MINUTES

MONTANA HOUSE OF REPRESENTATIVES
52nd LEGISLATURE - REGULAR SESSION

SUBCOMMITTEE ON LONG-RANGE PLANNING

Call to Order: By CHAIR MARY ELLEN CONNELLY, on February 11, 1991, at 8:00 a.m.

ROLL CALL

Members Present:

Rep. Mary Ellen Connelly, Chair (D)
Sen. Bob Hockett, Vice Chairman (D)
Rep. Francis Bardanouve (D)
Sen. Ethel Harding (R)
Sen. J.D. Lynch (D)
Rep. Bob Thoft (D)

Staff Present: Jim Haubein, Principal Fiscal Analyst (LFA)
Jane Hamman, Senior Budget Analyst (OBPP)
Claudia Montagne, Secretary

Please Note: These are summary minutes. Testimony and discussion are paraphrased and condensed.

HEARING ON WATER DEVELOPMENT AND RENEWABLE RESOURCE DEVELOPMENT GRANT PROGRAM

Tape 1:A:000

Phillips Conservation District: Moisture Monitoring System

Billi Jo Doll, Phillips Conservation District, testified in support of the proposal, WD 13. The district had the Soil Moisture Monitoring Project since 1988, with the following benefits: increased production, decreased energy costs, and increased water quality. The purpose is to reduce non-point source pollution, since irrigation is the number one user of agricultural water, and agriculture uses more water than any other industry. The project attempts to manage the water between the field capacity and the permanent wilting point for optimal production. In addition, they monitor saline seeps. The project hopes to be self-sustaining within a couple of years.

Questions from Subcommittee Members:

SEN. HOCKETT asked about the comments in the DNRC review referring to the number of people working on the project. **Ms. Doll** said there were two on the staff, and described the conditions during the previous summer. Two people are not enough.

SEN. HOCKETT asked if expansion was planned. **Ms. Doll** said two technicians have been trained in Valley County and one in Columbus. People could be trained for statewide application easily. **REP. BARDANOUVE** asked what would happen without available funding. **Ms. Doll** said the money they had would half fund one technician through the field season. SCS will hopefully provide funding for a technician for the field season. They are considering charging the producers per reading per tube, with dryland producers read once a month, and irrigators, once a week.

SEN. HARDING asked how the project was begun. **Ms. Doll** said they had been funded under a DNRC Alternative Energy Grant for the experimental stages. Now that it is a bona fide project with identifiable benefits, they will soon be able to charge for the service. They are not at that point quite yet.

SEN. HOCKETT asked if the project was cost effective enough for people to support it. **Ms. Doll** gave an example of one producer who dramatically increased his yields while reducing his return flows. She admitted there were not enough producers convinced to have the project support itself at this time.

Chinook Irrigation District: Milk River Water Supply

490

Robert Faggerty, Glasgow Irrigation District, testified in support of the project WD 1. He reviewed the problem and the proposed solution as described in the brochure, "The Milk River, Making It Meet the Need". **EXHIBIT 2** He described the entire project in detail. **EXHIBIT 3**

Glasgow Irrigation District: Improving Water Use

Robert Faggerty, Consultant, Milk River Irrigation District, testified in support of the Glasgow Division's project together with WD 1, the previous project. **EXHIBIT 2 & 3** This project would extend the program and include work they cannot cover. At present, they pay $15.82 in O & M, $1.82 for the original construction, and $3.79 in R & B for a total cost of $21 per acre per year. Their gross crop revenue is $150 per acre, and they are paying well above the standard of 10% of the gross crop revenue for water. **Mr. Faggerty** said he had worked in irrigation all of his life, and had operated and rehabilitated several projects, and had also been a consultant for the World Bank on twelve different projects overseas. He had seen very few projects that have as many problems as the Milk River project does. He encouraged support for this project to help develop an adequate water supply and to deal with the facility shortage.

Questions from Subcommittee Members:

REP. BARDANOUVE asked what this money would be used for. **Mr. Faggerty** referred the committee to Exhibit "A", **EXHIBIT 3,** and said in the Chinook Division, it would be for the final design, the structure program and reclamation and development over the first three years at $150,000 each year. On the Glasgow Division, it would be to extend the program of facility development to that end of the river system in order to make better use of the water.

SEN. HOCKETT said the charges for the Chinook Division are quoted at $6.50/acre/year, which would increase by $5.60 without the grant, and $3.90 with the grant. He asked if this referred to the Water Development Project Grant, and the 0% interest loan. He also asked about the Renewable Resource Development loan. **John Tubbs, DNRC,** said they had applied for three grant funds, RRD, WD and RDG, and were recommended for two, the Water Development and the RDG grant because of the close administration of the WD and RRD programs.

SEN. HOCKETT asked for the cost per acre on the Chinook Division assuming all this work is done. **Mr. Faggerty** said the cost would be $14.16 per acre. **SEN. HOCKETT** asked at what point this cost per acre would no longer be feasible. **Mr. Faggerty** said his guideline was 10% of the gross crop revenue per acre, $150 for the Milk River Project. However, $150 is low, because it is limited by water availability.

REP. BARDANOUVE asked why the RDG grant was not being heard with the WD grant applications. **Mr. Tubbs** said the presentation could easily cover the RDG grant, which was scheduled later in the week when that grant program would be held. **Ms. Barclay** added that the Department recommendation was that they receive $100,000 WD grant and a $300,000 RDG grant. **REP. BARDANOUVE** suggested that another hearing on the project would not be needed.

SEN. HOCKETT asked why the neutron probe wasn't being used on this project. **Mr. Faggerty** said they were trying to deliver one acre/foot of water for crop irrigation, the minimum needed for production. **Ms. Barclay** said that based upon their technical evaluation, the grants recommended for this project were more important than the neutron probe.

SEN. HOCKETT asked what would happen without the $300,000 for the Reclamation and Development Grant. **Mr. Faggerty** said they would lose this amount of the total of $6,000,000, which would raise the cost to irrigators by $300,000 over three years. The $300,000 would help them get the grant through the Small Project Reclamation Loan in the amount of $4,500,000.

REP. BARDANOUVE said this was the most complex irrigation project in the United States. It is divided between Canada and the U.S.

Also, there is the diversion of the water from the Hudson Bay watershed into the Milk River, and the Missouri River drainage. With the Virgelle segment, water would be diverted from the Missouri River over the Milk River Divide.

Former SEN. MARK ETCHART, Glasgow Irrigation District, spoke in support of the project.

Sever Enkerud, President, Milk River Irrigation District, said the money would be used to increase efficiency in order to make good use of the water. He was referring to the project for lining ditches, the Glasgow application (WD 3).

Curtis Maxley, County Commissioner, Blaine County, Chinook, said the project would renew a system that is over 70 years old. It is obsolete, with inefficient structures that cannot conserve water. The water shortages will increase with Fort Belknap and Canada using their allotments. The economic condition of the irrigators requires an infusion of grant money. This is not just an irrigation project, but an economic project, providing jobs for six to seven years. It will also be beneficial economically to irrigators from Chinook to Glasgow. He encouraged support for the project on behalf of the Blaine County Commissioners.

Jo Brunner, Montana Water Resources Association, rose in support of the project.

Ruby Water Company: Ruby Water Dam Feasibility Study

J. B. Anderson, Attorney and Rancher, Dillon, represented Ruby Water Company, testified in support of the grant application WD 8 requesting funding to do a feasibility study for a dam project in the Big Hole Valley. The idea was initiated in 1968 by three private ranch corporations. Planning was carried out with the SCS at that time, but there was no cooperation with the U.S. Forest Service for a needed land trade and permit. In the last year, with the water leasing negotiations on Swamp Creek for the purposes of enhancing grayling habitat at a halt, this project was revived through a cooperative effort with several purposes. These include increased irrigation, production and application of water to some new lands and maintenance of late fall streamflows. It is located 25 miles southwest of Wisdom and will impound the waters of Pioneer Creek where it meets with Ruby Creek.

The private individuals who comprise the water company are the sole appropriators on Pioneer Creek and the upper reaches of Ruby Creek. If funded, they will obtain support of the Conservation District and other individuals who will benefit from the return flow from the dam waters. Sale or lease of water from the impoundment to DFWP to enhance greyling habitat is another potential benefit. There will also be recreational possibilities and flood control benefits. The cost is estimated to be $1,000,000, with the feasibility study cost at $55,000, the

amount of this request. $14,000 was recommended, and **Mr. Anderson** asked for as much funding as possible.

The first focus of the study would be the legality of being able to store the water, and the consistency of the storage with other appropriative rights and uses of water. This is a demonstration project to show public and private users that wise use and storage of our water resource is a net benefit to all.

Questions from Subcommittee Members:

REP. BARDANOUVE asked about ownership of the land and the water rights. **Mr. Anderson** said it was owned by Jack Hershey Livestock and the Forest Service, who is willing to consider a land trade or a permit to impound water on their lands. There are three appropriators only on Ruby Creek before it dumps into the North Fork of the Big Hole.

REP. THOFT asked if he was certain that there is enough runoff to fill the reservoir and not affect the downstream users. **Mr. Anderson** said he was not certain who might contest the impoundment, but he believed there was enough runoff.

REP. BARDANOUVE asked the estimated cost to the landowners. **Mr. Anderson** said it was estimated at $1,000,000 for 5,000 acres under irrigation. It would supplement some ground already irrigated and add additional land. The primary focus is storage and water for grayling habitat. **Mr. Tubbs** clarified that the law limits the ability to grant money to private applicants, 25% of the cost and up to 5% of the available money.

Yellowstone County Conservation District: Streambank Re-enforcement and Erosion Control

Marianne Hanser, Supervisor, Yellowstone Conservation District Board, spoke in support of the project, RRD 2. The District is involved in ZooMontana's grant application on Canyon Creek, in that they administer the 310 permitting process in Yellowstone County. Canyon Creek is a tributary of the Yellowstone that causes trouble to farmers in the form of sedimentation, and erosion from heavy runoff. This is also the area for the proposed ZooMontana. They have enlisted the expertise of water hydrologists and engineers, with a plan including sloping banks and revegetation.

Jim Duncan, Administrator, ZooMontana, described the project in detail, showing slides of the area. ZooMontana would pick up the balance of the money for this project, which is a little over $100,000. The cost of the entire ZooMontana project is $4,500,000, of which $2,600,000 has been raised. Construction on this particular project is scheduled to start in August, and needs to be completed this year.

2:A:075

Questions from Subcommittee Members:

SEN. HOCKETT asked about the other $300,000 projected for this project. **Mr. Duncan** noted that the Streambank Stabilization project was not recommended for funding. **SEN. HOCKETT** asked the impact on the stream at a distance from the site. **Mr. Duncan** said the bulk of the work would be done on the first portion of the stream as it enters the zoo site, with the work downstream designed to take care of those problems created by changing the stream at that point. Therefore there would not be a direct effect past the highway.

REP. BARDANOUVE said the real problem was the poor use of irrigation water, and asked if any attempts had been made to educate irrigators upstream from this area. **Ms. Hanser** replied that was only 20% of the problem. Other factors are that the area is in the flood plain and experiences high runoff.

REP. THOFT asked where the excess water came from and why they could not control their flow. **Ms. Hanser** said it is diverted out of the Yellowstone River. **Mr. Duncan** said they were working on that and all parties would continue to do so.

SEN. HOCKETT asked if there is residential development that affects this excess flow. **Mr. Duncan** said there are not many major housing developments adjacent to the creek. That issue is being reviewed by the engineers.

Mr. Tubbs noted that ZooMontana had also applied for an RDG grant in the amount of $300,000 for a waste water sewer system, wells and water distribution system and a fence. It was felt by the Department that this project did not meet the crucial state need requirement, and therefore was not recommended for funding.

Mr. Duncan said that is the hardest funding to obtain. They have a challenge to raise $1,000,000 by June in order to receive $400,000 from the Murdock Trust. This would help in that effort.

Town of Ekalaka: Water Supply and Storage Project Grant and Loan

Alyce Kuehn, Town Clerk/Treasurer, testified in support of the application RRD 6. **EXHIBIT 4**

REP. BARDANOUVE asked how much the project would raise the water rates. **Ms. Kuehn** said initially, they had thought it would raise the rates by $3 per month, but it now appears it would raise the rates $1.50 per month. The current rate is $11.50 per month. Part of this project is a loan, with $49,000 in grant monies, and $100,000 in loan.

Mr. Tubbs said in the small grant programs, the loan is included if the total does not exceed $200,000. Approval of the project includes both the grant and loan.

SEN. HOCKETT commented that the water rates were quite modest. **Ms. Kuehn** said they were paying $1 to $2 higher than the average in the area.

REP. BARDANOUVE asked about the depth of the wells. **Ms. Kuehn** said they went into the Fox Hills Aquifer, and range from 405 to 479 feet. It is soft, good water, with the wells producing 80 to 135 gpm.

Stillwater Conservation District: Evaluation of Plastic Lining/Fabrication

Robert Story, Supervisor, Stillwater Conservation District, testified in support of the project, RRD 9, requesting $77,000 and recommended for $56,648. The project would evaluate the plastic lining for irrigation canals for the purpose of water conservation and repair and prevention of damage to cropland from ditch seepage. The method to be evaluated has better durability and its application in places where conventional liners are difficult to install. He introduced **Ed Ludington, President, Cove Ditch Company, and LeRoy Payne, Engineer, Vice President, Research and Development for IPC, Billings,** the company that makes and installs the liners.

Ed Ludington gave a history of the ditch. **EXHIBIT 5** The Cover Irrigation Company would provide some funds along with their equipment and personnel.

LeRoy Payne showed a twenty minute video of the ditch, and the process of applying the liner.

2:B:000

Questions from Subcommittee Members:

REP. BARDANOUVE asked the thickness and cost of the liner. **Mr. Payne** said the material requires no preparation and coating on top. Therefore it requires thickness and strength, provided by the cloth inside of it. The cost is $.45/square foot installed. Field studies are being conducted in a test over the last three years which would be completed by the end of the summer. Cows would not be able to pierce it, especially due to the gravel conditions of the canals.

Mr. Tubbs said the previous project on canal lining heard by the committee required 12 inches of topsoil cover. This one does not require that covering.

REP. BARDANOUVE asked if there had been a commercial application.

Mr. Payne said there had not been any commercial application of this particular sort. The material is 20 years old, and this grant is for testing it in this type of application.

REP. BARDANOUVE asked how much they pay per acre. **Mr. Payne** said the total assessment is $18 per acre per year. **Mr. Story** said the landowner whose field was in the video was committed to putting several thousand dollars into the project.

Mr. Tubbs added that the contingency in the grant is due to the fact that the current DNRC grant with MSU is yet to be completed. The recommendation is that this testing project must show cost effectiveness before funding will be awarded this grant.

A letter from the Montana Salinity Control Association in support of the project was introduced into the record. **EXHIBIT 6**

Fallon County: Baker Lake Erosion Control and Recreation Path

Alyce Kuehn, representing Fallon County, testified in support of the project, RRD 13. **EXHIBIT 7**

Jeanne Doney, DNRC, said two projects had been withdrawn and were no longer requesting funds: the River Road Stabilization Association, who could not use the $5,000 recommended, and the Outlook County Water and Sewer District, who found another source of funding.

Town of Miles City: Miles City Recycling Program

Darvin Brockway, Executive Director, Eastern Montana Industries, EMI, represented Miles City in support of the project, RRD 21, to enhance the recycling of cardboard and plastic. **EXHIBIT 8** He distributed a feasibility analysis of recyclable materials in the Miles City area, **EXHIBIT 9,** and a letter in support of the project from the Eastern Plains RC&D. **EXHIBIT 10** Also distributed were letters from school children in support of the project, **EXHIBIT 11,** and a packet of informational materials, including brochures on the truck, **EXHIBIT 12,** and articles on the project. **EXHIBIT 13**

Alyce Kuehn, Eastern Plains Resource Conservation and Development, testified in support of the project. **EXHIBIT 10**

CHAIR CONNELLY announced that **SEN. GERRY DEVLIN, SD 13,** wished to go on record in support of the project and submit a petition signed by citizens in the area and circulated by Concerned Citizens of Eastern Montana. **EXHIBIT 14**

REP. JESSICA STICKNEY, HD 26, Miles City, testified in support of the project. She described the credibility and accomplishments of the organization, Eastern Montana Industries, submitting the

grant. The communities have been galvanized by the possibility of being a multi-dump site. She said they would like to take advantage of this fervor and interest to accomplish this recycling effort.

It was announced that Carbon County, et al, having been ranked higher under the RDG Program, would appear during the hearings on that program.

Town of Chinook: Milk River Weir Replacement Grant and Loan

Dick King, Bear Paw Development, a three-county Economic and Community Development Corporation, testified in support of the project, RRD 27, recommended for $200,000 for a combination grant/loan. **EXHIBIT 15** He introduced the **Mayor, John Elias, and Frieda Bryson and Bill Oehmcke, Council Members.** The project would provide a permanent solution for the water supply problems experienced by Chinook. They understand the competition and the needs for the money across the state, but said at least the $200,000 loan is essential for the town of Chinook, enabling them to construct during the 1992 construction season.

3:A:000

They are approaching the Montana Community Development Block Grant Program and the U.S. Economic Development Administration, and would need this commitment of funding in order to be successful in those attempts. They have been turned down by the MCD Block Grant Program last fall because of a lack of commitment of other funding. A letter from the mayor outlines the city position. **EXHIBIT 15**

Questions from Subcommittee Members:

REP. BARDANOUVE asked if this would raise water and sewer rates. **Mr. King** said their residential rates would increase from $18 to $21; without the help from DNRC, with private market financing, the rates would increase from $40 to $45 per month. **REP. BARDANOUVE** asked about the silt build up behind the weir. **Mr. King** referred the committee to the sketch of the design, **EXHIBIT 15.** The silt will settle and the weir will self clean as part of the engineering design. There is a gate along side the facility to increase the flow and clean out the silt. The design is almost identical to that being used on the river by Harlem and by Havre.

REP. BARDANOUVE asked about the environmental impact of the project. **Mr. King** felt the impact would be minimal due to the extent of the river course. **REP. BARDANOUVE** said he had alkali on his land near the BIA dam near Harlem and said the dam destroys 100 acres of his irrigated land along side the dam. The BIA denies this impact. **Mr. King** said the dam at Fort Belknap is high. This one is low and controls the water flow. It will not back water up on the pumping plant. **REP. BARDANOUVE** asked if there would be construction in the river. **Mr. King** described the

permitting and construction process, closely monitored by DFWP. He justified the construction with the life of the project, anticipated to be 40 to 50 years, as close to a permanent solution as you can get with an infrastructure facility.

Mr. King said the $200,000 loan was essential based upon the payback capacity of the community of Chinook.

Mr. Tubbs said in each case, the loans are built into HB6 under these grant proposals. If there is not money available for the grants, a loan could be granted for that amount if the applicant can repay. **REP. BARDANOUVE** asked what the interest rates would be. **Mr. Tubbs** said the loans would be at the bond rate. The grant, if available, would be the subsidy.

John Elias addressed the issue of land use. The land in question has been used in this way for years. There would be no change in use and no increase in siltation.

Montana State Library: Montana Water Information System and Heritage Program

Mr. Tubbs said that because of the Governor's decision to include these programs as line items in the budget, a presentation was not in order. **Richard Miller, State Librarian,** distributed materials on the Montana Natural Resource Information System and the Assessment of the Fees and User Charges. **EXHIBITS 16 & 17** He said the subcommittee would hear their budget the following day.

Town of Columbus: Columbus Recreation

REP. VERN KELLER, HD 83, testified in support of the project, RRD 28, recommended for $99,906, albeit out of the funding. The project is approximately 34 acres, land adjacent to the Interstate. He read a letter from the Kiwanis Club of Columbus Montana, the Optimists, the Chamber of Commerce and the Columbus Jaycees, **EXHIBIT 18,** and submitted a plan for the project. **PROJECT 19**

REP. BARDANOUVE asked if they could be considered for a loan. **Ms. Doney** said a park would not be considered because it is without a revenue stream.

Town of Flaxville: Flaxville Loan Payment

REP. LINDA NELSON, HD 19, Medicine Lake, testified in support of the project. Flaxville is an agricultural community with little tax base which has had an unbelievable amount of problems in finding a source of drinkable water. She introduced **Ray Wittak, Mayor of Flaxville and Ralph Hammer, Treasurer.**

Mr. Wittak spoke on behalf of the project. **EXHIBIT 20** He also distributed the 1983 application summary for the Montana Community Development Block Grant and the amortization schedule for outstanding loan. **EXHIBIT 21 & 22**

Ms. Doney said there was no recommendation for funding for this project because there is no authority to grant funds for the purpose of repayment of debt.

Questions from Subcommittee Members:

REP. BARDANOUVE said this appears to be serious, and asked their present and projected rates. **Mr. Wittak** said the rate for water now is $11.78. With the treatment plant for the removal of nitrates, the rate would increase to $37.85. **REP. BARDANOUVE** asked Mr. Haubein, LFA, to look at the possibility of the legality of a loan reduction or write-off.

Mr. Wittak said Burlington Northern is on its way out and the population of the community is down to 88. It is impossible to keep the water system going with all of the improvements required.

REP. BARDANOUVE asked if this process for nitrate removal was proven. **Mr. Wittak** said it was approved by the Water Quality Bureau and DNRC, and was being used in three other communities.

REP. BARDANOUVE asked the Department to search for funding for this project.

Dawson County: Aquafarm

Hank Lordemann, Dawson County Development Council, testified in support of the project, RRD 40. **EXHIBIT 23** He also distributed a packet of materials, including information on the community, **EXHIBIT 24,** information and articles on Aquaculture, **EXHIBIT 25,** and letters of support from individuals and community groups. **EXHIBIT 26**

REP. JOHN JOHNSON, HD 23, Glendive, asked support for the feasibility study to determine the quality and quantity of underground water for this project. It would help an economic depressed area by locating a number of smaller plants on individual farms. He noted that aquaculture accounts for 22% of fish consumed, so the market is there for this product.

SEN. HARDING asked where the market would be. **Mr. Lordemann** said Great Falls, Billings, Denver, San Francisco and Los Angeles, with market surveys already completed by the developers of the process.

REP. BARDANOUVE asked what the fish would be fed. **Mr. Lordemann** said the diet consists of ground grain. An elevator in Richey could be converted into a fish food processing plant.

ADJOURNMENT

Adjournment: 11:50 a.m.

M. E. Connelly
MARY ELLEN CONNELLY, Chair

Montagne
CLAUDIA MONTAGNE, Secretary

MEC/cm

HOUSE OF REPRESENTATIVES

LONG-RANGE PLANNING SUBCOMMITTEE

ROLL CALL **DATE** 2-11-91

NAME	PRESENT	ABSENT	EXCUSED
REP. FRANCIS BARDANOUVE	✓		
SEN. ETHEL HARDING	✓		
SEN. BOB HOCKETT, VICE-CHAIRMAN	✓		
SEN. J.D. LYNCH	✓		
REP. BOB THOFT	✓		
REP. MARY ELLEN CONNELLY, CHAIR	✓		

HR:1991
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HOUSE OF REPRESENTATIVES

LONG-RANGE PLANNING SUBCOMMITTEE

ROLL CALL **DATE** 2-11-91

NAME	PRESENT	ABSENT	EXCUSED
REP. FRANCIS BARDANOUVE	✓		
SEN. ETHEL HARDING	✓		
SEN. BOB HOCKETT, VICE-CHAIRMAN	✓		
SEN. J.D. LYNCH	✓		
REP. BOB THOFT	✓		
REP. MARY ELLEN CONNELLY, CHAIR	✓		

HR:1991
CS10DLRLCALONGRP.MAN

Phillips Conservation District
Malta, Montana

Soil Moisture Monitoring Project

Crop production in Phillips County is inconsistent even when crops are produced on similar soil types. Consequently, the Phillips Conservation District established a soil moisture monitoring project in 1988 to more accurately determine soil moisture deficits.

Purpose

EXHIBIT 1
DATE 2-11-91
HB WD 13
Long Range Planning

The Phillips Conservation District project provides accurate information about the capabilities and limitations of the climatic region, soil types, water movement, and water availability. The data base compiled correlates soil moisture and production, providing the technology needed to make management decisions for optimum production.

This information is used as a tool for management decisions concerning recropping potential, alternative crops, adequately scheduling irrigation to maximize production, and water conservation. The project allows the producer to correlate this information to crop production. Optimizing production will increase on-farm revenue, enhance farm economic stability as well as the stability of agriculturally-based communities.

The Soil Moisture Monitoring Project

The project is designed to more accurately define soil moisture features such as:

- field capacity and permanent wilting point of a specific soil.
- account for problems such as soil stratification and salt content.
- monitor soil moisture using the neutron probe.

Eliminating Assumptions

Moisture needs for crops are based on parameters such as field capacity and permanent wilting point. From these two, the percent depletion of available water capacity is determined. Unfortunately, available data relies heavily upon estimation and observation for determining available water capacity, field capacity, and permanent wilting point. Guidelines are given for determining when these critical moisture points occur with different soils. Essentially, one estimation has been built upon another. The moisture monitoring project design eliminates many of the assumptions currently being used.

The Neutron Probe

A neutron probe was purchased in the spring of 1988 to accurately determine quantities of stored soil moisture. Monitoring sites are determined by technicians using soil maps and evaluating producer management goals.

The neutron probe's access tube is a 5-foot length of 2-inch conduit. Samples are taken at one-foot increments to a depth of 4 feet. Once the site is determined, a soil profile sample is removed and an access tube is placed at the site. A calibration curve for the neutron probe must be established for each soil.

John Dalton, state agriculture engineer for the Soil Conservation Service, developed the statistical regression analysis for calibration curves using the LOTUS computer program. This curve shows the relationship between actual soil moisture and probe readings based on the soil's physical and chemical properties. The neutron probe identifies and calculates the number of hydrogen atoms in the soil surrounding the access tube. Most often hydrogen is found in the form of water in the soil, but there are other elements that mimic hydrogen. The curve allows the neutron probe to accurately determine total moisture levels in the field.

Soil Water Retention Data

A technician dries the soil samples, conducts soil particle analysis, electrical conductivity analysis, and enters this information into the computer using the Soil Water Retention Data (SWRDAT) system developed by Otto Baumer, research soil scientist, National Soil Survey Laboratory, Lincoln, Nebraska. This is a computer model that generates the water-holding capacity of the soil.

Once the preliminary laboratory and computer calculations are compiled, the neutron probe is used to take soil moisture readings at regular intervals. The frequency of readings is determined by management decisions and technical assistance available, usually weekly or monthly. Moisture depletion levels are tracked and mailed to producers using the AWC-PLUS spreadsheet developed by the Phillips Conservation District (AWC stands for Available Water Capacity and PLUS means the addition of electroconductivity). The AWC-PLUS spreadsheet documents the current depletion in available water capacity for each one-foot increment. This spreadsheet information is developed using "in-lab" soil analysis coupled with neutron probe readings. Water available for the plant to use from the total water and the percent depletion of usable water is computed following each reading.

Data Can Be Used Statewide

Presentations given at banquets, field days, tours, and to interested producers emphasize the importance of soil moisture monitoring on production, water conservation, and management awareness. Although this information is utilized directly by the producers involved, it also can impact other producers, organizations, and agencies. Additionally, the data base is applicable to most of Montana.

For More Information

For more information on the Soil Moisture Monitoring Project, contact the Phillips Conservation District, U.S. Highway 191 South, HC 72 Box 7615, Malta, Montana 59538-9407; phone: 406-654-1334.

July 1990

entire exhibit is available at the Montana Historical Society, N. Roberts, Helena, MT. 59601. (Phone 406-444-4775)

EXHIBIT 2
DATE 2-11-91
HB WDI
Long Range Planning

THE MILK RIVER

MAKING IT MEET THE NEED

EXHIBIT 2
DATE 2.11.91
HB WDI

fiche only
cover

EXHIBIT 3
DATE 2.11.91
HB WD 1
Long Range Plann

CHINOOK IRRIGATION DIVISION ASSOCIATION

1. Brief Historical Outline of Milk River

A. Irrigation began during the 1880's by small individual systems, then developed into a community system by construction of a diversion dam at Ft. Belknap in 1890. Water shortages soon occurred because of lack of reservoirs. The high flows in the Milk River occur during March, April and make up 58% of the mean annual surplus water. If May is added, the three months make up 70% of mean annual surplus water.

B. In early 1900's, the USBR constructed a storage facility at Lake Sherburne on the St. Mary River and constructed a canal from St. Mary River to the North Fork of the MIlk River to supplement the Milk River flow. Nelson Reservoir was constructed in 1922 with a capacity of 60,000 acre feet. Fresno reservoir was constructed in 1939 with an original active capacity of 127,000 acre feet. Today, silt has reduced the capacity to 104,000 acre feet. Ft. Belknap Reservation owns one-seventh of the capacity (14,800 a.f.), municipal use of 5,000 a.f. and minimum drawdown of 2,000 a.f. leaves about 81,200 a.f. for project users. The rate of siltation of Fresno Reservoir to date has been slightly less than ½ of 1% per year.

C. Today there are about 138,000 acres of irrigated land in the MIlk River Basin, including 92,000 acres in the project, 11,000 acres irrigated under individual contracts with the Bureau, 10,425 acres under the Ft. Belknap Reservation and 25,000 acres under a junior water right.

D. The Chinook Irrigation Division Association is composed of the following irrigation districts: Paradise Valley Alfalfa Valley, Ft. Belknap, Harlem, Zurich and the Dodson Pumping unit. The equalization pact acreage is 38,280 acres (irrigated 35,726 acres).
The carriage and distribution systems of the Chinook Division was constructed from 1909-1917 and irrigable land opened for settlement in 1911. The division has operated since 1911 and the Dodson Pumping Unit since 1945.

2. Problems Today and Tomorrow

A. Milk River is over-appropriated. Adjudication of Milk River water has been given a priority by the State and has been closed to further application for water rights.

B. Milk River irrigators face significant water shortages 6 out of every 10 years. In 1983 and 1985, shortages exceeded 35% and in 1984 the shortage was one-half of the diversion requirement. The average annual shortage of diversion requirement is 122,600 acre feet (20%) or about 0.9 acre feet per acre.

A model study shows that a mean annual diversion of 4.6 acre feet/acre is necessary to satisfy the 1 acre-foot/acre crop irrigation requirement. The estimated mean annual diversion is currently only 3.7 acre/acre with only 0.8 acre-foot/acre being delivered to the crop root zone.

C. These shortages are due to water supply and facility shortages and over-appropriation of water supply.

D. The unfortunate part of a water shortage is that it takes a farm two to three years of normal supply to make up for the production losses suffered in a water short year. Recovery is slow and aggravating and frustrates the younger farmer struggling with financing his or her operation.

E. Unfortunately these shortages will increase by another 28,000 acre feet when Canada develops their share of the Milk River water and Fort Belknap Indian Reservation make use of the legal share of the Milk River water.

F. When the adjudication of the Milk River is complete, distribution of water shortages should change but the amount of shortage will remain the same.

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3. Solutions to the Problems

A. The Milk River irrigators have been working with USBR and Montana DNRC to find a solution to the shortages. A three phase plan has been formulated involving a basin-wide management of the water supply available; rehabilitation of aging canals, laterals and on-farm systems; and a new source of water (Refer to THE MILK RIVER pamphlet)

4. Phase 1 (briefly)

Has already begun by restoring the St. Mary's Canal to its original design capacity of 850 cfs; present capacity is estimated at 700 cfs. The cost of this work is being paid by the Milk River Water Users (estimated cost $350,000) and should be completed in 1991 or 1992. Restoring the canal will reduce the annual shortages by 16,000 acre feet.

Efforts are in progress to form a Joint Board Of Control for a more efficient and effective use of water, equipment and district staff.

Phase 2 (briefly)

Includes three programs, (A) Rehabilitation and Betterment, (B) Construction and Rehabilitation and (C) on-farm efficiency.

Today we will discuss the Chinook Irrigation Division Association applications for grants to perform work under the Rehabilitation and Betterment Program under Phase 2.

Phase 3 (briefly)

Formulated to provide an adequate water supply for land owners with junior water rights, Gros-Ventre-Assiniboine tribes of Ft Belknap Reservation, BLM, Bowdoin Wildlife Refuge, and Town of Chinook. Phase 3 involves construction of a 230 cfs canal from Virgelle to the Milk River.

The ultimate cast for phases two and three is estimated at $189,000,000 and the plan is to involve the provisions of the

Pick-Sloan plan under which Montana has not received their share of benefits. However, to provide assurance of interest by local irrigators, the Milk River Project water users are undertaking a plan to finance a $14,200,000 rehabilitation program to show good faith by local involvement. Glasgow district is already under contract for $2.2 million rehabilitation program and have begun their work.

5. The Chinook Division has applied for grants under the following programs:

A.	Water Development Final Design	$100,000
B.	Renewable Resource-Structures	100,000
C.	Reclamation and Development	300,000
	Total	$500,000

The six districts of the Chinook Division Irrigation Association include Ft. Belknap, Alfalfa Valley, Zurich, Harlem, Paradise Valley, Dodson Irrigation Districts. The total cost estimate represents the willingness to pay and invest $6,011,100 into the rehabilitation of the system.

Rehabilitation funds would not cover the entire system needs but would rehabilitate those portions of the canals, laterals, drains and structures, that were in the greatest need.

The budget is designed to provide funds to establish, organize and complete the work program on an accelerating basis.

The program is established to have a project engineer to organize, collect data, design lay out the construction program and supervise the construction work in the field. A project engineer has been contacted by the name of John Swedell, who participated in preparation of the project estimate. Mr. Swedell is a retired civil engineer from the Bureau of Reclamation and has expressed an interest in undertaking and directing the program as outlined. Mr. Swedell is an experienced rehabilitation engineer and is working for the Glasgow Irrigation District.

The program sequence is constructed to facilitate the orderly approach of constructing and rehabilitating the system over seven years.

The first year will concentrate on organization of the program of work by developing the construction procedure for dual participation by force account as well as contracting work by issuance of specifications and bidding process.

In order to accomplish the work, collection of data through field surveys, approved designs and construction procedures will have priority the first year.

The second and third years will be used to accelerate the field program to maximum potential. The final four years will be carrying out the program of work as approved. Consideration will be given to establishing a main base at a central location.

Because the Chinook Division was not constructed under the USBR program, they have not been eligible to date, to receive funds under the Act of Oct. 7, 1949 (63 Stat 724 as Amended). They can, however, apply for funds under the Small Reclamation Projects Act of 1956. Under this Act, the water users must provide <u>up-front</u> financing of 25% of the cost of the project, exclusive of Federal Grants. State grants are permissible.

For the division, this means one-fourth of $6,011,100 or $1,502,775 amounting to $39.26 for each acre (38,279 acres). The up-front contribution has to be made during the construction period of seven years. This is one reason the grant requests are a basic key to the initiation of this very critical and necessary program proposed by the Chinook Division.

If the Chinook Division were not to receive approval of their grant requests, the annual cost per acre including the up-front and operation and maintenance funds would be $13.21 per acre ($7.60 O&M + $5.61 up-front)

If the Chinook Division were to receive approval of their grant requests the annual costs would be $11.34 per acre, a savings of $1.87 per acre ($7.60 + 3.74) per year for 7 years.

Repayment of the loan under the Small Projects Act ($6,011,100 - $1,502,775 contribution) of $4,508,325 would cost $3.92 per acre per year for 30 years in addition to Operation and Maintenance costs. The loan repayment would begin on the eighth year.

The Chinook Division filed a loan application with the Bureau of Reclamation on June 4, 1990 with a deposit of $5,000.

