

HB 74

Geothermal Resources

House Finance Committee



Presented by:

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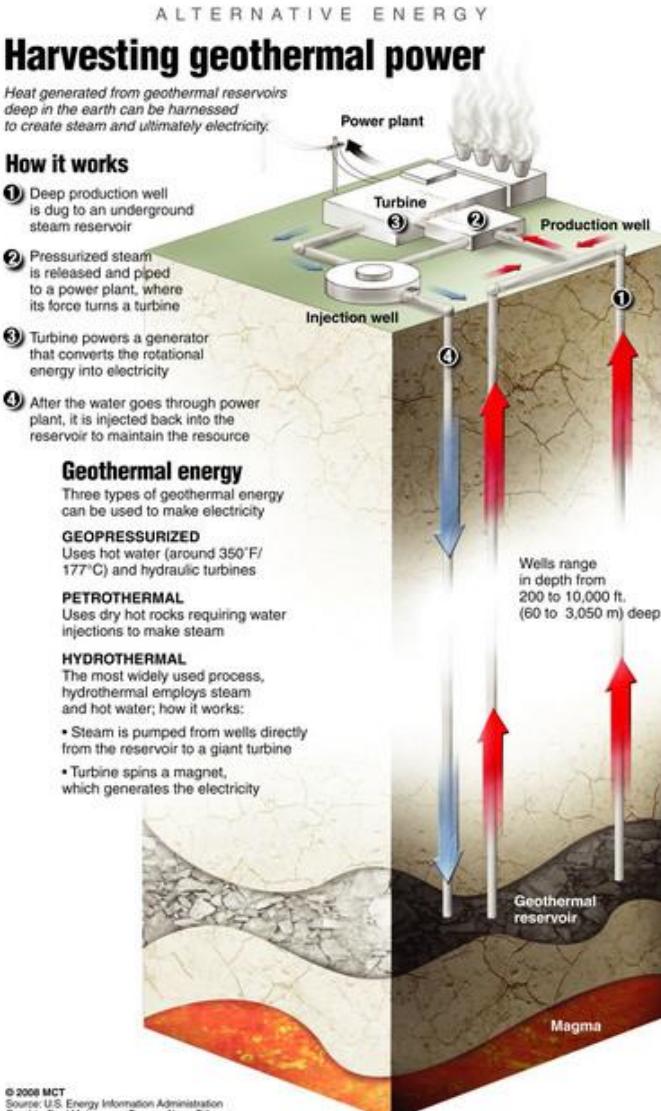
April 11, 2024



