

MINUTES

MONTANA HOUSE OF REPRESENTATIVES 52nd LEGISLATURE - REGULAR SESSION

SUBCOMMITTEE ON LONG-RANGE PLANNING

Call to Order: By CHAIR MARY ELLEN CONNELLY, on February 18, 1991, at 8 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 RECLAMATION AND DEVELOPMENT GRANT PROGRAM

Tape 1:A:000

MSU/Reclamation Research Unit: Effect of Sodium, Chlorine, and Total Salts

Frank Munshower, Director, Reclamation Research Unit, Montana State University (MSU), testified in support of project, RDG 9. The function of the research unit is to carry out disturbed land rehabilitation research, which is normally funded through grants and contracts such as this. The original problems of cyanide extraction of gold ores included the fate of residual cyanide in heap leach pads. The cyanide residues after neutralization may not pose the anticipated problems from the release of neutralized solutions on lands. Now the limiting factor appears to be salts.

Preliminary data indicate that cyanide is being neutralized to fairly innocuous products in the soils by bacteria, by light, and other factors. But the salt accompanying that solution, NaCl, does not break down and creates the salinity in the soils. This proposed study will look at soils to determine the amount of salt loading possible without destroying the capacity to grow vegetation. He distributed a sheet indicating other funding sources. **EXHIBIT 1**

Questions from Subcommittee Members:

REP. BARDANOUE asked if these salt areas could leach, and if the mining companies checked to see if there is a flow of moisture through the salt fields. Mr. Munshower said yes, and the mining companies are required to measure salt loadings and salt movement in any leachate in any soil application. Cyanide breaks down easily, but too much cyanide swamps the system. However, even before that occurs, it appears that there is a salt accumulation that may pose a greater long term hazard than the cyanide.

Carbon County, et al: Integrated Waste Management in Southcentral Montana

Duane Christensen, Stillwater County, Supervisor, Columbus Solid Waste District, testified in support of project, RDG 10. Three counties are involved in a solid waste project. Stillwater County generates 25 tons a day, and concern is developing regarding the amount of recyclables in the waste stream. The money would be used for education projects to encourage Recycle, Reuse and Reduce.

Martha Haverkamp, Joliet City Council, testified in support of the project. EXHIBIT 2

Jesse Wilson, Columbus City Council, testified in support of the project. He hoped the project would extend the useful life of the landfill, in addition to saving resources. The money would be used to hire a part-time coordinator, who would develop educational and display materials and administer the equipment they hope to acquire. \$12,000 would be used to buy bins for recycling collection centers. In addition they would purchase a crusher to reduce volume. He submitted a letter from the Mayor of the Town of Columbus, Robert Kem, in support of the project. EXHIBIT 3

REP. BARDANOUE asked if Columbus' landfill was leaking. Mr. Wilson said it was not but if the useful life (presently estimated at 20 years) could be extended, it would be worth it. There is no lining or leachate, and there are monitoring wells.

Bob Logar, Big Timber, reviewed the financial assessment, with \$121,000 requested and \$45,000 recommended with a difference of \$76,000. Big Timber's landfill must be closed with the new landfill opening in July of 1991. A \$450,000 bond issue had passed, evidence of the expense of meeting the new requirements of Subtitle D and upcoming State regulations. He suggested the committee grant them the \$76,000 for the purchase of a baler so they could reduce the volume and extend the life of the landfill by three times the normal life. This baler would be shared by Big Timber, Columbus and any community in the tri-county region who needed it.

REP. BARDANOUVE asked if Big Timber had a landfill, and if the baler would be portable. Mr. Logar said they had a city landfill, with fees charged to the county. The baler would be fixed, and the garbage would be hauled to Columbus.

Ms. Hamman asked what the markets would be for the recyclables. Mr. Logar said Big Timber would enter into an agreement with the Billings Recycling Center. Ms. Haverkamp said the market does fluctuate, but it's just a matter of time before seven printing plants designed to use recycled paper go on line.

Pesticide County Cleanup Committee: Pesticide Contamination Cleanup

Paddy Trusler, Lake County, testified in support of the project, RDG 15. EXHIBIT 4 The exhibit contains not only his testimony, but letters of support and informational testimony from local governmental entities in Lake County, Choteau County, Carbon County, Dawson County and Custer County.

1:A:000

Ken Engellant, Geraldine, Choteau County Commissioner, spoke of the major problem with Dieldron contamination at the airport in Geraldine. He asked for support for cleanup effort.

Questions from Subcommittee Members:

REP. BARDANOUVE asked what had been requested in the previous session for this project, and what has been accomplished. Mr. Trusler said \$300,000 had been requested and \$150,000 was received. Since the scope of the contamination was unknown, it was hard to get a handle on the cost. The request was cut in half so investigations could be conducted. \$45,000 of the original grant had been spent to date. The risk assessment to be conducted at each site will cost another \$45,000 to \$50,000. Therefore there will be approximately \$50,000 for some remedial cleanup.

REP. BARDANOUVE asked how much cash the counties had contributed. Mr. Trusler said initially DHES contributed \$30,000, and the counties contributed \$25,000. In this grant application, the counties will contribute another \$25,000, and the state will contribute \$15,000. It costs approximately \$100 - \$120 per yard to remediate the soil. With 2700 yards to move or remediate, \$100,000 has been spent to date to determine the extent of the problem.

Vic Anderson, DHES, testified in support of the project. EXHIBIT 5

REP. BARDANOUVE asked why liability could not be established in any of the five sites. Mr. Trusler said in the case of Ronan, it was past employees of the county who had contaminated the ground.

REP. BARDANOUE commented the counties should pay more, with the State providing help.

SEN. HOCKETT asked about the rest of the airports in Montana, and where the project would stop. **Mr. Tubbs** said the focus of this application is not only to clean up the five sites. If the white rock fungi or the bioremediation techniques work out, these will become demonstration methods for the rest of the state. He did agree with the Senator that the committee and the Department were likely to see more applicants for assistance in this area.

SEN. HOCKETT suggested a fee on license plates as a source of funding such as is used by the Weed Districts. It could be used for weed control and chemical control, since the problem is caused by chemical use and sales. Chemical people and chemical applicators have a responsibility for this. **Mr. Tubbs** said that idea was not investigated. It is true they are competitive with this money. The use of the money will go towards prevention of future occurrences through education of current users.

DNRC/Water Management Bureau: Arsenic in Upper Missouri River Basin

Abe Horpestad, DHES, Water Quality Bureau, testified in support of project, RDG 17. He gave the background on the grant application. The sources of arsenic, a carcinogen, in the Upper Missouri River Basin have been identified to be Yellowstone Park namely the Yellowstone and Madison Rivers; the Clarks Fork comes from the ores in Butte. He discussed the EPA standards for arsenic both for carcinogenicity and poisoning effects in drinking water. The level in the Upper Missouri River Basin, from Columbus north through Havre, is 1,000 times the national standard.

Mr. Horpestad said that above Three Forks, where irrigation has been used for 100 years with this water, there is three times as much arsenic in the ground water as in the surface water. The Water quality Bureau, DHES, has applied for an in stream flow reservation on the Madison/Missouri system to maintain dilutional levels. There may be 30 excess cases of cancer occurring now as a result of the arsenic concentrations in the Madison/Missouri system. There is already a reservation on the Yellowstone. The Department is objecting to the consumptive water reservations in the Clarks Fork on the basis of a potential health hazard.

Chuck Dalby, Hydrologist, DNRC, gave a summary of the project and read the testimony from the Bureau of Reclamation, Billings office. They support the project as a cooperator with matching funds. They are developing a water management model for the Upper Missouri River Basin, and arsenic is an important consideration. This project would collect additional water quality data and develop an arsenic management model.

Mr. Dalby described the need for an arsenic water quality model and the need for enough data to develop the model. A model is a tool, but does give the manager the ability to evaluate how different land management practices will affect water quality. This will be a starting point.

David Nimick, Hydrologist, USGS, testified in support of the project. USGS will do most of the field data collection efforts for the project, and will contribute up to \$115,000 on a dollar-for-dollar match for any monies granted. The field data collection efforts for the water quality model will be divided into two main components: (1) to collect arsenic in stream flow data at seven gauge stations on the main stem rivers; (2) to look at the chemical reactivity of arsenic. The last page of the handout he provided has a graph of arsenic concentrations this past summer in the Madison. At the upstream end of the river arsenic concentrations show no variation during the 24 hour period; however at the downstream end of the river, at Three Forks, there are marked changes on a 24 hour basis. This kind of cyclical change is important to understand to try and improve the water quality modeling effort DNRC will do. The last part of the field effort will be to look at ground water in the Missouri River downstream of Three Forks to locate "hot spots" of arsenic in the groundwater in areas that are irrigated with mainstem water. **EXHIBIT 6**

Gil Alexander, Director, Canyon Ferry Limnological Institute, described the Institute as a student research effort located at Canyon Ferry Lake in the facilities of the Bureau of Reclamation. Recent research indicates there is biomagnification of arsenic in Canyon Ferry Reservoir. Crayfish collected last summer indicated arsenic levels 12 - 30 times the level of arsenic in their bodies as in the water. This information indicates the necessity for more knowledge about the amount of arsenic and what happens to it once it enters the chemical and biological systems of the reservoir. The Upper Missouri drains 43,000 square miles before it reaches the reservoir, of which a significant portion is irrigated. He expressed concern about the amount of arsenic entering the ground water and contaminating soils. Introductions of dams along the mainstem have interrupted natural flushing of this element, and the impacts need to be understood.

Mr. Alexander said his institute could be of service to everyone involved by having students do projects in conjunction with the Water Quality Bureau, thus creating a more literate adult population for the state with regard to the real effects of arsenic and other carcinogens and chemicals within the systems.

Questions from Subcommittee Members:

SEN. LYNCH asked for clarification regarding DNRC's source of funds for this project. Mr. Dalby said the amount contributed by DNRC represents his salary for 1/2 year, and is an in-kind contribution. SEN. LYNCH asked for a breakdown of the uses for

the money. Mr. Dalby said \$115,000 of the \$179,000 would be used to match USGS funds. There was additional money contributed by the Bureau of Reclamation.

Tape 2:A:000

SEN. LYNCH said this sounds terribly important, and if so, why does it not go through DNRC's budget. **Ms. Barclay** said she had considered that, but she felt that an inappropriate way to manipulate the budget process. They could not bring all their important, necessary projects into the budget for the Subcommittee; that would put other agencies at a disadvantage.

SEN. LYNCH said these funds should be used for people who do not have access to funding other than through these grants, and not for state agencies competing against the people. **Ms. Barclay** said she understood; however, the RDG program is for public entities and in this case, DNRC is in effect assisting a number of local communities along the Upper Missouri River.

REP. BARDANOUE said his concern is the magnitude. Since the source of the problem (geysers, dams, irrigation) could not be shut down, what would be done with all of this information? **Ms. Barclay** said recent discoveries indicate the breadth of the problem. The basin is shut down in terms of development because answers to the questions - how is the arsenic carried, is it tied up in the sediments, where are the hot spots - cannot be determined. More data is needed before any future development can take place.

SEN. HOCKETT asked if an arsenic monitoring test was common for groundwater now. **Mr. Horpestad** said they were not common. Arsenic is ubiquitous. **SEN. HOCKETT** asked if groundwater tests run on areas of irrigation had shown arsenic in the drinking water. **Mr. Horpestad** said that was true, and that DHES had ordered Three Forks to drill a new well.

Ms. Barclay said if this were a man-made situation, the EPA and Superfund would be here. But since the source of the problem is natural, everyone is frustrated. It has been difficult to get recognition from the Park Service that it has contributed to the problem. All will have to work on this issue. At this point, it is important to assess the significance of the problem and how far it is travelling along the system.

Department of State Lands: Comet Mine Wetlands Development

Larry Marshall, Chief, Abandoned Mine Reclamation Bureau, testified in support of project, RDG 18. EXHIBIT 7

Yellowstone County: Yellowstone County LIS/GIS Project

Jim Logan, Yellowstone County LIS/GIS Project, testified in support of project, RDG 29. EXHIBIT 8 He distributed a map of the planning area, EXHIBIT 9, and a packet of materials.

Mary Jo Smith, Data Processing Director, Yellowstone County, testified in support of the project. **EXHIBIT 10** The exhibit contains the implementation plan and schedule. In addition, there is a list of established relationships, and what Yellowstone County hopes to gain from the system. They have allowed for additional training in the budget so all departments can utilize the system.

Questions from Subcommittee Members:

SEN. HOCKETT commented that no one had mentioned working with the Forest Service. **Ms. Smith** said that is one phase of the project Yellowstone County needs to put in place. The County also hopes to interact with MOSS and GRASS, BLM information systems. A discussion followed on how maps were entered and digitized, interactions with other systems, and savings and capabilities with the system. **Mr. Tubbs** noted that Yellowstone County had not been as far along when the application was filed. There is more certainty now, and Yellowstone County has proceeded in the right direction.

SEN. HARDING asked if Yellowstone County had coordinated with Montana Association of Counties (MACO). **Ms. Smith** said Yellowstone was the lead county, and were the ones that needed to get efficient. Regarding the filing of Irrigation Districts, **SEN. HARDING** asked if there were a problem with records. **Mr. Logan** said most of the Irrigation Districts are very old districts, and the process was through the Clerk of the Courts, and not through the Clerk and Recorder. Irrigation Districts have been subdivided with no subsequent change in the records. It is therefore difficult to track activities. With this system, boundaries will be reestablished and Yellowstone County will monitor and update records. This information will be provided to the Clerks of the Court for administration and taxing purposes, both for irrigation and drainage districts.

SEN. HARDING asked about continuity statewide with other counties. **Mr. Logan** said once established, agreements could be written up between surrounding counties so Yellowstone County could provide these types of services. **Ms. Smith** said they planned to share the information with the State Library. Flexible data bases will be used to facilitate communication with the Library, BLM, and other data bases in the state. This is important because the biggest cost in GIS is the transfer of data and collection of data.

Ms. Hamman asked if the county could afford the ongoing operating costs once this system is up. **Mr. Logan** said they had asked for firm bids on Phase II and III, and intend to look at all of the costs. **Ms. Smith** said Yellowstone County would bring its people up with the system.

DHES/Water Quality Bureau: Hydrogeology, Land Use and Chemical Quality of Water Resources in the Clarks Fork Yellowstone Basin

John Arrigo, DHES, Water Quality Bureau, introduced Robert Davis, USGS, and reviewed project, RDG 20. He distributed a handout, which provided summary of the project. **EXHIBIT 11** USGS will be implementing most of the field activities and will be matching the funds for this project.

Tape 2:B:000

Questions from Subcommittee Members:

REP. BARDANOUVE asked for a description of the Clarks Fork of the Yellowstone Basin. Mr. Arrigo referred the committee to the map on page three of **EXHIBIT 11**. He said Laurel is situated at the intersection of the Clarks Fork and the Yellowstone, and the Clarks Fork Yellowstone basin is the drainage area above that point. The emphasis will be in the river valleys, since that is where most people live, where most agricultural activities take place, and where the shallow groundwater is with all the problems.

REP. BARDANOUVE asked what DHES will do once pollution is found. Mr. Arrigo said a basic understanding of the ground water flow to implement pesticide management plans and wellhead protection plans would be used. For example, with sugar beet growers and the use of aldicarb, a pesticide management plan would involve ground water monitoring, and then working with the Department of Agriculture, the Conservation Districts, and the agricultural producers to see how they use the chemicals. It may be that all that is needed is to wait a month before irrigating after chemical application. In the area of wellhead protection, in a town where everyone has a well, a circle would be drawn around the town, extending it up gradient to the origin of the ground water feeding those wells. This would be a wellhead protection area, where no aldicarb is allowed in order to protect municipal supplies. Another option would be to restrict the use of a particular agricultural chemical if problems cannot be addressed through changes in management practices. For example, aldicarb has been eliminated in Wisconsin.

CHAIR CONNELLY said not much was being done in this area in Flathead County except through the Basin Commission. Mr. Arrigo said some survey monitoring had been done there for pesticides in ground water in the Flathead Basin, and nothing startling had been found. The difference there is that the ground water is deeper, with layers of silt and clay that separate the surface sources of pollution from the ground water. Nevertheless, it was hoped that areas such as the Flathead, the Bitterroot, the Missoula Valleys take this approach and look at the regional ground water flow system to see where it is coming from, where it is going to, and where the sources of pollution are.

REP. BARDANOUE asked if aldicarb was biodegradable. Mr. Arrigo said it was persistent in ground water. It is sprayed in one form, and it converts to different forms in the environment. National surveys indicate it is a leacher, and is easily dissolved in water.

ADJOURNMENT

Adjournment: 11:20 a.m.

M. E. Connelly

MARY ELLEN CONNELLY, Chair

Claudia Montagne

CLAUDIA MONTAGNE, Secretary

MEC/cm

HOUSE OF REPRESENTATIVES
LONG-RANGE PLANNING SUBCOMMITTEE

ROLL CALL

DATE 2-18-91

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

EXHIBIT
DATE 2-18-91
HB Long Range Plan

Applicant Name: Montana State University, Reclamation Research Unit

Project/Activity Name: Effect of Sodium, Chloride and Total Salts from Treated Cyanide Solutions on Soils.

Amount Requested: \$117,697

Other Funding Sources and Amounts: Matching funds
MSU Grants and Contracts Office: \$34,812

Total Project Cost: \$82,885

EXHIBIT 2
DATE 2-18-91
HB. RDG-10
Long Range Planning

TRI-CYCLERS

Tri-Cyclers is a non-profit group (subcommittee of Beartooth RC&D Area, Inc.) set up to assist local governments in three southcentral Montana counties with a public education program on the benefits and need for integrated waste management and to assist in the reduction of materials entering the waste stream.

Members include local elected officials, county and city employees, teachers, and many other concerned people. Formed in February 1990.

Activities include the following:

1. Sponsoring an Eastern Montana College continuing education 3-credit workshop to help teachers integrate solid waste management concepts into current curriculum. The course will be taught to meet the needs of all teachers K-12, June 14-21, 1991.
2. Assist with community recycling drives organized and run by local community groups to benefit local charities (10 to date in 5 communities).
3. Hold public information meetings with the following speakers: Mike Lightie, KMCS; Mark and Delia Richien, Billings Recycling; Paul Sinter, EQC; Judy Sass, Midwest Assistance Program (MAP); Carolyn Miller, Bright n' Beautiful.
4. Co-hosted the MAP's Mountain Plains States Solid Waste Training Seminar (Oct. 30, 1990, Billings)
5. Assist city and county with the development of materials recovery facilities and the obtaining of equipment for solid waste reduction and recycling.
6. Creation of a local solid waste information library and arranging for solid waste recycling curriculum for all schools in 3-county area.

TOWN OF COLUMBUS

COLUMBUS, MONTANA 59019

February 11, 1991

EXHIBIT 3
DATE 2-18-91
HB 8, RDG 10

Long Range Planning

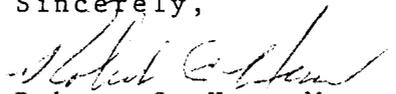
The Town of Columbus is a sponsor member of the Beartooth RC & D Area, Inc. We are also a member of the Tri-Cyclers, which is a resource committee of this RC & D.

The Town supports the grant application submitted by Beartooth RC & D and Tri-Cyclers to develop recycling projects and educational programs on recycling in Sweetgrass, Stillwater and Carbon Counties.

We feel this is a unique opportunity for Montana to support a grassroots coordinated effort to minimize solid waste in our three county area.

The Town, together with a local 4-H group is at this time building a recycling collection center which will be in operation this summer. This area and its citizens are committed to resolving this problem.

Sincerely,


Robert C. Kem, Mayor

STILLWATER COUNTY

Elevation 3,575 ft.
 Population, Columbus 1,235
 Cattle 62,400
 Hogs 10,600
 Sheep 16,300
 Honey (lbs.) 12,000
 Spring Wheat (bu.) 12,600
 Winter Wheat (bu.) 1,385,700
 Oats (bu.) 198,400
 Barley (bu.) 569,200
 Hay (ton) 42,300
 Sugar Beets (ton) 17,835
 Largest Chrome Deposit in U.S.A.
 Big Game Hunting
 600 Miles of Trout Fishing

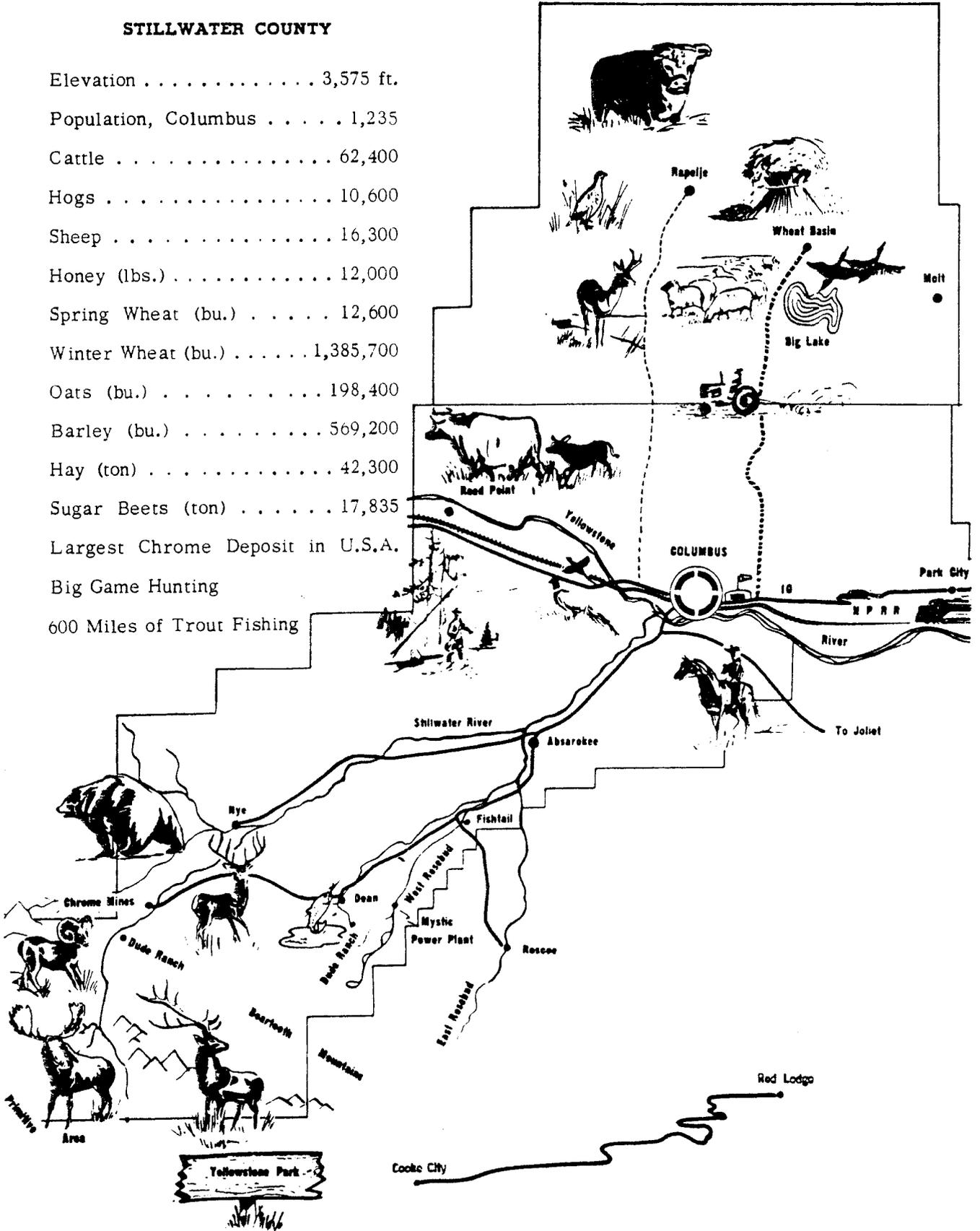


EXHIBIT 4
DATE 2-18-91
HB RDG 15
Long Range Planning

My name is Paddy Trusler and I am employed by Lake County. I have been designated to act as spokesperson for the pesticide clean-up committee to provide testimony on our grant application. Other county representatives are also in attendance to provide testimony so I will make my remarks brief.