The program of the grants if approved, would be as follows:

		1st year	2nd year	3rd y
(1)	Final design water development	$25,000	$25,000	$50,00
(2)	Renewable Resource Structures	$25,000	$25,000	$50,00
(3)	Reclamation and Development	$100,000	$100,000	$100,00
	Total Program	$150,000	$150,000	$200,00

(4) Local contribution based on grant approval would total $1,002,775 spread over seven years ($143,254 each year)

(5) Small Project Loan of $4,508,325. This amount would be expended over 7 years averaging $644,046 per year. The loan would be repayable over 30 years beginning at the end of major completion of the construction program.

It is our opinion that through the rehabilitation portion of the program designed under Phase 2, we can reduce our water supply and facility shortages by 0.3 of an acre foot, allowing for the development of the Canadian and Tribal lands using 28,000 acre feet of their entitlement which we now enjoy. This portion of the program is within the water users willingness to pay.

The ultimate solution for the water shortages of the Milk River Basin is to institute the development of a program under the auspices of the Pick-Sloan Plan which Congress adopted by passing the Flood Control Act of 1944. Most of Phase 2 and Phase 3 outlined in the pamphlet "The Milk River Making it Meet the Need" would be financed by the Pick-Sloan program. This work is beyond the ability of the water users to finance. The Pick-Sloan costs would be $175,000,000 exclusive of district contributions of $14,000,000.

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6. What are the Milk River Problems

   A. Over-appropriation of available water

   B. Inadequate water supply

   C. Facility shortage

   D. Socio-economic concerns

      1. How are you going to encourage young men and women to stay on a farm that is short of water 6 out of every 10 years

      2. How do we under a short water supply future encourage lending agencies to loan operating and financing loans

      3. How does one maintain goods and service to these land owners if there is a limited future

      4. We need dispersal of our agricultural production areas To improve system and on-farm irrigation inefficiencies is vital to stability of Milk River Basin

      5. The need to coordinate all irrigation districts, pumpers, tribal developments and other water users into a Joint Board of Control to administer the water distribution and costs among all users. This would include taking over all reserve works operation of the USBR and provide for a more efficient operation of the Milk River Basin through coordination of maintenance work and reduced personnel requirements and a more technically trained staff.

7. Why does Chinook Division Irrigation Association need these grants?

   A. We are about to embark on a program of improvements that will require water users to make special assessments for:

      1. 7 years of construction requiring $1,502,775 up-front monies in order to secure a loan of $4,508,325

      2. 30 year repayment of $4,508,325

B. The grant funds requested would be the catalyst to encourage the water users to proceed with the Small Reclamation Project loans to benefit the entire Chinook Division

Sometimes when large sums of money are involved and farmers being of a conservative nature and rightly so, it is necessary to "prime the pump". Encouraging people to undertake indebtedness now to secure the future with better water efficiencies on both the system and farm, is a risk worth consideration.

C. The Chinook Division Irrigation Association has never heretofore sought grants for improvement of their system. Secondly we have indicated our willingness to invest $6,011,100 of reimbursable and local contributions in order to achieve the needs of the association to meet in part the water supply shortage.

In our opinion, these grants would provide assurance that the State of Montana believes in the plan for the Chinook Division as a stabilizing influence of the socio-economic conditions of the Milk River Basin.

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DATE 2-11-91
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Exhibit "A"

Long Range Planning

CHINOOK DIVISION IRRIGATION ASSOCIATION
PROGRAM SOURCE OF FUNDS

SOURCE OF FUNDS	TYPE	1st yr 1992	2nd yr 1993	3rd yr 1994	4th yr 1995	5th yr 1996	6th yr 1997	7th yr 1998
ALL FUNDS	$6,011,100	$630,000	$860,000	$1,113,500	$1,083,700	$976,800	$965,000	$382,100
1. DNRC	Final Design Water Develop. Grant Appl. $100,000	COMPLETION → (25,000)	(25,000)	(50,000)				
2. DNRC	Renewable Resource Structure Grant Application $100,000	COMPLETION → (25,000)	(25,000)	(50,000)				
3. DNRC	Reclamation and Develop. Grant Appl. $300,000	COMPLETION → (100,000)	(100,000)	(100,000)				
4.	Local Contribution Based on approval of grant applications 25% Project Loan Less Grants $1,002,775	COMPLETION (143,254)	(143,254)	(143,254)	(143,254)	(143,254)	(143,254)	(143,251)
5.	Small Project Loan Funds $4,508,325	COMPLETION (336,746)	(566,746)	(770,246)	(940,446)	(833,546)	(821,746)	(238,849)

Exhibit "B"

CHINOOK DIVISION IRRIGATION ASSOCIATION
EXPENDITURES BY PROGRAM--BY YEARS

PROGRAM ITEM	TOTAL ESTIMATE	1st yr 1992	2nd yr 1993	3rd yr 1994	4th yr 1995	5th yr 1996	6th yr 1997	7th yr 1998
Clean, Reshape Line Canals	$1,913,700	200,000	225,000	350,000	350,000	350,000	350,000	88,700
Clean, Reshape Line Laterals	915,700	100,000	120,000	150,000	150,000	150,000	150,000	95,700
Waterways, Drains, Roadways	1,053,400	150,000	170,000	170,000	170,000	170,000	170,000	53,400
Pumping Plant Rehab	38,500			38,500				
Structure Rehab. Water Measuring	963,100	100,000	120,000	180,000	170,000	170,000	170,000	53,100
Diversion Rehab.	18,700				18,700			
Contingency	311,800*		100,000	100,000	100,000	11,800		
Administration Engineering	796,200	80,000	125,000	125,000	125,000	125,000	125,000	91,200
Program Total	$6,011,100	630,000	860,000	1,113,500	1,083,700	976,800	965,000	382,100

*Applies only to Harlem and Paradise Valley Irr. District.

Long Range Planning
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DATE 2-11-91
HB 201

Exhibit "C"

CHINOOK DIVISION IRRIGATION ASSOCIATION
REHABILITATION PROGRAMS BY DISTRICTS

% OF TOTAL COST		Ft. BelKnap Alfalfa Valley Zurich	Harlem	Paradise	Dodson	TOTAL PROJECT COST
		2,977,000	1,522,900	1,346,200	165,000	$6,011,10
5.2	Contingencies		165,500	146,300		311,80
13.2	Engineering	300,000	253,800	224,400	18,000	796,20
8.4						
	Main Canal					
26.7	Lining, All types	865,000	403,100	334,600		1,602,70
8.4	Repl. Siphon, Increase Cap	330,000		175,000		505,00
0.3	R&B Headworks			16,400		16,40
2.7	R&B Checks, Repl Check Str.	111,000	12,700	23,200	16,000	162,90
1.5	Reshape, Lining, Roads				90,000	90,00
1.8	Turnouts	90,000			15,000	105,00
	Measuring Devices				3,000	3,000
0.6	R&B Pump Station		38,500			38,50
5.2	Clean & Reshape	249,000	62,000			311,00
0.3	R&B Diversion		18,700			18,70
0.7	Rating Sections	44,000				44,00
0.3	New Siphons	18,000				18,00
48.5						
	Laterals					
12.2	Lining, all types	310,000	285,300	126,700	8,000	730,00
	Replace Checks			4,100		4,10
0.6	R&B Structures	15,000	9,800	13,200		38,00
3.1	Clean & Reshape	96,000	46,900	42,800		185,70
0.3	Weirs		16,700			16,70
0.8	Measuring Devices	50,000				50,00
17.0						
	Drains					
11.6	Clean & Reshape	499,000	73,300	110,000	15,000	697,30
	Main Roads					
4.4	Grading		136,600	129,500		266,10
	Acreage	17,810	11,148	8,315	1,006	38,27
	% To Total Program Expenditures	49.5	25.3	22.4	2.8	100.0

MILK RIVER BASIN

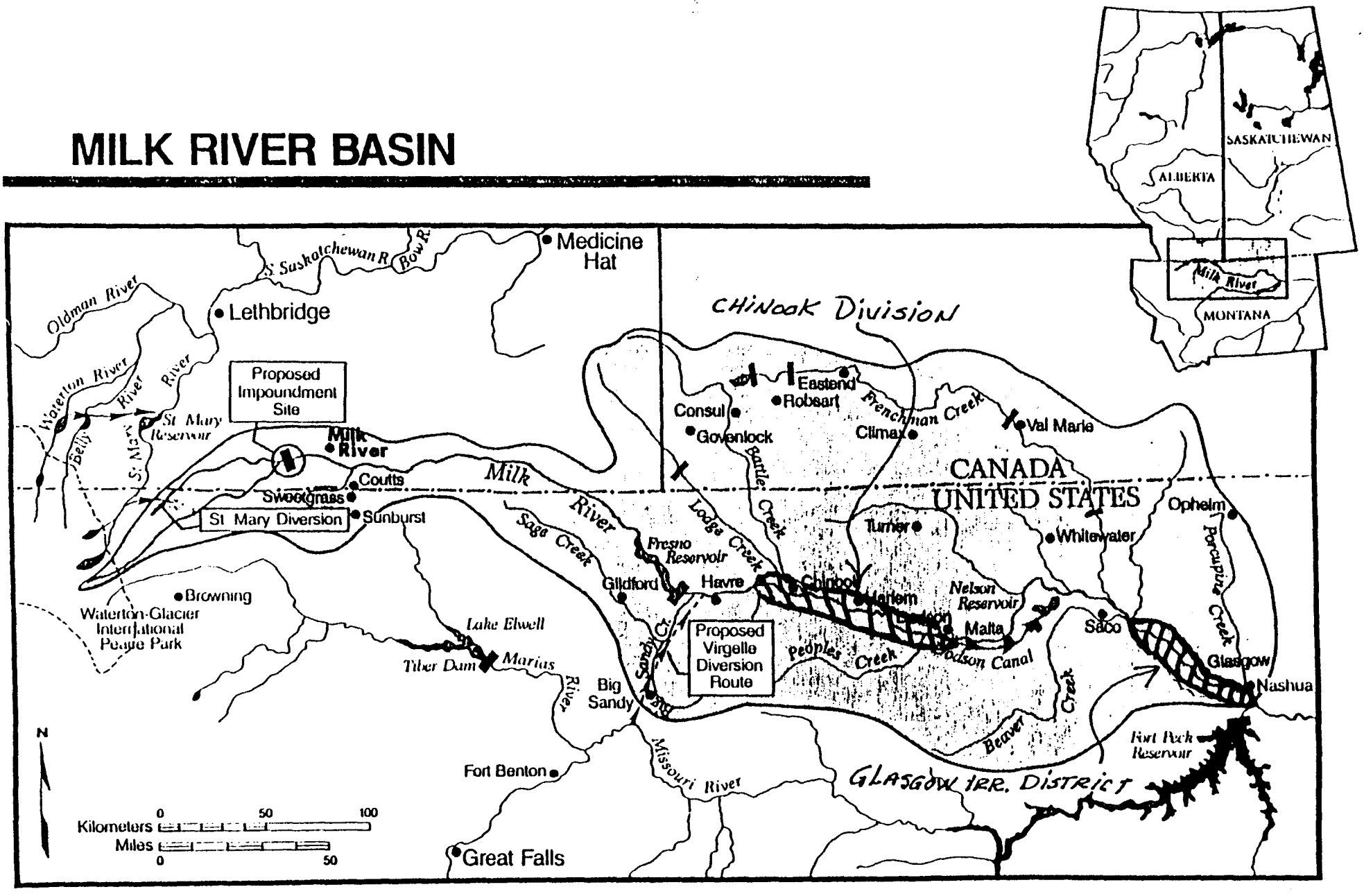

EXHIBIT 4
DATE 2.11.91
HB RRD 6
Long Range Planning

TO: Long Range Planning Committee Room 317
Representative Connelly, Chairperson

FROM: Town of Ekalaka
Alyce Kuehn, Town Clerk/Treasurer

RE: Renewable Resource Development Program

This water project is the result of 10 years of planning and implementing projects for the public water system in Ekalaka.

The Town began in earnest with their water system improvements when a grant application submitted to DNRC in 1981 was funded to complete a "Comprehensive Review and Engineering Analysis of the water and wastewater systems managed by the Town. Since that time the Town Council has tried very hard to address the deficiencies sited in that study of both the systems.

This project is the 2nd for the water system. A previous loan/grant application implemented in 1986 - saw 10,000 feet of new and replacement water main installed, numerous distribution valves and fire hydrants, a well reconditioned and a new well house constructed.

Following implementation of the above mentioned improvements ISO Commercial Risk Services were contacted requesting a review of the capabilities of the water system in addressing fire fighting demands. Some deficiencies were discovered in the supply side of the water system.

This project if funded will go a long way in addressing these defined deficiencies, as it will provide a new well with chlorination capabilities; an additional 100,000 gallons in stored water and automation for the system to make it more responsive to emergencies.

In reviewing the budget and the time schedule at this point in time, we see no reason why the project will require any deviations from the project as presented in the review document.

I sincerely thank you Chairman Connelly and your committee for allowing me to present my views on this project.

I request you find this a viable project, and will allow funding through DNRC's Renewable Resource Program.

I will be glad to answer any questions you have regarding this project.

Project No.: RRD-6

APPLICANT NAME: Town of Ekalaka, Carter County

PROJECT/ACTIVITY NAME: Water Supply and Storage Project

AMOUNT REQUESTED: $ 50,000 - Grant
$ 100,000 - Loan

OTHER FUNDING SOURCES AND AMOUNTS: $ 49,000 - City Funds

TOTAL PROJECT COST: $ 199,000

PROJECT DESCRIPTION:

This project will increase the water supply and provide additional storage for the Town of Ekalaka. The project will include a new production well complete with chlorination facilities, a new 100,000-gallon water storage reservoir, and a new telemetering control system.

Ekalaka is located in the southeast corner of Montana about 80 miles southeast of Miles City. The town is the county seat for Carter County. Potable water supplies are difficult to develop in the area, so two rural schools and 30 ranches haul drinking water from town.

TECHNICAL ASSESSMENT:

Ekalaka has done an exceptional job of analyzing its water system needs. Some assistance has also been obtained from consulting engineers. The town has also obtained advice from ISO Commercial Risk Services, the Water Quality Bureau, and its volunteer fire department. Ekalaka needs another good quality production well. The town currently relies on one good well and three wells that have sand or water quality problems.

A test well has not yet been drilled in preparation for drilling the proposed production well; it would be prudent to do so. Consistent with the Water Quality Bureau's recommendation, Ekalaka plans to build a pump house with gas chlorination facilities. An overall water treatment plant for the town was not proposed or considered, but the capital cost and operation will undoubtedly be very expensive.

The town now has one water storage reservoir with a capacity of 100,000 gallons. It needs an additional reservoir for normal operational and emergency reserves. Another 100,000 gallon buried concrete tank adjacent to the existing one is proposed. This will provide the necessary storage at a low cost. An alternate, bolted-steel tank would result in warmer water in the summer and potential freezing problems in the winter and so was rejected.

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HB RRDG
Long Range Planning

The town also proposes a radio-telemetry and float-control system to replace pressure switches and manual pump operation. This will improve the system's reliability and safety.

The Montana Bureau of Mines and Geology highly recommends that well number 2 be plugged and abandoned as a provision for state grant and loan funding.

FINANCIAL ASSESSMENT:

The finances for this project are to come from three sources.

Twenty-five percent, $50,000, will be paid in cash by the town from an established water system reserve fund. This fund has a current balance that is just short of the required amount. Another 25 percent is being requested as a DNRC grant. The balance of $100,000 is to be financed through the requested DNRC loan. DNRC grant funds will be applied to construction costs.

The town has no general obligation bonds and only one set of project revenue bonds which were issued in 1986 for other water system improvements. The current balance on these revenue bonds is $177,575 with over $37,500 in cash on hand for future payments. A rate increase of about $33 per year per user will be requested from the Public Service Commission to pay off the revenue bonds for the DNRC loan.

ENVIRONMENTAL NOTE:

The proposed project will not result in any significant temporary or long-term impacts on the environment. The ground at the reservoir site will be disturbed and then reclaimed through revegetation. Water users in the community and other area users will benefit from an improved water system with greater reliability and more capacity. The water will also be of higher quality if more is taken from the best aquifer in the area.

RECOMMENDATIONS:

DNRC recommends the requested grant of $49,975 and a loan of $100,000 contingent upon DNRC approval of final scope of work and budget. Any reduction in the scope of the project will result in a proportionately smaller grant. If grant funding is not available, the town may request a DNRC loan of up to $200,000 for the total project.

Well number 2 shall be plugged and abandoned under applicable rules and guidelines after the new production well is operating.

EXHIBIT 5
DATE 2.11.91
HB RRD 9
Long Range Planning

HISTORY AND FACTS OF COVE DITCH 2/7/91

Cove Ditch is a non-profit corporation and not a water district.

An agreement dated January, 1906, between the Cove Ditch Company and Yellowstone Ditch Company gave the Cove permission to enlarge and extend the Yellowstone Ditch in exchange for free water. Approximately 1,860 acres of land are irrigated by this contract. In April of 1917, an agreement was signed which gave approximately 3,000 miners inches of water to the Yellowstone Ditch irrigators.

The Cove Ditch is about 62 miles long and irrigates a total of 5,688 acres; however, the owners of the 3,828 acres of the Cove Ditch pay for all of the maintenance and improvements on the ditch.

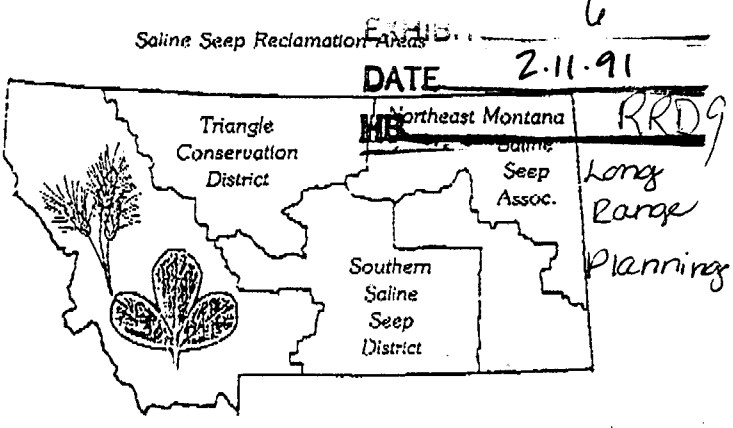
Cove assessments to its 3,828 shares of stock at $2.00 per share produce $7,656.00. An assessment can be made approximately every 45 to 50 days to satisfy legal requirements for a maximum of eight assessments per year. Improvements made at the headgate in 1985 to benefit all water users require almost one total assessment per year. This loan is from the State of Montana DNRC.

Several times in the past, court and legislative attempts have been made to modify the free water contract. Each attempt has failed. The Cove continues to work with the free water users to provide water, maintenance, and improvements.

EXHIB. 6
DATE 2-11-91
HB RRDG
Long Range Planning

Montana Salinity Control Association

P. O. Box 1411
Conrad, Montana 59425
Phone (406)278-3071



February 7, 1991

Bob VanOosten, Chrm.
Stillwater Conservation District
P. O. Box 415
Columbus, MT 59019

Dear Bob;

The Montana Salinity Control Association (MSCA) would support your efforts to secure DNRC/Renewable Resource Development grant funding from the 1991 legislature. Your district's proposal to demonstrate and evaluate the plastic lining and fabrication process to control irrigation canal leakage will have statewide implications. Water resources will become more precious with time. It is to your credit to develop a method to save water loss from canal leakage, and prevent saline ground water contamination.

MSCA is involved with irrigated saline projects in numerous areas across Montana, with the largest area known as the Bullhead Water Quality Project. We have become aware of the material developed by Innovative Process Corporation and will be in a position to adopt and promote practices demonstrated through your project. To date, lining alternatives have been rejected due to high costs and often temporary success.

It is critical for agriculture to develop cost-effective methods to solve their own resource problems. We endorse your efforts to this goal.

With regards,

Jane Holzer

Jane Holzer
Program Director

DNRC recommends a grant in the amount of $100,000 contingent upon approval of the scope of work and budget.

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DATE 2-11-91
HB Long Range Planning

Project No.: RRD-13

APPLICANT NAME: Fallon County

PROJECT/ACTIVITY NAME: Baker Lake Erosion Control and Recreation Path

AMOUNT REQUESTED: $ 15,361

OTHER FUNDING SOURCES AND AMOUNTS: $ 17,366 - Fallon County

TOTAL PROJECT COSTS: $ 32,727

PROJECT DESCRIPTION:

Baker Lake dam was constructed in the early 1900s. The State of Montana constructed Highway No. 7 over the dam in the 1930s. In 1975, Fallon County purchased a portion of the area around Baker Lake and in 1981, obtained a recreation easement from the City of Baker for the remaining portion of the area. Since 1983, improvements to the area include a park with playground equipment and picnic shelters, a softball complex, paving of the county road around the lake, and a gravel walking path. Fallon County is applying for grant funds to prevent further erosion of Baker Lake dam face and to provide a safe, all-weather asphalt pedestrian/bicycle pathway around the Baker Lake recreation area.

Despite the improvements made to date, most of the shoreline of Baker Lake is still not accessible to pedestrians and bicyclists. Several areas require pedestrian or cyclist traffic to use the shoulder or roadway of streets, county roads, and the state highway. This creates dangerous situations, especially during late evening hours when people tend to walk and bicycle around the lake. Existing gravel paths allow fair-weather use only.

The face of Baker Lake dam and portions of the shoreline are susceptible to erosion from wind and water. The dam face and portions of the shoreline are eroded and need repair.

Fallon County requests funds to construct a 8,569-foot, all-weather, asphalt pedestrian/bicycle path around part of the lake to provide safe travel and better access to Baker Lake. Further erosion will be prevented by rip-rapping the dam face and the shoreline where needed with rock; the rip-rap will provide a base for the path where the path crosses it.

TECHNICAL ASSESSMENT:

Preliminary designs include using washed, clean 6- inch to 12-inch diameter rock from a source in Fallon County for the rock rip-rap and wet area fill material. Rock will be deposited (1) along a 592-foot section of the dam face

to fill the eroded area to 2 feet above the high water level, (2) along a 277-foot section of Sixth Street East for path base and shoreline protection, and (3) at 200 feet of wet area along the path route as a base for the path. The 4-foot wide path will be constructed on top of the rock as a 3-inch gravel base with a 4-inch asphalt overlay. The path, along the route where rock is not required will be constructed of 4 inches of asphalt over a 2 to 3-inch gravel base. The asphalt will be sealed with oil and coated with sand. The county owns or has easements for all but the first 368 feet of the path route. An easement for this portion will be obtained before construction begins. Estimated construction time is 25 days.

One erosion prevention alternative would have involved filling the eroded dam face with soil and re-establishing vegetation. But high winds causing excessive wave action would erode the fill, thus this approach would not be applicable at the Baker Lake site. The county also considered both gravel or concrete as possible materials for pathway construction but a gravel pathway would not be useable in all weather conditions and concrete is not well suited for the soil type.

The Fallon County surveyor will prepare the final design and inspect the construction of the project. The Soil Conservation Service provided general assurances that the planned rip-rap would be useful in mitigating soil erosion even though the a 2 to 1 back slope exists at the project site. Specific review of the conditions at the Baker Lake site has not occurred, so final designs will be reviewed by DNRC with input from the Soil Conservation Service. Project administration duties will be performed by the Fallon County planner.

FINANCIAL ASSESSMENT:

The total project cost is $32,727. Fallon County will provide $17,366: $4,269 in salaries and benefits, $11,907 for materials, and $1,190 for contingencies. Grant funds would pay for $13,965 in contracted labor and equipment and $1,396 in contingency costs, totaling $15,361. The county will transport all materials, except the clean rock, to the project site, apply the oil seal and sand, and mix the asphalt. These costs were not incorporated into the budget. Although they don't appear excessive, no explanation is given of how the contract labor and equipment costs for laying the gravel base and asphalt were derived.

The county reserves the right to reject bids above the engineer's estimate and use the grant funds to complete the project with county personnel and rented equipment. Small equipment (Bobcat loader) not owned by the county is needed to work in wet and confined areas at the project site.

ENVIRONMENTAL NOTE:

Positive environmental impacts will be prevention of soil erosion on the dam face and shoreline. Minimal negative impacts to wildlife and shoreline vegetation may occur due to increased access to the shoreline and covering of vegetation and habitat by the path.

EXHIBIT 7 p.4
DATE 2-11-91
HB Long Range Planning

RECOMMENDATIONS:

DNRC recommends a grant of $15,361 contingent on prior determination by DNRC that corrective measures required under the Montana Dam Safety Act to bring Baker Lake dam up to safety standards will not later adversely affect the riprap and/or path when they are implemented and assurance that all county funding is committed and or available. The project will finally be contingent on DNRC approval of the scope of work, budget, and final design.

Project No.: RRD-14

APPLICANT NAME: Local Government Center - Montana State University

PROJECT/ACTIVITY NAME: Solid Waste Information and Assistance Center

AMOUNT REQUESTED: $ 99,360

OTHER FUNDING SOURCES AND AMOUNTS: $ 39,000 - Local Government Center and Northwest Area Foundation

TOTAL PROJECT COST: $ 138,360

PROJECT DESCRIPTION:

The cost of operating solid waste landfills will jump dramatically when the U.S. Environmental Protection Agency's "Subtitle D" regulation becomes effective in late 1990. These standards will set minimum national criteria for locating, designing, operating, clean-up, and closure of new and existing municipal landfills. Local governments will have 18 months after the effective date of these regulations to comply. Some authorities estimate that the cost of establishing new landfills could jump ten-fold or more because of the new requirements.

The Local Government Center at Montana State University is seeking funding for a Solid Waste Information and Assistance Center to help Montana communities develop programs of waste reduction, reuse, recycling, and composting. These efforts would be aimed at reducing the volume of trash that would otherwise find its way to a landfill, thereby extending the life of existing landfills and decreasing the need to establish new facilities. The goals of the project are to increase citizen knowledge of integrated solid waste management, decrease the amount of waste that communities send to local landfills, improve the effectiveness of communities in selecting private contractors, and improve overall efficiency in the operation of local solid waste management programs.

The project would be carried out in four broad phases:

Phase I - Center Start-up. This phase would include contacting appropriate state offices for regulatory information, private recyclers regarding potential services and markets for recyclables, and private haulers for services and costs.

EXHIBIT
DATE 2-11-91
HB RRD 2/
Long Range Planning

MADAM CHAIR, FOR THE RECORD, MY NAME IS DARVIN BROCKWAY. I AM THE EXECUTIVE DIRECTOR OF EASTERN MONTANA INDUSTRIES (EMI). I AM REPRESENTING THE city of miles city and EMI for the miles city Community Recycling Program. The GRANT WAS SUBMITTED TO THE DNRC THIS PAST MAY.

The grant is to purchase the machinery necessary to allow miles city's Sheltered Workshop to recycle cardboard and plastic in an effort to reduce landfill useage.

EMI at present recycles CARDBOARD through the loan of a baler from Montana Recycling. This baler makes 300-pound bales and larger boxes must be cut before the cardboard can fit into the baler. The 300 LB bales must then be broken once they reach Montana Recycling so that they can be repacked into the 1000 LB bales accepted by the mill. FOR this reason, EMI hopes for a grant to finance a 1000-pound baler.

If EMI could deliver 1000 LB bales, Montana Recycling would only act as brokers. Montana Recycling would then find EMI the best price, then EMI would ship directly to the factory.

AS IT STANDS NOW, EMI RECEIVES $15-$20 per ton, and has to pay transportation costs to Montana Recycling. With the 1000 LB bales, EMI could receive as much as $50 to $60 per ton after paying the transportation costs.

- FEASABILITY ANALYSIS -

The recycling project is not only a Miles City project, but an Eastern Montana project as can be seen by a letter of support from the EASTERN Plains RC&D. # I have sufficient copies for the committee ALSO, EMI presently TRAVELS to other communities to pick up Aluminum. With some modifications or new equipment, there is no reason EMI could pick up plastics and cardboard.

EMI HAS JUST Received a donation of $3800 to purchase a glass crusher. The crusher is on order and should be here in another 3 or 4 weeks JUST Received word about plastic.

In summary, I would like to thank all of you for your attention to this grant and especially to Rep Bond. Kimberley. Rep Kimberley acknowledged the efforts of the citizens of the Miles city area in this letter & the editor of the Miles City Star.

EXHIBIT 9
DATE 2-11-91
HB RRD 21
Long Range Planning

FEASABILITY ANALYSIS OF RECYCLABLE MATERIALS IN THE MILES CITY AREA

This analysis is a result of a request by the Montana Department of Natural Resources and Conservation. It is an attempt to determine if their are sufficient volumes of recyclable materials in the Miles City area to generate the revenue required to offset labor and transportation costs of a recycling center. Estimates have been made of the volumes of recyclable plastics, glass, and cardboard based on interviews with a local grassroots recycling group calling itself "Citizens for Recycling". Interviews have also been conducted with members of the Solid Waste Board and landfill operators. Additionally information from the operators of the existing recycling center at Eastern Montana Industries (EMI) has been gathered. EMI currently operates a limited recycling center and accepts cardboard and aluminum cans. They have a small baler capable of producing 300 pound cardboard bales. These bales, when shipped to Montana Recycling in Billings, must be broken and rebaled into the industry accepted 1000 pound bales. Consequently there is a significant reduction in the price paid for the small bales.

Current prices and availability of markets for recyclable plastics, glass and cardboard are from Montana Recycling in Missoula, Montana. Labor prices are those currently being paid to the developmentally disabled at EMI in Miles City.

Annual labor cost for 4 developmentally disabled adults for one year is $22,766.40.

Transportation costs (fuel) for one year are estimated at $2100.00.

Total labor and transportation costs are estimated at $24866.40.

Annual revenues are estimated at $23,160.00. This amount is based on the estimated volumes of plastic, cardboard, and glass generated in the Miles City area. Current market prices supplied by Montana Recycling in Missoula are: $66.00 per ton for Cardboard, $30.00 per ton for glass, and $100.00 per ton for plastic.

It is estimated that the Miles City area would generate for recycling 160 tons of cardboard, 60 tons of glass, and 108 tons of plastic annually.

Cardboard:	160 tons x	$66.00/ton	= $10,560.00
Glass:	60 tons x	$30.00/ton	= $ 1,800.00
Plastic:	108 tons x	$100.00/ton	= $10,800.00
Total revenue:			$23,160.00

With labor and transportation costs estimated at $24,866.40 and revenue estimated at $23,160.00 it appears that revenues would be nearly sufficient to cover transportation and labor costs. The approximately $1700.00 shortfall could easily be absorbed by the existing EMI recycling center. If DNRC grant funds are used to purchase the recycling equipment required to recycle the plastic, glass and cardboard now estimated to be generated in the Miles City area, the program would support itself on the resulting revenues. If, however, the recycling center had to purchase the required equipment, it is not financially feasible to operate the center.

EXHIBIT 10
DATE 2-11-91
HB RRD 21
Long Range Planning

EASTERN PLAINS RC&D

December 5, 1990

Custer County RC&D
Mark L. Richardson, City Manager
City of Miles City
Drawer 910
Miles City, MT 59301

Re: Recycling Program

Dear Custer County Core Group,

On November 8th, The Eastern Plains RC&D Council members were all sent copies of a synopsis regarding your recycling proposal that would employ the handicapped.

In reading the project design we learned that the program had been submitted in grant form to The Montana Department of Natural Resources and Conservation, from the Custer County Core Group.

At the Eastern Plains RC&D Council meeting held on November 26, 1990, your proposition as presented to DNRC was discussed by the Council and everyone agreed that the potentiality built into this project is important to Eastern Montana. This proposal is important in two areas, in building an additional service for the residents of this area, and also as farther probability for economic development.

The Eastern Plains RC&D Council gave unanimous support to this project, and congratulated the Custer County Core Group on their initiative in pursing this idea. Commending them for their innovative approach in searching for products and/or services for Eastern Montana that can provide jobs and stability to the region's economy.

I, as Chairman of the Eastern Montana RC&D find my instructions to document the endorsement of the Custer County Core Group's project a gratifying duty. The Eastern Plains RC&D was formed with the idea that community promotion and/or expansion would lead to community development; and this proposal has that potential.

Sincerely yours,

Alyce Kuehn, Chairman
P. O. Box 338
Ekalaka, Montana 59324

Exhibit 11 consists of 22 letters written by junior high students in Miles City. The entire exhibit is available at the Montana Historical Society, 225 N. Roberts, Helena, MT. 59601. (Phone 406-444-4775)

EXHIBIT 11
DATE 2-1-91
HB RRD 21
Long Range Planning

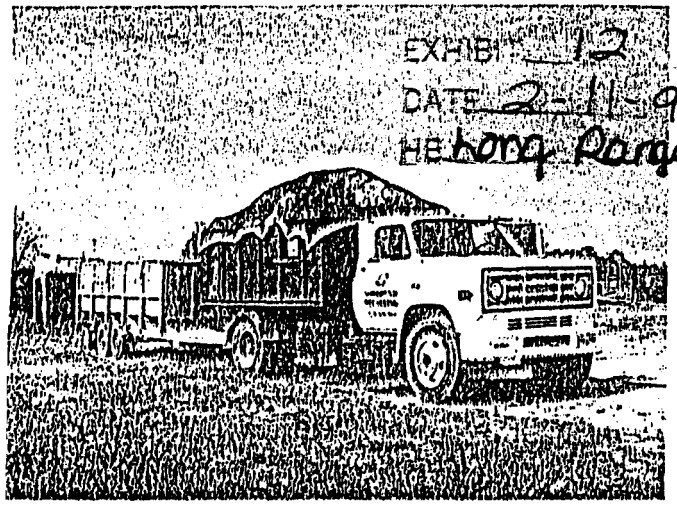
Ms. Connelly,

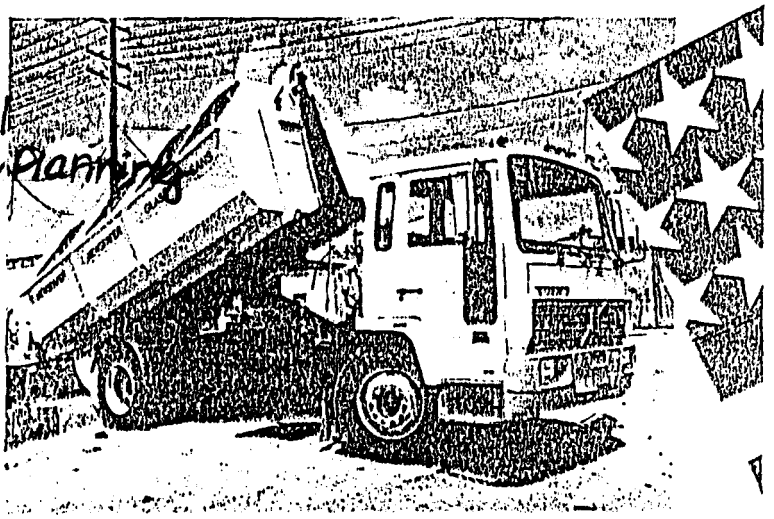
As junior high school students we fully support recycling. We are the people who have to live in this world later and we want the next generation to live in a better world. Eastern Montana natives most likely want to help the environment but don't have the resources to help out. The grant for funds to purchase a compacter, a baler, loading equipment and transportation equipment, which would make recycling easier. As Miles City citizens we hope that money will be granted so we can do our part to save the environment.

