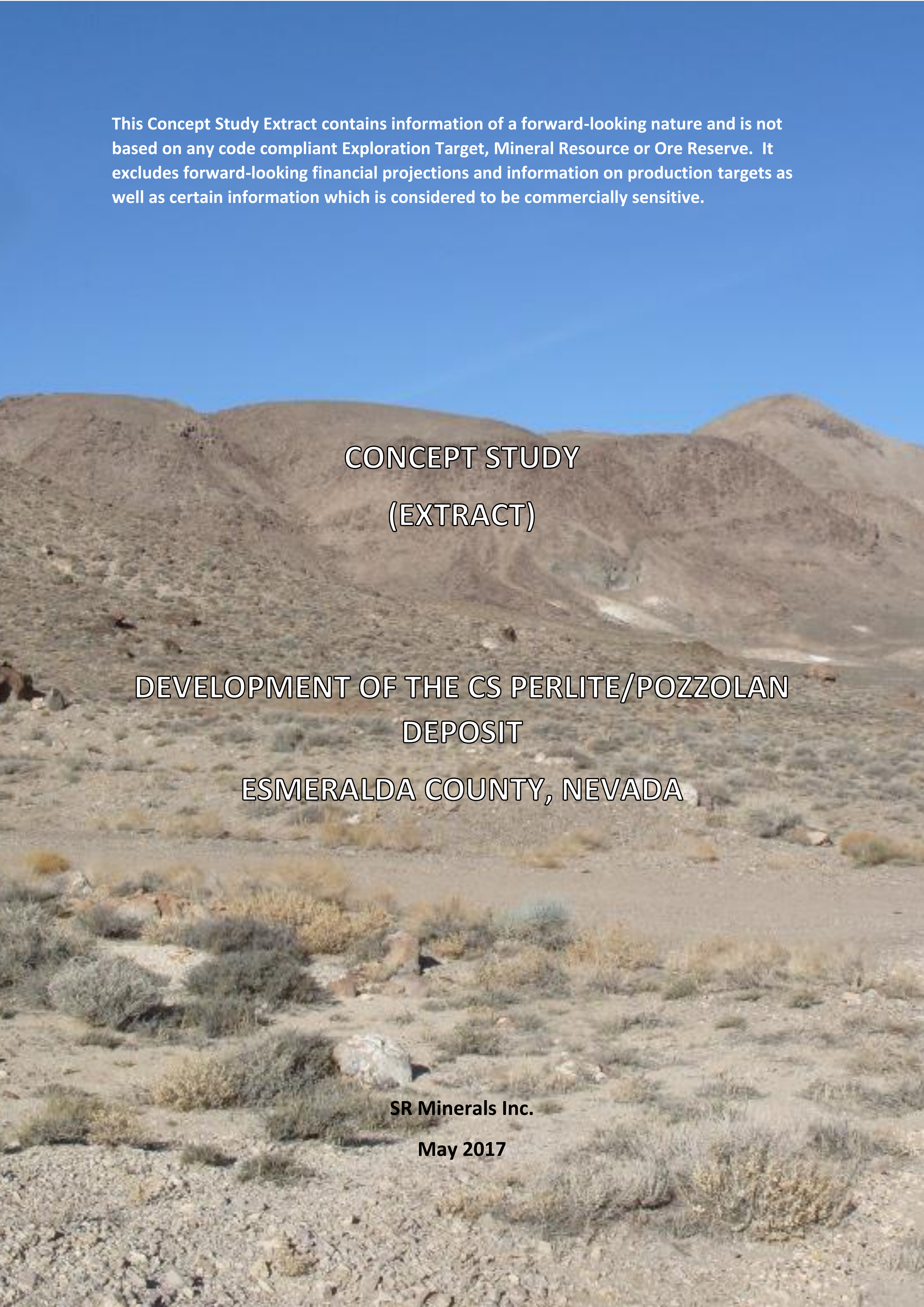


This Concept Study Extract contains information of a forward-looking nature and is not based on any code compliant Exploration Target, Mineral Resource or Ore Reserve. It excludes forward-looking financial projections and information on production targets as well as certain information which is considered to be commercially sensitive.

CONCEPT STUDY

(EXTRACT)

DEVELOPMENT OF THE CS PERLITE/POZZOLAN DEPOSIT

ESMERALDA COUNTY, NEVADA

SR Minerals Inc.

May 2017

Summary

The CS Project offers the opportunity to develop production of two separate industrial commodities in the same project area.

Work to date has identified a potentially large deposit of perlite, an industrial mineral which expands on heating to a lightweight material with multiple industrial uses. Expansion tests indicate a high quality perlite. Testing of this same material shows it also has potential as a high quality natural pozzolan for use as a "green" replacement for cement. The project also contains a separate, large area of non-perlitic pozzolan where initial testing results are also favourable.

A quality natural pozzolan competes with Class F coal-fired power plant fly ash. Established natural pozzolan producers in the western US are enjoying rapidly increased sales volumes in cement and concrete markets as traditional supplies of fly ash shrink in line with the continuing closure of coal fired power plants across the USA. Since 2010, 248 power plants or just under 50% of all coal fired power stations in the US have announced a scheduled retirement plan. Many of these 248 plants are deciding to close their doors early, primarily because they cannot compete or remain competitive with gas-fired power production. The supply of fly ash to the western US is already precarious and predicted to become critical in the coming years opening up an already expanding market for natural pozzolan.

For now logistics will be an important factor in the development of a pozzolan-perlite project at the CS Deposit as the project is some distance (160 miles) from rail infrastructure but close to a sealed highway. The project will rely on truck transport with transport costs a large component of the estimated delivered price of CS natural pozzolan and perlite. Potential markets are within reach in Nevada and the populous state of California. Specific market opportunities have been identified for both pozzolan and perlite and the current perlite industry structure suggests that there is room for cooperation with perlite expanding companies looking to integrate with mining operations.

Low-cost market entry strategies have been identified for production of both perlite and pozzolan using a common production plant enabling flexible outputs to meet the market. It is envisaged that, initially at least, the plant will comprise simple crushing and screening sections with raw crushed pozzolan sold to cement producers for intergrinding with cement clinker and crushed raw perlite screened to specific size fractions for sale to perlite expanding companies.

An order-of-magnitude estimate of capital and operating costs for this start-up production plan and simple cash flow analysis suggests the potential for a profitable project based on the broad assumptions made. In future there is potential to grow with the markets and to make step changes in the value of the business through downstream processing.

A preliminary permitting study suggests that the project could be permitted with an Environmental Assessment (EA) rather than a lengthier Environmental Impact Statement (EIS). The time period from submission of a completed Plan of Operations to the receipt of all regulatory permits and consents is estimated at 9 months.

