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Standard Lithium Announces Positive Preliminary Economic Assessment and Update of Inferred Mineral Resource at South-West Arkansas Lithium Project

EL DORADO, Ark., Oct. 12, 2021 (GLOBE NEWSWIRE) -- **Standard Lithium Ltd.** ("Standard Lithium" or the "Company") (TSXV: SLI) (NYSE: SLI) (FRA: S5L), an innovative technology and lithium project development company, reports the positive results of a Preliminary Economic Assessment (PEA) for the Company's South-West Arkansas (SWA) Lithium Project (the "Project"; previously called the Tetra Project; See Company News Release dated May 17th 2021).

Key Points:

- Pre-tax US$2.83 Billion NPV at 8% discount rate and IRR of 40.5%;
- After-tax US$1.97 Billion NPV at 8% discount rate and IRR of 32.1%;
- 20-year mine-life producing an average of 30,000 tonnes per year of battery-quality lithium hydroxide monohydrate (LHM);
- Operating costs of US$2,599 per tonne of battery quality lithium hydroxide;
- AACE Class 5 Total CAPEX estimate of US$870 Million including conservative 25% contingency of direct capital costs; and,
- SW Arkansas Lithium Project PEA lithium brine resource is updated to consider the potential unitized area of production, leading to an increased total (global) in-situ resource of 1,195,000 tonnes Lithium Carbonate Equivalent (LCE) at the Inferred Category.

Dr. Andy Robinson, President and COO of Standard Lithium commented, *"the completion of this PEA for the SWA Lithium Project is an important milestone for Standard Lithium as it begins to showcase the significant potential that is present within the Smackover Formation in southwestern Arkansas. This PEA is the result of a concerted team effort, and we owe considerable thanks to all the team members who have contributed their professional expertise to this study. The ability to showcase this PEA and highlight these attractive project fundamentals is based on the many tens-of-thousands of hours that the broader Standard Lithium team has spent over the past few years proving and derisking our lithium extraction technology at pre-commercial scales. It is because of our large-scale technology proof that we can hope to deploy it, in the future, on our other assets in the region. The attractive potential economics from this PEA support continued effort to de-risk and advance the SWA Project in parallel with the Company's immediate focus, which is to deliver the first new lithium production facility in North America at the Lanxess facilities."*

The PEA and updated lithium resource estimate are based on a unitized area of future potential production resulting in 36,172 gross mineral acres (14,638 gross mineral hectares).

The PEA considers the production of battery-quality lithium hydroxide averaging 30,000 tonnes per annum (tpa) over a 20-year operating timeframe. The PEA also updates the existing inferred mineral resource.

The PEA is preliminary in nature and includes inferred resources that are considered too speculative to have the economic considerations applied to them that would enable them to be categorized as mineral reserves and there is no certainty the estimates presented in the PEA will be realized.

Table 1: PEA Highlights

	Units	Values
Average Annual Production (as $LiOH•H_2O$)	tpa[1]	30,000[2]
Plant Operation	years	20
Total Capital Cost (CAPEX)	US$	869,868,000[3]
Operating Cost (OPEX) per year	US$/yr	77,972,000[4]
OPEX per tonne	US$/t	2,599
Initial Selling Price	US$/t	14,500[5]
Average Annual Revenue	US$	570,076,000[6]
Discount Rate	%	8.0
Net Present Value (NPV) Pre-Tax	US$	2,830,190,000
Net Present Value (NPV) Post-Tax	US$	1,965,427,000
Internal Rate of Return (IRR) Pre-Tax	%	40.5
Internal Rate of Return (IRR) Post-Tax	%	32.1

Notes:
All model outputs are expressed on a 100% project ownership basis with no adjustments for project financing assumptions
[1] Metric tonnes (1,000 kg) per annum
[2] Total production for years 1 to 15 is 30,666 tpa LHM and 28,000 tpa LHM for years 16 to 20
[3] AACE Class 5 estimate includes 25% contingency on direct capital costs
[4] Includes all operating expenditures, ongoing land costs, established Royalties, sustaining capital and allowance for mine closure. All costs are escalated at 2% per annum
[5] Selling price of battery quality lithium hydroxide monohydrate based on an initial price of $14,500/t in 2021, adjusted for inflation at 2% per annum. Sensitivity analysis modelled the starting price between US$12,500-US$16,500/t.
[6] Average annual revenue over projected 20 year mine-life.