The grant request today is actually the final phase of investigation, research and development, and remedial clean-up. The 1989 legislature awarded the Department of Health and Environmental Sciences \$150,000.00 to determine the extent and depth of pesticide and herbicide contamination in five county weed control areas. These counties are Lake, Choteau, Dawson, Carbon, and Custer. I am happy to report to you today that 4 of the 5 have been tested and that a remedial clean-up procedure has been demonstrated with very encouraging results.

I would like to provide a few specifics:
Investigation of pesticide contamination has concluded in Carbon, Custer, Dawson, and Lake County. It has been determined that for these 4 sites combined over 2700 yards of contaminated soil will require treatment. At each site the Department of Health and Environmental Sciences worked closely with the counties using in-kind match monies and services as much as possible. Grant monies to date have been used almost exclusively for laboratory analysis. The remaining site, Geraldine, is to be handled in much the same manner.

One of the more exciting results of our work was a demonstration project conducted at the Carbon County site in Joliet. At this site white rot fungi was used to bioremediate contaminated soils. No soil was excavated but during in place treatment of the soils we observed dramatic reduction, up to 96% in contamination levels; this result in just 45 days. We feel confident that this type of bioremediation will be effective on all sites.

The question yet unanswered is to what level must the contaminants be reduced in order to alleviate future public health concern. This question will be answered by conducting a risk assessment at each site using 1989 grant funds. Data reviewed from this risk assessment will provide definite levels required for remediation and therefore the total cost of cleanup.

The final phase is the subject of this grant request. I believe we have determined the vertical and horizontal magnitude of the contaminants at four of the five sites. We will have results for the fifth in early 1991. The cleanup phase will accomplish two major objectives. The first and most important is to eliminate obvious public health risks. The second is to provide model remediation techniques which can be used statewide.

Ex. 4
2-18-91
Long Range Pla

Pesticide and herbicide contamination is not concentrated in the five counties which are involved in the grant application. As other contaminated sites are determined remediation will be necessary. We believe that the testing, and evaluation of bioremediation techniques, conducted within this grant, will provide invaluable information to individuals and regulatory agencies, as to what techniques are effective and which provide the highest percent of contaminate reduction.

It is important to understand that this grant does not contain administrative monies for either the State or the counties. All monies spent to date have been used to investigate each site and develop a plan for clean-up. The monies in this grant will be used totally for the actual clean-up. In addition to grant monies an additional \$40,000.00 of cash and in-kind services has been pledged by the State Department of Health and the counties.

In conclusion, I would stress one of the major criteria of benefit for RDG projects is "investigation and remediation of sites where hazardous wastes or regulated substances threaten public health and the environment". The investigation phase is nearly complete and the remediation is necessary. Supplemental information substantiates that none of the county weed control districts are financially capable of these respective remediation projects. Whereas this grant will certainly be advantageous to the counties involved, it has the additional benefit that the results can be applied to other similar contamination problems in Montana.

I would like to thank the DNRC and this committee for their interest in this grant application.

LAKE COUNTY LAND SERVICES

PLANNING AND SANITATION

106 Fourth Avenue East
Polson, Montana 59860-2175
Telephone 406-883-6211

L 4
DATE 2.18.91

HB 8 RDG 15
Long Range Plan.

TO: Long Range Planning Committee
FROM: Pesticide Clean-up Committee
DATE: February 15, 1991
RE: Activities Associated With The 1989 RIT Grant for
Investigation and Evaluation of Remediation Alternatives

The purpose of this memorandum is to brief you on:

- 1) the results of MBI's bench-scale treatability for soils from the Lake County Weed Control site;
- 2) our preliminary evaluation of the initial analytical results from the October 1990 sampling at Lake County Weed Control District, Miles City Airport, and Richey Airport; and
- 3) the results of the Joliet treatability study.

In addition, we provide rough estimates of cleanup costs. It is obvious we **need** the 1991 grant funds; the 1989 funds **will not** be sufficient to clean up all five sites.

1) MBI's study

Microbial Biotechnology of Polson, MT conducted a feasibility study on Lake County Weed Control District soils. The study was designed to characterize the effectiveness of indigenous and/or cultured bacteria to biodegrade pesticides and herbicides found in soils on-site.

Core soil samples were obtained from three locations on-site in October, 1990. During late November, an attempt was made to culture indigenous bacteria from the samples with little success. Next, a mixed culture of pseudomonad bacteria was added to a slurry of on-site soils contained in a stirred vat reactor. A known concentration of chlorine was added. After 21 days, the total concentration of chlorinated compounds was reduced by 98.7%. MBI concluded that the bioremediation process for the removal of contaminating agents at the site is feasible; however, they recommend ground excavation and installation of stirred vat reactors on-site.

February 15, 1991

Page 2

Due to an equipment changeover, MBI is currently unable to provide us with a completely detailed analytical analysis relative to depth on the core samples collected. Without documented analytical results, we are unable to draw any concrete conclusions regarding this study at this time. However, this type of remediation has not been ruled out.

2) Joliet Treatability Study

A treatability study was conducted by MSE, Inc. and Mycotech, Inc., of Butte at the Joliet site using white rot fungi. The results of this treatability study indicate that white rot fungi is very effective at biodegrading the organic herbicides 2,4-D and 2,4,5-T. Two different strains of fungi, Strain 2 and 3, were both tested at approximately 25 percent by volume; Strain 2 appeared to be more effective at this particular site. Utilizing Strain 2, concentration reductions of at least 96 percent were achieved, as confirmed by three outside laboratories. However, due to the limited scope and funding of this study and some problems with the study design, we cannot conclude that all degradation occurring at the site was actually due to the white rot fungi; some may have been due to aeration from rototilling. In addition, the number of samples collected did not allow for solid statistical verification of concentrations observed before and after treatment.

Unfortunately, the study indicated that arsenic contamination was more prevalent at the site we had anticipated. Cleanup at this site may require other alternatives in addition to or instead of biodegradation.

3) Results of October 1990 sampling

As you know, we submitted samples collected at the Lake Co., Miles City, and Richey sites in a phased manner. We have requested additional analytical analysis for depth samples that were on hold pending results of surficial and one foot depth samples. Following is a brief summary of results for each site based on the first batch of samples analyzed. NOTE: Since this report was written, additional analysis results have been received; however, these results did not make any appreciable changes in the estimates of soil volumes and treatment costs detailed in this report.

- Lake County Weed Control District: Pesticides were detected in all locations at the site. The contamination appears to be confined to the top two feet of soil, with the exception of RN-SS-23 in quadrant 07 of the loading and mixing area where significant levels of 2,4,-D and picloram were still detected at a depth of 2 feet. This sampling location contains the filled-in remains of an old septic tank once used by the weed control district. Analytical results of sample RN-SS-03 in the western quadrant show methoxychlor at a depth of 2 feet; however, in the duplicate sample, none was detected. Depending on the results of additional analysis, remediation may be necessary to a

depth of three feet in these areas. The surface area of contamination at this site is approximately 11,954 square feet. If soils to a depth of one ft. in grids RN-SS-05, 08, 19 and 20, three ft. in grids 03 and 07, and two feet in all other areas were designated for treatment, the estimated soil volume would total 794 cubic yards.

- Miles City Airport: Pesticides were detected in all sampling locations on-site. The contamination appears to be confined to the top two feet of soil, with the possible exception of sample location MC-SS-16 which lies underneath the northwest corner of the old hangar foundation. Significant concentrations of dalapon and picloram were detected at a depth of 2 feet. No samples were collected beyond this depth; however, contamination could have migrated further into the ground. Therefore, remediation may be necessary to a depth of three feet below the foundation. The surface area of contamination at this site is approximately 15,589 square feet. If solid to a depth of one ft. in grids MC-SS-03, 06, 10,11,13,15, and 17, three ft. underneath the entire foundation, and two ft. in all other areas were designated for treatment, the estimated soil volume would total 1154 cubic yards.

- Richey Airport: Pesticides were detected in all locations sampled at the site. The contamination appears to be confined to the top two feet of soil in a majority of sampling locations; however, high concentrations of endrin were detected in RY-SS-06 (inside the hangar) at depth of 2 feet. No samples were collected beyond this point; therefore, the extent of contamination to depth is undetermined. The surface area of contamination at this site is approximately 8620 square feet. If soils to a depth of one ft. in grids RY-SS-01,08, and 09, three ft. in grids 02, 03 and 06, and two ft. in all other areas were designated for treatment, the estimated soil volume would total 622 cubic yards.

- Joliet Weed District: Samples were collected for MDHES at this site in 1987. Herbicides 2,4-D and 2,4,5-T were detected in soils on-site in levels up to 11,000 ppm and 720 ppm, respectively. Tetrachlorodibenzo-p-dioxins (tetra-dioxins) were detected at a level of 12.1 ppb in the soil under the shed. Analytical results of untreated samples collected from beneath the shed floor during the 1990 treatability study showed the highest concentration of 2,4-D at 1100 ppm and 2,4,5-T at 53 ppm. It has been assumed that the contamination will average three feet in depth. The treatment area would be the 1500 square feet described in the site assessment. The estimated soil volume would total 167 cubic yards.

Cleanup Cost Estimates (ROUGH!)

Based on encouraging results from the Joliet treatability study, DHES is seriously considering complete remediation of all five pesticide sites utilizing white rot fungi. However, we have not ruled out the use of bacteria yet. A treatability study would be needed to be conducted at all the sites to identify the ideal degradation conditions (e.g., moisture/nutrient content). If successful, the bacteria/fungi would be employed to clean up the sites.

Bob Earns of Mycotech, Inc. unofficially quoted a bioremediation cost of \$120-160/cubic yard of soil treated. He estimated a higher amount of \$180/cubic yard for the Joliet site due to its indoor location. This amounts to an approximate total of \$250,000.00 to \$425,000.00 to cleanup the Lake Co., Ronan, Joliet, and Richey sites. Following is a breakdown of site by site estimates.

	<u>Worst-case</u> ¹	<u>Best-case</u> ²
Lake Co.	\$119,000	\$ 54,825
Miles City	173,100	86,475
Richey	93,300	89,025
Joliet	25,050	20,100
Geraldine ³	?	?
	<hr/> \$410,550	<hr/> \$250,000

1
Cleanup to background levels or less.

2
Cleanup to < 1.0 ppm of total contaminants.

3
Not enough site data to estimate volume of contaminated soil.

We still do not have enough data on the Geraldine Airport to estimate cleanup costs. Also, we do not know costs for bacterial degradation.

It's clear that we will not have enough grant money to clean all five sites to background. However, rarely are Superfund sites cleaned to background. Instead, they are usually cleaned to allowable levels determined by risk assessment. We had hoped to avoid conducting a risk assessment by discovering that contamination generally did not extend to depth or over the entire site and funding would be sufficient to clean up to background. Since this is not the case, having a risk assessment is warranted. The only cleanup level we have found for a pesticide Superfund site was relatively high (total pesticide concentration of 3 ppm) compared to the levels found at depth at these sites, so a risk assessment may greatly decrease that volume of soils needing remediation. We will need to contract with a toxicologist to perform a risk assessment for the determination of cleanup levels at each site.



The Beautiful Mission Range as seen from Ronan

City of Ronan

Ronan, Montana 59864

EXHIBIT 4

DATE 2-18-91

HB 8, RDG 15

Long Range Planning

May 7, 1990

Carol Fox -
Solid And Hazardous Waste
State Dept. of Health
and Environmental Sciences
Cogswell Building
Helena, Montana
59620

Dear Carol:

As you are aware the Lake County Weed District Office is located in Ronan, Montana. I have recently learned that funding is necessary to clean-up the contamination problem at the site. I have also become aware that your department is willing to seek grant funds through the legislature to assist the weed district in contracting for appropriate clean up. As Mayor of Ronan I would like to express my support of your endeavors and would offer assistance in any way possible.

I thank you for your efforts.

Sincerely,

George Atkinson, Mayor

Lake County Weed Control District

(406) 676-5270

1210 Round Butte Road West

Ronan, Montana 59864

May 4, 1990

Carol Fox
Solid and Hazardous Waste Bureau
Dept. of Health & Environmental Sciences
Cogswell Building
Helena, Montana
59620

EXHIBIT 4
DATE 2.18.91
HB 8 R0615

Long Range Planning

Dear Carol,

As Weed District Supervisor, I have been trying to determine how our agency can fund a clean up of our chemical mixing and rinse site. I have learned that the grant received in 1989 to assist in this clean-up is only sufficient to complete investigatory work. Because of this, your bureau is completing a grant application which would assist us in remediating the site. I highly support your efforts and will provide any assistance that I am able.

I am not familiar with the grant requirements but I would be happy to provide information you may need for it's completion. Please contact me if I can be of help.

Sincerely,



Gregg Bennett

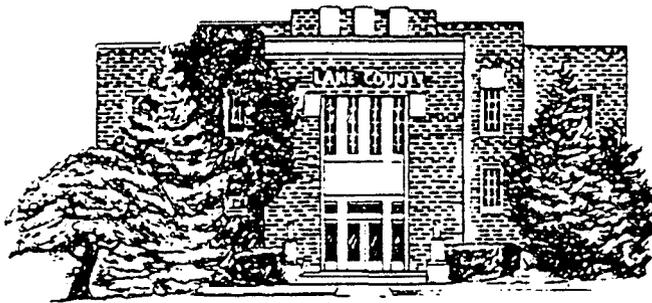
Supervisor

Lake County Weed District

COUNTY COMMISSIONERS
DON PETERSON
District One
RAY HARBIN
District Two
GERALD L. NEWGARD
District Three

TREASURER
PATRICIA J. COOK

CLERK AND RECORDER
SURVEYOR
LORIN JACOBSON



ASSESSOR
LENORE A. ROAT

SHERIFF AND CORONER
JOE GELDRICH

CLERK OF COURT
KATHERINE E. PEDERSEN

SUPERINTENDENT OF SCHOOLS
GLENNADENE FERRELL

COUNTY ATTORNEY
LARRY J. NISTLER

JUSTICE OF THE PEACE
CHUCK WHITSON

LAKE COUNTY

PHONE 406/883-6211 • 106 FOURTH AVENUE EAST • POLSON, MONTANA 59860

May 8, 1990

RECEIVED

Carol Fox
Solid and Hazardous Waste Bureau
Dept. of Health &
Environmental Sciences
Helena, Montana
59620

MAY 10 1990

MONTANA DEPARTMENT OF HEALTH
AND ENVIRONMENTAL SCIENCES
SOLID AND HAZARDOUS WASTE BUREAU

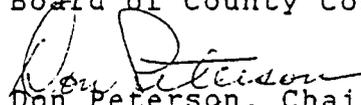
Dear Ms. Fox;

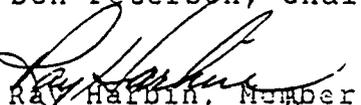
The Board of Lake County Commissioners have become aware of a potential grant which would provide funding for the cleanup of pesticide contamination at the Lake County Weed District. Specifically this grant will provide expertise in developing a plan and contracting with a reputable firm for clean up and abatement of this potential health hazard.

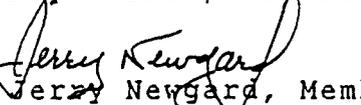
As you are aware, local governments are facing a serious financial crunch. Lake County is no exception. Thus, we would highly support a grant application which would assist the Lake County Weed District in abating what could become a serious environmental problem.

Thank you in advance for any effort put forth on Lake County's behalf.

Sincerely,
Board of County Commissioners


Don Peterson, Chairman


Ray Harbin, Member


Jerry Newgard, Member

DP/RH/JN/vhd

LAKE COUNTY LAND SERVICES

PLANNING AND SANITATION

106 Fourth Avenue East
Polson, Montana 59860-2175
Telephone 406-883-6211

EXHIBIT 4

DATE 2.18.91

HB R.D. 15

Long Range Planning

May 7, 1990

Carol Fox
Solid and Hazardous Waste Bureau
Department of Health
and Environmental Sciences
Helena, Montana
59620

Dear Carol:

I have recently become aware of the lack of funding to complete clean-up work at the Lake County Weed Control District site. Unfortunately the Weed District has always faced financial hardship in trying to accomplish their objectives. Thus providing monies for cleanup of this problem would no doubt require expenditures over several budget years. This of course at the expense of controlling weed infestation.

I am aware, however, that money may be available through a grant to assist the Weed District in clean-up activities. Certainly this endeavor, if successful, would resolve the problem quickly and effectively.

I highly endorse the grant application and the efforts put forth by the bureau. Please let me know if I can be of any assistance.

Sincerely,



Paddy Trusler Admin.

Lake County Land Services

PRT/vhd

LAKE COUNTY LAND SERVICES RECEIVED

PLANNING AND SANITATION

106 Fourth Avenue East
Polson, Montana 59860-2175
Telephone 406-883-6211

APR 2 1990

MONTANA DEPARTMENT OF HEALTH
AND ENVIRONMENTAL SCIENCES
SOLID AND HAZARDOUS WASTE BUREAU

March 27, 1990

Carol Fox
State Dept. of Health
and Environmental Sciences
Solid and Hazardous Waste Bureau
Cogswell Building
Helena, Montana
59620

RE: 1991 RDG Application for Pesticide Cleanup

Dear Carol:

First let us express our appreciation for your efforts, on behalf of Lake County, in securing grant funds for pesticide contamination cleanup at the Weed Control office in Ronan. Hopefully with a cooperative effort we can accomplish a thorough investigation and effective cleanup.

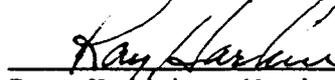
The Lake County Commissioners remain fully committed to the cleanup of contaminated soils at the Weed Control office. We concur with the decision to, at a minimum, determine the extent of contamination at all sites listed in the 1989 grant application utilizing existing funds. We hope that monies from the 1989 grant coupled with state and local matches will also provide for cleanup activities. If however monies are not sufficient for cleanup and if additional grant funds can be obtained, Lake County will commit an additional \$5,000 in local match, during FY 91/92, for cleanup at Ronan.

In the development of the 1991 RDG application please feel free to contact us if you require further assistance. Again we appreciate your efforts in this matter.

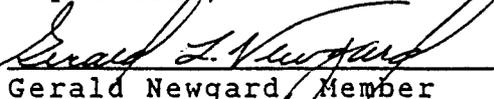
Sincerely,



Don Peterson, Chairman



Ray Harbin, Member



Gerald Newgard, Member

DP/RH/GN/PRT/vhd



The Beautiful Mission Range as seen from Ronan

City of Ronan

109 2nd Avenue South-West
Ronan, Montana 59864

April 28, 1988

EXHIBIT 4

DATE 2.18.91

HB 8 R06 15

Long Range Planning

Duane Robertson
Solid & Hazardous Waste Bureau
SDH & ES
Cogswell Bldg.
Helena, Montana 59620

Dear Mr. Robertson:

As you may be aware the Lake County Weed District office is located in Ronan, Montana. I have recently learned that washing and mixing operations in the past have created a soil contamination problem at the site. I have also become aware that your department would be willing to seek grant funds through the legislature to assist the weed district in determining the extent of the problem and contracting for appropriate clean up. As Mayor of Ronan I would like to express my support of your endeavors and would offer assistance in any way possible.

I thank you for your efforts.

Sincerely,

George Atkinson
Mayor

LAKE COUNTY
LAND SERVICES DEPARTMENT

POLSON, MONTANA
59860

ADMINISTRATOR
Paddy R. Trusler

TELEPHONE 406-883-6211

PLANNING

Jerry Sorensen
Nancy Thormahlen

SANITATION

Al Hawkaluk
Tom Dodd

April 28, 1988

Duane Robertson, Chief
Solid & Hazardous Waste Bureau
DHES
Helena, MT 59620

Dear Duane:

I have recently become aware of the soil contamination problem in the Lake County Weed Control District. I have and will continue to provide any assistance I can to resolve the problem. As such I have become aware that money may be available through a grant to assist the Weed District in clean-up activities. Certainly this endeavor, if successful, would resolve the problem quickly and effectively. Unfortunately the Weed District has always faced financial hardship in trying to accomplish their objective. Thus to provide monies for clean-up of this problem would no doubt require expenditures over several budget years. This of course at the expense of controlling weed infestation.

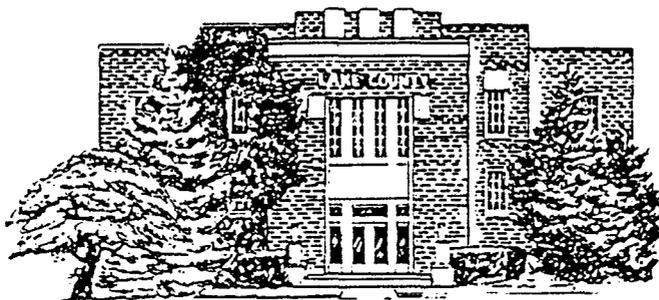
I highly endorse the grant application and the efforts put forth by the bureau. Please let me know if I can be of any assistance.

Sincerely,



Paddy Trusler
Administrator

COUNTY COMMISSIONERS
DON PETERSON
District One
RAY HARBIN
District Two
MIKE W. HUTCHIN
District Three
TREASURER
PATRICIA J. COOK
CLERK AND RECORDER
SURVEYOR
LORIN JACOBSON



ASSESSOR
LENORE A. ROAT
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COUNTY ATTORNEY
LARRY J. NISTLER
JUSTICE OF THE PEACE
CHUCK WHITSON

LAKE COUNTY

PHONE 406/883-6211 • 106 FOURTH AVENUE EAST • POLSON, MONTANA 59860

April 28, 1988

EXHIBIT 4
DATE 2.18.91
HB 8 RD 415
Long Range Planning

Duane Robertson, Chief
Solid & Hazardous Waste Bureau
DHES
Helena, MT 59620

Dear Mr. Robertson:

The Board of Lake County Commissioners have become aware of a potential grant which would allow the Lake County Weed District to abate a potential health hazard. Specifically this grant will provide expertise in determining the extent of soil contamination by chemicals, develop a plan and contract with a reputable firm for removal.

As you are aware local governments are facing a serious financial crunch. Lake County is no exception. Thus we would highly support a grant application which would assist the Lake County Weed District in abating what could become a serious environmental problem.

Please be advised the Board of Lake County Commissioners would be prepared to budget \$5,000.00 to aid in the cost of cleanup and provide up to \$5,000.00 in-kind services when the soil removal process commences.

Thanking you in advance for any effort put forth on Lake County's behalf.

Sincerely,
Board of County Commissioners

Mike Hutchin
Mike Hutchin, Chairman

Ray Harbin
Ray Harbin, Member

Don Peterson
Don Peterson, Member

Lake County Weed Control District

(406) 676-5270

1210 Round Butte Road West

Ronan, Montana 59864

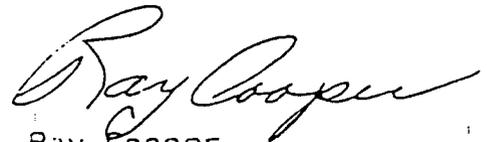
April 28, 1988

Mr. Duane Robertson
Solid & Hazardous Waste Bureau
DHES
Cogswell Bldg.
Helena, MT 59620

Dear Duane,

As Weed District Supervisor I have been trying to determine how our agency can fund a clean up of our chemical mixing and rinse site. I have now learned that your bureau is contemplating a grant application which would assist us in our endeavors. I highly support your efforts and would provide any assistance that I am able.

I am not familiar with the grant requirements but I would be happy to provide information you may need for it's completion. Please contact me if I can be of help.



Ray Cooper
Supervisor

Lake County Weed District

Lake County Weed Control District

(406) 676-5270
1210 Round Butte Road West
Ronan, Montana 59864

EXHIBIT 4

DATE 2-18-91

HB 8 RD 6 18

Long Range Planning

LAKE COUNTY WEED CONTROL

Improvement Program in Safety and Chemical Handling Management

In 1990 Lake County adopted a training program for prospective employee's. This training consisted of several video's in chemical handling, chemical clean up, chemical storage and chemical transportation. Also included in the program was a lecture and question and answer session provided by the County Health office (Dr. Campbell). His program covered chemical exposure, due to breathing - touching or oral ingestion. It also included helpful hints concerning diet and clothing needs in working with chemical sprays.

Enclosed is a proposed concrete tank pit, to be used as a chemical loading station at our headquarters here in Ronan.

Other things that will be installed this season -1991- will be the use of 100 gallon snuttles with a direct pump and measurement gauge in mixing chemicals on the spray trucks.