It is recommended that the Company proceed to engage with market participants, carry out drilling on the deposit and start critical path baseline permitting studies as soon as possible.

1. Introduction

This study sets out information on the CS Industrial Mineral Deposit and its potential industrial applications as a perlite and as a pozzolan.

The original Company discovery was made in what is now referred to as the “Main Zone” of glassy rhyolite. This was initially targeted as a potential pozzolan deposit. Later testing identified the same material to be a potentially high quality perlite. Subsequent work also identified a separate area of non-perlitic tuff (the “Tuff Zone”) also having potential as a pozzolan.

Testwork and evaluation work is ongoing and has so far focused on pozzolan production from the Main Zone. Consequently, in this study, more detailed consideration is given to this option. However following the identification of the Tuff Zone and the discovery that the Main Zone is perlitic, both zones and production of both pozzolan and perlite is now being evaluated.

This study provides information on the markets and market opportunities for CS pozzolan and perlite together with testing results to-date and a conceptual review of development options, permitting and development timelines and costs.

2. Location & Access

The CS Project claims are located on federally owned land administered by the Bureau of Land Management (BLM), near to Crow Springs in Esmeralda County, Nevada (Figure 1). The nearest town is Tonopah, some 25 miles southeast in a direct line and 30 miles by road. Most services are available in Tonopah (population 2,478 in 2010) which is the administrative centre for adjacent Nye County.

Access from Tonopah is via US Route 6/95, the main arterial highway linking Tonopah to Las Vegas and Southern California and then by county maintained dirt road for 9 miles. The property is traversed by a powerline and fibre-optic cable and associated right of way (Figure2). The nearest practical railhead is in Fallon some 155 miles distant (Figure 4).

Figure 1. CS Project. Location Plan.

3. Tenure

Minerals on federal land are classified as either:

- **Locatable** meaning the mineral rights can be acquired by staking Mining Claims, either Placer Claims and Lode Claims – traditionally applies to metallic minerals and certain higher value industrial minerals.

- **Saleable** where the mineral rights must be acquired by agreement with BLM usually in exchange for a royalty payment – traditionally applies to “common” low value mineral materials such as aggregates and certain named industrial minerals such as pumice.

- **Leasable** where the minerals rights are acquired by specific lease agreements – applies to a few named minerals such as potash.

SR Minerals Inc., a Nevada incorporated company wholly owned by UK based Sunrise Resources plc, has initially staked 39 placer claims and 25 lode claims to cover both the Main Zone perlite/pozzolan deposit and the non-perlitic Tuff Zone pozzolan.

4. Geology & Resource Potential

The project area is underlain by a rhyolite dome of late Miocene age (7ma), flanked by more recent, scree and poor quality diatomite deposits. The dome is elongated N-S with dimensions 1 mile x 0.5 mile (Figure 3).

The dome has a central core of flow banded crystalline rhyolite. In the Main Zone this transitions outwards, in an easterly direction, into a zonally arranged sequence of glassy rhyolites having variable perlite textures from onion skin, to granular, to pumiceous. At the western margin of the Main Zone, in proximity to the crystalline rhyolite a zone of perlite with a high content of marenkenites (apache tears) represents a zone of incomplete hydration.

To the south, in the Tuff Zone, there is an area of shallow to horizontally bedded tuff having pozzolanic properties, but which is not perlitic. The grain size of the tuff and the content and size of volcanic ejecta within it is variable from layer to layer but increases to the west suggesting increasing proximity to the original volcanic vent in this direction. The tuff appears to overlie and may be younger than the surrounding diatomite.

No drilling has been carried out to date but both the Main Zone perlite /pozzolan area and the Tuff Zone pozzolan have large surface areas.

At the maximum production rates currently contemplated there is a high likelihood that sufficient tonnages can be developed with shallow drilling to allow for many years of open pit mining with a low-strip ratio.

Looking NW to Main Zone (Rhyolite dome)

Tuff Zone pozzolan outcrops

Main Zone Pumiceous Perlite

Granular perlite sample, Main Zone

Figure 3.

5. Perlite

5.1 Uses of Perlite

Perlite is a glassy volcanic raw material, usually of rhyolitic composition, which, when heated in a furnace, pops like popcorn and expands up to 20 times in volume into a white or pale coloured, low density material used in:

• Various industrial and household applications such as insulation, paint texturing, plaster and concrete fillers, building material fillers, formed insulation, field conditioners (soil porosity enhancement), and fire proofing.

• Filter aids (in competition with diatomite).

• Insulating industrial cryogenic storage vessels.

• As a potting medium in gardening and horticulture to aid water retention and aeration of the soil.

The applications for expanded perlite were building construction products, 53%; horticultural aggregate, 15%; fillers, 15%; filter aid, 9%; and other, 8%.

Further information on perlite uses and specifications for different uses is given in the Perlite Institute information sheets included in Appendix 1.

5.2 Perlite Market

World perlite production was estimated to be approximately 4.6 million tons in 2016. The world's leading producers were, in descending order of production, China, Greece, Turkey, and the United States, with 40%, 20%, 20%, and 10%, respectively, of world production. Although China is the leading producer, most was believed to be consumed internally. Greece and Turkey are the leading exporters of perlite.

Greece is the major source of US imports, mainly into the eastern states, where it can be competitive due to the coastal location of perlite mines in Greece.

Data from the USGS shows that, in 2016, US domestic production of raw processed perlite (crushed, screened and sized but not expanded) was estimated to be 473,000 tons with an ex-mine value of $28.9 million (average $61/t ex mine). Consumption was estimated to be 585,000 tonnes with a 19% import dependency.

All US domestic production of perlite comes from the western states, principally New Mexico and Arizona but some also from Oregon, Idaho and small amount from Nevada. Crude ore production was from seven mines operated by six companies in five western states.

The US perlite producers are:

- Imerys (Arizona)
- Dicaperl (New Mexico)
- Cornerstone Minerals (Oregon)
- Hess Perlite (Idaho)

- Wilkin Mining & Trucking (Nevada)
- EP Minerals (Nevada)

Imerys is also a major producer of perlite in Greece and Turkey.

Due to the low density and consequently high transport costs for expanded perlite, the majority of raw processed perlite is expanded not at the mine site but close to its centres of consumption and whilst all existing producers of perlite own expansion plants in the USA there are many companies in the expansion business buying raw, sized perlite from the perlite mining companies. In fact, processed crude perlite was expanded at 46 plants in 28 states. This suggests potential for backward integration to a new mine site.

The distribution of the perlite mines, expanders and major consumers is illustrated in Figure 4. Expansion plants are scalable to small or even mobile plant sizes. Perlite deposits are not uncommon and those deposits that have become established are large high quality deposits close to rail links which allow for transport of raw material over large distances throughout the USA.