Project Development
The development plan for the PEA considers the production of battery-quality lithium hydroxide averaging 30,000 tonnes per annum (tpa) over a 20-year operating timeframe. The project contemplates, in broad terms, the extraction of brine from the southern portion of the project where the brine has a higher lithium grade (approximately 400 mg/L) and better reservoir characteristics, and reinjection of the tailbrine into the northern part of the project

where the lithium grade is significantly lower (approximately 160 mg/L; additional details are provided below). The lithium extraction process is based on the Company's proprietary LiSTR technology, and the final conversion to a lithium hydroxide product will use an electrochemical process tailored to lithium hydroxide production. The project is located in an area with significant existing infrastructure such as water, power, gas, road, rail and workforce; plus existing operating oil and gas assets, including wells, collection systems, easements and gas processing facilities. It should be noted that the Company has secured an option to acquire a key parcel of land in the contemplated Project area. This land may be suitable for siting a future brine processing and conversion facility as it is well served by existing infrastructure, utilities and pipeline easements. Development of the project, subject to continuing project definition, due diligence and receipt of future feasibility studies, contemplates production commencing in 2025 from the land package assembled by the Company to date (subject to unitization as described below).

Brine Leases and Future Unitization

The SW Arkansas Lithium Project is based on the Company's existing brine leases (maintained through an option agreement with Tetra Technologies Inc., a NYSE-listed Company) that have a net lease area of 27,262 acres (11,033 hectares). As the PEA contemplates a future production scenario (subject to ongoing project development and de-risking), it is necessary to model the potentially available resource by aggregating these leases into a single unitized production area; this has the effect of 'filling in the gaps' between the lease parcels to generate a single unitized area of 36,172 gross mineral acres (14,638 gross mineral hectares). Note that this 'unitizing', or 'grossing-up' of the existing leases to a possible future production area is normal for brine production in Arkansas (the Arkansas Brine Statute), and can only be considered when the net holding in the unitized area is greater than 75%. Note also that future aggregation and unitization of the leases is subject to regulatory approval, and will be governed by an existing process that is managed and overseen by the Arkansas Oil and Gas Commission (AOGC).

Brine Production/Injection, Pipelines and Pre-Treatment

Based upon geological and brine chemistry information in the SWA Lithium Project area, the lithium concentrations are anticipated to be consistent within the South and North Resource areas, averaging 399 mg/L and 160 mg/L, respectively. A network of 23 brine supply wells would produce from the Smackover Formation in the higher-grade South Resource area averaging about 1,715 m^3/day per well for an aggregated total production of 39,452 m^3/day (1,644 m^3/hr or 7,238 US gallons per minute). The average brine supply well production rate is similar to the two existing bromine operations located immediately to the east of the Project. Brine from the supply wells would be conveyed to a lithium extraction and lithium hydroxide production facility by a network of underground fibreglass pipelines totalling approximately 18.3 km (11.4 miles) in length. The brine entering the production facility would be pre-treated to remove hydrogen sulphide gas (H_2S), suspended solids and hydrocarbons, prior to processing by the Company's proprietary direct lithium extraction process (LiSTR). After LiSTR processing, the lithium depleted brine is returned to the lower-grade North Resource area by a pipeline system 20.3 km (12.6 miles) in length to a network of 24 brine injection wells completed in the Smackover Formation. All extraction and reinjection would occur in the single unitized area to maintain reservoir pressures (as is the practice elsewhere in southern Arkansas).