FUNDAMENTALS OF GEOTHERMAL SYSTEMS

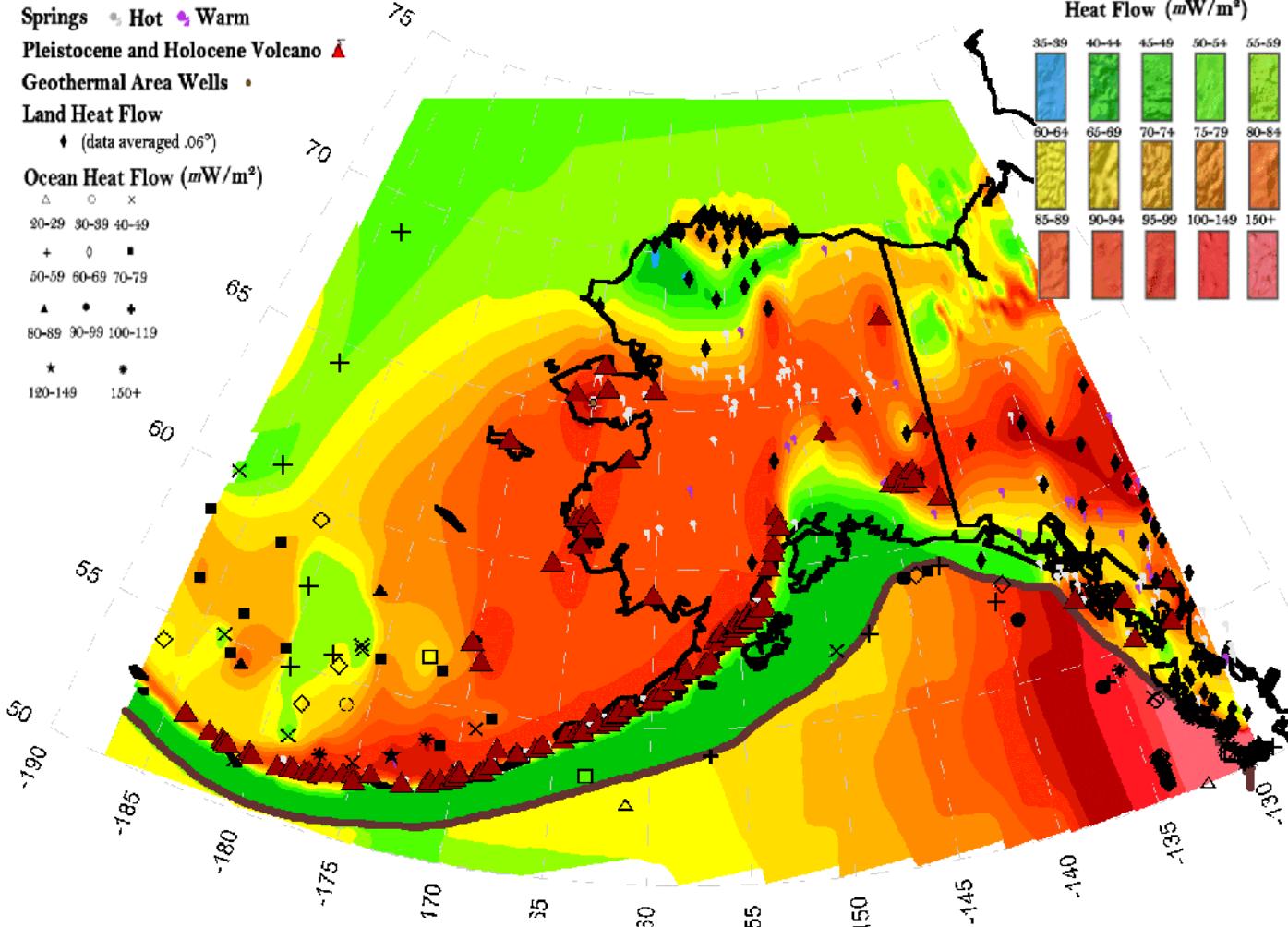
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FUNDAMENTAL INGREDIENTS OF USEABLE GEOTHERMAL ENERGY



- Elevated geothermal gradient
- Porosity and permeability for the migration of fluids
- Surface access
- Sufficiently large thermal system
- Customers for energy

HEAT FLOW IN ALASKA



Source:
SMU Geothermal Map of Alaska, 2004

Most of Alaska is thought to have slightly elevated heat flow (red). However, only very localized areas will have all the ingredients for cost-effective geothermal energy use.

INTRODUCTION TO GEOTHERMAL RESOURCES



- Geothermal heat, where technically and economically accessible, is an excellent form of sustainable energy
- Hydrothermal systems are the most common form of energy extraction from geothermal heat
- Complex geologic parameters necessary for a viable geothermal resource, all present at one location, is rare
- Alaska contains many potential geothermal resources
- New technologies that will expand geothermal development into less favorable geology are on the horizon

FISCAL NOTE: DGGS GEOTHERMAL



- **“Powering Alaska’s Future with Geothermal Energy” \$1,000.0 UGF; included in FY2025 Governor’s Amended Budget**
- **Enables DGGS to restart its geothermal program:**
 - Supply information to support DNR’s geothermal leasing program and attract explorers and developers of Alaska’s geothermal resources
 - Analyze satellite-based remote sensing data for known geothermal springs and the areas around them
 - Contract airborne thermal imagery to identify/prioritize promising geothermal sites
 - Contract limited, site-scale airborne geophysical surveys
 - Conduct ground-based geologic mapping and geothermal-site investigations
 - Collect water samples from geothermal springs and obtain state-of-the art analyses at commercial laboratories
 - Attract federal funds to characterize Alaska’s geothermal systems
 - Complement initiatives by university, federal, native, and private-sector partners

OVERVIEW OF HB 74

**Sean Clifton, Policy & Program Specialist
Division of Oil & Gas**

PURPOSE OF HB 74



Modernize Alaska's geothermal exploration program

- Greater potential for providing affordable, renewable energy to rural communities and remote natural resource extraction projects
- Promote clean energy industry job creation