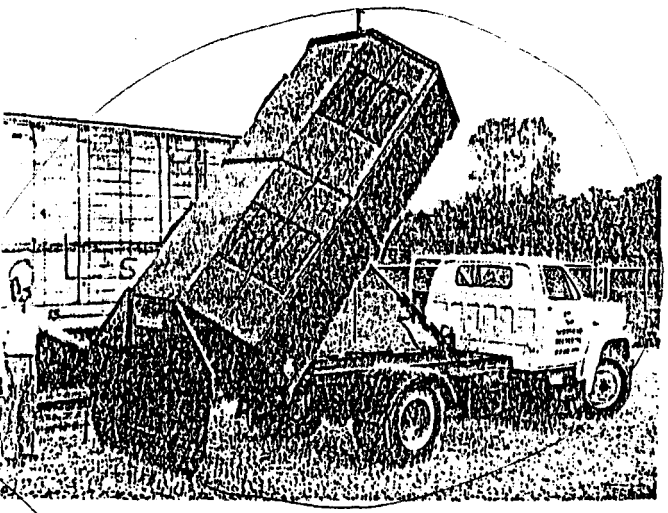
Peace,

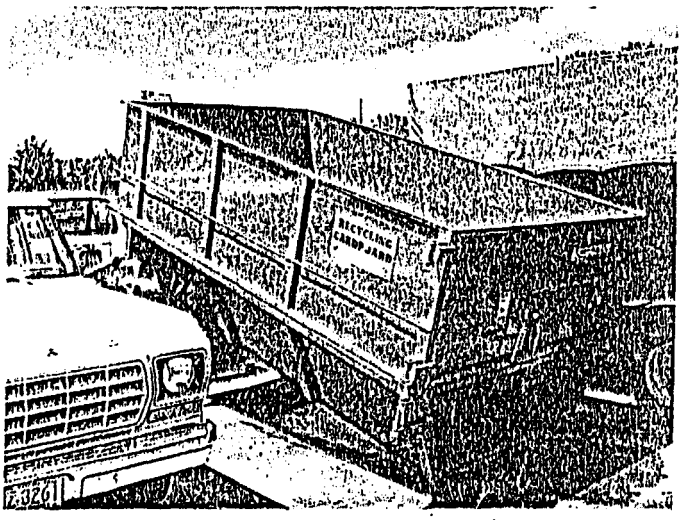
Heidi Currey
Sarah ~~Hauck~~
Amy Meidinger

EXHIBIT 12
DATE 2-11-91
HB Long Range Planning









NOW ...in the USA, it's the MULTI LIFT way!

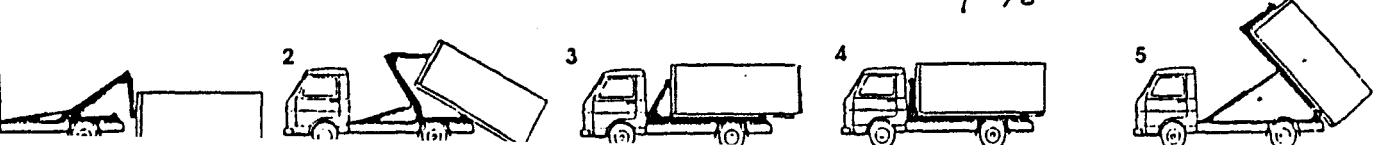
Pneumatic Tires on Forklift (Not Hard Tires)

Quick-change body system loads, unloads in seconds . . .

Truck roll-off systems range in lift capacities of 3-4-5-8-12-16-20 tons. Quickly converts any basic truck into a fleet of special or general purpose haulers • Haul, dump or store with many different, inter-changeable containers and platforms • Maximizes vehicle and personnel productivity • Picks up from docks, angles or unlevel ground quickly and safely • One man, in-cab operation • Minimal maintenance • Simple installation • DEALERSHIPS AVAILABLE IN SELECTED AREAS.

Pump 5,000# Capacity

Contains about $7,800/each
Hydraulic System - $8-9,000
1 Ton Truck

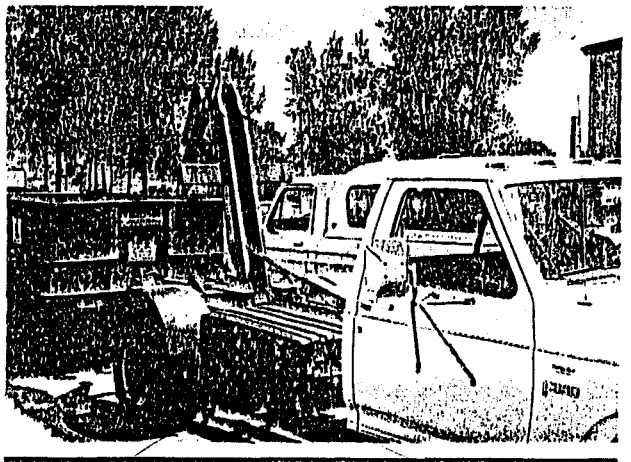


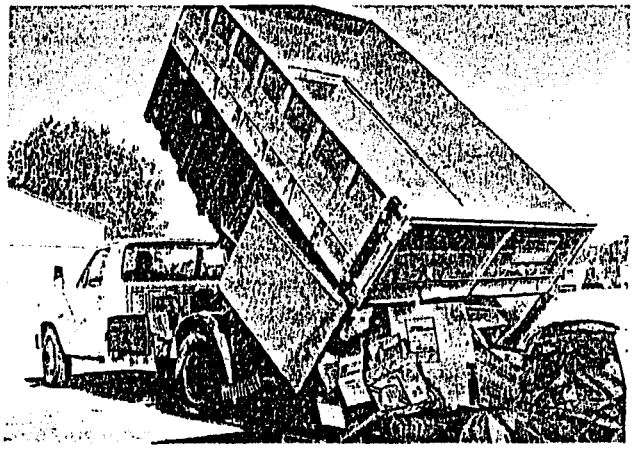
MULTI LIFT® converts one truck i

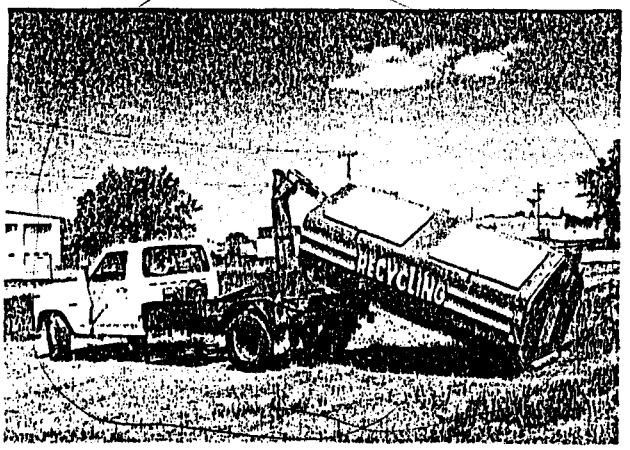
Anytime your drivers are waiting for their trucks to be loaded or unloaded, you're losing money.
But if they're climbing into their cabs on time and on schedule, ready to transport, dump, drop-off or pick-up a variety of full or empty containers—then, unquestionably, you're getting maximum productivity out of your drivers and your trucks!

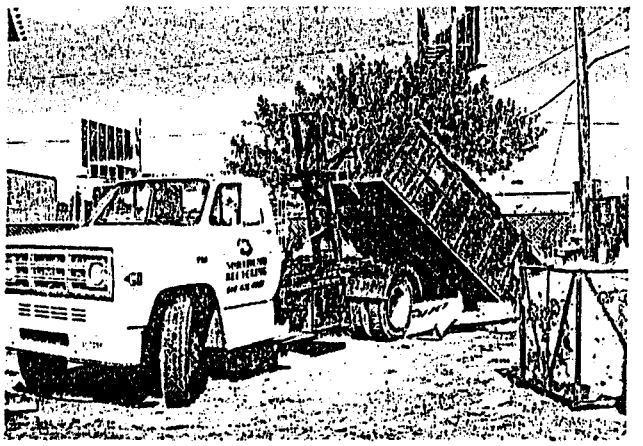
Ranging in lift capacities from 3 to 20 tons, MULTI LIFT QUICK-CHANGE BODY SYSTEMS enable you to convert—in two minutes or less—any basic truck into any type of special or general purpose vehicle. Now—with just one basic truck chassis—you can haul, pick-up, drop-off, unload, dump, or store with as many different bodies, containers or platforms as you need.

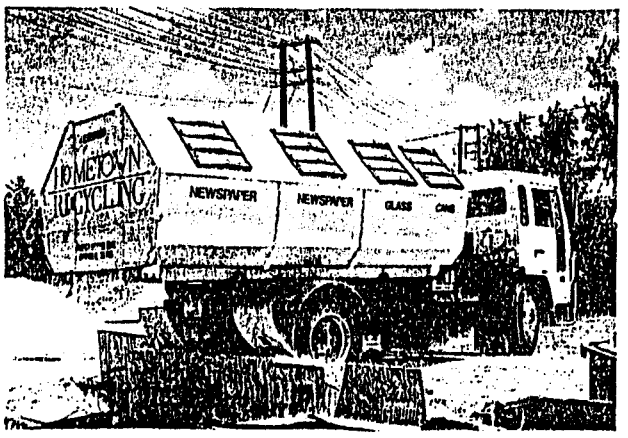
ONE MAN, IN-CAB, AUTOMATIC LOADING AND UNLOADING... in a matter of seconds!
The driver backs his truck into the unload position. With in-cab controls, he switches on the Power Take Off. Smoothly, precisely he manipulates the hydraulic boom until the body is on the ground. Releases the hook. And drives away without having to leave the cab. To load, the procedure is simply reversed: back the truck up to the body. Engage the adjustable hook arm to lock onto the container ring. Activate the hydraulic lift. Pull the container fully onto the chassis. Lock it into position. Haul to another drop-off and pick-up location.

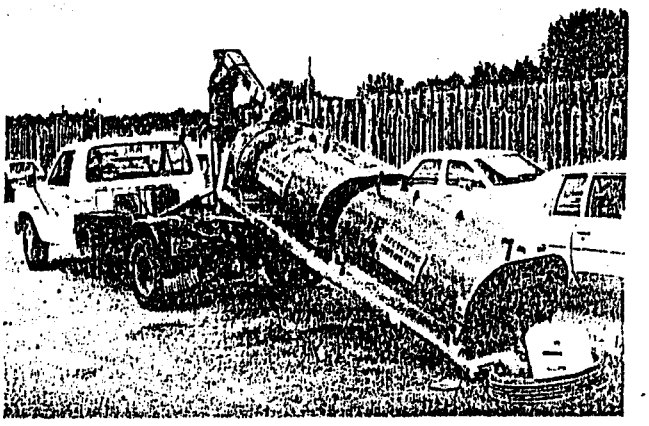












fleet of multi-purpose vehicles!

EXH... 12pg
DATE 2-11-91
Long Range Pl...

MULTI LIFT saves time, truck, labor and insurance costs!
MULTI LIFT is faster, Smoother, More powerful. And costs less to operate: no sheaves or cables... fewer moving parts... far less maintenance.

Best of all, one MULTI LIFT truck can easily service 20 or more interchangeable bodies. With fewer turcks and fewer drivers, insurance costs should be minimal.

The difference is in the roll-off system!

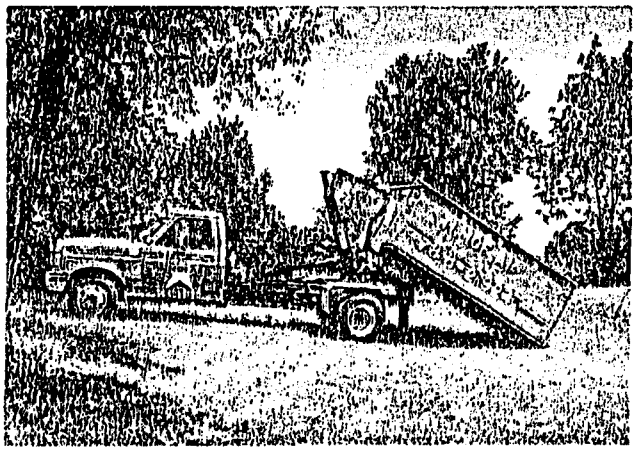
MULTI LIFT's rapid and flexible handling of truck bodies with one man, in-cab operation enables the driver to automatically pick-up or set down a container body at dock height, or on unlevel ground... quickly, safely, profitably! MULTI LIFT's fully hydraulic operation is designed to fit all commercial truck chassis. Unitized construction facilitates installation on the truck frame.

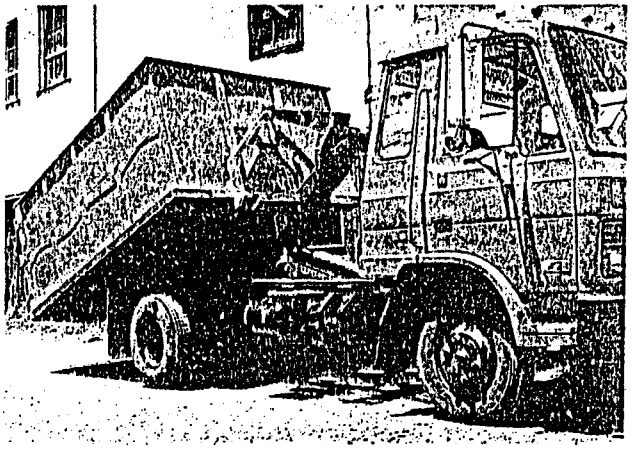
Compare these MULTI LIFT features:

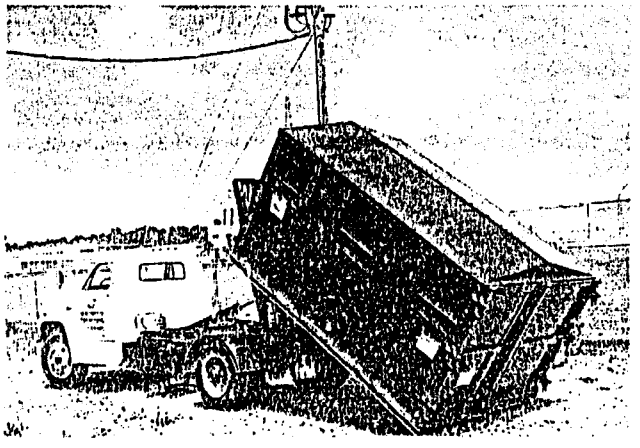
- You can approach and pick-up at angles up to 30°
- Haul, dump or store with large selection of bodies: box, bed, stake, etc.
- Tandem operation with trailer
- Lets you change bodies—not trucks
- Drop off bodies save time, trucks, manpower
- One man, fully automated in-cab operation

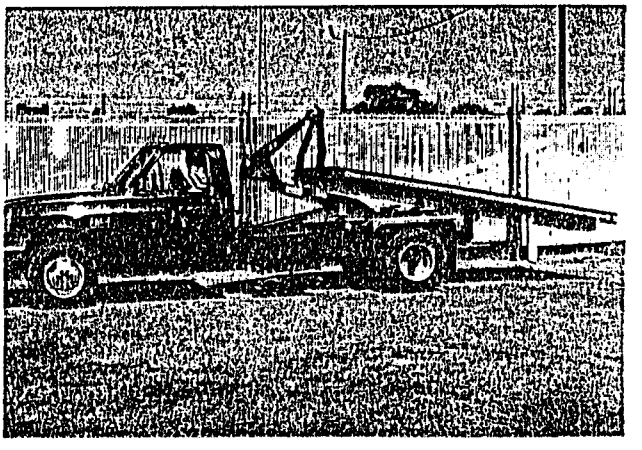
Some typical applications:

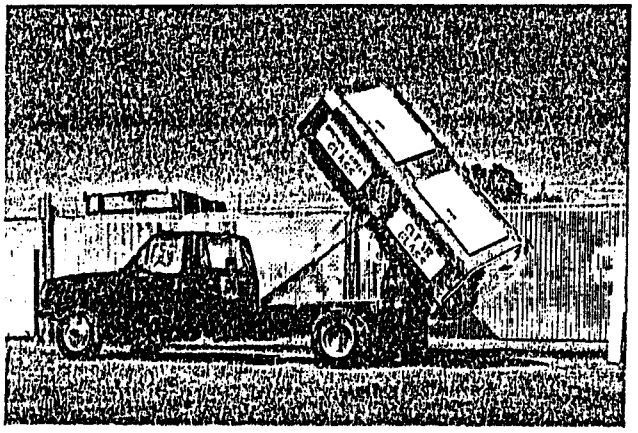
Recycling collection • Solid Wastes Removal • Municipal Services • Parks & Recreation Departments • Street, Water and Highway Departments • Trees & Landscaping Services • Construction Sites • Contractors • Agricultural Services • Auto Body Shops • Sign Erection Co's • Etc.

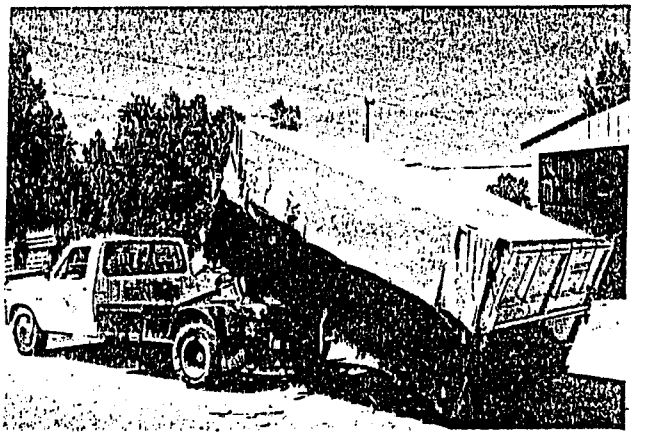






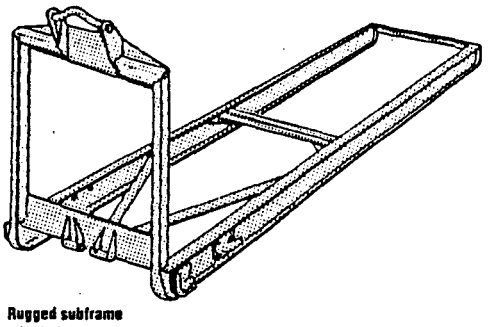




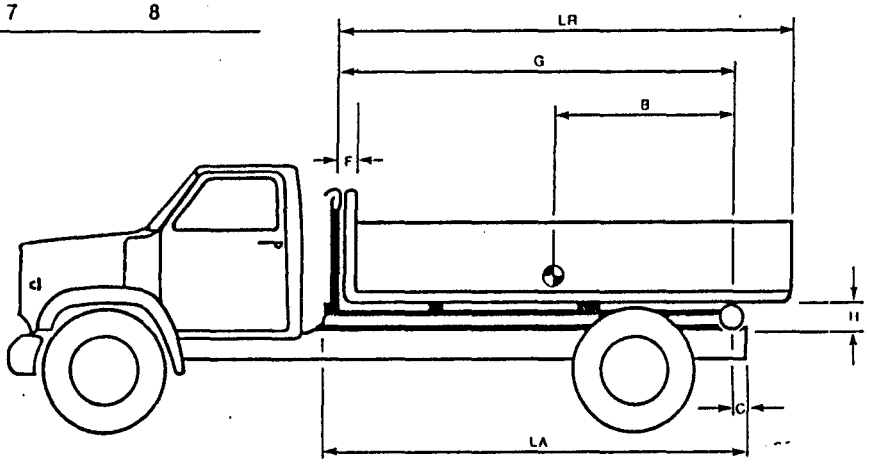


MULTI LIFT TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS	HL-3N	HL-4N	HL-5N/5L	HL-8N
Chassis Type	2-axle	2-axle	2-axle	2-axle
GVW (lbs)	12,500-16,500	14,000-18,000	18,000-23,000	27,000-35,000
Lifting Capacity (lbs)	6600	8800	11,000	17,600
Installed Weight (lbs)	1100	1190	1320/1370	2425
Max. Tipping Angle	50°	50°	50°/45°	53°
Working Pressure (psi)	3600	3600	3600	3600
Recommended Pump Capacity (gpm)	6	6	6	16
Oil Tank Volume (gal)	2.1	2.1	2.1	10.6
Operation Time (tipping, lifting, demounting) (s/cycle)	20	30	30	20-40
LR = Container Length (ft)	9.5-12	9.5-12	11-14.5/ 12-15.5	9-15
LA = Installation Length (in)	121	121	139/151	152
B = Position of Hooklift Center of Gravity (in)	71	71	79/87	98
G = Hook/Rear Roller (in)	113	113	130/142	138
h = Installation Height (in)	5	5	6	9
C = Position of Rear Roller (in)	2	2	5	7
F = Hook/Container Front (in)	6	6	7	8



Rugged subframe adapts to your container



Specifications on larger models available upon request.

Specifications subject to change without notice.

Your Distributor is:

MULTITEK, INC.
P.O. Box 170
Prentice, WI 54556
Phone 715-

MULTI LIFT

HIAB CRANES & LOADERS, INC.
34 Blevins Drive, Suite 10, New Castle, DE 19720
Phone: (302) 328-5100 Fax: (302) 328-5344

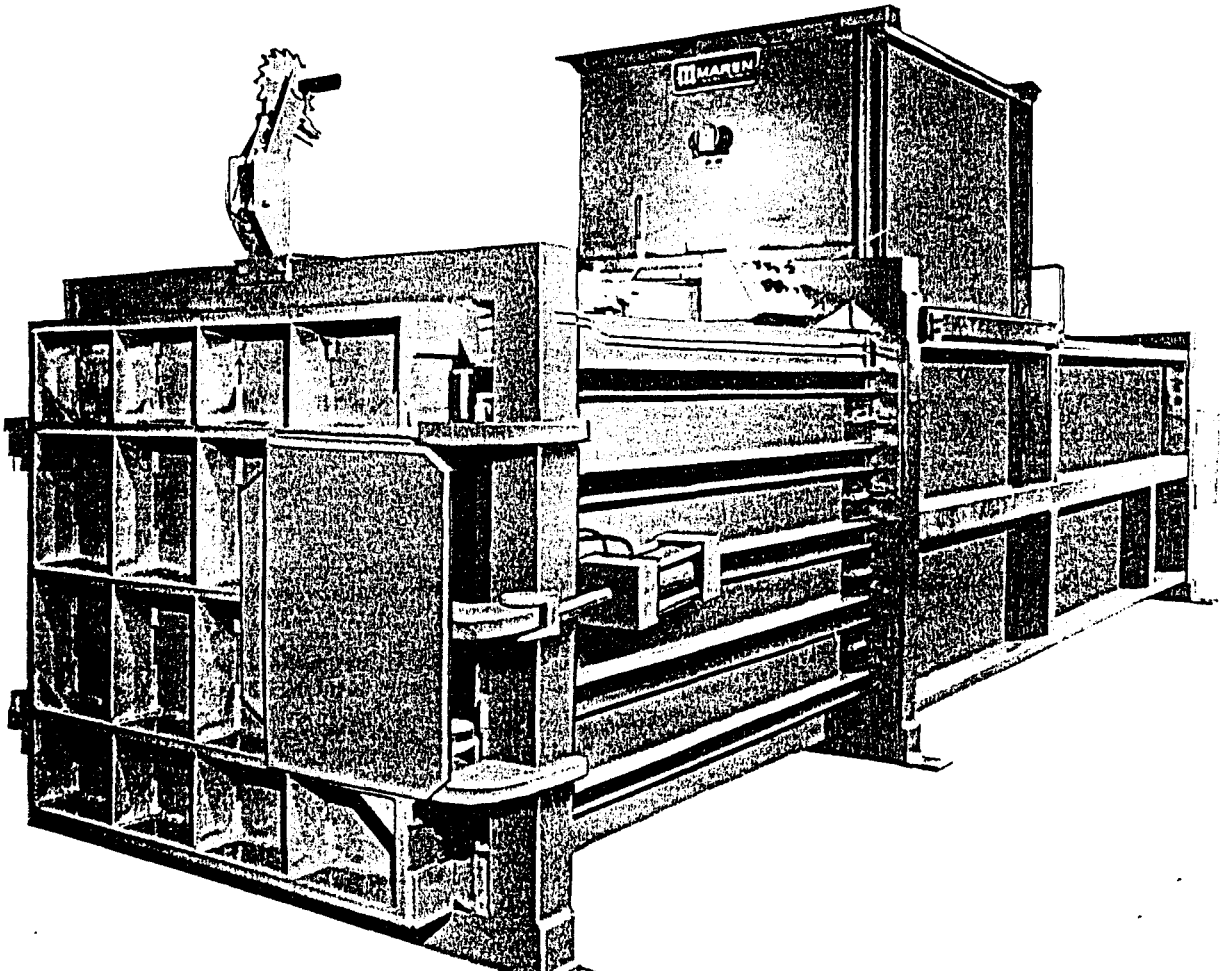
EXHIBIT 12 p.5
DATE 2-11-91
re: Long Range Planning

Maren giant 60"/72" horizontal balers

MAREN

Mill size bales ... low cost balers ... cut waste handling costs!

Maren's big horizontal balers solve scrap handling problems efficiently and economically, by quickly converting large unsightly volumes into easily stored mill size bales. These simple to operate balers also save manpower, eliminate pilferage problems, reduce fire hazards, and promote increased profits through recycling. There is a Maren baler that precisely meets your needs.



Maren high performance horizontal balers solve waste problems.

Maren high performance horizontal balers solve waste problems. Maren options give you the opportunity to select the particular baler that provides the greatest efficiency for your needs. This kind of versatility in a time proven product spells real cost economy for you. Compare Maren features and benefits. Unmatched performance means long, rugged, dependable use to solve your air pollution, waste handling and disposal problems.

- Fast ram cycles available
- 21 tons of thrust, or more, for dense uniform bales
- Large, wide feeder hoppers for easy loading of bulky materials
- Safe, easy operation
- Safety - Hydraulic relief valves
- Safety Door checks
- "Full bale" alert buzzers
- Automatic bale ejection
- No pits or special foundations needed
- Open end design available
- Delivered ready for operation

Automatic Balers Models 60 / 72

The lowest priced automatic balers on the market for making compact to "mill sized" bales. These units are very popular for use in a pneumatic conveying system for baling corrugated and paper, and for many special applications. Combining low investment cost with automatic operation, Maren automatic balers quickly pay for themselves in lower labor costs, improved housekeeping and space savings.

Super Size Models 60S / 72S

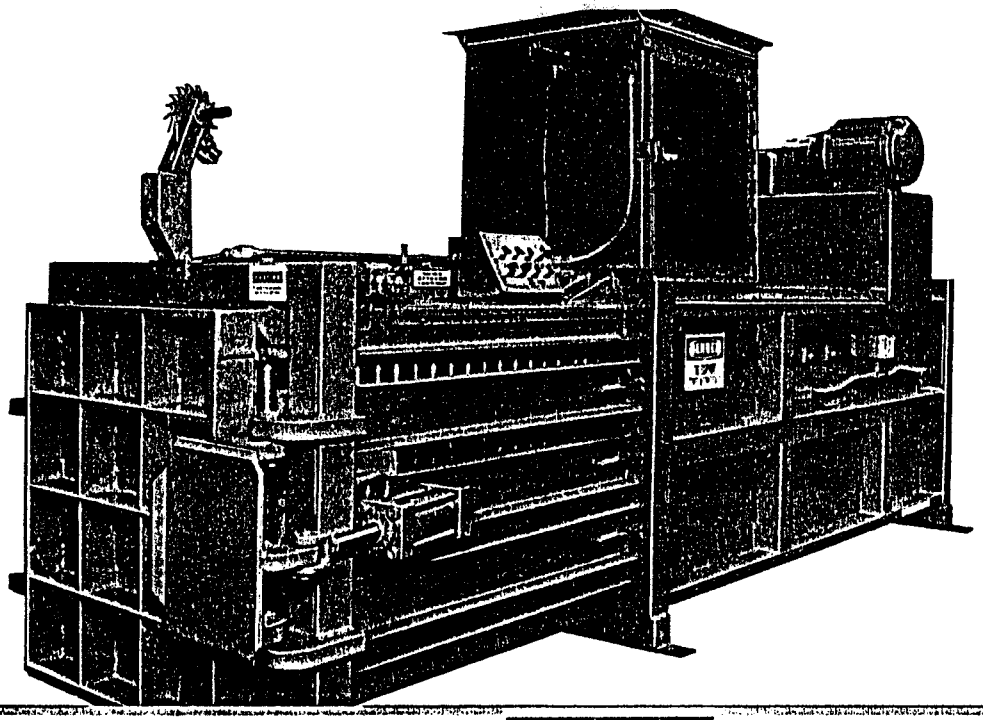
Big "supersize" feeder hoppers to take even the largest boxes. Model 60-S and 72-S eliminate the need for shredders and pinch conveyors. The giant feeder hopper capacity can take big items without preprocessing. Hoppers available in a number of sizes, from 35 cubic feet to 65 cubic feet. Special shear features can also be supplied to keep hopper clear for next load. Big boxes are forced against stationary shear blade, chopping off top portion of box that is baled on next stroke. Reinforced bridge and ram promote long equipment life. Extra high thrust delivers maximum bale density.

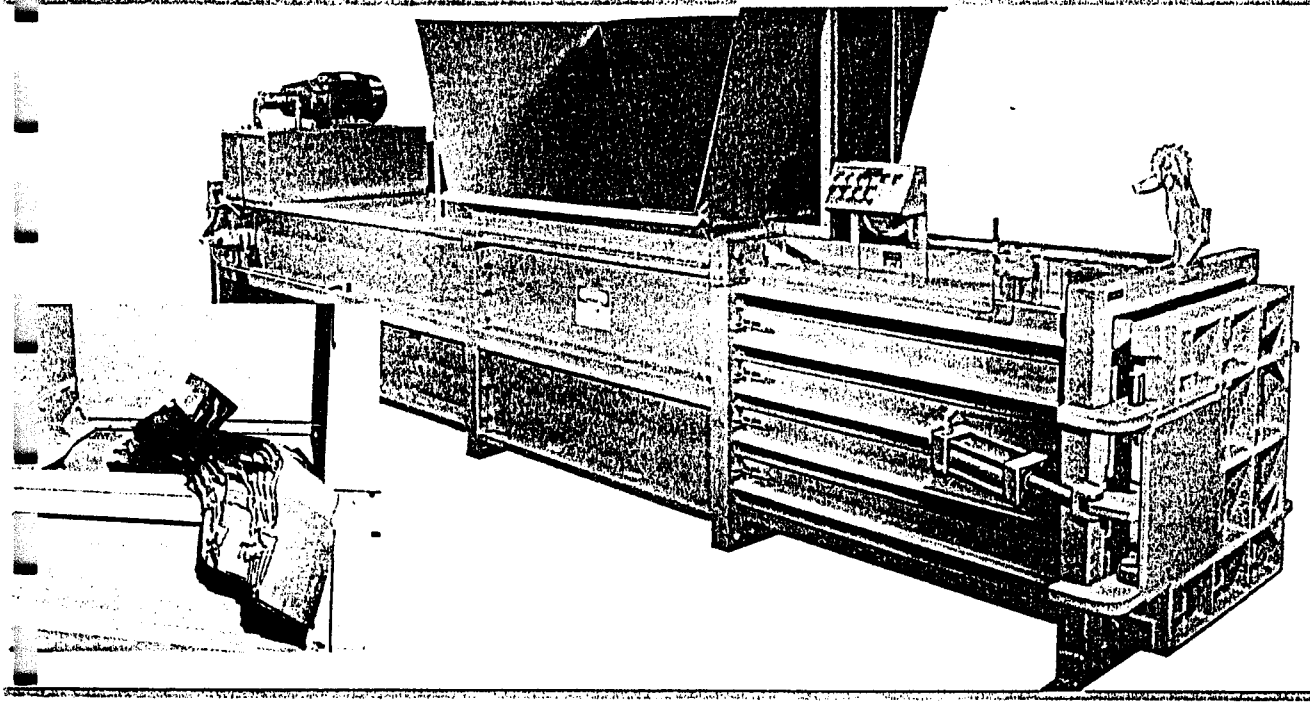
Safe, automatic operation requires no attendant

Maren automatic balers operate unattended while a bale is being made. Waste materials are delivered into feeder hopper by pneumatic conveying, belt conveyor or gravity feed system. Baler starts operating as soon as enough material has accumulated in the hopper to cut off sonar beam control. The ram moves forward, packs the hopperful of material into the baling chamber and returns automatically to its back position. If sonar beam continues to be interrupted by accumulated material in hopper, the ram goes thru another stroke cycle. If hopper is empty, motor shuts off and baler is idle.

While bale is being made, no attendant is required. When a finished bale is formed, operator is signalled by a loud buzzer. He returns to baler, inserts wire ties and ties off finished bale.

EXHIBIT 12 P.7
DATE 2-11-91
Hehong Range Plant

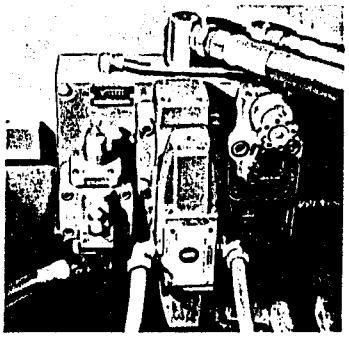




Other attractive design features...

Safety Door Check

Maren door checks (the original in the industry) insure safe discharge door operation. Discharge door cannot pop open during baler operation. Hydraulic cylinder gradually relieves pressure against door, when bale is ready for ejection.



Master Control

Another extra Maren feature. As shown, all valving is centralized in one manifold. Thus valves can be quickly and easily removed and replaced - without even breaking a pipe coupling.

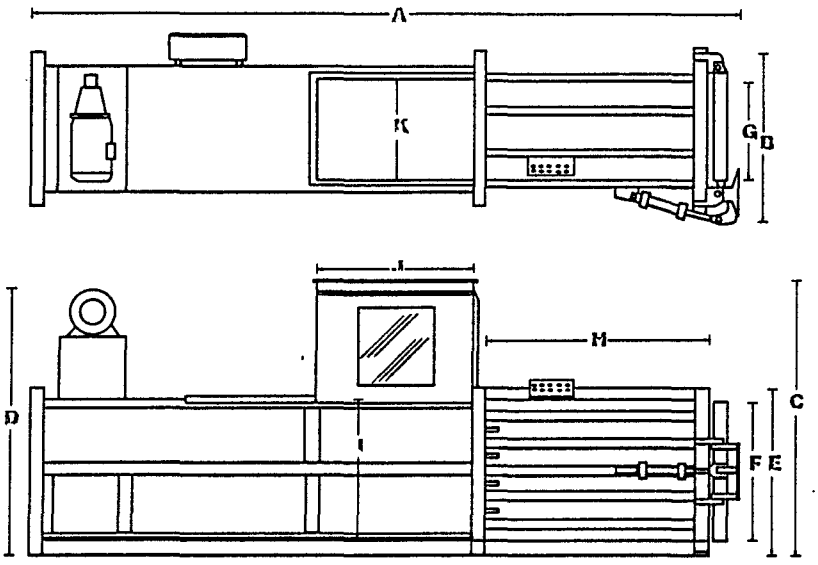
Optional manual and semi-automatic controls available.

Balers can be equipped with safe, easy manual controls. A feeder hopper door is provided in place of feeder hopper chute. The direction of the ram is controlled by hand lever. The operator fills the hopper with materials, closes and locks hopper door. The operating lever is held forward to compress material into the baling chamber. The lever is then held in the opposite direction to return ram to original position, with hopper clear for next load.

With semi-automatic controls, the operator momentarily contacts a push button which starts the baler motor. The ram automatically makes one complete stroke forward, automatically reverses and stops.