A program that is being considered is the purchase of a new sprayer system with the tiltable sprayer head assembly. This system is called chemical injection sprayer control. Instead of mixing chemicals by hand, a pump injection sprayer control system delivers chemicals at individually established rates. The system automatically mixes and dispenses up to three selected rates of

Lake County Weed Control District

(406) 676-5270

1210 Round Butte Road West

Ronan, Montana 59864

chemicals into the sprayer lines.

This system eliminates rinsing tanks, keeps chemical transfer out of field situations and in a controlled environment.

We at the Lake County Weed Control, are aware of problems in our industry and we are always willing to look and discuss new ideas in chemical handling.

Greg Bennett
Director

Frame Construction

P.O. Box W
Ronan, Montana 59864
Phone 675-3470 • Office — 675-2076 • Home
Warren Frame

EXHIBIT 4
DATE 2.18.91
HB 8, RD6.14
Long Range Planning

PROPOSAL SUBMITTED TO WEED CONTROL OFFICE		PHONE 676-5270	DATE 6-26-87
STREET LAKE COUNTY		JOB NAME CONCRETE TANK PIT	
CITY, STATE AND ZIP CODE RONAN, MT. 59860		JOB LOCATION JOB SITE: RONAN	
ARCHITECT	DATE OF PLANS	JOB PHONE	

We hereby submit specifications and estimates for

7 X 14 CONCRETE TANK PIT AS SHOWN ON ENCLOSED SKETCH.

EQUIPMENT, MATERIALS, AND LABOR TO FORM AND POUR. INCLUDING: CONCRETE, REBAR, GRAVEL, EXCAVATION, AND BACKFILL.

We Propose hereby to furnish material and labor — complete in accordance with above specifications, for the sum of

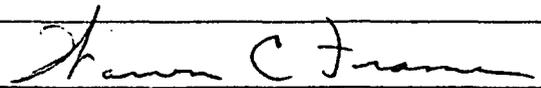
QUOTE: THIRTY ONE HUNDRED ----- dollars (\$ **93100.00**)

Payment to be made as follows:

DUE UPON COMPLETION OR END OF MONTH PROGRESS.

All material is guaranteed to be as specified. All work to be completed in a workmanlike manner according to standard practices. Any alteration or deviation from above specifications involving extra costs will be executed only upon written orders, and will become an extra charge over and above the estimate. All agreements contingent upon strikes, accidents or delays beyond our control. Owner to carry fire, tornado and other necessary insurance. Our workers are fully covered by Workmen's Compensation Insurance.

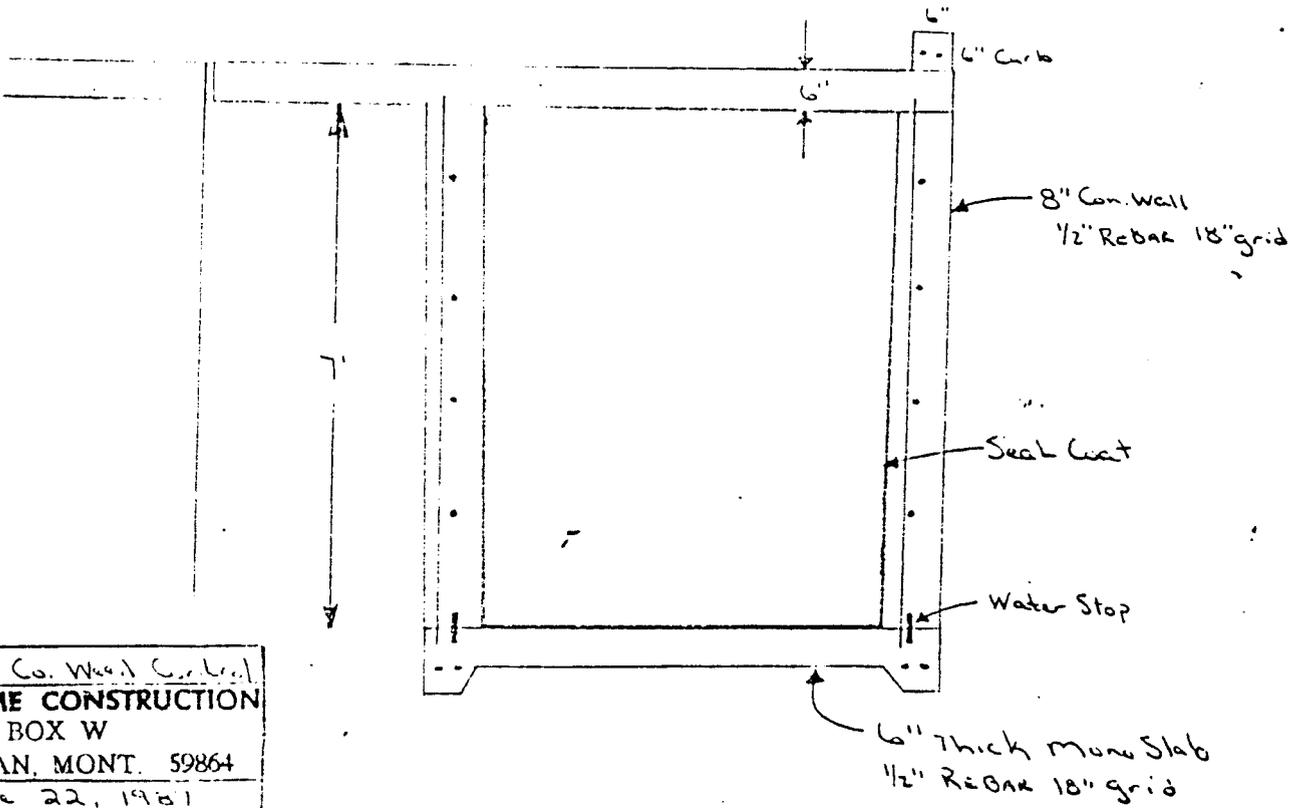
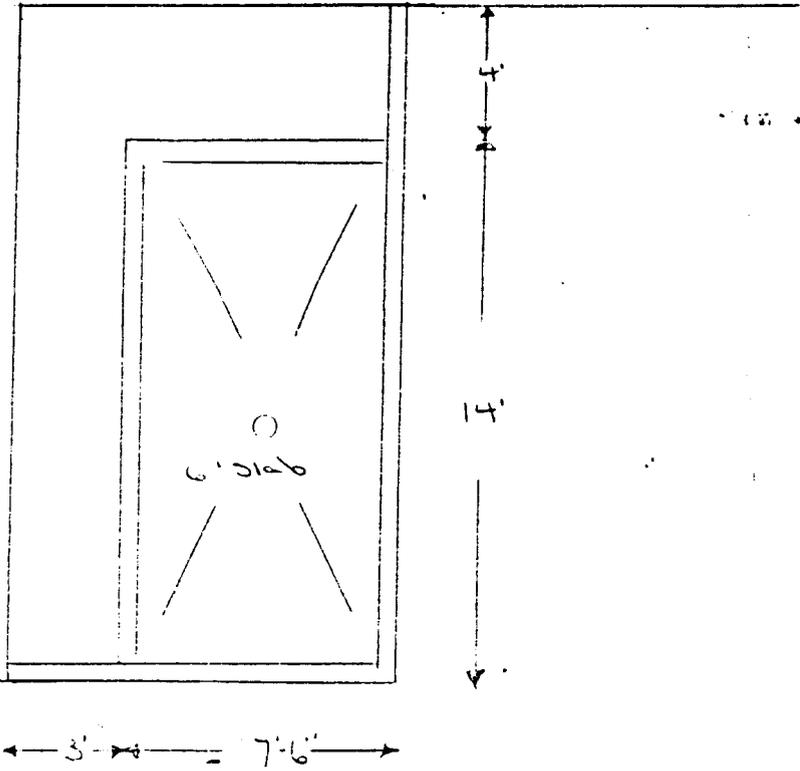
Authorized Signature



Note: This proposal may be withdrawn by us if not accepted within _____ days

Acceptance of Proposal — The above prices, specifications and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

Signature _____

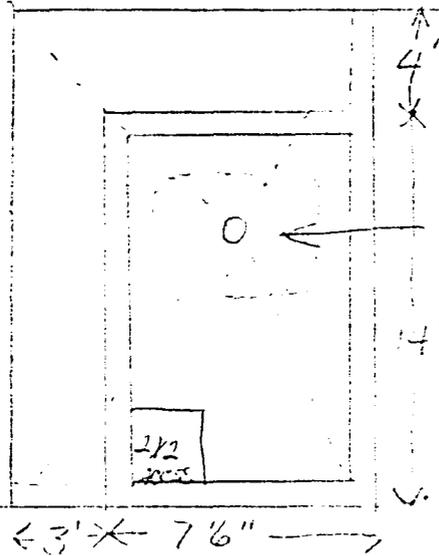


LAKE Co. Wood Co. Inc.
FRAME CONSTRUCTION
 P. O. BOX W
 RONAN, MONT. 59864
 June 22, 1981

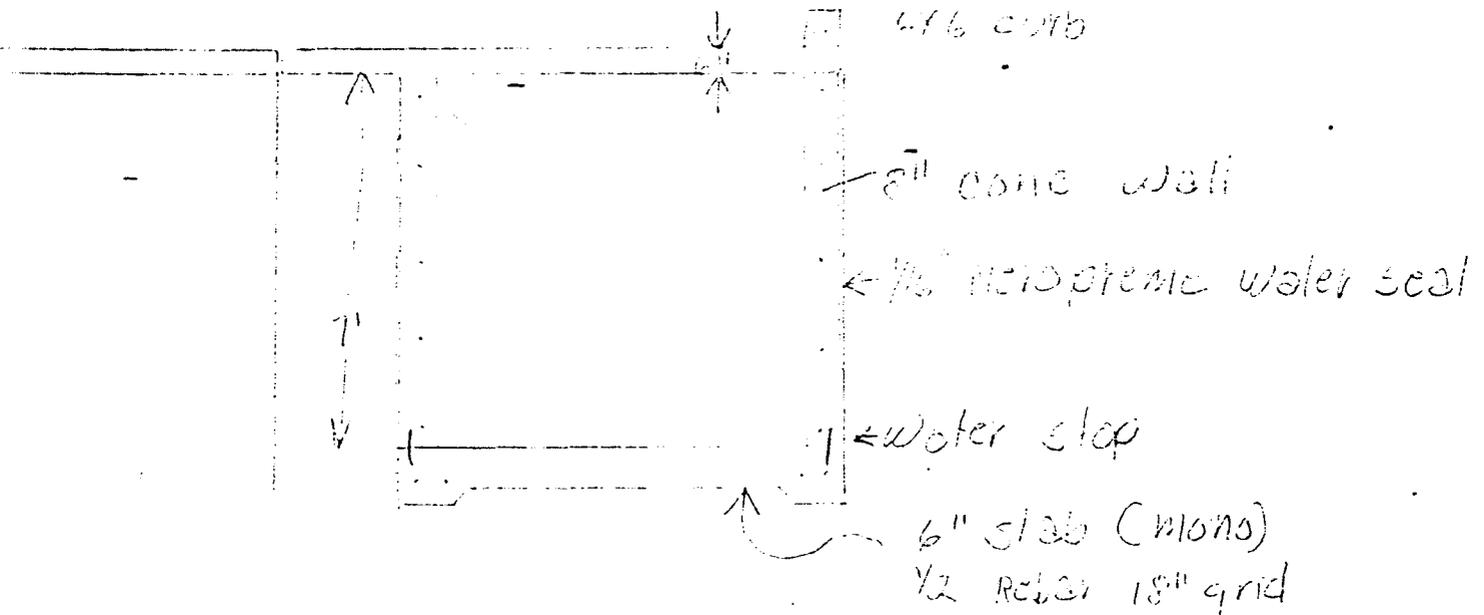
LAKE COUNTY Weed Control

EXHIBIT 4
 DATE 2.18.91
 HB8, RDC.14
 Long Range Planning

Existing Building



300 gal poly Tank



excavation, back-filled
 all materials exc. tank
 and floor drain.

\$ 3000⁰⁰

1/16" neoprene foundation
 seal (optional)

270⁰⁰

Lynn Cooper
 Rt 1 Box 101R4
 Polson MT 59260

\$ 3270⁰⁰

The following information is being provided to substantiate the necessity of a grant to remediate chemically contaminated soils at the Lake County Weed Control office located in Ronan, Montana.

The weed control program is operated through a mil levy appropriation and is granted approximately five mils per year. As you are aware I-105 has frozen our ability to levy additional mils for any purpose. At present the total of the budget expenditures are used for weed eradication and public education. The budget request and expenditure for the last three fiscal years are as follows:

	Budget	Expenditure
FY 88	\$146,900	\$141,521
FY 89	\$146,350	\$128,004
FY 90	\$141,440	\$137,584

It is quite obvious that nearly the total appropriation is expended on existing programs. The Lake County Weed Control staff and advisory board are wholeheartedly in support of the grant application to DNRC as submitted by the Pesticide Cleanup Committee.

CARBON COUNTY PLANNING/SANITARIAN'S OFFICE

William M. King, R.S.
Office: (406) 446-1694

P.O. Box 466
Red Lodge, Montana 59068

January 2, 1991

EXHIBIT 4
DATE 2-18-91
HB 8, RDG 14
Long Range Planning

Julie A. Lethert
CECRA Program
Department of Health & Environmental Sciences
Solid & Hazardous Waste Bureau
Cogswell Building
Helena, MT 59620

Dear Ms. Lethert:

This letter is regarding the 1991 Pesticide Contamination Cleanup project submitted for Reclamation and Development Grant Program funding involving, among others, the Joliet Weed Board building pesticide clean-up project, Carbon County.

Please be informed that funding of this project is sincerely requested by the Carbon County Health Department and Carbon County Planning Board. Ultimate total cleanup leading to a healthy environment in the Town of Joliet (and therefore Carbon County) is essential to our way of life.

Please be informed, also, that this office would gladly provide oral testimony should your office desire it. Thank you in advance for your recognition of the severity of our problem.

Sincerely,



William M. King, R.S.
Sanitarian/Planning Director/Floodplain Administrator/Disaster & Emergency Services Coordinator/Safety Coordinator

cc: File - Joliet Weed Board Building Pesticide Cleanup Project

WMK:lma

RECEIVED

JAN 03 1991

MONTANA DEPARTMENT OF HEALTH
AND ENVIRONMENTAL SCIENCES
SOLID & HAZARDOUS WASTE BUREAU

BOARD OF COMMISSIONERS

County of Carbon



Red Lodge, Montana
59068

January 3, 1991

TO: Pesticide County Cleanup Committee
FROM: Carbon County Commissioners

RE: Reclamation and Development grant to determine the nature and cleanup at the Joliet Weed District site.

In 1989 the Pesticide County Cleanup Committee received a \$150,000 Reclamation and Development Grant to determine the nature and extent of contamination and the cleanup alternatives at the Joliet Weed District storage shed.

The study of this project was designed to characterize the effectiveness of white rot fungi to biodegrade pesticides, herbicides and dioxins in soils at the weed storage site. The treatability study began in July of 1990 and was to be completed by October; however, it was extended beyond the original completion date due to the need for re-application of fungi to further reduce herbicide concentrations on site.

To date, a summary has shown that white rot fungi are capable of degrading all the compounds found at the Joliet site to acceptable levels.

Since it is believed that this treatability study will prove successful and technology will be used to cleanup pesticide - contaminated soils in five other counties, we would ask (no, beg) that you fund the 1991 grant to complete this pesticide contamination cleanup project.

Sincerely

Mona L. Nutting
Chairman, Carbon County Commissioners

TOWN OF JOLIET

JOLIET, MONTANA 59041

January 2, 1991

Julie Lethart
Health & Env. Science
Dept. of Solid Waste & Hazardous Waste
Cogswell Bldg - 836 Front St.
Helena, MT 59620

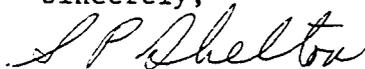
EXHIBIT 4
DATE 2.18.91
HB 8, R.D.G. 17
Long Range Planning

Dear Ms Lethart:

The Joliet City Council is very interested in the hazardous waste disposal project located in the old weed building in Joliet. The building is located in a position that contaminates could affect some of our residences, therefore we are in support of the action the County is taking in cleaning up of this hazardous waste site.

It is our understanding that in order to complete this project additional funds are needed. The Joliet City Council is - therefore requesting that these additional funds be granted.

Sincerely,



S.P. Shelton, Mayor

EXHIBIT 4

DATE 2.18.91

HB § 20615

Long Range Planning

=====

M*E*M*O*R*A*N*D*U*M

=====

DATE: 12-31-90

TO: Carol Fox, Montana Hazardous Waste Bureau, Department of Environmental Sciences

FROM: Rod McNeil, Director R&D, Microbial Biotechnology, Inc.

SUBJECT: Bioremediation feasibility study on Lake County Weed Control District in Ronan, MT

In response to your request of October, 1990, MBI sampled the Lake County Weed Control District location, obtaining 3 cores extending to a depth of 6 feet from the three locations indicated on Map A.

Cores 1 and 3 were relatively complete, offering sampling from surface continuously through to depth: Core 2 produced a void, allowing only surface and bottom sampling of the hole.

These samples were obtained in late October, at the time when our laboratory was switching over from packing column to macrobore capillary column chromatography work. We were unable to perform individual assays for quantitative results on each of the core sections. Cumulative total chloride concentration assays were taken on each sample area to determine the approximate amount of total contamination.

A microbiological examination of the corings from the 3 sites

surface down to approximately 3 feet with a transition to clastic clays below 3 feet.

No biological activity of note was found in any of the samples that would indicate the initiation of on-site degradation. Limited sample degradation was found by differential total organic carbon analysis in area A immediately in front of the storage building.

Other observations concerning the sample collection are of interest in the bioremediation of this area. In all 3 cases, sampling, which was performed November 6, 1990, struck free water at a depth of 5-6 feet in all 3 corings. It is possible that the area contains a perched groundwater table. However, as indicated in the original report we received from Becky Dupuis, the supposed groundwater table is at 20 feet. We found the area from 5 feet down to be totally saturated. This will present significant additional expense in a bioremediation effort, as the potential for migration of the contaminants out of the area is greatly increased by the presence of groundwater.

No migration studies have been done to date on the groundwater observed. It is possible that this groundwater supply represents a perched lens or a bubble in the surrounding groundwater table which may aid in isolation of the contamination migration into the groundwater supply. Draw-down wells are the only solution for the removal of contamination once it has reached the water supply. However, as I have mentioned, further studies concerning hydrology of the area will be necessary to determine the dispersal of the contaminants already known to ^{be} present in the

area.

During late November, we attempted to culture from these corings any indigenous bacteria that might be useful in the biodegradation for the herbicides, pesticides, and insecticides that have been identified from the area. While a significant biological population existed in the so-called "washed-down area" the other areas were devoid of most microbiological growth and the toxicity level of the constituents present was adequate to minimize microbiological growth. For this reason, it was felt that any biodegradation of the contaminants present would have to be done in a continuously stirred vat reactor. We utilize such portable vat reactors to treat soil on-site to preclude the issues of transport, and to increase the rate of biodegradation. As a general test for the determination of the effectiveness of the bioremediation process, we can monitor the quantity of free chloride generated through the degradation of insecticides. For instance, in the degradation of lindane we will generate 6 free chlorides for the destruction of each mole of lindane. This generalized test is not accurate for monitoring those compounds which do not contain chlorine. However, the vast majority of compounds detected at this site do in fact contain large quantities of chlorine.

It was thus felt that a bioremediation evaluation in stirred-vat reactors, utilizing a portion of the cores from the site would be representative of the chlorine containing compounds degradation. A total of 100 g. on a transect sampling through all of the cores from each of the three locations was slurried, and a mixed culture of a pseudomonad bacterium capable of

degrading chlorinated compounds was added. Initial cell concentration was at 1×10^6 cells per mL and 100 mL of culture was mixed with 100 g of soil. This was mixed for 1 hour, and then 10 g of the mix transferred to a continuous flow batch fermenter with a 1 liter capacity. The stirred vat reactor was then continuously sampled over a 21-day period to determine the breakdown and release of free chloride. Hydrochloric acid is the major byproduct constituent of the breakdown and in the first 5 days of the degradation, the pH dropped from 8.0 to 2.0. Due to the extreme pH, the cultured bacteria began to fail, and so by serial dilution, a portion of the hydrochloric acid was removed to allow the culture to rebound. Over a 4-day recovery period, after the draw down, the pH was again noted to cycle down to 2.7, and thereafter in the procedure, a portion of the volume was drawn off and diluted back every 4 days, in order to minimize the effects of hydrochloric acid on the parent culture. The total initial chloride concentration from the soil as transferred to the 1 l reactors measured 356 ppm chlorine and at 21 days the residual remaining in solution was 4.7 ppm. This represents an overall removal of 98.7% for chlorinated compounds in a 21 day trial run. The total solids recovery from the filter flat of the stirred vat reactor was 94%. The residual 6% loss was either due to sampling error or transfer loss in the filtration process on the continual 4-day draw down to relieve the acid pressure on the culture.

It is our opinion that the bioremediation process for the removal of these contaminating agents from the site is practical,

however, we would recommend ground excavation and stirred vat reactor removal for two reasons:

1) It would expedite the process and minimize further migration. There seems to be at least limited preliminary evidence that the groundwater table comes close to the surface at this location, and may present a migration site contamination problem in the future, as these contaminants move out with the groundwater supply. If in fact this is simply a saturated lens, then a draw-down well above the true groundwater table would allow the removal of the vast majority of the contaminants which are water soluble:

2) The second reason for containment of the excavated soil in a continuous stirred-vat reactor is to allow complete control of the reaction. The accumulation of hydrochloric acid as the bacteria break down the various toxicants requires the continuous removal of hydrochloric acid. This can be either achieved titrimetrically by neutralization of slaked lime, or by physical filtration removal from the stirred media. In any case, the presence of such large quantities of acid will require close monitoring to allow the survival of the required biological population. This approach would not be effective in situ. Once the bacteria had found the nutrient resource and begun the decomposition process, the hydrochloric acid in the localized zones would limit or stop bacteriological growth, thus stopping the bioremediation process. Hence, the need for stirred-vat reactors. We have at our disposal 6000 gallon stirred vat reactors, which are field portable. The soil could be excavated from the location and have it treated on site. The existing

storage building or the back of the warehouse area could be utilized to house the tanks, to prevent contact and unwanted personnel exposure to the toxicants. The very nature of the area suggests limited dispersal at this point, however a more thorough ground survey would be necessary to determine the degree of dispersal.

Assuming the original report's estimates of 7000 square feet is accurate, we would assume that the contamination based on our limited cross-section, extends down to the water lens in the 5-6 ft. range. This would indicate that as much as 1500 cu. yds. of solid may be effected and be involved in the bioremediation process. Certainly the concentration relative to depth indicates that the vast majority of contamination is present in the first 1 ft. of the topsoil. On a mass-ratio basis, approximately 2/3 of the total contamination is contained in the top 1 ft. of soil. Due to the transitional nature of the soil at 2-3 ft. to a clastic clay composite, the vast majority of contamination is limited to the top 2 1/2 ft. Due to the limited permeability of the soil below this point, based on total chloride content, we would estimate that 90% of the total contamination is limited to the first 2 1/2 ft in soil depth. To give you some idea of costs for stirred-vat reactor biodegradation, costs run from 100 to 350 dollars per yard of material. The range of cost is dependant on the toxicity and the handling characteristics of the intermediary products associated with the degradation. Obviously, with 2,4 D there is a potential generation of dioxin and dioxin daughter products as intermediaries during the decontamination process.

This requires highly restricted assay and characteristics. We will be glad to work with the whatever basis they require; to either provide the assay work as the bioremediation process progressed, or allow state agencies to do all of the monitoring while we conduct the bioremediation process. The contained nature of the site, and the county ownership of the property offers a unique opportunity to evaluate bioremediation in a controlled environment. The proximity of the site to our own facility also facilitates rapid response to any modification required during the bioremediation process. We would also be happy to do a pilot-scale demonstration, using soil from the Ronan site at our facility to demonstrate the feasibility of this technology solving problems at this location.

I understand that you are in the process of preparing a submission to the state for funding on cleaning up this site. For budgetary purposes, I would estimate that a total cleanup of this site would run between \$100,000-\$150,000 including the analytical monitoring required. In stirred vat reactors, I would anticipate that the bioremediation would take 3--6 months and result in the decomposition of 90+% of all resident products. This would bring all substances within compliance limits and we would guarantee the results as such.