There is a substantial differential between the price of raw perlite and expanded perlite with expanded perlite frequently sold to end users on a volumetric basis.

The average US sale price for expanded perlite in the US in 2014 (last date published by USGS) was $332/ton ex-works (compared to £57/ton for raw processed perlite in the same year). Some milled expanded filter aids sell for substantially higher prices. Imported raw processed Greek perlite was valued at $108/ton landed in the eastern states in 2014.

Current (April 2017) published prices for raw perlite ($75-90 FOB east Mediterranean) and expanded perlite (milled filter aid ex-works USA $850-1100) underline the value added in the expansion process and prices increases since the dates referred to above.

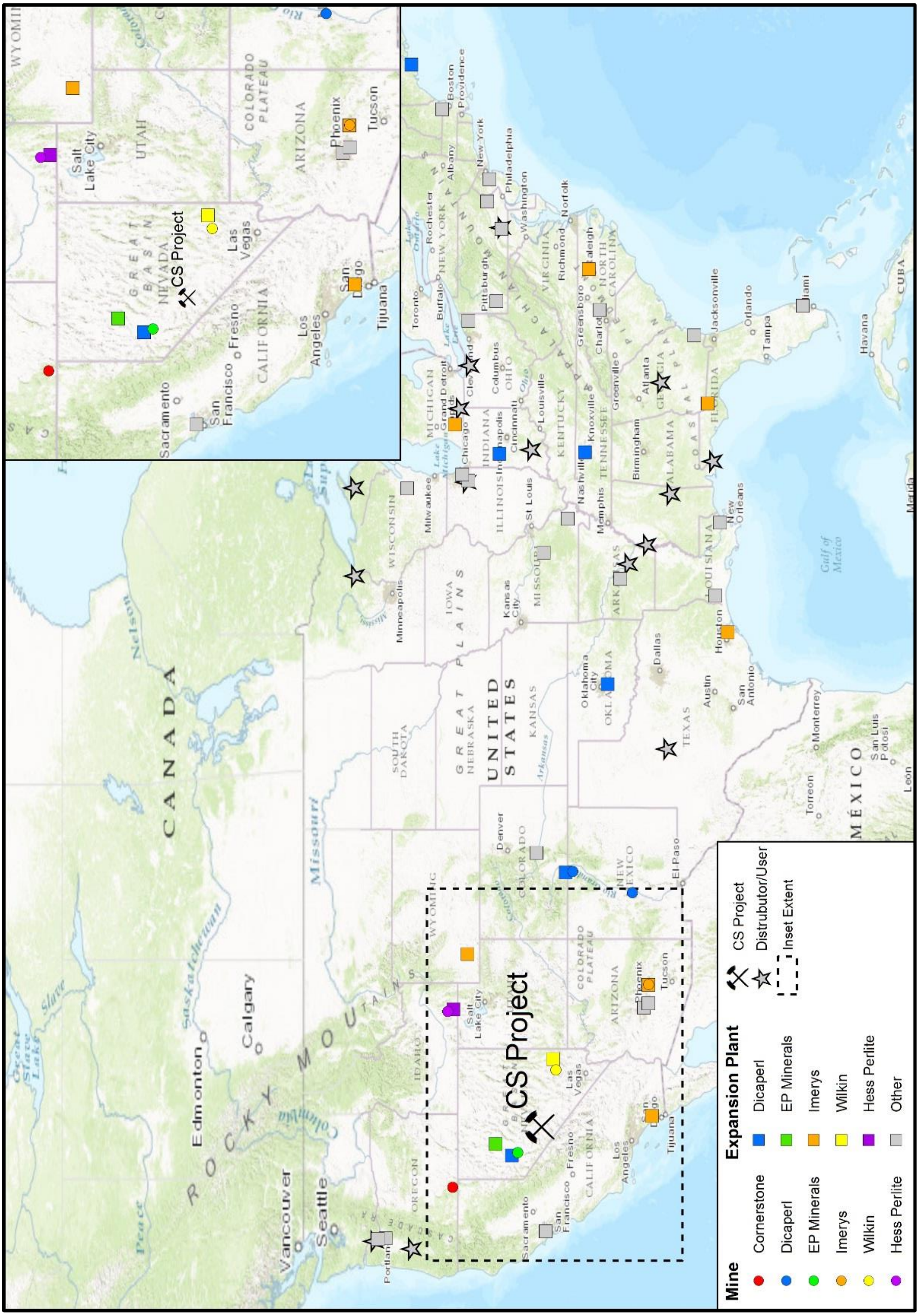


Figure 4. Location of Perlite Mines, expansion plants and Major US Consumers

5.3 Initial Markets for CS Perlite.

Within Nevada there are three perlite expansion plants.

- EP Minerals LLC has a plant within its Colado processing complex at Lovelock producing expanded filter aid perlite with raw material supplied from their own mine (Popcorn Mine) just south of Fallon.

- Dicaperl owns an expansion plant at Fallon on the rail line, 160 miles distant from the CS project. This plant produces perlite microspheres and horticultural grade expanded perlite and is fed from their own mines in New Mexico, a far distant source.

- Wilkin Mining & Trucking owns a small perlite mine and expanding plant located at Caliente north of Las Vegas and has produced large sized expanded perlite for the horticultural market.

The CS Project does not have the benefit of an adjacent rail link but the nearest rail link at Fallon (160 miles distant) could be a route to a wider market and to the markets on Northern California.

There is a closer rail facility at Thorne (103 miles distant) but this and 52 miles of track towards Fernley, is owned by the US military and whilst it may be possible to negotiate access, the maintenance level on this section of track is not believed to be at the highest due to infrequent use.

The CS deposit is geographically closer to the markets of southern California than any existing producer where the largest independent perlite expander is Aztec Perlite.

5.4 CS Perlite – Market Entry Strategy

Without the benefit of a detailed market study, a number of market strategies suggest themselves. These are presented in order of increasing capital and operating cost and increasing revenue/profit potential.

- Production of crushed and sized raw perlite to existing expanders
- JV production of expanded perlite with existing expander.
- Supply of raw perlite to own expanding plant strategically located in southern California to supply expanded perlite of specific grades tailored to local west coast US markets.

It is recommended that the Company pursue a low costs market entry providing raw processed perlite to existing expanders. This would require only a crushing and screening operation on site with delivery by tipper truck.

Once the material is proven in the market it should be possible to grow the business by moving into expanded perlite production via a greenfield operation or by merger/acquisition of an established perlite expanding business looking to backward integrate to a secure mine supply. This would offer the opportunity for a further step change in the value of the business.

5.5 CS Perlite - Testing Results

Initial testing of any perlite sample has the objective to determine the expansion characteristics of the perlite. A low density, white and bright product is the target. Commercial products have expanded densities of 2-25lb/ft^3 compared to 65-70lb/ft^3 for the raw material.