A full bale pressure switch and buzzer is standard on all manual, semi-automatic, and automatic balers, to alert the operator that the bale is complete and ready to be tied.

Compare specifications... there's a Maren "big bale" baler to solve all your waste handling problems efficiently.



$ 5-10,000 Conveyor

Installation Cost + $ 2,000 freight

$ 35,000

SPECIFICATIONS		MAREN 72	MAREN 72S	MAREN 72/48-312	MAREN 72/60-336
Overall Dimensions					
	(A) Length	180"	218"	220"	244"
	(B) Width	50"	50"	62"	65"
	(C) Height - with Infeed Chute	76 3/4"	82 3/4"	82 3/4"	82 3/4"
	(D) Height - at power pack end	74"	80"	83"	84 1/2"
	(E) Height - to top of Baling Chamber	45"	51"	51"	51"
Product Bale - Baling Chamber					
	(F) Height	36"	42"	42"	42"
	(G) Width	30"	30"	42"	45"
*	(H) Length	72"	72"	72"	72"
Feeder Hopper					
	(I) Height - not including Infeed Chute	36"	42"	42"	42"
	(J) Length	30"	48"	48"	60"
	(K) Width	30"	30"	42"	45"
Capacity of Feeder Hopper		19 CF	35CF	49CF	65CF
Number of Bale Ties		4	5	5	5
Operating Pressure		1500 PSI	1500 PSI	2150 PSI	2300 PSI
Thrust		42,390 lbs.	42,390 lbs.	60,000 lbs.	64,260 lbs.
Pump		18 GPM	25 GPM		
Cylinder		6" dia. x 38"	6" dia. x 56"	6" dia. x 56"	6" dia. x 68"
Motor		15 HP	20 HP	30 HP	40 HP
Cycle Time		18 Sec.	20 Sec.	20 Sec.	30 Sec.
Total Press Weight		7,000 lbs.	8,800 lbs.	11,500 lbs.	13,000 lbs.

*** A 60" bale is also available on any of the above described units.**

MAREN ... FOR THE VERY LARGEST CHOICE IN BALERS AND BALING ACCESSORIES.

Select from the nations largest line. Achieve maximum productivity with the right piece of equipment for every need, from the nation's leading baler manufacturer. Vertical balers, horizontal balers, portable balers, open end balers, special material balers, automatic bale tiers, pinch conveyors, shredders.

MAREN ENGINEERING CORP.
P. O. Box 278 / South Holland, IL 60473 / Phone (312) 333-6250 / Fax No. (312) 333-7507

Printed in USA

EXHIBIT 13
DATE 2-11-91
HB RRD 21
Long Range Planning

letters

MILES CITY STAR, Thursday, February 7, 1991

Non-corrugated cardboard won't do

Dear editor,

Shortly after you ran your very fine article on the cardboard recycling operation, we received word from the buyer that the mills are no longer wants non-corrugated cardboard (i.e., cereal boxes, soap boxes, etc.). They currently are only taking cardboard boxes and the brown paper grocery sacks. Feed sacks are also acceptable if they have the plastic liners removed. We regret sending mixed signals to the public about what can be saved, but recycling markets do tend to fluctuate.

Businesses or people wishing to recycle their cardboard can drop it off in the wooden fenced enclosure directly behind the main shop (adjacent to our clothing drop).

We also wanted to extend our thanks to the Star, Custer County residents, and especially to the Citizens For Recycling for the enormous support we have received on behalf of our recycling efforts. Citizens For Recycling has certainly been the driving force behind our recent expansion into new recycling areas.

Sherman Weimer
Program Director
Eastern Montana Industries

Letters on recycling are impressive

Dear editor,

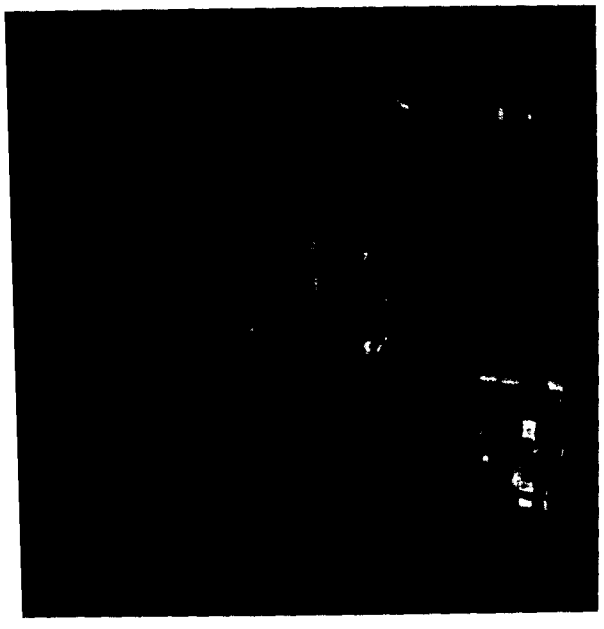
At this point, I have received both individual letters and pages of signatures from what I would guess to be most of the town (supporting Eastern Montana Industries' application for a recycling grant).

It's important that you are concerned about your grant program, but more important is that you have your community pulling together.

Although I am not personally able to guarantee your grant, I will certainly do all I can to help it along. You have some fine people representing you in Jessica Stickney, Tom Zook, and Gerry Devlin. I have told them how pleased I have been with your united efforts.

I would like to respond to all of you individually, but hopefully this will let you know that your efforts are noted and appreciated.

Berv Kimberley
State representative



adnesday, January 30, 1991

Cardboard recycling moves ahead with help of E

By JOHN HALBERT
Star Staff Writer

A bulky problem in the kitchen trash ould, with a little effort, become a ıled benefit at Eastern Montana Industries.

EMI recycles cardboard — that is, collects and bales it for shipment to illings. It picks up empty boxes from dozen or so businesses once a week. Many more businesses would be interested in having their boxes recycled they could be picked up more than ce a week. But transportation costs oney, and the economics are such at EMI can't afford more pick-ups an it provides now, according to erman Weimer, EMI program ector.

But if people are interested in recycling cardboard, they could drop off their boxes at the EMI recycling center between 8 a.m. and 4:30 p.m. on weekdays.

"We are hoping within the next month to get some large drop-off bins made so people wouldn't have to drop off when we're open, but we have no place to put it now," Weimer said.

He said EMI can bale any kind of cardboard, as long as it is not coated with plastic or wax to make it waterproof. Milk cartons and meat boxes won't do.

The cardboard should be clean and have no foreign material in it. The empty laundry-soap box is fine, but the plastic carrying handle should be cut out. The pull-out metal pouring spouts on salt and some hot cereal boxes should be discarded, as should the plastic or foil liners in cold cereal boxes.

On the other hand, it doesn't matter if the cardboard is torn or has holes in it. As long as it's clean, neatness doesn't count. And any amount is welcome.

Brown paper, such as grocery sacks, can also go into the bales. Newsprint and other forms of paper cannot, however. Newsprint can be recycled, but in other ways. EMI is not now in the business of recycling newspapers.

Even the cardboard business is marginal, as things stand now. EMI uses an old baler borrowed from Montana Recycling in Billings. It makes 300-pound bales, and larger boxes must be cut with a power saw before they can fit in the bin.

And the 300-pound bales, once shipped to Montana Recycling in Billings, must be broken up and repackaged in 1,000-pound bales before they are shipped to the mill — another link in the labor and cost chain.

For that reason, EMI has high hopes for a grant now being considered by the Legislature that would finance a 1,000-pound baler for the non-profit handicapped workshop.

"If we could deliver 1,000-pound bales, Montana Recycling would only act as brokers. They would find us the best price," Weimer said.

That would greatly alter the economic picture. Now, with 300-pound bales, EMI gets a penny or two a pound delivered — $15 to $20 per ton, depending on the market, with freight to be paid out of that.

With 1,000-pound bales, it might get $50 to $60 per ton, *after* paying the freight. "That's why we need a baler," Weimer said.

The once-a-week pick-up runs, which also gather aluminum for recycling, take all day Friday. Then there is the labor cost of fitting the cardboard into the bin to be baled.

"So actually, we're not making money at all on our cardboard business," Weimer said. "I doubt if it even covers our labor costs. I know it doesn't cover transport costs."

And, he said, more frequent or daily pick-up probably is not in the cards, even if EMI gets its new baler. Even Billings recyclers don't offer that.

It is perfectly understandable that a business finds it more convenient to throw out boxes daily rather than stockpile for or deliver to EMI — storage space costs money, and gas ain't cheap either. But there are indirect incentives for recycling.

Weimer said some 30 percent of landfill waste is cardboard. The more of that 30 percent that is recycled, the longer the life of the landfill and the lower the cost of the fees or taxes that will have to pay for a new one.

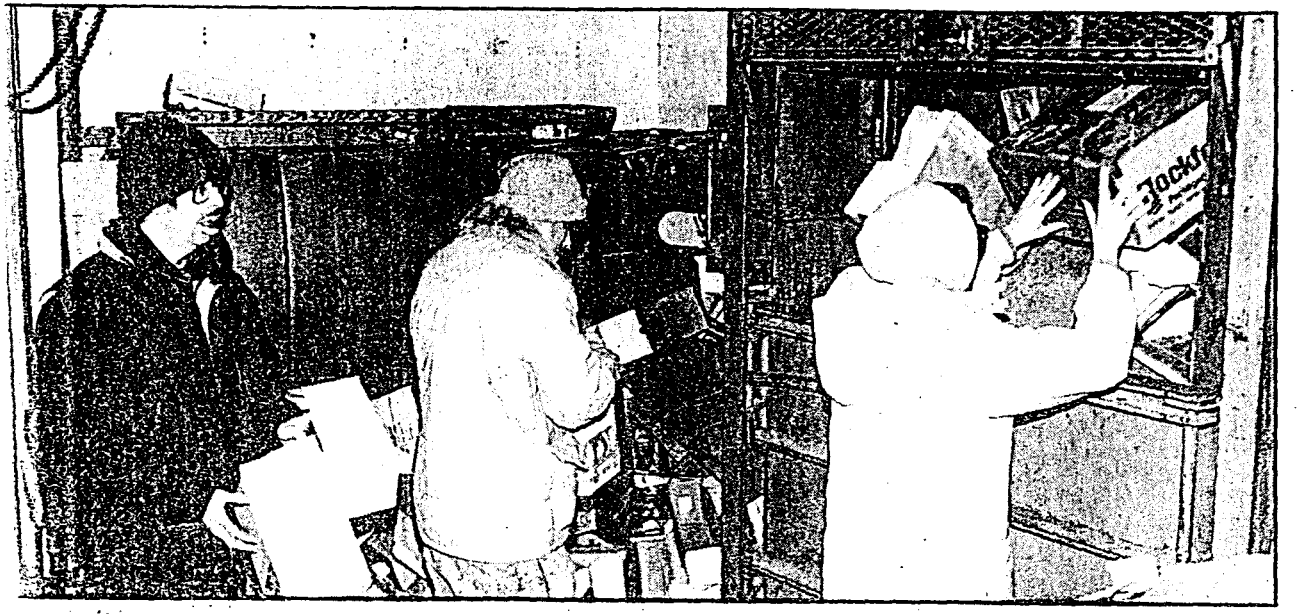
In fact, Weimer s
Scanlan, operator
Area Sanitary Land
ly got EMI interes
cardboard. "He sai
lieve the amount of
thrown out."

And if the sanitati
hauling is in any wa
volume can be reduce
cardboard in other v

"I really think, i
recycled, they could s
costs," Weimer said

"We don't have th
manpower to do all
said. "But if everyone
for his own little pile
would make it a lot e
certainly recycle
cardboard."

The businesses fro
picks up cardboard bo
include: Copper Thin
Furniture, Conlin's Fu
Auto Parts, Scott's Gl
A&T Supply, Jiffy Lub
liams, Holy Rosary H
County Rest Home, Pi
and the Kid Company



ın Meehan (from the left), Daryl Nunberg and Lin- Slayton load cardboard boxes into the 300-pound baler at the Eastern Montana Industries Recycling Center. EMI is trying to get a 1,000-pound baler. (Star photo by Elaine Swanson)

Grocers do own

By Star Staff Writer

Miles City's big cardboard generators — the grocery stores cle their cardboard one way or another. Mac's IGA and But their own balers and ship their cardboard back to their distrib houses — IGA to Billings, Buttrey to Great Falls — on the bring in fresh merchandise.

Reynolds Warehouse Grocery lets customers take their goo cardboard boxes if they wish. Manager Larry Gruba said ther enough boxes, and he pays some retired people 9 cents a box extras.

"A lot of people out in the country want cardboard boxes th in the back of a pickup. Paper and plastic just don't make it, have to go 60 miles on a gravel road," Gruba said.

EXHIBIT 14
DATE 2.11.91
HB RRD 21

Copy from Long Range Plan. Sen. Devlin

TO: Natural Resources Sub-Committe
Berv Kimberly, Chairman
Capital Station
Helena, MT 59620

FROM: Concerned Citizens of Eastern Montana

RE: Recycling

We support the awarding to Eastern Montana Industries their grant to purchase a plastic bailer, forklift and the construction of a loading dock. This grant would expand their already active recycling program.

Sandy Spielman	Marilyn Hart
Sister M. Thrahan Casey	Tom Wolff
Sister M. Agnes Staudenraus	Joyce Lisen
Sister M. Inocentiae Hoffman	[illegible]
Ethel Bender	Nancy Martin
Geraldine Snell	Rosemary Malloy
Connie G. Clarke	Sandy Blankenship
Miles Milligan	Rene' Mowry
Barb Boyl	Jaime Dant
Esther DeMent	Dawnda Honstein
Eileen Nickelson	Cathy Peck
Dolores Rudolph	K Hockel RN
Kenneth Rudolph	R Gerber RN
Pam Inman	C Ruppel RN
Rhonda Heddo	Christine Marthaler
Angie Hepner	Judith Damm
Anne French	[illegible]
Geraldine Gabert	Michele Certain
Betty A. Eddy	Ruth Gonzales
Margaret Dunigan	Suzanne Barone
Tracy Lynn Wheeler	Daniel Gallahan
Terry L. Grunkurd	Mary Margaret Friend
Glennda Brandt	Kristy Walk
Gloria Bailey	Sister M. Ruth

City of Chinook

MONTANA 59523
JOHN ELIAS, Mayor

EXHIBIT 15
DATE 2.11.91
HB RRD 27
Long Range Planning

February 11, 1991

Representative Mary Ellen Connelly, Chairman
Long Range Building Committee
1991 Montana Legislature
Helena, MT 59620

RE: APPLICATION FOR ASSISTANCE
WATER DEVELOPMENT/RENEWABLE RESOURCE PROGRAMS

Dear Representative Connelly:

The City of Chinook has applied for assistance from the Water Development and Renewable Resource Programs to help construct a critical water supply facility. The proposed project involves the replacement of a temporary weir (low head dam) with a permanent facility. The City's existing facility washed out in May, 1990, threatening its ability to supply water to the community of 1,600. Emergency repairs succeeded in restoring the facility to use, but the reliability of this facility is highly uncertain. If it washes out again, there is no assurance that we can restore it to use. This could cause drastic water shortages and severe damage to our $2,000,000 treatment plant.

The estimated cost of replacing the existing facility with a permanent concrete structure is $752,000. We requested a $100,000 grant and a $200,000 loan from the Water Development and Renewable Resources Programs. DNRC has recommended a $50,000 grant from the Renewable Resources Program and a $150,000 loan from the Water Development Program.

We understand that the likelihood of a grant is doubtful. Despite the urgency of our project, several other applicants are ranked above us, and competition for grant funds is robust. We respectfully request that the Committee accept the DNRC recommendation and fund the grant at $50,000.

If our efforts to obtain a grant are unsuccessful, we intend to request a $200,000 loan. Although a revenue bond to repay a loan of this amount would increase our water rates to even higher levels, the project is of such importantance that we have no other option.

Our ability to construct this essential facility depends on securing assistance from three sources. In addition to the DNRC Programs, we will continue to seek assistance from the Montana Community Development Block Grant Program and the U.S. Economic Development Administration. A commitment from the Water Development and Renewable Resources Programs is vital to our efforts to obtain other financial assistance.

We are attaching the following information:

1. Copy of local news article regarding the failure of the weir in May, 1990 and photographs of existing facility after it washed out.

2. Analysis of the City of Chinook's financial condition and capability.

3. Engineer's sketch of proposed new facility.

We appreciate this opportunity to testify before your Committee.

Sincerely,

John Elias, Mayor

Weir problem bubbles up

EXHIBIT 15
DATE 2-11-91
HB RRD 27
Long Range Planning

The City of Chinook celebrated rural water week in a way it really didn't want to, repairing its weir in the Milk River to keep culinary water going to its residents.

When a side of the weir washed out last week, city workers and John Pike Construction worked to plug up the leak and keep water flowing.

And, the city council began deliberating on ways of replacing the old weir, mostly old concrete and riprap, at its regular meeting Thursday.

Dick King of Bear Paw Development Corporation told the council that the earliest it could expect to have the weir replaced is 1992, even if it had the money to do so.

He said Havre put in a new weir some time ago at a cost of $645,000 which was a "permanent solution" to its problem.

To bond for that in Chinook would raise rates to as much as $35 a month, said King, and Chinook already is in the higher range of water rates around the state.

He said Bear Paw Development is looking for ways to help finance the project, including state and federal sources. A first application to the Montana Department of Natural Resources and Conservation should be ready by May 15 for funding in July of 1991.

He said the Community Development Block Grant program is possible but more funds are being used for economic development and fewer for public facilities.

King said he talked to an engineering firm, noting that $1 million in water treatment facilities are being jeopardized if something isn't done.

King said the city can draw water from the river without the weir, but there is probable damage to the pumps.

He expected that funding might come from two or three sources.

He also pointed out that the city's economic development fund has funds in it that can be used to pay for temporary repairs on the present weir.

Alderman George Vande Ven urged King to get some federal funds as quickly as possible before the city loses its water completely through the damaged weir.

The weir had been repaired by Monday night and there appeared to be no interupption in water service to residents.

In other business, the council hired a new water works employee and a police officer.

The water worker, Brenda Wilson, replaces Kenneth Finley, who resigned recently. While the voting was unanimous for Wilson, there was more discussion on hiring a police officer.

It wasn't until Montana Highway Patrol officer Joe Dow gave a professional recommendation to Timothy Gomke did Mayor John Elias marshal enough support for his recommendation.

Elias recommended Gomke who had worked in Plentywood and Hill County prior to applying for the Chinook job. Gomke's wife is a dispatcher with the Blaine County Sheriff's Department.

Alderman Jim Oehmcke led the discussion on the officer, noting his research was "unfavorable."

Alderwoman Freda Bryson said had not received a good report on Gomke, either, but Peggy Ray, police chief, said she recommended Gomke.

Other council members chose someone as well. Sheri Nicholson picked Jeremy House while Vande Van picked another candidate.

As discussion ebbed and flowed around Gomke's credentials, Oehmcke said he had concerns about Gomke's attitude and way of doing business.

That action was defended. It was noted by Ray that Gomke came to her and assistant chief Mark Weber to explain it wasn't the way others were reporting.

Dow spoke up and at some length recommended Gomke for the job, personally guaranteeing the officer would stay in Chinook and not use the community as a stepping stone to a better job.

He said he worked with Gomke when Gomke was a jailer with Hill County. He called him aggressive and Dow said "my version of what I think happened in Plentywood" was that Gomke went to Plentywood thinking "he was going to clean up the world."

"I think he's make a good officer," Dow vouched.

He said Ray, Weber and Officer Elmer Dean Zarn "would lead him down the right path." He added that Gomke "didn't do anything criminal" but tried to act like a highway patrolman and "write alot of tickets."

Dow said Gomke told him he had learned from the Plentywood experience. He said Gomke was a good source of information and was cooperative. "He's like a piece of clay. You can mold him into the officer you want," said Dow.

After Oehmcke wondered whether Gomke would listen to direction, Dow said he had spoken with the candidate who said he never had proper supervision.

Ray told the council she felt the other candidates would use the city as a stepping stone.

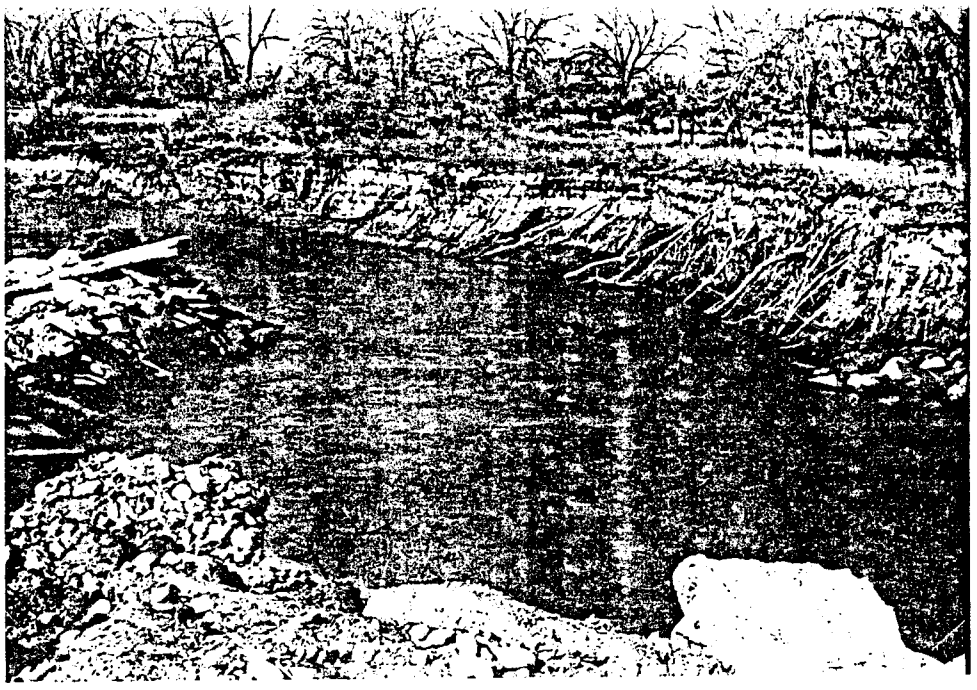
After listening to Dow's endorsement, Oehmcke changed his mind and voted in favor of Gomke, as did Nicholson. Bryson and Vande Ven voted against, with Elias casting the deciding vote to hire Gomke, 3-2.

In his recommendation, Elias said he couldn't get a good or bad recommendation on Gomke from Hill County, only that he would "make a good officer."

Milk River 1/4 Mile Downstream From Treatment Plant (remnants of washed out weir in foreground).

View Of Washed Out Weir - May 4, 1990. Photgraph was taken below weir site looking upstream.

EXHIBIT 15
DATE 2-11-91
HB RED 27
Long Range Planning



Chinook's Milk River Weir - May 4, 1990, (Far bank collapsed, causing most of weir to disappear).

Close-Up Of Remaining Portion of Weir - May 4, 1990.

"NEED FOR CDBG ASSISTANCE" FORM FOR PUBLIC FACILITY APPLICATIONS

This form should be completed by each applicant for a CDBG public facility grant. As noted in the Application Guidelines for Housing and Public Facilities Projects, this information will be used to assess the degree to which the applicant has clearly documented that its request is necessary and reasonable, relative to its financial capability and the amount of CDBG assistance per household, in comparison to other applications.

Note: The following information should be taken from the local government's most recent Annual Financial Report submitted to the Montana Department of Commerce for the fiscal year ending just prior to application submittal. Please fill in the information in the spaces provided below.

1. Taxable valuation of the applicant jurisdiction:
   $1,252,945 (1990) $1,304,581 (1989)

2. Number of mills levied within the project area by:

   a. the applicant (general purpose local government);

      129.94

   b. the local school district;

      169.90

   c. any other taxing jurisdictions applicable to the project area; and

      97.82 (Blaine County, Statewide School Levies,
      University Mill Levy, and Airport)

   d. total mills levied by all jurisdictions (total of the above).

      397.661

3. For all public facilities with existing or proposed user fees the:

   a. existing average monthly service rate for the service to be assisted;
      $17.83 (See attached notice of rate increase).

   b. anticipated average monthly rate for the service, with CDBG assistance; and

      $20.33 ($200,000 DNRC Loan @ 10% for 20 Yrs.)

c. anticipated average monthly rate for the service, without CDBG assistance.

$25.00 ($200,000 DNRC Loan @ 10% for 20 Yrs.) ($250,000 Revenue Bond @ 10% for 20 Yrs.)

For water projects, the existing and anticipated rates must be based on 10,000 gallons monthly consumption per residential household. For the calculation of anticipated rate increases, with and without CDBG assistance, the applicant must specify the interest rate, term, and amount to be financed.

4. Total existing bonded indebtedness of, including a brief description of the sources of debt:

a. the city or town, if a municipality

$30,000 - GOB (Swimming Pool)	REVENUE BONDS: $140,000 - (Treatment Plant)
$42,000 - SID#44 (N/S Sewer System)	$136,596 - (Water Service Lines)
$1,060,000 - SID#51 (Streets)	$410,000 - (Sewer Treatment Plant)

b. the county, if a county-wide project, or

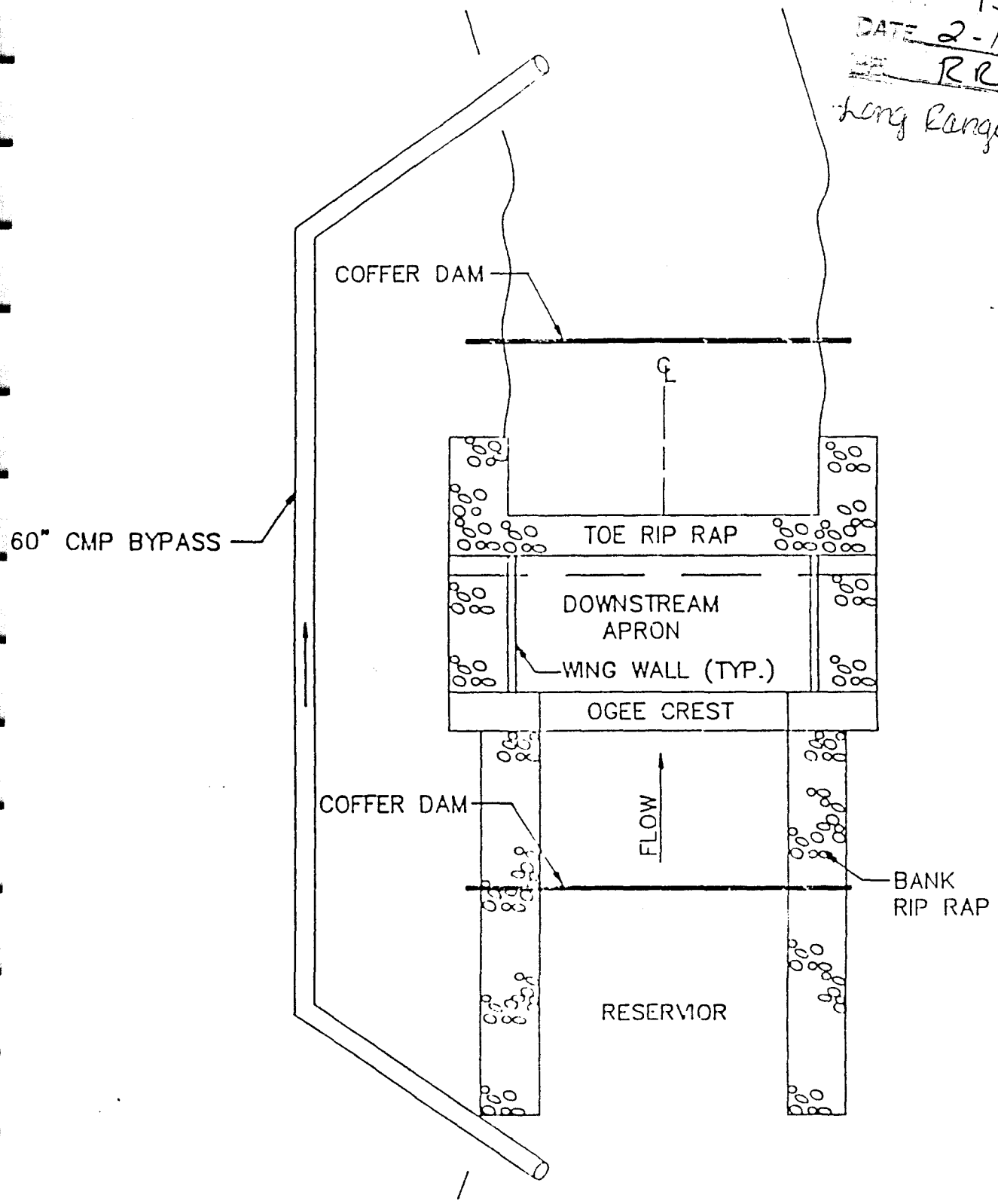
c. the sewer, water or solid waste district, if applicable.

5. If applicable, the amount of any non-obligated local government cash reserves exceeding $25,000 or more currently in certificates of deposits or other similar savings accounts.

All of Chinook's reserve funds are obligated for debt service and other restricted purposes. As of 6/30/90, the City's water enterprise fund had a cash balance of $2,972. For the year ending 6/30/89, the City's water fund lost $4,656 (see attached financial statements).

The applicant should also provide any additional narrative pertinent to the financial condition of the community and need for CDBG assistance.

15
DATE 2-11-91
RRD-27
Long Range Planning



PLAN VIEW OF STRUCTURE

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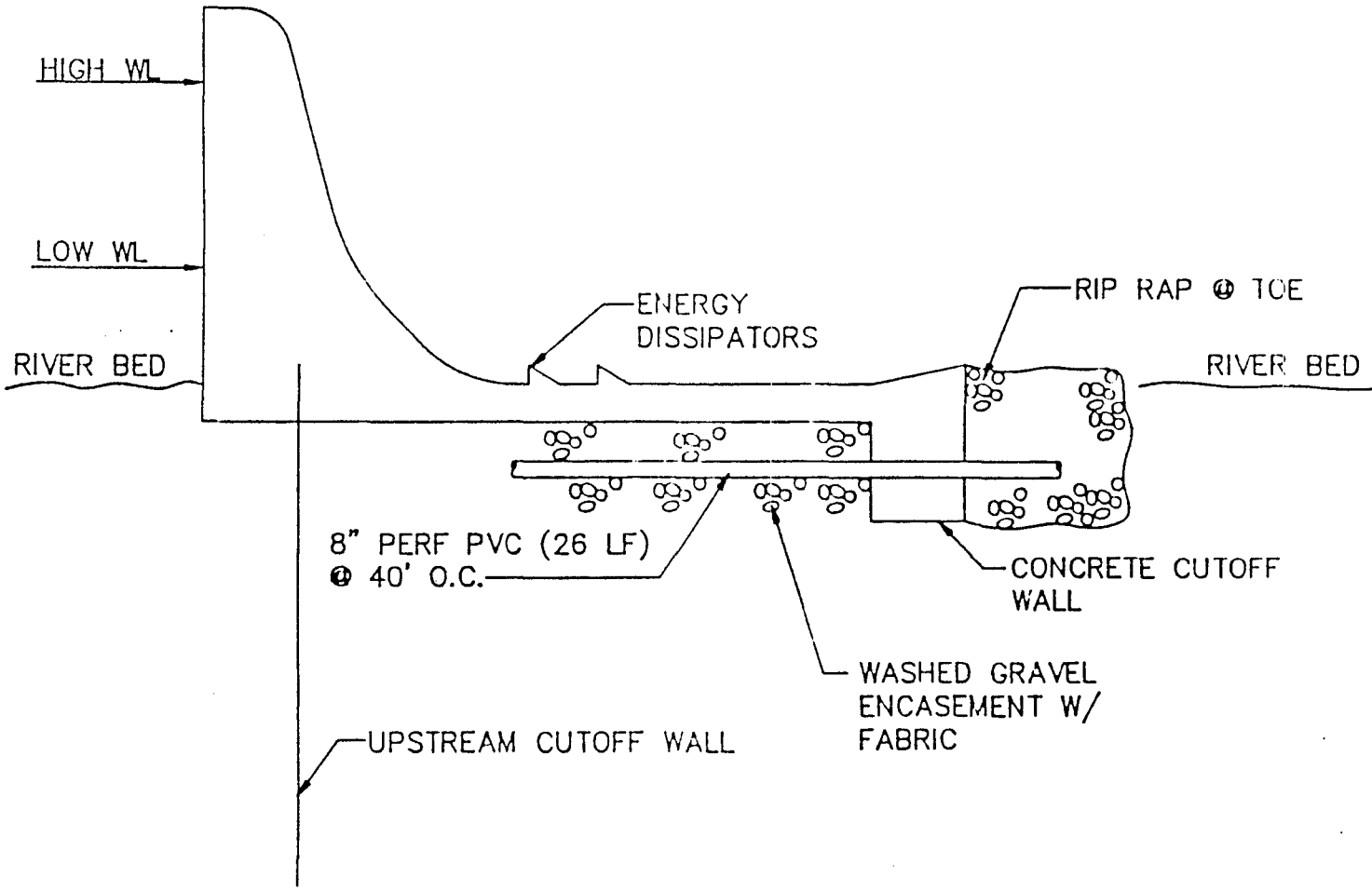


TYPICAL DAM SECTION

SCALE=1"=10'

EXHIBIT 16 p 1
DATE 2-11-91
HB Long Range Planning

MONTANA NATURAL RESOURCE INFORMATION SYSTEM

including three separate projects:

Natural Heritage Program

Water Information System

Geographic Information System

Briefing for

Montana State Legislature
Appropriations-Finance and Claims
Long-Range Planning Joint Subcommittee
Mary Ellen Connelly, Chairman

February 11, 1991

In 1985, the Montana Legislature created the Natural Resource Information System (NRIS) "... ***to provide a ready, accessible means of finding information on Montana's natural resources.***"

After six years of development and operation, the NRIS program has achieved great success serving business and industry, government agencies, and private citizens.

- NRIS operates a data clearinghouse and referral service to link users with the best sources of information.

- NRIS coordinates among agencies and organizations that collect, manage, or use the same types of natural resource information to prevent duplication of effort and promote information sharing.

- NRIS provides assistance in systems design and in developing standards for the collection of new data to ensure quality and compatibility.

The **Montana State Library** is the home for this program for two reasons:

1) this agency's primary function is to provide information to those who need it; and
2) the Library remains neutral -- its role is to maintain and distribute information without judging it.