Align geothermal licensing with the oil and gas exploration license program, thereby increasing feasibility for companies to develop resources

- More time for a company to identify and prove resource to convert to leases
- Conversion to leases based on completion of work commitment and submission of exploration plan instead of proving discovery of commercial resource
- Doubles maximum acreage allowed for exploration
- Repeals rental/royalty modification after 20 years of production, providing stability and predictability for investors in geothermal energy projects

Reform definitions for geothermal resources and fluids to account for technological advancements in the geothermal industry

DNR GEOTHERMAL LEASING/PERMITTING HISTORY



| | |
|---------|---|
| Present | <p>Mount Spurr Two leases in the Mount Spurr area, issued as permits in 2021 and converted to leases in 2023.</p> <p>Augustine Island Prospecting permit in the southern part of the volcanic island issued in 2022, expiring August 2024. A second permit for extended areas around that permit was awarded in January 2024.</p> |
| 2013 | <p>Augustine Island 26 tracts were offered. Only one tract was leased to a private individual and no exploration work was conducted as a result of that lease sale.</p> |
| 2008 | <p>Mount Spurr 16 tracts were leased to Ormat and one private individual. Ormat purchased 15 leases in the 2008 sale and drilled on southern flank of volcano. They didn't find adequate temperatures in wells to pursue the project. The State has the data available on the Division of Oil & Gas website.</p> |
| 1986 | <p>Mount Spurr On June 24, 1986, DNR offered 2,640 acres in two tracts. Both tracts received bids. The lease for Tract 1 expired in 1996, and the lease for Tract 2 was terminated in 1990.</p> |
| 1983 | <p>Mount Spurr DNR held its first geothermal lease sale in the Mount Spurr area on May 17, 1983. 10,240 acres in 16 tracts were offered in Competitive Geothermal Lease Sale 1. One tract received a bid. The lease for that tract was terminated in 1992.</p> |

LEASING UNDER CURRENT LAW



Application and call for competing proposals

- If competing proposals ► competitive lease sale
- If no competing interest ► issue prospecting permit with *two-year* time limit
 - This bill replaces two-year permits with five-year licenses modelled after our modern oil and gas exploration licensing program ([AS 38.05.131–134](#))
 - Conversion to lease:
 - Permit (current): “showing of a discovery of geothermal resources in commercial quantities”
 - License (bill): after work commitment is met

Both processes require Best Interest Finding and public input opportunity prior to award of permit, license, or lease

Royalties are set by [AS 38.05.181\(g\)](#): 1.75% of gross revenue for the first 10 years of production, then 3.5% of gross revenue after 10 years

SECTIONAL SUMMARY



| Section (Agency) | Summary |
|-------------------|--|
| 1 (AOGCC) | Grants Alaska Oil & Gas Conservation Commission (AOGCC) authority to pursue primacy of Class V injection wells for geothermal energy |
| 2 (AOGCC) | Removes unnecessary reference to AS 41.06 from AS 31.05.030(m) (see Section 10) |
| 3 (DNR) | Changes <i>permits</i> to <i>licenses</i> ; adds exemption for geothermal resources intended for domestic, noncommercial, or small-scale industrial use (<i>same as</i> Section 11); removes preferential rights clause (inappropriate for commercial development of State resources) |
| 4 (DNR) | Changes <i>permit</i> to <i>license</i> ; extends term of licenses (formerly <i>permits</i>) from two to five years; replaces lease conversion requirement of <i>commercial discovery and development plan</i> with <i>work commitment and exploration plan</i> |
| 5 (DNR) | Changes <i>permit</i> to <i>license</i> |
| 6 (DNR) | Changes <i>permits</i> to <i>licenses</i> ; increases maximum acreage from 51,200 to 100,000; moves rental fees to be set by regulation |
| 7 (DNR) | Amends AS 38.05.181(f) to grant leases for 10 years, with opportunity for a five-year extension, with standard indefinite extension by production Repeals opportunity for DNR commissioner to modify rent and royalty rates after 20 years of production |
| 8 (DNR) | Adds three new subsections AS 38.05.181(i–k) to modernize unitization statute for geothermal leases to match the model used for oil & gas |
| 9 (DNR) | Replaces AS 38.05.965(6) definition of <i>geothermal resources</i> (<i>same as</i> Section 14) |
| 10 (AOGCC) | Amends AS 41.06.020(e), clarifies that AS 41.06 does not limit DNR's authority over geothermal resource management on state land |
| 11 (AOGCC) | New subsection AS 41.06.020(f) adds exemption for geothermal resources intended for domestic, noncommercial, or small-scale industrial use (see Section 3) |
| 12 (AOGCC) | Adds new subsection AS 41.06.057 to provide for penalties for violations of geothermal statutes (like oil & gas AS 31.05.150) |
| 13 (AOGCC) | Amends AS 41.06.060(4) definition of <i>geothermal fluid</i> to remove temperature references and better conform with other changes in this bill |
| 14 (AOGCC) | Replaces AS 41.06.060(5) definition of <i>geothermal resources</i> (<i>same as</i> Section 9) |
| 15 (AOGCC) | Repeals AS 41.06.005(b) and AS 41.06.030, since geothermal units are managed by DNR |
| 16–20 (AOGCC/DNR) | General provisions for applicability and effective dates, including applicability for prospecting permits issued or currently being processed |

