statement relating to the 2023 Annual Meeting of Stockholders and is incorporated herein by reference.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a) Documents filed as part of this report.

(1) The following financial statements of Lightbridge Corporation, supplemental information and report of independent registered public accounting firm are included in this Form 10-K:

- Consolidated Balance Sheets at December 31, 2022 and 2021
- Consolidated Statements of Operations for the Years Ended December 31, 2022 and 2021
- Consolidated Statements of Cash Flows for the Years Ended December 31, 2022 and 2021
- Consolidated Statements of Changes in Stockholders' Equity for the Years Ended December 31, 2022 and 2021
- Notes to Consolidated Financial Statements
- Report of BDO USA, LLP dated March 30, 2023 on the Company's financial statements filed as a part hereof for the fiscal years ended December 31, 2022 and 2021. The independent registered public accounting firm's consent with respect to this report appears in Exhibit 23 of this Annual Report on Form 10-K.

(2) All schedules have been omitted because they are not required, not applicable or the information is otherwise included.

(3) Exhibits.

Exhibit Number	Description
1.1	At-the-Market Equity Offering Sales Agreement, dated May 28, 2019, by and between Lightbridge Corporation and Stifel, Nicolaus & Company, Incorporated (incorporated by reference to Exhibit 1.1 to the Form 8-K filed by the Company on May 28, 2019).
1.2	Amendment No. 1 to the At-the-Market Equity Offering Sales Agreement, dated May 28, 2019, by and between Lightbridge Corporation and Stifel, Nicolaus & Company, Incorporated (incorporated by reference to Exhibit 1.1 to the Form 8-K filed by the Company on April 9, 2021).
3.1*	Articles of Incorporation of the Company, as amended through October 27, 2022.
3.2	Amended and Restated Bylaws of the Company as amended through November 4, 2021 (incorporated by reference to Exhibit 3.1 to the Form 10-Q filed by the Company on November 8, 2021).
4.2	Description of Securities (incorporated by reference to Exhibit 4.2 to the Form 10-K filed by the Company on March 31, 2022).
4.3	Specimen Certificate for Company's Common Stock (incorporated by reference to Exhibit 4.1 to the Company's registration statement on Form S-3 filed on April 1, 2013, File No. 333-187659).
10.1**	Lightbridge Corporation 2006 Stock Plan (incorporated by reference to Exhibit 10.1 to the Form 8-K filed by the Company on February 21, 2006).
10.2**	Lightbridge Corporation 2015 Equity Incentive Plan, as amended (incorporated by reference to Appendix A to the definitive proxy statement filed on March 29, 2018, File No. 001-34487).

10.3**	Form of Incentive Stock Option Agreement for Employees under the 2015 Equity Incentive Plan (incorporated by reference to Exhibit 99.2 to the Company's Registration Statement on Form S-8, File No. 333-218796, filed on June 16, 2017).
10.4**	Form of Non-Qualified Stock Option Agreement for Employees under the 2015 Equity Incentive Plan (incorporated by reference to Exhibit 99.3 to the Company's Registration Statement on Form S-8, File No. 333-218796, filed on June 16, 2017).
10.5**	Form of Non-Qualified Stock Option Agreement for Non-Employee Directors under the 2015 Equity Incentive Plan (incorporated by reference to Exhibit 99.4 to the Company's Registration Statement on Form S-8, File No. 333-218796, filed on June 16, 2017)
10.6**	Amended Lightbridge Corporation 2020 Omnibus Incentive Plan (incorporated by reference to Appendix B to the definitive proxy statement filed on August 31, 2022).
10.7**	Form of Non-Statutory Stock Option Agreement for Employees under the 2020 Omnibus Incentive Plan. (incorporated by reference to Exhibit 10.12 to the Form 10-K filed by the Company on March 25, 2021).
10.8**	Form of Restricted Stock Unit Award Agreement for Employees under the 2020 Omnibus Incentive Plan. (incorporated by reference to Exhibit 10.13 to the Form 10-K filed by the Company on March 25, 2021).
10.9**	Form of Restricted Stock Unit Award Agreement for Non-Employee Directors under the 2020 Omnibus Incentive Plan. (incorporated by reference to Exhibit 10.14 to the Form 10-K filed by the Company on March 25, 2021).
10.10**	Employment Agreement, dated August 8, 2018, between the Company and Seth Grae (incorporated by reference to Exhibit 10.2 to the Form 10-Q filed by the Company on August 9, 2018).
10.11**	Employment Agreement, dated August 8, 2018, between the Company and Andrey Mushakov (incorporated by reference to Exhibit 10.3 to the Form 10-Q filed by the Company on August 9, 2018).
10.12**	Employment Agreement, dated August 8, 2018, between the Company and Larry Goldman (incorporated by reference to Exhibit 10.4 to the Form 10-Q filed by the Company on August 9, 2018).
10.13**	Form of Indemnification Agreement (August 2018) (incorporated by reference to Exhibit 10.5 to the Form 10-Q filed by the Company on August 9, 2018).
10.14**	Form of Restricted Stock Award Agreement under the 2020 Omnibus Incentive Plan (incorporated by reference to Exhibit 10.14 to the Form 10-K filed by the Company on March 31, 2022).
10.15*▲	Strategic Partnership Project Agreement, dated September 27, 2022, between the Company and Battelle Energy Alliance, LLC.
10.16*▲	Project Task Statement under the Strategic Partnership Project Agreement, dated December 9, 2022, between the Company and Battelle Energy Alliance, LLC.
10.17*▲	Cooperative Research and Development Agreement, dated September 27, 2022, between the Company and Battelle Energy Alliance, LLC.
10.18*▲	Project Task Statement under the Cooperative Research and Development Agreement, dated December 9, 2022, between the Company and Battelle Energy Alliance, LLC.
21.1	Subsidiaries of the Company (incorporated by reference to Exhibit 21.1 to the Form 10-K filed by the Company on March 15, 2016).
23.1*	Consent of BDO USA, LLP.
24.1*	Power of Attorney (Included on the signature page hereto).
31.1*	Rule 13a-14(a)/15d-14(a) Certification - Principal Executive Officer.

31.2*	Rule 13a-14(a)/15d-14(a) Certification - Principal Financial Officer and Principal Accounting Officer.
32*	Section 1350 Certifications.
101	The following materials from Lightbridge Corporation's Annual Report on Form 10-K for the year ended December 31, 2022, formatted in Inline eXtensible Business Reporting Language (XBRL): (i) the Consolidated Balance Sheets; (ii) Consolidated Statement of Operations; (iii) Consolidated Statement of Cash Flows; (iv) Consolidated Statement of Changes in Stockholders' Equity; and (v) Notes to Consolidated Financial Statements
101.INS	Inline XBRL Instance Document (the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document).
101.SCH	Inline XBRL Taxonomy Extension Schema Document.
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document.
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document.
101.LAB	Inline XBRL Taxonomy Extension Labels Linkbase Document.
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document.
104*	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101).

_____

* Filed or furnished herewith

** Indicates management contract or compensatory plan or arrangement.

▲ Certain portions of this Exhibit have been redacted pursuant to Item 601(b)(10)(iv) of Regulation S-K. The Company agrees to furnish supplementally an unredacted copy of this Exhibit to the SEC upon request.

Item 16. Form 10-K Summary

None.

LIGHTBRIDGE CORPORATION
DECEMBER 31, 2022 and 2021

TABLE OF CONTENTS

Report of Independent Registered Public Accounting Firm

Shareholders and Board of Directors
Lightbridge Corporation
Reston, Virginia

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Lightbridge Corporation (the "Company") as of December 31, 2022 and 2021, the related consolidated statements of operations, changes in stockholders' equity, and cash flows for each of the years then ended, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2022 and 2021, and the results of its operations and its cash flows for each of the years then ended, in conformity with accounting principles generally accepted in the United States of America.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's consolidated financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) ("PCAOB") and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated financial statements that was communicated or required to be communicated to the audit committee and that: (1) relates to accounts or disclosures that are material to the consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of a critical audit matter does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing separate opinions on the critical audit matter or on the accounts or disclosures to which it relates.