The size gradation of the expanded material, dependent to some extent on the sizing of the furnace feed, is an important factor in determining the particular industrial application.

Following simple torch heating tests which suggested the CS Deposit samples expanded significantly on heating, two samples were submitted to the perlite testing laboratory at the New Mexico Bureau of Geology and Mineral Resources (NMBGMR). Samples were crushed and screened to give a -50 +100 mesh material for expansion at 1300°F. Samples were tested against a control/reference sample of perlite considered to be one of the highest quality perlites in North America (Dicaperl's Socorro, New Mexico, perlite).

The results are tabulated below:

Sample	**Furnace Yield**	**Expanded Density**	**Brightness - OLD**	**Brightness - NEW**	**Sinks - Avg of 2 runs**
Parameter	(%)	(lbs/ft3)			(%)
Socorro Reference	91.92	1.81	85.40	79.50	3.30
#2001172 (1)	87.60	1.60	86.00	80.00	0.60
#2001174 (2)	94.98	2.25	84.90	78.90	0.20
#2001174 dup (3)	94.78	2.32	85.30	79.30	0.20

Sample 2001172 is a sample of the pumiceous perlite. Sample 2001174 is a sample of the granular perlite.

The CS samples yielded a high brightness, very low density expanded product comparable to the commercial reference sample.

The expanded test products have been subject to a full sieve analysis and results indicate potential in a wide range of commercial applications.

However, further testwork is necessary to determine which applications can be targeted in commercial practice.

Eleven further samples from across the Main Zone representing a range of perlite types have been submitted to NMBGMR for further perlite expansion testing.

6. Pozzolan

Pozzolan is defined (ASTM C125) as *a siliceous or siliceous and aluminous material, which in itself possesses little or no cementitious value but will, in finely divided form and in the presence of moisture, chemically react with calcium hydroxide (lime) at ordinary temperatures to form compounds possessing cementitious properties*.

Pozzolans are part of a group of materials also referred to as Supplementary Cementitious Materials (SCMs).

6.1 Uses of Pozzolan

The production of cement is responsible for 5% of the global man-made carbon dioxide emissions with nearly one tonne of CO_2 generated for each tonne of cement produced. Cement manufacturers are therefore under strong pressure to minimise their carbon footprint and the use of pozzolan as a partial replacement for Portland cement in cement and concrete mixes is one way in which this is being achieved.

In addition to reducing greenhouse gasses, the use of pozzolan can provide benefits in terms of long-term strength and stability in cement and concrete. It can mitigate the Alkali-Silica Reaction (ASR) whereby alkalis in the Portland cement react with siliceous aggregates resulting in expansion and cracking of the concrete. Natural pozzolan can also reducing porosity thereby Increasing the resistance to external chemical ingress such as sulphate attack, sulphate attack which leads to expansion, cracking and a loss of bond between the cement paste and the aggregate.

Today, pozzolans are used as a direct additive to concrete mixes and as a partial replacement for cement in amounts of up to 35% of the cementing material.

6.2 Pozzolan Market & The Case for Natural Pozzolan

Because pozzolan is defined by its physio-chemical properties a wide range of materials can have pozzolanic properties. Natural pozzolans includes some rock types such as pumice, perlite and glassy tuff and certain minerals which acquire improved pozzolanic properties on heating such as meta-kaolin. Some industrial by products are also good pozzolans such as coal-fired power station ashes (Fly ash) and silica fume.

The Romans perfected the use in natural pozzolan/lime mixtures over 2000 years ago and "Roman" cement was the main cement used until Portland cement became popular in the early 1900s and established as the main hydraulic cement used today.

Whilst many Roman concrete structures made with natural pozzolans have survived for millennia, some modern concretes structures made with ordinary Portland cement have deteriorated in just a few years or decades due to their inferior chemistry of their concrete and so the past sixty years have seen the widespread adoption of pozzolan in cements and concrete and this demand has largely been satisfied by coal-fired power station fly ash which, being a waste material formerly landfilled, can be free at source.

Today, however, the availability and quality of fly ash is under threat as coal-fired power stations are phased out and quality becomes more variable due to increased emission control legislation.

The market opportunity for a producer of pozzolan has to be considered against the decades old established supply of class F-Fly ash which has many of the same properties as a good natural pozzolan. Indeed, many of the standard specifications for natural pozzolan apply equally to fly ash.

Concrete represents about 15 percent of the total cost of building and maintaining transportation infrastructure in the U.S. each year. More than 75 percent of that concrete—$9.9 billion worth—utilizes fly ash as a partial cement replacement blend. In some states, like California, Florida, Louisiana, New Mexico, Nevada, Utah and Texas, fly ash is used for virtually all of their concrete projects.

Since about 2012, there has been a persistent lack of Class F fly ash in numerous localities across the US. This has persisted to the point where, despite assurances from fly ash supply companies, it is of serious concern to cement companies and the various State Department of Transports ("DOTs") responsible for transport infrastructure maintenance and development spending. The use of SCMs has become mandatory for cement producers supplying to state and federal DOTs. Whilst many DOTs have historically mandated use of fly ash the use of any SCM meeting various performance standards – including natural pozzolan - is now accepted.

There are shortages of Class F fly ash in California, the Midwest, the Northeast, and in Texas, Colorado, Oklahoma, and Kansas. There have been spot shortages in nearly every locality in the US in the past 3 years.

Fly ash supply in the US is reducing due to the rapid closure of coal-fired power plants across the country resulting from:

- Increasingly difficult-to-meet federal and local regulations - Mercury and Air Toxics Standards (MATS), Clean Power Act and Interstate pollution regulations etc.

- A concurrent rapid decline of the cost of natural gas.

Whilst the scraping of the Clean Power Act by the Trump administration may, after long court challenges, address some of the regulatory issues, it is widely agreed that this will not halt the continuing closures of coal-fired power stations. A power-plant can be retrofitted to natural gas for about the same cost as upgrading a coal plant to meet the new mercury and cross state pollution regulations. In doing so, they reduce their energy costs and greatly reduce their regulatory exposures. Many US States also have their own emissions goals and renewable energy standards that encourage utilities to look beyond coal - for example, Oregon passed a bill in 2016 to eliminate by 2030 its use of electricity generated by coal. California now has only one small coal-fired power station.

Since 2010, 248 power plants or just under 50% of all coal-fired power stations in the US have announced a scheduled retirement plan. Many of these 248 plants are deciding to close their doors early primarily because they cannot compete or remain competitive with gas-fired power production.

A particularly relevant example for the western US is the 2019 scheduled closure of the Navajo Generating Station located near Page, Arizona. This is the largest coal-fired electric generation facility west of the Mississippi and currently a major supplier of fly ash to Nevada, Arizona and California. It was listed as the 3rd largest emitter of carbon dioxide in the United States by the US Environmental Protection Agency.

