

## Saline Minerals from Searles Dry Lake Trona, California

**HANKSITE** ( $\text{Na}_{22}\text{K}(\text{SO}_4)_9(\text{CO}_3)_2\text{Cl}$ ) Over 99% of hanksite in the world is in Searles Dry Lake. The only other location where it is found is Lake Katwe in Uganda. It is also the third most abundant saline mineral in Searles Dry Lake. A bed of mostly hanksite, 20-30 foot thick, is found over most of the 50 square miles of the Upper Salt. It was first identified by George Hidden in 1885. It occurs as euhedral hexagonal dipyrimidal crystals up to eight inches in length. Two forms are found. The first habit ("pyramidal" or "prismatic") shows little development of the basal pinacoid, and these "pointed" crystals commonly terminate with pyramidal faces. The basal pinacoid, if present, is small. Colorless to pale yellow crystals of this habit, up to four inches long are easily collected during the Gem-O-Rama's "Blow Hole" field trip. Crystals of the second habit, the "basal pinacoid", commonly terminate in distinct, large, flat basal faces that may even cause the crystals to be longer than they are wide. Crystals of this "barrel" shape are commonly collected during the Gem-O-Rama's "Mud" field trip where they are always found with occluded dark green to black mud. The occluded material, however, does not distort the crystals and specimens typically show very shiny mirror faces. They occur as single crystals up to eight inches in length and in clusters that may weigh 100+ pounds.

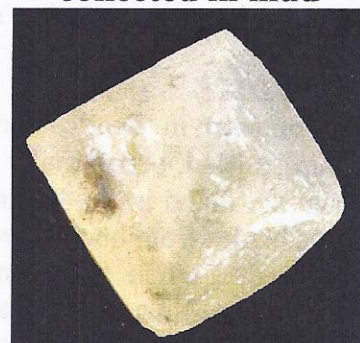


**Terminated Hanksite collected  
in brine**



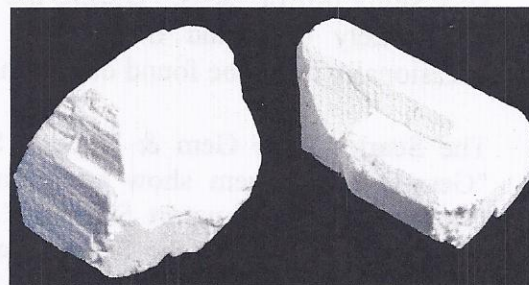
**Barrel and Pancake Hanksite  
collected in mud**

**SULFOHALITE** ( $\text{Na}_6(\text{SO}_4)_2\text{FCl}$ ) Sulfohalite is another mineral first recognized at Searles Dry Lake. It occurs as octahedral crystals that stem from its isometric hex octahedral crystal structure. It is pale-to-medium yellow-green in color, and can be found up to one inch in size. It occurs in both the Upper and Lower Salt. Occasionally, it crystallizes as rhombic dodecahedrons, or with cubic faces modifying the octahedral shape. Most sulfohalite is collected during the Gem-O-Rama's "Blow Hole" field trip although it may rarely be found on the "Mud" field trip. Clear crystals of octahedral halite are often mistaken for sulfohalite.



**Sulfohalite collected in brine**

**BORAX** ( $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$ ) The most abundant boron-containing saline mineral in Searles Dry Lake. Borax occurs as colorless to pale yellowish, monoclinic prismatic crystals commonly up to 5 inches in length. Two crystal habits are encountered, a "short prismatic" type with the length of the crystal between one and two times the width, and an "elongate prismatic" type with the length from three to five times the width (Pemberton). Borax dehydrates to tincalconite (the pentahydrate) upon exposure to air. In Searles Dry Lake, borax occurs from the Overburden Mud through the Lower Salt. Borax may be collected during the Gem-O-Rama on both Saturday field trips.



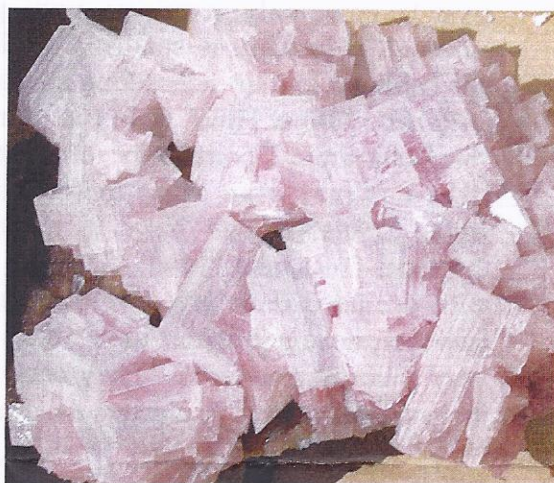
**Borax collected in brine and  
mud**

**TRONA** ( $\text{Na}_3(\text{CO}_3)(\text{HCO}_3)\cdot 2\text{H}_2\text{O}$ ) Trona is the second most abundant saline mineral in Searles Dry Lake. Trona occurs as monoclinic prismatic, tabular crystals. Occasionally, these are macro-sized and look like small blades, but often they are micro-sized with no apparent shape. Trona is present in all saline mineral beds in Searles Dry Lake, but is most abundant around the edges of and at the bottom of the Upper Salt, in all beds of the Lower Salt, and in the EF through HI saline mineral beds in the Mixed Layer. During the Gem-O-Rama, the best trona is collected during the "Mud" field trip where nice blades can be found in large (18+ inch) chunks of trona. Small fine-grained chunks of trona can also be found on the "Blow Holes" field trip.



**Trona collected in mud**

**HALITE** ( $\text{NaCl}$ ) This is the most abundant mineral in Searles Dry Lake. The first 20 feet of the Upper Salt is a porous bed of nearly pure halite. Halite is also dispersed with other saline minerals below the 20-foot level in the Upper Salt, throughout the Lower Salt and becomes massive in the deeper Mixed Layer beds. Halite has a distinctive cubic shape because of its isometric crystal structure. During the Gem-O-Rama, on the "Brine Pools" field trip halite is found in large clusters where some crystals may be up to 2 inches wide. Often these specimens are a light pink to a cranberry-red color. This color is due to millions of microscopic, rod-shaped halobacteria that live in the brine. These bacteria produce a red carotenoid pigment, similar to beta carotene and the red pigment found in tomatoes and red peppers. On the "Mud" and "Blow Holes" field trips, the relatively rare octahedral halite may be found. Often this crystal form is misidentified as sulfahalite.



**Halite collected in brine pools**

**THENARDITE** ( $\text{Na}_2\text{SO}_4$ ) This is the second most abundant sulfate mineral in Searles Dry Lake. It is often found in the Overburden Mud, occasionally found in the Upper Salt, and massive amounts are found in the HI and IK beds in the Mixed Layer. It is found as blades from one to three inches long, and often these blades are twinned. When found in the Overburden Mud, the crystals contain occluded dark green to black mud. The occluded material, however, does not distort the crystals and specimens typically show very shiny mirror faces. During the Gem-O-Rama, thenardite will most likely be found during the "Blow Hole" field trip, but occasionally it will be found during the "Mud" field trip.



**Thenardite collected in mud and brine**

The Searles Lake Gem & Mineral Society sponsors the weekend "Gem-O-Rama" gem show beginning on the second Saturday in October with the support Searles Valley Minerals, Inc. of Trona, California. These are the Searles Lake saline minerals that can be collected on the three field trips that are offered. More information is at <http://www1.iwvisp.com/tronagemclub/> our web site. (Note: that is the number 1, not a lower case L)