THE STATE of ALASKA
GOVERNOR MIKE DUNLEAVY

Department of Natural Resources
OFFICE OF THE COMMISSIONER

550 West 7th Avenue, Suite 1400
Anchorage, AK 99501-3561
Main: 907.269-8431
Fax: 907-269-8918

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The Honorable Peter Micciche
Senate Resources Committee Chair
Alaska State Capitol, Room 504
Juneau, AK 99801-1182

Dear Senator Micciche:

In response to February 10, 2020 Senate Resource Committee questions regarding SB161 Geothermal Resources below are answers to the committee's questions. Questions are paraphrased where possible.

Sen. Sen Kiehl -Removing preferential rights of the surface owner (Bill Section 2). What notice does a surface owner get?

There are two interpretations of what *preferential rights* means in the context of AS 38.05.181(a): water rights or the right to use the geothermal resource. Deleting this language from the statute is intended both to eliminate this confusion, and to relieve license applicants of the concern that a surface owner may demand to take their license or lease to develop themselves after a geothermal system is discovered.

When viewed as a preference right to a water source, it is effectively a super-preference, like a federal reserved water right, and it exceeds the rights ordinarily granted under AS 46.15.150. For a geothermal system with sufficient heat and pressure to be commercially viable, it would also be deep enough that it would be unlikely to be subject to any surface owner claims to water rights. If competing claims for a water right are identified, we would consult with the Division of Mining, Land & Water's Water Section to resolve the issue.

If a company wanted to develop a commercial geothermal system, and a surface owner made a claim to or is already using the geothermal resource for private purposes, the Division of Oil & Gas would protect the surface owner's rights under AS 38.05.130. As the proposed language added to AS 38.05.181(a) in section 2 of the bill clarifies, a *domestic, noncommercial, or small-scale industrial* user would not have (or need) a lease.

For conflicts over surface access, DNR has a resolution process described in 11 AAC 86.145. Geothermal is an energy resource of the State and is part of the *mineral estate*, much like oil and gas. As such, the geothermal licensee/lessee does not have exclusive use of the surface, but access to the subsurface estate must be made available under the reservation provided in AS 38.05.125. Thus, reasonable efforts must be made for the developer and surface owner to come to an agreement for surface access. If a surface use agreement can't be reached between the developer and the surface landowner, DNR holds a hearing wherein the developer has to prove there is no other alternative location for the well or data acquisition. If the Commissioner concurs, the developer posts a bond to compensate the landowner for any impacts and the work progresses.

The Division of Oil & Gas would follow a procedure like we use for exploration licenses, with public notices and opportunities for public comment before issuing a final decision. Surface owners on or adjacent to a proposed project area would certainly be included in that process.

Sen. Micciche - Bill section 7 Royalty Reduction. How are royalties paid on geothermal resources?

The language in proposed section AS 38.05.181(i), "The commissioner may not reduce royalty… in connection with a unit agreement," is only to clarify that royalty reductions are not to be permanently established under a unit agreement, and are only to be adjudicated under the authority described in sections AS 38.05.181(f) and (j). This is the same type of language used in AS 38.05.180(p), with respect to oil and gas unitization. The intent of this bill is to align geothermal management with our existing structures and processes in oil and gas management.

Royalties have never been paid on geothermal resources, so the exact process is not yet established, but it should be similar to the system used for oil and gas. In statute, they are to be paid at 1.75% of gross revenue for the first 10 years of commercial operation, then 3.5% after 10 years (See AS 38.05.181(g)).

This is similar to oil and gas royalties in two respects. First, royalties must be paid upon removal of the resource from the lease (i.e. sale), regardless of profit. Since geothermal doesn't involve a measurable export of hydrocarbon volumes, however, royalties would be paid on "gross revenues derived from the production, sale, or use of geothermal resources" per AS 38.05.181(g). Second, royalty reduction provisions exist in statute for oil and gas and are evaluated by application to the Commissioner under specific circumstances provided for in statute (See AS 38.05.180(j), for example).

If you would like a more detailed explanation of how royalties work, the Senate Finance Committee has requested the Division of Oil & Gas give a presentation on that topic during this session. We would be happy to provide the presentation when it's available and notify you when the presentation will be held in case you wish to observe.

Follow-up question: In that section, "except as provided in (f) and (j), is that where prior to production… can you explain what is meant by that sentence?"

