Statement of

James C. Witcher

Southwest Technology Development Institute

New Mexico State University

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Thank you for the opportunity to present testimony regarding H. R. 2772, The John Rishel Geothermal Steam Act Amendments introduced by Rep. Jim Gibbons (R-NV). My testimony reflects two decades experience in geothermal resource evaluation, exploration, and development for direct-use geothermal heating in the Southwest. As geologist and project manager with the Southwest Technology Development Institute (SWTDI) at New Mexico State University (NMSU) in Las Cruces, I have had the pleasure and privilege of working with most of the geothermal direct-use projects in New Mexico (NM). As a result, I have gained an appreciation for the concerns and requirements of a successful direct-use geothermal operation.

Importance of Geothermal Direct-Use

Geothermal resources suitable for direct-use generally have lower temperature and represent a very large resource base in terms of the number of potential use sites, especially in the West. I will discuss NM geothermal as an example of the importance of direct-heat utilization.

Besides spas, direct-use geothermal applications in NM include space heating, district heating (NMSU campus), large commercial greenhouses, and aquaculture (fish farming). I will focus on the commercial greenhouse sector.

Four NM greenhouse growers use geothermal energy to heat about 50 acres. This acreage represents more than half of the wholesale commercial greenhouses in the state. Gross sales are estimated to exceed $12 million annually, placing geothermal greenhouses among the top ten agriculture sectors in the State. Most of this acreage has been built in the last decade. Approximately 250 jobs have been created with an estimated payroll more than $4 million annually. The two largest greenhouses and an important aquaculture business are in rural areas and the greenhouses are among the largest businesses and tax base in their respective localities.

While the geothermal greenhouses require more than 275 billion BTU per year of geothermal heat and accrue a net savings in energy costs when compared to local conventional fuel, it is clear that geothermal direct-use also provides important economic development in rural areas that are often left behind by the flow of money and people to population centers.

Greenhouses and aquaculture are not the only potential agriculture or industrial user of geothermal in NM. I believe that processing of chile, onions, milk, and cheese may someday benefit from geothermal direct-use.

I have only outlined the direct-use development and potential in NM; however, important geothermal direct-use development in the agriculture sector is also occurring in the rural areas of Nevada, Utah, Idaho, California, Idaho, and Oregon. In fact, I believe that all of the western states and some other states to the

east have significant direct-use geothermal potential.

Impediments to Geothermal Direct-Use

Individuals and companies using geothermal direct-use are somewhat unique among the nation's energy producers. A direct-use operator normally does not develop the geothermal resource for energy sales as the sole or major business revenue. A geothermal greenhouse or aquaculture operator is a grower or farmer first.

"Location, location, location" as often quoted in real estate is first and foremost in starting a geothermal direct-use business. Irrigation water, labor, markets, transportation, and geothermal all need to coincide. Certainly energy availability and cost of energy can rank high. Aquaculture and mining operations, using hydrometallurgy, in a colder climate may require geothermal heat to have economic viability. However, in each of these cases the main purpose of business is not energy sales (or energy use).

Except for the mining example, these firms will not have a person with leasing expertise, engineers, geologists, and accountants, trained in the details of the Minerals Management Service (MMS) reporting forms and rules, on company staff.

With this thumbnail sketch of a direct-use geothermal businesses, it is clear that several things are required for viable geothermal direct-use. First, geothermal has to be economic for the intended direct-heating purpose. Second, resource accessibility and assurances of continued accessibility are required. Third, fees and rules governing geothermal use must be simple and straightforward.Out of hundreds of direct-use geothermal endeavors, only three are identified as using the federal geothermal resource according to Kevin Rafferty of the Geo-Heat Center, Oregon Institute of Technology, Klamath Falls, Oregon. Two of these direct-use geothermal businesses are in NM. Another direct-use operator in NM has a federal geothermal lease and a viable, but shut-in, production well just over the fence from his large commercial greenhouse located on private land. The later geothermal operator currently chooses to pump from a private geothermal reservoir with lower temperature than from the adjacent and hotter federal reservoir.