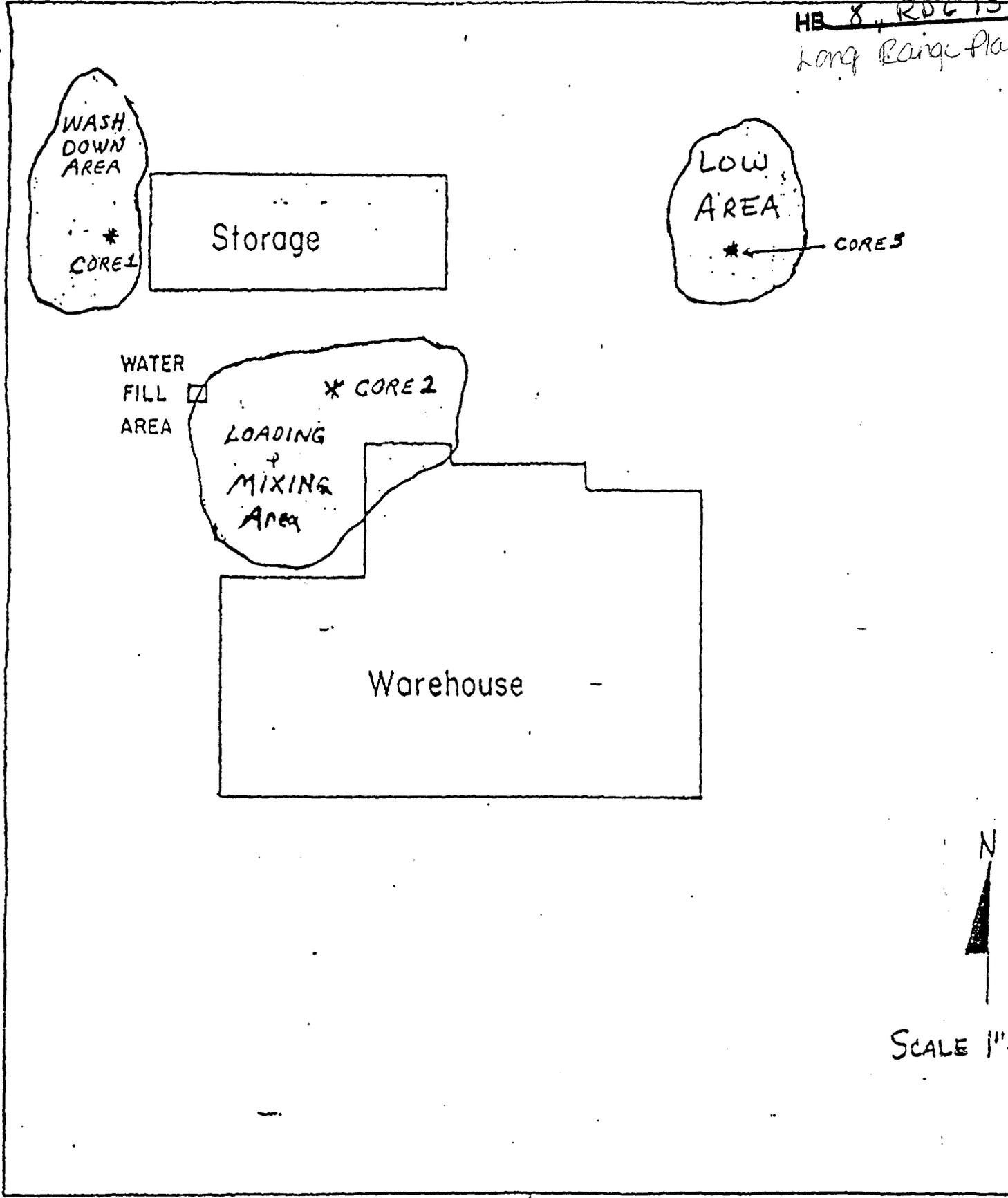
I have enclosed for your review an article on the degradation of PCB's which are similar in chemical decomposition to the constituents found at the Ronan site. As can be seen by Untermann's results, the stirred reactor vessels accelerated decomposition twenty -fold in his experiments.

It is still our intent to provide you with a complete

breakdown with a detailed analysis relative to depth on all of the samples collected from the site. The changeover in our lab to capillary gas chromatography has taken far longer than I would have liked, but I feel that the increased sensitivity and ability to reproduce results warrant the expenditure of time and effort. I appreciate your patience in this matter, and if there is anything that I can provide in the way of further information regarding our sampling at the site, or recommendations on how to accomplish the cleanup, please feel free to contact me.

MAP A

EXHIBIT 4
DATE 2.18.91
HB 8, RDG 15
Long Range Plan



SCALE 1" = 10'

WORK AREAS & LOW AREA

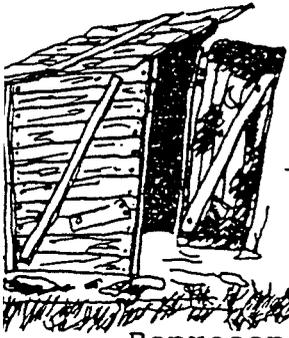
Tri-County Sanitarian

Dawson - Prairie - Wibaux

207 W. Bell

Glendive, Montana 59330

Phone: 365-5772



12 February 1991

Representative Mary Ellen Connelly, Chairperson
Long Range Planning Subcommittee
Capital Building
Helena, Mt.

EXHIBIT 4
DATE 2.18.91
HB 8, RDG. 15

Long Range Planning

Dear Representative Connelly,

Dawson County is one of five counties faced with cleaning up past pesticide spills on county property.

These same five counties, in 1989, were awarded \$150,000 (out of a \$300,000 dollar request) under the RDG program. This money, along with matching funds from the respective counties and MDHES money, was used to test the five sites to further define the parameters of the contamination. This work has been completed. Without further funding from the RDG program little or no actual cleanup can begin. Based on volume estimates, generated as a result of depth sampling, all \$300,000 is need for cleanup. In Dawson County, it would cost \$83,000 to \$99,000 to cleanup the Richey Airport. As you can see, this is cost prohibitive for this county!

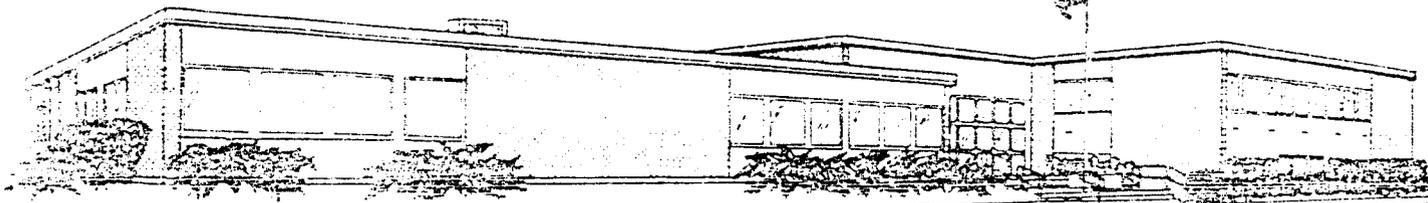
The threat to ground water from these pesticides is real. Tests from wells at these sites has not, at this time, shown levels of these chemicals. No one can accurately predict when this will occur. It is not a matter of "if" it is "when".

Dawson County as since implemented strict permit procedures to control and monitor chemical storage, loading and unloading on all county property which includes roads and other property under county jurisdiction.

I strongly implore you to grant the Pesticide Cleanup Committees request for the \$300,000, from the RDG program, so we can complete work that has already been started to cleanup chemicals that threaten public health and the environment. Thank you for your valuable time.

Yours for a cleaner environment,

Dennis J. Snow R.S.
District Sanitarian



Office of:
County Commissioners
Phone 365-3562
Judy Reddig
Richard Shoopman
Robert Ziegler

County of Dawson

207 W. Bell
Glendive, MT 59330

February 7, 1991

Office of:
Clerk and Recorder
Phone 365-3058
Patricia Peterson Boje

Office of:
County Treasurer
Phone 365-3026
Cindi Hansen

Representative Mary Ellen Connely
Chairwoman, Long Range
Planning Subcommittee

Dear Representative Connely:

The Dawson County Commissioners would like to "Thank" the Department of Natural Resource Council for their past support of pesticide contamination cleanup in Montana.

Dawson County will be providing \$10,000 to help the Reclamation and Development Grant, but our funds are limited.

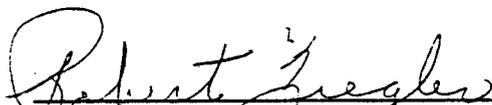
The Commissioners are implementing rules to insure proper handling of these chemicals to prevent a situation like this in the future.

This danger to public health and environment must be addressed.

WE ARE ASKING YOUR CONTINUED COMMITMENT TO RECLAMATION AND DEVELOPMENT GRANT SO WE MAY RID OUR STATE OF THIS DANGEROUS SITUATION.

Sincerely,

BOARD OF COUNTY COMMISSIONERS


ROBERT ZIEGLER, CHAIRMAN


JUDY REDDIG, MEMBER



DAWSON COUNTY AIRPORT COMMISSION

P.O. BOX 196 • GLENDIVE, MONTANA 59330



EXHIBIT 4
DATE 2.18.91
HB 8, RDG 15
Long Range Planning

Feb. 11, 1991

Dear Representative Connolly,

The last couple of years the Dawson County Airport Board and myself as airport manager have been working with our local sanitarian Mr. Snow to clean pesticide contamination. Mr. Snow works very hard to make the world a cleaner environment for all of us and he is a very dedicated person. Our secondary airport at Richey Montana is in need of funding to cleanup what a generation before us has caused. The administration of Dawson County have pledged \$10,000 to cleanup Richey airport but we can not do it without grant monies and your help. In my opinion our sanitarian Mr. Snow is the best man in the state of Montana to handle contamination cleanup and if he is given grant monies to clean up our Richey airport the project results will be applied in similar problem areas in Montana. I understand that at Joliet treatability study the results were 99% reduction of 2-4-D & 2-4-5-T in 15 days through the use of white rot fungi. I believe that we could get the same results at Richey if the funds are available to treat the area. The areas of contamination at the Richey airport are in and around buildings that are used by people and I am very concerned about the possible health threat to them and their children.

Sincerely,

Leon Baker
Leon Baker
Airport Manager

File

Town of Richey

Box 205
Richey, Montana 59259

Mayor
Stanley Waters
Clerk
Barbara Babb

Councilpersons
Darrel Buller
Alton Olson
Nils Silveland
George Winhofer

January 30, 1989

EXHIBIT 4

DATE 2.18.91

HB 8, RDG 15

Long Range Planning

Rep. Mary Ellen Connelly
Long Range Planning Committee

Dear Ms. Connelly:

The Town of Richey is greatly concerned regarding the pesticide contaminated soil at the Richey Airport.

We feel it could be a hazard to the health of the Town and surrounding community.

Sincerely,

Stanley Waters
Stanley Waters, Mayor

CC: Dennis Snow
District Sanitarium

Town of Richey

Box 205
Richey, Montana 59259

Mayor
Stanley Waters
Clerk
Barbara Babb

Councilpersons
Darrel Butler
Alton Olson
Nils Sikveland
George Winhofer

May 2, 1988

Mr. Dennis Snow
Dawson County Sanitarian
207 W. Pell
Glendive, Mt. 59330

Dear Mr. Snow:

The Town of Richey is concerned regarding the Chemical
Spill at the Richey airport.

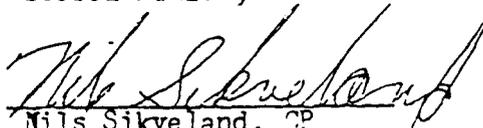
This could be hazardous to the Town and surrounding
community.

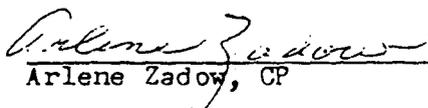
Sincerely,
Town Council


Stanley Waters, Mayor


Darrel Butler, CP


Alton Olson, CP & Pres.


Nils Sikveland, CP


Arlene Zadow, CP



TED SCHWINDEN
GOVERNOR

STATE OF MONTANA
DEPARTMENT OF AGRICULTURE

ENVIRONMENTAL MANAGEMENT DIVISION
AGRICULTURE/LIVESTOCK BLDG.

CAPITOL STATION
HELENA, MONTANA 59620-0205

KEITH KELLY
DIRECTOR
(406) 444-3144

GARY GINGERY
ADMINISTRATOR
(406) 444-2944

May 3, 1988

Duane Robertson, Chief
Solid and Hazardous Waste Bureau
DHES
Helena, Montana 59620

EXHIBIT 4
DATE 2.18.91
HB 8, RD 613
Long Range Planning

RE: Proposed RIT grant to investigate and cleanup Richey airport.

Dear Mr. Robertson:

I am writing in regard to a pesticide storage/disposal problem that has recently been brought to my attention. The site is at the Richey airport in Dawson county. In a hangar located on airport property is stored some 200 barrels which at one time, and in some cases still do, contained pesticides. Among the chemicals found there are: Methyl Parathion, Ethyl Parathion, 2,4-D Amine, 2,4-D Ester, 76 Butyl Ester, Cygon, Fargo, Roundup, Dithon and Banvel. Also found at the site was one container of Endrin half full and a container of Dieldron nearly full. The airport sits atop an underground lake which is seven feet below the soil surface, the fact that 7-10 (possibly more) of these containers were leaking could result in groundwater contamination. I was unable to determine how many of the barrels actually contained pesticide and how many were leaking due to the fact that they were stacked so closely together and time was short.

At this time I am investigating the situation under authority of the Montana Pesticide Act, since I am the duly authorized agent of the Department of Agriculture. We are trying to determine who the responsible party is and whether any of the pesticides can be used in a manner consistent with the labelling, in other words applied to a crop situation. At this time, I have been told to embargo any unregistered products, leaking products or any that do not have a proper label attached to the container, until such time as we can determine the ownership and responsibility of the containers.



TED SCHWINDEN
GOVERNOR

STATE OF MONTANA
DEPARTMENT OF AGRICULTURE

ENVIRONMENTAL MANAGEMENT DIVISION

AGRICULTURE/LIVESTOCK BLDG.

CAPITOL STATION

HELENA, MONTANA 59620-0205

KEITH KELLY
DIRECTOR
(406) 444-3144

GARY GINGERY
ADMINISTRATOR
(406) 444-2944

It is my estimation that, if left in such a manner these pesticide barrels constitute a hazard to humans and the environment. Potentially the groundwater could be contaminated and in the event of a fire the Air Quality Act would be violated. I personally would like to see this cleaned up by the state to insure that it is cleaned up properly, also to forego any more economic drain than is necessary for Dawson county.

Sincerely,

A handwritten signature in cursive script that reads "Shelley Lee Mills".

Shelley Lee Mills, Pesticide Specialist
Environmental Management Division
Montana Department of Agriculture
Glasgow

cc: Steve Baril
Don Vidrine
Dennis Snow
file

DEPARTMENT OF
HEALTH AND ENVIRONMENTAL SCIENCES

EXHIBIT 5
DATE 2-18-91
HB 8, RDG
Long Range Planning



STAN STEPHENS, GOVERNOR

COGSWELL BUILDING

STATE OF MONTANA

FAX # (406) 444-2606

HELENA, MONTANA 59620

Pesticide Contamination Cleanup Grant
Testimony Provided to the Long Range Planning Subcommittee
February 18, 1991

Department's Role

-The Montana Department of Health and Environmental Sciences (MDHES) Solid and Hazardous Bureau is serving as the grant facilitator and technical advisor for the Pesticide Contamination Cleanup Committee. As such, the Department advises the Committee on necessary investigations, contracts with professional consultants needed on the project, and assures that the project complies with state environmental regulations.

-MDHES administrative costs are donated as an in-kind match. In addition, MDHES will be contributing \$15,000 in cash match.

-The Department does not have funds to pay for the investigation and cleanup of these sites.

Comparison of 1989 with 1991 Grant

-The 1989 \$150,000 Reclamation and Development Grant (RDG) involves: 1) remedial investigations to determine nature and extent of contamination, 2) feasibility studies to determine best cleanup technology; 3) risk assessment to determine acceptable cleanup levels; and 4) remedial design. Any leftover funds are to be used for cleanup. Based on accomplishments to date, the majority of the 1989 RDG will be spent on the first three phases and it's unlikely that 1989 funds will be available for cleanup.

-The 1991 RDG grant project will be strictly for remedial design and cleanup. Based on the information gained on depth of contamination from the 1989 grant project, \$300,000 will be needed for the remedial design and cleanup of all five sites.

Success of Bioremediation

-We have concentrated our efforts on bioremediation since other alternatives are more costly. Results of a laboratory study involving bacterial degradation on contaminated soils from Lake County and a field study involving white rot fungi indicate bioremediation is a successful cleanup technology for these sites. At the Joliet site, a 96% degradation in contaminants occurred in the field.

February 18, 1991

Page 2

-We are dealing with new Montana companies specializing in bioremediation, Microbial Biotechnology, Inc. (MBI) of Polson and Mycotech, Inc. of Butte.

-The demonstration of the effectiveness of bioremediation will spur cleanup of other contaminated sites in Montana.

-White rot fungi break down contaminants into safe, naturally occurring compounds without producing toxic by-products.

Historical Contamination

-The grant funds are being spent on contamination problems caused by historical use of the sites. At some sites, the counties did not cause the contamination problems but inherited the liability for them. The counties have instituted measures to handle pesticides products and any spills in a proper manner such that recontamination is unlikely.

Appropriate Use of RIT Funds

-This project meets the major RDG criteria of investigation and cleanup of hazardous substance sites (90-2-1111 MCA).

-These sites are not eligible for federal Superfund funding.

Economies of Scale

-The counties and DHES have developed a cooperative, efficient working relationship.

-By addressing five sites with similar contamination problems, this project takes advantage of economies of scale.

Summary of Benefits

-Without grant funds, the counties cannot afford cleanups.

-Cleanup will reduce or eliminate potential health and environmental impacts from contamination.

-The project will serve as an example for other similar cleanup projects.

-Cleanup will allow development, improvements, and new businesses at the airport sites that are now prohibited.

This project has many benefits and tremendous local support. We appreciate your consideration and hope that you will fund it.

EXHIBIT 6
DATE 2-18-91
HB 8 RDG-17
Long Range Planning

Arsenic in the Upper Missouri River Basin

Objective A: Sample for arsenic in upper Missouri River basin ground water

Sample 75 wells in areas irrigated with Missouri River water after consideration of soils, hydrogeology, and distribution of irrigated lands.

Objective B: Arsenic water-quality model

1. Data collection

- Intensive arsenic sampling at 7 gaging stations for 18 months.
- Arsenic geochemical studies.
- Pilot study of interaction between irrigated soils and arsenic.

2. Model development and calibration

3. Model uses

- Determine variations in arsenic concentrations, both seasonally and in wet and dry years, at different points in the basin.
- Predict how frequently and where in the basin arsenic concentrations exceed the drinking water standard.
- Predict potential effects of new consumptive depletions and changes in current pattern of diversions.
- Explore effects of possible changes in reservoir management and hydropower generation.
- Provide a framework for other water-quality management decisions.

MISSOURI RIVER BASIN WATERWAYS

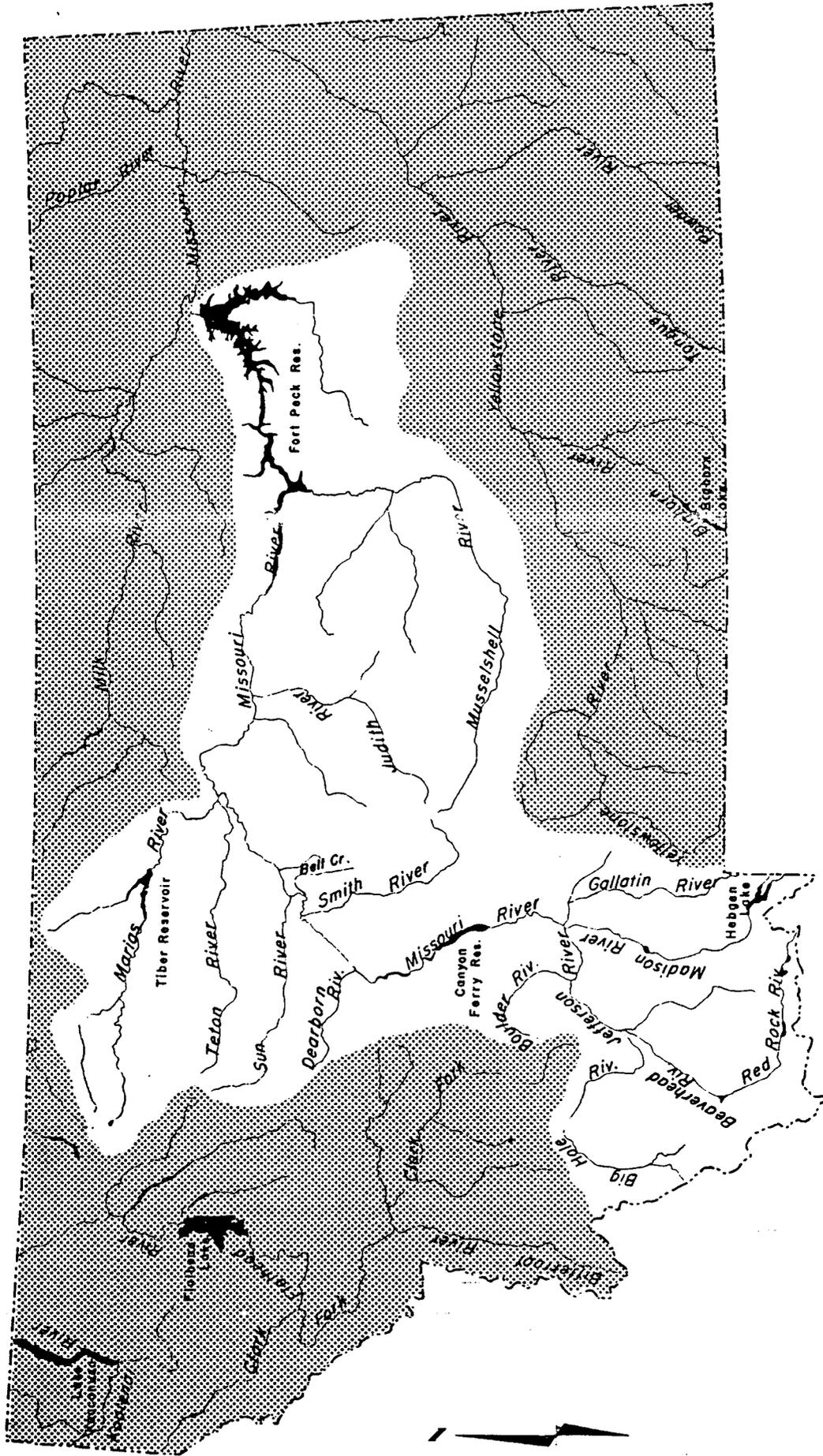
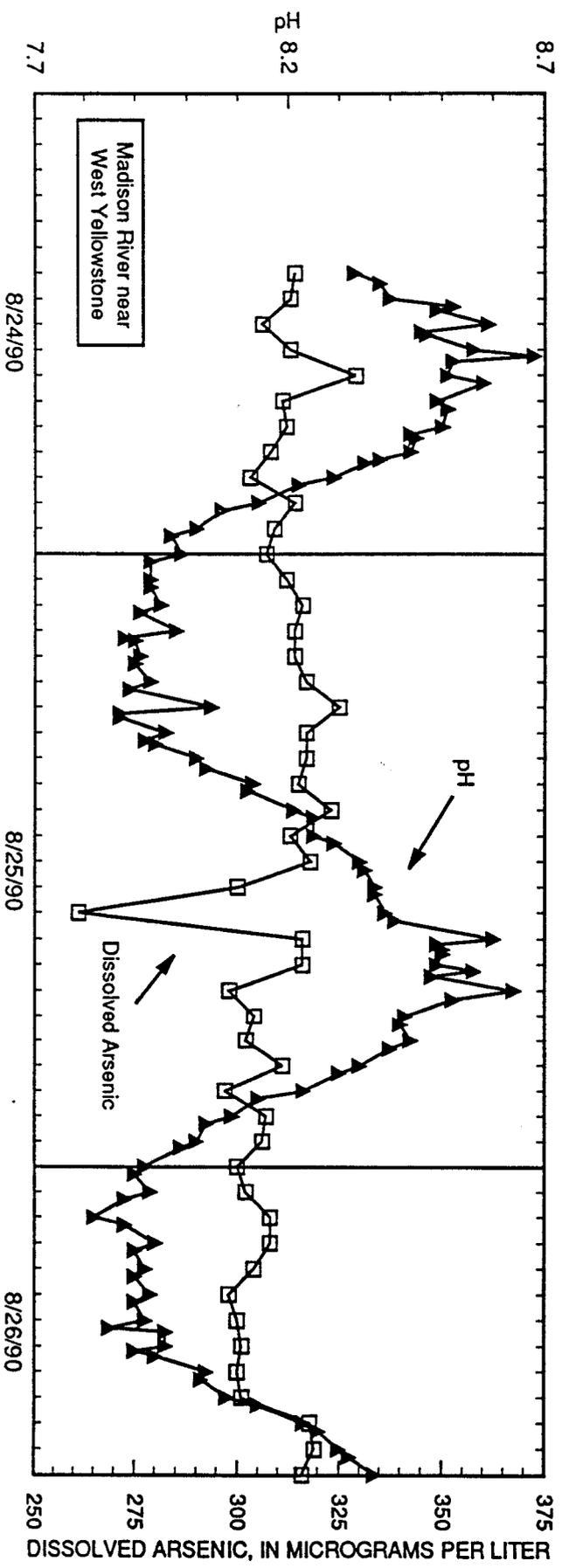
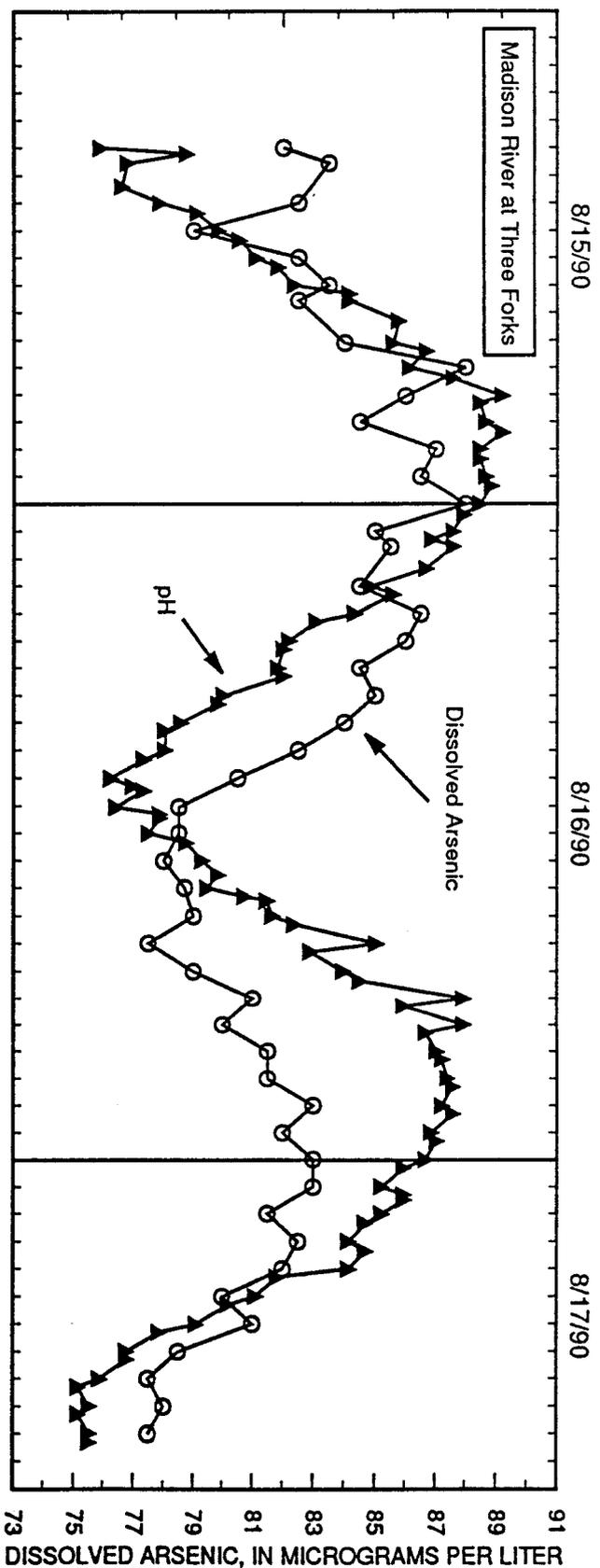