EXHIBIT 16 p.3
DATE 2-11-91
HB Long Range Planning

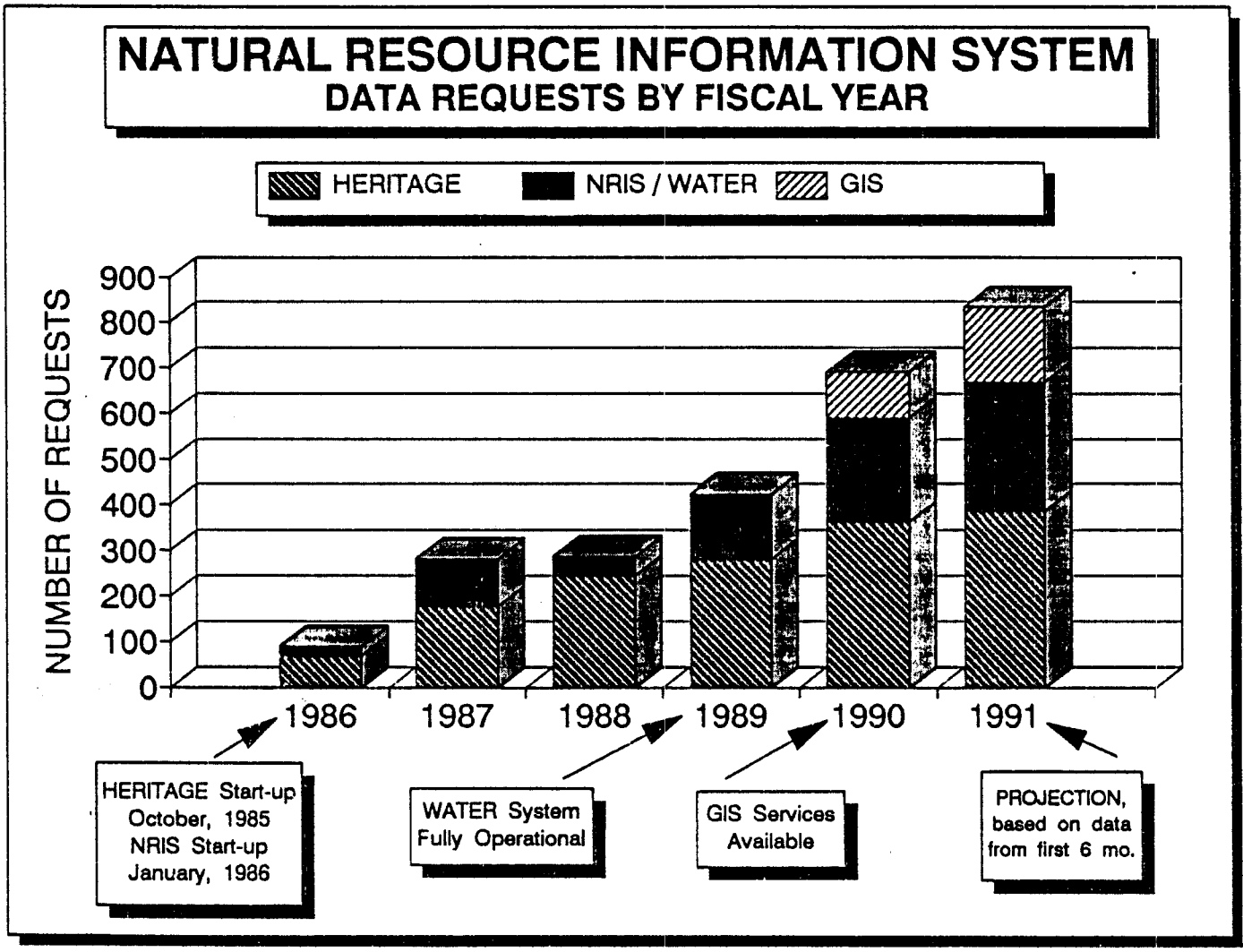
The Natural Resource Information System (NRIS) is a central access point to existing data collected by public and private agencies. The data remain at the respective agencies, and NRIS maintains an indexing system to improve access, especially to unpublished sources and electronic databases not indexed elsewhere.

NRIS activities are organized into three main projects:

Montana Natural Heritage Program is a computer-assisted inventory of Montana's biological resources, emphasizing the locations of rare or endangered plant and animal species and biological communities. These data are used extensively for land-use planning and resource management.

Montana Water Information System is the starting point for locating water resources information in Montana, such as data on surface water, groundwater, water quality, riparian areas, water rights, climate data and more.

Montana Geographic Information System provides digital mapping and analytical services as well as technical assistance to agencies developing in-house GIS capability. NRIS inventories data available for GIS applications and coordinates GIS data standards and sharing throughout the state.



Improved access to information has expedited permit processes and facilitated planning and resource development. Developers, planners, and other decision-makers are learning about the possible biological/resource impacts of projects while in the planning stage -- before significant commitments have been made.

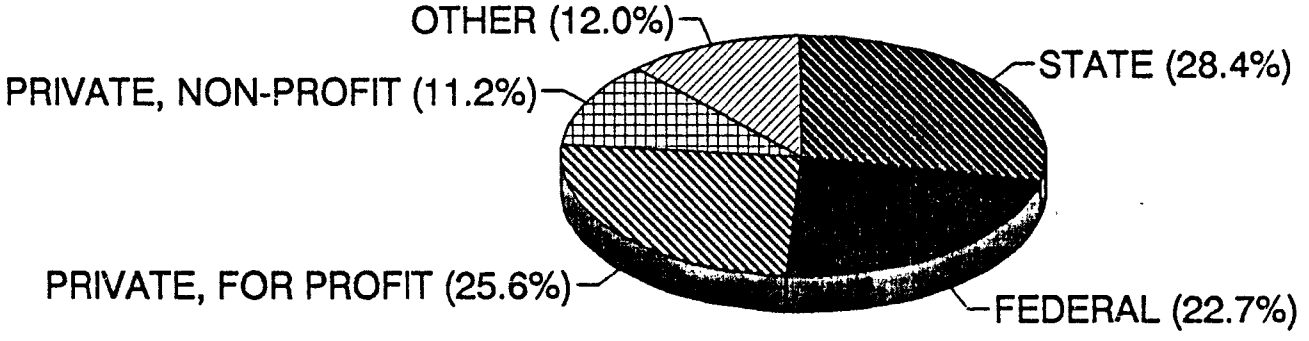
The NRIS Program provides an alternative to confrontation between development and conservation interests, helping business, industry, and government agencies prevent potential delays, litigation, or expense.

EXHIBIT 16 p 5
DATE 2-11-91
HB Long Range Planning

NATURAL RESOURCE INFORMATION SYSTEM
USERS BY SECTOR

NATURAL HERITAGE PROGRAM, WATER INFORMATION SYSTEM
GEOGRAPHIC INFORMATION SYSTEM

TOTAL REQUESTS: 2126



PERIOD OF RECORD: 10/01/85 THROUGH 12/31/90

Typical Data Requests

- A consulting firm, on behalf of a state agency, was preparing a biological assessment of the effects of widening and improving a stretch of highway in Montana. The Heritage Program provided detailed information on 47 sensitive species populations within a one-mile corridor of the highway.

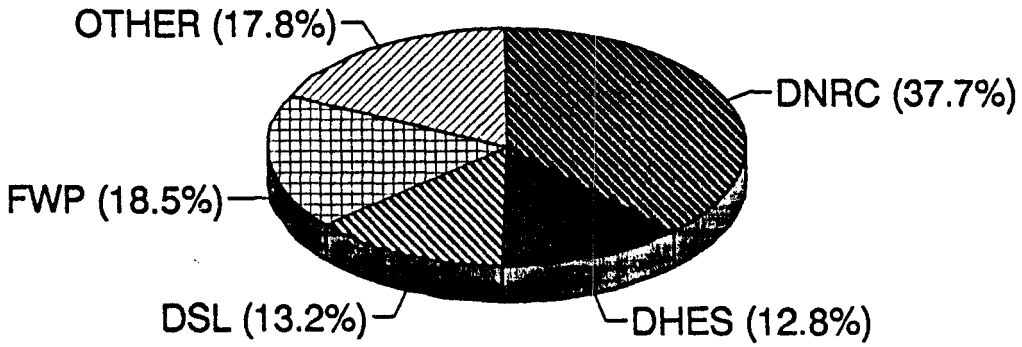
- A city/county planning office was evaluating a site for future industrial use. NRIS conducted a broad search and provided data from several state and federal agencies: climate data; groundwater and surface water stations; water rights, water level, and aquifer data; wildlife information; and a list of studies pertinent to the area.

- A federal agency asked NRIS to input watershed unit boundaries, geologic, drainage pattern, elevation, habitat, and precipitation data into the GIS to assist in developing a model for land classification projects. The automated procedures provides a method to examine classification schemes that were not feasible to study using manual techniques.

NATURAL RESOURCE INFORMATION SYSTEM
USERS BY STATE AGENCY

NATURAL HERITAGE PROGRAM, WATER INFORMATION SYSTEM
GEOGRAPHIC INFORMATION SYSTEM

TOTAL REQUESTS: 604



PERIOD OF RECORD: 10/01/85 THROUGH 12/31/90

Typical Data Requests

- A state agency requested biological information in the vicinity of a proposed large-scale mine site in central Montana. The Heritage Program provided a vertebrate species list, a list of plant species known to occur in the area, and detailed records of sensitive species locations.

- A state agency, working with a federal agency, needed data to determine the regional unit hydrograph characteristics for selected basins in Montana and evaluate designs for dam spillways. NRIS supplied hourly precipitation data from a CD-ROM product, and converted the data to a format suitable for a computer model constructed for the project.

- A state agency needed a map of mining activity sites and products information for Montana. NRIS imported these data from the agency and produced nine maps of the state depicting 35 different products at 5,088 mine activity sites. These digital data and maps are now available to other government agencies and the private sector.

Natural Resource Information System

EXHIBIT 16 p.87
DATE 2-11-91
HB Long Range Plan.

Summary of Major Accomplishments
1990-91 Biennium

Montana Natural Heritage Program

- Continued database development and maintenance:
  - -- Element Tracking Database, contains taxonomic and status information on over 1,800 plant and animal species and plant communities in Montana
  - -- Element Occurrence Database, used to manage information on the individual location records (or, "element occurrences") of sensitive species throughout the state, grew by about 10% this biennium, and contains 2,936 records
  - -- Managed Areas Database, land ownership and management information
  - -- Source Abstract Database, bibliographic information with 2,991 records
  - -- Vertebrate Characterization Abstract: Range-wide and state-specific information on all Montana vertebrate species is tracked in this database (616 records)
  - -- Sensitive Species Lists, status reports on the highest-ranking plants and animals; annual updates widely distributed in April of each year

- Plant and animal species monitoring, in cooperation with state and federal agencies, conducted more than 30 botanical and zoological field surveys of rare species

- Continued support to the interagency wildlife and fisheries working groups at the request of MDFWP: helped develop a strategic plan for the watchable wildlife program; assisted in developing a state recovery plan for the Arctic grayling; initiating recovery plan for the federally Endangered pallid sturgeon

- Completed a cooperative Arctic grayling research project on the Big Hole River; coordinated a multi-agency raptor study at Kevin Rim, studying the impacts of oil and gas development on this high-density raptor nesting area; performed extensive surveys and stream assessments for the rare harlequin duck in western Montana

- Conducted extensive research on plant communities and developed a grassland classification for northeastern Montana

Montana Water Information System

- On-line access to the Montana Bureau of Mines and Geology (MBMG) Ground Water Information Center (GWIC) Database

- Increased expertise with all major sources of hydrologic and climatic data for Montana, streamlining access to critical data for statewide projects

- Support to the State/EPA Data Management project, on behalf of the Montana Department of Health and Environmental Sciences (DHES)

- On-line access with a PC Interface for STORET (the main database for water quality data), including a direct connection the state's mainframe

- Support to the Environmental Quality Council/Ground Water Task Force

- Support to the Montana State Water Plan Advisory Council; worked with the Drought Monitoring Technical Subcommittee

- Continued development of the Montana Rivers Information System, in cooperation with the Montana Department of Fish, Wildlife and Parks
  - -- Database refinement of FWP's Interagency Stream and Lake database
  - -- Conversion to EPA River Reach indexing system
  - -- Developed a User's Manual for the database

- Development of a PC Version of the NAWDEX Master Water Data Index (MWDI), receiving national recognition

Indexing Projects

- Continued enhancement of the Montana Natural Resource Index
  - -- Addition of the Abandoned Mines Reclamation, Hardrock and Coal collections, Department of State Lands
  - -- completion of a new software version of the reporting function

- Development of the *Montana Data Directory*, a database of automated data files maintained by state and federal agencies; wrote all software programs and published User's Manual

Geographic Information System (GIS)

- Statewide GIS Coordination Efforts:
  - -- Support to the 19-member, Montana Interagency GIS Interagency Technical Working Group; major goal to evaluate and establish a GIS data standards plan
  - -- Edit and publish the *Montana GIS Newsletter*; helped organize the annual Montana GIS Conference
  - -- Imported 13 new statewide digital data coverages; available for state projects

- Continued support to the Montana Department of Health and Environmental Sciences on the Clark Fork Superfund GIS Project:
  - -- Responded to more than 175 work requests from EPA, DHES, and their contractors as well as ARCO and their contractors; worked out agreements to exchange and transfer GIS data
  - -- Support to the Butte-Silver Bow County to develop GIS capability to plan and implement institutional controls related to Superfund activities; (Anaconda next)

- Continued GIS support to the DHES Water Quality Bureau re: non-point source pollution monitoring in Clark Fork Basin

- Initiated GIS project with the Department of State Lands re: monitoring hydrologic impacts of coal mining in the Powder River Basin and mine permitting

- In cooperation with the Department of Natural Resources, created two new statewide GIS coverages of small-scale hydro sites and wind gauging stations

- Plans to conduct a GIS pilot project with the Montana Department of Fish, Wildlife and Parks; also provided support to FWP on the interagency Granite Butte Elk Study

- Continued support to the U.S. Forest Service, Helena National Forest on a land classification model using GIS

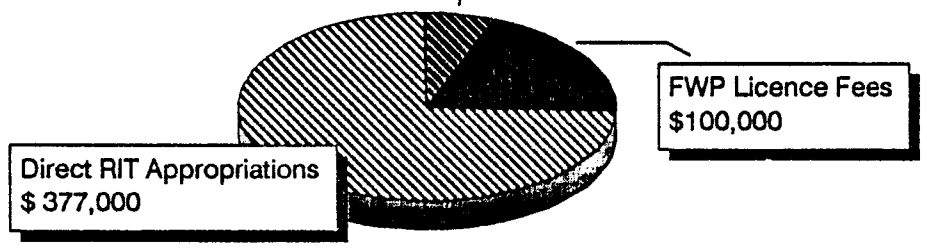
- Provided technical assistance to the Legislative Council and the Apportionment Commission re: using GIS for the 1990 Re-districting process

- Developed a one-day course (with workbook) providing an overview of basic GIS capabilities, components, and requirements

EXHIBIT 16 p.9
DATE 2-11-91
HB Long Range Planning

NRIS PROGRAM CORE FUNDING
1992/1993 BIENNIUM

Governer's Budget Office
Total: $507,000



NRIS PROGRAM CORE FUNDING
1992/1993 BIENNIUM

Option: Based on Competitive RIT Grants
Total: $507,000

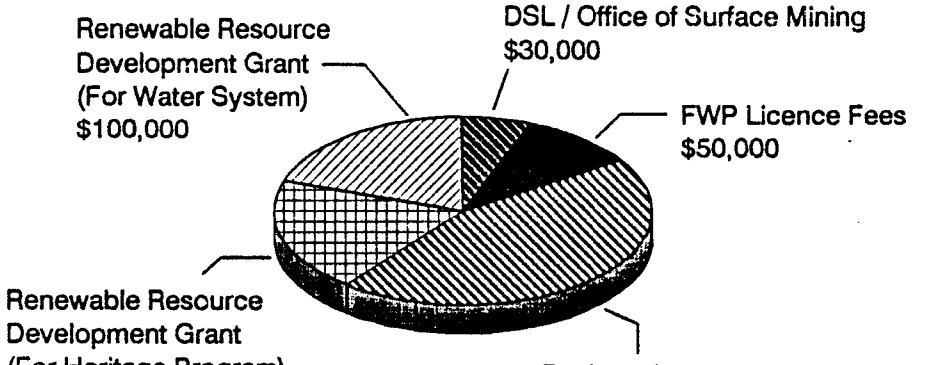


EXHIBIT 17 p 1
DATE 2-11-91
HB Library Plan

MONTANA
NATURAL RESOURCE INFORMATION SYSTEM

including

Natural Heritage Program

Water Information System

Geographic Information System

FEES/USER CHARGES

Assessment After 15 Months

Presented to the

MONTANA STATE LIBRARY COMMISSION,

MONTANA NATURAL RESOURCE DATA SYSTEM ADVISORY COMMITTEE

and

MONTANA LEGISLATURE

FEBRUARY 1, 1991

Introduction

The Natural Resource Information System (NRIS) is a clearinghouse for natural resource information and a central access point to existing data collected by public and private agencies. NRIS has created an indexing system to improve access to the data, especially to unpublished sources and electronic databases not indexed elsewhere. NRIS has three major components:

Montana Natural Heritage Program maintains a computer-assisted inventory of Montana's biological resources, emphasizing the locations of rare or endangered plant and animal species and biological communities. These data are used extensively for land-use planning and resource management decisions.

Montana Water Information System is the starting point for locating water resources information in Montana, such as data on surface water, groundwater, water quality, riparian areas, water rights, climate data, and more.

Montana Geographic Information System provides digital mapping and analytical services as well as technical assistance to agencies developing in-house GIS capability. NRIS inventories data available for GIS applications and coordinates GIS data standards and sharing throughout the state.

In 1989, as part of the legislation providing continued funding for NRIS and its principal projects (HB 775 and HB 776), the Legislature directed the NRIS program to begin charging private users for data and information services. It was the Legislature's intent that a more diversified funding strategy for NRIS was needed and that fees collected from direct beneficiaries of NRIS data and services should be part of the funding mix.

The language in the two bills regarding this directive on fees was very specific: It granted the NRIS Advisory Committee the authority to recommend and approve the charging system, and called for detailed records of the fee revenue collected and how it is used. The language also clearly excluded other library services from the charging system, and protected the existing policy to offer NRIS data and services at no cost to the general public and government agencies.

By October 1, 1989, the NRIS staff designed a charging system, which was subsequently endorsed by the NRIS Advisory Committee and the State Library Commission. **This report, per legislative directive, is an account of experience to date using the approved charging system.**

(Refer to Attachment A of this document for details of the charging system now in place; to obtain the report that led to the creation of the charging system, contact NRIS.)

EXHIBIT 17 p.3
DATE 2-11-91
HB Long Range Planning

Data After 15 Months of Charging Fees

Since October 1, 1989, the NRIS Program has responded to 272 information requests from the private sector, (see chart, below). Of this total, 175 requests were for Natural Heritage data and information, 82 requests for water data and general NRIS information, and 15 requests for GIS data and services.

Among the 272 requests, approximately 44 percent were exempt from fees, based on established policies: the 74 requests from non-profit organizations and the 45 requests from individuals. The remaining requests -- 117 from consulting firms and 36 from industry -- were eligible for fees, based on their for-profit status.

Private Sector Use of NRIS (10/1/89 -- 12/31/90)

a Source and vices	Non-Profit Group	Individuals	Private Consultants	Industry	TOTAL
RITAGE	58	32	68	17	175
TER, et al	16	11	42	13	82
S	0	2	7	6	15
TAL	74	45	117	36	272

Of the 153 for-profit requestors, 37 were invoiced for a total of $1,834. Thus far, NRIS has received $1,102, has formally waived $508 in charges, and has $225 in accounts receivable. The discrepancy between the number of for-profit, private sector requestors (153) and the number invoiced (37) exists because the NRIS program does not charge for certain types of requests (again, based on established policies). These include:

- requests for standard reports which have been previously compiled (e.g., lists of plant and animal species of special concern);
- requests of minimal complexity answered over the phone, without the need to search any of the databases; for example, general requests for information on services available, or a specific question that one of the specialists can answer without taking much time;
- requests requiring a cursory database search, and for which no data were provided.
- requests by consulting firms performing work for state or federal agencies; in most cases, when NRIS is certain the work is on behalf of a government agency, an invoice is not sent;

Recommendation

It should be noted there continues to be a standing policy of the State Library Commission against charging fees for information and services. Thus far, the NRIS program fee system has not become a serious issue, and given this evaluation, it appears unlikely that there will be any major opposition from the Library Commission.

Therefore, based on the first 15 months of experience, it appears the fees/charging system, as designed and implemented, is appropriate. The State Library and NRIS recommend no change in the system to the Legislature.

Attachment A

FEES/CHARGING SYSTEM

Natural Resource Information System

Policy Statement:

The Natural Resource Information System (NRIS) will charge a fee to private users of the data and services in an effort to recover the service cost incurred for staff time and other expenses to deliver data.

Fee Structure:

Basic Charge: **$30.00 Access Fee per request**
Includes one hour of data manager's time to clarify data need with user, conduct computer search and retrieval, quality assurance, and assembling and mailing completed data request, etc.

Materials Charge: **$0.25/page of computer printout**
$5.00/floppy disk

Staff charge: **$25.00 per hour, rounded to the nearest half-hour**
Applies to data analysis, manual searches and map interpretations, technical assistance in defining needs, preparing special reports with the data, etc. (for staff time beyond one hour included with basic charge)

Exemptions and Related Policies

1) Charges only apply to private users of the NRIS/Heritage program. Private users are defined as "Any business, entity, or individual using, directly or indirectly, the data and services as part of a potential for-profit activity."
2) No charges to government agencies, non-profit organizations, contractors and consultants on retainer to government agencies, or members of the general public.
3) The NRIS Director reserves the right to waive user charges when a data request requires less than one hour of response time and no data are provided relevant to user's request.
4) Invoices submitted with data responses; payable in 30 days.
5) All revenue is deposited into the specific Resource Indemnity Trust accounts that support NRIS projects, and subsequently made available for other grants.

KIWANIS CLUB OF COLUMBUS MONTANA

P.O. BOX 922

INCORPORATED "WE BUILD"

EXHIBIT 18
DATE 2-11-91
HB RRD 28
long Range Plan.

February 4, 1991

Long Range Building Committee
Montana Capitol
Helena, MT 59620

Re: Columbus Recreation Project - RRD Grant Application

Dear Committee Members:

Thank you for your consideration of this grant application. In reviewing the DNRC report, it is evident that many good projects will probably not be funded this Biennium due to limited money availability. As an applicant seeking funds for a recreation project, we found grant funds from any source to be scarce. Federal funding for the Land and Water Conservation Grant Program has slowed to a trickle, and this had been a prime source of recreation grant funds in Montana. Because park projects are eligible for funding through the RRD Program, this program may receive more applications in the future for recreation type facilities. But because of the ranking criteria structure for these grant applications, particularly the urgency criterion, it appears recreation projects will seldomly be considered urgent and will not compete with applications relating to other public services or agriculture. The Town of Columbus is committed to completing this recreation project, which will be completed in phases. Funds from donations and volunteers will be used. Our first phase goal is to raise $20,000 and we have managed to raise over $13,000 through a variety of local fund raising efforts.

May we suggest an alternative grant program for recreation projects. Small civic organizations can and do achieve tremendous results performing community projects with donations and volunteers. But while they generally have the volunteers, they lack the capital. A relatively small level of funding, i.e. $5,000, would be a tremendous boost to a small community or organization which is raising money one dollar at a time through raffles and bake sales. Funds such as these would go a long way because all labor and equipment are provided by volunteers. $100,000 dollars, which is only 5% of the money projected to be available for the RRD program in the next biennium, would help out 20 small organizations. The grants could be limited to material purchases only; do not pay wages, benefits, administration, professional services, etc. Both parties will benefit, the community receives a significant boost to its fund raising efforts and the state receives matching contributions in the form of in kind services and the grant money would be used for essential materials.

While we support the RRD grant program, we hope this suggestion may be a way for worthy recreation projects to have a better opportunity to receive funding. Columbus regards recreation as a very important component in its economic strategy. A diverse community which provides recreation opportunities is more attractive to business and individuals. Thanks again for your consideration.

Tom Kaiserski
Tom Kaiserski
Pres., Columbus Kiwanis Club

Edward Viig
Edward Viig
Pres., Columbus Optimists

Jon J. Brown
Jon Brown
Pres., Columbus Chamber of Commerce

Tim Russell
Tim Russell
Pres., Columbus Jaycees

Department of Natural Resources and Conservation
Water Development and
Renewable Resource Development Grant Programs

EXHIBIT 19 p.1
DATE 2-11-91
HB RRD 28
Long Range Planning

TECHNICAL NARRATIVE

Applicant Town of Columbus

Project Title Columbus Recreation Project

A. PURPOSE AND OBJECTIVES: The purpose of this project is to develop phase one of the Columbus Recreation Project. The primary features of phase one are the construction of two baseball/softball fields, an access road and parking area, and a small concession/restroom facility served by water and sewer.

The major objectives of this project are:

1. To utilize previously unproductive land for the most suitable and beneficial (recreational) use which is compatible with the community.

2. To develop a recreation complex in Columbus which will serve the community plus attract league and tournament events.

3. To pursue a community project in which all civic groups, local governments and residents can participate.

4. To provide a beneficial effect on the local economy by attracting league and tournament play to Columbus which will benefit service sector businesses and employment opportunities.

5. To diversify the local economy in other than resource dependent or commodity oriented projects.

Little League baseball, softball and walking/jogging are major summer activities in Columbus, with as many as 1600 participants. Current playing fields are in disrepair and located away from residential areas. Also, because not enough area exists for practice, the teams must utilize the city park, which is undersized for this use. There are no walking/jogging trails in the Columbus area. Recreation is vital to any community and adequate ball fields and a walking/jogging trail would greatly improve recreation opportunities in Columbus, and help maintain the rural community lifestyle of this area.

The site consists of 34 acres owned by the State of Montana and leased by the Town of Columbus on a twenty (20) year lease which is renewable. (See Exhibit H). The past use of the property has been for agricultural purposes. Attempts at dryland farming by previous lessees have been completely unproductive, due in part to the presence of highly alkaline soils, and the property has reverted to weeds. With soil

conditioning and sprinkler irrigation, areas with excess alkalinity will be leached down and good sod forming grass will be established. The Columbus Recreation Project would put this propertty to its highest and best use and turn unproductive land into a community asset.

The Town of Columbus is the sponsoring entity. The Town will manage all grant funds. Three civic groups, (Kiwanis, Optimists and Jaycees) will help raise matching funds and provide volunteer labor, user groups, (Little League and Softball Association) will provide volunteer labor and maintain fields, and The Chamber of Commerce will be responsible for promoting the project. (See attached letter in Exhibit I).

The Town of Columbus and Stillwater County will benefit from the Columbus Recreation Project. Both the Town and County have expressed support for the project. (See cover letter from the Town and County letter of support in Exhibit I) Earth moving equipment will be provided by both entities for road construction and earth work for playing field preparation. Local and regional engineering, surveying, construction, banking and service industries will be participating and benefitting from this project

B. DESCRIPTION OF PROJECT: The project will develop a recreation complex on 34 acres of property adjacent to the Town of Columbus. (See attached vicinity map Exhibit A and site plan Exhibit B). The site plan includes constructing 4 irrigated little league/softball fields, a multipurpose athletic field, horseshoe pitching area, a walking/jogging path, and a small concession restroom facility, and an access road and parking area. Phase 1 of the plan involves constructing the two baseball/softball fields, the small concession restroom facility, the walking/jogging path, and the access road and parking area. In this grant application we are seeking funds to complete Phase 1. Grant funds received would be used for the following Phase 1 items:

1) The preparation and seeding of 3.08 acres for outfield grass for two baseball/softball fields. Also, the infield areas for both fields will be improved by adding sand at the rate of 3 cubic yards/1000 square feet to improve drainage and provide a smooth, even playing surface. Gypsum will be added to irrigated areas, at a rate of 10 lbs./per 100 square feet, where excess salts are a problem.

2) Installation of a clock operated underground sprinkler system supplied by a well 40-60 feet deep producing 65 g.p.m.

3) The purchase of backstops, fencing and bleachers for two ball fields.

4) The engineering design and construction of 2000 feet of gravel access road 24 feet wide and a 20,000 square foot gravel parking area.

5) The construction of a 20 foot by 40 foot concession/restroom building.

6) The construction of 700' of 6" sewer line and 700' of 1-1/4" water line to serve the concession/restroom building. Both of these lines would extend from existing municipal lines. Municipal water is for drinking purposes and would not be used to provide irrigation water.

7) The construction of 3000 feet of gravel walking/jogging path, 10 feet wide, which will circle the perimeter of the property north of the irrigation waste ditch.

C. PROJECT HISTORY: The baseball and softball users developed a preliminary plan for constructing ball fields on the site in 1983. An architectural firm from Billings completed a preliminary site plan in March of 1983. Some initial survey work was also done at that time to determine site topography. The necessary funding to build the facility was not generated at that time, but interest in the idea persisted. Since 1983, participation has steadily grown in youth baseball/softball as a result of population increases due to mining activity in the county.

The lease on the 34 acre site came up for renewal in 1988 and the Chamber of Commerce, civic clubs and user groups urged the Town of Columbus to bid on the lease. The lease was obtained by the Town in September of 1988 with a stipulation in the lease that the property be used exclusively for recreation.

The Stillwater County Planning Office began to develop a preliminary site plan in February of 1989. An advisory committee comprised of interested citizens worked with the Planning Office to develop the master plan of the site. The new plan is fundamentally similar to the 1983 plan prepared by the architect, however, additional facilities were added to the master plan. It was decided that only by phasing the project would it be possible to raise funds required to construct any of the facilities. Initial cost estimates were obtained and a public hearing was held on the project in December 1989 at the Town of Columbus Civic Center. Full public support was expressed for the project at that hearing (see news article attached to environmental assessment section). The Town Council formally approved the project and agreed to sponsor this grant application.

To date, the Stillwater County Planning Office has contributed over 350 hours of staff time to obtaining the lease to the site, developing the preliminary plan with citizen participation, drafting the site plan, organizing public meetings, and researching the technical options and developing cost estimates.

With the use of local government equipment, civic volunteers intend to operate equipment and provide as much of the labor as possible to complete this project. The following is a partial list of individuals or organizations which have pledged support for this project:

1) Montana Power Company will provide a $3000.00 value with installation of an electrical service line.

2) The Soil Conservation Service will provide construction elevations for a $2000.00 value.

3) A fence contractor will dig all post holes at no cost, $500.00 - $1000.00 value.

4) A local excavating company will provide earth moving equipment, and along with Town and County equipment will provide in-kind services valued at $10,000.00 - $15,000.00.

5) Local farmers and ranchers will give $3,000.00 -$4,000.00 worth of equipment and time for seed bed preparation.

6) Local assistance in designing the sprinkler system is available.

7) Softball Association will provide $6,000.00 worth of fencing, irrigation pipe and building materials.

8) Civic groups will provide funding for ongoing maintenance and operations.

In addition to our human resources, the availability to the community of the state property at a lease price which is affordable ($125.00 per year) is a major reason this project is possible. It presents an opportunity to the community which would not be affordable if the property had to be purchased at market value.

D. ALTERNATIVES:

1. Upgrade the Existing Facilities:

Upgrading the existing facilities was not chosen as an alternative for the following reasons:

A. Groundwater at the site of existing softball field in Columbus is contaminated with hexavalent chrome. Pollutants from a former 1950's chrome processing operation, now an EPA superfund site located one-half mile northwest of the existing softball fields, have contaminated groundwater. The plume of contaminated groundwater has spread to the existing softball field site. A well located at the site was monitored in January 1990, and hexavalent chrome levels exceeded the federal standards for safe drinking water. This well would have been the primary water source for those fields for drinking and irrigation.

B. The existing unimproved location used for youth baseball is located on a small corner of the high school property. This property is planned for future school expansion, which precludes investing any substantial funds for ball field improvements.

Dear Little League Family:

Green grassy ballfields with smooth even infields, sheltered by shade trees. This is the dream of every family involved with youth baseball and softball in Columbus.

In order to begin making the dream come true, we want to raise $20,000. That money would be used to drill a well, install a sprinkling system, prepare and seed outfields, prepare two infields, and gravel a parking area. Other improvements would come at a later time, possibly funded through a state grant.

We have raised over $5,000. We need $15,000. Please help make the dream a reality.

Mail your contribution to: (Postage paid envelope provided)

Columbus Recreation Project
c/o Columbus Kiwanis Club
P.O. Box 922
Columbus, MT 59019

Larry Goehner, President
Columbus Kiwanis Club

Edward Viig, President
Columbus Optimists

Jon Brown, President
Columbus Chamber of Commerce

Tim Russell, President
Columbus Jaycees

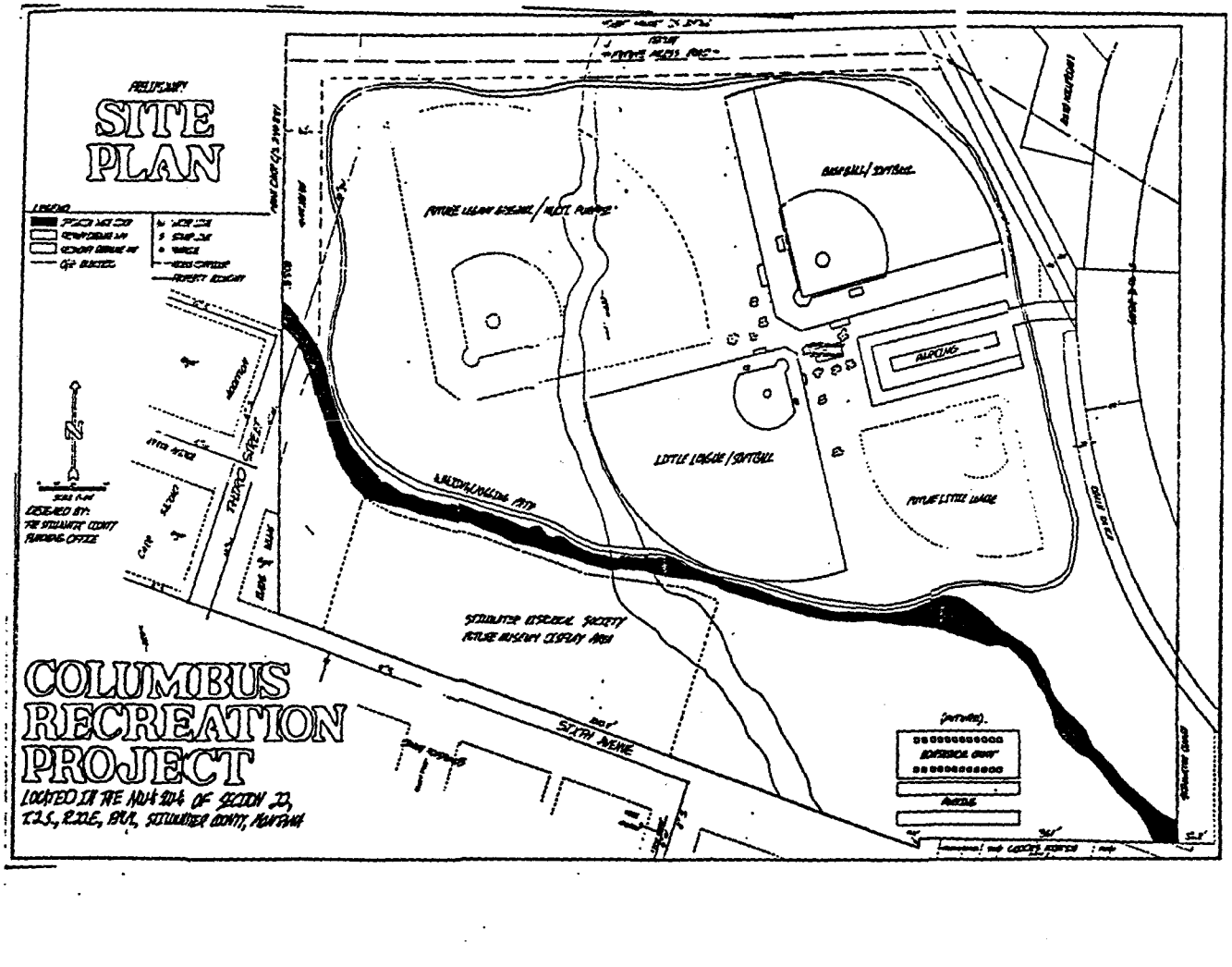
Ennis Geraghty, President
Columbus Youth Baseball
and Softball

Baseball is a major family activity in Columbus. As a family who is directly involved in Little League, you are aware of the importance it plays in your child's spring/summer activities. The participation in Columbus is tremendous, with 186 kids signing up to play ball in 1990. Mining activity has swelled the town's population, and we can expect the participation to grow.