SECTIONS 3–6: PERMITS TO LICENSES



- Provisions in these sections replace “permit” with “license.”
- Within DOG, “permits” are for surface use authorizations. For subsurface, “licenses” and “leases” are issued.
- Adopting the exploration licensing program for geothermal resource management conforms with existing processes for oil and gas.
- Section 17 allows for conversion of existing permits to licenses.

SECTION 3: PRIVATE USE EXEMPTION



- **New language:**

A prospecting license or lease is not required under this section to explore for, develop, or use geothermal resources if the geothermal resource is intended for domestic, noncommercial, or small-scale industrial use.

- **Intent:**

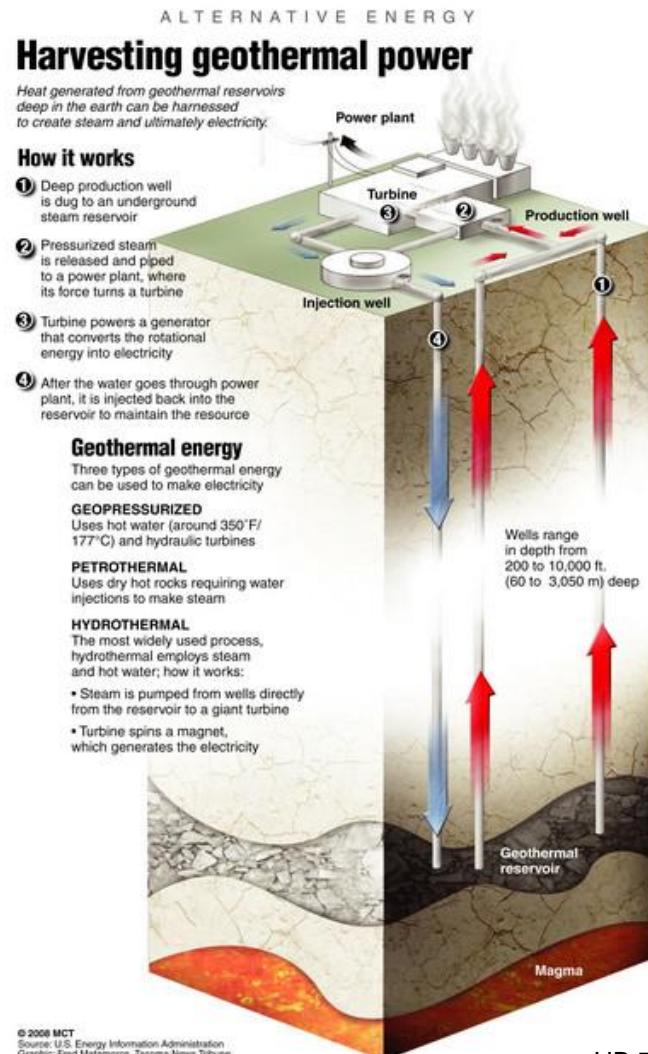
- Clarify that domestic users of ground source heat pumps don't need an authorization from DNR
- Encourage the use of geothermal energy to provide affordable energy in non-utility scale applications