The rise and fall of coal-fired power generation and production of fly ash is illustrated in Figure 7.

Some fly ash suppliers, such as Ash Grove cement, have dropped out of the fly ash business entirely due to lack of available materials and there are reports of bidding wars between marketers for available fly ash sources. The largest supplier in the North American fly ash industry (Headwaters) recently sold out to the second largest supplier (Boral).

This success with a natural pozzolan is a function not only of the Class F supply issue, but also a desire among some customers for a pozzolan that is consistent in its chemistry and performance. A consistent problem with fly ash is in fact, its inconsistency. The remaining supply has increased quality issues due to the enhanced pollution control equipment (such as powdered activated carbon (PAC) injection for mercury control) which transfers pollutants from the airborne emissions into the fly ash.

Until the fly ash supply deteriorates to the point where natural pozzolan producers can be price setters, the pricing for natural pozzolan takes a lead from the pricing of fly ash. This pricing is largely a function of distance from the remaining coal-fired power stations which are mainly located in the central and eastern states.

6.3 Initial Markets for CS Pozzolan

For the CS Deposit the largest volume demand envisaged for natural pozzolan will be in the cement and concrete markets. Other markets do exist, for example in oilfield cements and grouts, but other producers are better placed geographically to serve these markets which may be developed in time.

The CS project is not directly rail linked (and so shipments will have to be trucked). However, the location of the CS Deposit within Nevada and close to the Californian border does present an opportunity. The location of various cement plants in the western states is shown relative to rail infrastructure in Figure 8 and relative to road infrastructure in Figure 9.

California has cement production of 9.6 million tonnes (2015) and use about 900,000 tonnes of SCM's of which fly ash currently accounts for about 90%.

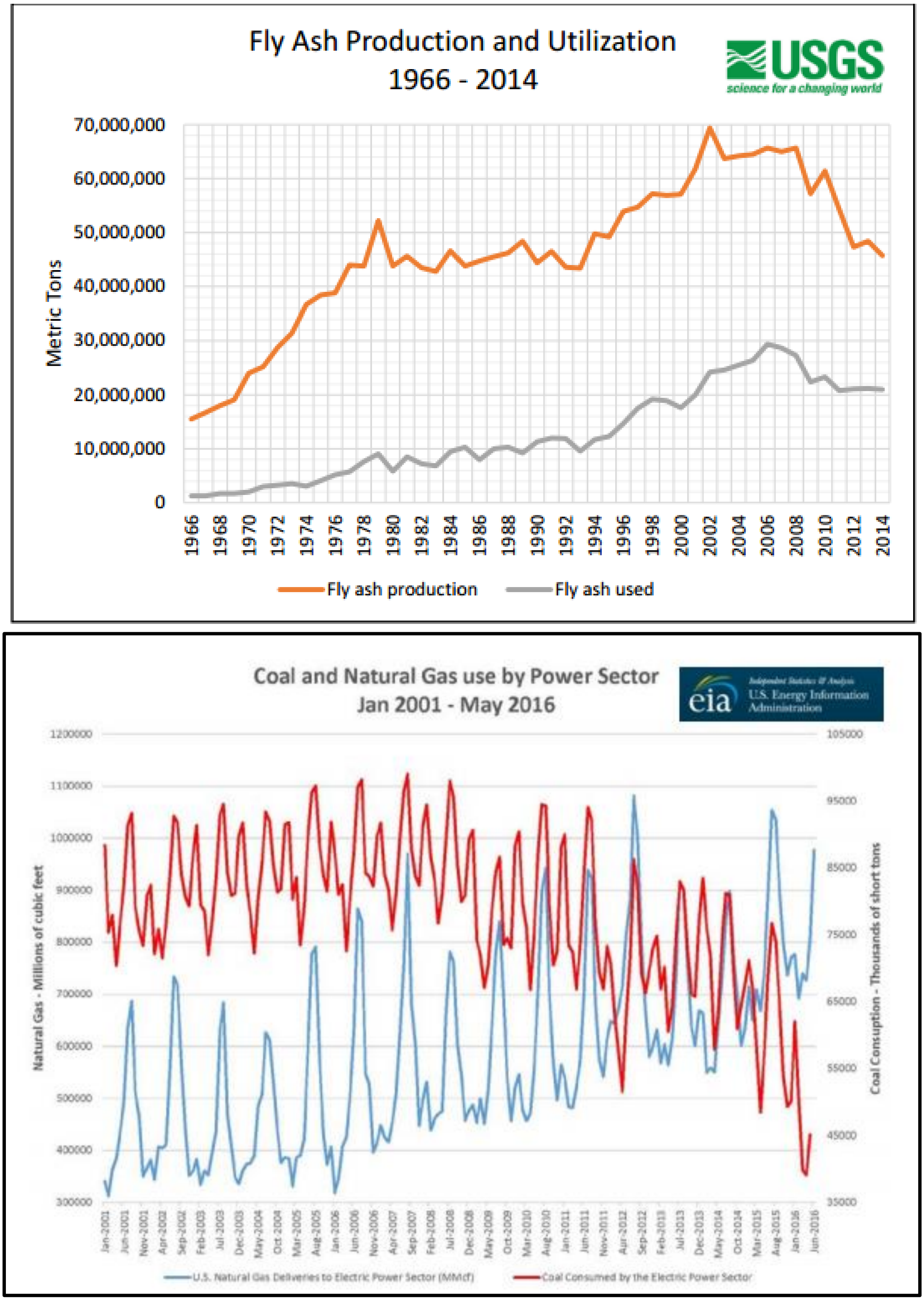


Figure 7. Top: Fly ash Production & Consumption. Bottom: Coal & Gas Power Usage

In Nevada and California fly ash is a valuable resource for state DOTs that demand concrete that can perform well in harsh environments and under special conditions. However, California and Nevada are “at the end of the line” when it comes to fly ash supply from US coal mines and this reflects in the current pricing of fly ash at $70-85/ton approximately 17-20% less than cement cost in California.

California has recently approved the importation of fly ash from India and China. However, China is suffering their own shortage of ‘good’ Class F fly ash and all the supplies along the coast have been allocated. Now, China has to ‘import’ fly ash needed for coastal construction from its interior and western regions.

Currently the use of fly ash offers both a costs saving and an improvement in cement mix quality. It is easy to see a future situation where supplies of high quality natural pozzolan could command a price equal or greater than the price of cement and that is already the case with very specialist natural pozzolans such as silica fume and meta-kaolin and other SCMs such as blast furnace slag.