Surely every family in Columbus involved in Little League has dreamed of green grassy ballfields with smooth, even infields. Volunteer workers have done a commendable job making the existing fields playable and comfortable for spectators, but the fields are difficult to play on at best. Indeed, the terrific interest and participation in baseball, despite the field conditions, makes the powerful statement that Columbus loves Little League baseball.

The Columbus Optimists, Jaycees, Chamber of Commerce, and Little League, under the sponsorship of the Columbus Kiwanis Club, want to make the dream come true of building a ballfield complex that Columbus can be proud of. The County Planning Office has assisted in developing a site plan for property adjacent to the county fairgrounds. The property is available for immediate development. The first phase of the plan calls for building two ballfields. The Planning Office has applied for grant money to build the complex. However, receiving a grant is never a sure thing. A funding decision on the grant will not be made until after the state legislature meets in the spring of 1991. Even if successful, the money may not be available until 1993. In order to begin making the dream come true, we are hoping to raise $20,000. That money would be used to drill a well, install a sprinkling system, prepare and seed the outfields, prepare two infields, and gravel a parking area. Other improvements would come at a later time, possibly funded through the grant.

We have currently raised over $5,000. We have also constructed a 3300 foot walking/jogging path around the site available for immediate public use. We hope you will consider making a donation so that we can raise the other $15,000 and make the dream a reality.



DATE 8-11-91
HB PLD-28

VICINITY MAP

COLUMBUS RECREATION PROJECT

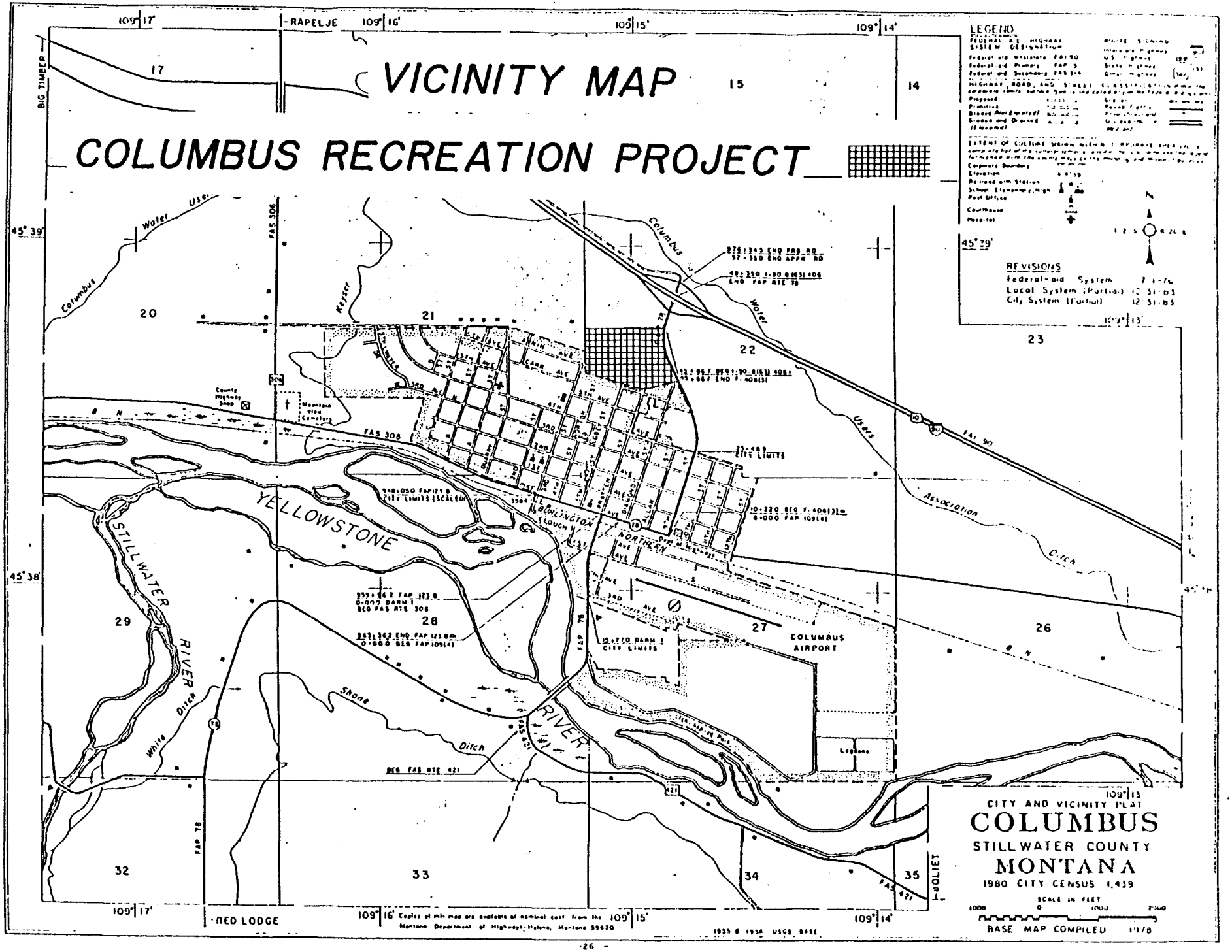


EXHIBIT 40
DATE 2-11-91
HB Long Range Planning

TESTIMONY FOR FLAXVILLE WELL DNRC LOAN WRITE-OFF

Good morning ladies and gentlemen. My name is Ray Wittak and I am the mayor of Flaxville.

We are requesting grant funding to write off a loan made to us in 1985 for drilling a water well that we can't use due to the poor quality of the water. Show sample. The odor and color in the water is due to tannins and lignins and it is very difficult and costly to treat the water to remove those contaminants even though this water meets safe drinking water standards just as it is. Pass it around.

Flaxville has had a reliable water supply for 75 years from relatively shallow 50 foot wells. Our water problems began in 1978 when the health department began requiring water testing and our water had nitrate levels just above the safe drinking standard. In 1982 we drilled a 450 foot well - it couldn't be used due to high levels of iron, manganese, sulfate and dissolved solids. In 1983 we applied for grants and loans and drilled a well to 675 feet which produced this dark water. In 1985 we applied for Block Grant funding to treat the dark water and after extensive testing and pilot plant trials the project fell through because the construction costs exceeded available funds. Prior to reapplying for Block Grant funding in 1989 we asked the Bureau of Mines to review all our previous well logs and test area wells. Their assessment was that the two deeper wells would not provide a reliable water supply and that both the iron removal and tannin and lignin removal would be cost prohibitive compared to nitrate removal from the shallow wells. So after 10 years of being manipulated by the State Helath Department and spending $_____ of our own money on these projects we ~~are~~ were right back where we started. We have been awarded $226,000 in Block Grant funds and will be building a nitrate treatment plant this summer.

If you assume an average rate of water use of 10,000 gallons per month our current water rates are $18.53 per month. Our projected costs for nitrate removal will raise that rate to $37.85 per month. Writing off the DNRC loan will help get those rates down to a more reasonable level of $33 per month.

As with other small towns in Eastern Montana we have a continuing population decline and a large percentage of elderly and retired people. 73 percent of our households are classified as low and moderate income. As our population gets smaller there will be fewer people to pay the increasing cost for water. At some point people will begin moving out just to avoid the high costs for water. We currently have 62 water users, projecting our population decline to 2015 when the final DNRC loan payment is due, we will have 40 users who will each be paying 7.50 per month for the loan repayment and have a total water bill of $66.22 per month - that is assuming there are no additional costs or inflation.

Over the years of dealing with our nitrate problem we have recieved a great deal of well-intentioned regulatory advice and assistance all resulting in considerable expense to us and all we have to show for it are two useless holes in the ground and a long term debt. It has left the whole town disillusioned and frustrated with the whole process. Writing off the Water Development Loan would go a long way in improving our attitude and resolving some of the injustice in this situation.

Thank you for your time and we hope you will look favorably on our request.

QUESTIONS?

EXHIBIT 21
DATE 2.11.91
HB LRD 143
Long Range Planning

1983
MONTANA COMMUNITY DEVELOPMENT
BLOCK GRANT PROGRAM
APPLICATION SUMMARY

I. APPLICANT NAME : Town of Flaxville c/o Ralph [illegible]

II. ADDRESS : (Street or P.O. Box)

(City) Flaxville (Zip Code) 59222

III. CONTACT PERSON : Carlo Porteen TELEPHONE NO. 226-9451

V. TYPE OF APPLICANT : City/Town X County ______

VI. TYPE OF APPLICATION:

(A) Single Purpose X (B) Comprehensive ______
1. Economic Development ______ 1. Economic Development ______
2. Housing ______ 2. Housing ______
3. Public Facilities X 3. Public Facilities ______
Problem being addressed: Problem being addressed:
a. [illegible] ______ a. [illegible] ______
b. Blight ______ b. Blight ______
c. Public Health Threat X c. Public Health Threat ______

VII. BRIEF PROJECT DESCRIPTION: The Flaxville community water supply currently is so high in nitrates, it is a potential threat to the health of those who use it. Department of Health and Environmental Sciences officials have stated that Flaxville must correct the problem by January 1, 1984 or face court action by the State of Montana. In order to comply with this mandate by DHES, the town proposes to drill and develop a deep well 900 to 1,000' deep, and integrate the well into the current water system, and utilize the new water source. Abandoning the present well system (50' in depth - 3 wells), capacity at 30 GPM, 17 GPM, and 11 GPM is an alternative. Flaxville's population has continued to decline over the last 20 years (1980 census: 142).
Water high in nitrates can cause methemoglobinemia or "blue baby syndrome" in infants; impairs oxygen carried by blood cells in infants and causing death in extreme cases.

VIII.	CDBG Funds Requested	Other Public	Private	Total Project Cost
Project Budget	$ 21,850.00	$ 50,000.00	$	$ 71,850.00

IX. Is the applicant a current CDBG Grantee? No If yes, attach explanation and status report.

X. Percent of Project Benefit to Low to Moderate Income Persons: 67.74 % 34.6% (Census tape 3-A)
(Community Needs Survey 6-83)

XI. Citation of Legal Authority to Conduct the Proposed Program: Flaxville, Montana is an incorporated town having general powers and organized in accordance with Montana law. The Montana Legislature mandates specific powers to municipalities in Sec. 7-1-4124, M.C.A.(7) solicit and accept bequests, donations, or grants of money....

XII. To the best of my knowledge and belief, statements in the application are true and correct and the submission has been duly authorized by resolution of the governing body of the applicant:

Signature: Raymond Wittak Title: Flaxville Mayor

Typed Name: Raymond Wittak Date: June 30, 1983

16 MG / 1 mil

WATER DEVELOPMENT BUREAU

AMORTIZATION SCHEDULE

PROJECT NAME: TOWN OF FLAXVILLE (7.2%, 30 YEARS, SEMIANNUAL PAYMENTS

EXHIBIT 2
2-11-91
Long Range Planning

PAYMENT:	1799.57
PRINCIPAL:	44,000
INTEREST PER PERIOD (IN DECIMALS):	0.036
NO. OF PERIODS:	$ 60.00

PAYMENT NO.	INTEREST	PRINCIPAL	BALANCE	
			$ 44,000.00	
1.00	$ 1,584.00	$ 215.57	$ 43,784.43	paid
2.00	$ 1,576.24	$ 223.33	$ 43,561.11	"
3.00	$ 1,568.20	$ 231.37	$ 43,329.74	"
4.00	$ 1,559.87	$ 239.70	$ 43,090.04	"
5.00	$ 1,551.24	$ 248.33	$ 42,841.72	"
6.00	$ 1,542.30	$ 257.27	$ 42,584.45	
7.00	$ 1,533.04	$ 266.53	$ 42,317.92	"
8.00	$ 1,523.45	$ 276.12	$ 42,041.30	"
9.00	$ 1,513.50	$ 286.06	$ 41,755.74	"
10.00	$ 1,503.21	$ 296.36	$ 41,459.38	"
11.00	$ 1,492.54	$ 307.03	$ 41,152.35	"
12.00	$ 1,481.48	$ 318.08	$ 40,834.27	" Feb 8-91
13.00	$ 1,470.03	$ 329.53	$ 40,504.73	
14.00	$ 1,458.17	$ 341.40	$ 40,163.33	
15.00	$ 1,445.88	$ 353.69	$ 39,809.65	
16.00	$ 1,433.15	$ 366.42	$ 39,443.23	
17.00	$ 1,419.96	$ 379.61	$ 39,063.62	
18.00	$ 1,406.29	$ 393.23	$ 38,670.34	
19.00	$ 1,392.13	$ 407.44	$ 38,262.90	
20.00	$ 1,377.46	$ 422.10	$ 37,840.80	
21.00	$ 1,362.27	$ 437.30	$ 37,403.50	
22.00	$ 1,346.53	$ 453.04	$ 36,950.46	
23.00	$ 1,330.22	$ 469.35	$ 36,481.11	
24.00	$ 1,313.32	$ 486.25	$ 35,994.86	
25.00	$ 1,295.82	$ 503.75	$ 35,491.11	
26.00	$ 1,277.68	$ 521.89	$ 34,969.23	
27.00	$ 1,258.89	$ 540.68	$ 34,428.55	
28.00	$ 1,239.43	$ 560.14	$ 33,868.41	
29.00	$ 1,219.26	$ 580.30	$ 33,238.11	
30.00	$ 1,198.37	$ 601.20	$ 32,686.91	
31.00	$ 1,176.73	$ 622.84	$ 32,064.07	
32.00	$ 1,154.31	$ 645.26	$ 31,418.81	
33.00	$ 1,131.03	$ 668.49	$ 30,750.32	
34.00	$ 1,107.01	$ 692.56	$ 30,057.77	
35.00	$ 1,082.08	$ 717.49	$ 29,340.23	
36.00	$ 1,056.25	$ 743.32	$ 28,596.96	
37.00	$ 1,029.49	$ 770.08	$ 27,826.88	
38.00	$ 1,001.77	$ 797.80	$ 27,029.09	
39.00	$ 973.05	$ 826.52	$ 26,202.56	
40.00	$ 943.29	$ 856.27	$ 25,346.29	
41.00	$ 912.47	$ 887.10	$ 24,459.19	
42.00	$ 880.53	$ 919.04	$ 23,540.15	
43.00	$ 847.45	$ 952.12	$ 22,588.03	
44.00	$ 813.17	$ 986.40	$ 21,601.63	
45.00	$ 777.66	$ 1,021.91	$ 20,579.72	
46.00	$ 740.87	$ 1,058.70	$ 19,521.03	
47.00	$ 702.76	$ 1,096.81	$ 18,424.22	
48.00	$ 663.27	$ 1,136.30	$ 17,287.92	
49.00	$ 622.37	$ 1,177.20	$ 16,110.72	
50.00	$ 579.99	$ 1,219.58	$ 14,891.14	
51.00	$ 536.08	$ 1,263.49	$ 13,627.65	
52.00	$ 490.60	$ 1,308.97	$ 12,318.63	
53.00	$ 443.47	$ 1,356.09	$ 10,962.59	
54.00	$ 394.65	$ 1,404.91	$ 9,557.67	
55.00	$ 344.08	$ 1,455.49	$ 8,102.13	
56.00	$ 291.68	$ 1,507.89	$ 6,594.29	
57.00	$ 237.39	$ 1,562.17	$ 5,032.12	
58.00	$ 181.10	$ 1,618.41	$ 3,413.71	
59.00	$ 122.89	$ 1,676.67	$ 1,737.03	
60.00	$ 62.53	$ 1,737.03	$ -0.00	

TOTAL INT $ 63,974.06 $ 30,925

1982 - 450' well - High iron - 5839.50

1983 - 1144' - CDBG Grant -
21,850
loan 44000
town funds 6000

Loan repayment - 1985 - 44,000 loan 1799.50
Semi Annual
To date - 12 payments - Int 18429.07
principle 3165.75

Total Int after 30 years. 7.2 on 44,000 loan
= 63,974.06

EXHIBIT 23
DATE 2-11-91
HB RRD 40
Long Range Planning

Glendive, for those of you who are not familiar with our town, is located on Interstate 90, approximately 40 miles from the North Dakota border. The Yellowstone River divides the city proper from the West Glendive area. We have active economic development groups with recent successes as the Veterans Nursing Home Project and Paddlefish Caviar Processing Plant. These successes raise the spirits, but they do not replace the lost business activity due to the drought and the collapse of the agriculture and oil industries.

During the last 10 years in the City of Glendive alone, we have lost over 50 businesses and have seen a decline in population to about 4,800. Throughout Dawson County we have had a total population decrease to approximately 9,500. We have a long ways to go to establish an economic equalibrium.

Aqua-farm is a economic development proposal to establish new business and new jobs in the Glendive area. Many of the project benefits such as new career opportunities, new capital formation, new tax base, etc. will be determined by the availability of and the quality of the water. Cost estimates are also contingent upon the volume, quality, and depth of the aquifers. Disease control and potential profitability in the Aqua-farm will be greatly influenced by the water resources available in Dawson County.

The purpose of the feasibility study is to determine: 1.) availability of water resources; 2.)water quality;

3.) the availability of water geothermo vanes, if any; 4.) the depth of the located aquifers and; 5.) what is the maximum draw down available in these aquifers and how much usage will they sustain over a period of time.

The Dawson County Development Council is now in the process of studying other, less costly construction and water resource techniques in the development of Aqua Farms. These processes may include:

1.) Use of river water with filtration system.
2.) Recycled well water so volumes do not have to be so large.
3.) Cheaper construction techniques using steel bin rings and plastic liners.
4.) Use of existing buildings.
5.) Phased in development: start small and expand as the plant gains profitability.
6.) Adapting the fish species to meet the water quality.
7.) Consultations with engineers and construction methods on existing aqua-farms.

It is probably evident to you, that in the development of an aqua-farm, many of the decisions that lie ahead are entirely dependent on the quantity, quality, and depth of the water resources. We need this information to proceed.

These fisheries can be housed many different ways once 1 or 2 of these are in production. ~~And other counties such as Ravalli, Flathead, Deer Lodge, Chouteau, and Blaine in~~

23 p.s
DATE 2-11-91
HB RRD 40
Long Range Planning

~~those are in production.~~ And other counties such as Ravahli, Flathead, Deer Lodge, Chouteau, and Blaine in the great State of Montana could become a vast network of aquafarms, small or large.

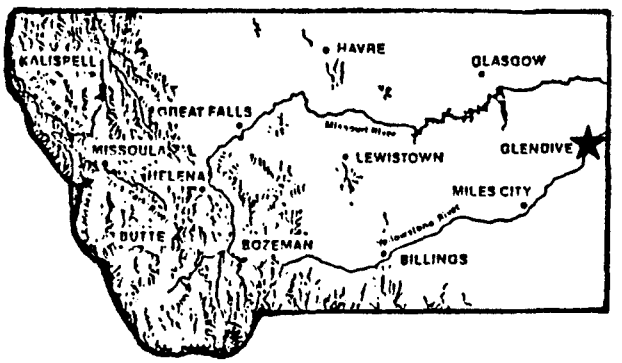
We have determined a "Needs Assessment" but are now looking for technical assistance and "know how" to do this project to its fullest potential and in an orderly fashion. State funding would give us a chance to begin.

As farming is becoming an industry that is having a tough time in the market place, things need to change. That is why with Aquafarming coming into the region, it could become an added income to both farmers and the seafood industry. In addition to the demand for the product we can also create a demand for some of our locally grown grain for use as a feed in the aqua farm.

Aqua farms may be new to our area but they have been in existence for many years in other states that are quite similar environmentally to Eastern Montana.

It will be futile for the Dawson County Development Council to spend hours and hours on the planning and development of an Aqua farm if the most basic resource to the success of this endeavor is not available in sufficient quantity or quality. We need this State grant to fund this feasibility study. We urge your approval so that we can proceed in a substaniative manner. We would like to use Montana water and resources to create and maintain Montana jobs.

GLENDIVE
MONTANA



GATEWAY
TO
THE WEST

GLENDIVE FORWARD

"An Economic Development Corporation"

P.O. Box 1202 Glendive, MT 59330

(406) 365-8612

MONTANA COMMUNITY PROFILE

EXHIBIT 24
DATE 2.11.91
HB RRD 40
Long Range Planning

GLENDIVE — Name of Community
DAWSON — County
State Certified: ☒ yes ☐ no
Date Compiled November 1990

LOCATION

Distance in highway miles from United States cities:

Chicago	1,050	Los Angeles	1,482
Denver	700	San Francisco	1,407
Phoenix	1,505	Portland	1,068
Salt Lake City	770	St. Paul/Minn.	665
Seattle	998	Spokane	800

Distance in highway miles from Canadian cities:

Calgary	731	Saskatoon	371
Edmonton	917	Vancouver	1,142
Regina	250	Winnepeg	563

POPULATION

	1970	1980	1990
City	7,085	5,978	4,764 **
County	12,314	11,805	9,459 **

(1990 Census - Preliminary figures)

DAWSON County

Age:	18-24	25-44	45-54
Male	979	1,868	647
Female	894	1,691	655
Total	1,873	3,559	1,302

Last Census 1980 (not available for 1990)

LABOR

Hourly wage rates:

Job Title	Min.	Ave.	Max.
Laborer	4.50	6.85	9.20
Welder	12.00	13.50	15.00
Meter Reader	7.85	9.00	10.30
Lineman	10.90	13.50	15.50
Secretary	6.00	7.75	9.50
Cashier/Clerk	5.50	7.75	8.05
Engineer	15.00	17.00	20.00
Mechanic	11.00	11.50	12.75

% of Labor Force Unionized: 19%
Work Stoppages in Past Two Years: ----

County Labor Data

Labor Force	5,130
Unemployed	152
Unemployed as % of Labor Force	3%
Total Employment	5,282
Agricultural Employment	423
Non-agricultural Employment	4,859

8/1990 (year) annual average from Montana Department of Labor

TRANSPORTATION SERVICES

Motor Carrier

Highway bus service available: ☒ yes ☐ no
Number highways serving city: Federal 1 State 2
City within 1-mile of interstate highway interchange: ☒ yes ☐ no
Name(s) of nearest interstate: I-94
Distance to nearest interstate interchange: one (1) miles

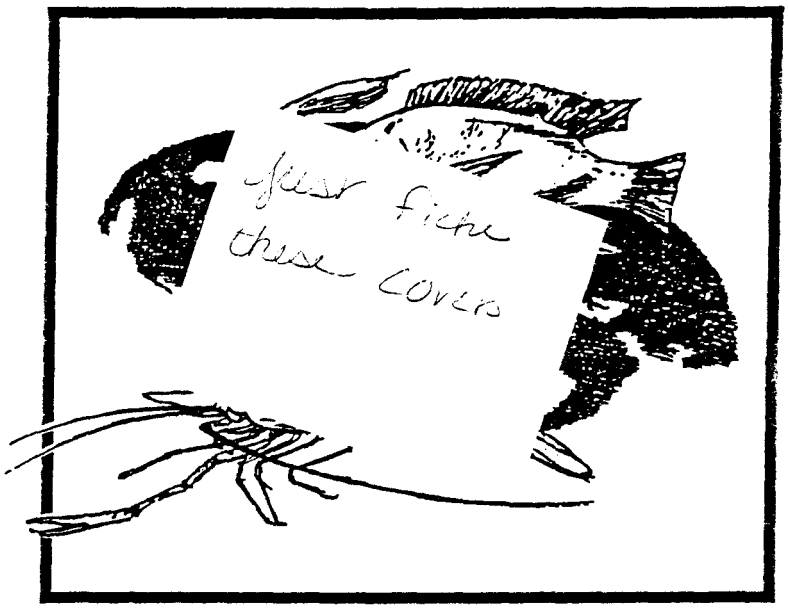
Motor freight carriers serving community:
Interstate carriers: Midwest Motor Express Inc.
Intrastate carriers: Bob's Pickup & Delivery

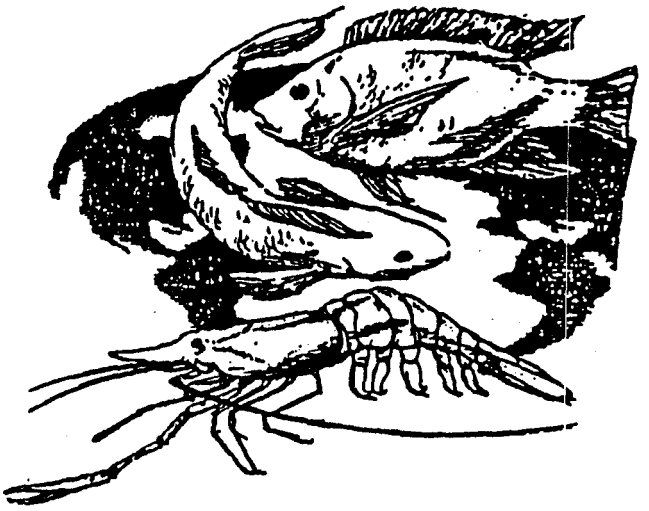
Time in transit for carload or truckload lots to:

City	Days by Railroad	Days by Motor Freight
Chicago	3	3-4
Phoenix	8	4-5
Denver	3	3-4
Salt Lake City	6	4
Los Angeles	8	4-5
Minneapolis	2	1
Seattle	4	2
Portland	4	2
San Francisco	7	4-5
Spokane	3	2
CANADA		
Calgary	5	3-4
Edmonton	6	4-5
Regina	6	1
Saskatoon	7	2
Vancouver	5	4-5
Winnepeg	5	2-3

INCREASE YOUR PROFIT BY USING WASTE HEAT

FISH FARMING





BUSINESS OPPORTUNITIES IN AQUACULTURE

OPPORTUNITIES IN NORTH DAKOTA

SCOPE OF WORK ADDENDUM

Addendum #260

Preliminary work with intent to establish an Aquaculture Venture for Dawson County Montana.

1. On Site evaluation including water analysis.

2. Pre-engineering design, including line drawings of system and estimated costs.

3. Pre-design of processing facility large enough to accommodate the designed system with plans for enlargement.

4. Preliminary marketing study with intent to define available markets for direct sales of facility fish.

5. Financial proforma necessary for submission to banking and financial groups, including costs of system, expenses over a 3 year period including revenues with and without processing facility.

6. Estimated study period will be 120 days.

7. The purpose is to establish size, cost analysis and cash flow proforma for an intensive family farm aquaculture system.

8. Define possible impact and jobs potential within the community.

AQUACULTURE INDUSTRY

In recent years, there has been considerable public interest in the rapidly growing aquaculture industry. Aquaculture is broadly defined as the farming and husbandry of freshwater and marine organisms by private industry for commercial purposes or by public agencies for augmenting natural stocks.

On a world scale, aquaculture presently accounts for 15% of total fisheries product supply or 22 billion pounds annually. The aquaculture production projection for the year 2000 is 200 billion pounds per year.

Aquaculture is slated to be one of the greatest growth industries in the United States within the next ten years. The consumption of seafood products in the United States alone is nearly 4 billion pounds per year - almost 11 million pounds per day! Total U.S. aquaculture production is over 200 million pounds per year. By the year 2000, production is expected to reach 1.2 billion pounds per year. It is no wonder that many have searched and still continue to search for knowledge and answers in the rush to be part of the ground floor growth of this exciting new industry.

INTENSIVE CLOSED CYCLE CULTURE

The major goal of closed cycle culture is to maximize the amount of fish grown in a specific area of water while controlling all aspects of the environment. For instance, a properly designed and operated system using a freshwater replacement rate of 5 - 10% per day can produce approximately 1 pound of fish per gallon of water. Even with large quantities of fresh water available, costs to pump, heat, treat bacteria and remove metabolic wastes can be cost effective.

The economics of high density farming is to minimize the costs per pound of raising the fish. Operating costs are controlled, harvesting is more economical, and market demand can be met in a more timely manner. The result is greater profit. Start-up costs for this type of business are higher but the profitability is greatly increased and the pay back time of the return on investment is shorter.

EXHIBIT 25 p.24
DATE 2-11-91
HB RD
Long Range Plannin

CLOSED CYCLE INTENSIVE AQUACULTURE FACILITY

50,000 POUND PRODUCTION ANNUALLY

Closed cycle intensive aquaculture has been developed over the last ten years. This system has several advantages over other alternative fish production in its ability to control all aspects of the environment. Several costly problems such as predation, and contamination can be virtually eliminated. In cold climates, closed cycle intensive systems enable a producer to control water temperature as well, thus allowing producers to raise more profitable warm water species such as tilapia and striped bass.

Intensive aquaculture is quite adaptable to varied sizes, species, and levels of expertise, dependent upon the expectations of the people involved. Keeton Fisheries Consultants has developed a 50,000 pound per year unit. This is a comfortable size to provide a livelihood or an add on crop for a family owned farm. The intention of this unit is to provide an environment adequate for the production of tilapia in a system that can be managed with a limited amount of training at a cost in line with production expectations. It is assumed this unit will be included on an existing site or new building to accommodate the culture unit. Therefore, costs included here are for the facility only. Costs for buildings, land, water, or utility hook-up are not included. Further, no expenses are included for labor or insurance since it is assumed this would already be in place.

The Closed Cycle System designed here is for year round production of 50,000 pounds of tilapia. Production would be integrated with fingerlings being introduced on a monthly basis as well as weekly harvests. Ideally, integrated production would provide 4,167 pounds for sale per month. At a sale price of $1.30 per pound this production could generate a gross revenue of $5,417.10 monthly.

CLOSED CYCLE INTENSIVE AQUACULTURE

ON THE SMALL SCALE

Interest has developed in fish production for the family farm

or small producer. Catfish farming in such states as Mississippi and Louisiana have enabled many agricultural families to thrive in areas long tied to financially depressed crops. Currently, these southern growers have diversified into crayfish, red drum, striped bass, tilapia, and tropical fish.

"The record Christmas freeze of 1989 caused millions of dollars in damage to aquaculture interests across the Gulf Coast area, particularly to pond raised redfish, crawfish, and Florida tropical fish, according to a Water Farming Journal survey." This article goes on to say Florida tropical fish farmers lost as much as 75% of their stock to this cold snap and a weeks inability to harvest catfish in Mississippi associated with the cold caused processors lost production on 5 million pounds. Intensive Systems would have enabled these same growers to protect their crops from such losses.

Intensive closed cycle enables the agricultural community in Northern states to compete successfully with these southern producers. Because of the efficiency of intensive production limited labor is involved compared to pond production, harvests can be conducted in a smooth simple operation compared to pond harvest conducted with nets, vacuumes, and extensive labor. Intensive growers can withhold feed prior to harvest insuring taste is not affected by feed components. Further, weather adversely affects pond growers with cold snaps,and droughts as the very least. Intensive systems continue to produce through snow and sleet as long as the power is available. Most important, intensive growers can control the quantity, quality and taste of the end produce.

The producer can predict approximate harvest and deliver a specified amount of the product on a contractual basis by supplying a specified number of pounds per week on a year round basis. An individual can control the size of its product for specialty markets by delaying part of the harvest and rearing to a specific weight. Through controlled harvesting and deliver a fresher product than ocean harvested fish quality of this crop can also be assured.

FACILITY DESCRIPTION

THE BUILDING

The system has been designed to be housed in an insulated

building 40 feet by 100 feet. This system can be adapted to farm buildings of similar design already present.

Inside the building the culture system includes several components; raceways for fish production, water heating and delivery, the filtration system, ammonia removal, oxygen supplementation. The fish raceways of concrete construction are the most economical and quite satisfactory when combined with a coating of specialized epoxy paint or gelcoat throughout the inside. The raceways are plumbed in such a way as to deliver water to the system from above and outlet occurs by standpipe facilitating regular backwashing to remove solids from the raceways. The water removed from the raceway is transported by gravity to the filtration system.

THE SYSTEM
(Keeton Fisheries Consultants Proprietary Technology)

The raceway systems are configured in a four stage arrangement of various sizes to accommodate different sized fish for integrated production technology. Stage One consists of two raceways of 1,680 gallons each, Stage Two contains two raceways of 3,360 gallons each, Stage Three has two raceways of 6,720 gallons each and the final Stage Four contains four raceways of 6,720 gallons each. Total tank volume is 50,170 gallons.

The filtration system consist of a biological filter, packed column, foam fractionators and other elements necessary for the removal of ammonia, nitrogen and proteins for the water column. The first stage of filtration removes 90% of solids, PO4 reduction of 80% and 40% of nitrogen. The second stage involved a reverse flow fractionation for protein skimming.

After filtration has been completed water is ozonated. Ozonation delivers oxygen enriched water as well as destroying any bacteria left in the water from the raceways or filtration process. In addition to the ozone treatment, each raceway is aerated using specialized ozone resistant tubing and airstones throughout.

Total water flow rate to the combined raceways is 350GPM with 4 each 3 feet and 8 feet RBC's for ammonia removal. Total air provided to the system is 88-100 cubic feet per minute. Heat for the system can be provided by coal fired boiler,

propane or natural gas depending upon client needs.

In addition to the elements required for a closed cycle system some backup equipment is necessary. Most important is the availability of a generator to power the system in the event of power outages. A system able to provide oxygen to production tanks for several hours at a time will be able to avoid large scale mortality.

MARKETS

The popularity of Tilapia continues to increase everywhere it is introduced. Demand outreaches production geometrically. The major interest for Tilapia is on both the east and west coasts, with product request for fresh not frozen fish shipped by air. Fish can be dressed for several markets, whole, whole heads on, whole gutted, whole heads off, fillets etc. With access to an airport, growers from anywhere in the United States can market their products in large population centers. Therefore, fish grown in The Midwest or Far West may be sold in Minneapolis, Chicago,New York, Los Angeles, etc.

Large processing plants are being considered in North Dakota, Wyoming, and Colorado. All have designs to address the needs of the small producers in their areas. The plan is to accommodate small growers without the time or ability to market their own fish nationally. With the presence of such large scale processing top dollar can be demanded by the growers in the area. Growers in areas without plans for large scale processing facilities could combine in cooperatives for such advantages as processing, delivery, bulk feed purchases etc.

TILAPIA, FISH OF CHOICE

FOR

CLOSED CYCLE INTENSIVE AQUACULTURE

Tilapia was originally termed the miracle fish by Christian scholars who trace its origins to the Sea of Galilee and the miracle of the loaves and fishes. St. Peter's Tilapia, sometimes called Saint Peters Fish, African Perch or "Sunshine Snapper (R) is a member of the Chichilidae family and related to the American sunfish.

Recent developments have revitalized this miracle fish into a modern day wonder. Hybridization has created a fish which can not only be economically grown in large numbers under controlled environmental conditions, but a fish which delights the pallets of the most discriminating.

TASTE, SIZE, AND NUTRITIONAL CONTENT

It has been known for many years that the flesh of the tilapia can be superb; some chef's have compared it to the finest turbot from the North Sea. The tilapia yields a firm white meat which is not oily and has virtually no fishy smell or tastes. In blind taste tests, tilapia has won out over trout and catfish. Visitors to the Epcot Center are served tilapia with a dill sauce and this fish routinely sells out accounting for up to 15% of one restaurant's lunch sales. In Hawaii, farmed tilapia is so highly regarded that it is serves as sashimi in Japanese restaurants.

To achieve tilapia's distinct taste, it must be grown in good, clean, warm water and fed a controlled diet to produce the fine textured white flesh with few intramuscular bones. Intensive Closed Cycle Facilities are an ideal setting for this remarkable fish.