COMMERCIAL GEOTHERMAL POWER PLANTS VS Non-COMMERCIAL SYSTEMS

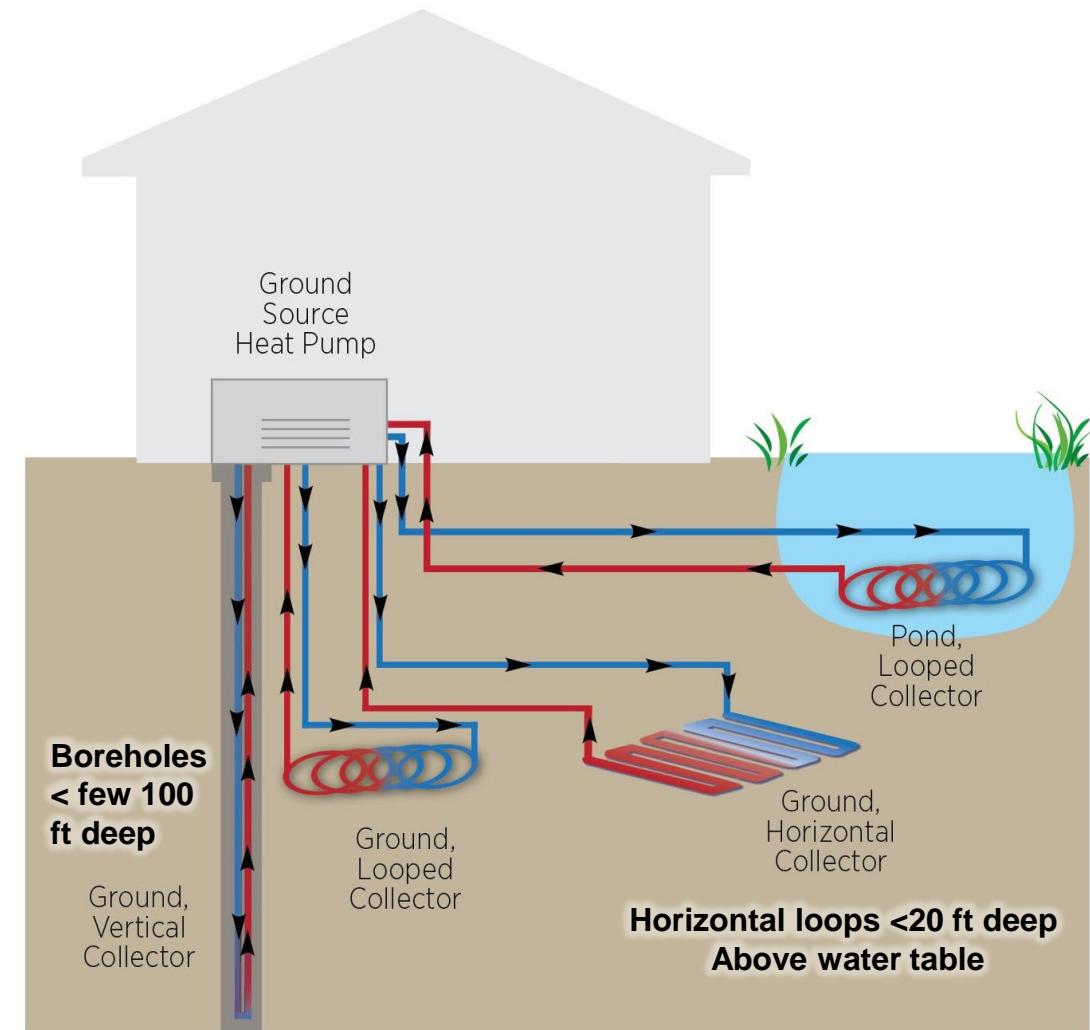


Commercial power plants: wells thousands of feet deep tapping hot, non-potable water

- **Deep subsurface vs near-surface systems separated by 1000s of feet**
- **Vertical communication unlikely**



Non-commercial systems: heat pumps/loops above water table or wells less than a few hundred feet deep



