

Approved March 21, 1986
Date

MINUTES OF THE Senate COMMITTEE ON Assessment and Taxation

The meeting was called to order by Senator Fred A. Kerr at
Chairperson

11:00 a.m./~~xxx~~ on Thursday, March 20, 1986 in room 519-S of the Capitol.

All members were present except:

Senators Montgomery (Excused), Mulich (Excused) and Parrish (Excused)

Committee staff present:

Tom Severn, Research Department
Melinda Hanson, Research Department
Don Hayward, Revisor's Office
LaVonne Mumert, Secretary for the Committee

Conferees appearing before the committee:

Don Steeples, Kansas Geological Survey
Mason Ashby, Geary County Development Commission
Dr. Philips Bradford, Advanced Technology Commission

H.B. 2642 - Severance tax imposed on hydrogen. Re Proposal No. 8

Staff explained that the bill provides that hydrogen would be subject to the severance tax as of July 1, 1996 and also provides for a two-year exemption for any new source of supply. Chairman Kerr noted that a company interested in the hydrogen issue had requested that the issue be studied so that they would know what might be expected with regard to application of the severance tax for their planning purposes.

Don Steeples read his written statement (Attachment 1). He pointed out that there is no commercial natural hydrogen production presently anywhere in the world. He discussed the difficulty of restricting diffusion and flow patterns of hydrogen. Mr. Steeples feels that it is not likely that hydrogen is likely to be trapped at high pressures anywhere in Kansas. It is his belief that the reservoir pressures in the Kansas field are extremely low. He expressed concern that placing a severance tax on hydrogen may hamper exploration or lend credence to risky promotional schemes. In response to questions from Chairman Kerr, Mr. Steeples said that Professor Zeller and Professor Anguino have both reviewed his statement. He advised that Professor Zeller told him about two weeks ago that he was not aware of anyone planning to do any major exploration in the hydrogen field near Manhattan.

H.B. 2745 - Income tax credit for hydrogen research

Senator Karr said the purpose of the bill is to encourage research and development of hydrogen.

Staff explained that the bill provides a \$100 tax credit for each \$10,000 of qualified research expenditures.

Mason Ashby talked about the speculation and uncertainty regarding the hydrogen field and its potential. He feels it is very important to have an informed capital market. He talked about the Billings Corporation and said that his contact with the company dropped off last fall.

Dr. Philips Bradford spoke in favor of the bill (Attachment 2). Dr. Bradford described hydrogen and its uses. He stated that it is economically advantageous to locate hydrogen processing plants at the production sites so there is a potential for economic development for the state. He discussed various subjects for research. Dr. Bradford advised that Phillips Petroleum, Amoco and Chevron are currently doing some research on hydrogen. Answering questions from Senator Frey, Dr. Bradford said the research funds would be spent in Kansas, most likely either at universities or in the field area.

Meeting adjourned.

KGS Testimony

Before Senate Assessment and Taxation Committee

March 20, 1986

My name is Don Steeples, and I am here in my capacity as Associate Director for Research at the Kansas Geological Survey. This testimony relates the professional opinion of the Kansas Geological Survey on the proposed hydrogen severance tax. By statute, and I quote, the Survey is "to make as far as possible a complete geological survey of the State of Kansas, giving special attention to any and all natural products of economic importance in order to determine the character, location, and amount of such products and to prepare reports on the same." End quote.

Much discussion in the past two years has centered on the unusual occurrence of natural hydrogen in an area of several square miles near Junction City. There is absolutely no question that this hydrogen is of substantial scientific interest. By studying these unusual gases much will be learned about their origin, possibly even clues about the early history of the earth itself. We are not here to discuss the origin of the gas, however, but rather its possible classification as a natural resource. The dictionary defines resource as "an available supply that can be drawn upon when needed." The Kansas Geological Survey questions whether the hydrogen is a resource.

