Industrial Minerals on Arizona State Trust Land
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Arizona Geological Survey
Special Paper 9
Chapter #7
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Industrial Minerals on Arizona State Trust Land

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Introduction

Contrary to popular belief, Arizona State Trust Land is not public land. All uses of the land must benefit the Trust, a fact that is considered with the review of each application received for sale, lease, or permit. This includes applications for activities ranging from commercial development to recreation. In 1863, the Territory of Arizona was established by an act of Congress. This act reserved sections 16 and 36 in each township to be held in trust for the benefit of the common schools. Later, the Enabling Act of 1910 allowed the Territory of Arizona to prepare for statehood. This act reserved the additional sections 2 and 32 of each township for the common schools and granted another 2,350,000 acres to be held in trust for other beneficiaries. In all, Congress granted the State of Arizona almost 11 million acres (Figure 1).

The State was to manage those lands and maximize revenue for 13 separate beneficiaries. To meet this mandate, the State established the Arizona State Land Department (ASLD) in 1915. Since that time, the ASLD has contributed over $2 billion toward the permanent fund for the beneficiaries through the sale and leasing of the land and natural products which includes minerals. The current inventory of State Trust Lands includes 9.26 million acres representing almost 13% of the State (Figure 2).

The ASLD Minerals Section manages the exploration, development, and leasing of mineral products on State Trust Land. We are not a regulatory agency, but a department guided by our fiduciary responsibilities to the Trust. Our mineral programs include: Exploration Permits, Mineral Leases, Mineral Material Leases, Special Land Use Permits, Oil & Gas Leases, and Geothermal Leases.

Industrial minerals on Arizona State Trust Land

Industrial minerals fall under the category of either Mineral or Mineral Materials Leases. Common industrial minerals found on Arizona State Trust Land include potash, limestone, gypsum, salt, specialty clays, zeolites, crushed stone, and sand and gravel.

Potash

One important future mineral revenue source to the Trust is Holbrook Basin potash. The potash is part of the Permian Supai Formation and ranges up to 40 ft. thick with the pay zone or practical mining thickness ranging from five to more than ten ft. The Arizona Geological Survey estimates there are 682 million to 2.27 billion metric tons (751 million to 2.5 billion short tons) of potash in the Holbrook Basin in northeastern Arizona (Figure 3). Approximately 24 to 157 million metric tons (26 to 173 million short tons) of that underlie 66,000 acres of State Trust Land open to mineral leasing and on which exploration permits have been issued. Even at a conservative estimate of $300 per ton, the minimum amount of potash estimated to underlie State Trust Land could potentially generate over $350,000,000 in royalty revenue for the Trust. Another 18 to 122 million metric tons (20 to 134 million short tons) underlie 29,000 acres of State Trust Land currently closed to mineral leasing due to the expansion of the Petrified Forest National Park.

Gypsum and limestone

The ASLD has three mineral leases for gypsum and five for limestone and a high potential for more. Out of the eight leases, only one is active at this time, the Phoenix Cement Company’s gypsum lease in Yavapai County. Based on the location of the current leases, other known occurrences, and mapped outcrops, there are more than 2 million acres of State Trust Land with limestone potential and more than 0.5 million acres of State Trust Land with gypsum potential (Figure 4). As the economy begins to recover during the next few years, the ASLD expects more of the existing leases to become active and to see a greater interest in the development of these resources statewide.
Currently, the ASLD does not have any Mineral Leases for salt; however, several different groups have expressed interest in utilizing salt deposits for natural gas storage on State Trust Land. Based on the locations of known and potential salt basins, there could be as much as 1.9 million acres of State Trust Land with salt or natural gas storage potential (Figure 5). Additionally, other useful industrial minerals such as potash, lithium, boron, and gypsum are often found associated with salt basins. The Holbrook potash deposit, discussed previously, is found within one of these salt basins.

**Specialty Clays**

The ASLD has about 20 specialty clay Mineral Leases in various stages of the permitting/leasing process in four different counties. The majority of them are not active with only three reporting production since 2011. In Yavapai County there is a lease for hectorite at the Lyle Pit. This pit is leased to the Gadsden Sonora Holdings LLC and was a featured stop during the pre-conference field trip. Gadsden Sonora Holdings LLC also produces saponite from their Burro Creek Pit located on the border of Mohave and Yavapai Counties. In Maricopa County, BPC Excavators Inc. mine a purple slate for use in the manufacturing of vitrified clay pipe. The slate adds strength to the finished product and helps prevent the pipes from cracking.

**Zeolites**

The ASLD has eight zeolite Mineral Leases in various stages of the permitting/leasing process. Grouped together along the border of Cochise and Graham counties, they are located on split estate, meaning ASLD owns the mineral rights and the Bureau of Land Management (BLM) owns the surface rights to the land. At this time, none of the leases on State Trust land are in operation, but a deposit on the adjacent land, where BLM owns both the surface and mineral rights, is being mined.
FIGURE 4 - Gypsum and limstone occurrences in Arizona.