SECTION 3: PREFERENTIAL RIGHTS



- **Current statute grants preferential rights to a surface owner to apply for a geothermal prospecting permit once notice is received of an existing application**
 - Inappropriate for a surface owner to have a preferential right to the *State's* mineral estate
- **Surface owners may still pursue *domestic* geothermal developments for their own uses**
 - Need well permits from AOGCC if hazards may exist
 - Need environmental review or permits from agencies such as Department of Environmental Conservation, Fish & Game, DNR Division of Mining Land & Water, or federal agencies
 - Examples of permitting requirements are detailed in a supplemental slide
- **Geothermal licenses and leases are *not* surface use authorizations**
 - They only provide the exclusive right to explore for and develop the subsurface resources
 - Public notice is a part of the license issuance process and surface owners can participate
 - Surface use authorizations require public notice *and* direct notice to any affected surface owners

SECTIONS 4 & 7: TERMS & WORK COMMITMENT



- **Changes prospecting *permit* to *license* and increases term from 2 to 5 years**
 - Creates greater opportunity for success of noncompetitive geothermal program
- **Conversion to noncompetitive lease through completion of agreed upon work commitment**
 - Current process for oil and gas exploration license
 - Commitment expressed in dollar figure
 - Annual reporting and performance assessments are required
- **Amends AS 38.05.181(f) for geothermal leases**
 - Geothermal leases last for 10 years, with opportunity for a five-year extension, and standard indefinite extension by production
 - Repeals opportunity for DNR commissioner to renegotiate rental and royalty rates for geothermal leases after 20 years of production

SECTION 6: ACREAGE LIMIT & RENT



- **Maximum acreage a lessee may hold increases from 51,200 to 100,000 acres**
 - Geothermal systems can underlie very large areas
 - Enables explorers to more effectively delineate resource
- **Rental fees to be set by regulation instead of statute**
 - Enables DOG to be nimbler in response to market changes

SECTIONS 9, 13, & 14: GEOTHERMAL RESOURCES DEFINITION



“Geothermal resources” means the natural heat of the earth; the energy, in whatever form, below the surface of the earth present in, resulting from, or created by, or which may be extracted from, such natural heat; and all minerals in solution or other products obtained from naturally heated fluids, brines, associated gases, and steam, in whatever form, found below the surface of the earth; but excluding oil, hydrocarbon gases, or other hydrocarbon substances.

“geothermal fluid” means liquids, brines, water, gases, or steam naturally or artificially present in a geothermal system; “geothermal fluid” does not include oil, hydrocarbon gases, or other hydrocarbon substances;”

- Modern definition for geothermal resources
- Not limited by temperature because current technology enables development of cooler geothermal systems
- Ensures all the State’s mineral estate resources are captured in definition
- Distinguishes geothermal fluids from hydrocarbon resources
- Same definition being applied to both DNR & AOGCC statutes



MINERALS OR GASES

- **Why this is an issue**

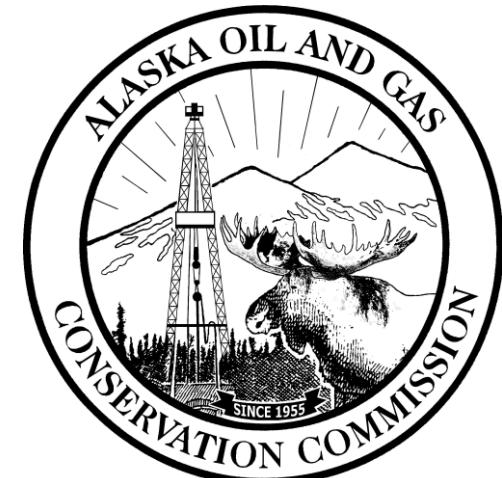
- In some places, minerals such as lithium are being extracted from geothermal fluids as part of the production system
- Helium and hydrogen are sometimes present in geothermal fluids and could also be produced
- These are all valuable resources and production should be encouraged

- **What happens if these resources are produced**

- The geothermal lease grants access to the State's subsurface, so no additional lease or permit is needed for associated extraction from fluid as part of the geothermal operation
- Minerals and gases, except hydrocarbons, are part of the geothermal fluid, so royalties for produced minerals or gases would be paid under the terms of the geothermal lease
- Production of dissolved minerals would, however, need a mining license from Department of Revenue and pay taxes under [AS 43.65](#)

Royalties for geothermal leases are set by [AS 38.05.181\(g\)](#): 1.75% of gross revenue for the first 10 years of production, then 3.5% of gross revenue after 10 years

QUESTIONS?



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