Classification of Research and Development Expenses

As described in Note 1 to the consolidated financial statements, the Company records research and development expenses as incurred, which consists of wages and related payroll benefits, non-cash stock-based compensation, materials, testing, consulting and other outside research and development services, related to the development of the Company's nuclear fuel technology. During the year ended December 31, 2022, the Company incurred approximately $0.7 million of research and development expenses.

We identified the classification of research and development expenses as a critical audit matter. The principal consideration for our determination is the Company's methodology for classifying various operating expenses as research and development expenses. Auditing this classification was especially challenging given the significant audit effort and the extent of audit evidence required.

The primary procedures we performed to address this critical audit matter included:

- Testing a sample of research and development expenses.
- Performing inquiries of the project manager to determine the nature of expenses.
- Testing management's allocation of wages, payroll benefits, and non-cash stock-based compensation by (i) recalculating the percentage of wages, payroll benefits and non-cash stock-based compensation allocated to research and development expenses, (ii) testing the completeness and accuracy of data used in determining the allocation.

/s/ BDO USA, LLP

We have served as the Company's auditor since 2015.

Philadelphia, Pennsylvania
March 30, 2023

LIGHTBRIDGE CORPORATION
CONSOLIDATED BALANCE SHEETS

	December 31, 2022	December 31, 2021
ASSETS		
Current Assets		
Cash and cash equivalents	$ 28,899,997	$ 24,747,613
Prepaid expenses and other current assets	115,264	113,452
Total Current Assets	29,015,261	24,861,065
Other Assets		
Prepaid project costs	345,000	—
Trademarks	108,225	101,583
Total Assets	$ 29,468,486	$ 24,962,648
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current Liabilities		
Accounts payable and accrued liabilities	$ 350,331	$ 171,521
Total Current Liabilities	350,331	171,521
Commitments and contingencies - Note 5		
Stockholders' Equity		
Preferred stock, $0.001 par value, 10,000,000 authorized shares, 0 shares issued and outstanding at December 31, 2022 and 2021	—	—
Common stock, $0.001 par value, 25,000,000 authorized, 11,900,217 shares and 9,759,223 shares issued and outstanding at December 31, 2022 and 2021, respectively	11,900	9,759
Additional paid-in capital	173,595,385	161,772,641
Accumulated deficit	(144,489,130)	(136,991,273)
Total Stockholders' Equity	29,118,155	24,791,127
Total Liabilities and Stockholders' Equity	$ 29,468,486	$ 24,962,648

The accompanying notes are an integral part of these consolidated financial statements.

LIGHTBRIDGE CORPORATION
CONSOLIDATED STATEMENTS OF OPERATIONS

	Years Ended December 31,	
	2022	**2021**
Revenue	$ —	$ —
Operating Expenses		
General and administrative	7,490,086	7,158,558
Research and development	669,818	1,366,496
Total Operating Expenses	8,159,904	8,525,054
Other Operating Income		
Distribution from joint venture	—	119,641
Contributed services - research and development	372,612	527,927
Total Other Operating Income	372,612	647,568
Total Operating Loss	$ (7,787,292)	$ (7,877,486)
Other Income		
Interest income	289,435	8,127
Foreign currency transaction gain	—	33,694
Total Other Income	289,435	41,821
Net Loss Before Income Taxes	(7,497,857)	(7,835,665)
Income taxes	—	—
Net Loss	$ (7,497,857)	$ (7,835,665)
Accumulated Preferred Stock Dividend	—	(477,991)
Additional deemed dividend on preferred stock due to the beneficial conversion feature	—	(213,720)
Deemed dividend upon induced conversions of Series A and Series B Preferred Stock to common stock	—	(3,509,328)
Net Loss Attributable to Common Shareholders	$ (7,497,857)	$ (12,036,704)
Net Loss Per Common Share		
Basic and diluted	$ (0.69)	$ (1.71)
Weighted Average Number of Common Shares Outstanding	10,834,574	7,035,510

The accompanying notes are an integral part of these consolidated financial statements.

LIGHTBRIDGE CORPORATION
CONSOLIDATED STATEMENTS OF CASH FLOWS

	Years Ended December 31,	
	2022	**2021**
Operating Activities		
Net Loss	$ (7,497,857)	$ (7,835,665)
Adjustments to reconcile net loss from operations to net cash used in operating activities:		
Common stock issued for services	45,000	254,994
Stock-based compensation	842,704	826,493
Changes in operating assets and liabilities:		
Prepaid expenses and other current assets	(1,812)	59,008
Prepaid project costs	(345,000)	—
Accounts payable and accrued liabilities	193,810	(140,919)
Accrued legal settlement costs	—	(4,200,000)
Net Cash Used in Operating Activities	(6,763,155)	(11,036,089)
Investing Activities		
Trademarks	(6,642)	(16,021)
Net Cash Used in Investing Activities	(6,642)	(16,021)
Financing Activities		
Net proceeds from the issuances of common stock	11,026,785	14,821,354
Net proceeds from the exercise of stock options	—	270,857
Payments for taxes related to net share settlement of equity awards	(104,604)	(824,153)
Net Cash Provided by Financing Activities	10,922,181	14,268,058
Net Increase in Cash and Cash Equivalents	4,152,384	3,215,948
Cash and Cash Equivalents, Beginning of Year	24,747,613	21,531,665
Cash and Cash Equivalents, End of Year	$ 28,899,997	$ 24,747,613
Supplemental Disclosure of Cash Flow Information		
Cash paid during the year:		
Interest paid	$ —	$ —
Income taxes paid	$ —	$ —
Non-Cash Financing Activities:		
Accumulated preferred stock dividend	$ —	$ 691,711
Exchanges of preferred stock Series A and B to common stock	$ —	$ 3,366
Payment of accrued liabilities with common stock	$ 15,000	$ 69,690

The accompanying notes are an integral part of these consolidated financial statements.

LIGHTBRIDGE CORPORATION
CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDERS' EQUITY
FOR THE YEARS ENDED DECEMBER 31, 2022 AND 2021

	Common Stock		Additional Paid-in	Accumulated	Total
	Shares	Amount	Capital	Deficit	Equity
Balance - January 1, 2022	9,759,223	$ 9,759	$ 161,772,641	$ (136,991,273)	$ 24,791,127
Shares issued, net of share settlement for withholding taxes paid upon vesting of restricted stock awards	268,796	269	(104,873)	—	(104,604)
Shares issued - registered offerings - net of offering costs	1,855,085	1,855	11,024,930	—	11,026,785
Shares issued to consultant & directors for services	17,113	17	59,983	—	60,000
Stock-based compensation	—	—	842,704	—	842,704
Net loss	—	—	—	(7,497,857)	(7,497,857)
Balance - December 31, 2022	11,900,217	$ 11,900	$ 173,595,385	$ (144,489,130)	$ 29,118,155

	Series A Preferred Stock		Series B Preferred Stock		Common Stock		Additional Paid-in	Accumulated	Total
	Shares	Amount	Shares	Amount	Shares	Amount	Capital	Deficit	Equity
Balance - January1, 2021	699,878	$ 699	2,666,667	$ 2,667	6,567,110	$ 6,567	$146,353,232	$(129,155,608)	$17,207,557
Exchanges of Series A & B Preferred Stock to Common Stock	(699,878)	(699)	(2,666,667)	(2,667)	789,382	790	2,576	—	—
Shares issued, net of share settlement for withholding taxes paid upon vesting of restricted stock units	—	—	—	—	130,281	130	(824,283)	—	(824,153)
Common stock issued pursuant to restricted stock awards	—	—	—	—	188,588	188	(188)	—	—
Common stock issued - registered ATM offerings - net of offering costs	—	—	—	—	2,008,822	2,010	14,819,344	—	14,821,354
Common stock issued through the exercise of options	—	—	—	—	30,282	30	270,827	—	270,857
Common stock issued to directors and consultants for services	—	—	—	—	44,758	44	324,640	—	324,684
Stock-based compensation	—	—	—	—	—	—	826,493	—	826,493
Net loss	—	—	—	—	—	—	—	(7,835,665)	(7,835,665)
Balance - December 31, 2021	—	$ —	—	$ —	9,759,223	$ 9,759	$161,772,641	$(136,991,273)	$24,791,127

The accompanying notes are an integral part of these consolidated financial statements.

