MINUTES OF THE MEETING
AGRICULTURE, LIVESTOCK & IRRIGATION
MONTANA STATE SENATE

April 4, 1979

The twenty-eighth meeting of the Agriculture, Livestock and Irrigation Committee was called to order on the avove date in Room 415 of the State Capitol by Chairman Galt at 1:00 p.m.

ROLL CALL: All members were present with the exception of Senators Conover and Kolstad

CONSIDERATION OF HOUSE JOINT RESOLUTION 47: Representative Ernst was the chief sponsor of this resolution. He has much concern for the grain producers of Montana . Most of the grain produced in Montana is exported. The availability of railroad cars to transport the grain is lacking, and many producers pay a penalty for late delivery of their grain. This resolution calls for a study of the feasibility of a pipeline to transport this grain. It does not call for an appropriation. It asks Montana State University to gather the information and present it to the Legislature next session. Rep. Ernst felt this could be a competitive method of transporting grain.

Zack Stevens, Montana Farm Bureau, and also speaking today for WIFE, Grange and the Grain Growers, said this is not a slurry shipment of grain. This method would capsulate the grain so it would not be damaged during shipment. He distributed an article to the committee that concerns shipment by pipeline. Exhibit #1. He felt it would be adviseable to look into other methods.

Chris Johannson, Montana Grain Elevators, rose in support of the bill. He felt the grain car shortage had been critical since July 1977 and has not improved.

Terry Murphy, National Farmers Organization, also supported the resolution. He felt this method of pipeline transportation should be looked into. Grain transporation by freight is too expensive to grain growers. The pipeline method could prove very beneficial to this area since we have to ship so far.

Alice Fryslie, Montana Cattlemen's Association, supported the resolution and felt this method was very worthy of a study.

OPPONENTS:

Gordon McGowan, Montana Railroad Association, submitted to the committee data on the B.N. shipment of grain., exhibit #2.

He felt someday a study of this type might be necessary but he did not feel it would help the problem of grain transportation at this time. He felt the grain trade had not provided the storage that it should have.

Danny Oberg, felt there was some merit to the study but not at this time.

Kenneth Clark, Railroad Brotherhoods, felt that sometime in the future a study of this type could be necessary.

Representative Ernst in closing said this resolution would gather data and present it to see if this method was feasible and it would stimulate some competition.

CONSIDERATION OF SENATE RESOLUTION 4: Senator Conover was absent so Senator Graham presented the resolution in his behalf. This resolution would request the President to increase the target price of corn, wheat and barley by 10% to reflect the current cost of production. He is attempting to get Congress to realize that with inflation we need a better target price for our corn, wheat and barley.

There were no opponents.

During discussion Senator Graham said that if we get a higher target price it would tend to increase the world wide market.

DISPOSITION OF SENATE RESOLUTION 4: Senator Graham moved that the resolution BE ADOPTED. Motion carried unanimously by those present.

DISPOSITION OF HOUSE JOINT RESOLUTION 61: Senator Graham moved that HJR 61 BE CONCURRED IN. Motion carried. Senators Aklestad and Hager voting NO. Note absences.

SENATOR JACK E. GALT, Chairman

Date 4-4

ROLL CALL

AGRICULTURE COMMITTEE

46th LEGISLATIVE SESSION - 1979

NAME	PRESENT	ABSENT	EXCUSED
SEN. KOLSTAD			
SEN. AKLESTAD	✓		
SEN. BOYLAN	✓		
SEN. CONOVER			
SEN. GRAHAM	✓		
SEN. HAGER	✓		
SEN. NELSON	✓		
SEN. GALT, Chairman	✓		

Each Day Attach to Minutes.

DATE 4-11

COMMITTEE ON AGRICULTURE

HJR 61 SR4 VISITORS' REGISTER

NAME	REPRESENTING	BILL #	Check Support
Gordon McGowan	Mont RR	61	
John Delano	"	61	
Chris Johansen	Mont. Grain Growers Assn Mont. Farmers Union	61	?
Tom Murphy	Natl. Farmers Org.	61	X
Jack Stevens	Farm Bureau	61	X

Richard E. Hansen Jr.
Box- 226
Joplin, Montana. 59531

PIPELINES: FREIGHT TRANSPORT OF THE FUTURE.

By- Dick Hansen Jr.

