



LOS ANGELES BASIN GEOLOGICAL SOCIETY

January 2025 Newsletter – Happy New Year!
Attention Students: A Free Lunch!

Repurposing Idle Oil & Gas Wells to Thermal Energy Storage Systems for Long Duration, Dispatchable Electricity Delivery

Bill Bartling

Thursday, January 23rd, 11:30AM

Signal Hill Petroleum, 2633 Cherry Ave., Signal Hill

2nd floor Conference Room

For Out-of-Towners, a Virtual Attendance Option is Available – See Below!

Abstract

There are nearly 40,000 idle oil and gas wells in California. State and local regulators apply pressure to abandon these wells but their abandonment comes at a significant and often underfunded cost, and many are sources of actual or potential methane emissions. Converting these end-of-economic life assets to Thermal Energy Storage Systems (TES) permanently seals off emissions and provides long duration energy storage. Idle oil and gas wells are ideal environments for a TES due to their large volumes and high thermal insulation.

The conversion of an idle well begins with sealing off all hydrocarbon producing zones with a cement plug per standard abandonment procedures. Then a portion of the well above the plug is outfitted with a closed-loop heat exchanger surrounded by thermal energy storage media (TES). This media is a combination of sand and Phase Change Materials (PCM) to enhance heat storage capacity. A renewable heat source, such as solar collectors or heat pumps, heats the working fluid during the charge cycle which is circulated into the well with the TES. During the harvest cycle, the working fluid is diverted to an Organic Rankine Cycle Engine (ORC) or other similar system for power generation.

A steady-state, zero-dimensional analysis was performed to assess the potential of a repurposed oilwell-to-TES system for long duration energy storage (LDES). A 50% (volumetric) mix of PCM and sand resulted in a TES that meets the thermal load of a 75 kW ORC power block, an established, field-tested system with over a million hours of operational uptime. The PCM analyzed is the eutectic binary mixture of 60% sodium nitrate (NaNO₃) and 40% potassium nitrate (KNO₃) commonly referred to as solar salt. Preliminary analysis indicates that a TES depth of less than 3200' would be sufficient and this is well within typical oilwell operational depths. The thermal inertia of steel piping and water made a sizeable contribution to TES performance given their high proportion of the TES volume.

The nationwide inventory of idle wells is a rich resource for conversion to energy storage. TES provides long duration storage to augment intermittent and cyclic energy to balance generation and demand.

Biography

Bill Bartling is Co-Founder at Geo2Watts and advisor for Lillianah Technologies. Bill is also the retired Chief Deputy for CalGEM, formerly known as DOGGR, and lives in Prescott, Arizona. Prior to joining DOGGR in 2015 Bill was General Manager of Borehole Imaging for OptaSense Ltd., President and CEO of SR2020, Sr. Director of Market Strategy at Silicon Graphics Inc, CEO of SciFrame, Inc., Manager of Technical Computing at Occidental Petroleum, Sr. VP of Software Engineering at CogniSeis Development and Earth Scientist/Manager in exploration, production and research at Chevron. Ongoing technical projects include energy transformation, carbon sequestration and management, subsurface/reservoir modeling and interpretation and medical imaging technologies. Bill has a BA in Biology from UCSB and MS in Geology from San Diego State, is VP of SEG Pacific Section, is on the Advisory Board of the SDSU Center for Computational Sciences and is a member of SPE, AAPG and SEG. [LinkedIn](#)

Luncheon prices, cash or check

Lunch and Talk (pre-registered)	\$25.00
Walk-ins:	\$35.00
Retired:	\$20.00
Student:	FREE!

Reservations are required by noon, January 20th, at labgs.org/meeting_info.html or directly contact LABGS Secretary Joseph Landeros at (626) 497-1710 or landerosjd@gmail.com.

Virtual Attendance on Zoom

A virtual option will be available for those who cannot attend in person for the January talk. See below for a new link. We trialed Zoom for the November 2024 presentation and hosted several folks virtually. We plan to offer Zoom for all talks in the foreseeable future.

To Join the Zoom Meeting:

<https://csulb.zoom.us/j/88206836217>

Meeting ID: 882 0683 6217

The Pacific Section Society of Economic Paleontologists and Mineralogists is holding their Spring Field Trip

March 7-9, 2025, Friday evening through Sunday around noon

Please join us on the 2025 PS-SEPM field trip and hold the above dates open. Registration has begun and spots are available.