Direct Lithium Extraction by LiSTR

The proprietary LiSTR lithium extraction process uses a fine-grained, solid, inorganic adsorbent to selectively adsorb lithium ions from the brine. The LiSTR process produces a concentrated lithium chloride solution. This process is currently being successfully tested by the Company at their Demonstration Plant in Union County, Arkansas (see December 03, 2020 news release). This Demonstration Plant has been successfully operating at a pre-commercial scale since May 2020.

Lithium Hydroxide Production

The concentrated lithium chloride solution from LiSTR is further concentrated by high pressure reverse osmosis and impurities are removed through ion exchange (as also successfully proven at the Company's Demonstration Plant). The further concentrated and purified lithium chloride solution is processed by electrolysis to form a highly pure lithium hydroxide solution. This solution is crystalized into a solid, battery-quality lithium hydroxide monohydrate.

Capital Costs

At full build-out, with estimated average production over 20 years of 30,000 tonnes per annum of lithium hydroxide, the direct capital costs are estimated at US$532 million, with indirect costs of US$205 million. A contingency of 25% was applied to direct costs (US$133 million) to yield an estimated all-in capital cost of US$870 million. A summary of the capital costs is provided in Table 2 below.

Table 2: Capital Cost Summary

Description	Direct Costs Million US$ [1]	Indirect Costs Million US$ [2]
Extraction and Reinjection Wellfield[3]	204.9	2.3
Pipelines[3]	38.7	2.5
Receiving/Pre-Treatment	35.4	28.1
Lithium Extraction (LiSTR)	135.0	103.8
Lithium Hydroxide Conversion	90.9	39.9
Utilities/Infrastructure	26.9	28.5
Contingency	133.0[4]	-
Total	664.8	205.1
CAPEX TOTAL	**US$869.9 million**	

Notes:

[1] Direct costs were estimated using either vendor-supplied quotes, and/or engineer estimated pricing (based on recent experience) for all major equipment. Major equipment prices were scaled using appropriate AACE Class 5 Direct Cost Factors (provided by the relevant QP) to derive all direct equipment costs

[2] Indirect costs were estimated using AACE Class 5 Indirect Cost Factors multiplied by the direct costs. Indirect costs include all contractor costs (including engineering); indirect labor costs and Owner's Engineer costs

[3] Exceptions to above costing estimate methodology were the wellfield and pipelines,

which were based on HGA's recent project experience in the local area
[4] AACE Class 5 estimate includes 25% contingency on direct capital costs

Operating Costs

The operating cost estimate includes both direct costs and indirect costs, as well as allowances for mine closure. The majority of the operating cost comprises reagent usage required to extract the lithium from the brine, as well as conversion to lithium hydroxide monohydrate and electricity consumption. Out of this, the greatest amount is related to acid and base consumption (hydrochloric acid and ammonium hydroxide) and was estimated using information from the operating Demonstration Plant located in Union County, Arkansas. The all-in operating cost of $2,599 per tonne of lithium hydroxide is one of the lowest reported in the industry owing to two key factors which are location-specific. DLE processes are reagent intensive; in the case of the LiSTR process, the principal reagent cost is hydrochloric acid. A large portion (approximately 50%) of the acid required is produced on-site as a by-product of the electrochemical conversion of lithium chloride to lithium hydroxide. This can result in significant cost-savings during the lithium extraction step. The electrochemical conversion uses a large quantity of electricity, which would normally (in most jurisdictions around the world) result in a cost disbenefit; however, bulk electricity pricing in southern Arkansas is favorable (<6 cents/kWh), and hence results in overall lower-than-normal operating costs.