JOPLIN: Our nation's deteriorating rail freight system, coupled with a chronic boxcar shortage and continually soaring freight rates, has American grain producers in particular looking for alternative transport means. Trucks are seen as about the only other way. But given the huge volumes to be transported, our truck system at best can only make a dent.

There could though, be a third alternative which has been around for many years and generally ignored as being too far-fetched. This concerns using pipelines to move grain, and in fact, a wide variety of freight and solid products.

Not only is this concept becoming increasingly attractive, most researchers and other authorities agree is is economically feasible. More, they point out that with agricultural products in particular, the export of U.S. agricultural commodities plays an increasingly vital role in balancing our trade deficit, and feeding the world's exploding hungry population. Therefore, it's expected that in the future the production level of U.S. agriculture will have to be drastically increased, and export of agricultural products greatly expanded. Some authorities predict freight transport needs as doubling by the end of this century.

This would require a transportation capacity much larger than our present existing, and inadequate, network of railroads can handle. Instead of building new railroads or trying to upgrade what we have, say these sources, it could well be cheaper to build pipelines. Also, it is pointed out by both the U.S. Departmetns of Energy and Transportation

MORE

that the future of our vast network of existing gas, oil and slurry pipelines could be in serious doubt by the year 2000 if new use for them is not found because of lack of these commodities to be transpoted. When this happens, these lines could be easily converted to freight pipelines at minimal cost for general transportation use. Pipeline operators and manufacturers of pipelines and related equipment have long been aware of all this, as well as the tremendous potential for their systems presented by the grain fields of their respective countries.

Transportation of commodities via pipeline is economical only when these products exist in a somewhat concentrated area or areas, and in a relatively large and stable volume. Proponents of pipelining freight, however, note that much the same factors are necessary for rail freight--particularly the 'unit train' concept. Also, pipelines are expensive to construct. But when weighed against cost of upgrading our existing rail system or building new railroads to meet greatly expanded future transportation needs, this cost too becomes less significan

Along with this, pipelines offer huge potential energy savings, since the only energy needed for their operation is electricity, and this need not be generated with oil. Traffic congestion by trucks and trains could be cut dramatically, as well as noise and air pollution and other environmental concerns. There seems little arguement that, once in place, pipelines not only can operate more economically, but need far less maintenance than railroads or highways.

The concept of pipelining was first recorded in 1667 by French physicist Denis Papin, who proposed a pneumatic dispatch system. Since then the method has been used throughout the world for transporting light-weight cargoes such as cash, documents, mail, telegrams, etc.

MORE

Pneumo trains, different from pneumatic dispatch in that the trains are suspended by wheels inside the pipe, were built experimentally by the Russians a decade or more ago. In the U.S., Tubexpress System, Inc., Houston, Texas, has a pneumo train system currently on the market. They are also the only U.S. firm currently making pipeline capsules. This system is known as pneumatic capsule pipeline (PCP), as opposed to hydrolic capsule pipeline (HCP).

Sparked by high rail costs and frequent car shortages, the Consolidation Coal Co., in Pennsylvania built a 108-mile pipeline in the 1950's which transported coal across Ohio to a Cleveland generating plant. The line operated profitably until 1963, when railroads adopted the unitized train concept and reduced rates below that of the pipeline.

But pipelines in this country as well as in other parts of the world, such as France and Russia, have become firmly established carriers of such minerals and chemicals as nickle-copper concentrates, borax, sulpher, iron, lead, zinc, as well as rock salt, clay, sand, gravel, and many other solid commodities.

This form of transportation is particularly attractive in areas where rugged terrain restricts or prohibits other means of shipping, such as the 72-mile pipeline used by the American Gilsonite Company to move their solid petroleum product across a summit 3,000 feet above the mine at Bonanza, Utah, to a refinery at Grand Junction, Colorado.

In the case of minerals, chemicals and such solids, however, movement is usually accomplished by means of reducing them to slurries and pumping them through the line under pressure with water as the transport vehicle. In some cases, minerals such as iron and lead are cast into solid 'slugs' and propelled through the lines.

MORE

Pipeline engineers have also worked on proposals involving partial processing of some chemicals and minerals while moving through the lines. Introduction of chemicals, for example, into lines carrying wood chips would partially pulp the chips while enroute to their destination. Another example concerns treatment of pulverized phosphate rock in the line so upon delivery the material is ready for recovering phosphoric acid.