LIGHTBRIDGE CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Note 1. Basis of Presentation, Summary of Significant Accounting Policies, and Nature of Operations

The Company was formed on October 6, 2006, when Thorium Power, Ltd., which was incorporated in the state of Nevada on February 2, 1999, merged with Thorium Power, Inc. (TPI), which was incorporated in the state of Delaware on January 8, 1992 (subsequently and collectively referred to as "we" or the "Company"). On September 29, 2009, the Company changed its name from Thorium Power, Ltd. to Lightbridge Corporation and began its focus on developing and commercializing metallic nuclear fuels. The Company is a nuclear fuel technology company developing its next generation nuclear fuel technology.

Basis of presentation

Basis of Consolidation

These consolidated financial statements include the accounts of Lightbridge, a Nevada corporation, and the Company's wholly-owned subsidiaries, TPI, a Delaware corporation, and Lightbridge International Holding LLC, a Delaware limited liability company. These wholly-owned subsidiaries are inactive. All significant intercompany transactions and balances have been eliminated in consolidation.

Segment Reporting

ASC Topic 280, "Segment Reporting," requires use of the "management approach" model for segment reporting. The management approach model is based on the way a company's management organizes segments within the company for making operating decisions and assessing performance. We report our results in a single reportable segment, which reflects how our chief operating decision maker allocates resources considering our core data which is managed centrally on a company-wide basis, and evaluates our financial results. Because we have a single reportable segment, all required financial segment information can be found directly in the Consolidated Financial Statements. We evaluate the performance of our reporting segment based on operating expenses and will evaluate additional segment disclosure requirements if and when the Company expands its operation.

Use of Estimates and Assumptions

The preparation of consolidated financial statements, in conformity with accounting principles generally accepted in the United States of America, requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenue and expenses during the reporting period. Actual results could differ from those estimates. Estimates and assumptions are periodically reviewed and the effects of revisions are reflected in the consolidated financial statements in the period they are determined to be necessary.

Significant Estimates

These accompanying consolidated financial statements include some amounts that are based on management's best estimates and assumptions. The most significant estimates relate to its valuation of stock options, the valuation allowance on deferred tax assets and contingent liabilities. It is reasonably possible that these above-mentioned estimates and others may be adjusted as more current information becomes available, and any adjustment could be significant in future reporting periods. The compensation expense related to stock options may have been a materially different amount had other reasonable assumptions been used that differed from the reasonable assumptions made by management.

Fair Value of Financial Instruments

The fair value of a financial instrument is the amount that would be received in an asset sale or paid to transfer a liability in an orderly transaction between unaffiliated market participants. Assets and liabilities measured at fair value are categorized based on whether the inputs are observable in the market and the degree that the inputs are observable. The categorization of financial instruments within the valuation hierarchy is based on the lowest level of input that is significant to the fair value measurement.

In accordance with the provisions of ASC 820, "Fair Value Measurements," the Company determines fair value as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The Company generally applies the income approach to determine fair value. This method uses valuation techniques to convert future amounts to a single present amount. The measurement is based on the value indicated by current market expectations with respect to the future amounts.

ASC 820 establishes a fair value hierarchy that prioritizes the inputs used to measure fair value. The hierarchy gives the highest priority to active markets for identical assets and liabilities (Level 1 measurement) and the lowest priority to unobservable inputs (Level 3 measurement). The Company classifies fair value balances based on the observability of those inputs. The three levels of the fair value hierarchy are as follows:

Level 1 - Observable inputs such as quoted prices in active markets for identical assets or liabilities

Level 2 - Inputs other than quoted prices that are observable for the asset or liability, either directly or indirectly. These include quoted prices for similar assets or liabilities in active markets, quoted prices for identical or similar assets or liabilities in markets that are not active and inputs other than quoted prices that are observable for the asset or liability

Level 3 - Unobservable inputs that reflect management's assumptions

For disclosure purposes, assets and liabilities are classified in their entirety in the fair value hierarchy level based on the lowest level of input that is significant to the overall fair value measurement. The Company's assessment of the significance of a particular input to the fair value measurement requires judgment and may affect the placement within the fair value hierarchy levels.

The Company's financial instruments consist principally of cash and cash equivalents, accounts payable and accrued liabilities. The carrying amounts of cash and cash equivalents, accounts payable and accrued liabilities are considered to be representative to their respective fair values because of the short-term nature of those instruments. Cash equivalents which consists of U.S. treasury bills are classified as Level 1 on the fair value hierarchy as there are quoted prices in active markets for identical assets.

Certain Risks and Uncertainties

The Company will need additional funding by way of a combination of strategic alliances, government grants, further offerings of equity securities, or an offering of debt securities in order to support its future R&D activities required to further enhance and complete the development of its fuel products to a proof-of-concept stage and a commercial stage thereafter.

There can be no assurance that the Company will be able to successfully continue to conduct its operations if there is a lack of financial resources available in the future to continue its fuel development activities, and a failure to do so would have a material adverse effect on the Company's future R&D activities, financial position, results of operations, and cash flows. Also, the success of the Company's operations will be subject to other numerous contingencies, some of which are beyond management's control. These contingencies include general and regional economic conditions, contingent liabilities, potential competition with other nuclear fuel developers, including those entities developing accident tolerant fuels, changes in government regulations, support for nuclear power, changes in accounting and taxation standards, inability to achieve overall short-term and long-term research and development milestones toward commercialization, future impairment charges to its assets, and global or regional catastrophic events. The Company may also be subject to various additional political, economic, and other uncertainties.

Cash and Cash Equivalents

The Company may at times invest its excess cash in interest bearing accounts and U.S. treasury bills. It classifies all highly liquid investments with original stated maturities of three months or less from date of purchase as cash equivalents and all highly liquid investments with stated maturities of greater than three months as marketable securities. The Company holds cash balances in excess of the federally insured limits of $250,000. It deems this credit risk not to be significant as cash is held by two prominent financial institutions in 2022 and 2021. The Company buys and holds short-term U.S. treasury bills to maturity. U.S. treasury bills totaled approximately $19.9 million and $9.0 million at December 31, 2022 and 2021, respectively. The remaining $9.0 million and $15.7 million at December 31, 2022 and 2021, respectively, are on deposit with two notable financial institutions.

Contributed services - Research and Development

The Company was awarded a grant in 2019 and a second grant in 2021 from the United States Department of Energy (DOE) which represented contributed services to further the Company's R&D activities. The Company concluded that its government grants were not within the scope of the revenue recognition standard ASC Topic 606 as they did not meet the definition of a contract with a customer. Additionally, the Company concluded that the grants met the definition of a contribution, as the grants were a non-reciprocal transaction. As such, the Company determined that Subtopic 958-605, Not-for-Profit-Entities-Revenue Recognition applies for these contributed services, even though the Company is a business entity, as guidance in the contributions received subsections of Subtopic 958-605 applies to all entities (not-for-profits and business entities).

The Company early adopted Accounting Standards Update 2020-07 in the fourth quarter of 2021, which amends Subtopic 958-605 and further clarifies the presentation and disclosure about contributions.

Subtopic 958-605 requires that nonfinancial assets, which includes services, such as the research and development services provided under the Gateway for Accelerated Innovation in Nuclear (GAIN) vouchers described in Note 6, should be shown on a gross method at the fair value of the services contributed, with contributed services - research and development shown as other operating income and the related costs as a charge to research and development expense, rather than depicting contributed services - research and development as a reduction of research and development expense. The fair value of contributed services was determined by the cost of professional time and materials which were charged by the subcontractor who fulfilled the services contributed under the grant award. The principal market used to arrive at fair value is the market in which the Company operates.

The Company recognized contributed services - research and development of approximately $0.4 million for the year ended December 31, 2022 and approximately $0.5 million for the year ended December 31, 2021.

Trademarks

Costs for filing and legal fees for trademark applications are capitalized. Trademarks are considered intangible assets with an indefinite useful life and therefore are not amortized. The Company performed an impairment test in the fourth quarter of 2022 and 2021 and no impairment of the trademarks was identified. As of December 31, 2022 and December 31, 2021, the carrying value of trademarks was approximately $0.1 million.