It may help to clarify that royalties are paid *on production of the resource*. For example, with oil and gas, they are paid on volumes of hydrocarbons produced. On geothermal, being a slightly different animal, royalties would be paid on a small percentage of gross revenue *on production of the resource*. If there is no production, there are no royalties to be paid, and thus only $3 per acre rentals on a license or lease would be paid (See AS 38.05.181(e)).

Sen. Sen Kiehl - Little guys vs industrial interests; deleted preferential rights?

There is no requirement—under current statute or this proposed legislation—for a landowner to obtain license or lease for non-commercial usage of geothermal resources under their own land. This legislation seeks to make it clearer that non-commercial users of geothermal resources are exempt from licensing, leasing, or royalty requirements (See Section 2 of the SB161).

The minimum and maximum acreages specified in the proposed modification of AS 38.05.181(e) are in reference to *prospecting licenses and geothermal leases*. Since this does not apply to private landowners for non-commercial use, private landowners would be not be required to obtain a license or meet an acreage quota.

Follow-up question: Will that continue if someone leases the geothermal resources under their property?

If a private landowner is using geothermal resources that a commercial developer is also seeking to develop commercially under a license, the Division of Oil & Gas would protect the surface owner's rights

under AS 38.05.130. It should be noted that we think this scenario would be unlikely because private landowners usually don't have the financial resources to develop a *commercially viable* geothermal resource. If this kind of conflict ever arises, we would ensure private landowners would not be left without heat or power, or otherwise damaged by commercial development.

Sen Bishop - Under section 2(a), the Commissioner may, under regulations adopted by the Commissioner, grant prospecting licenses and leases to a qualified person to explore for, develop, or use geothermal resources. With that being said, can you give me an idea of what you might be thinking about in those regulations? Because, I've been on a drillrig, on a geosite, and are you going to require the same line of permitting.

The Division of Oil & Gas licenses or leases access to the resource. After access is secured, subsurface use is allowed. Specific surface permitting, like building pads, facilities, pipelines, and other infrastructure in support of exploration and development is secured through the Division of Oil & Gas. Additional permitting may also be required under other state or federal agencies. DNR is concerned with the responsible development of natural resources and protection of all parties.

Issuance of permits to drill wells is AOGCC's jurisdiction. AOGCC is specifically concerned with the prevention of waste, protecting correlative rights, improving ultimate recovery and protecting underground freshwater, with respect to the drilling and maintenance of wells. Things like drill rig operations and well integrity fall within their domain.

Current statute triggers AOGCC jurisdiction over geothermal wells by temperature (greater than 120 °C) or if the energy will be used for commercial purposes (See AS 41.06.060(5)). *Commercial* is "the sale of the heat or power to a third party" (See AS 41.06.060(1)). This bill modifies the definition of geothermal resources and removes the reference to temperature as a triggering factor with respect to AOGCC jurisdiction. A domestic, noncommercial, or small-scale industrial geothermal well would not fall under the Commission's regulatory authority. With no definition of *small-scale industrial* in Title 41, a regulation will be written to clarify the effect of that change. Regardless of changes proposed in this bill, if an operator will or does encounter heat or pressure that constitutes a threat to human life or health, a permit to drill is required (See AS 41.06.020(c)(3)).

In short, DNR issues licenses or leases for access to oil, gas, or geothermal resources, while AOGCC issues drilling permits. They are separate authorities and processes. A geothermal well would be under AOGCC's jurisdiction to permit, even if it's not a commercial operation, if the well "may encounter geothermal resources, fluid, or water of sufficient heat or pressure to constitute a threat to human life or health."

The Department of Environmental Conservation (DEC) does not regulate discharges incidental to geothermal drilling due to an exemption provided in AS 46.03.100(e)(4)(A). However, if the incidental discharge enters surface water (WOTUS), then an Alaska Pollutant Discharge Elimination System (APDES) permit is required under 18 AAC 83 (APDES program authority is from AS 46.03.100(b) and (h)). In the past, the DEC Division of Water has permitted geothermal discharges using Plan Review in Lieu of Permit per AS 46.03.100(b)(4). In addition, Engineering Support and Plan Review (ESPR) conducts plan reviews for smaller systems in the municipality (heating or cooling pumps at UAA, U-med district, hatchery, and more).

The DEC also operates a permit program under AS 46.03.100(b)(2) for activities defined as "hydrostatic testing, including flushing and aquifer pump testing." General permit AKG003000 provides for coverage of land disposal or discharge to surface water. There has been one geothermal-related authorization, issued in 2015 for the Akutan Geothermal Project.