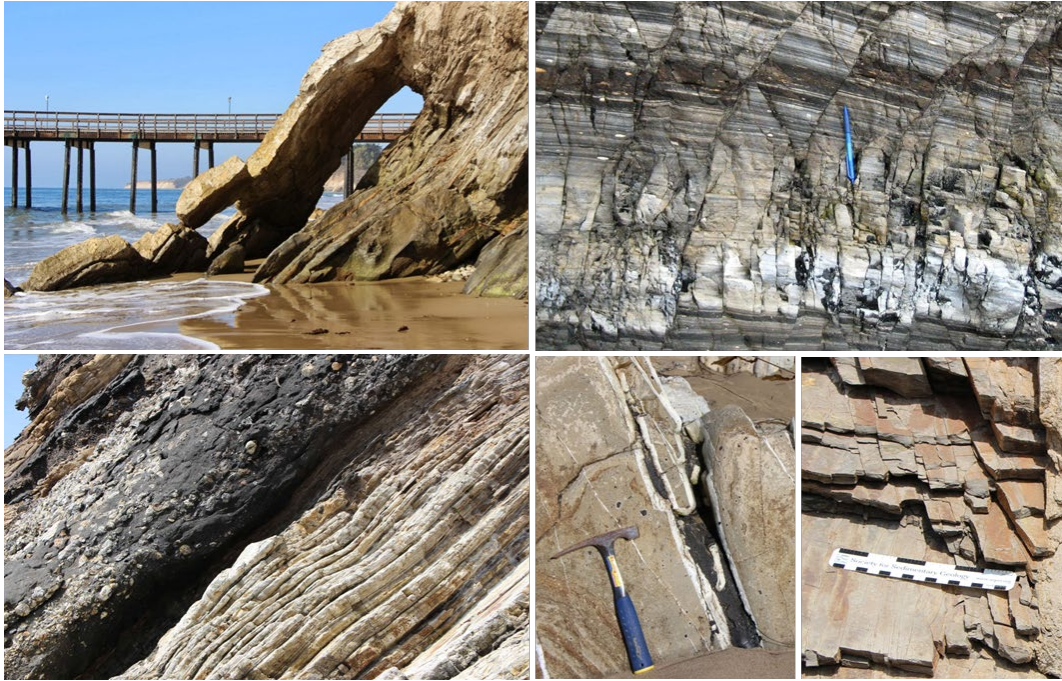
Rick Behl (CSU Long Beach, emeritus) will lead the trip and examine the stratigraphy, lithology and sedimentary structures of the Monterey Formation along the beautiful Santa Barbara coast.

These dates were selected to take advantage of especially low tides that will permit access to spectacular outcrops of interesting and unusual rocks.

The Monterey Formation was a critical player in the global carbon cycle during the mid-Miocene climate transition from global greenhouse to icehouse conditions. The Monterey is the key source rock and an important reservoir for oil in California and has been studied for over 100 years. Over 1 1/2 days, we will walk through three classic sedimentary successions at Gaviota Beach, Haskells Beach and Arroyo Burro Beach. At these locations, we will observe organic-rich and mudstone, chert, porcelanite, dolomite, phosphatic hardgrounds, oil-saturated breccias, sandstone and conglomerate. On a larger-scale, we will see sandstone injectities, and channelized slope conglomerate deposits and slope collapse with bus-size shale blocks into a lowstand submarine canyon.

The PSSEPM has reserved a 60-person group campsite at Cachuma Lake for Friday and Saturday night. For those who prefer indoor comfort to camping, hotels are available in Solvang, Buellton, Santa Barbara and Goleta.

The importance of the upper Miocene Monterey formation cannot be overstated as regards California's petroleum geology. These exposures are courtesy of the Pacific Ocean – this trip is a must-see and the LABGS strongly encourages you to attend.



Historical Anecdotes for January

Going back 100 years to 1925, the Los Angeles Basin did not have any new field discoveries, amazingly enough. The Newport-Inglewood Fault Zone (NIFZ) Trend's largest fields had just been discovered one after the other beginning with Huntington Beach in 1920. The resultant oil boom was felt nationwide as workers flocked to California to participate in the surge of a needed workforce. Townlot drilling and "postage stamp" mineral ownership on small lots in Huntington and Long Beach led to some astounding over-development and rapid depletion of reservoirs. This was both good and bad: the rapid pressure depletion of yesteryear equates to by-passed oil opportunities for existing operators today. Among the arrivals answering the demand for workers in the new NIFZ trend were some from LeFlore County, Oklahoma. Dan Steward's maternal grandfather, Bill LeFlore, and his brothers Joe, Cyrus, sister Viola and her husband Ernest all moved out west and started anew in southern California. The action quickly moved to Long Beach in 1921 and 1922, with 13 other fields following, the last discovery being the Rosecrans East field in 1959. All told, the NIFZ trend hosted 15 oil fields which produced more than 3.1 billion barrels. Several of the fields remain active.

New pool discoveries – new areas adjacent to, or above or below existing productive horizons within an established field, were reported in 1925: the Rideout Heights area of the Whittier field; Sansinena, Newport, Dominguez, Inglewood, and Rosecrans.

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“When a feller says ‘it hain’t th’ money, but th’ principle o’ th’ thing,’ it’s th’ money.”

- *Frank McKinney Hubbard (1868 – 1930)*