Leases

In accordance with ASU 2016-02, *Leases (Topic 842)*, which requires recognition of most lease arrangements on the balance sheet, the Company recognizes operating lease right of use assets and liabilities at commencement date based on the present value of the future minimum lease payments over the lease term. Leases with an initial term of 12 months or less are not recorded on the consolidated balance sheet in accordance with the short-term lease recognition exemption. The Company applies the practical expedient to non-separate and non-lease components for all leases that qualify. Lease expense is recognized on a straight-line basis over the lease term. The Company has only one lease for office rent and the lease is for a term of 12 months without renewal options (See Note 5. Commitments and Contingencies).

Income Taxes

Income taxes are accounted for using the asset and liability method. Deferred tax assets and liabilities are recognized for the future tax consequences attributable to temporary differences between the financial statements carrying amounts of assets and liabilities and their respective tax bases, operating loss carryforwards, and tax credit carryforwards. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in income in the period that includes the enactment date. In accordance with FASB ASC 740, Accounting for Income Taxes, the Company reflects in the financial statements the benefit of positions taken in a previously filed tax return or expected to be taken in a future tax return only when it is considered 'more-likely-than-not' that the position taken will be sustained by a taxing authority. As of December 31, 2022 and 2021, the Company had no unrecognized income tax benefits and correspondingly there is no impact on the Company's effective income tax rate associated with these items. The Company's policy for recording interest and penalties relating to uncertain income tax positions is to record them as a component of income tax expense in the accompanying consolidated statements of operations. As of December 31, 2022 and 2021, the Company had no such accruals.

Common Stock Warrants

The Company accounts for common stock warrants as either equity instruments or derivative liabilities depending on the specific terms of the warrant agreement. Common stock warrants are accounted for as a derivative in accordance with ASC 815, *Derivatives and Hedging,* if the stock warrants contain terms that could potentially require "net cash settlement" and therefore, do not meet the scope exception for treatment as a derivative. Warrant instruments that could potentially require "net cash settlement" in the absence of explicit language precluding such settlement are initially classified as derivative liabilities at their estimated fair values, regardless of the likelihood that such instruments will ever be settled in cash.

All outstanding warrants expired on May 16, 2022.

Stock-Based Compensation

The stock-based compensation expense incurred by Lightbridge for employees and directors in connection with its equity incentive plan is based on the employee model of ASC 718, and the fair value of any stock options granted is measured at the grant date. In accordance with ASU 2018-07, Compensation - Stock Compensation (Topic 718): Improvements to Nonemployee Share-Based Payment Accounting, options granted to our consultants are accounted for in the same manner as options issued to employees.

Awards with service-based vesting conditions only: Expense is recognized on a straight-line basis over the requisite service period of the award.

Awards with performance-based vesting conditions: Expense is not recognized until it is determined that it is probable the performance-based conditions will be met. When achievement of a performance-based condition is probable, a catch-up of expense is recorded as if the award had been vesting on a straight-line basis from the award date. The award will continue to be expensed on a straight-line basis over the requisite service period until a higher performance-based condition is met, if applicable.

Awards with market-based vesting conditions: Expense is recognized on a straight-line basis over the requisite service period, which is the lesser of the derived service period or the explicit service period if one is present. However, if the market condition is satisfied prior to the end of the requisite service period, the Company accelerates all remaining expense to be recognized.

Awards with both performance-based and market-based vesting conditions: If an award vesting or exercisability is conditional upon the achievement of either a market condition or performance or service conditions, the requisite service period is generally the shortest of the explicit, implicit, and derived service period.

The Company elected to use the Black-Scholes pricing model to determine the fair value of stock options on the measurement date of the grant for service-based vesting conditions and the Monte-Carlo valuation method for performance-based or market-based vesting conditions for stock options. The Company estimates forfeitures at the time of grant and revises the estimate, if necessary, in subsequent periods if actual forfeitures differ from those estimates. The forfeiture rate estimate used for all equity awards was zero, based on the experience of the Company having an insignificant historical forfeiture rate. Shares that are issued to employees upon exercise of the stock options may be issued net of a number of shares with a fair value equal to the required tax withholding requirements to be paid by the Company regarding its tax withholding obligations. As a result, the actual number of shares issued with tax withholding obligations are fewer than the actual number of shares exercised under the stock option or on the dates of vesting of Restricted Stock Unit (“RSU”) or Restricted Stock Awards (“RSAs”) grants.

The Company grants two types of RSAs. The first type is an award of our shares that have full voting rights and dividend rights (with dividends paid upon vesting of the RSA) but are restricted with regard to sale or transfer before vesting. As such, they are shown as shares issued and outstanding. These restrictions lapse over the vesting period. The shares are forfeited and returned to the Company if they do not vest. The RSAs are included in common stock issued and outstanding and are considered contingently issuable in the calculation of weighted-average shares outstanding for purposes of calculating earnings per share. The consolidated statement of changes in stockholders’ equity shows the initial grant of RSAs as a reclassification from additional paid-in capital to common stock, with any compensation expense related to the RSAs included in stock-based compensation. The second type of RSAs granted by the Company have only performance conditions. These RSAs do not have voting and dividend rights until they vest as ordinary common shares and are not included in common stock issued and outstanding.

Research and Development Costs

Research and development expenses are expensed when incurred. Research and development expenses consist primarily of wages and related payroll benefits, non-cash stock-based compensation, materials, testing, consulting and other outside research and development services, related to the development of the Company’s nuclear fuel. Advance payments for goods or services for future research and development activities are deferred and expensed as the goods are delivered or the related services are performed.

Recent Accounting Pronouncements

In November 2021, the FASB issued ASU 2021-10, Government Assistance (Topic 832) - Disclosures by Business Entities about Government Assistance. This ASU requires disclosures that are expected to increase the transparency of transactions with a government accounted for by applying a grant or contribution accounting model by analogy, including (1) the nature of the transactions and the form in which assistance has been received, (2) the accounting policy applied, and (3) the balance sheet and income statement line items that are affected by the transactions, and the amounts applicable to each financial statement line item. This ASU is effective for annual periods beginning after December 15, 2021, with early adoption permitted. The Company adopted this guidance on January 1, 2022 and it did not have a material impact on our consolidated financial statements.

In August 2020, the FASB issued ASU 2020-06, Debt-Debt with Conversion and Other Options (Subtopic 470-20) and Derivatives and Hedging-Contracts in Entity's Own Equity (Subtopic 815-40), which simplifies the complexity associated with applying U.S. GAAP for certain financial instruments with characteristics of liabilities and equity. This ASU (1) simplifies the accounting for convertible debt instruments and convertible preferred stock by removing the existing guidance in ASC 470-20, Debt: Debt with Conversion and Other Options, that requires entities to account for beneficial conversion features and cash conversion features in equity, separately from the host convertible debt or preferred stock; (2) revises the scope exception from derivative accounting in ASC 815-40 for freestanding financial instruments and embedded features that are both indexed to the issuer's own stock and classified in stockholders' equity, by removing certain criteria required for equity classification; and (3) revises the guidance in ASC 260, Earnings Per Share, to require entities to calculate diluted earnings per share for convertible instruments by using the if-converted method. ASU 2020-06 is effective for fiscal years beginning after December 15, 2023, including interim periods within those fiscal years. Early adoption is permitted, but no earlier than fiscal years beginning after December 15, 2020, including interim periods within those fiscal years. Adoption is either through a modified retrospective method or a full retrospective method of transition. The Company does not currently have any transaction or instruments to which this standard applies. If, in the future, the Company issues new convertible debt, new warrants or certain other instruments, the standard may have a material effect, but this cannot be determined at this time.

The FASB issued ASU No. 2016-13, Financial Instruments - Credit Losses (Topic 326). This standard requires a financial asset to be presented at the net amount expected to be collected. The financial assets of the Company in scope of ASU 2016-13 will primarily be accounts receivable. The Company will estimate an allowance for expected credit losses on accounts receivable that result from the inability of customers to make required payments. In estimating the allowance for expected credit losses, consideration will be given to the current aging of receivables, historical experience, and a review for potential bad debts. The Company will adopt this guidance in the first quarter of fiscal 2023 and does not expect the adoption to have a material impact on its results of operations, financial position, and disclosures.

Immaterial Revision

An immaterial revision was made during the course of preparing the Company's consolidated financial statements as of and for the year ended December 31, 2022, after the Company completed a preliminary Internal Revenue Code Section 382 analysis of its historical net operating loss carryforward amounts. As a result, a portion of the prior years' net operating loss carryforwards were limited and incorrectly presented in the deferred tax table within Note 7. Income Taxes.