Gypsum and limestone occurrences based on current and past mineral leases and exploration permits on State Trust Land, as well as the Arizona Department of Mines and Mineral Resource’s Arizona Industrial Minerals report (1987).

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The zeolite is confined to a bed 0.5 to 1 ft. thick with approximately 20 ft. of overburden. Zeolites have an atomic structure that is microporous allowing them to be commonly used as adsorbents. Industry uses include water purification systems, laundry detergent, medicine, and agriculture.

**Gemstones**

The ASLD has one gemstone lease which is located in Graham County. This lease, managed by Mr. David Penney, produces fire agate, some of which has been sold on the Home Shopping Network. Fire agate is a semi-precious gemstone commonly formed from hydrothermal activity in volcanic ash layers.

**Crushed stone and sand and gravel**

In 2011, Arizona produced approximately 26 million metric tons (29 million short tons) of construction sand and gravel with 1.4 million metric tons (1.5 million short tons) being produced on State Trust Land (Table 1). This is down from a production high of 5 million metric tons (5.5 million short tons) on State Trust Land in 2006. Although State Trust Land covers almost 13 percent of Arizona, historically, the ASLD only provides between 4 and 5 percent of Arizona’s annual aggregate production. Reasons for this percentage differential may be attributed to many factors including length of application process, mandatory advertising and auction procedures, understaffing, land-use conflicts, and unfavorable land locations. Nevertheless, the ASLD still manages thousands of acres along major drainages with high aggregate potential and has recently increased staffing to speed up the processing of applications. Currently, the ASLD has 19 active Mineral Material Leases, primarily for sand and gravel or crushed stone (Figure 6). As might be expected, these operations are largely concentrated within the Phoenix-Tucson metropolitan corridor. Projections for 2012 indicate production of common variety materials on State Trust Land will increase substantially to between 2.25 and 2.5 million metric tons (2.5 to 2.75 million short tons).

**Obtaining a Mineral Lease**

Industrial minerals, in general, can be applied for on State Trust Land under a standard Mineral Lease. However, to obtain a Mineral Lease on State Trust Land there are many important steps to follow which are listed below:

- Exploration Permit application
- Exploration Plan
- Confirm resource
- Mineral Lease application
- Surface land and mineral appraisal
- Insurance and bond
- Issue Mineral Lease

Processing time for Mineral Leases is approximately 4 to 12 months. This does not include the time needed for exploration and confirmation of the resource which can take several years. Consulting the ASLD Minerals Section prior to the initiation of this process is highly recommended.
FIGURE 6 - Active Mineral Material Leases on State Trust Land.
Obtaining a Mineral Materials Lease

For common variety minerals such as sand and gravel, cinders, crushed stone, and common clay, a Mineral Materials Lease is required. The conditions for this lease are slightly different from the standard Minerals Lease due to statutory and constitutional requirements that stipulate a 10 week advertising period and a public auction. The primary steps to follow are listed below:

- Mineral Materials Lease application
- Exploration Plan
- Confirm resource
- Surface land and mineral appraisal
- 10 weeks advertising
- Public auction
- Insurance and bond
- Issue Mineral Materials Lease

Processing time for Mineral Materials Leases is approximately 6 to 15 months. Consulting the ASLD Minerals Section prior to the initiation of this process is highly recommended.

Summaries of all the ASLD mineral lease programs and their applications can be found online at: http://www.land.state.az.us/programs/operations/applications.htm.

References

TABLE 1 - A comparison of sand and gravel production in Arizona to production on State Trust Land.

<table>
<thead>
<tr>
<th>Production Year</th>
<th>Arizona Sand and Gravel (million metric tons)*</th>
<th>State Trust Land Common Variety (million metric tons)</th>
<th>State Trust Land Revenue ($million)</th>
<th>STL Production, % of AZ Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>59.4</td>
<td>1.9</td>
<td>$1.8</td>
<td>3.2%</td>
</tr>
<tr>
<td>2001</td>
<td>52.9</td>
<td>2.0</td>
<td>$2.0</td>
<td>3.8%</td>
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<tr>
<td>2002</td>
<td>53.8</td>
<td>1.9</td>
<td>$2.5</td>
<td>3.5%</td>
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<tr>
<td>2003</td>
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<td>$2.9</td>
<td>5.1%</td>
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<td>$3.8</td>
<td>4.6%</td>
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<td>84.9</td>
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<td>$4.9</td>
<td>5.3%</td>
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<td>$5.4</td>
<td>5.0%</td>
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<tr>
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<td>3.1</td>
<td>$4.6</td>
<td>4.6%</td>
</tr>
<tr>
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<tr>
<td>2011</td>
<td>26</td>
<td>1.4</td>
<td>$1.3</td>
<td>5.2%</td>
</tr>
<tr>
<td>Totals</td>
<td>742</td>
<td>34</td>
<td>$40.3</td>
<td>4.5% (average)</td>
</tr>
</tbody>
</table>

* 4th quarter 2011 production estimated to get annual value