Sen. Micciche - Is a prospecting license or lease is required for exploration?

The language in the bill modifying AS 38.05.181(a) states:

> A prospecting license or lease is not required under this section to explore for, develop, or use geothermal resources drawn from a depth with a ground temperature of not more than 30 degrees Celsius if the geothermal resource is intended for domestic, noncommercial, or small-scale industrial use.

A *domestic, noncommercial, small-scale industrial* user does **not** need to obtain a license or lease. This proposed change distinguishes private users from commercial developers, who **do** need a license or lease. Current statutory language is less clear on this point.

Sen. Giessel - Could DNR provide a map of the state with potential geothermal energy areas with nearby populations centers that may be using those energy sources?

DGGS has an existing 1983 Geothermal Resources of Alaska map *posted on the DGGS website*. An updated map of geothermal resources is attached.

Sen. Micciche - Are there many domestic (i.e. not commercial) resources that DGGS would not know about? Would they register with DGGS?

Domestic users of geothermal energy usually employ shallow, ground-source heat pump systems that use the regional geothermal energy rather than the elevated geothermal gradients found around hot springs. The natural background geothermal energy present in the earth varies regionally, and DGGS has some data to build regional geothermal gradient maps. Data to construct these maps is best developed in areas with oil and gas drilling, where bottom-hole temperatures allow us to construct geothermal gradient maps for the basins. In these areas the geothermal gradient is roughly 30–40 °C per 3,000 feet of depth. Similar data is not available throughout most of Alaska, and additional work would be required to obtain and compile that information into statewide geothermal gradient maps. DGGS has information on the known hot springs and fumaroles around the state, but there is the possibility of buried, or blind geothermal systems in areas with geology similar to that around known geothermal systems, but where the hot water has not made it to the surface.

DGGS is not a regulatory agency, and as such does not register, permit, regulate or monitor the use of geothermal energy. Domestic, low-temperature systems are typically shallow, and typically permitted like water wells.

Sen Giessel - Are there tax credits available for geothermal exploration or production?

No, there are not any provisions for tax credits for geothermal resource exploration or production in State law.

Last year, however, Senator Lisa Murkowski submitted the *Advanced Geothermal Innovation Leadership Act of 2019 (AGILE Act)* in the U.S. Senate. Among other things, it will authorize grants, incentives, and resource assessments that could help energize development of our geothermal resources significantly. The Congress page for the bill can be accessed here, and a letter of support from the Geothermal Research Council can be accessed here.

Sen. Kiehl - Why are we changing to the definition of geothermal resources?

The current definition of a geothermal resource in AS 38.05.965(6) reads:

> (6) geothermal resources - means the natural heat of the earth at temperatures greater than 120 degrees Celsius, measured at the point where the highest-temperature resources encountered enter or contact a well or other resource extraction device, and includes

(A) the energy, including pressure, in whatever form present in, resulting from, created by, or that may be extracted from that natural heat;

(B) the material medium, including the geothermal fluid naturally present, as well as substances artificially introduced to serve as a heat transfer medium; and

(C) all dissolved or entrained minerals and gases that may be obtained from the material medium, but excluding hydrocarbon substances and helium;

This definition limits a geothermal resource to systems with temperatures greater than 120 °C at the well. This is above the temperature that can be developed with current technology. Thus, geothermal systems where temperatures are below this could be developed and would not be considered geothermal resources, and not covered by this statute and accompanying regulations.

Technological improvements will continue to lower the temperature of geothermal systems that can produce commercial quantities of energy. The new language removes the temperature criteria to allow inclusion of lower temperature systems in the definition and thereby the regulatory framework. This will eliminate potential uncertainty should commercial development of a geothermal system with temperatures below 120 °C occur.

Currently, AS 38.05.965(6) and AS 41.06.060(5) have differing definitions for a geothermal resource. They will be aligned by the proposed bill.

The proposed change to AS 38.05.181(a) provides an exclusion for domestic, noncommercial, and small industrial systems from leasing requirements for use of geothermal energy below a temperature of 30 °C.

Thank you for the opportunity to present to the committee. Should you have any further questions, please do not hesitate to contact me at laura.ogan@alaska.gov or at 317-5186.

Sincerely,

Laura Ogan
Legislative Liaison & Special Projects