Note 2. Net Loss Per Share

Basic net loss per share is computed using the weighted-average number of common shares outstanding during the year except that it does not include unvested common shares subject to repurchase or cancellation. Diluted net income per share is computed using the weighted-average number of common shares and, if dilutive, potential common shares outstanding during the period. Potential common shares consist of the incremental common shares issuable upon the exercise of stock options, warrants and convertible preferred shares (see Note 8. Stockholders' Equity and Stock-Based Compensation). The common stock equivalents of performance-based milestone compensation arrangements are included as potentially dilutive shares only if the performance condition has been met as of the end of the reporting period.

The treasury stock method is used in calculating diluted EPS for potentially dilutive stock options and share purchase warrants, which assumes that any proceeds received from the exercise of in-the-money stock options and share purchase warrants, would be used to purchase common shares at the average market price for the period, unless including the effects of these potentially dilutive securities would be anti-dilutive.

The following table sets forth the computation of the basic and diluted loss per share (dollars in millions, except share data):

	Years Ended December 31,	
	2022	2021
Basic		
Numerator:		
Net loss attributable to common stockholders	$ (7.5)	$ (12.0)
Denominator:		
Weighted-average common shares outstanding	10,834,574	7,035,510
Basic net loss per share	$ (0.69)	$ (1.71)
Diluted		
Numerator:		
Net loss attributable to common stockholders, basic	$ (7.5)	$ (12.0)
Effect of dilutive securities	—	—
Net loss, diluted	$ (7.5)	$ (12.0)
Denominator:		
Weighted average common shares outstanding - basic	10,834,574	7,035,510
Potential common share issuances:		
Incremental dilutive shares from equity instruments (treasury stock method)	—	—
Weighted-average common shares outstanding	10,834,574	7,035,510
Diluted net loss per share	$ (0.69)	$ (1.71)

The following outstanding securities have been excluded from the computation of diluted weighted shares outstanding for the years noted below, as they would have been anti-dilutive due to the Company's losses at December 31, 2022 and 2021 and also because the exercise price of certain of these outstanding securities was greater than the average closing price of the Company's common stock.

	Years Ended December 31,	
	2022	2021
Warrants outstanding	—	45,577
Stock options outstanding	525,903	538,713
RSAs outstanding	—	188,588
Total	525,903	772,878

Note 3. Prepaid Project Costs

In 2022, the Company entered into agreements with Idaho National Laboratory (INL), in collaboration with the U.S. Department of Energy (DOE), to support the development of Lightbridge Fuel™. The Company made advanced payments for future project work totaling $0.4 million to Battelle Energy Alliance, LLC ("BEA") as of December 31, 2022.

Note 4. Accounts Payable and Accrued Liabilities

Accounts payable and accrued liabilities consisted of the following (rounded in millions):

	December 31, 2022	December 31, 2021
Trade payables	$ 0.2	$ 0.1
Accrued directors' fee and consulting expenses	0.2	0.1
Total	$ 0.4	$ 0.2

Note 5. Commitments and Contingencies

Commitments

Operating Leases

The Company leased office space for a 12-month term from January 1, 2023 through December 31, 2023 with a monthly payment of approximately $8,000. The future minimum lease payments required under the Company's non-cancellable operating leases for 2023 total approximately $0.1 million. Total rent expense for the year ended December 31, 2022 and 2021 was approximately $0.1 million.

Project Task Statements (Purchase Orders)

For the year ended December 31, 2022, the Company had approximately $3.4 million in outstanding project task statement obligations to BEA relating to the research and development being conducted under the Strategic Partnership Project Agreement and Cooperative Research and Development Agreement at INL (see Note 6. Research and Development Costs).

Note 6. Research and Development Costs

In 2022, Lightbridge entered into agreements with INL, in collaboration with the DOE, to support the development of Lightbridge Fuel™. These framework agreements use an innovative structure and consist of an "umbrella" Strategic Partnership Project Agreement and an "umbrella" Cooperative Research and Development Agreement (CRADA), each with BEA, the DOE's operating contractor for INL, with an initial duration of seven years. Throughout the duration of these umbrella agreements, all R&D work contracted with BEA is through the issuance of project task statements.

It is anticipated that the initial phase of work under the two agreements will culminate in irradiation testing in the Advanced Test Reactor (ATR) of fuel samples using enriched uranium supplied by the DOE. The initial phase of work aims to generate irradiation performance data for Lightbridge's delta-phase uranium-zirconium alloy relating to various thermophysical properties. The data will support fuel performance modeling and regulatory licensing efforts for the commercial deployment of Lightbridge Fuel.

It is anticipated that subsequent phases of work under the two umbrella agreements will include post-irradiation examination of the irradiated fuel samples, loop radiation testing in the ATR, and post-irradiation examination of one or more uranium-zirconium fuel rodlets, as well as transient experiments in the Transient Reactor Test Facility at INL.

On March 25, 2021, the Company was awarded a second voucher from the DOE's GAIN program to support development of Lightbridge Fuel™ in collaboration with the Pacific Northwest National Laboratory (PNNL). The scope of this project was to demonstrate Lightbridge's nuclear fuel casting process using depleted uranium, a key step in the manufacture of Lightbridge Fuel™. On July 14, 2021, the Company executed a CRADA with the Battelle Memorial Institute (Battelle), Pacific Northwest Division, the operating contractor of the PNNL, in collaboration with the DOE. The total project value was $0.7 million, with three-quarters of this amount expected to be paid by the DOE for the scope of work performed by PNNL and the remaining amount provided by Lightbridge, by providing in-kind services to the project. PNNL has completed a contract extension with the Company for one month to complete the final report related to this PNNL GAIN voucher in December 2022. The PNNL Gain voucher project was completed on January 31, 2023. For the years ended December 31, 2022 and 2021, the Company recorded $0.4 million and $0.1 million of contributed services - research and development, respectively. The Company recorded the corresponding amount as research and development expenses for the work that was completed by Battelle.

On December 19, 2019, the Company was awarded its first voucher from the DOE's GAIN program to support development of Lightbridge Fuel™ in collaboration with INL. The scope of the project included experiment design for irradiation of Lightbridge metallic fuel material samples in the ATR at INL. On April 22, 2020, the Company entered into a CRADA with BAE, the operating contractor of INL, in collaboration with the DOE. Signing the CRADA was the last step in the contracting process to formalize a voucher award from the GAIN program. The voucher award could only be used to conduct the experiment defined in the CRADA. All work was completed on this GAIN voucher in the third quarter of 2021. This experiment design formed the basis of the Company's current and future efforts with the INL. The Company had no cash payment obligations related to the GAIN voucher, but did provide in-kind services consisting of project management, quality assurance, and technical oversight under the CRADA. The DOE incurred payment obligations to BAE, related to the work done under the GAIN voucher. For the year ended December 31, 2021, the Company recorded approximately $0.4 million of contributed services - research and development for work that was completed that caused the DOE to incur payment obligations related to the GAIN voucher. The Company had no payment obligations related to the GAIN voucher. This amount was recorded as contributed services - research and development in the Other Operating Income section of the consolidated statement of operations and the corresponding amount was recorded as research and development expenses.

The R&D services provided under the GAIN vouchers were utilized by the Company in its ongoing development of its next generation nuclear fuel technology. The Company believes that the amounts paid by the DOE to BEA and Battelle for the service provided does not differ materially from what the Company would have paid had it directly contracted for these services for its R&D activity.

Note 7. Income Taxes

Revision of Previously Issued Financial Statements

The Company's ability to utilize its net operating loss (NOL) carryforwards may be substantially limited due to ownership changes that have occurred or that could occur in the future, as required by Section 382 of the Internal Revenue Code of 1986, as amended (the Code), as well as similar state provisions. These ownership changes may limit the amount of NOL carryforwards that can be utilized annually to offset future taxable income and tax, respectively. In general, an "ownership change," as defined by Section 382 of the Code, results from a transaction or series of transactions over a three-year period resulting in an ownership change of more than 50 percent of the outstanding stock of a company by certain stockholders or public groups.