United States
Department of
Agriculture

Cooperative State
Research Service

Office for
Small-Scale Agriculture

A Small-Scale Agriculture Alternative

Aquaculture

An ancient science practiced by many major civilizations, aquaculture today produces more than 2,000 different species of plants and animals in fresh and salt waters around the world.

U.S. aquaculture production has dramatically expanded in the past 10 years with pond-raised catfish in the Southeast, cage-raised coho salmon in the Pacific Northwest, pen-raised Atlantic salmon in the Northeast, and farm-raised crawfish in Louisiana and Texas. Freshwater trout dominate the aquatic production of several States, while ornamental fish, plants, and algae abound in others. Emerging species with commercial potential include hybrid striped bass, redfish, yellow perch, and hybrids of trout and salmon.

During the last few years, harvests from capture-fisheries have reached a stable level. At the same time, however, consumer demand for both seafood and freshwater products has continued to increase. Per capita consumption has increased over 25 percent in the past 6 years.

Low-fat product

U.S. consumers are becoming increasingly aware of the advantages of aquaculture products. Trends in seafood consumption, fueled by concern for a contamination-free, low-fat product, suggest a steady annual increase in demand for several years to come.

Imports, many utilizing expensive air freight transportation, represent 46 percent of the U.S. seafood consumption in pounds and 82 percent in U.S. consumer dollars. Recent successful introductions of South American shrimp and Norwegian salmon prove the profitability of good-quality seafood.

Like traditional farming, aquaculture requires hard work, pride in the best product possible, and marketing knowhow to generate an acceptable return. Products are sold whole, processed, and value-added. Markets may be found locally, regionally, and internationally. Growers can market aquaculture crops as bait, ornamentals, pets, or stockers; specimen water plants; environmental grasses, and by-products: feed, fish oils, and fertilizers.

Water experience needed

Small-scale aquaculture is limited less by a lack of information than by farmers with experience working with water crops. There are many parallels with more traditional farming products. For example, problems of quality, shelf-life, and market development are similar to those for any perishable farm product.

Inspection of seafood processing is not yet federally mandated but Congress has seriously considered enabling legislation. Legislation, if approved, would have a direct impact on marketing processed aquaculture products.

One factor complicating aquacultural development is that mandated authorities of numerous State and Federal agencies may overlap and cause conflicts.

Information sources

Aquaculture specialist James W. Avault, Jr. (Louisiana State University, Baton Rouge, LA 70803), emphasizes that getting answers to problem questions is essential for successful aquaculture. His December 1989 article in *Aquaculture Magazine* lists many information sources.

There are a number of multispecies book sources, a list of which is available from the U.S. Department of Agriculture's (USDA) National Agricultural Library, with its AGRICOLA computer database and Aquaculture Information Center (NAL, Beltsville, MD 20705).

Federal sources

The USDA, lead agency in coordinating aquaculture development, also has these information sources: the Extension Service (Washington, DC 20250), the Cooperative State Research Service (CSRS) Office of Aquaculture (Aerospace Building, Suite 342, Washington, DC 20250-2200), the Soil Conservation Service (SCS, Washington, DC 20250) and federally supported Extension and research projects at 1890 and 1862 State land-grant colleges and universities.

Specific information about these and many more contacts also can be found in the "Directory of Small-Scale Agriculture" (Superintendent of Documents, United States Government Printing Office, Washington, DC 20402/$5.50 per copy).

Several other Federal agencies also are involved in aquaculture. The U.S. Department of the Interior's Fish and Wildlife Service (USFWS) may help with questions on hatchery management, fish biology, disease control, and reservoir management.

The U.S. Department of Commerce's National Marine Fisheries Service (NMFS, 1335 East-West Highway, Silver Spring, MD 20910) focuses on saltwater fish, shrimp, oyster, and other shellfish species.

Also within the Department of Commerce is the Office of Sea Grants, administered by the National Oceanic and Atmospheric Administration (NOAA, Rockville, MD 20805) to support research.

The Environmental Protection Agency (EPA, Waterside Mall, Washington, DC 20460) monitors the impact of aquaculture practices on surface and ground water.

The Food and Drug Administration (FDA, 5600 Fishers Land, Rockville, MD 20852) regulates pest control materials, food additives, and processing practices.

child's play. While no one has actually seen it done (poor visibility and all), they are claimed to be able to pancake themselves into footprints on pond bottoms in order to avoid capture. So, if you plan on growing tilapia, you should design a system that can be drained, preferably into a concrete sump where collection will be relatively easy.

At present there are not very many commercial suppliers of tilapia. Those known to me are listed below, along with the species and sizes they can supply. Breeding pairs of various species can often be obtained by contacting universities where research is being done.

SUPPLIER	FISH AVAILABLE	
Jack Dequine Southern Fish Culturists Post Office Box 251 Leesburg, Florida 32748 (904) 787-1360	Fingerlings:	*T. aurea*
David Dunseth. Santee Cooper 223 N. Live Oak Drive Moncks Corner, SC 29461 (803) 899-2121	Fry and fingerlings:	*T. nilotica* *T. aurea*
Kearney Lau Hi Tide Aquatic, Inc. 67 Chrystie Street New York, NY 10002 (212) 925-9030	Broodstock:	*T. aurea*
Carl Manley Verde Fish Farm Post Office Box 706 Camp Verde, AZ 86322 (602) 567-3753	All sizes:	*T. zillii* *T. mossambica*
Leo Ray Fish Breeders of Idaho Buhl, Idaho 83316 (208) 543-6645	Fingerlings:	*T. zillii* *T. mossambica*
Mike Sipe Natural Systems, Inc. Route 1, Box 319 Palmetto, Florida 33561 (813) 722-8911	Fry:	*T. mossambica* ♀ X *T. hornorum* ♂ hybrids 95 - 100% male. —color and improved body shape varieties available.
	Fry:	*T. hornorum* ♀ X *T. mossambica* ♂ sex-reversed (95 - 100% male) hybrids.
	Broodstock:	*T. mossambica* *T. hornorum*
Erwin Young Better Products, Inc. Post Office Box 1052 Alamosa, CA 81101 (303) 589-3032	All sizes:	*T. aurea* *T. nilotica*

Current Research

Because of the interest in tilapia as a culture animal, a good deal of practical research is going on in the United States. However, it is not feasible to review even a fraction of the projects, so I have lumped them into major groupings. The first of these are studies on nutrition. Because the

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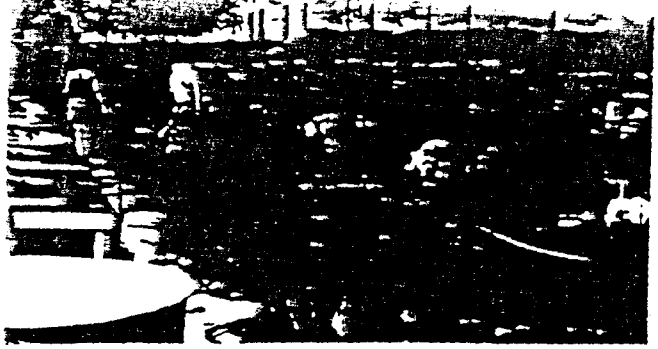
TILAPIA AUREA incubat



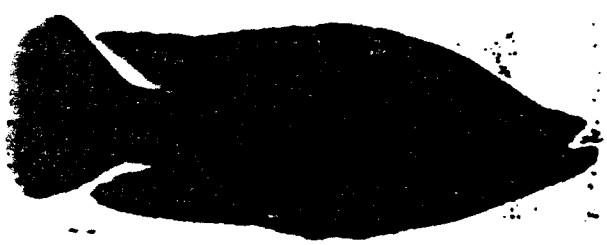
IN ORDER to better evaluate the effects of organic fertilization on tilapia growth and on other aspects of the culture environment, experiments have been run over experimental pools. Various numbers of laying hens per pool have been evaluated. Photo courtesy of Texas A&M

(86°F). Lower lethal temperatures vary between 9° and 15°C (48° and 59°F). The implications are obvious—in the continental United States, these fish can be grown outdoors year round only in the deep south or in situations where there is a supply of supplemental industrial, solar, or geothermal heat. All these options are being pursued at present. In Idaho and Colorado several species are being grown in water from geothermal wells. Power plant discharges are being used as culture sites in several locations. In Alabama, Texas, Mississippi, Florida, Arizona and California, tilapia are being raised in ponds and lakes. One of the Arizona operations uses a solar heating system to maintain adequate temperature through the winter.

Perhaps the most difficult problem associated with tilapia culture is reproduction. The essence of the matter is that they are sexually precocious and can begin to reproduce at less than one-quarter pound (100 grams). If unmanaged, they will yield ponds full of fish too small to market. The females don't eat while carrying eggs, and consequently grow very little (even when not involved with reproductive activity, females tend to grow at only a fraction of the rate of males).

Because this is such an important question in regard to tilapia culture, a great deal of work has been done, looking for solutions. Several possibilities have surfaced and are discussed briefly below.

a. **Hybrid crosses.** Some of the species, when crossed, produce broods with distorted sex ratios. Instead of 1:1 ratios of males and females, they produce predominantly, or in some cases, all, males. To date the most commonly produced hybrids are the offspring of *Tilapia mossambica* females X *Tilapia hornorum* males and *Tilapia nilotica* females X *Tilapia hornorum* males. The difficulty

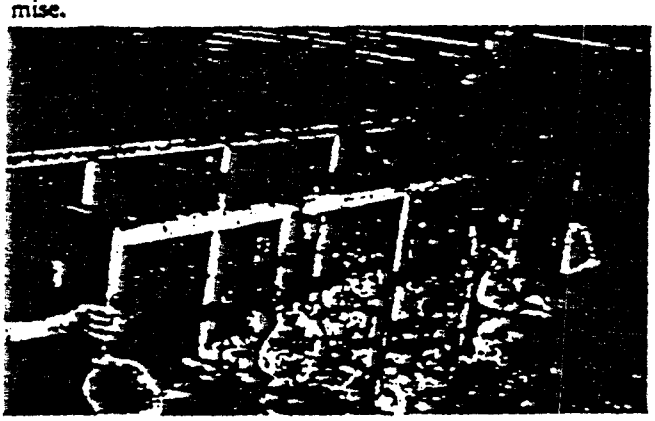


HYBRID TILAPIA — F. progeny of Tilapia mossambica female X Tilapia hornorum male. Photo courtesy of author

upshot is that some fish will yield hybrid broods that are 100 percent male, while others will yield broods that are predominantly male, but contain some females. Establishment of good breeding stocks, then, is no mean feat. At the present time, there are commercial quantities of fry available; suppliers are listed later in this article. If stocks of 100 percent male hybrids are available, the over-reproduction question is solved. If hybrid fry with some females (or for that matter, any of the normal species) are what is available, there are the following options.

b. **Predator stocking.** Predator fish can be stocked with the tilapia in order to consume fry. The trick with this strategy is to stock predators in such a way that they don't eat the cash crop. The best method developed so far is to stock with a small predator—one that is too small to feed on the tilapia once they grow past the fry stage. The most promising candidate seems to be the freshwater Jack Dempsey.

c. **Hormone treatments.** Work carried out at several universities (Auburn, Texas A&M, and the University of Oklahoma, foremost among them in the United States) has shown that if tilapia fry are exposed to minute amounts of androgens (male hormones) within a few days of abandoning the mother's mouth, essentially 100 percent males will result. While the technique must be carefully done (there is a relatively brief time when the fry are susceptible to the hormone treatment) and is just beginning to be used on a commercial scale, it does hold promise.



CAGE CULTURE of T. aurea at Auburn University. Photo courtesy of Auburn University

d. **Cage culturing.** If tilapia are housed in mesh cages with no surfaces upon which to deposit eggs and milt, reproduction is effectively interrupted.

e. **High density stocking.** In situations where water quality can be maintained (e.g., raceways), the fish can be stocked at high densities, and at those densities reproduction seems to be inhibited.

So there are a variety of ways around the reproduction question, each with its own set of pluses and minuses. In most instances, a combination will probably be the best bet.

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Indoor Fish: Big Catch Or Big Snag?

The jury is still out on whether this makeshift northern version of fish farming will land a big catch for Midwestern farmers or turn out to be an unrealistic sinker.

The eighties produced a barrage of alternative crops to boost farm income. Some worked; many didn't. But one idea that continually bobs to the surface is indoor fish farming. And although it hasn't proven itself a solid investment yet, it continues to draw interest in the Midwest — from both farmers and researchers.

"Aquaculture is becoming more than just a fad," says Ron Rosati, associate professor of ag mechanization and aquaculture at Illinois State University. There's been great interest in the program, now in its fourth year at the Normal, IL, facility. Enrollment has been high in past seminars, and this year the university will offer its first aquaculture course for credit, he reports.

Similar programs are already in place at Iowa State University, University of Minnesota, University of Wisconsin, Cornell University and several community colleges and technical schools around the Midwest. And although some of this research involves outdoor ponds, the bulk of the studies deal with the indoor alternative — water-recycling fish farming. Set up much like a big aquarium, the system continually filters water and circulates it back to the tank.

"The potential for indoor fish production is immense," says Steve Waite, a former University of Illinois biologist who now heads his own aquaculture consulting firm and is president of the Illinois Aquaculture Industry Association. "We have a much higher volume per unit of space than with outdoor ponds. With indoor production we are doing along when we raise 100,000 lbs. per acre per year. In contrast, outdoor ponds in the South do well to produce 5,000 to 6,000 lbs. per acre.

"With indoor production, we control water temperature and thus there's no slowdown in growth due to weather. We can schedule output just as they do in the poultry industry," he says.

Searching for a system

The problem is that the industry is still in its infancy, Waite says. And there's no definitive way to set up an indoor system. There are, however, some basic necessary components.

"It's much the same as traditional livestock systems," he says. You need housing (in this case a tank or container), food and oxygen, and a good waste management system. The last is essential in maintaining water quality.

"I try to work with the individual to use as much of his existing facilities and equipment as possible," he says. "When it comes to heating the water, for example, we've used wood, LP gas, natural gas or electricity — whatever is cheapest. There's nothing magical about setting up a good system — it's mostly just common sense."

Waite sees the greatest fish production potential in areas where barns, which formerly housed cattle, hogs, or chicken, are now standing empty.

Rosati agrees, "You really can be creative in assembling a system and farmers are generally good at that." Bulk tanks or even old manure pits can be used for the fish if they're cleaned and sealed, he adds.

The biggest drawback of indoor systems is the lack of an efficient yet affordable waste filtering system. Rosati says that after four years of experimentation, he and fellow researchers have settled on a rather expensive but fairly efficient two-filter system for the four 6,000-gal. tanks they operate. The first filter, a biofilter, dissolves ammonia waste and consumes no

water, while the second filter removes particle waste. "The only problem we're having is that the particle filter consumes a lot of water — about 200 gallon per day," he says.

"When we bought the complete filter system, we were told it was a turnkey operation. But it didn't work as well as we had hoped it would so we started modifying it," Rosati says, adding that "the perfect filter" has yet to be developed.

Cost of equipment

Cost of equipment and heating are the next most limiting factors of startup. A brand new 24,000-gal. system, like the one at Illinois State, would cost just over $100,000 to construct from scratch, including the cost of land, building and utilities, says Rosati. "Our figure is rather unrealistic because no farmer is going to start from scratch."

But if you own the land and have an unused building sitting on it, you can knock $15,000 to $17,000 off that figure, to start. And if you have some used tanks and pumps, you can subtract another few thousand.

The major item you will probably need to purchase is a filtering system, he says. The ISU system includes both a particle filter and a biofilter which total about $20,000 for a 12,000-gal. capacity system. That's quite a bit bigger than most starter systems need, he notes. There are smaller, less complicated filtering systems on the market but you should expect to pay upwards of $5,000.

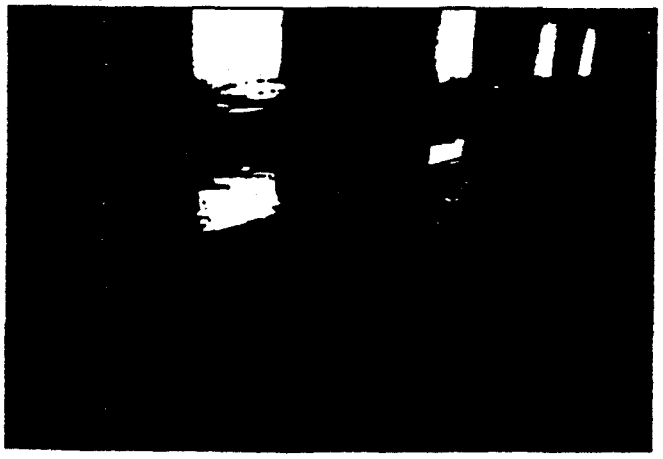
Midwestern fish farmers are counting on new species like tilapia to help them net big profits from indoor systems.

Finding financing for aquaculture systems still remains the biggest hurdle for the would-be fish farmer, says Waite. "Lending institutions don't have any reference points by which to judge the startup and potential of aquaculture systems. There's just no data."

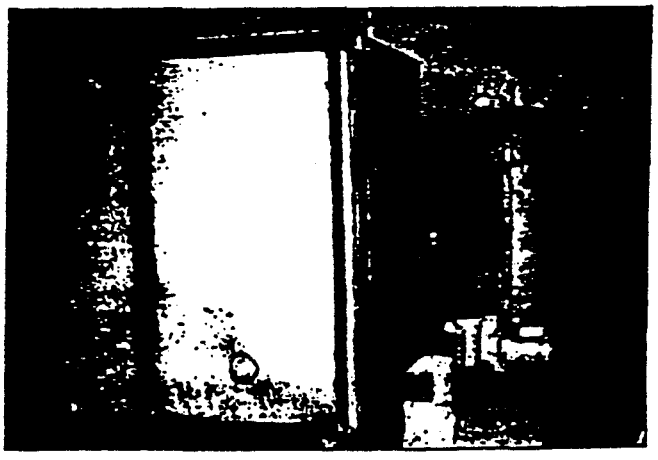
As a result, the chances of getting a bank loan are very slim. Although, he adds, Illinois is in the process of establishing a loan guarantee program that will guarantee a lender 85% return if the individual would default.

Insurance is, of course, a necessity, but might not be easy to get. As squirmish as bankers are

(Continued on page 96)



Indoor systems do offer the flexibility of making your own components from existing equipment like old bulk tanks and empty buildings.



Buying all new equipment may ensure longer life but can cost thousands of dollars. Six-thousand-gallon stainless steel tanks like this cost $7,000.

(Continued from page 93)

over the lack of information available about fish farming techniques and profitability, insurance companies are often unsure of the type of coverage needed or are unwilling to provide coverage for the producer just starting out. Rosati says your best bet is to try to purchase property and liability insurance for the value of the complete system, like you would for a farrowing unit.

What type of fish?

If all the preceding problems can be solved, the remaining challenges are getting your fish to do well, arranging for processing and identifying a market. Critical to all of it is choosing the right type of fish.

Waite says fish convert feed better than any other "livestock," and among fish species, the tilapia is one of the most efficient. A tasty fish, native to Africa, it gains 1 lb. for each 1.2 lbs. of feed. "As a rule of thumb, beef cattle convert at a 6 to 1 ratio, swine at 3 to 1, poultry at 2 to 1, and catfish at 1.75 to 1." he says. "At 1.2 to 1, tilapia convert about as efficiently as it's biologically possible to do."

Other fish with promising potential are hybrid striped bass, perch, sauger and crayfish. Game fish like walleye and muskie may be in demand, but just don't do as well in indoor systems because they don't accept artificial food well, says Roy Heidinger, director of fisheries, Southern Illinois University.

"Tilapia are probably your best bet," he says. "They feed well on artificial food, tolerate low oxygen and higher ammonia levels in the water and produce a good meat."

But because there are so many technical things to learn as you go, Waite, along with other experts, advocates a go-slow approach. "A farmer getting into fish farming may want to start with 100,000 gallons of capacity, whereas we recommend something like 2,000 gallons," he says. "You probably won't make a lot of money with a small system, but you can put tangible value on learning and the experience you gain. You also won't lose your shirt."

Waite says indoor fish production won't be the salvation of a farm operation that's in financial trouble. But it could be a viable additional enterprise where good management, workable facilities and adequate start-up capital are available, he says. "Livestock farmers may be best suited because they have a feel for animals and may have unused buildings, but it's certainly not restricted to them."

Waite is also optimistic about the profit potential for indoor systems. "Farmers shouldn't go into this with a major investment, but after the first year, they could be getting $8,000 to $12,000 out of what had been an empty building."

Others, like Don Garling, extension aquaculture specialist at Michigan State University, argue that indoor recycling systems are still not economically feasible. "That doesn't mean they won't be feasible someday, maybe even in the next five to ten years.

"If someone is interested in learning about fish farming on an experimental basis, that's great. But I'd try to steer them away from thinking it's going to be a big money-making venture."

Where To Find Fish Facts

If you're interested in finding more fish facts, a trip to your local library or bookstore is the best place to start. Periodicals like Aquaculture Magazine and Progressive Fish Culturist can provide you with up-to-date information on industry technology and available equipment.

From there you may want to try a university or community college near you. Many offer classes and seminars on aquaculture, covering both the financing and management needs of pond and indoor systems. They may also have an extension specialist in aquaculture on staff to answer your questions, or at least point you in the right direction. We've compiled this list to aid you in your search.

Cornell University
William Youngs
Dept. of Natural Resources
Ithaca, NY 14853
607/255-5469 or circle 228.

Iowa State University
Bob Summerfeld
Dept. of Animal Ecology
Ames, IA 50011
515/294-6107 or circle 230.

Illinois State University
Ron Rosati
Dept. of Agriculture
150 Turner Hall
Normal, IL 61761
309/438-5654 or circle 229.

Michigan State University
Don Garling
Dept. of Fish and Wild Life
9A Natural Resources
East Lansing, MI 48824
517/353-1989 or circle 231.

University of Minnesota
Dave Landkamer
Dept. of Fish and Wild Life
138 Hodson Hall
1980 Folwell Ave.
St. Paul, MN 55108
612/624-2720 or circle 232.

University of Wisconsin
Terry Kayes
Dept. of Food Science
1605 Linden Dr.
Madison, WI 53706-1565
608/262-1242 or circle 233.

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N.D. NEWSPAPER
CLIPPING SERVICE
222 N. Fourth St.
Bismarck, ND 58501
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Grand Forks
Herald

Trout, catfish, carp

Farm grows fish for fun and money in power plant ponds

Associated Press

STANTON, N.D. — A whale of a business is taking shape in the shadows of a power plant.

The Missouri River Trout Ranch expects to raise and market 350,000 pounds of rainbow trout a year at a fish farm on the grounds of Basin Electric Cooperative's Leland Olds Station, said company President Terry Ernst.

The company also is looking into raising minnows, catfish for food or river stocking, and carp, Ernst said.

The farm now is raising 250,000 rainbow trout in temperature-controlled ponds at the power plant and at a hatchery up river from Stanton. Three natural ponds also are being used, and another 11 will be added this fall.

"We can keep digging ponds and just keep right on rolling," Ernst said.

The power plant provides a supply of warm water that is mixed with river water to keep the ponds' temperature between 58 and 60 degrees. Fish grow better in warm water.

Sales have been limited so far because the cleaning and packaging has been done by hand. But a processing plant under construction near Basin Electric's property will house machinery that can clean one fish every 10 seconds.

The new plant is expected to be operating within a month.

Super Valu and Cloverdale have been supplying grocery stores with the fish during an introductory period.

Ernst doesn't see marketing as a problem.

"There have been a lot of people calling me. I'm not out there pressing the issue because I have nothing to sell. I don't have a facility," he said.

North Dakotans could buy 2,000 pounds of trout a week because fish is becoming more popular due to its health and environmental advantages, Ernst said.

"They're dumping more stuff in the rivers or in the lakes and oceans," he said. "The timing is great."

North Dakotans spend more than $200,000 a year on minnows for bait, most of which comes from Minnesota.

"There's no reason that couldn't be done in the state," Ernst said.

Raising specialty fish and carp also hold possibilities, he said.

Fish farm already planning to expand

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Willows spend week on fish farm

Illinois operation similar to what is being considered for Binford

On the job training is difficult to come by when one is attempting to become an entrepreneur in a new or unusual business, but Mark and Nicki Willows got a chance to learn the ropes first hand when they were invited for a week at an Illinois fish farm.

The tilapia operation at Champagne, IL, is similar in size to the one the Willows are planning for their farm in rural Binford.

About 50,000 pounds of fish were being produced every six months at the facility, which itself is fairly new and was in the midst of its first harvest.

The farm was set up inside of three soft-walled quonset buildings in the shape of a T. The buildings were designed for research projects in Alaska and were of an air-filled double wall construction capable of withstanding high winds and extremes of temperature.

"When the wind blew the walls would sway but it would have taken a lot to push them down," said Mark. "Probably as much or more than a conventional building."

The central building was the machine shed which housed the mechanical end of the operation.

In one arm of the T was the "low-tech" operation, so named because it used air bubbled into the water to provide oxygen for the fish and the water was filtered by a comparatively primitive biological filter.

On the "high-tech" side, oxygen was supplied by dispersing liquid oxygen into the water which was filtered with an ozone system.

There were eight tanks on each side, each being constructed of a grain bin ring 21 feet in diameter and four feet deep.

For a full week the Willows followed in the footsteps of the crew that operated the facility. They learned to check water for toxic buildups of waste products and to keep daily records of everything from food intake to oxygen levels.

"There was really not much hard labor," said Willows. "Just management. It was time consuming."

During their stay the Willows were even able to see one of the potential problems of a facility.

"Something went wrong with the filters to one of the tanks and the levels of nitrates went way up past the acceptable limits. In fact it was so high it was off the scale when it was tested," recalled Willows. "But the tilapia proved how hardy they were because every one of them survived until the problem was corrected."

The system the Willows are planning to install at their tilapia operation has characteristics of both the high-tech and low-tech sides but is a unique system designed especially for them.

Willows expects answers on potential financing for his project near Binford within the next few weeks and still hopes to be in operation this fall.

He is looking at 10-12 new jobs in the area in the first year and said that there is potential for many more if things work out.

"There is a lot of interest in fish farming across the state but everyone is waiting for the first one to get off the ground," he said. Willows plans to have that first tilapia farm in the area and said that Binford could become the central processing and distribution point for the region.

Large lined tanks held the 50,000 pounds of rapidly growing tilapia.

The entire operation was housed in soft-walled buildings.

Cooperstown Courier

Two fish farms now being planned for northern half of Griggs County

Private enterprize joins pilot project in development of new industry

There are now two fish farms on the drawing boards in Griggs County, both of which are in the northern half of the county.

The first of these is the Basin Electric pilot project which is tentatively planned for construction on the Richard Olson farm southwest of Binford.

A $20,000 grant has been obtained from the Economic Development Center. This will provide between a quarter and a third of the money required to get the project off the ground.

An estimated $68,000 will be needed for a feasibility study by the University of North Dakota and the engineering by Keeton Fisheries out of Colorado.

These two areas of planning are referred to as Phase One by those involved in the project.

Phase two will be the actual construction of the facility. The cost estimate for construction will not be available until the completion of Phase One but it is hoped that it will be possible to keep the cost to a minimum by modifying an existing structure.

Phase three will be production and marketing.

Basin Electric, in cooperation with UND, will continue to study the pilot facility for three years to determine long range feasibility on a larger scale.

The more recently proposed fish farm is a private venture by Mark Willows who is looking at constructing a facility capable of producing 80,000 pounds of fish per year on his farm.

The engineering work for Willows is also being performed by Keeton and the design is expected to be similar to that of the Basin pilot project.

Willows has applied for funds through a revolving loan block grant program administered by the South Central Regional Council.

Otter Tail Power has committed $10,000 to the project and the remainder will be privately funded.

Both projects are planned to be operational within several months.

The fish produced will be tilapia, a whitefish said to be similar to orange roughy.

The processing will be done right in Binford at the Binford Locker Plant.

It is hoped that the new industry will bring 10-12 new part-time jobs to the Binford area within a year.

The Antelope Valley tilapia pilot project near Beulah is also expected to begin operation at about the same time.

It is possible that a marketing co-op will be developed which will allow Binford to serve the eastern half of the state and the Beulah plant the western half.

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GOOD LIVING

FOOD, FASHION AND TRENDS

A trendy fish hooks a place on menus

The fab fish for the '90s may be tilapia, now turning up on trendy menus from California to Boston.

"It's the ideal fish for the American palate," says Floyd Smiley, president of The Aqua Group in Clearwater, Fla. "It's like a cod fish ... white, with no odor. But most important of all, it doesn't taste like fish."

Popular in Thailand and the Philippines and long raised in Israel, tilapia is now being raised here on aqua farms in Kentucky, Idaho and Florida; production may reach 1 billion pounds by the end of the decade.

"It's a good, tasty fish. If you crossed a striped bass and a cod you'd come up with something close," says Roger Berkowitz of Boston's Legal Seafoods, where tilapia is sometimes served.

Depending on the market, the fish will carry a "moderate" menu price of $12 and up.

By Craig Wilson, Arlene Vigoda and David Landis

Fish may be wheat of the future

By MIKE DORSHER, Tribune Staff Writer

Tilapia, the same kind of fish that Jesus Christ used to feed the masses, may become a cash crop for North Dakota farmers under a plan resurrected by GOP congressional candidate Ed Schafer.

The Bismarck businessman is heading a partnership that plans to break ground next month on a "fish farm" next to Basin Electric Co-op's Antelope Valley generator in Mercer County. The fish farm will use warm waste water from the power plant to fill its 26 "growing tanks" and heat the complex.

The $3 million project will consist of an 160- by 400-foot air-supported "bubble" covering the growing tanks, plus an office and processing building, Schafer says. They plan to have the first fish in the water by mid-July, with the processing plant starting to ship 20,000 fillets weekly by early December.

The project was conceived by Basin Electric officials as an anchor for their industrial park adjacent to the Antelope Valley station, but when they asked Schafer to look at the business plan he found it lacking. Schafer, however, did further research, put up some of his own money and launched the project under a partnership called, "Fish 'N Dakota."

"It will be a real showcase facili-

(More on FARM, back page)

Farm: Fish consumption rises

CONTINUED FROM PAGE 1A

ty," says Rick Davis, who founded the Teltec business phone company in Bismarck before becoming partners with Schafer and Gary Meiers, a specialist in "aqua-culture."

"The future of fish is cultured growth," Davis says, adding that 99 percent of the oceans' edible fish are being harvested now. "By the time we are ready to bring fish to market, we will be a very well-studied facility, so we shouldn't have any problem selling all the fish we can produce."

The only type of fish they plan to produce is a tropical variety called, "tilapia." It's nicknamed Hawaiian sunfish or St. Peter's fish, Schafer says, because it's the type of fish Christ used to feed the masses.

Comparable to orange roughy in taste and appearance, the tilapia will yield small, white fillets that will sell in supermarkets for about $4.50 a pound, Schafer says. Most of the fillets will be frozen immediately and trucked to wholesalers on both coasts, but a few may be shipped fresh directly to restaurants in Denver, Minneapolis and Chicago.

Market studies indicate fish consumption in the United States has tripled in the last five years and will quadruple again in the next three years, Davis says.

As demand grows, Schafer adds, "we're looking at this as an alternative crop for North Dakota." He envisions farmers across the state growing tilapia and bringing them to Fish 'N Dakota for processing in the winter.

"It's very consistent with the exotic animal ranching that's going on now," Davis says. "Instead of having a llama in their pen, they could have a fish tank in their barn."

It's exactly the kind of North Dakota specialty crop called for in the Vision 2000 study on economic development. Schafer sees it as a perfect marriage between North Dakota's agriculture and energy industries.

"The proximity of the Antelope Valley Station gives us an unique advantage," Davis says. By using the free waste water from Basin, Fish 'N Dakota can produce 67 percent more fillets in a facility that costs 50 percent less than outdoor fish farms in the southern United States, Schafer says.

Whereas outdoor fish farms have to worry about cold snaps, bacteria and runoff, "We won't have environmental factors to deal with," Schafer says. "We're going to have a facility available here in North Dakota that nobody else has."

GRAND FORKS HERALD

Group plans to start N.D. fish farms

Associated Press

BISMARCK — Development of a fish farm in Mercer County could eventually fishtail into a new cash crop in North Dakota, an investor said.

Ed Schafer, a Bismarck businessman who helped form a partnership called Fish'N Dakota, said he envisions North Dakota farmers across the state growing fish for sale at supermarkets around the country.

"We're looking at this as an alternative crop for North Dakota," said Schafer, the Republican congressional candidate in this year's election.

Schafer is joined in the venture by Bismarck businessman Rick Davis and Gary Myers of Parshall.

Market studies indicate fish consumption in the United States has tripled in the last five years and will quadruple again in the next three years, Davis said.

"The future of fish is cultured growth," Davis said.

The three plan to build a $3 million fish farm next to the Basin Electric Power Cooperative's Antelope Valley generator plant in Mercer County.

The fish farm would use warm waste water from the plant to fill its 26 growing ponds and heat the complex, Schafer said.

The farm will consist of a 160- by 400-foot air-supported "bubble" covering the growing tanks. There also will be a building to process the fish into fillets.

Plans call for beginning the growing process in mid-July and shipping 20,000 fillets weekly by December, Schafer said.

The farm will raise tilapia, a tropical fish similar to the American sunfish.

Comparable to orange roughy in taste and appearance, the fish will yield small, white fillets and sell in supermarkets for about $4.50 a pound, Schafer said.

Most of the fillets will be frozen and trucked to wholesalers on both coasts, he said. A few may be shipped fresh directly to restaurants in Denver, Minneapolis and Chicago.

"By the time we are ready to bring fish to market, we will be a very well-studied facility, so we shouldn't have any problem selling all the fish we can produce," Davis said.

83

Williston Herald

Trout ranches uses water from N.D. electricity station

STANTON (AP) — A whale of a business is taking shape in the shadows of a power plant.

The Missouri River Trout Ranch expects to raise and market 350,000 pounds of rainbow trout a year at a fish farm on the grounds of Basin Electric Cooperative's Leland Olds Station, said company President Terry Ernst.

The company also is looking into raising bait minnows, catfish for food or river stocking as well as carp, Ernst said.

The farm is raising 250,000 rainbow trout in temperature-controlled ponds at the power plant and at a hatchery up river from Stanton. Three natural ponds also are being used, and another 11 will be added this fall.

"We can keep digging ponds and just keep right on rolling," Ernst said.

The power plant provides a supply of warm water that is mixed with river water to keep the ponds' temperature between 58 and 60 degrees. Fish grow better in warm water.

Sales have been limited so far because the cleaning and packaging has been done by hand. But a processing plant under construction near Basin Electric's property will house machinery that can clean one fish every 10 seconds.

The new plant is expected to be operating within a month.

Super Valu and Cloverdale have been supplying grocery stores with the fish during an introductory period.

Ernst doesn't see marketing as a problem.

"There have been a lot of people calling me. I'm not out there pressing the issue because I have nothing to sell. I don't have a facility," he said.

North Dakotans could buy 2,000 pounds of trout a week because fish is becoming more popular due to its health and environmental advantages, Ernst said.

"They're dumping more stuff in the rivers or in the lakes and oceans," he said. "The timing is great."

North Dakotans spend more than $200,000 a year on minnows for bait, most of which comes from Minnesota.

"There's no reason that couldn't be done in the state," Ernst said.

Raising specialty fish and carp also hold possibilities, he said.