EXHIBIT 6
 DATE 2.18.91
 # 8, RDG 17
 Long Range Plan.

Daily Variations in Arsenic Concentrations in the Madison River



DEPARTMENT OF STATE LANDS

EXHIBIT 7
DATE 2-18-91
HB 8, RDG-18
Long Range Planning



STAN STEPHENS, GOVERNOR

CAPITOL STATION

STATE OF MONTANA

(406) 444-2074

1625 ELEVENTH AVENUE
HELENA, MONTANA 59620

February 1, 1991

MEMORANDUM

To: Reclamation and Development Grants File
(RIT)

From: Larry Marshall, Chief
Abandoned Mine Reclamation Bureau

Re: Testimony Presented Before 1991 Legislature

Good Morning Mr. Chairman and members of the committee. My name is Larry Marshall. I'm Chief of the Abandoned Mine Reclamation Bureau, Department of State Lands. The Abandoned Mine Reclamation Bureau was created because of the federal strip mining law passed in 1977. At this time we are funded solely by a federal tax on coal mined in Montana. Presently, we accomplish approximately \$5 million in abandoned mine reclamation each year and have reclaimed well over 2,400 mine sites all over the State.

We have submitted grant applications for two of the projects before you today, the Comet Mine Wetlands Development Project, listed as number 18, and the Cataract Creek Reclamation Project, listed as number 25. I will address each project in turn.

The Comet Wetlands Development Project, located in the High Ore Creek drainage north of Basin, Montana, will be designed to provide a system for biologically and chemically removing heavy metals from the tailings drainage water. This will be accomplished through the development of a wetlands system. The project would also include the construction of a sheet-pile cutoff wall to restrict the flow of groundwater beyond the tailings area and the construction of a drainage interceptor ditch to reduce surface water runoff flows into the wetlands.

This project is requested as an extension of work funded by a 1987 RIT grant. Those funds did not prove adequate to do all the intended reclamation work. The objectives of the additional work needed at the Comet Mine are to reduce the amount of drainage water entering the tailings area and to reduce the amount of sediment and suspended particles in the drainage water leaving the tailings.

The implementation of this project will be consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Comprehensive Environmental Cleanup and Responsibility Act (CERCA).

The second project application submitted was the Cataract Creek Reclamation Project. The application for this project has been withdrawn and no funding is requested.

SUMMARY OF ALL RIT PROJECTS

SNOWSHOE CREEK STREAMBANK RECLAMATION PROJECT

This Project was funded by the 1987 Legislature in the amount of \$107,000. Construction was begun in October of 1988 with completion in November 1989. Final project cost was \$120,000. The \$13,000 difference was funded through Montana's administrative grant from the Federal Office of Surface Mining. This project consisted of an abandoned mill/mine site approximately 17 miles south of Libby, Montana. The work at the site consisted of:

- Excavating, hauling, contouring, and grading mine waste material;
- Closing and draining mine adits;
- Removing mine waste from stream channels and floodplains;
- Constructing drainage ditches;
- Liming, topsoiling, and vegetating all disturbed areas; and
- Monitoring well with two years of post monitoring.

County of Yellowstone



COMMISSIONERS

(406) 256-2701

Box 35000
Billings, MT 59107

February 1, 1991

EXHIBIT 8
DATE 2-18-91
HB 8, RD 629
Long Range Planning

Representative Mary Ellen Connelly, Chairman
Long Range Planning Subcommittee
Capitol Building
Helena, MT 59601

Dear Representative Connelly:

These are times that we are all searching for ways to make a difference in Montana. Yellowstone County is on the verge of applying a technology that will revolutionize the way we will be doing business. This technology is a Multipurpose Land Information System/Geographic Information System (MLIS/GIS).

Yellowstone County applied for a grant from the Department of Natural Resources and Conservation to help us make the transition and implement the program. Unfortunately the recommendation from staff is not to fund our request. We have included for your review our response to the staff recommendation.

The adoption of this technology will ensure that we can continue to provide the required services. MLIS/GIS will also allow Yellowstone County to provide the public with a significant increase in responsiveness, extension of service capabilities, provide quality products, and lend assistance as a valuable economic development tool. It will help to eliminate the tremendous information duplication and inconsistency of map data. MLIS/GIS will carry the map location data once for many departments instead of duplicating the map data for each department. The MLIS/GIS will allow us to use the prodigious data banks available at the federal, state and city government levels. The MLIS/GIS provides benefits as an analytical and operational tool for making policy, planning, and management decisions. The MLIS/GIS technology also will allow us to deal with the problems and challenges we now face - more efficiently, economically and with all the data appropriate for the decision making process. The MLIS/GIS positions us to handle the unknown and unexplored with more confidence.

Long Range Planning Subcommittee
February 1, 1991

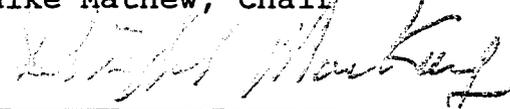
Through Yellowstone County's implementation of MLIS/GIS, Montana's natural resources, such as water and vegetation, will be preserved and protected. Additionally, its natural resources such as coal, oil and land, can be developed efficiently, economically and environmentally sound.

Due to the staff recommendation, we need your support as a member of the Long Range Planning Subcommittee, for your recommendation to the Governor to fund our request. We sincerely believe that the application of MLIS/GIS technology will give the most favorable long term impact on government and business in Montana. A true win-win for Montanans.

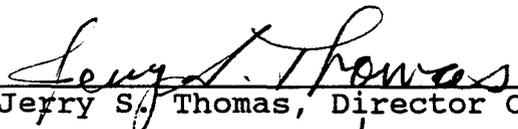
Please feel free to contact MaryJo Smith, DP Director at (406) 256-6901 or Jim Logan, Surveyor at (406) 256-2727 if you have any questions or concerns.

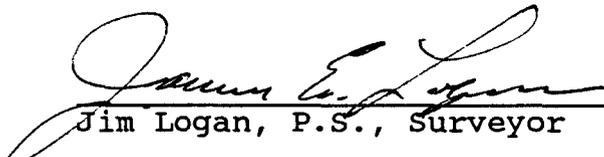
Sincerely,


Mike Mathew, Chair


Dwight MacKay, Member

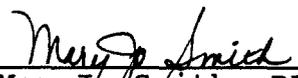

James A. Ziegler, Member


Jerry S. Thomas, Director OMB


Jim Logan, P.S., Surveyor


Bill Arnold, Planning

Absent
Gene Widmer, Appraiser


MaryJo Smith, DP Director

mk
Enc.

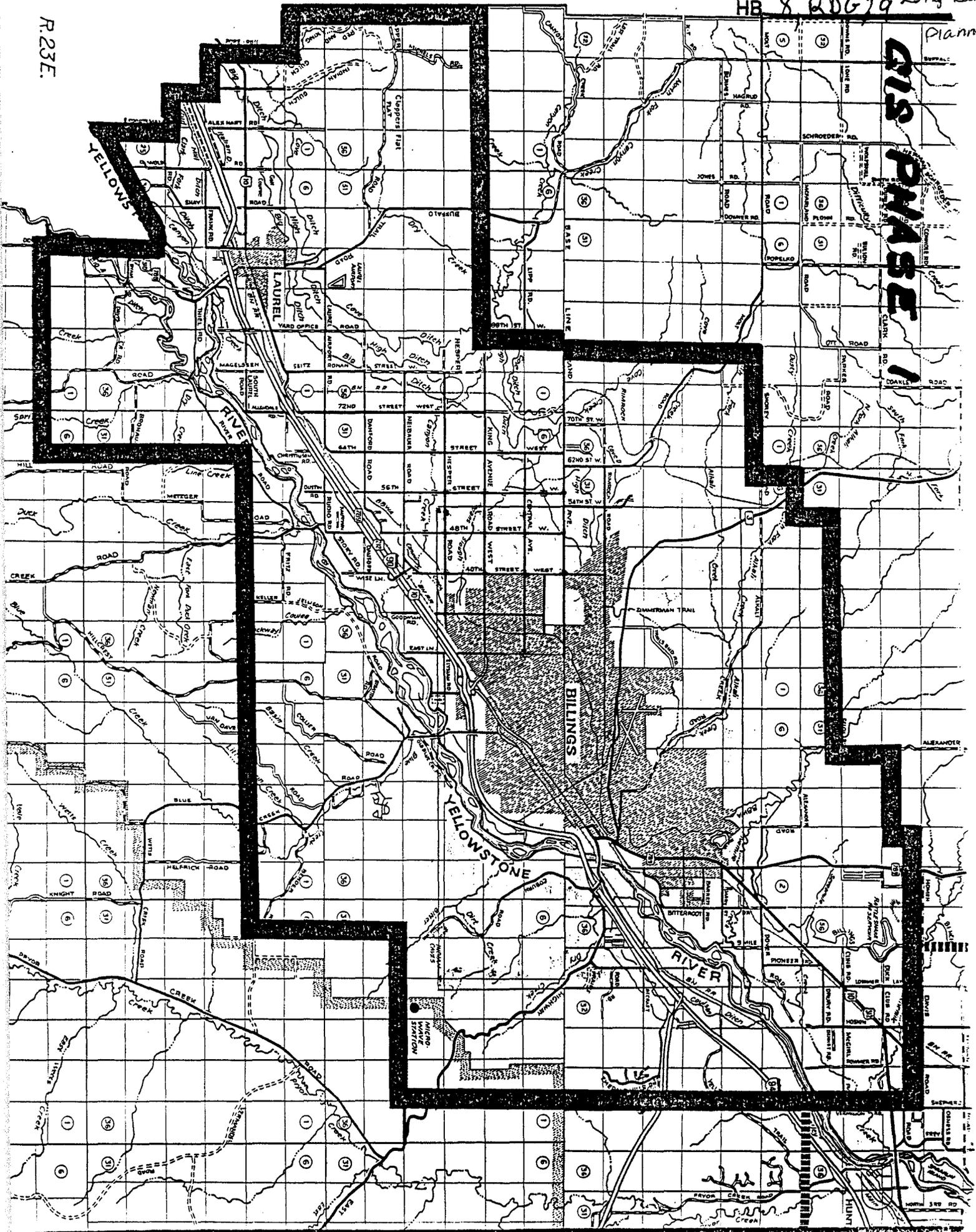
EXHIBIT 9
 DATE 2-18-91
 HB 8, RDG 29
 Long Range Plan.

Stn. No.	Road	Road No.	Asm. No.	Dist.	Type	MTRL # SIZE	Color	Comm.	Cond.	Dir T/Tabl S/S	Act.	
33001	BLUE CREEK ROAD	33001	1	A	POLE	4	WE GN	WILLOW DR	4	S R	NS	INV SURVY 3
33001	BLUE CREEK ROAD	33001	1	B	SIGN	S	WE GN	BLUE CREEK RD	4	S R	EW	INV SURVY 3
33001	BLUE CREEK ROAD	33001	1	C	SIGN	30X30	WE RD		3	S R	W	INV SURVY 3
33001	BLUE CREEK ROAD	33001	2	A	POLE	4	BK YW		4	S R		INV SURVY 3
33001	BLUE CREEK ROAD	33001	2	B	SIGN	30X30	BK YW	35 MPH	4	S R	N	INV SURVY 3
33001	BLUE CREEK ROAD	33001	2		SIGN	18X18			5	S R		INV SURVY 3
33001	BLUE CREEK ROAD	33001	3		NOTE			BULLET HOLE IN SIGN A		S R		INV SURVY 3
33001	BLUE CREEK ROAD	33001	3		BARR	2	RD WE	ABANDONED APPROACH	2	S R		INV SURVY 3
33001	BLUE CREEK ROAD	33001	3		NOTE			DO NOT REPLC BARR; HWY REN		S R		INV SURVY 3
33001	BLUE CREEK ROAD	33001	4		POLE	3			5	S R		INV SURVY 3
33001	BLUE CREEK ROAD	33001	4	A	SIGN	30X48	WE GN	LANDFILL >	4	S R	N	INV SURVY 3
33001	BLUE CREEK ROAD	33001	5		POLE	3			5	S R		INV SURVY 3
33001	BLUE CREEK ROAD	33001	5	A	SIGN	12X36	YE BK		5	S R	N	INV SURVY 3
33001	BLUE CREEK ROAD	33001	6		POLE	3			4	S R		INV SURVY 3
33001	BLUE CREEK ROAD	33001	6	A	SIGN	24X72	WE GN	LANDFILL 3/4 MILES >	4	S R	N	INV SURVY 3
33001	BLUE CREEK ROAD	33001	7		POLE	2			4	S R		INV SURVY 3
33001	BLUE CREEK ROAD	33001	7	A	SIGN	6X12	WE GN	MILE 1	5	S R	N	INV SURVY 3
33001	BLUE CREEK ROAD	33001	8		POLE	4			4	SE R		INV SURVY 3
33001	BLUE CREEK ROAD	33001	8	A	SIGN	30X30	BK YW	DEER CROSSING	4	SE R	NW	INV SURVY 3
33001	BLUE CREEK ROAD	33001	8	A	NOTE			BULLET HOLE IN SIGN		SE R		INV SURVY 3
33001	BLUE CREEK ROAD	33001	8	B	SIGN	24X18	BK YW	NEXT 5 MILES	4	SE R	NW	INV SURVY 3
33001	BLUE CREEK ROAD	33001	9		POLE	2			4	SE R		INV SURVY 3
33001	BLUE CREEK ROAD	33001	9	A	SIGN	30X30	BK YW	BENT AND STRAIGHTENED	4	SE R	NW	INV SURVY 3
33001	BLUE CREEK ROAD	33001	10		NOTE				4	SE R		INV SURVY 3
33001	BLUE CREEK ROAD	33001	10	A	POLE	2			3	SE R	NW	INV SURVY 3
33001	BLUE CREEK ROAD	33001	10	B	SIGN	10X18	WE GN	MILE 2	3	SE R		INV SURVY 3
33001	BLUE CREEK ROAD	33001	10		SIGN	10X18	WE GN	MILE 2	3	SE R	SE	INV SURVY 3

R.23E.

GIS PHASE 1

Planner



Year	Month	Expend.	Subtotal	Notes	System / Category	Cost	
1990	Mar						
	Apr						
	May	\$18,600	\$18,600	Surveyor 1.6 F.T.E. Appraiser 1.0 F.T.E.	2 Temporary Employees	\$18,600 (Surveyor)	
	June			Utilities Dept CAD Files			
	July			No Charge AutoCAD Software & Hardware (Surveyor & Appraiser)			
	Aug	\$52,000	\$70,600		GPS Training	\$5,070	
	Sept	\$6,000	\$81,670		Management Survey	\$6,000	
	Oct	\$13,360	\$95,030		Lease GPS Equip. & Survey	\$13,360	
	Nov	\$760	\$95,790		Computations	\$760	
	Dec	\$121,700	\$217,490		GIS Hardware & Software	\$121,700 (Surveyor)	
	1991	Jan	\$18,000	\$235,490		GIS Training - 3 People	\$18,000
		Feb					
Mar							
Apr							
May							
Jun							
July							
Aug							
Sep		\$127,840	\$363,330	Hardware - Software (Assessor & Appraiser)	Hardware & Software (Planning)	\$76,340 + \$3,000 installation	
Oct				\$45,3000 - \$3,000 installation	GIS Training - 3 People	\$18,000	
Nov		\$18,000	\$381,330	Planning 1.0 F.T.E.	Memory	\$20,000	
Dec		\$20,000	\$401,330				
1992	Jan						
	Feb						
	Mar						
	Apr						
	May						
	June						
	July						
	Aug						
	Sep						
	Oct	\$20,000	\$421,330		Memory	\$20,000	
	Nov						
	Dec	\$90,000	\$511,330		9 - Monitors & Printers	at \$10,000 = \$90,000	
1993	Jan						
	Feb						
	Mar						
	Apr						
	May						
	Jun						
	July						
	Aug						
	Sep						
	Oct						
	Nov						
	Dec	\$50,000	\$561,330		5 - Expansion, Monitors, & Printers	5 at \$10,000 = \$50,000	
		\$561,330 Total					
		\$625,000 Budget					
			TOTAL				
			3.6 F.T.E.				

GIS/L.I.S. CASH FLOW BUDGET CALENDAR

Global Positioning System

\$1200/Month

\$2032/Month

Note 56K Line to Planning
\$750 + \$150/Month Copper
Or \$20,000 Fiber Optic

1990
1991
1992
1993
5/8/90

Surveys
Multipurpose Land Information System
Build Attributes (GIS)
Build Attributes Geographic Information System
Base Map Revisions & GEO Code Attribute Updates

Service Contract

- Elections
- Treasurer
- Appraiser
- Superintendent of Schools
- Data Processing
- Weed Control
- Economic Development
- Clerk & Recorder
- Sheriff

County of Yellowstone



COMMISSIONERS

(406) 256-2701

Box 35000
Billings, MT 59107

January 24, 1991

EXHIBIT 10

DATE 2-18-91

HB 8 RD 6 29

Long Range Plan

Mr. Greg Mills, Program Officer
Department of Natural Resources & Conservation
Conservation & Resources Development Division
Resource Development Bureau
1520 East Sixth Avenue
Helena, MT 59620-2301

RE: Yellowstone County MLIS/GIS Program Response

Dear Mr. Mills:

Yellowstone County received your evaluation of our Multipurpose Land Information System/Geographic Information System (MLIS/GIS) project submitted for Reclamation and Development Grants Program (RDGP) funding. It is unfortunate that Yellowstone County had a misconception of the evaluation process. It was our understanding that the evaluation committee would contact us during the evaluation period and an exchange of questions and answers to concerns would unfold. Our contact with the committee was your letter dated November 28, 1990.

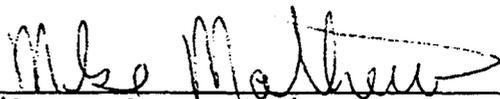
The MLIS/GIS project for Yellowstone County is an ongoing project. We have completed a pilot program on a small geographic area in Laurel. We are also in the process of performing a GPS monument survey to establish a central basis for a mapping foundation. Yellowstone County has also been able to establish relationships with the City of Billings and many state and federal agencies in order to obtain a large quantity of our GIS data/information from automated sources, thereby reducing our implementation schedule. Please refer to Exhibit A for a sample of our established relationships.

The implementation plan and schedule are addressed in the detailed paragraphs below, along with your other concerns. The schedule for our implementation is 5 years versus the 24 month grant period submitted. The schedule and funding were submitted only for the grant period, they did not include the long-term nature of this project.

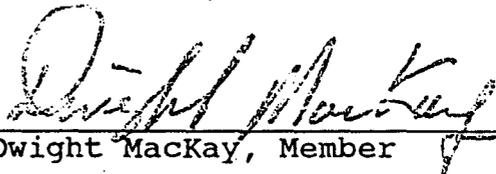
Mr. Greg Mills, Project Director
January 24, 1991
Page Two

We would like to attend the Legislative Review of the projects and present the information and work that has been completed in the last six months. Yellowstone County feels the MLIS/GIS process is an investment which will provide quality information services to the citizens in Montana for many years to come. Your thoughtful consideration of our response is greatly appreciated.