The closest major cities to the CS Project, i.e. centres of cement and concrete production and consumption are:

Las Vegas, NV	230 miles
Reno, NV	220
Fresno, CA	270
Sacramento, CA	320
San Jose, CA	340
Los Angeles, CA	360
Salt Lake City, UT	430

Within these large metro areas demand comes from cement plants and from ready mix plants producing concrete.

The state of Nevada, mostly Las Vegas and Reno metro areas, consumes approximately 1.3 million tons of cement annually (down from 2.3 million tons just prior to the 2008 recession) with a potential market for pozzolan in Nevada in the vicinity of 250,000 tons per year.

Figure 8. Location of CS Project, Cement Plants & Rail Infrastructure

Figure 9. Location of CS Project, Cement Plants & Rail Infrastructure

Other companies have tried to develop natural pozzolan sources within California more local than the CS Project to areas of demand but have failed for one of the following reasons;

- Bad timing – historical competition from fly ash.
- Permitting difficulties.
- Poor quality pozzolan.

6.4 Pozzolan Market Entry Strategy.

Natural pozzolan can be supplied as either:

- a crushed material (minus 1”) to exiting cement producers
- a finished ground pozzolan raw material to cement producers and ready mix supply companies.

A cement company taking minus 1”crushed material would add the material to its intermediate product, cement clinker, for intergrinding with the clinker to produce a Type 1P Portland-Pozzolan cement. Such a cement is of interest to cement users who do not separately source, store or mix a pozzolan.

Discussions with cement companies have already identified interest in this potential supply.

Similarly to the production and supply of a raw perlite product, this would involve a relatively simple plant crushing and screening only and, in fact, would not require the same careful size control that would be required for perlite production.

Whilst the market for a finished ground pozzolan will have a higher value and a larger market, the supply of crushed pozzolanic material to cement producers provides a lower risk, low capital and operating cost means to enter the market. Transporting crushed mine grade materials in tipper trucks is, generally speaking, about half the cost of transporting a finished pozzolan which usually requires a pneumatic truck for transport and unloading

It is estimated that there may be a demand of up to 110,000 ton per year of crushed raw natural pozzolan that could be supplied from the CS deposit to Nevada, California and Utah in the current market.

6.5 CS Pozzolan - Testing Results

There are 4 common specification tests applied to natural pozzolan and class F fly ash.

ASTM C618 is the “Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete. “

This standard sets out minimum contents of the requisite reactive chemical elements and also minimum strength requirements of a cement mix having a 20% pozzolan or fly ash replacement of Portland cement. This strength is expressed as a relative percentage against a “control” 100% Portland cement mix i.e. the “Strength Against Index” or “SAI”. This is measured after curing times of 7 days and 28 days.

Other factors assessed in ASTM C618 are grain size, water requirement (% of control) and soundness. A low water requirement (water demand) is desirable to give good workability.

The extent to which a NP can mitigate the Alkali-Silica Reaction (ASR) is tested by standard ASTMs C1567 &1260.

The extent to which a natural pozzolan can increase resistance to external sulphate attack (which leads to expansion, cracking and a loss of bond between the cement paste and the aggregate) is tested by standard ASTM C1012.

A further standard, AASHTO M295, is a supplementary standard to ASTM C618 which also includes a measure of the available alkalis in the pozzolan itself and is often required when supplying to certain Government DOTs. Approximately 1/3 of the demand from SCM's in California comes from California DOT projects which require a pozzolan to meet the available alkali standard in AASHTO M295.

A natural pozzolan that can meet the ASTMC618 standards and then mitigate ASR and improve sulphate resistance – and which has low water demand - will be a premium pozzolan of interest to cement and concrete companies.

If it can also meet the available alkali standard in AASHTO M295 its market reach will be extended.

ASTM C618 Testing

Chemical Analysis

To date seven samples of the Main Zone perlite/pozzolan have been analysed by XRF and one sample from the Tuff Zone.

All samples far exceed the ASTM C618 requirement that total $SiO2+Fe203+Al2O3$ minimum requirement exceeds 75%. The sum of these oxides varies between 84% and 88% in the CS pozzolan samples.

Strength Against Index (SAI)

As an initial test of the pozzolan five surface samples from the Main Zone and one surface sample from the Tuff Zone have been through pre-certification ASTM C618 SAI testing at Magmatics' lab in Malad, Idaho.

The samples were chosen to represent visually and texturally distinct samples, although all have similar chemistry and mineralogy.

All samples passed with respect to the ASTM C618 criteria of a 75% minimum SAI at 7 and 28 days.

A composite of two samples representing the more pumiceous perlite type were submitted to CTL Thompson, and independent certification laboratory for certification testing to ASTM Standards.

The sample was successfully certified as passing ASTM C618 with good strength against index and low water demand.

ASTM C1567 Testing

This test, evaluating mitigation of the Alkali-Silica Reaction, measures expansion of a mortar bar made using a 20% replacement mix on curing.

Testing is in progress.

Available Alkali Testing

Testing is in progress

STM C1012 Testing

Tests for resistance to sulfate attack (C1012) have not yet been initiated.

Based on testing carried out to date samples from the Main Zone perlite (-pozzolan) deposit and the Tuff Zone pozzolan, all samples are considered by Magmatics Inc. as representing high quality natural pozzolan characteristics in the key performance categories related to water demand and reactivity (represented by SAI).

Magmatics has also concluded that CS pozzolan tested to-date is as likely to be effective as any commercial raw natural pozzolan currently available in North America, and likely as or more effective than many of the available Class F fly ash pozzolans in the western USA, particularly as it regards mitigation of chemical attack and the long term enhancement of compressive strength.

A further 12 samples have been submitted to Magmatics for pre-certification testing including a further three samples from the Tuff Zone.

None of the samples from the Tuff Zone have been tested for Alakali-Silica Reaction (ASR) or Available Alkali and this will be an important next step.

7. Preliminary Economic Evaluation

This section builds on the information given in sections 5.4 and 6.4 where perlite and pozzolan market entry strategies are considered.

The entry level conceptual production plan is based on supply of a raw crushed pozzolan to cement producers in Nevada and California and a raw processed perlite to expanders in Nevada and California.

Invariably, in commercial perlite mining and raw perlite processing operations, there is a proportion of the crushed raw material that is too fine to feed to the expansion furnace and this is usually a waste stream, the relative proportion of which influence the profitability of an expanding operation.

The following conceptual mining and processing plan is envisaged:

- Mining of pozzolan from the Tuff zone
- Mining of perlite from the Main Zone
- Primary crushing circuit operating on a batch basis on either:
    - run-of mine perlite ore for feed to perlite screening circuit.
    - run-of mine pozzolan ore for feed to pozzolan sales stockpile.
- Screening circuit primarily for raw perlite production.