Table 3: Operating Cost Summary

Description	Operating Cost US$/tonne Lithium Hydroxide[1]
Workforce[2]	190
Electrical Power[3]	378
Reagents and Consumables[4]	836
Natural Gas[5]	39
Maintenance/Waste Disposal/Misc[6]	563
Indirect Operational Costs[7]	110
Royalties and Land/Lease Costs[8]	482
OPEX Total	**2,599**

Notes:

[1] Operating costs are calculated based on average annual production of 30,000 tonnes of lithium hydroxide
[2] Approximately 75 FTE positions
[3] Approximately 40% of electrical energy consumed by wellfield and pipelines; 60% by the processing facility
[4] Majority of reagent costs are comprised of HCl and NH_4OH consumption. As discussed elsewhere, approximately 50% of the required HCl is produced on-site as a by-product of the electrochemical conversion of lithium chloride solution to lithium hydroxide solution, resulting in a significant cost saving. Additional cost savings can be attributed to the on-site production of concentrated NaCl solution, resulting from pre-concentration of the LiCl ahead of conversion. This NaCl solution is used as a regenerant in some of the polishing IX processes. Other reagents and consumables are air, lithium titanate make-up (owing to

small losses in the process), membrane replacement, nitrogen and scale inhibitors for pumps/wellheads.
[5] Assumes that all natural gas is purchased from open market and none is co-produced at the wellheads
[6] Includes all maintenance and workover costs and is based on experience in similar-sized electrochemical facilities, brine processing facilities and Smackover brine production wellfields
[7] Indirect costs (insurance, environmental monitoring, community benefits etc.) are factored from other capital and operational costs, except for mine closure, which is based on known well-abandonment costs
[8] Based on agreed royalties and expected future lease costs. Does not include future lease-fees-in-lieu-of-royalties which are still to be determined and subject to regulatory approval (lease-fees-in-lieu-of-royalties have been determined for bromine and certain other minerals in the State of Arkansas, but have not yet been determined for lithium extraction)

Sensitivity Analysis
Lithium hydroxide monohydrate battery quality pricing assessment was completed. Project pricing was based upon a current price of $14,500 US/tonne adjusted for inflation to the start of production in 2025. The sensitivity analysis is provided in Table 4 below.

Table 4: Lithium Hydroxide sale price post-tax sensitivity analysis

LHM Price in 2021[1] (US$/t)	Post-Tax NPV (US$ Million)	Post-Tax IRR
12,500	1,544.7	27.6%
13,500	1,755.1	29.9%
14,500	1,965.4	32.1%
15,500	2,175.8	34.2%
16,500	2,386.1	36.3%

Notes:
[1] 2% annual LHM price escalation from 2021 to the start of production in 2025 was applied.

Mineral Resource Assessment
The resource present in the Smackover Formation below the SWA Lithium Project was updated based on the proposed unitized area encompassing 36,172 gross mineral acres (14,638 gross mineral hectares; see discussion above for disclosure on Unitization process). Using a cut-off criteria of 50 mg/L lithium, the SWA Lithium Project resource estimate is classified as ‘Inferred’ according to the CIM definition standards (see note 4 after Table 5). The total (global) in-situ Inferred lithium brine resource is estimated at 225,000 tonnes of elemental lithium, or 1,195,000 tonnes lithium carbonate equivalent (“LCE”); see Table 5 below for more detail.

Table 5: South-West Arkansas Lithium Brine Project Inferred Resource Estimation

	Upper Smackover Formation		Middle Smackover Formation		**Total (and main resource)[1]**
Parameter	South Resource Area	North Resource Area	South Resource Area	North Resource Area	
Aquifer Volume (km^3)	2.852	4.226	0.704	1.080	8.862
Brine Volume (km^3)	0.281	0.416	0.071	0.110	0.76
Average lithium concentration (mg/L)	399	160	399	160	199
Average Porosity	10.1%	10.1%	10.3%	10.3%	10.1%
Total Li inferred resource (as metal) metric tonnes [4][5]	112,000	67,000	28,000	18,000	225,000
Total LCE inferred resource (metric tonnes)[4][5]	596,000	354,000	152,000	93,000	**1,195,000**

Notes:

[1] Mineral resources are not mineral reserves and do not have demonstrated economic viability. There is no guarantee that all or any part of the mineral resource will be converted into a mineral reserve. The estimate of mineral resources may be materially affected by geology, environment, permitting, legal, title, taxation, socio-political, marketing, or other relevant issues.