Let us review the apparent facts of this phenomenon:

(1) We are not aware of any commercial natural hydrogen production at the present time anywhere in the world. There is little reason to believe that the geologic situation in Kansas is unique. In other

words, the very absence of hydrogen production elsewhere in the world is cause to view this occurrence cautiously. There are many other places in the world where natural hydrogen has been found in small quantities. We know of at least 14 places in the United States where hydrogen content of natural gas exceeds 20 percent.

(2) The hydrogen is present in several geologic layers or "reservoirs" as they are sometimes called. Since hydrogen is one of nature's smallest molecules, it is notoriously difficult to restrict its diffusion and flow patterns. The fact that several geologic layers contain the hydrogen, and that it very likely originated much deeper than those layers, suggests that the hydrogen is gradually and systematically moving to shallower layers. A ramification of hydrogen's mobility and diffusivity is that it may not concentrate itself in significant quantities in any reservoir at pressures sufficiently high for commercial production.

(3) In a joint project involving the United States Geological Survey and the Department of Geology at The University of Kansas, our scientists have determined that unusually high concentrations of hydrogen are slowly leaking out of the ground throughout an area encompassing at least a half dozen counties in north-central Kansas from the Nebraska border southward past Junction City and westward at least as far as Abilene. This observation, combined with the observation of hydrogen presence in several geologic layers, suggests that continual upward leakage of hydrogen is occurring over a wide area and that hydrogen is not likely to be trapped at high pressures anywhere in Kansas.

(4) Scientists from the geology departments at the University of Kansas and the University of Missouri in Kansas City have noted that gas sample collection at the so-called hydrogen wells is best done when low pressure weather fronts have just passed the area. This strongly implies to us that the reservoir pressures are exceptionally low, possibly no more than a few pounds per square inch, and that well-flow rates are commensurately low. This is based on the knowledge that weather fronts do not affect the wellhead pressure noticeably at producing natural gas wells in Kansas or anywhere else. Natural gas wells in Kansas can have several hundred pounds-per-square-inch pressure; if not, they have delivery rates that make it profitable to compress the gas for pipeline transport.

The Kansas Geological Survey has not been directly involved with the hydrogen drilling effort. Nevertheless, it is our conclusion, based on somewhat limited data, that the likelihood of commercially profitable hydrogen production in Kansas is remote. One way to make it even more remote is to promise to tax it at some specific time in the future. We suggest that if a severance tax is to be put on hydrogen, that it not go into effect until such time as gross value of hydrogen produced exceeds perhaps \$10 million per year. This will prevent killing the industry in the bud.

We are concerned about placing a severance tax on what may be a phantom resource. Such action on the part of the Legislature may hamper viable exploration and engineering efforts, or lend credence to promotional schemes that are not likely to bear fruit. It also may have the effect of raising false hope for the state of the ailing Kansas

economy, which will eventually result in disappointment for the populace.

Hydrogen

is:

1. A chemical fuel with the highest energy value per unit mass.
2. The cleanest of all chemical fuels.
3. The costliest fuel to produce .
4. Purchased and consumed by industry in large quantities; greater than 3 trillion ft³/yr.

Hydrogen is used for:

1. Production of Ammonia for fertilizers .
2. Hydrogenation in food processing.
3. Chemical processes in fuels, plastics, and pharmaceuticals.
4. Rocket fuel for defense and space.
5. Fuel cells to produce electricity.
6. Internal combustion engines.
7. Numerous specialty applications.

**Natural Hydrogen
in Kansas
Can Attract Industry
Because:**

1. It may be the world's largest source.
2. It may be the lowest cost source.
3. It is not easy to transport.
 - A. It diffuses through pipelines, and
 - B. requires larger pipes per unit mass.
 - C. Must be liquified to move by truck or railcar.

Therefore:

It is economically advantageous to locate
the process plants at the production sites.

4. There are large agricultural based markets
in the Midwest to which Kansas is central.

Natural Hydrogen Research

1. Geology: Locating more concentrated sources underground.
2. Engineering: Improved cement for well casings.
3. Separation and Purification.
4. Storage and Handling.
5. Economics and Markets: New Applications
6. Safety.