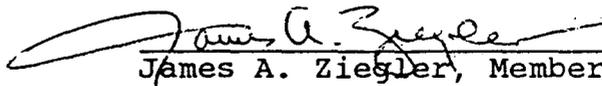
Sincerely,



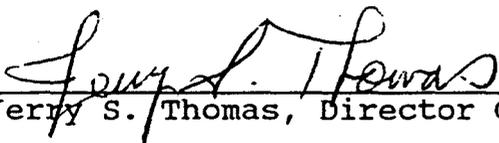
Mike Mathew, Chair



Dwight MacKay, Member



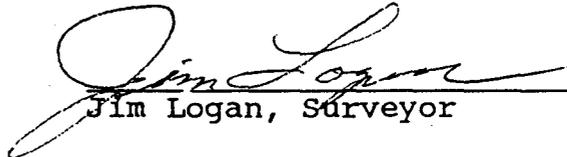
James A. Ziegler, Member



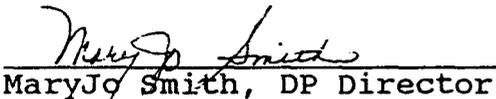
Jerry S. Thomas, Director OMB

Absent

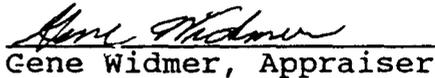
Bill Arnold, Planning



Jim Logan, Surveyor



MaryJo Smith, DP Director



Gene Widmer, Appraiser

mk
Enc.

I. TECHNICAL ASSESSMENT

A. Implementation Plan1. GIS Pilot Project

Yellowstone County conducted a pilot project prior to the decision to go forward with a GIS project. The pilot was conducted in the summer of 1990. Accomplishing the pilot early in the process enabled the County to identify requirements and time-cost estimates prior to proceeding with the GIS process.

The pilot involved:

- a. The preparation of the multipurpose land information system for the business district in Laurel, Montana. See Exhibit B.
- b. Attaching label points to the topology in the project area.
- c. A successful translation of the State of Montana Computer Assisted Mass Appraisal System (CAMAS) was completed for the pilot area. Exhibit C lists the attributes selected for transfer to the GIS database.
- d. Subsequent queries were performed on the database. A plot of one query is enclosed as Exhibit D displaying "Previous Appraisal Improvement Value Range".
- e. Tabular reports were also generated from the GIS database. Examples of the reports are enclosed as follows:
 - (1) Ordered by geocode - Exhibit E.
 - (2) Ordered by tax code - Exhibit F.
 - (3) Ordered by address - Exhibit G.
 - (4) Ordered by owner name - Exhibit H.

2. Global Positioning System (GPS) Surveying Pilot

The Geographic Information Systems' accuracy will determine the extent of possible applications. All land data and land information for which a geodetic framework exists can be referenced and integrated using a common language, the geodetic control system. The universal compatibility, along with the accuracy and operational effectiveness of a base created with geodetic control, allows the GIS to handle diverse spatially related

information without additional costs. The key to this efficiency is, that in most cases, the cost of creating and maintaining files based on geodetic control is less than the price of repeated attempts to translate incompatible data.

With the above thoughts in mind, and with accuracies reported of 0.1 feet, modest costs, and high speed, the global positioning system was chosen for geodetic positioning operations.

On November 28 and 29, 1990 the Surveyor's Office conducted a GPS training survey on a selected number of section corners and quarter corners in Billings, Montana. See Exhibits I and J. The results of this training survey appear to be better than order B. (Better than 1:1,000,000.) This gives better than adequate accuracy for a MLIS foundation. In the future, the kinematic GPS procedure will be piloted and assessed for fulfilling selected areas of the MLIS foundation.

3. Multipurpose Land Information System (MLIS) Pilot

During the spring of 1990, a database containing mapping for the City of Billings and surrounding area was located. This mapping contains slightly greater than 60% of the polygons located in Yellowstone County. The contents are formatted in AutoDesk's AutoCAD software; the software the County Surveyor's Office currently uses.

DXF and DWG data files were furnished to two GIS vendors to create topology from this database. Both vendors were successful in transforming this data. After seeing the results, the Yellowstone County Surveyor's Office entered into an agreement to exchange information to acquire this database; refer to Exhibit A.

4. Current Progress

As a result of the pilot programs, the Surveyor's Office has begun to use the GIS technology. The AutoCAD, DCA and PC Arc/Info softwares were purchased and are being used for design and planning in the road department, construction design quantities, GPS surveys and computations for MLIS. The Surveyor's Office is currently implementing sign inventory (Exhibit M) and a road surface management system on PC Arc/Info, a PC GIS system. Also, the City of Billings map is being converted, cleaned and configured for topological data as part of the first phase requirements for our overall GIS system.

Yellowstone County is in the process of preparing an RFP for the purchase of GIS hardware and software. The plan is to release the RFP to the public in February 1991.

Recognizing that any GIS implementation has to be flexible to react to new technology and identifying new information resources; the following scenario is anticipated:

- a. Phase I (Planning Jurisdiction) 12/90 - 10/91
Purchase software and one workstation to create topology.
 - (1) Surveyor's Office - Appraiser Office
 - (a) Surveyor
 - 1) Conduct GPS surveys for MLIS foundation.
 - 2) Transfer City of Billings AutoCAD database maps to GIS.
 - 3) Clean and configure database to GIS.
 - (b) Appraiser
 - 1) Digitize areas in Phase I outside city map coverage in PC Arc/Info to transfer to GIS.
 - (c) Data Processing
 - 1) Management, scheduling, budgeting and long-term planning support.
 - 2) System management.
 - (2) At the completion of MLIS in Phase I, Yellowstone County will:
 - (a) Deliver to the Soil Conservation Service (SCS) the MLIS for their use in our cooperative effort. The SCS will then add soils to be utilized in the GIS.

(3) Concurrently with step 2 above, the Surveyor's Office and Appraiser's Office will:

(a) Translate the State of Montana (CAMAS) appraisal system to the Yellowstone County GIS topology.

(b) Translate the TIGER files to GIS.

(c) Translate the United States Geological Service (USGS) files to GIS.

b. Phase II - (Shepherd, Huntley, Worden, Ballantine, Nibbe, Pompey's Pillar, area) 10/91 - 12/92

(1) Acquire two more systems - one to be placed in Planning and one in Appraiser's Office

(a) Activities Part I

Surveyor - GPS surveys, create topology for Phase II area.

Appraiser - Digitize maps for Phase II.

Planning - Develop attributes for Phase I.

(b) Activities Part II

Surveyor - Appraiser

Translate State of Montana (CAMAS) appraisal system to GIS topology.

Planning

Develop attributes not included in CAMAS for Phase I and/or II.

(c) Data Processing

- 1) Management, scheduling, budgeting and long-term planning support.
- 2) System management.

(d) Train and place GIS in County offices.

c. Phase III - (Balance of Yellowstone County area) 12/92 - 12/93

- (1) Repeat activities in Phase II for Phase III, Surveyor, Planning, Appraiser and Data Processing.
- (2) Maintain system and develop additional attributes.
- (3) Surveyor, Planning, Appraiser, and Data Processing will continue to support the overall system as indicated in the organizational structure.

As the data capabilities in the databases are available, workstations will be placed in the appropriate offices. The offices which will benefit and be a part of GIS are: Surveyor, Weed Control, Appraiser, Treasurer, Elections, Clerk and Recorder, Data Processing, Sheriff, Economic Development, and Superintendent of Schools.

Yellowstone County intends to utilize GIS "off-the-shelf" software selected during the RFP process. Much research has been performed and we have found that the current GIS "off-the-shelf" software will fulfill approximately 98% of our current needs. Any additional custom programming will be provided by the software vendor. The County's contract programmer and/or department personnel will provide macro's, ASCII files, special reports, etc. Custom programming may be required to convert data for unknown future data translations.

B. Schedule

The schedule provided in the grant application was originally intended to define only the period of the grant. The County views the project as a continuous project, with new data always entering the system. The schedule in the proposal displayed the conversion of all

D. Staffing Plan

Due to the nature of GIS, a matrix organization is the management style. The principal value rests in the fact that equal priority has been given to all functional departments. The functional departments include Finance, Administration, Distribution, Production, Research and Development, and various product areas. Thus people working in the product teams that cross the functional areas have to work with two perspectives in mind: functional and end product. This dual focus allows the various operating teams to combine functional skills and resources with an orientation driven by the key tasks and challenges from the organization's environment. For example, tasks relating to the need to develop and fine tune information for specific departments or the needs of specific areas.

The GIS project will primarily be utilizing existing staff, with new job descriptions. The current staffing plan is as follows: Surveyor's Office commitment of 1.6 full-time equivalent (FTE) people, Appraiser Office commitment of 1.0 FTE person, Planning Office commitment of 1.0 FTE person (new position), and Data Processing Office commitment of .6 FTE person. Additionally, the Surveyor, Appraiser, County Planner and Data Processing Director have committed to the matrix management of GIS. Each department head will be an active member of the management of the project. The overall management team will provide at least a FTE position. All members of the management team currently report directly to the Board of County Commissioners.

The review board has expressed concern that the Data Processing Coordinator would handle GIS as part of other duties. The Data Processing Director will be responsible for the management, scheduling, budgeting and long-term planning support to the project. The day-to-day responsibility will be assumed by the Data Processing Coordinator and Surveyor's office. The overall matrix management will be headed by the Data Processing Director, with the active support, cooperation, and participation of the Surveyor, Appraiser, and County Planner. These four (4) people will work together throughout the project's life cycle.

As is the case with most local governments and the private sector, staffing requirements are kept to a minimum while providing equivalent or increased services. Throughout the projects life cycle, staffing requirements will be continually reviewed.

II. FINANCIAL ASSESSMENT

A. Budget

The GIS/MLIS Cash Flow Budget Calendar has been provided in Exhibit L.

The existing hardware/software configuration is:

HARDWARE:

IBM Model 95, 40846 microprocessor
33 MHz clock speed
70 NS memory speed
Storage: 1 1.44 mb 3 1/2"
floppy drive
1 1.2 mb 5 1/4"
floppy drive
1 320 mb hard drive

Pen plotter
Digitizer and controller

SOFTWARE:

AutoCAD, DCA and PC Arc/Info.

The GIS hardware and software configuration budgeted as:

Phase I:

County Surveyor: Workstation w/5-1/4" disk drive
CD Rom Drive
Quad-density drive
Standalone tape drive
5-1/4" peripheral
data drawer
Pen plotter (in house)
Digitizer and controller
(in house)
GIS software \$121,700

Phase II:

Appraisal Office: Workstation w/16 mb memory
Digitizer & controller
GIS software \$ 48,300

Planning Office: (Remote)	Workstation w/16 mb memory	
	Digitizer & controller	
	Pen plotter	
	GIS/network software	
	Remote communications	
	Ethernet Materials	\$ 79,540
Surveyor's Office:	Network software	
	Expanded memory	\$ 40,000
Total		<u>\$289,540</u>

The prices were taken from a budgetary estimate provided by Intergraph and Environmental Systems Research Institute, Inc. on March 28, 1990.

Although Yellowstone County is a few months behind in its Hardware Acquisition Schedule, we are still within the budgeted costs. Also, as a result of our current equipment acquisitions, we have been able to generate unanticipated revenue from outside agencies. The potential for additional revenue exists.

The hardware and software required to connect the county offices has been included in the defined configuration. Within the County Courthouse, the workstations will be connected via Ethernet. The Planning Office will be connected via 56K telephone line and remote network software and hardware.

III. PUBLIC BENEFITS ASSESSMENT

A. Urgency

Yellowstone County feels that now is the time to implement a GIS system. Local governments and the public sector are experiencing a need to maintain and provide extended, quality services with existing or fewer staff. Yellowstone County is experiencing the same phenomenon.

In the future, Yellowstone County, through the implementation of GIS, will:

- conserve its use of natural resources
- provide better service for the public
- be ready for anything
- reduce duplication

- increase coordination
- improve accuracy
- improve speed
- increase revenue
- decrease cost
- improve resource management
- provide new programs
- provide easy data access
- provide improved public relations, and
- increase compliance with the law.

The GIS will allow Yellowstone County to improve, as well as expand the services provided to the public. The system will also provide for a more efficient expenditure of public funds. The system potential for subscription services to the private sector and neighboring counties further justifies GIS.

The private sector will gain from the County's implementation of GIS. For professional engineers and architects which utilize a computerized system, approximately 70% of the users utilize Autodesk's AutoCAD. They will be able to access our MLIS/GIS data through a modem or through diskettes of data files via a PC or workstation. For example, the engineers and architects will be able to take our data and utilize it in their individual projects, therefore reducing their project cost. Examples of additional private sector companies which will benefit from our GIS will be the real estate industry, title companies, and attorneys dealing with real estate cases.

Yellowstone County also intends to share our GIS data and experience with other counties throughout the State of Montana. We are willing to work with both local and state governments in order to obtain and share all our data requirements.

It is crucial for local governments to plan for the future, and GIS is the first, most important step we can take. The future is now and Yellowstone County can no longer wait to begin to achieve the benefits of GIS.

B. Funding, Reclamation and Environmental Issues:

The Yellowstone County Board of Commissioners is committed to GIS. In the next five years the County has budgeted expenditures of \$625,000. The GIS/MLIS cash flow budget calendar has been provided in Exhibit L. Money has been committed from many County offices in order to implement the project including: Aid to Transportation, Interest Income, Interfund Transfers, Land Planning, General, Weed Control, Planning, Economic Development, and Roads.

The long-term staffing needs in the County will change. Each department utilizing GIS will need to dedicate resources to take full advantage of the system. Training of each GIS team member will be emphasized. The GIS staff members job descriptions will be modified as their responsibilities change.

All departments who will benefit from GIS are budgeting money for the initial hardware/software expense and the redirection of staff. These departments will continue with their responsible budgeting for ongoing GIS usage.

In our grant submission, the County's commitment for the two years of the grant period were replaced with the funding from DNRC. The DNRC grant money would reduce the County's financial outlay. The County would then have three choices: 1) to reduce its budgeted financial obligations, 2) to redirect the budgeted funds to other areas of need, or 3) to provide expanded services for the same budgeted dollar amount. Yellowstone County feels it is a very critical application for continuation of County functionality especially with regard to the Road Services department. If the DNRC grant is denied, Yellowstone County will continue with the project as currently budgeted.

The GIS will help determine the reclamation issues associated with the Meridian Minerals Coal Mine at Bull Mountain. The GIS will also help with the following environmental issues:

- Non-point discharge into the Yellowstone River
- Flood plain management
- Management development
- Enable Yellowstone County to more closely monitor our air pollution

- Enables Yellowstone County to have the capability to monitor the cooling waters discharged from the refineries and power plants
- Solid Waste

C. Long-Term Benefits and Changes

The long-term benefits of GIS for Yellowstone County are numerous. GIS will allow us to assemble all the County resources into an integrated information base while retaining the departmental aspect of information processing. The GIS will allow us to "draw" maps, and additionally, to retrieve, analyze, manipulate, and query information by referring to a map location. With the integrated information capability, an individual researching a parcel of real estate, with a specific map location, can retrieve the following data:

- demographics
- appraisal
- tax information
- utility locations
- easements
- land use
- voter information; political districting
- boundaries and districting
- documents filed in the Clerk and Recorder office
- other relevant engineering and topographical information

The adoption of this technology will ensure that we can continue to provide the required services. GIS will also allow Yellowstone County to provide the public with a significant increase in responsiveness, extension of service capabilities, and provide quality products. It will help to eliminate the tremendous information duplication and inconsistency of map data. GIS will carry the map location data once for many departments instead of duplicating the map data for each department. The GIS will allow us to use the prodigious data banks available at the federal, state and city government levels. The GIS provides benefits as an analytical and

operational tool for making policy, planning, and management decisions. The GIS technology also will allow us to deal with the problems and challenges we now face - more efficiently, economically and with all the data appropriate for the decision making process. The GIS positions us to handle the unknown and unexplored with more confidence.

IV. CONCLUSION

In this era, governments are facing many of the same challenges that businesses are. The evolution of markets, management methods, availability and location of resources, and social activities are dictating government planning and action. This must be accomplished in order to meet current service levels, let alone furnish extended service. There are two distinct areas concerning government costs. First is the direct cost of the governing agency to carry out its programs; these services are supported by taxes. The other is the requirements by government for information from private citizens and businesses. These requirements take the form of environmental assessments, planning, natural resource management and others. The cost of this activity is reflected in the cost of goods and services, and consequently lifestyles. A quality MLIS/GIS is an extremely powerful information and analysis tool that will have a tremendous positive impact on both cost activities.

The individual elected officials, boards, and support personnel of Yellowstone County advocate the MLIS/GIS system and have committed substantial funds to MLIS/GIS this year. They have also committed to a five year program to fund the process. The committed funds come from budgets that have been seriously depleted. It now appears that budgets will be even more seriously strained over the next few years due to the taxing structure and economy in Montana.

The funding of Yellowstone County's MLIS/GIS grant application would allow the County to work with the existing fund levels to maintain services during the transition of MLIS/GIS. Receipt of the grant would also open up the possibility of compressing the application of MLIS/GIS capabilities to obtain a quicker return on the initial dollars invested. This would allow the benefits of the system to be applied sooner, with the inherent capabilities that would be available.

Yellowstone County has identified and acquired access to numerous resources, and has successfully applied them to MLIS/GIS. These include:

1. The State of Montana CAMAS data banks.
2. The City of Billings and vicinity map.

We have made a cooperative agreement with SCS for the planning area soils attribute map. The database will also be supplemented with TIGER files and USGS map data. We will continue to develop these types of relationships in both the public and private sector.

Through Yellowstone County's implementation of GIS, Montana's natural resources, such as water and vegetation, will be preserved and protected. Additionally, its natural resources, such as coal, oil and land, can be developed efficiently, economically and environmentally sound.

EXHIBIT 10
EXHIBIT 2.18.91
DATE 2.18.91
HB Long Range Planning

V. REFERENCES

"Land Base Accuracy", James G. Donahue L.S., Mapping Manager, Engineering Service Corporation, ACSM Bulletin 1988, no. 117, pp 25-27.

"Creative Organization Theory", Gareth Morgan

"GPS Satellite Surveying", Alfred Leick, Department of Surveying Engineering, University of Maine, Orono, Maine, Contribution by Steven Lambert, University of Maine.

County of Yellowstone



OFFICE OF THE SURVEYOR

P.O. Box 35023
Billings, Montana 59107

April 2, 1990

Mr. Carl Christensen
Assistant Public Utilities Director
2251 Belknap Avenue
Billings, Montana 59101

MEMORANDUM OF UNDERSTANDING

Dear Mr. Christensen:

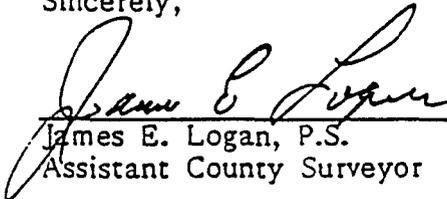
Please find below our understanding of the conversation concerning exchange of map data. Whereas the Public Utilities Department has the City of Billings map on Auto Desk, Auto Cad files, and the Yellowstone County Surveyors Office is in the process of creating a GIS/LIS map system, and as exchange of data would benefit both departments, the following is agreed:

The Utilities Department will copy to disks furnished by the Yellowstone County Surveyors Office, in either DXF or DWG format, the City of Billings map and utilities.

The Yellowstone County Surveyors Office will configure and clean the data for its GIS/LIS map system. The Yellowstone County Surveyors Office will provide the Utilities Department a like amount of data in the GIS/LIS format at a future date.

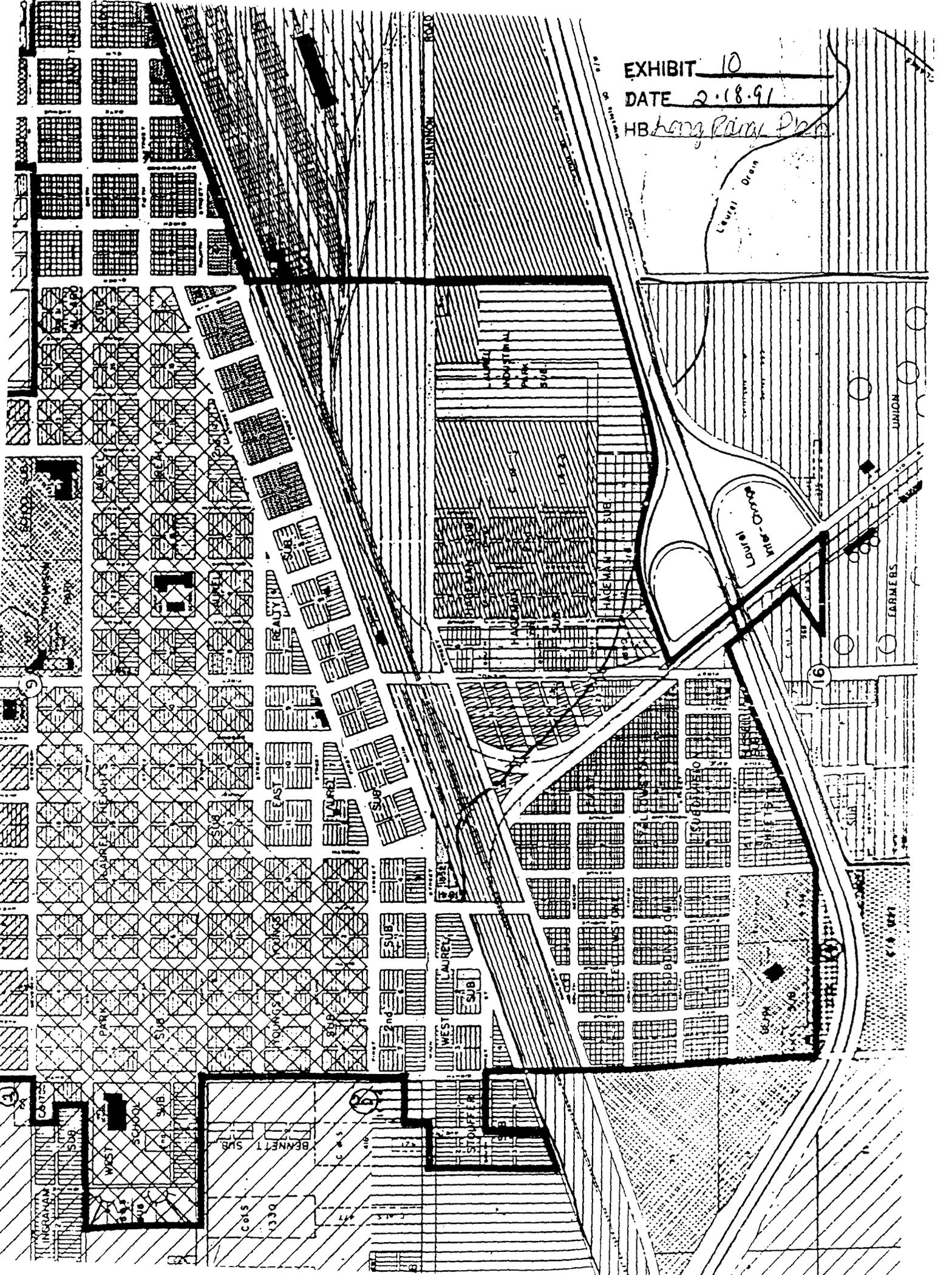
If this is your understanding, please acknowledge this with your signature below.