During the course of preparing the Company's consolidated financial statements as of and for the year ended December 31, 2022, the Company completed a preliminary assessment of the available NOL carryforwards under Section 382 of the Code. The Company determined that it likely had undergone multiple ownership changes from 2009 to 2022 as defined under Section 382. As a result of these identified ownership changes, the portion of NOL carryforwards attributable to the pre-ownership change periods are subject to a substantial annual limitation under Section 382 of the Code. A conclusive Section 382 study had not been performed due to the Company's current projections of the lack of taxable income for the foreseeable future. The Company has adjusted its previously reported NOL carryforwards to address the impact of these 382 ownership changes. This resulted in a reduction of available total federal and state NOL carryforwards of $109 million, as originally reported at December 31, 2021, to $47 million (post-2017 NOLs) at December 31, 2022. The write-down of $62 million (pre-2018 NOLs) reduced the net operating losses line as of December 31, 2021 within gross deferred tax assets, as previously disclosed, by $15.9 million, with a corresponding decrease in the valuation allowance. NOLs created in years beginning after 2017 now only offset 80% of taxable income but no longer have a 20-year expiration.

Since the limitation affected the prior period, the Company has determined that its December 31, 2021 tax footnote presentation overstated the gross deferred tax asset and corresponding valuation allowance by $15.9 million. However, there was no net impact to the net deferred tax asset and tax expense as the decrease in the net operating loss was offset completely by a corresponding adjustment to the Company's overall valuation allowance. For comparative purposes, the Company's prior year tax footnote has been revised to reflect the adjustment to the net operating losses and valuation allowance. The revision had no effect on the previously reported balance sheets, statements of operations, cash flows and stockholders' equity.

The Company's revised deferred tax asset disclosures are below:

Deferred tax assets consisted of the following (rounded in millions):

	December 31, 2021 As Previously Reported	2021 Adjustment	December 31, 2021 As Revised
Stock-based compensation	$ 3.1	$ —	$ 3.1
Patent impairment provision	0.3	—	0.3
Net operating loss carry-forwards	27.6	(15.9)	11.7
Research and development tax credits	0.3	—	0.3
Less: valuation allowance	(31.3)	15.9	(15.4)
Total	$ —	$ —	$ —

The 2022 and 2021 annual effective tax rate is estimated to be 25% for the combined U.S. federal and state statutory tax rates. The Company reviews tax uncertainties in light of changing facts and circumstances and adjusts them accordingly. As of December 31, 2022 and 2021, there were no tax contingencies or unrecognized tax positions recorded.

On August 16, 2022, President Biden signed the Inflation Reduction Act (the "IRA"). The IRA contains a number of tax related provisions including a 15% minimum corporate income tax on certain large corporations as well as an excise tax on stock repurchases. Both provisions are effective for tax years beginning after December 31, 2022. The Company is in the process of evaluating the IRA but does not expect it to have a material impact on the Company's consolidated financial statements.

Deferred income taxes reflect the net tax effects of temporary differences between the carrying amounts of assets and liabilities recognized for financial reporting, and the amounts recognized for income tax purposes. The significant components of deferred tax assets (at an approximate 25% effective tax rate) as of December 31, 2022 and 2021, respectively, are as follows.

Deferred tax assets consisted of the following (rounded in millions):

	December 31, 2022	December 31, 2021 As Revised
Stock-based compensation	$ 3.5	$ 3.1
Patent impairment provision	0.4	0.3
Net operating loss carry-forwards	13.6	11.7
Research and development expenses – capitalized for tax purposes	0.1	—
Research and development tax credits	0.3	0.3
Less: valuation allowance	(17.9)	(15.4)
Total	$ —	$ —

The Company has NOL carryforwards for federal and state tax purposes of approximately $54 million at December 31, 2022, that is potentially available to offset future taxable income.

For financial reporting purposes, no deferred tax asset was recognized because as of December 31, 2022 and 2021, management currently estimates that it is more likely than not that substantially all of the deferred tax assets, the majority of which are NOLs, will be unused. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income during the years in which those temporary differences are deductible. Any unused annual limitation may be carried over to later years, and the amount of the limitation may under certain circumstances be increased by the built-in gains in assets held by us at the time of the change that are recognized in the five-year period after the change.

The reconciliation between income taxes (benefit) at the U.S. and State statutory combined tax rates of approximately 25% and the amount recorded in the accompanying consolidated financial statements is as follows (rounded in millions):

	December 31, 2022	December 31, 2021
Tax benefit at U.S. federal statutory rates	$ (1.6)	$ (1.7)
Tax benefit at state statutory rates	(0.4)	(0.2)
Tax benefit from federal and state R&D tax credits	—	—
Other	(0.4)	—
Increase in valuation allowance	2.4	1.9
Total provision for income tax benefit	$ —	$ —

Recent Change in U.S. Tax Law

Prior to 2022, Internal Revenue Code Section 174 allowed taxpayers to deduct R&D expenditures in the year in which they were incurred. The 2017 Tax Act amended Section 174, effective for amounts paid or incurred in tax years beginning after December 31, 2021, to require taxpayers to charge their R&D expenditures to a capital account. Capitalized research and development costs are required to be amortized over five years (15 years for expenditures attributable to foreign research).

Due to the Company's future significant R&D expenses, the impact of this tax law change will mean that a significant portion of our total operating expenses will be taken as a deduction over a 5-year period rather than being currently deductible. The Company does not expect to pay cash taxes as a result of this change as our remaining operating expenses after excluding research and development expenses are significant and the Company expects to continue to generate losses for tax purposes.

Note 8. Stockholders' Equity and Stock-Based Compensation

On October 27, 2022, at the Company's annual shareholder meeting, the shareholders' approved an amendment to the Articles of Incorporation of the Company to increase the number of authorized shares of common stock from 13,500,000 shares to 25,000,000 shares and an amendment to the Lightbridge Corporation 2020 Omnibus Incentive Plan to increase the number of shares of common stock available for issuance under this Incentive Plan from 650,000 shares to 1,100,000 shares.

At December 31, 2022, the Company had 11,900,217 common shares outstanding (including outstanding restricted stock awards totaling 416,316 shares). Also outstanding were stock options relating to 525,903 shares of common stock, all totaling 12,426,120 shares of common stock and all common stock equivalents, outstanding at December 31, 2022.

At December 31, 2021, the Company had 9,759,223 common shares outstanding (including outstanding restricted stock awards totaling 188,588 shares). Also outstanding were warrants relating to 45,577 shares of common stock, stock options relating to 538,713 shares of common stock and performance-based RSA awards of 188,588 shares, all totaling 10,532,101 shares of common stock and all common stock equivalents, outstanding at December 31, 2021.

Common Stock Equity Offerings

ATM Offerings

On May 28, 2019, the Company entered into an at-the-market (ATM) equity offering sales agreement with Stifel, Nicolaus & Company, Incorporated (Stifel), which was amended on April 9, 2021, pursuant to which the Company may issue and sell shares of its common stock from time to time through Stifel as the Company's sales agent. Under this agreement, the Company pays Stifel a commission equal to 4.0% of the aggregate gross proceeds of any sales of common stock under the agreement. The offering of common stock pursuant to this agreement can be terminated with 10 days written notice by either party. Sales of the Company's common stock through Stifel, if any, will be made by any method that is deemed to be an "at-the-market" equity offering as defined in Rule 415 promulgated under the Securities Act of 1933. On March 25, 2021, the Company filed a new shelf registration statement on Form S-3, registering the sale of up to $75 million of the Company's securities, which registration statement was declared effective on April 5, 2021. The Company filed a prospectus supplement, dated April 9, 2021, with the Securities and Exchange Commission pursuant to which the Company offered and sold shares of common stock having an aggregate offering price of up to $9.0 million through its ATM. The Company, after this offering was completed, filed a second prospectus supplement, dated November 19, 2021, with the Securities and Exchange Commission pursuant to which the Company may offer and sell shares of common stock having an aggregate offering price of up to up to $20.0 million from time to time under this prospectus supplement, through its ATM. The Company filed another prospectus supplement, dated November 9, 2022, with the SEC pursuant to which it may offer and sell shares of common stock having an aggregate offering price of up to $20.0 million from time to time, through the ATM.

The Company records its ATM sales on a settlement date basis. The Company sold approximately 1.9 million shares, under the ATM for the year ended December 31, 2022 resulting in net proceeds of approximately $11.0 million. The Company sold approximately 2.0 million shares under the ATM for the year ended December 31, 2021 resulting in net proceeds of approximately $14.8 million.