I believe the current royalty structure is the main obstacle with federal direct-use geothermal in NM. In order to use the federal geothermal resource, expensive BTU metering is required (BTU or Btu - British thermal unit - a quantity that is equivalent to heat a pound of water 1 oF). The cost for equipment, installation, testing, and maintenance of BTU meters at one NM geothermal greenhouse exceeds the cost of a geothermal production well, including drilling, casing, and pump. Finally, there is no recognized standard for BTU metering of geothermal direct-use wells which means that one geothermal operator may not be metered the same as another, depending upon equipment brands, method of installation, and personnel performing installation and testing.

Another drawback of current royalty structure, based upon the ten percent avoided cost of the least expensive locally-available fuel, is that it does not account for any uniformity in either the avoided fuel cost or in the way the geothermal itself is valued.

Geothermal potential in a rural area that uses bottled gas (propane) because of a lack of access to less expensive pipeline gas is jeopardized by the current royalty structure. In fact, in such a case, it is likely that the only reason a greenhouse would be built in an area with high conventional energy costs is because geothermal is available. This argument can apply to other direct-use geothermal applications such as ice removal from a large bridge.

A geothermal operator that uses 140 oF water for direct-use heating will have significantly greater investment in wells, heat distribution, and operating costs than the geothermal operator that uses 210 oF geothermal water to obtain the same useable BTU. The real value of the geothermal BTU is therefore different from place to place.

Current royalty rules do not account for the discrepancy in the value of the geothermal from place to place and as a result discourages development of the lower temperature resource base because the royalty may be as great as the benefit (cost savings) that the direct-use operator would accrue from geothermal direct-use.

Direct-use geothermal and geothermal electricity are treated with different valuation philosophy. Power production royalties are calculated based upon sales or energy output with specified deductions or "netback"

for power transmission and conversion of geothermal into saleable and marketable electricity. With direct-use, the current royalty structure begins with energy input at the wellhead without taking into account relative costs for pumps, heat exchangers, and heat equipment inside the greenhouse to obtain a usable BTU.

Direct-use geothermal is penalized even further when one considers that hot water from a conventional gas-fired boiler has less heating equipment cost inside a greenhouse than with geothermal because of generally higher heating loop temperatures. However, the current approach adds a boiler inefficiency factor in calculating the equivalent conventional fuel cost for royalty evaluation.

H. R. 2772 and Geothermal Direct-Use

H. R. 2772 encourages the use of the federal geothermal resource base for direct-use applications. Where the geothermal resource is potentially feasible to use and meets the first development hurdle of basic economics, H. R. 2772 greatly assists the leasing processes for direct-use by eliminating the minimum lease acreage requirement. While direct-use geothermal operators may dislike the sixty-day publication requirement of a direct-use lease application, I believe that this is not onerous as many permits already require publication.

H. R. 2772 provides a fair and simple remedy to current royalty problems for geothermal direct-use. Because geothermal direct-use operators are not in the energy business as their prime business, the simplified fees eliminate many problems and allow for more streamlined administration of federal land by the Bureau of Land Management (BLM) and provide direct-use developers a fee structure that is known upfront. Some may argue that a fee or royalty based upon business sales should be implemented to replace the current royalty structure. I would argue that the benefit derived from geothermal use would accrue in the form of a larger tax base, higher employment, and a cleaner environment.

Conclusion

Experience in NM shows that geothermal direct-use development has significant potential for environmentally clean, rural economic development in all states where suitable lower temperature geothermal resources exist, while at the same time reducing dependence on foreign energy supplies.

I urge the Committee to support H. R. 2772, the John Rishel Geothermal Steam Act Amendments of 2003. It is my belief that by enacting the amendments into law, much desired, but currently avoided, geothermal direct-use development on federal public lands will begin to take form.

Thank you.

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