Sincerely,


James E. Logan, P.S.
Assistant County Surveyor


Carl Christensen
Assistant Public Utilities Director

EXHIBIT 10
DATE 2-18-91
HB Long River Park



Level Drain

Long River Park

UNION
FARMERS

16

BENNETT SUB

WEST LAURET SUB

COLE

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Thu Jan 10 16:56:41 1991

1

ITEM NAME	INPUT WIDTH	OUTPUT WIDTH	N. DEC	TYPE	ALTERNATE NAME
STRUCTURE-CODE	3	3	0	C	F501
YEAR-BUILT	4	4	0	I	F502
WORKMANSHIP	1	1	0	I	F503
CONDITION	1	1	0	I	F504
QUALITY-GRADE	1	1	0	C	F505
GRADE-VARIATION	3	3	2	N	F506
EFFECTIVE-AGE	2	2	0	I	F507
PHYSICAL-DEPREC	2	2	0	I	F508
FUNC-OBSOL	2	2	0	I	F509
ECON-OBSOL	2	2	0	I	F510
PERCENT-COMPLETE	3	3	0	I	F511
STORIES	2	3	1	N	F512
FOUNDATION	1	1	0	I	F513
WALL-CONSTR	1	1	0	I	F514
EXTERIOR	1	1	0	I	F515
ROOF-TYPE	1	1	0	I	F516
ROOF-MATERIAL	1	1	0	I	F517
ORNAM-EXT-BK-ST	4	4	0	I	F518
SOLAR-COL-AREA	4	4	0	I	F519
BASEMENT-AREA	4	4	0	I	F520
FIN-BASE-AREA	4	4	0	I	F521
FIN-BAS-Q-GRADE	2	2	1	N	F522
DAYLT-BASEMENT	1	1	0	I	F523
HEATING-SOURCE	1	1	0	I	F524
HEATING-SYSTEM	1	1	0	I	F525
CENTRAL-AIR-COOL	1	1	0	I	F526
ADEQUATE-ELEC	1	1	0	I	F527
LIVING-ROOM	2	2	0	I	F528
DINING-ROOM	1	1	0	I	F529
FAMILY-REC-RM	1	1	0	I	F530
BEDROOMS	2	2	0	I	F531
KITCHENS	1	1	0	I	F532
BUILT-INS	2	2	0	I	F533
FULL-BATHS	1	1	0	I	F534
HALF-BATHS	1	1	0	I	F535
HOT-WATER-HEATER	1	1	0	I	F536
KITCHEN-SINKS	1	1	0	I	F537
OTHER-FEATURES	1	1	0	I	F538
UTIL-TYPE-ROOMS	1	1	0	I	F539
MOBIL-HOME-WIDTH	2	2	0	I	F540
FIRST-FL-AREA	4	4	0	I	F541
UPPER-FL-AREA	4	4	0	I	F542
UNFIN-FL-AREA	4	4	0	I	F543
HALF-STORY-AREA	4	4	0	I	F544
UF-HALF-STORY-AR	4	4	0	I	F545
ATTIC-AREA	4	4	0	I	F546
FIN-ATTIC-AREA	4	4	0	I	F547
FIN-ATTIC-GRADE	2	2	1	N	F548
HEATED-AREA	4	4	0	I	F549
FIREPL-CHIMNEYS	1	1	0	I	F550
TOTAL-CHIMNEY-HT	2	2	0	N	F551
FIREPL-OPENING	1	1	0	I	F552
PRE-FAB-FIREPL	1	1	0	I	F553
ENCL-PORCH-AREA	4	4	0	I	F554
OPEN-PORCH-AREA	4	4	0	I	F555
DECK-PATIO-AREA	4	4	0	I	F556
BASE-GARAGE-AREA	4	4	0	I	F557
ATT-GARAGE-AREA	4	4	0	I	F558
ATT-CARPORT-AREA	4	4	0	I	F559
FLAT-ADD-COST	7	7	6	N	F600
ACC-BLDG-TYPE	1	1	0	I	F601
ACC-STORIES	2	3	1	N	F602

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2

EXHIBIT 10
DATE 2-18-91
HB Long Range Plan

ACC-WALL-CONSTR	1	1	0	I	F603
ACC-GND-AREA	4	4	0	I	F604
ACC-FINISH-AREA	4	4	0	I	F605
ACC-FLAT-ADD-\$	4	4	0	I	F606
ACC-QUAL-GRADE	1	1	0	I	F607
ACC-EFF-AGE	2	2	0	I	F608
ACC-FLAT-\$	5	5	0	I	F609
POOL-TYPE	1	1	0	I	F610
POOL-AREA	4	4	0	I	F611
POOL-QUAL-GRADE	1	1	0	I	F612
POOL-EFF-AGE	2	2	0	I	F613
POOL-FLAT-\$	5	5	0	I	F614
CONCRETE-AREA	4	4	0	I	F615
CONCRETE-FLAT-\$	4	4	0	I	F616
ASPHALT-AREA	4	4	0	I	F617
ASPHALT-FLAT-\$	4	4	0	I	F618
OTHER-ACC-FLAT-\$	5	5	0	I	F619
COST-BASE-MO-YR	4	4	0	C	F701
CONT-REVIEW-NEED	2	2	0	I	F702
PROP-CARD-DATA	1	1	0	I	F703
QUESTIONNAIRE	1	1	0	I	F704
EXTERN-INSP-DATA	1	1	0	I	F705
INTERN-INSP-DATA	1	1	0	I	F706
ENUMERATED-BY	5	5	0	I	F707
ENUMERATED-ON	4	4	0	C	F708
IMPR-APPR-BY	5	5	0	I	F709
IMPR-APPR-ON	4	4	0	C	F710
LAND-APPR-BY	5	5	0	I	F711
LAND-APPR-ON	4	4	0	C	F712
PREV-APPR-LAND-\$	7	7	0	I	F713
PREV-APPR-IMPR-\$	7	7	0	I	F714
PREV-APPR-DATE	4	4	0	C	F715
PROP-CLASS-LAND	4	4	0	I	F716
PROP-CLASS-IMP	4	4	0	I	F717
YR-NEW-CONST	2	2	0	I	F718
VALUE-NEW-CONST	7	7	0	I	F719
OCCUPANCY	3	3	0	C	
COUNTY	2	2	0	I	F101
TOWNSHIP	4	4	0	I	F102
SECTION	2	2	0	I	F103
QUARTER-SEC	1	1	0	I	F104
Q-S-BLOCK	2	2	0	I	F105
Q-S-LOT	2	2	0	I	F106
UNIT-NUM	4	4	0	I	F107
SHEET	2	2	0	I	F108
TOTAL-SHEETS	2	2	0	I	F109
ACTION-CODE	1	1	0	I	F110
MUNICIPALITY	3	3	0	I	F201
ADDITION	3	3	0	I	F202
ADDN-BLOCK	3	3	0	I	F203
ADDN-LOT	3	3	0	I	F204
LEVY-DISTRICT	4	4	0	I	F205
OWNERSHIP-TYPE	2	2	0	I	F206
PROPERTY-TYPE	1	1	0	I	F207
PRP-STREET-NUM	5	5	0	I	F208
PRP-STREET-NAME	20	20	0	C	F209
PRP-ZIP-CODE	7	7	0	I	F210
SHORT-LEGAL	105	105	0	C	F211
TAX-NUMBER	7	7	0	C	F212
MAP-CODE	9	9	0	C	F213
PERCNT-OWNER	4	4	0	I	F214
OWN-LAST-NAME	16	16	0	C	F215
OWN-FIRST-NAME	12	12	0	C	F216
SECND-OWN-INITLS	2	2	0	C	F217

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OWN-ADDR0	21	21	0	C	F218
OWN-ADDR-2	21	21	0	C	F219
OWN-ADDR-3	21	21	0	C	F220
OWN-ZIP-CODE	9	9	0	I	F221
UNIT-OF-MEASURE	1	1	0	I	F301
WIDTH	4	4	0	I	F302
DEPTH	4	4	0	I	F303
BACKLOT-SETBACK	4	4	0	I	F304
TRIANG-FACTOR	1	1	0	I	F305
STANDARD-DEPTH	4	4	0	I	F306
SF-AREA	6	6	0	I	F307
ACRE-AREA	6	7	3	N	F308
UNIT-VALUE	7	7	2	N	F309
SITE-VALUE	6	6	0	I	F310
STREET-SURFACE	1	1	0	I	F311
WATER-SOURCE	1	1	0	I	F312
SEWER	1	1	0	I	F313
VIEW-LOT	1	1	0	I	F314
ZONING	1	1	0	I	F315
CODE-RESTRICT	1	1	0	I	F316
NEIGH-PREDOM-USE	1	1	0	I	F317
NEIGH-TREND	1	1	0	I	F318
LOCAL-INDEX	3	3	0	I	F401
PRINCIPAL-BLDGS	2	2	0	I	F402
CONFORM-TO-NEIGH	1	1	0	I	F403
GEOCODE	11	11	0	C	
LEVEL	2	2	0	I	
LEVEL-X	2	2	0	I	
SQ-FT	5	5	0	I	

Code	Tax Code	Property Address	Owner Name	Owner Address	Str Type	Occ	Zone
B00965	20	WYOMING AVE	HOEFELDT GARY G & MAR X		SFR	1	
B00964	19	PENNSYLVANIA AVE	JONES ETAL WANDA B	% GUENTHNER H & RM	MUL	3	EXHIBIT 10
B00974	219	MONTANA AVE	SCHWINDT DOUGLAS O	RTE 2 BOX 787	SFR	1	DATE 2-19-91
B00973	207 E 1	ST	SWAN ERVIN S	207 E 1ST ST	SFR	1	HBLeroy, Rany, Mary
B00972	209 E 1	ST	SHAY HOWARD R	209 E 1ST	SFR	1	
B00971	213 E 1	ST	RUDD RAYMOND W	% ALVAREZ, MARIA R	SFR	1	
B00970	215 E 1	ST	CLARK THEODORE E	1906 CAMDEN DR	SFR	1	
B00969	219 E 1	ST	MECCAGE MELL R	219 E 1ST	MUL	1	
B00966	12	WYOMING AVE	COTTER JAMES M	12 WYOMING AVE	SFR	1	
B00963	15	PENNSYLVANIA AVE	JONES EDWARD W	GUENTHER HS AND RM	SFR	1	
B00975	215	MONTANA AVE	MILTENBERGER GERALDINE	215 E 1ST	SFR	1	
B00967	14	WYOMING AVE	DITTRICH HAROLD E	BOX 1119	SFR	1	
B00962	13	PENNSYLVANIA AVE	GUENTHNER HOWARD S	13 PENNSYLVANIA AVE	RTL	6	
B00976	201 E 1	ST	KINNEY AUSTIN J	201 E 1ST ST	SFR	1	
B00957	419	MAIN ST E	KERNS KRAYTON D & X		RTL	6	
B00961	0	PENNSYLVANIA AVE	GUENTHNER HOWARD S	13 PENNSYLVANIA AVE	000	6	
B00958A	0	MAIN ST E	FIRST TRUST CO CECIL OLIVER	% WESTER MILTON & GD	RTL	6	
B00958	415	MAIN ST E	FIRST TRUST CO ETAL - CO-TR	% STEVENS, JAMES M E	GAR	6	
B00959	407	MAIN ST E	MASBRUCH DENNIS R AND MILLER, KENDALL D & P		RTL	6	
B00960	401	MAIN ST E	ANGELOS PETER A & CL P O	BOX 664	RES	6	
	0					0	
	0					0	
10930501	B00048	0 X	FICHTNER LEONARD W	902 PENNSYLVANIA AVE	000 0	6	
210930506	B00047	315	MAIN ST W EAGLES FRAT ORDE	R LAUREL AERIE # 2564	FRT OTH	6	
210930507	B00046	311	MAIN ST W FICHTNER	LEONARD W C/O LAUREL AERIE 2564	WAR WAR	6	
210930508	B00045	0	MAIN ST W EVERGREEN REBEKA	H LODGE #86 % EVENSON, LOUISE	CRH CRH	6	
210930509	B00044	305	MAIN ST W SMALL BUSINESS A	ADMINISTRATIO X	RTL MUL	5	
210930512	B00043	301	MAIN ST W CHRISTIAN	KENNETH W E % CHRISTIAN, MILDRED	OFF OFF	6	
210930513	B00054	0 W 1	ST SCHREINER	REYNOLD 513 DATE AVE	MUL DUP	6	
210930515	B00053	0 3	AVE SCHREINER	REYNOLD 513 DATE AVE	GAR GAR	6	
210930518	B00049	314	1 ST CHAPMAN ETAL	WESLEY %GROSHELL RUDY	SFR RTL	1	
210930523	B00050	11	5TH AVE LAMB	LEONARD L X	RTL RTL	6	
210930524	B00051	15	4 AVE LAMB	LEONARD L 2013 EAST LOCKWOOD	SFR SFR	1	
210930526	B00052	19	4 AVE PRICE	THOMAS E 11022 MAIN ST	SFR SFR	1	
210930601	B00037	221	MAIN ST W MARTIN	JAMES W P O BOX 97	RTL RTL	6	
210930602	B00036	217	MAIN ST W PODOLANCHUK	ANTON P O BOX 1145	RTL RTL	6	
210930603	B00035	213	MAIN ST W ROYSDON	LUCY A & GLE % BROOKS, KARMEN J &	RTL RTL	6	
210930605	B00034	207	MAIN ST W VAN BEBBER	HULDA 207 W MAIN	RTL RTL	6	
210930606	B00033	201	MAIN ST W POWERS	DAVID K 815 5 ST	GAR GAR	6	
210930608	B00042	0	X LAUREL-WORDEN CR	EAMERIES INC 16 2 AVE	000 0	6	
210930609	B00041	16	2 AVE LAUREL-WORDEN CR	EAMERIES INC 16 2 AVE	OTH OTH	6	
210930611	B00040	20	2 AVE GRACE BAPTIST CH	URCH % GRACE BIBLE CHURCH	CRH 0	6	
210930612	B00039	19	3 AVE HILLIARD ETAL	MICHAEL J 528 PARK LN	OFF OFF	6	
210930613	B00038	0	X MARTIN CO INC	JAMES W 2760 S AVE #350	WAR WAR	6	
210930701	B00025	0	X HAYES	WALTON E 3610 POLY DR	RTL RTL	6	
210930702	B00024	0	MAIN ST W HAYES	WALTON E 3610 POLY DR	OTH 0	6	
210930703	B00023	113	MAIN ST W BENDER	HAROLD C/O WANNER VIRGINA C	MED MED	6	
210930704	B00022	111	MAIN ST W HERMAN	LARRY D 111 W MAIN	OFF OFF	6	
210930705	B00021	109	MAIN ST W FRANK	CLIFFORD H C/O HENDRICKSON R & K	OFF OFF	6	
210930706	B00020	0	MAIN ST W WINTERS	FRED D & DAR % BRENDEN, ROBERT M &	RTL RTL	6	
210930707	B00019	105	MAIN ST W HUGHES	ELSE % BRENDEN, ROBERT M &	RTL RTL	6	
210930708	B00018	101	MAIN ST W MARTIN CO INC	JAMES W C/O RANKIN DEAN ETAL	RTL RTL	6	
210930709	B00031	12	1 AVE YSTONE BANK	X P O BOX 7	BNK BNK	6	
210930711	B00030	16	1 AVE MORAN	JOHN R 305 E 4 ST	OFF OFF	6	
210930712	B00029	18	1 AVE LAIRD	PEARL S 1011 1 AVE # 1	RTL RTL	6	
210930713	B00028	0	X YELLOWSTONE BANK	OF LAUREL X	000 0	6	
210930714	B00027	0	X CITY OF LAUREL	X LAUREL MT	OTH 0	6	
210930717	B00026	0	X YSTONE BANK	X P O BOX 7	000 0	6	
210931201	B00080	315 W 1	ST GREEN	JAMES A 315 WEST 1ST AVE	SFR SFR	1	
210931203	B00079	311 W 1	ST THON	DIAN W & WIL % ELLIE WOLD	SFR SFR	1	
210931205	B00077	305 W 1	ST CRANFORD	HERMAN S 115 W 2 ST	OFF OFF	1	

ordered by
 recode

Geocode | Tax Code | Prop | Address | Owner/Name | Owner Address

Structure
Type
Occupancy
0
0
Flooring

Geocode	Tax Code	Prop	Address	Owner/Name	Owner Address	Structure Type	Occupancy	Flooring
0								
0								
08210930708	B00018	101	MAIN ST W	MARTIN CO INC	JAMES W	C/O RANKIN DEAN ETAL	RTL	RTL 6
08210930707	B00019	105	MAIN ST W	HUGHES	ELSE	% BRENDEN, ROBERT M &	RTL	RTL 6
08210930706	B00020	0	MAIN ST W	WINTERS	FRED D & DAR	% BRENDEN, ROBERT M &	RTL	RTL 6
08210930705	B00021	109	MAIN ST W	FRANK	CLIFFORD H	C/O HENDRICKSON R & K	OFF	OFF 6
08210930704	B00022	111	MAIN ST W	HERMAN	LARRY D	111 W MAIN	OFF	OFF 6
08210930703	B00023	113	MAIN ST W	BENDER	HAROLD	C/O WANNER VIRGINA C	MED	MED 6
08210930702	B00024	0	MAIN ST W	HAYES	WALTON E	3610 POLY DR	OTH	0 6
08210930701	B00025	0	X	HAYES	WALTON E	3610 POLY DR	RTL	RTL 6
08210930717	B00026	0	X	YSTONE BANK	X	P O BOX 7	000	0 6
08210930714	B00027	0	X	CITY OF LAUREL	X	LAUREL MT	OTH	0 6
08210930713	B00028	0	X	YELLOWSTONE BANK	OF LAUREL	X	000	0 6
08210930712	B00029	18	1 AVE	LAIRD	PEARL S	1011 1 AVE # 1	RTL	RTL 6
08210930711	B00030	16	1 AVE	MORAN	JOHN R	305 E 4 ST	OFF	OFF 6
08210930709	B00031	12	1 AVE	YSTONE BANK	X	P O BOX 7	BNK	BNK 6
08210930606	B00033	201	MAIN ST W	POWERS	DAVID K	815 5 ST	GAR	GAR 6
08210930605	B00034	207	MAIN ST W	VAN BEBBER	HULDA	207 W MAIN	RTL	RTL 6
08210930603	B00035	213	MAIN ST W	ROYSDON	LUCY A & GLE	% BROOKS, KARMEN J &	RTL	RTL 6
08210930602	B00036	217	MAIN ST W	PODOLANCHUK	ANTON	P O BOX 1145	RTL	RTL 6
08210930601	B00037	221	MAIN ST W	MARTIN	JAMES W	P O BOX 97	RTL	RTL 6
08210930613	B00038	0	X	MARTIN CO INC	JAMES W	2760 S AVE #350	WAR	WAR 6
08210930612	B00039	19	3 AVE	HILLIARD ETAL	MICHAEL J	528 PARK LN	OFF	OFF 6
08210930611	B00040	20	2 AVE	GRACE BAPTIST CH	URCH	% GRACE BIBLE CHURCH	CRH	0 6
08210930609	B00041	16	2 AVE	LAUREL-WORDEN CR	EAMERIES INC	16 2 AVE	OTH	OTH 6
08210930608	B00042	0	X	LAUREL-WORDEN CR	EAMERIES INC	16 2 AVE	000	0 6
08210930512	B00043	301	MAIN ST W	CHRISTIAN	KENNETH W E	% CHRISTIAN, MILDRED	OFF	OFF 6
08210930509	B00044	305	MAIN ST W	SMALL BUSINESS A	DMINISTRATIO	X	RTL	MUL 5
08210930508	B00045	0	MAIN ST W	EVERGREEN REBEKA	H LODGE #86	% EVENSON, LOUISE	CRH	CRH 6
08210930507	B00046	311	MAIN ST W	FICHTNER	LEONARD W	C/O LAUREL AERIE 2564	WAR	WAR 6
08210930506	B00047	315	MAIN ST W	EAGLES FRAT ORDE	R LAUREL	AERIE # 2564	FRT	OTH 6
08210930501	B00048	0	X	FICHNER	LEONARD W	902 PENNSYLVANIA AVE	000	0 6
08210930518	B00049	314	1 ST	CHAPMAN ETAL	WESLEY	%GROSHHELL RUDY	SFR	RTL 1
08210930523	B00050	11	5THAVE	LAMB	LEONARD L	X	RTL	RTL 6
08210930524	B00051	15	4 AVE	LAMB	LEONARD L	2013 EAST LOCKWOOD	SFR	SFR 1
08210930526	B00052	19	4 AVE	PRICE	THOMAS E	11022 MAIN ST	SFR	SFR 1
08210930515	B00053	0	3 AVE	SCHREINER	REYNOLD	513 DATE AVE	GAR	GAR 6
08210930513	B00054	0	W 1 ST	SCHREINER	REYNOLD	513 DATE AVE	MUL	DUP 6
08210931206	B00076	301	W 1 ST	HILLIARD	MICHAEL J &	X	SFR	SFR 1
08210931205	B00077	305	W 1 ST	GRATWOHL	HERMAN R	615 W 2 ST	SFR	SFR 1
08210931203	B00079	311	W 1 ST	THON	DIAN W & WIL	% ELLIE WOLD #	SFR	SFR 1
08210931201	B00080	315	W 1 ST	GREEN	JAMES A	315 WEST 1ST AVE	SFR	SFR 1
08210931212	B00081	113	4 AVE	ADAMS	HAROLD I	113 4 AVE	SFR	SFR 1
08210931211	B00082	115	4 AVE	RAHN	RUDOLPH	C/O STABELFELDT W & J	SFR	SFR 1
08210931210	B00083	117	4 AVE	RICHARDSON	CLARENCE A	117 4 AVE	SFR	SFR 1
08210931209	B00084	120	3 AVE	BATHURST	C E	120 3 AVE	SFR	SFR 1
08210931208	B00085	118	3 AVE	BEATTIE ETAL	DAVID	118 3 AVE	SFR	SFR 1
08210931207	B00086	112	3 AVE	IST SECURITY BAN	K OF LAUREL	X	SFR	SFR 1
08210931308	B00087	203	1 ST W	LEE	OLIVIA S	% BRIDGES, OLIVIA S	OFF	OFF 6
08210931307	B00088	207	1 ST W	LEE	OLIVIA S	% BRIDGES, OLIVIA S	OTH	RTL 6
08210931305	B00089	209	1 ST W	ARDEN	DORIS R	209 W 1 ST	OFF	RTL 6
08210931306	B00090	0	X	CITY OF LAUREL	X	LAUREL MT	000	0 1
08210931301	B00091	215	1 ST W	CITY OF LAUREL	X	LAUREL MT	OTH	0 6
08210932020	B00092	0	1 ST W	CITY OF LAUREL	X	LAUREL MT	OTH	0 6
08210932001	B00093	109	1 ST W	MYERS	DONNA	X	RTL	RTL 6
08210932002	B00093A	101	1 ST W	MYERS	DONNA	P O BOX 20542	RTL	RTL 6
08210932003	B00094	204	1 AVE	MYERS	DONNA	DBA B16-M-CO	RTL	RTL 6
08210932004	B00095	0	1 AVE	LOWELL	ROBERT M	208 1 AVE	SFR	OTH 1
08210932005	B00096	210	1 AVE	RYAN	CARL J	210 1 AVE	MED	MED 6
08210932006	B00097	212	1 AVE	MORRISON	RICHARD D	X	MED	MED 6