ESTING A NEW CROP

Gazette photo by Tim Steeg

leppe of Bryant holds one of the tilapia that he and his father raise on a farm north a. You know tilapia; it's a new fish showing up on Iowa menus.

)u say you eat this stuff?

, it's on the menu,)w rib-eye steak

By Dale Kueter
Gazette staff writer

VIRA — Customers at the Elvira ountry Inn in this small town west f Clinton are starting to ask for)y name.

ine that. Here, in the middle of beef k country, just a few miles from the ippi River where catfish abound, a fish has managed to angle its way) menu.

le aren't exactly hooked on tilapia. t as popular as catfish yet," said Inn)ave Hull.

)ere it is on Hull's menu, right be rib-eye steak: Tilapia, a m, hybrid, freshwater fish, locally a culinary delight. Price: $7.50.

ia, an unknown fish in Iowa two go, have been catching a lot of heat since a Dubuque man, Jac Adams, proposed to raise tilapia in a $10.8 million aquaculture operation at Manchester.

Some claim tilapia originated in the Middle East and was the biblical fish referred to in Jesus' miracle of multiplying the loaves and fish. It's getting a less rousing reception in Iowa.

Bruce Mensel, chairman of the Department of Animal Ecology at Iowa State University, said there are "all sorts of reasons to be skeptical" of Adams' plans.

Mensel questions both the technology and economics of raising tilapia, which has been likened in appearance to a red snapper. "We don't believe there is a large market for tilapia," he said a week ago. An Auburn University expert concurs.

But Curtis Stutzman, an aquaculture adviser at Kirkwood Community College's rural development center, has a different appraisal.

■ Please turn to page 13A: Fish

Fish: Not well-known yet

■ From page 1A

"They say the fish is not marketable," said Stutzman. "We say it is, that tilapia is a fish that meets all the criteria people want in seafood."

Stutzman said eight people in Iowa already are raising the fish, albeit on a small scale. He helped Todd and Darrell Kleppe of rural Elvira start a tilapia operation. The Kleppes sell fresh fish to people who come to their farm, and supply two restaurants, including the Elvira Country Inn.

"If Adams wants to bring a $10 million investment to Iowa, why should we tell him otherwise?" Stutzman asked. He said the ISU people are "fisheries biologists who are making comments on marketing. They should stick to comments on whether tilapia can be raised in Iowa, and leave marketing people to handle marketing."

Stutzman claims ISU "talked to only one wholesale broker who deals with game fish. We've done 1,500 taste tests in Cedar Rapids and Iowa City grocery stores. Our survey shows people think tilapia tastes like orange roughy, and that's a popular fish in these parts."

Stutzman agrees tilapia are not well-known in Iowa. "You can't sell them without some marketing plan, but they can be sold on the basis of (taste) acceptability."

Darrell Kleppe and his son, Todd, heard about tilapia two years ago. "The cattle business wasn't so good then. So we decided to get into an alternative."

> *"We've done 1,500 taste tests in Cedar Rapids and Iowa City grocery stores. Our survey shows people think tilapia tastes like orange roughy, and that's a popular fish in these parts."*
>
> *Curtis Stutzman, aquaculture adviser*

The Kleppes hope to make fish-raising a permanent part of their farming operation.

Stutzman thinks the Kleppes have the largest tilapia setup in Iowa now. They marketed about 10,000 pounds last year.

"We have 11 tanks and about 5,500 fish," said Kleppe. When young, the fish are fed commercial trout chow, and later are fed catfish chow. The fish are filleted at about a pound and a quarter to a pound and a half.

"We're just a farmers' tavern, but our customers like tilapia," said Hull. "I'd say the flavor is good. There is no fish taste.

"But many of our customers still ask: 'What's tilapia?' "

palatability are in every way competitive with t
freshwater and marine species.

In attempts to evaluate market potential, the sta
Auburn has carried out marketing studies. Using fis ra
in the experimental ponds at the university, they op
supermarkets in the area with fresh, cleaned fish
materials explaining what tilapia were. The fish were pr
competitively with rainbow trout and catfish, and lc
tremely well. More marketing studies are planned.

LeRoy and Carol Carpenter (Hickory Ridge Fishe
Inc.) have been selling *Tilapia aurea* in Oklahom
They have set up an operation in a power plant
pond, and market the fresh fish to supermarkets and
markers in the area. Their experience is that marke
mand exceeds their ability to supply. At present,
approximately 1,000 pounds (live weight) per we

Leo Ray (Fish Breeders of Idaho), of Buhl, Idaho, ha
a similar experience. He has set up a sequential polycu
system in geothermal raceways. Catfish are raised

LEO RAY sits alongside geothermal raceways where T. mossambica x zilli are cultured.

using demand feeders and commercial feed. T
stream end of the raceway complex has been stocke
tilapia (two species are currently being used, *Tilapia m
bica* and *Tilapia zillii*). The tilapia receive no su le
feed; they graze on detritus that flows through the sy
is interesting to note that they feed on what would b
in an ordinary raceway system. It is also interes g
that the *Tilapia zillii* do well grazing on detritus, i ch
recognized feeding niche is aquatic vegetation. As of
ly, Leo was marketing 2,000 pounds per week (live w
Los Angeles, Seattle and San Diego. At presen i
tion consists of 85 raceway sections, each 10' x 2 x
which are used for tilapia. He plans to expand his
tion to 250,000 pounds per year (a little over t ce
output) in the near future, in that present ma et
ceed his ability to supply. The way he began m
tilapia is a story in itself. He began by putting a free
each box of catfish shipped. People tried them lik
and it has gone from there.

Tilapia zillii are marketed in the west and south
means of controlling vegetation in irrigation d ch
have turned out to be an effective means of ke ir
lakes and irrigation canals free of water weeds. B
their low resistance to cold, they have to be re-stoc
spring. In some of the colder irrigation canals the
do well, for the same reason.

Arnold Burt (Burr-Saylor Aquaculture Com
Phoenix, Arizona, has set up a pond aquacultu
based on the golden tilapia hybrid. Ma et
mitments have been made, with initial de

Aquaculture Boom Making Its Way to This Region

By TRACY SAYLER

The USDA classifies aquaculture as the most rapidly growing sector of the agricultural industry, expanding by 20 percent per year in the United States since 1980.

In the Midwest, Minnesota is fast becoming a leader in aquaculture production, and there are even some North Dakotan's who plan on turning fish farming into a profitable venture.

"Aquaculture will probably grow quite a bit in the 1990s," says Dave Harvey, economist with USDA's Economic Research Service, Washington, DC.

The changing dietary habits of health-conscious consumers are the primary push behind the industry, he says. Also, the growing elderly population and immigrating ethnic groups are contributing to the increasing consumption of fish in this country.

Harvey says per capita consumption of fish in the United States has increased from 11.8 pounds per person in 1970 to about 15 pounds in 1988.

Those figures are still much below the consumption rate in Japan where per capita consumption is over 100 pounds per year. The amount of fish consumed per person is even higher in Scandinavian countries such as Iceland.

US aquaculture production currently exceeds 500 million pounds per year, up from about 200 million pounds in 1980. USDA predicts total US output will double by the year 2000.

Catfish is by far the largest segment of the aquaculture industry in the United States, accounting for almost half of all fish grown in a controlled aquatic environment.

The catfish industry is growing at a rate of about 25 percent per year, according to Harvey, expanding from 47 million pounds produced in 1980 to 342 million pounds produced in 1989.

Aquaculture encompasses a wide variety of products in the United States, and some of the larger segments of the industry are trout, salmon, crawfish and other shellfish.

Most of the growth in aquaculture has occurred in the South and Coastal areas of the United States, but interest in aquaculture is also growing in the Midwest, with Minnesota taking the lead.

"It's a big industry here. We certainly have a cultural heritage of people who want to eat, catch, and produce fish," says David Landkamer, University of Minnesota extension aquaculture specialist.

Landkamer says in 1989 there were about 120 licensed fish farmers in the state with hatcheries. Half of those produced bait species, about a third produced trout, and the rest produced a variety of fish including walleye and salmon.

The estimated pondside value of aquaculture in Minnesota is about $10 milion, and that doesn't include the value of the wild bait harvest in the state which Landkamer estimates at $40 million.

He says the aquaculture industry in the state could increase substantially in future years. "There are people in the industry that think it could grow to a $100 million business by the end of the century, and eventually 10 times that big in the next 40 years. I think that a $100 million industry in the next 25 years is pretty realistic."

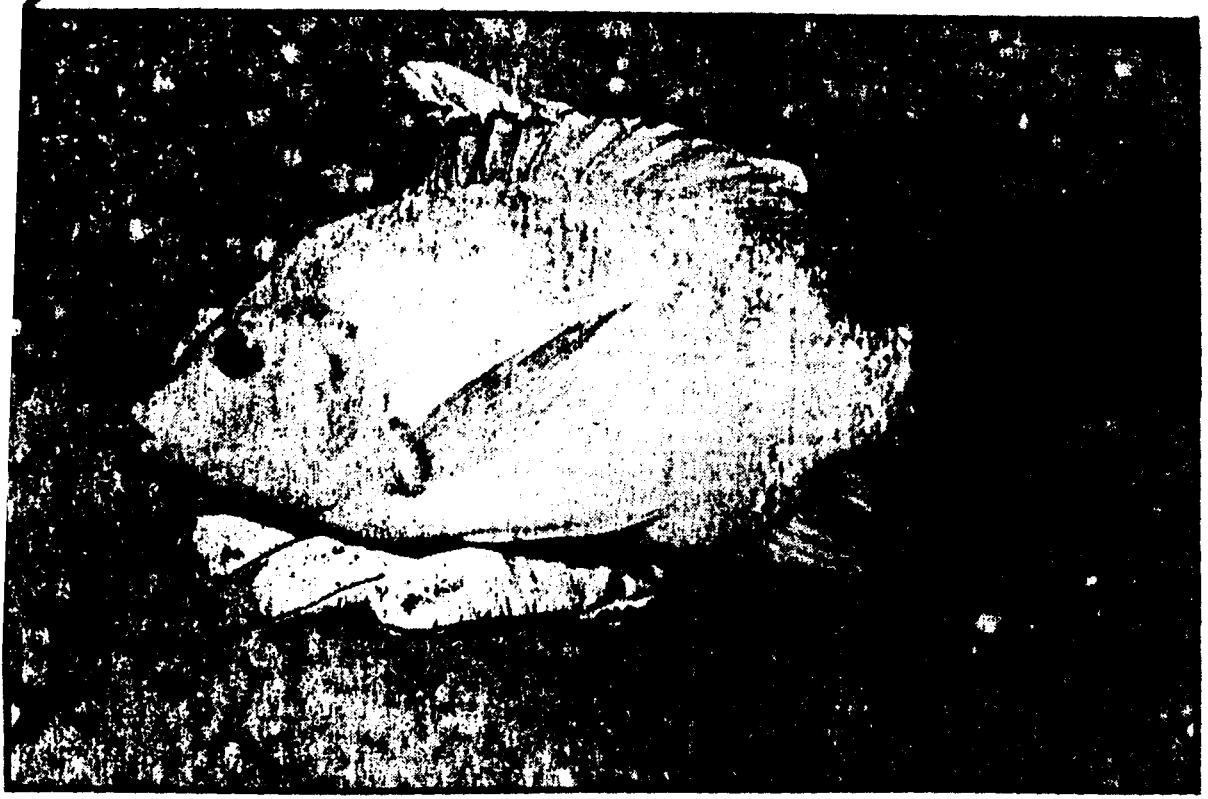
Landkamer says the greatest potential for large-scale production in the state is baitfish and salmon. Net pen aquaculture, or producing fish in cages suspended from floating collars, is being considered for salmon production in flooded abandoned mine pits on Minnesota's Iron Range.

The short growing season and Minnesota's cool climate will be a constraint the state will always face, he says, but that shouldn't stop the industry's growth.

"Fish crops can be produced down South faster than they can be produced here, but that's true with any ag commodity." Landkamer says coolwater fish such as walleye, trout, salmon, and baitfish can be successfully produced in cold regions.

Minnesota is close to large fish

Continued on next page.



Tilapia, a tropical fish, will be grown and marketed by Fish N' Dakota, a new company formed to develop aquaculture in North Dakota.

Aquaculture Booming Industry in United States, Continued from Page 30

markets, including the Twin Cities, Chicago, and Milwaukee. A close proximity to markets enables the state to compete effectively with foreign suppliers, he says.

"It costs Norway $1 a pound to fly their fish to the states, and that's reflected in the price. Minnesota doesn't have to pay those shipping charges," says Landkamer.

The aquaculture industry is even making its way into North Dakota. Ed Schafer and Rick Davis, two businessmen from Bismarck, ND, and Gary Myers, Parshall, ND, have formed Fish'N Dakota through which they will produce and market a tropical fish called tilapia.

Schafer, the company's president, says tilapia is a fast growing fish which likes water temperatures of 80 to 85 degrees. The fish will be produced at a fish farm which will be located near Beulah, ND.

He says the farm will use waste hot water from the Antelope Valley Power Station. "We plan to use their hot water by-products to heat our fishwater as well as our facility."

The fish will be processed into four and six-ounce fillets at the Beulah facility, and then shipped to Boyco, Inc., Stanton, ND, where it will be packaged and shipped. Schafer says tilapia fillets are white and flaky and are similar to orange roughy in taste and appearance.

Construction of Fish'N Dakota should start this month and the farm should be producing fish by October, he says. The plant will eventually employ about 35 people and produce about 3 million pounds of non-processed fish a year, or 20,000 pounds of finished fillets per week.

Schafer says it is hoped that Fish'N Dakota will support an additional fish feed company. "We're hoping that one of the auxiliary businesses that will spring up to support our structure will be someone who takes North Dakota grain and pelletizes it to feed our fish."

Aquaculture Promising Market for US Spring Wheat

By TRACY SAYLER

Vheat leaders are watching the owth of aquaculture in this coun- and abroad with great interest. aquaculture intensifies, the mand for fish rations will in- ease, and it is hoped that the fish lustry will find wheat an attrac- e ration ingredient.

'As aquaculture grows, ad- ional feed supplies will be eded," says Dave Harvey, onomist with USDA's Economic search Service, Washington, C.

Aquaculture currently uses over),000 tons of domestic grain for h-farm rations. Many fish tions contain the same grain gredients used for livestock feed. Harvey says corn, soybeans, and heat are used for fish feeds. oreign countries, including Nor- ay and Japan, try to minimize the ains they use for their fish feeds d try to use more fish meal in- ead because of higher production sts.

In the case of US aquaculture, e situation is just the opposite, he ys. Fish meal is more expensive d fish producers would like to use ore grain in their fish feeds.

"I think the wheat industry stands to benefit a whole lot from increased aquaculture production. In fact, I don't see how it can't." says David Landkamer, University of Minnesota extension aquaculture specialist.

He says the two primary production costs to fish farming are labor and feed. "As fish meal increases in price, more fish farmers will try and turn to supplementing fish meal with more grain to keep costs down."

Wheat has an advantage over other fish food ingredients because wheat gluten acts as a binder in fish food, a quality that is sought after in the aquaculture industry.

The wheat gluten works like glue, making fish food hold its consistency. Fish feed with wheat gluten in it lasts longer in the water and won't break down as quickly as fish feed pellets made from other ingredients, says Landkamer. The high gluten and nutritional qualities of wheat thus make the grain ideal for fish food.

However, data on using spring wheat as fish feed and research on distinguishing what types of wheat flour will work best for fish food is limited.

A research project currently being conducted at the University of Minnesota is investigating the use of spring wheat flour for its binding and nutritional value in aquacultural feed rations, according to Bill Breene, professor of food science and nutrition, University of Minnesota.

The project started last summer and is sponsored by the Minnesota Wheat Council, Agricultural Utilization Research Institute, Crookston, MN, Buhler-Miag, Inc., and Northern Crops Institute.

If a successful spring wheat fish ration formulation is found, the research project results could be a valuable tool in marketing high protein spring wheat for fish feed rations.

Marketing wheat as a fish ration also has potential overseas, according to Glenn Samson, director of Programs, US Wheat Associates, Washington, DC.

US Wheat Associates is currently working with governments and commercial fish producers in at least nine different countries, including Taiwan, Japan, China, to further develop an aquafeed market that incorporates a substantial amount of US wheat, he says.

"The potential market for wheat in aquaculture abroad hasn't been fully capitalized," says Samson.


Fish farms could use wheat in their feed program.

EXHIBIT 25 p.22
DATE 2-11-91
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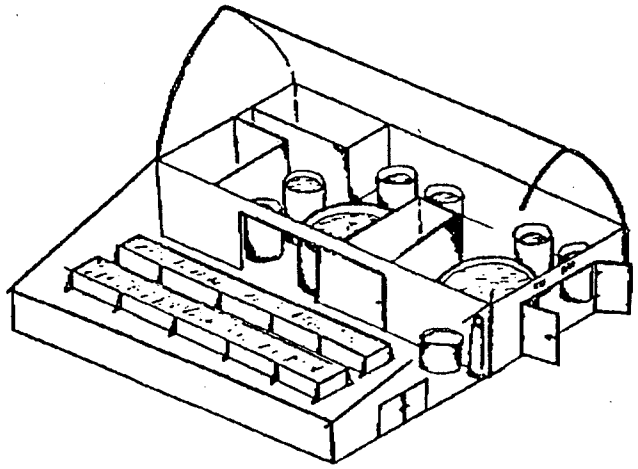
Exhibit 25
2-11-91
Long Range Plannin

KEETON FISHERIES CONSULTANTS, INC.

Introducing the

Family Fish Farm™



A New Market
for the American Farmer

Recent headlines agree as they record the struggles and woes facing today's farmer. Especially hardest hit are the families of the midwest. Once heralded as the "Breadbasket of the World", farms that have been a family asset for generations now risk foreclosure. American families strive to keep pace with escalating operational costs, while prices for cash crops and livestock diminish.

Keeton Fisheries Consultants has been privileged to design, engineer and construct many technologically advanced "Family Fish Farms"™ across the country and around the world. The results have been astounding, seeing farmers convert unused barns into productive food sources, while providing an additional source of family income. We envision aquaculture as a salvation to U.S. agriculture.

Maximize the Profitable Space of your Farm

The Family Fish Farm is designed specifically to efficiently convert and utilize existing space on your farm. Whether it be an unused barn or storage facility, we will engineer a design capable of producing approximately 50,000 - 150,000 pounds of fish annually. In some cases, additional construction may be necessary to increase functional space to meet the size family fish farm you request.

By comparison to other sources of agricultural income, intensive closed-system aquaculture offers a much higher yield, per square foot of area to be developed.

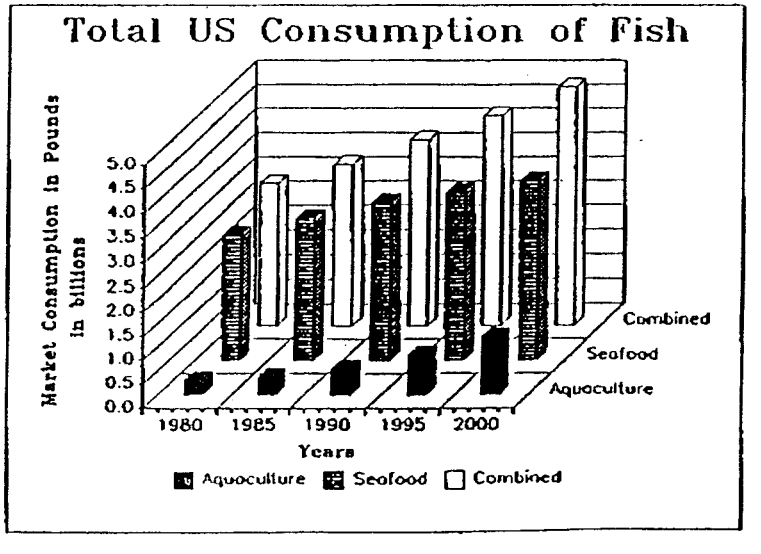
Why Is The Growth Of Aquaculture So Dramatic?

With the emphasis and understanding of nutrition expanding for today's health conscious generation, fish is rapidly being recognized as a high protein, low fat, inexpensive protein source.

The main goal of closed system aquaculture is to maximize the amount of fish grown in a specific area of water.

Technologically, major advancements and discoveries have increased the profitability of the industry. Intensive recirculating Family Fish Farms, are now able to hold stocking densities of 1 - 1.5 pounds per gallon, once only a pipe dream, but now a reality with KFC advanced technology.

The design of the Family Fish Farm also protects your investments by maximizing valuable water resources through recirculation, protection from predators and contamination.



Aquaculture continues steady growth, providing more of the total market share of fish for America's consumers. These increases help offset the depleting ocean fisheries production of seafood.

Exhibit 25
2-11-91
Long Range Planni

The Most Promising Industry Into the 21st Century

Over the past few years, an increasing amount of interest has developed in the rapid growth and profitability of aquaculture. Aquaculture is predicted to be one of the greatest growth industries in the United States over the next ten years.

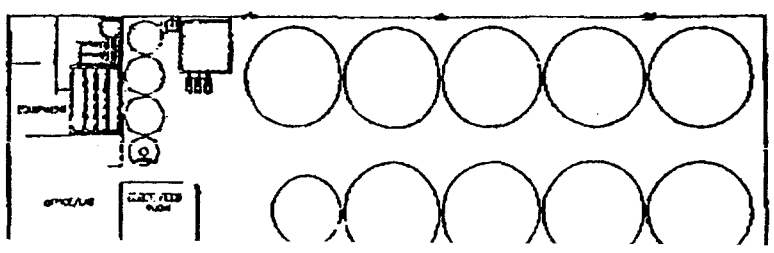
Worldwide statistics reveal that presently, aquaculture accounts for 15% of the 22 billon pounds produced annually. With the great ocean bank fisheries being dramatically depleted and overfished, technology and economics have shifted to benefit the development of aquaculture.

Presently, the United States imports the majority of the produce consumed. Of the consumables brought into the USA, only petroleum ranks higher in importation, based on total per capita consumption. The US market consumes 4 billion pounds per year (just under 11 million pounds daily), while producing 200 million pounds per year. By the year 2000, production is expected to reach or exceed 1.2 billion pounds annually.

A Specialized Design for Intensive Aquaculture

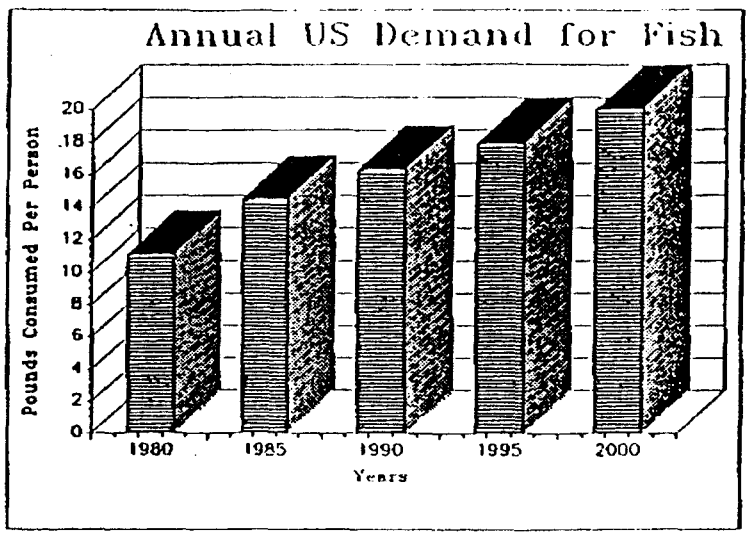
With over 20 years experience, Keeton Fisheries Consultants is a recognized leader in aquaculture innovation and development. KFC specializes in the engineering and design of turnkey intensive aquaculture facilities.

Each Family Fish Farm is engineered with the most up to date technological advancements. Having completed working systems across the country and around the world, you can benefit from our years of expertise.



National Market for Fish

Keeton Fisheries Consultants has accomplished marketing studies that reveal the nation wide market waiting at your doorstep. We have additional information on fish processing, packaging and marketing included with your feasability study.



Percapita growth indicates 25% increase in consumption every decade.

Impact to your Local Economy

Based on the size system you choose, you can provide 1 - 10 additional fulltime jobs into the local or regional economy.

GLENDIVE JAYCEES

P.O. BOX 456
GLENDIVE, MONTANA U.S.A. 59330

24
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RRD46
Long Range Planning

DAWSON COUNTY DEVELOPMENT COUNCIL
111 WEST BELL
GLENDIVE, MONTANA 59330

The Glendive Junior Chamber of Commerce board of directors and regular members passed a motion to give Jaycee support to Dawson County Development Council. The Jaycees need to be notified in advance of needs by the Dawson County Development Council, before Jaycees can act.

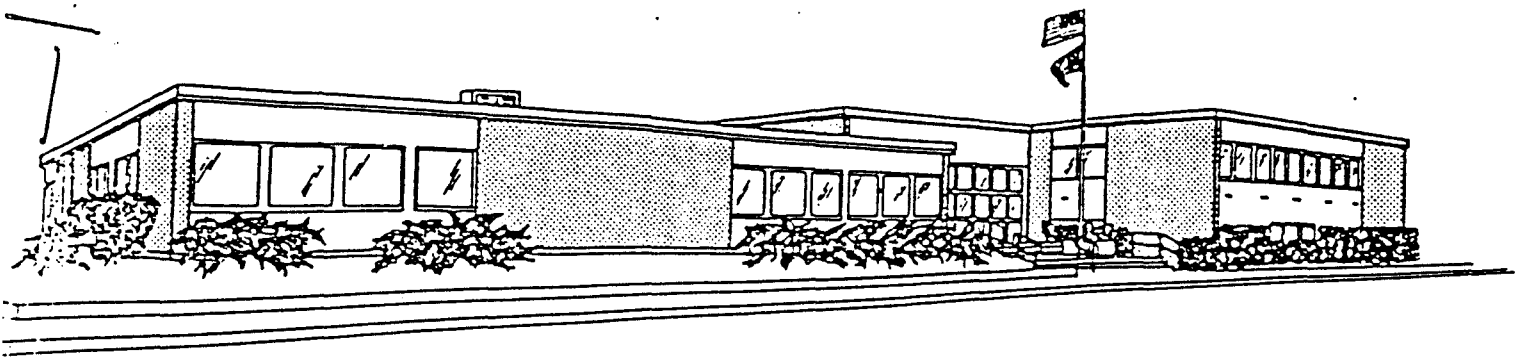
The board of directors along with the regular membership would then discuss the motion and vote on it. The Jaycees are a constructive action organization of young people who devote a portion of their time to community service in the public interest, developing young people as leaders of their community.

We would like to give our support and hope we can work together to build a stronger Glendive area.

Respectfully yours,

Bob W. Anderson

Bob W. Anderson



County of Dawson

207 W. Bell
Glendive, MT 59330

Office of:
County Commissioners
Phone 365-3562
Robert Ziegler
W.M. Harpster
Judy Reddig

Office of:
Clerk and Recorder
Phone 365-3058
Patricia Peterson

Office of:
County Treasurer
Phone 365-3026
Cindi Hansen

July 9, 1990

Dept. of Natural Resources
5 No. Prairie, P.O. Box 276
Miles City, Mt 59301
Attn: Gene Claypool

Dear Gene:

You recently requested the Dawson County Commissioners to review an application for a grant of the Dawson County Development Council, and give our opinion on the project.

This letter is in response to that invitation. We will review the guidelines for reviewing applications you sent, and give our response to each question for which we have information.

We are writing in support of this grant which could help our starving economy. This feasibility study would tell the quality, temperature and flow of the river & acquifer water to determine if we could handle this industry.

We see many positive aspects to this business.

1. Would do no damage to our environment, wildlife, and land.

2. Waste from fish could be mixed with local grain to create a value-added product (fish food).

3. A natural fertilizer would be created.

4. Thermo-water could be used to heat government buildings in this area.

5. It would create at least 150 new jobs for our area.

6. It would create new industry in addition to the fish industry.

7. Build additional tax base for our county.

EXHIBIT 26
DATE 2-11-91
HB RRD40
Long Range Planning

Cover Letter to Gene Claypool, D.N.R.C July 9, 1990 Page two.

Overnite air delivery of fresh fish from Glendive in Eastern Montana is available to Chicago, Minneapolis, Denver, and other cities in the west.

We are also looking at the waste from our paddlefish caviar business for an additional value added product.

We believe the fall-out from this project could be enormous, and beyond our knowledge at this point in time

We hope you will grant this application because we must encourage Montana value added products to provide jobs, tax base, and bolster our sagging economy.

Any help you may be able to provide would be most appreciated.

Sincerely,

BOARD OF COUNTY COMMISSIONERS
Dawson County Montana

Robert Zeigler, Chairman

Judy Reddig, Member

Burt Oliphant, Member

Dawson County Development Council
Glendive, Montana 59330

Long Range Planning Committee
Montana State Legislature
Helena, Montana

Dear Members;

We would like to express our support for the AquaFarm Water Feasability Study in Glendive, Montana as proposed by Mr. Hank Lordemann to DNRC. We feel this project should receive ranking and funding under the Water Development and Renewable Resource Development Program.

This project has a lot of potential benefits for Glendive and Montana. We need to know if aqua-farming will succeed here as it has in other states. Can we develope our natural resources and make this new technology work to provide new income and jobs for this state?

The funding of this grant application will be the key to the development of a new industry for Montana. With a 20% loss in population and a loss of 50 businesses in 5 years, we can only hope that proposals such as this will be sucessful. We must be ready to take some risk with new ideas such as this if this state is to turn around our current recession.

Our small local development group asks for your support of this grant application and the search for new technology.

Thank you.

Michael C Wilson
Dawson County Development Council

GLENDIVE FORWARD
• An Economic Development Corporation •
• 111 W. Towne • P.O. Box 1202 • Glendive, Montana 59330 • (406) 365-8512

July 9, 1990

26
2-11-91
RR040
Long Range Planning

M. T. E. C.
P. O. Box 275
Miles City, MT 59301
Attn: Duane Claypool

Re: Butler Research & Development Co./Fish Farming

Dear Mr. Claypool:

Glendive Forward of Montana, Inc. would like to go on record as being very much in favor of the above mentioned project. Anything that will benefit the economic development of Glendive we would wholeheartedly approve of. However, at this time, we are not in any financial situation to be of help in bringing this about.

We do hope that you are able to find financial assistance so that this in fact can become a reality.

If you should have the time or information, we would be very interested in just how the project in Williston is faring and if they are getting the project off the ground.

If you should need any help or request any particular information, please don't hesitate to either write or call at 406/365-8612.

Yours very truly,

Marion Erickson,
Administrator

me

DAWSON COUNTY CONSERVATION DISTRICT
102 Fir Street, F.P.
Glendive, MT 59330
PH: (406) 365-5565

July 11, 1990

Duane Claypool
DNRC-CD Bureau
P.O. Box 276
Miles City, MT 59301

Dear Mr. Claypool;

The board of the Dawson County Conservation District would like to go on record that we are in full support of the proposed "Aquafarm Water Project Feasibility Study". We feel there is great potential and economic need for such a project in eastern Montana.

The conservation district is submitting a DNRC grant application and have agreed to be the project sponsor for the proposal.

Please review and consider the enclosed application for possible funding.

If there are any questions, please contact us.

Sincerely,

Dennis Basta, Chairman

Hank Lordemann,
Project Coordinator

DB/pw
cc: Les Pederson, DNRC
encl.

RON MARLENEE
MONTANA

WASHINGTON OFFICE:
2465 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225-1555

Congress of the United States
House of Representatives
Washington, DC 20515

MONTANA OFFICES
312 9TH STREET, SOUTH
GREAT FALLS, MT 59405
(406) 453-3264

103 NORTH BROADWAY STREET
BILLINGS, MT 59101
(406) 657-6753
TOLL FREE
800 332 5965

August 24, 1990

DATE 2-11-91
RR040
Long Range Planning

Mr. Hank Lordeman
318 North Meade
Glendive, MT 59330

Dear Hank,

I want to express my enthusiastic support for your efforts in conducting a feasibility study for the Aquafarm Water Project. In association with the Dawson County Development Council, these efforts to bring 150 jobs and a $6 million payroll to Dawson County should be fully supported and explored to their greatest extent.

Sportsmen are well aware that the needs of recreational and commercial fishing will need to be well-balanced in the future. I am committed to keeping the outdoor opportunities of Montanans vital while exploring new solutions to bring food products to market. Your plan to raise Atlantic Salmon, Walleye, Prawns, and Yellow Perch for the consumer market by means of accelerated fish farming is a perfect example of maintaining the necessary balance between our natural resources and their wise use and development.

In addition to exploring this exciting new market, I also recognize that your proposed accelerated fish farming methods will rely -- to a significant extent -- upon local agricultural products such as oats, barley, and soybeans for fish feed. The fertilizer by-product of the process will benefit ag producers in Dawson County and throughout the area.

I am pleased to offer my enthusiastic support of this phase of the project, and hope that your plans for the project are realized. I believe this idea can become a thriving industry for eastern Montana.

If I can be of any assistance to you please do not hesitate to contact me.

Sincerely,

VISITOR'S REGISTER

_____ SUBCOMMITTEE

AGENCY(S) _____ DATE 2-11-91

DEPARTMENT _____

NAME	REPRESENTING	SUPPORT	OPPOSE
Jim Duncan	Zoo Montana	X	
Clyde Kyle Lee	Sallow Co	✓	
Rep. Jessica Stickney	H.D. 26 Miles City	✓	
HANK LORDEMANN	DAWSON COUNTY DEVELOPMENT COUNCIL	—	
Richard Miller	MT State Library Comm.	✓	
Flaxville Water Project	~~H.F~~		
Rep Linda Nelson	Flaxville Water Project	✓	
Ralph Hammer-Clerk	Flaxville	✓	
GRANT EDWARDS	FLAXVILLE	✓	
Raymond Hillak	Flaxville Mont	✓	
John Johnson	Glendive MT Dist 23	X RRD3	
Stan Bradshaw	MTA	RRD7	

IF YOU CARE TO WRITE COMMENTS, ASK SECRETARY FOR WITNESS STATEMENT.
IF YOU HAVE WRITTEN COMMENTS, PLEASE GIVE A COPY TO THE SECRETARY.

FORM CS-33A
Rev. 1985

VISITOR'S REGISTER

Long Range Planning SUBCOMMITTEE

AGENCY(S) DNRC DATE 2-18-91

DEPARTMENT WD & RRD Grants

NAME	REPRESENTING	SUP-PORT	OP-POSE
Billi Jo Doll	Phillips Conservation Dist	✓	
Marianne [illegible]	Yellowstone Co Cons Dist		
Curtis C Mokley	Upper Milk river water users	✓	
[illegible] Mokley	" " " " "	✓	
[illegible] Bulbeck	" " " "	✓	
[illegible] Enkerud	Glasgow Irrigation Dist	✓	
Robert M Fagenberg	Milk River Consultant	✓	
Mark Etchart	Glasgow Irrigation Dist	✓	
J B Anderson	Ruby Dam project	✓	
[illegible] Kuehn	Town of Ekalaka	✓	
Jo Brunner	MWRA Glasgow Milk Chinook	✓	
John Elias	Chinook		
Freda Brison	Chinook		
William P. [illegible]	Chinook		
[illegible] King	Bear Paw Development		
[illegible] H. Brabury	City of Miles City Eastern Montana Industries	✓	
Janet H Ellis	MT Audubon support Heritage & NRIS program	✓	
LeRoy Payne	Stillwater Cons Dist	✓	
[illegible]	Stillwater Cons Dist	✓	
Robert R Story Jr	Stillwater Cons Dist	✓	

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