Preferred Stock Equity Offerings

Exchange of Outstanding Series A and Series B Convertible Preferred Stock for Common Shares

On October 29, 2021, the Company entered into an agreement with the holder of all of the outstanding Series A Preferred Stock, to exchange all of the outstanding Series A Preferred Stock and the payment-in-kind (PIK) dividends for 262,910 shares of the Company's common stock ($10 per share induced conversion price), without any cash payments by either party.

On December 3, 2021, the Company entered into a series of agreements with all of the holders of the Company's Series B convertible preferred stock to exchange all outstanding Series B Preferred Stock for shares of the Company's common stock at an exchange rate equal to the sum of the liquidation preference of the Series B Preferred Stock and the accrued and unpaid dividends thereon, divided by $10.00 per share. Upon the closing of the exchange, the Company issued an aggregate of 522,244 shares of common stock to the holders in exchange for all 2,666,667 issued and outstanding Series B Preferred Stock.

The exchange for both Series A and Series B preferred stock was effected without registration under the Securities Act of 1933, as amended, pursuant to the exemption from registration set forth in Section 3(a)(9) of the Securities Act.

In accordance with ASC 470-20, the Company accounted for both exchanges as an induced conversion based on the short period of time the exchange offer was open and that all equity securities pursuant to the original terms were exchanged. Pursuant to this accounting guidance, the Company evaluated the fair value of the incremental 183,098 common shares issued to the Series A Preferred stockholders. Based on the $9.57 closing stock price on October 29, 2021, the Company recorded to additional paid-in capital a deemed dividend of $1.8 million at the date of the exchange. Also, the Company evaluated the fair value of the incremental 232,111 common shares issued to the Series B Preferred stockholders. Based on the $7.57 closing stock price on December 3, 2021, the Company recorded to additional paid-in capital a deemed dividend of $1.8 million at the date of the exchange.

Warrants

The Company did not have any outstanding warrants as of December 31, 2022 and had 45,577 outstanding warrants as of December 31, 2021. The 45,577 warrants that were issued to investors on November 17, 2014, entitling the holders to purchase 45,577 common shares in the Company at an exercise price of $138.60 per common share, expired on May 16, 2022.

Stock-based Compensation

2020 Equity Incentive Plan

On March 9, 2020, the Board of Directors adopted the Company's 2020 Omnibus Incentive Plan (the "2020 Plan"). On September 3, 2020, the shareholders approved the 2020 Plan to authorize grants of the following types of awards (a) Options, (b) Stock Appreciation Rights, (c) Restricted Stock and Restricted Stock Units, and (d) Other Stock-Based and Cash-Based Awards.

Stock Options

During the year ended December 31, 2022, the Company issued 18,852 stock options to two consultants. These options were assigned a weighted average fair value of $3.98 per share (total fair value of $75,000). During the year ended December 31, 2021, the Company issued 58,164 stock options to consultants. The 2021 options issued to the consultants of the Company were assigned a weighted average fair value of $2.58 per share (total fair value of $150,000). The value was determined using the Black-Scholes pricing model. The following assumptions were used in the Black-Scholes pricing model:

	2022	2021
Expected volatility	97.58% to 115.37%	95.15% to 131.85%
Risk free interest rate	1.02% to 3.28%	0.06% to 0.93%
Dividend yield rate	0	0
Weighted average years	2-6 years	1-6 years
Closing price per share - common stock	$5.93 to $6.27	$4.55 to $6.51

Stock options issued to the Company's employees, directors and consultants are summarized as follows for the year ended December 31, 2022:

	Options Outstanding	Weighted Average Exercise Price	Weighted Average Grant Date Fair Value
Beginning of the year - January 1, 2022	538,713	$ 18.51	$ 12.92
Granted	18,852	6.17	3.98
Exercised	—	—	—
Forfeited	—	—	—
Expired	(31,662)	7.29	2.37
End of the period - December 31, 2022	525,903	$ 18.74	$ 13.23
Options exercisable	514,513	$ 19.03	$ 13.43

Stock option transactions to the employees, directors and consultants are summarized as follows for the year ended December 31, 2021:

	Options Outstanding	Weighted Average Exercise Price	Weighted Average Grant Date Fair Value
Beginning of the year - January 1, 2021	515,847	$ 20.23	$ 14.51
Granted	58,164	6.72	2.58
Exercised	(30,282)	8.94	6.77
Forfeited	(3,997)	62.52	43.63
Expired	(1,019)	329.81	291.73
End of the year - December 31, 2021	538,713	$ 18.51	$ 12.92
Options exercisable	526,947	$ 18.79	$ 13.11

During the year ended December 31, 2021, the Company received approximately $0.3 million of net proceeds from the exercise of 30,282 stock options.

A summary of the status of the Company's non-vested options as of December 31, 2022 and December 31, 2021, and changes during the year ended December 31, 2021 and the year ended December 31, 2022, is presented below:

	Shares	Weighted Average Exercise Price	Weighted Average Fair Value Grant Date
Non-vested - December 31, 2020	49,726	$ 9.71	$ 7.44
Granted	58,164	6.72	2.58
Vested	(96,124)	8.40	4.89
Forfeited	—	—	—
Non-vested - December 31, 2021	11,766	$ 5.71	$ 4.25
Granted	18,852	6.17	3.98
Vested	(19,228)	6.17	3.90
Forfeited	—	—	—
Non-vested - December 31, 2022	11,390	$ 5.69	$ 4.39

The above tables include stock options issued and outstanding as of December 31, 2022 as follows:

i. A total of 325,571 incentive stock options and non-qualified 10-year options have been issued, and are outstanding, to the directors, officers, and employees at exercise prices of $3.82 to $75.60 per share. From this total, 127,299 options are held by the Chief Executive Officer, who is also a director, with remaining contractual lives of 2.27 years to 6.92 years. All other options issued to directors, officers, and employees have a remaining contractual life ranging from 2.27 years to 6.92 years.

ii. A total of 200,332 non-qualified 2 to 10-year options have been issued, and are outstanding, to consultants at exercise prices of $3.82 to $75.60 per share and have a remaining contractual life ranging from 0.36 years to 9.67 years.

As of December 31, 2022, there was approximately $42,000 of total unrecognized compensation cost related to non-vested stock options granted under the plans. That cost is expected to be recognized over a weighted-average period of approximately 2.06 years. For stock options outstanding at December 31, 2022 and 2021, the intrinsic value was approximately $5,000 and $238,000, respectively. For those vested stock options at December 31, 2022 and 2021, the intrinsic value was approximately $5,000 and $225,000, respectively.

The following table provides certain information with respect to the above-referenced stock options that were outstanding and exercisable at December 31, 2022:

	Stock Options Outstanding			Stock Options Vested		
Exercise Prices	Weighted Average Remaining Contractual Life -Years	Number of Awards	Weighted Average Exercise Price	Weighted Average Remaining Contractual Life -Years	Number of Awards	Weighted Average Exercise Price
$ 3.82-$9.00	5.44	128,407	$ 4.81	5.10	117,017	$ 4.72
$ 9.01-$12.48	5.60	116,544	$ 10.80	5.60	116,544	$ 10.80
$ 12.49-$24.00	4.12	195,090	$ 14.23	4.12	195,090	$ 14.23
$ 24.01-$72.00	2.72	62,771	$ 55.07	2.72	62,771	$ 55.07
$ 72.01-$75.60	2.15	23,091	$ 75.59	2.15	23,091	$ 75.59
Total	4.52	525,903	$ 18.74	4.42	514,513	$ 19.03

Common Share Issuances

2022

For the year ended December 31, 2022, the Company issued 10,565 common shares, respectively, to its investor relations firm for services provided during the year ended December 31, 2022.

On December 15, 2022, the Board of Directors approved an equity grant of $200,000 in total to its five directors, which equaled to a total of 52,085 shares of common stock issued to the five directors, valued on the grant date at $3.84 per share and issued on January 3, 2023. As of December 31, 2022, the Company accrued these directors' fees of $200,000 under accrued directors' fees.

2021

For the year ended December 31, 2021, the Company issued 10,462 common shares to its investor relations firm for services provided during the year ended December 31, 2021.