Conventional centrifugal or positive displacement pumps are used to help propel solids through the lines, the type depending upon the length of the line and pressure requirements. Theoretically, there is no limit as to the distance solids can be pumped, although in long-distance lines booster pumps are usually installed at 20-30 mile spacings.

While such slurry pipelines have carried a wide variety of products with little or no problems for years, it was obvious that such commodities as grain could not be handled in this manner. Researhers in this country and Canada turned to their laboratories for the answer during the mid-50's. One of the first considerations was that of using air to move grain and other water-absorbent products. However, the high velocity required with use of conventional pneumatic conveying equipment and resulting damage to grain through abrasion and degradation appeared to cast doubt on air as a carrier vehicle.

Research engineers at the U.S. Department of Agriculture Cooperative Seed Processing Laboratory, Corvallis, Oregon, finally developed a pneumatic conveying system requiring from 30 to 40 times less velocity than conventional air systems. A test model was built and successfully lowered product damage and provied easy system cleanout. But it is presently regarded as mainly feasible for short distance use.

In 1958, a more unique answer came from the Alberta Research Council of Edmonton, Alberta, Canada. The solution; Encapsulation.

This consited of simply sealing grain and similar moisture absorbant products in 'capsules' of watertight material, which then could be handled in the conventional manner with liquid as the transport medium. The capsules could be made of plastic film, with heat sealing, or re-usable containers such as thin-walled stainless steel or other material, which would be returned to point of origin.

Most of the early Canadian research involved using existing oil pipelines, and scientists at Edmonton were successful in sending a capsule weighing several hundred pounds through an oil pipeline for a distance of more than 100 miles. Researchers also managed to develop a valving system there which allows a capsule to negotiate bypass valves and similar problems involved in using existing oil lines.

These and further tests revealed that both power and pumping costs, as compared with that of oil alone, actually decrease as the density of the capsule introduced into the line increases. Also, it was determined a further economic advantage of using existing lines for grain shipment in particular, with a crude oil propellent, was that it would allow for salvage credit of the oil on the receiving end in addition to the grain.

Continued research, however, tends to lean heavily toward the development of specialized pipelines exclusively for freight. The general concept is that of using fluid—most likely water, to move the capsules. This is known as hydraulic capsule pipeline (HCP).

At present, most if not all research in progress in the U.S. involves movement of coal. Coal slurry pipelines have been around

for many years, however these use tremendous amounts of water, and pollution and environmental problems continue to plague this method. Also the coal must be reduced to slurry form, then dewatered at destination

With HCP, the system involves two lines; one to move the capsules, the other to return them. Once the system is charged with water, little or no additional water or other fluid is needed. About the only work presently underway in the U.S. is being conducted by Dr. Henry Liu, professor, Civil Engineering, University of Missouri. Operating under a grant from the U.S. Department of Energy, Dr. Liu and his associates agree that once the system is perfected for coal it can easily be adapted for grain or other freight.

Dr. Liu noted coal seemed to offer an opportunity to develop the simplest type of HCP conceivable. Only a single cargo is involved, making capsule preparation and handling easier, and accidental leakage of water into capsules has no serious consequence. He pointed out also, pipeline diameters and volume of transport can be pinpointed. For example, a six inch line would move nearly one million tons of coal per year, while a 30-inch line could be capable of moving some 25 million tons per year. Canadian studies on grain suggest that a 30-inch pipe size--not uncommon for oil and gas lines, could move some 300 million bushels annually to market.

A recent major breakthrough in the technology of HCP is the electromagnetic capsule pump, developed by the University of Missouri research team. The university has applied for a patent, and it is felt by most researchers that the pump has revolutionized the whole technology of HCP by making pumping of capsules through pipe an easy task.

Two related studies are also being conducted there under sponsorship

of the U.S. Department of Transportation and Department of Agriculture.

"These and other studies," Dr. Liu said, "show no conceptual difficulty in freight pipelining. If there is a problem, it's that of development." A test model has been built and demonstrated, and a larger, more elaborate system is planned for the near future.

But as noted, perhaps the greatest push for freight pipelines comes from the energy crisis as well as environmental and social factors. According to statistics compiled by the Department of Transportation, some 3,000 fatalities, over 26,000 injuries, and hundreds of millions of dollars in property damage occurs each year from truck accidents alone. If HCP can replace only 10 percent of the truck freight a significant savings in lives and property damage would result.