[2] Numbers may not add up due to rounding to the nearest 1,000 unit).

[3] The resource estimate was completed and reported using a cut-off of 50 mg/L lithium.

[4] The resource estimate was developed and classified in accordance with guidelines established by the Canadian Institute of Mining and Metallurgy (CIM). The associated Technical Report was completed in accordance with the Canadian Securities Administration's National Instrument 43-101 and all associated documents and amendments. As per these guidelines, the resource was estimated in terms of metallic (or elemental) lithium.

[5] In order to describe the resource in terms of 'industry standard' lithium carbonate equivalent, a conversion factor of 5.323 was used to convert elemental lithium to LCE.

With respect to reconciliation of resources, the updated 2021 SWA Lithium Project resource is 49% larger than the 2019 resource estimate. This difference is directly related to unitization of the resource area. More specifically, the total aquifer volume has increased from 7.66 km^3 in 2019 to 8.86 km^3 (1.84 mi^3 to 2.13 mi^3) in this report.

The lithium brine Inferred Resource, as reported, is contained within the Upper and Middle Members of the Smackover Formation, a late jurassic oolitic limestone aquifer that underlies the entire Project. This brine resource is in an area where there is some localised oil and gas with on-property production, and where brine is produced as a by-product of hydrocarbon extraction. The data used to estimate and model the resource were gathered from existing and suspended oil and gas production wells on or adjacent to the Project.

The resource area is split into the northern and southern resource zones, where a fault system is generally interpreted to act as the divide between the two areas (although there is hydrogeological continuity in the resource zone across the fault system). In general, the Smackover Formation is slightly thinner, with lower lithium grades in the northern zone, and slightly thicker with higher lithium grades in the southern zone. The depth, shape, thickness and lateral extent of the Smackover Formation were mapped out using the following data:

- 2,444 wells drilled into the subsurface in the general SWA Lithium Project area. Of these, 2,041 wells were deep enough (2,135 m, or 7,000 feet) to penetrate the Upper Smackover Formation;
- 104 wells had electric logs available within the SWA Lithium Project that included the top of the Upper Smackover Formation;
- 32 wells had electric logs available within the SWA Lithium Project that included the base of the Upper Smackover Formation;
- 19 wells had electric logs available within the SWA Lithium Project that included the base of the Middle Smackover Formation; and,
- 29 wells had density logs and/or porosity logs that could be used to calculate total porosity in the Middle and Upper Smackover Formations. Nineteen of the 29 logs logged the entire Upper Smackover Formation.

In addition, hardcopy prints of 20 proprietary regional seismic lines totaling over 200 line-km (over 125 line-miles) were procured, scanned, rasterized and loaded into Kingdom® seismic and geological interpretation software.

The porosity and permeability data used to model the resource included:

- Historical effective porosity measurements of more than 1,935 Smackover Formation core samples that yielded an average effective porosity of 14.3%;
- Historical permeability data that vary from <0.01 to >5,000 millidarcies (mD) with an average of 338 mD;
- 515 core plug samples from oil and gas wells within the Upper and Middle Smackover Formations at the SWA Lithium Project were analysed for permeability and porosity and yielded an overall average permeability of 53.3 mD and a total porosity of 10.2%; and,
- 3,194 Smackover Formation total porosity values based on LAS density/porosity logs from 29 wells within, and/or adjacent to the SWA Lithium Project that have an average total porosity of 9.2%.