On November 18, 2021, the Board of Directors approved an equity grant of $210,000 in total to its six directors, which equaled to a total of 19,644 shares of common stock issued to the six directors, valued on the grant date at $10.69 per share. There were 13,096 common shares issued to four directors that vested immediately upon issuance and the remaining 6,548 shares of common shares were issued to the two remaining directors that vested on January 1, 2022.

Restricted Stock Units Issued and Net Share Settlements for Payments of Withholding Taxes

On October 28, 2020, the Compensation Committee of the Board granted from the 2020 Plan time-based restricted stock units ('RSUs") to certain of the Company's executive officers, employees, and consultants. Each RSU represents a contingent right to receive, upon vesting, one share of the Company's common stock. The number of RSUs granted to executive officers, employees and consultants totaled 243,800 shares. These RSUs awards vest in three equal installments on each of the first three annual anniversaries of the grant date, on October 28, 2021, October 28, 2022 and October 28, 2023.

On October 28, 2021, the first tranche of 78,617 of total outstanding RSUs vested. Regarding these 78,617 RSUs that vested, the Company withheld 35,304 common shares of the employees at the stock price on the vesting date of $9.93 per share, in order to make payments of withholding taxes of $0.3 million on these vested shares. The Company issued a total of 43,313 shares of common stock, net of the share settlement for the taxes paid upon the vesting of these RSUs, to its employees and one consultant.

On November 4, 2021, the Compensation Committee of the Board of Directors approved the accelerated vesting of the remaining 157,233 RSUs outstanding, and all these remaining 157,233 RSUs vested on December 15, 2021. Regarding these 157,233 RSUs vested on December 15, 2021, the Company withheld 70,265 common shares to be issued to the employees, at the stock price on the vesting date 6.74 per share in order to make the payments for withholding taxes of $0.5 million on these vested shares. The Company issued a total of 86,968 shares of common stock, net of share settlement for the taxes paid upon vesting of RSUs, to its employees and one consultant. Total payments for withholding taxes on the net share settlements of vested RSU equity awards for the year ended December 31, 2021 was $0.8 million.

Restricted Stock Units Outstanding

The following summarizes the Company's RSUs activity:

	Number of Shares	Weighted Average Grant Date Fair Value
Total RSUs outstanding at January 1, 2021	243,800	$ 2.69
Total RSUs granted	—	$ —
Total RSUs vested (including accelerated vesting)	(235,850)	$ 2.69
Total RSUs forfeited	(7,950)	$ 2.69
Total unvested RSUs outstanding at December 31, 2021	—	$ —

Restricted Stock Awards Issued and Net Share Settlements for Payments of Withholding Taxes

On November 18, 2021, the Board of Directors approved an equity grant of approximately $2 million, which equaled to a total of 188,588 RSAs, to all of its employees and two consultants, valued at the stock price on the grant date of $10.69 per share. These RSAs awards contained a performance-based accelerated vesting provision and a service-based vesting provision, with the service-based vesting provision being one-third vesting on each of the first three anniversaries of the date of grant. The Company did not meet the performance-based vesting provision. Therefore, these RSAs awards vest in three equal installments on each of the first three annual anniversaries of the grant date, on November 18, 2022, November 18, 2023 and November 18, 2024. There was an additional performance-based RSA grant on November 18, 2021 of approximately $2 million, which equaled to a total 188,588 shares, with vesting only upon the Company completing a business acquisition in 2022, with the target's historical financials meeting certain financial performance metrics. The Company did not meet this milestone and these 188,588 RSAs expired at December 31, 2022 and were returned back to the stock plan.

On November 18, 2022, the first tranche, or 62,862. of the total outstanding RSAs vested. Regarding these 62,862 RSAs that vested, the Company withheld 21,794 common shares of the employees at the stock price on the vesting date of $4.80 per share, in order to make payments of withholding taxes of $0.1 million on these vested shares. The Company issued a total of 41,068 shares of common stock, net of the share settlement for the taxes paid upon the vesting of these RSAs, to its employees and consultants.

On December 15, 2022, the Board of Directors approved an equity grant of approximately $1.4 million, which equaled to a total of 290,590 RSAs, to all of its employees and two consultants, valued at the stock price on the grant date of $4.71 per share. These RSAs awards vest in three equal installments on each of the first three annual anniversaries of the grant date, on December 15, 2023, December 15, 2024 and December 15, 2025.

As of December 31, 2022 and 2021, there were 416,316 RSAs and 188,588 RSAs included in the total outstanding common shares, respectively and compensation expense recognized straight line over the three-year vesting period. A total of $0.7 million and $0.1 million of compensation expense were recorded for the year ended December 31, 2022 and 2021, respectively.

The following summarizes the Company's RSAs activity:

	Number of Shares	Weighted Average Grant Date Fair Value
Total RSAs outstanding at January 1, 2022	377,176	$ 10.69
Total RSAs granted	290,590	$ 4.71
Total RSAs vested	(62,862)	$ 10.69
Total performance-based RSAs expired	(188,588)	$ 10.69
Total unvested RSAs outstanding at December 31, 2022	416,316	$ 6.52

Scheduled vesting for outstanding RSAs with service conditions at December 31, 2022 is as follows:

	Year Ending December 31,			
	2023	2024	2025	Total
Scheduled vesting	159,727	159,726	96,863	416,316

As of December 31, 2022, there was approximately $2.6 million of total unrecognized compensation cost related to these unvested RSAs compensation arrangements. The compensation expense will be recognized on a straight-line basis over the three-year vesting period and the total unrecognized compensation is expected to be recognized over a weighted-average period of 2.43 years.

The components of total stock-based compensation expense included in the Company's consolidated statements of operations for the years ended December 31, 2022 and 2021 are as follows (rounded in millions):

	Years Ended December 31,	
	2022	2021
Research and development expenses	$ —	$ —
General and administrative expenses	0.8	0.8
Total stock-based compensation expense	$ 0.8	$ 0.8

Note 9. Related Party Transactions

On February 9, 2022, the Company entered into an agreement with We Don't Have Time Inc. ("WDHT"), an organization with a social media network platform dealing with the climate crisis, pursuant to which WDHT will provide a variety of climate-change related consulting services to the Company and the Company agreed to pay a monthly membership fee of $1,200 to WDHT through and including December 2022. Dr. Chakraborty, a member of the Company's Board of Directors, is also the CEO of WDHT US division. For the year ended December 31, 2022, the Company incurred $14,400, respectively, in dues paid to WDHT.

In addition, for the year ended December 31, 2022, the Company incurred $105,000 in fees to WDHT to attend conferences in which the Company participated with WDHT to promote the Company's nuclear fuel.

Note 10. Subsequent Events

ATM Sales

Sales under the ATM that were made from January 1, 2023 to the date of the filing of these financial statements were approximately 0.2 million common shares that totaled net proceeds of approximately $0.7 million.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

LIGHTBRIDGE CORPORATION

Date: March 30, 2023

By: */s/ Seth Grae*
Seth Grae
Chief Executive Officer,
President and Director

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Seth Grae and Larry Goldman, jointly and severally, his or her attorney-in-fact, with the power of substitution, for him or her in any and all capacities, to sign any amendments to this Annual Report on Form 10-K and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, hereby ratifying and confirming all that each of said attorneys-in-fact, or his or her substitute or substitutes, may do or cause to be done by virtue hereof.

In accordance with the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the Registrant and in the capacities on the dates indicated.

Signature	Title	Date
/s/ Seth Grae Seth Grae	Chief Executive Officer, President and Director (Principal Executive Officer)	March 30, 2023
/s/ Larry Goldman Larry Goldman	Chief Financial Officer, and Treasurer (Principal Financial and Accounting Officer)	March 30, 2023
/s/ Thomas Graham, Jr. Thomas Graham, Jr.	Director	March 30, 2023
/s/ Sweta Chakraborty Sweta Chakraborty	Director	March 30, 2023
/s/ Jesse Funches Jesse Funches	Director	March 30, 2023
/s/ Daniel Magraw Daniel B. Magraw	Director	March 30, 2023
/s/ Mark Tobin Mark Tobin	Director	March 30, 2023

11710 Plaza America Drive
Suite 2000
Reston, Virginia 20190 USA
www.ltbridge.com