The crushing plant (100tph) would operate on a batch basis depending on market demand and the screening plant would only operate when crushing perlite ore.

This preliminary economic evaluation is subject to broad assumptions that are at best order of magnitude but provide at least an initial basis for a decision on further feasibility studies and a continuing evaluation of the project.

Simple pre-tax cash flow analysis suggest a project with an attractive NPV and IRR. Future opportunities not considered here include production of a finished (fine ground) pozzolan and production of expanded perlite.

Contract mining/crushing and screening and equipment leasing should be seriously considered to achieve the lowest possible start-up costs.

An alternative production scenario would be to initially mine only from the perlite zone for processing as a pozzolan and, in the screening circuit, scalp off certain size fractions for sale as raw perlite.

8. Permitting & Development Timeline

As a part of this study a permitting study was commissioned with OAR LLC.

The process requires the Company to submit a Plan of Operations which includes reclamation plans and the results of various environmental and cultural baseline studies. Many of the permitting studies can be carried out at the same time. Critical aspects of the project requiring definition include the mining plan and whether concurrent reclamation will be carried out. These aspects cannot be defined until a drilling programme is carried out.

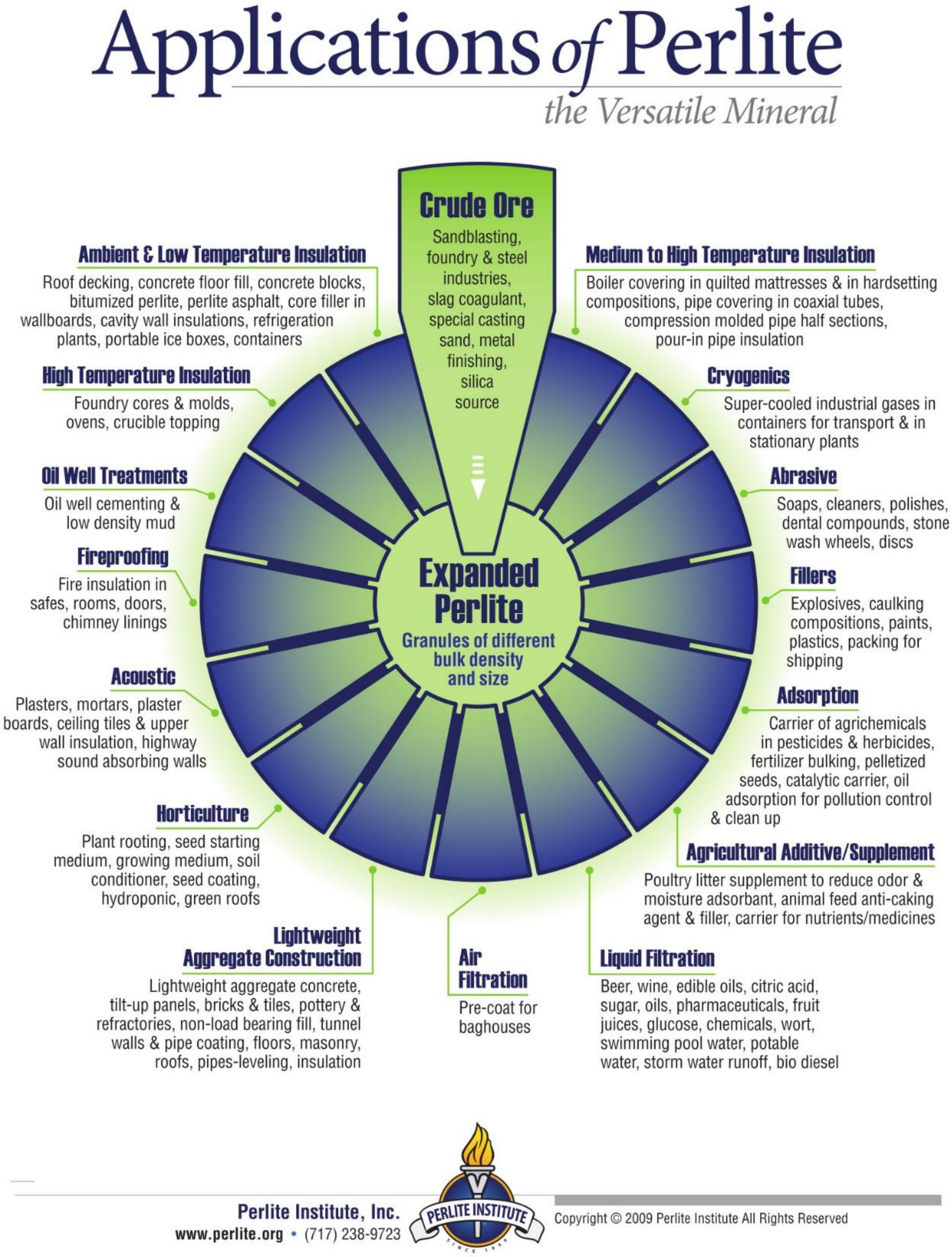
Provided that the boundaries of the project area and disturbance can be defined it may be possible to conduct some studies early, particularly biological studies but biological studies need to be conducted during the blooming period, spring and early summer.

It is recommended that drilling and botanical studies are initiated as soon as possible.

The time period from submission of a completed Plan of Operations to the receipt of all regulatory permits and consents is estimated at 9 months.

The permitting timeline is likely to be the constraining factor in the timeline to production.

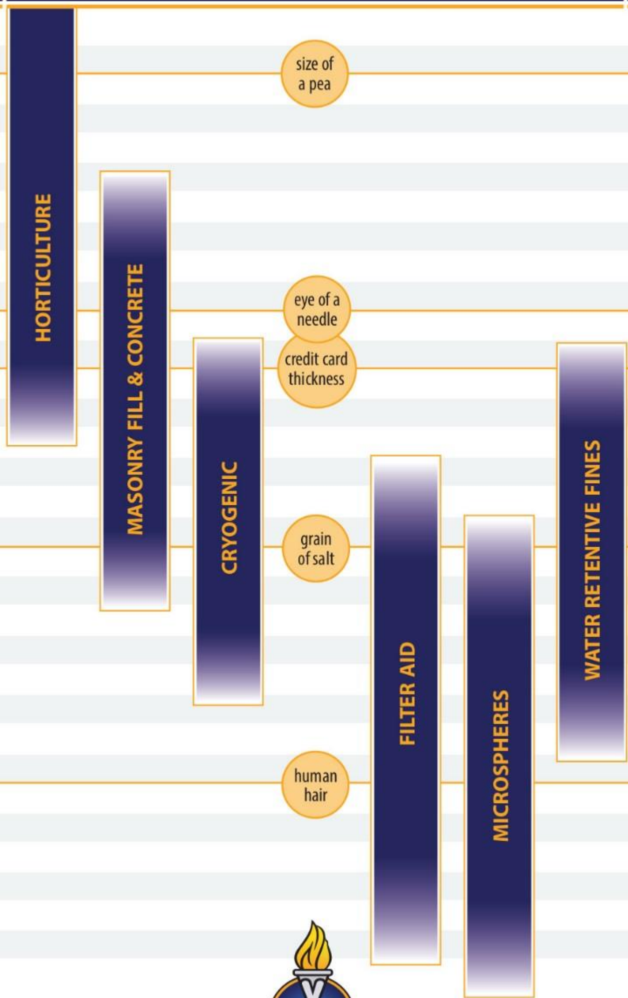
APPENDIX 1: Perlite Institute Information Sheets