Representative *in-situ* brine geochemistry was assessed using eight lithium brine samples taken from wells re-entered by the Company in 2018 and was supplemented by four historical samples. These data yielded an average lithium grade of 160 mg/L in the northern resource zone and 399 mg/L in the southern resource zone. Sample quality assurance and quality control was maintained throughout by use of blanks, duplicates, standard ‘spikes’, and by using an independent and accredited laboratory, with a history of analysing high salinity lithium brines.

Main Recommendations

The principal recommendation from the PEA is that the project progress to a Pre-Feasibility Study.

Summary of Consultants - Quality Assurance
The PEA was prepared by a multi-disciplinary team of Qualified Persons ("QPs") that include geologists, hydrogeologists, civil and chemical engineers with relevant experience in brine geology, brine resource modelling and estimation, lithium-brine processing and project development and execution. This was combined with an update of the inferred resource assessment completed by APEX Geoscience Ltd. A National Instrument 43-101 report is required to be filed within 45 days, in conjunction with the disclosure of the PEA in this news release.

The companies involved in completing the PEA include:

APEX Geoscience Ltd (APEX): APEX is geological consulting company headquartered in Edmonton, Alberta. APEX has completed mineral exploration and resource modelling and estimations world-wide for over 25 years including lithium resource evaluations.

ECCI: ECCI is located in Little Rock, Arkansas and was established in 1993 to provide environmental support to engineering and construction projects.

Hunt, Guillot & Associates (HGA): HGA's headquarters is in Ruston, Louisiana near to the SWA Lithium Project. HGA has extensive engineering and construction expertise in the Gulf Coast region. HGA is a private company founded in 1997 with more than 450 employees.

Matrix Solutions Inc (Matrix): Matrix is a Canadian, privately-owned environmental and engineering company established in 1984 with more than 500 employees.

NORAM: NORAM is a Vancouver-based private company active in a wide range of technologies world-wide including electrochemistry for the production of lithium hydroxide monohydrate. NORAM was founded in 1988 and has more than 100 employees.

METNETH$_2$O Inc (METNETH$_2$O): METNETH$_2$O is a Canadian company in Peterborough, Ontario that provides hydrometallurgical solutions including pilot plant design and data analysis to companies world-wide.

News Release Quality Assurance
The scientific and technical information contained in this news release relating to the SWA Lithium Project PEA has been compiled by the above-mentioned companies. All companies have reviewed and approved the presentation of the PEA information in this news release. The final content of this news release has been reviewed by Clive Brereton, a Fellow of the Canadian Academy of Engineering and Vice President of NORAM Engineering and Constructors, and reviewed and approved by Eric Mielke, M.A.Sc., P.Eng., of NORAM. Mr. Mielke is a "Qualified Person" as the term is defined in National Instrument 43-101 and is independent of the Company.

About Standard Lithium Ltd.

Standard Lithium is an innovative technology and lithium development company. The Company's flagship project is located in southern Arkansas, where it is engaged in the testing and proving of the commercial viability of lithium extraction from over 150,000 acres of permitted brine operations. The Company has commissioned its first-of-a-kind industrial-scale direct lithium extraction demonstration plant at Lanxess's south plant facility in

southern Arkansas. The demonstration plant utilizes the Company's proprietary LiSTR technology to selectively extract lithium from Lanxess's tail brine. The demonstration plant is being used for proof-of-concept and commercial feasibility studies. The scalable, environmentally friendly process eliminates the use of evaporation ponds, reduces processing time from months to hours and greatly increases the effective recovery of lithium. The Company is also pursuing the resource development of over 30,000 acres of separate brine leases located in south west Arkansas and approximately 45,000 acres of mineral leases located in the Mojave Desert in San Bernardino county, California.

Standard Lithium is jointly listed on the TSX Venture and the NYSE American Exchanges under the trading symbol “SLI”; and on the Frankfurt Stock Exchange under the symbol “S5L”. Please visit the Company’s website at www.standardlithium.com.

On behalf of the Board of Standard Lithium Ltd.
Robert Mintak, CEO & Director

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