Along with this, HCP benefits would include reduced truck traffic and alleviation of much highway congestion, energy conservation, air and noise pollution, and more efficient use of our present rail system for such things as improved passenger service, according to most sources.

Since HCP can only replace a small portion of the truck business, and that replacement would take place gradually, proponents see little fear for truckers losing jobs, etc. It would likely be decades before enough HCP's could be built to seriously affect jobs.

As for railroads, these same sources point out they are already demonstrating their inability to cope with current shipping demands, and show little concern for preparing for future increased traffic. Thus, HCP's would do little except greatly facilitate coal, grain and other freight at much cheaper rates, it is generally agreed.

Another big plus for HCP would be in inter-city freight transport, again relieving congestion, pollution, noise, energy, and other problems. Studies show the price for inter-city freight movement by HCP's at

around 27 cents per ton-mile, as compared with figures for rail and trucks respectively of 1.4 and 7.5 cents.

Donn Leva, Director, Tubexpress Systems, said they believe the biggest drawback in moving grain exclusively through pipelines is the seasonal limitations. "Pipelines are very economic when operating at high load factors from point to point. However, because pipelines are 'capital intense' they must be operated at least 60 percent of the year to be economically feasible."

Dr. Liu and others though, see this as no problem, since the capsules could be used for many other items when not moving grain. No major difficulty is forseen in actual encapsulating, and the University of Missouri as well as in Canada, have worked out most problems of introducing and retrieving capsules from lines.

Capsule length, size and shape can be varied to meet particular needs and requirements, and tests show that during shipment a cushioning film of liquid carrying vehicle forces itself around the capsule, protecting it from contact with the pipe wall.

As far as shipments of grain from different firms, or various kinds, types, grades, etc., again indications are any problems are considered minor. Shipments of grain from different firms, for example, or various classes or grades, would be separated by use of a 'blank'—pumping clear fluid or clean air for a sufficient period to avoid mixing individual shipments. One researcher suggests a highly sophisticated systems approach involving a sequential identification system as an integral part of a normal dispatching system.

Local and termian elevators would have to install equipment to load and unload containers, and while this is admitted to be a considerable expense, it is also pointed out costs could be little more than that

of equipment required for present conventional grain handling, or for future unit train facilities.

Capsule pipelining of freight as well as the entire field of transportation of solids via pipeline, is a broad new technology involving a wide range of commodities. Due in part to comparatively simpler problems involved as well as energy, environmental, pollution and other factors, it is felt development of transporting grain and other solids will be the wave of the future in transportation by all sources contacted. "If it were not virtually certain pipelines will cost less than conventional shipping, as well as provide a multitude of other important benefits, there would be no point of continuing research and development," said one source.

While the technology, know-how and equipment for freight pipelining is available today, Dr. Liu thinks perfecting the entire concept as well as brining it to market will take another five years. "Once the system is developed for coal, it can easily be adapted for grain," Dr. Liu said. "In fact, the system appears to be more attractive for grain and other agricultural products than for coal, for the simple reason that for transporting ag products HCP will be competing with trains and trucks rather than slurry pipelines as in the case of coal transport. Transportation costs are generally much higher for trucks and trains than for pipelines, as our studies make clear."

A spokesman for the Alberta Research Council pointed up another interesting development. "This relates to the common knowledge that rail handling of grain in particular is noticably inefficient. We think we see the possibility of grain pipelining forcing the rail industry, including the rail regulatory bodies, to examine their

operations to become substantially more efficient.

"One of the major areas of emphasis, of course, lies in the realm of boxcar utilization. It is the accepted practice in the rail business to accept a very long rail car demurrage, and this makes little sense when one requires a high use factor in any transport system to take full advantage of capital investment."

So, with all the bright potential, why then did the big push for freight pipelining die on the vine a decade ago?

"Simply because governments at various levels which underwrote much of the research and development, failed to realize that it is not enough to come up with a good idea," said one early researcher. "The idea has to be explained and sold and this requires a major educational effort. Very little was done in this area at the time enthusiasm and expectations were high and public interest aroused."