Applications of Perlite
the Versatile Mineral
Crude Ore
Sandblasting, foundry & steel industries, slag coagulant, special casting sand, metal finishing, silica source
Expanded Perlite
Granules of different bulk density and size
Ambient & Low Temperature Insulation
Roof decking, concrete floor fill, concrete blocks, bitumized perlite, perlite asphalt, core filler in wallboards, cavity wall insulations, refrigeration plants, portable ice boxes, containers
High Temperature Insulation
Foundry cores & molds, ovens, crucible topping
Oil Well Treatments
Oil well cementing & low density mud
Fireproofing
Fire insulation in safes, rooms, doors, chimney linings
Acoustic
Plasters, mortars, plaster boards, ceiling tiles & upper wall insulation, highway sound absorbing walls
Horticulture
Plant rooting, seed starting medium, growing medium, soil conditioner, seed coating, hydroponic, green roofs
Lightweight Aggregate Construction
Lightweight aggregate concrete, tilt-up panels, bricks & tiles, pottery & refractories, non-load bearing fill, tunnel walls & pipe coating, floors, masonry, roofs, pipes-leveling, insulation
Air Filtration
Pre-coat for baghouses
Liquid Filtration
Beer, wine, edible oils, citric acid, sugar, oils, pharmaceuticals, fruit juices, glucose, chemicals, wort, swimming pool water, potable water, storm water runoff, bio diesel
Agricultural Additive/Supplement
Poultry litter supplement to reduce odor & moisture adsorbant, animal feed anti-caking agent & filler, carrier for nutrients/medicines
Adsorption
Carrier of agrichemicals in pesticides & herbicides, fertilizer bulking, pelletized seeds, catalytic carrier, oil adsorption for pollution control & clean up
Fillers
Explosives, caulking compositions, paints, plastics, packing for shipping
Abrasive
Soaps, cleaners, polishes, dental compounds, stone wash wheels, discs
Cryogenics
Super-cooled industrial gases in containers for transport & in stationary plants
Medium to High Temperature Insulation
Boiler covering in quilted mattresses & in hardsetting compositions, pipe covering in coaxial tubes, compression molded pipe half sections, pour-in pipe insulation
Perlite Institute, Inc.
www.perlite.org • (717) 238-9723
PERLITE INSTITUTE
Copyright © 2009 Perlite Institute All Rights Reserved

Grades *of* Expanded Perlite & Perlite Particle Size

Particle size is one important factor in determining how expanded perlite works in a given application. The illustration below is meant to simplify the subject and indicate, in very general terms, some common perlite grades and how they relate to one another in particle size. Other factors such as physical structure and density can also be critical in certain applications but are not addressed herein.

TYPICAL PERLITE APPLICATIONS



U.S. MESH	INCHES	MICRONS	MM
2		10,000	10
3	.265	6730	6.73
4	.187	4760	4.76
5	.157	4000	4.00
6	.132	3360	3.36
7	.111	2830	2.83
8	.0937	2380	2.38
10	.0787	2000	2.00
12	.0661	1680	1.68
14	.0555	1410	1.41
16	.0469	1190	1.19
18	.0394	1000	1.00
20	.0331	841	.84
25	.0280	707	.71
30	.0232	595	.59
35	.0197	500	.50
40	.0165	420	.42
45	.0138	354	.35
50	.0117	297	.297
60	.0098	250	.250
70	.0083	210	.210
80	.0070	177	.177
100	.0059	149	.149
120	.0049	125	.125
140	.0041	105	.105
170	.0035	88	.088
200	.0029	74	.074
230	.0024	63	.062
270	.0021	53	.053
325	.0017	44	.044
400	.0015	37	.037
550	.0009	25	.025
		10	.010

Perlite Institute, Inc.
www.perlite.org • (717) 238-9723

APPENDIX 2: Cement Nomenclature

Cement Nomenclature

In the US, three separate standards may apply depending on the category of cement. For Portland cement types:

Cement Type	**Description**
Type I	Normal
Type II	Moderate Sulphate Resistance
Type II (MH)	Moderate Heat of Hydration (and Moderate Sulphate Resistance)
Type III	High Early Strength
Type IV	Low Heat Hydration
Type V	High Sulphate Resistance

For blended hydraulic cements – specified by ASTM C595 – the following nomenclature is used:

Cement Type	**Description**
Type IL	Portland-Limestone Cement
Type IS	Portland-Slag Cement
Type IP	Portland-Pozzolan Cement
Type IT	Ternary Blended Cement

In addition, some blended cements have special performance properties verified by additional testing. These are designated by letters in parentheses following the cement type. For example Type IP(MS) is a Portland-pozzolan cement with moderate sulphate resistance properties. Other special properties are designated by (HS), for high sulphate resistance; (A), for air-entraining cements; (MH) for moderate heat of hydration; and (LH) for low heat of hydration. Refer to ASTM C595 for more detail.

However, with an interest in the industry for performance-based specifications, ASTM C1157 describes cements by their performance attributes:

Cement Type	Description
Type GU	General Use
Type HE	High Early-Strength
Type MS	Moderate Sulphate Resistance
Type HS	High Sulphate Resistance
Type MH	Moderate Heat of Hydration
Type LH	Low Heat of Hydration

Type IP and P Cement

Portland-Pozzolan Cements are designated as Type IP or Type P.

Type IP may be used on general construction and Type P is used where high early strengths are not required.

These cements are manufactured by intergrinding Portland cement clinker with a suitable pozzolan, by blending Portland cement or Portland blast-furnace slag cement and a pozzolan, or by a combination of intergrinding and blending. The pozzolan content of these cements is between 15% and 40% by weight. Laboratory tests indicate that performance of concrete made with Type IP cement as a group is similar to that of Type I cement concrete, however strengths through 28 days can be slightly lower for the Type IP than the Type I cement. Type IP may be designated as air-entraining, moderate sulfate resistant, or with moderate heat of hydration by adding the suffixes A, MS, or MH. Type P may be designated as low heat of hydration (LH), moderate sulfate resistant (MS), or air-entraining (A).