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Saint Paul, Minnesota
March 12, 1979

MEMORANDUM

TO: John Willard

FROM: J. W. Pratt

Per our conversation recently concerning meeting (seminar) held at Great Falls, Montana on March 2 and question or information you wanted. In order as requested information is as follows:

1. Q - Number of covered hoppers added each year.

A.	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	TOTAL
	1235	1375	35	1000	625	564	550	600	1000	*1275	#6984

* Ordered for 1979 Includes air slides (25 BN air slides from 78, 50 BN and Cr for 79 - 100 Covered Hyp (GWD)
\# Includes Air Slides

Source: New car acquisition files (Purchasing Division Report)

2. Q - Surplus of box and covered hoppers 1975 through 1978:

A.		Box	Covered Hoppers
1975	1st Quarter	1450	300
	2nd Quarter	1900	800
	3rd Quarter	1900	500
	4th Quarter	2600	None
1976	1st Quarter	3500	None
	2nd Quarter	2100	500
	3rd Quarter	1700	None
	4th Quarter	3700	300
1977	1st Quarter	3800	300
	2nd Quarter	3300	300
	3rd Quarter	500	none
	4th Quarter	300 ?	none

1978 no surplus entire year - Source: CS44 Report.

3. Q - List of Embargoes Fall 1978 to date as pertains to grain.

A. BN Embargo 11-78 effective 9-8-78 Fisher Flour Mills, Seattle, Washington
* AAR CSD Embargo 7841 effective Farmers Export, Galveston, Texas
AAR CSD Embargo 7842 effective 12-29-78 Cargill-Houston, Texas
AAR CSD Embargo 7839 effective 12-20-78 Continental, Tacoma, Washington
AAR CSD Embargo 7838 effective 12-18-78 Good Pasture Grain Co., Houston, TX

M E M O R A N D U M

AAR CSD Embargo 7837 effective 12-12-78 Cargill, Houston, Texas
AAR CSD Embargo 7836 effective 12- 6-78 United Grain, Tacoma, Washington
AAR CSD Embargo 7835 effective 12- 6-78 United Grain, Vancouver, WA
AAR CSD Embargo 7834 effective 11-29-78 Good Pasture, Houston, TX
AAR CSD Embargo 7831 effective 11-14-78 Cargill-Houston, TX
AAR CSD Embargo 7830 effective 10-27-78 Cargill-Houston, TX
* AAR CSD Embargo 7829 effective 9-19-78 Corpus Christi Pub.Elevator, Corpus Christi, TX
AAR CSD Embargo 7903 effective 1-16-79 ContiCaribean.Elevator, Lake Charles

* STILL IN EFFECT AS OF 3/9/79.: SOURCE Embargo Files

4. Q. 1st solid grain train

A. 12/13/78, fifty-nine (59) cars 53 C6 covered hoppers, 6B2 box) off Grenora Line to West Coast. Arrived West Coast 12/18/78. Source: Grain Train Files

5. Q. Average number of cars held at Ports account buildup of cars for various reasons (unloading problems, delay or no ships, plant breakdown, etc.).

A. 1. CSD Embargo 7835 12- 6-78 Based on 30 days after effective date of embargo
2. CSD Embargo 7836 12- 6-78 based on 30 days after effective date of embargo
3. CSD Embargo 7839 12-20-78 based on 30 days after effective date of embargo
4. BN Embargo 11-78 9- 8-78 based on 30 days after effective date of embargo

1. Total all grain 2624 cars average 131 cars
2. Total all grain 10,335 cars average 517 cars
3. Total all grain 9,371 cars average 426 cars
4. Total all grain 7,025 cars average 390 cars

SOURCE: Daily Grain and Situation Report

STANDING COMMITTEE REPORT

April 4 19 79

MR. President

We, your committee on Agriculture, Livestock & Irrigation

having had under consideration Senate Resolution Bill No. 4

Respectfully report as follows: That Senate Resolution Bill No. 4

BE ADOPTED

~~DO PASS~~

JACK E. GALT, Chairman.

STATE PUB. CO.
Helena, Mont.

STANDING COMMITTEE REPORT

April 4 19 79

MR. President

We, your committee on Agriculture, Livestock & Irrigation

having had under consideration House Joint Resolution Bill No. 61

Respectfully report as follows: That House Joint Resolution Bill No. 61

BE CONCURRED IN
~~DO PASS~~

JACK E. GALT, Chairman.

STATE PUB. CO.
Helena, Mont.