Code	Tax-code	Property Address	Owner Name	Owner Address	Rate	Rate	Rate	
210940609	B00943	0	COLORADO AVE	JOHNSTON'S INC X	C/O SCHESSLER H-LE	000	0	6
210940715	B00953A	0	COLORADO AVE	SCHESSLER ENTERPRISES TRUST	C/O ROBERT PRICE	000	0	6
10940607	B00931	10	COLORADO AVE	ELTON H KEITH	219 E MAIN	RES	RES	6
10940714	B00953	13	COLORADO AVE	SCHESSLER TRUST	ROBERT PRICE RT 2 P.O. BOX 1078	DEP	RTL	6
210940611	B00942	20	COLORADO AVE	SCHESSLER ENTERPRISES TRUST	C/O ROBERT PRICE	SFR	SFR	6
10932007	B00098	0	FIRST AVE	LAUREL FEDERAL CREDIT UNION	220 1ST AVE	000	0	6
10940707	B00945	0	MAIN ST E	ERB MYRON Y & IS	% JOHNSON ENTERPRISES	OTH	0	6
	B00958A	0	MAIN ST E	FIRST TRUST CO	CECIL OLIVER % WESTER MILTON & GD	RTL		6
10940501	B00923	101	MAIN ST E	FRANK CLIFFORD H	% WIKE, JEWEL	RES	RES	6
10940503	B00921	103	MAIN ST E	WIECHERT JACK W & FRA	X	RTL	RTL	6
210940504	B00920	105	MAIN ST E	GROSHELLE GARY R	RTE 1	FRT	BAR	6
210940505	B00919	107	MAIN ST E	LOWERY ROBIN W	P O BOX 908	RTL	RTL	6
10940506	B00918	109	MAIN ST E	SANDERS GLENN A & LA	% JACOBS, DENNIS R &	RES	RES	6
10940507	B00917	111	MAIN ST E	BARGNESS EUGENE M	415 11TH	RTL	RTL	6
210940508	B00916	113	MAIN ST E	BROWN THOMAS R	222 LAURMAC LN	RTL	RTL	6
10940509	B00915	117	MAIN ST E	FRICKEL THOMAS E AND FRANK, LESLIE D		RTL	RTL	6
10940601	B00938	201	MAIN ST E	HILGERT FRED	% MILLER KENDALL ETL	RTL	RTL	6
210940602	B00937	203	MAIN ST E	DWL CAFE, INC X	203 E MAIN	RES	RES	6
10940603	B00936	209	MAIN ST E	SLICK'S, INC X	209 E MAIN	RES	RES	6
10940604	B00935	215	MAIN ST E	GUENTHNER BYRON T & AR	% A B C T V & APPLIA	000	0	6
210940701	B00950	301	MAIN ST E	GRAINGER EARL R	419 4TH AVE	HOT	HOT	6
210940702	B00949	303	MAIN ST E	GRAINGER EARL R	C/O PALACE BAR & LNS	RES	RES	6
10940703	B00948	305	MAIN ST E	PALACE BAR & LANES	% MC GILLEN DARRELL J	OTH	BWL	6
10940705	B00946	309	MAIN ST E	HALVORSON LA VERNE J	1319 5TH AVE	WAR	RTL	6
210940708	B00944	317	MAIN ST E	ERB MYRON Y & IS	% JOHNSON ENTERPRISES	GAR	GAR	6
	B00960	401	MAIN ST E	ANGELOS PETER A & CL	P O BOX 664	RES		6
	B00959	407	MAIN ST E	MASBRUCH DENNIS R AND MILLER, KENDALL D & P		RTL		6
	B00958	415	MAIN ST E	FIRST TRUST CO ETAL - CO-TR	% STEVENS, JAMES M E	GAR		6
	B00957	419	MAIN ST E	KERNS KRAYTON D & X		RTL		6
210930706	B00020	0	MAIN ST W	WINTERS FRED D & DAR	% BRENDEN, ROBERT M &	RTL	RTL	6
210930702	B00024	0	MAIN ST W	HAYES WALTON E	3610 POLY DR	OTH	0	6
210930508	B00045	0	MAIN ST W	EVERGREEN REBEKA H LODGE #86	% EVENSON, LOUISE	CRH	CRH	6
210930708	B00018	101	MAIN ST W	MARTIN CO INC JAMES W	C/O RANKIN DEAN ETAL	RTL	RTL	6
210930707	B00019	105	MAIN ST W	HUGHES ELSE	% BRENDEN, ROBERT M &	RTL	RTL	6
210930705	B00021	109	MAIN ST W	FRANK CLIFFORD H	C/O HENDRICKSON R & K	OFF	OFF	6
210930704	B00022	111	MAIN ST W	HERMAN LARRY D	111 W MAIN	OFF	OFF	6
210930703	B00023	113	MAIN ST W	BENDER HAROLD	C/O WANNER VIRGINA C	MED	MED	6
210930606	B00033	201	MAIN ST W	POWERS DAVID K	815 5 ST	GAR	GAR	6
210930605	B00034	207	MAIN ST W	VAN BEBBER HULDA	207 W MAIN	RTL	RTL	6
210930603	B00035	213	MAIN ST W	ROYSDON LUCY A & GLE	% BROOKS, KARMEN J &	RTL	RTL	6
210930602	B00036	217	MAIN ST W	PODOLANCHUK ANTON	P O BOX 1145	RTL	RTL	6
210930601	B00037	221	MAIN ST W	MARTIN JAMES W	P O BOX 97	RTL	RTL	6
210930512	B00043	301	MAIN ST W	CHRISTIAN KENNETH W E	% CHRISTIAN, MILDRED	OFF	OFF	6
210930509	B00044	305	MAIN ST W	SMALL BUSINESS ADMINISTRATION	X	RTL	MUL	5
210930507	B00046	311	MAIN ST W	FICHTNER LEONARD W	C/O LAUREL AERIE 2564	WAR	WAR	6
210930506	B00047	315	MAIN ST W	EAGLES FRAT ORDR R LAUREL	AERIE # 2564	FRT	OTH	6
210941312	B00982	0	MONTANA AVE	MARTIN JAMES WOLD	P O BOX 97	SHD	WAR	6
210940510	B00914	6	MONTANA AVE	LANCE DAVIS	1310 5TH AVE	RTL	RTL	6
210940618	B00939	11	MONTANA AVE	STAHLEY JOHN J	% MAKOFF D J & C C	LAU	LAU	6
210940616	B00940	15	MONTANA AVE	SMITH JOHN H	15 MONTANA AVE	MED	MED	6
210940614	B00941	19	MONTANA AVE	SECURITY FEDERAL SVGS & LOAN	PO BOX 2503	BNK	BNK	6
210940513	B00928	20	MONTANA AVE	FIRST SECURITY BANK OF LAURE	20 MONTANA AVE	BNK	BNK	6
	B00975	215	MONTANA AVE	MILTENBERGER GERALDINE	215 E 1ST	SFR		1
	B00974	219	MONTANA AVE	SCHWINDT DOUGLAS D	RTE 2 BOX 787	SFR		1
210940710	B00956	0	PENNSYLVANIA AVE	ERB MYRON Y & IS	JOHNSON ENTERPRISES I	OTH	0	6
	B00961	0	PENNSYLVANIA AVE	GUENTHNER HOWARD S	13 PENNSYLVANIA AVE	000		6
	B00962	13	PENNSYLVANIA AVE	GUENTHNER HOWARD S	13 PENNSYLVANIA AVE	RTL		6
	B00963	15	PENNSYLVANIA AVE	JONES EDWARD W	GUENTHER HS AND RM	SFR		1
	B00964	19	PENNSYLVANIA AVE	JONES ETAL WANDA B	% GUENTHNER H & RM	MUL		3
210940712	B00955	20	PENNSYLVANIA AVE	MC MANUS HAROLD P	ET X	SFR	SFR	1
	B00966	12	WYOMING AVE	COTTER JAMES M	12 WYOMING AVE	SFR		1

EXHIBIT 10
 DATE 2.18.91
 HB Long Parry Plan

10940708
 10940705
 10940703
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 10940501

Order by

Sec Code	Tax Code	0	Property Address	Owner Name	Owner Address	City	County	0	Zone
08210931212	B00081	113	4 AVE	ADAMS	HAROLD I	113 4 AVE	SFR	SFR	1
	B00960	401	MAIN ST E	ANGELOS	PETER A & CL	P O BOX 664	RES		6
08210931305	B00089	209	1 ST W	ARDEN	DORIS R	209 W 1 ST	OFF	RTL	6
08210931908	B00116	209	3 AVE	BARCLAY	GENEVIEVE A	209 3 AVE	SFR	SFR	1
08210940507	B00917	111	MAIN ST E	BARSNESS	EUGENE M	415 11TH	RTL	RTL	6
08210931811	B00130	201	4 AVE	BARTHLOMEW	MICHAEL J	201 4 AVE	SFR	SFR	1
08210931209	B00084	120	3 AVE	BATHURST	C E	120 3 AVE	SFR	SFR	1
08210931208	B00085	118	3 AVE	BEATTIE ETAL	DAVID	118 3 AVE	SFR	SFR	1
08210930703	B00023	113	MAIN ST W	BENDER	HAROLD	C/O WANNER VIRGINA C	MED	MED	6
08210940502	B00922	5	1 AVE	BRADLEY	THOMAS L	615 3RD AVE	OFF	OFF	6
08210940508	B00916	113	MAIN ST E	BROWN	THOMAS R	222 LAURMAC LN	RTL	RTL	6
08210931809	B00128	211	4 AVE	BURROWS	HELEN R	X	SFR	SFR	1
08210931810	B00129	209	4 AVE	BURROWS	JAMES A	P O BOX 1001	SFR	SFR	1
08210931805	B00124	216	3 AVE	CELLMER	JAREL J	216 3 AVE	SFR	SFR	1
08210930518	B00049	314	1 ST	CHAPMAN ETAL	WESLEY	XGROSHHELL RUDY	SFR	RTL	1
08210930512	B00043	301	MAIN ST W	CHRISTIAN	KENNETH W	E % CHRISTIAN, MILDRED	OFF	OFF	6
08210930714	B00027	0	X	CITY OF LAUREL	X	LAUREL MT	OTH	0	6
08210931306	B00090	0	X	CITY OF LAUREL	X	LAUREL MT	000	0	1
08210932019	B00107	0	X	CITY OF LAUREL	X	LAUREL MT	000	0	1
08210941501	B00968	0	X	CITY OF LAUREL	X	LAUREL MT	000	0	0
08210941306	B00978	0	1 ST	CITY OF LAUREL	X	LAUREL MT	000	0	6
08210932020	B00092	0	1 ST W	CITY OF LAUREL	X	LAUREL MT	OTH	0	6
08210931301	B00091	215	1 ST W	CITY OF LAUREL	X	LAUREL MT	OTH	0	6
	B00970	215	E 1 ST	CLARK	THEODORE E	1906 CAMDEN DR	SFR		1
	B00966	12	WYOMING AVE	COTTER	JAMES M	12 WYOMING AVE	SFR		1
	B00967	14	WYOMING AVE	DITTRICH	HAROLD E	BOX 1118	SFR		1
08210930506	B00047	315	MAIN ST W	EAGLES FRAT ORDE	R LAUREL	AERIE # 2564	FRT	OTH	6
08210931802	B00121	206	3 AVE	EARLY	J G	206 3 AVE	SFR	SFR	1
08210931803	B00122	208	3 AVE	EBERSVILLER	GERALDEAN M	208 3 AVE	SFR	SFR	1
08210940607	B00931	10	COLORADO AVE	ELTON	H KEITH	219 E MAIN	RES	RES	6
08210940707	B00945	0	MAIN ST E	ERB	MYRON Y & IS	% JOHNSON ENTERPRISES	OTH	0	6
08210940708	B00944	317	MAIN ST E	ERB	MYRON Y & IS	% JOHNSON ENTERPRISES	GAR	GAR	6
08210940710	B00956	0	PENNSYLVANIA AVE	ERB	MYRON Y & IS	JOHNSON ENTERPRISES I	OTH	0	6
08210930508	B00045	0	MAIN ST W	EVERGREEN REBEKA	H LODGE #86	% EVENSON, LOUISE	CRH	CRH	6
08210930507	B00046	311	MAIN ST W	FICHTNER	LEONARD W	C/O LAUREL AERIE 2564	WAR	WAR	6
08210930501	B00048	0	X	FICHTNER	LEONARD W	902 PENNSYLVANIA AVE	000	0	6
08210940513	B00928	20	MONTANA AVE	FIRST SECURITY B	ANK OF LAURE	20 MONTANA AVE	BNK	BNK	6
	B00958A	0	MAIN ST E	FIRST TRUST CO	CECIL OLIVER	% WESTER MILTON & GD	RTL		6
	B00958	415	MAIN ST E	FIRST TRUST CO	ETAL - CO-TR	% STEVENS, JAMES M	E GAR		6
08210940501	B00923	101	MAIN ST E	FRANK	CLIFFORD H	% WIKE, JEWEL	RES	RES	6
08210930705	B00021	109	MAIN ST W	FRANK	CLIFFORD H	C/O HENDRICKSON R & K	OFF	OFF	6
08210940509	B00915	117	MAIN ST E	FRICKEL	THOMAS E AND	FRANK, LESLIE D	RTL	RTL	6
08210931909	B00117	205	3 AVE	GETZ	FRED C & CLA	% WEBSTER, DALE R & S	SFR	SFR	1
08210930611	B00040	20	2 AVE	GRACE BAPTIST CH	URCH	% GRACE BIBLE CHURCH	CRH	0	6
08210940701	B00950	301	MAIN ST E	GRAINGER	EARL R	419 4TH AVE	HOT	HOT	6
08210940702	B00949	303	MAIN ST E	GRAINGER	EARL R	C/O PALACE BAR & LNS	RES	RES	6
08210931205	B00077	305	W 1 ST	GRATWOHL	HERMAN R	615 W 2 ST	SFR	SFR	1
08210931201	B00080	315	W 1 ST	GREEN	JAMES A	315 WEST 1ST AVE	SFR	SFR	1
08210940504	B00920	105	MAIN ST E	GROSHELLE	GARY R	RTE 1	FRT	BAR	6
08210931906	B00114	218	W 3 ST	GROSHELLE	RUDOLPH F	ROUTE 1	SFR	SFR	1
08210940604	B00935	215	MAIN ST E	GUENTHNER	BYRON T & AR	% A B C T V & APPLIA	000	0	6
	B00961	0	PENNSYLVANIA AVE	GUENTHNER	HOWARD S	13 PENNSYLVANIA AVE	000		6
	B00962	13	PENNSYLVANIA AVE	GUENTHNER	HOWARD S	13 PENNSYLVANIA AVE	RTL		6
08210931808	B00127	215	4 AVE	GUINN	VIREL T & DO	P O BOX 22	SFR	SFR	1
08210931806	B00125	0	3 AVE	GUNLICKSON	ALBERTA	C/O ORTH LEONARD & JA	SFR	SFR	1
08210940705	B00946	309	MAIN ST E	HALVORSON	LA VERNE J	1319 5TH AVE	WAR	RTL	6
08210932011	B00102	217	2 AVE	HARTLEY	BEULAH W	C/O DANIELS DB & PA	SFR	SFR	1
08210930702	B00024	0	MAIN ST W	HAYES	WALTON E	3610 POLY DR	OTH	0	6
08210930701	B00025	0	X	HAYES	WALTON E	3610 POLY DR	RTL	RTL	6
08210930704	B00022	111	MAIN ST W	HERMAN	LARRY D	111 W MAIN	OFF	OFF	6
08210940601	B00938	201	MAIN ST E	HILBERT	FRED	% MILLER KENDALL ETL	RTL	RTL	6

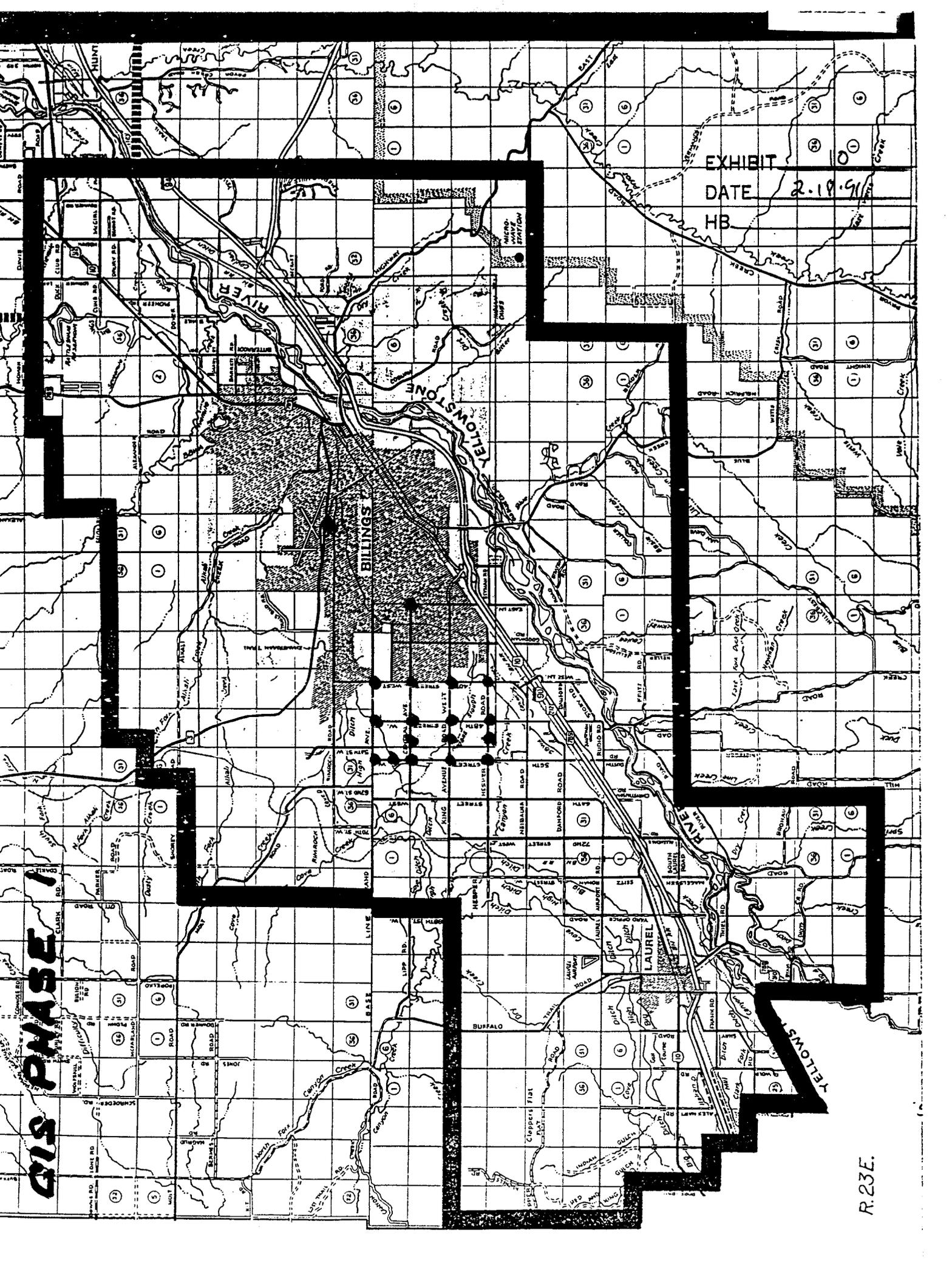


EXHIBIT 10
DATE 2-19-91
HB

GIS PHASE 1

R.23E.

TRIMBLE SURVEY POINT DATABASE

Report of Database Query Results

Thu Jan 10 09:17:01 1991

NAME: 00A2 *AIRPORT 2*
LATITUDE: 45 48' 5.77396" N LONGITUDE: 108 32'13.72216" W
HEIGHT (ellipsoid) 1070.900000 HEIGHT UNITS: meters
HEIGHT (ortho) (separation)
QUALITY: ORIGIN: GPS_1 ELLIPSOID: WGS-84 DATUM:
SURVEY DATE: 19901129
REMARKS:

NAME: 000H *HESPER & 40TH*
LATITUDE: 45 44'26.14496" N LONGITUDE: 108 37' 2.73682" W
HEIGHT (ellipsoid) 978.748500 HEIGHT UNITS: meters
HEIGHT (ortho) (separation)
QUALITY: ORIGIN: GPS_2 ELLIPSOID: WGS-84 DATUM:
SURVEY DATE: 19901129
REMARKS:

NAME: 000K *KING & SHILOH*
LATITUDE: 45 45'18.31079" N LONGITUDE: 108 37' 2.97029" W
HEIGHT (ellipsoid) 980.673900 HEIGHT UNITS: meters
HEIGHT (ortho) (separation)
QUALITY: ORIGIN: GPS_2 ELLIPSOID: WGS-84 DATUM:
SURVEY DATE: 19901129
REMARKS:

NAME: 002G *GRAND & 52ND.*
LATITUDE: 45 47' 2.67807" N LONGITUDE: 108 38'56.12080" W
HEIGHT (ellipsoid) 1000.928600 HEIGHT UNITS: meters
HEIGHT (ortho) (separation)
QUALITY: ORIGIN: GPS_2 ELLIPSOID: WGS-84 DATUM:
SURVEY DATE: 19901129
REMARKS:

NAME: C66E *1/4 COR. ON CENTRAL BETWEEN 48TH & 56TH*
LATITUDE: 45 46'10.77054" N LONGITUDE: 108 38'55.56787" W
HEIGHT (ellipsoid) 992.454900 HEIGHT UNITS: meters
HEIGHT (ortho) (separation)
QUALITY: ORIGIN: GPS_2 ELLIPSOID: WGS-84 DATUM:
SURVEY DATE: 19901129
REMARKS:

NAME: 006H *HESPER & 56TH.*
LATITUDE: 45 44'26.32300" N LONGITUDE: 108 39'31.46683" W
HEIGHT (ellipsoid) 987.050600 HEIGHT UNITS: meters
HEIGHT (ortho) (separation)
QUALITY: ORIGIN: GPS_2 ELLIPSOID: WGS-84 DATUM:
SURVEY DATE: 19901129
REMARKS:

Month 0 is assumed to be January 1991.

5 YEAR SCHEDULE OF THE YELLOWSTONE COUNTY LIS/GIS PROJECT

(In Months)

ACTIVITY 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 ... 36 ... 48 ... 60

Prepare RFP for GIS software/
hardware vendor. —

RFP preparation time by
prospective vendors. —

Review of proposals. —

On-site review of top 2 GIS
vendors. —

GIS selected vendor
installation of equipment for
Surveyor's office. —

GIS training of 3 people. —

Build Attribute Data for GIS. —

Build data for Multi-purpose
Land Information System.
(On-going - currently working
with City of Billings map) —

Base map revisions and GEO
code attribute updates. —

Hardware expansion for
Assessor, Appraiser and
Planning. —

GIS training for new
installations. —

EXHIBIT 10
DATE 2.18.91
HB Long Range Plan.

ACTIVITY 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 ... 36 ... 48 ... 60

Memory expansion.

Hardware expansion for Elections, Treasurer, Appraiser, Superintendent of Schools, Data Processing, Weed Control, Economic Development, Clerk and Recorder, Sheriff.

Hardware expansion - 5 additional machines for existing offices.

In-house, on-the-job training with support of software vendor, as required.

Year	Month	Expend.	Subtotal	Notes	System / Category	Cost		
1990	Mar				Surveys			
	Apr							
	May	\$18,600	\$18,600	Surveyor 1.6 F.T.E Appraiser 1.0 F.T.E			2 Temporary Employees \$18,600 (Surveyor)	
	June			Utilities Dept CAD Files No Charge				
	July			AutoCAD Software & Hardware (Surveyor & Appraiser)				
	Aug	\$52,000	\$70,600				*GPS Training \$5,070	
	Sept	\$6,000	\$81,670				Management Survey \$6,000	
	Oct	\$13,360	\$95,030				Lease GPS Equip. & Survey \$13,360	
	Nov	\$760	\$95,790				Computations \$760	
	Dec	\$121,700	\$217,490				GIS Hardware & Software \$121,700 (Surveyor)	
	1991	Jan	\$18,000	\$235,490			Build Attributes (GIS)	GIS Training - 3 People \$18,000
		Feb						
Mar								
Apr								
May								
June								
July								
Aug								
Sept		\$127,840	\$363,330	Hardware - Software (Assessor & Appraiser)		Hardware & Software (Planning) \$76,540 + \$3,000 installation		
Oct				\$45,3000 - \$3,000 installation		GIS Training - 3 People \$18,000		
Nov		\$18,000	\$381,330	Planning 1.0 F.T.E.		Memory \$20,000		
Dec		\$20,000	\$401,330					
1992	Jan				Base Map Revisions & GEO Code Attribute Updates			
	Feb							
	Mar							
	Apr							
	May							
	June							
	July							
	Aug							
	Sept							
	Oct	\$20,000	\$421,330				Memory \$20,000	
	Nov							
	Dec	\$90,000	\$511,330				9 - Monitors & Printers at \$10,000 = \$90,000	
1993	Jan				Geographic Information System			
	Feb							
	Mar							
	Apr							
	May							
	June							
	July							
	Aug							
	Sept							
	Oct							
	Nov							
	Dec	\$50,000	\$561,330				5 - Expansion, Monitors, & Printers 5 at \$10,000 = \$50,000	
		\$561,330 Total						
		\$625,000 Budget		TOTAL 3.6 F.T.E.				

G.I.S./L.I.S. CASH FLOW BUDGET CALENDAR

GIS / Planning System

\$1200/Month

\$2032/Month

Note 56K Line to Planning
\$750 - \$150/Month Copper
or \$20,000 Fiber Optic

2	BLUE CREEK ROAD	33001	1		POLE	W	4		4	S	R			INV	SURVY	3	
3	BLUE CREEK ROAD	33001	1	A	SIGN	STN	S	WE GN	WILLOW DR	5	S	R	NS		INV	SURVY	3
4	BLUE CREEK ROAD	33001	1	B	SIGN	STN	S	WE GN	BLUE CREEK RD	4	S	R	EW		INV	SURVY	3
5	BLUE CREEK ROAD	33001	1	C	SIGN	R1-1	30X30	WE RD		3	S	R	W		INV	SURVY	3
6	BLUE CREEK ROAD	33001	2		POLE	W	4		4	S	R			INV	SURVY	3	
7	BLUE CREEK ROAD	33001	2	A	SIGN	W1-2L	30X30	BK YW		4	S	R		INV	SURVY	3	
8	BLUE CREEK ROAD	33001	2	B	SIGN	W13-1	18X18	BK YW	35 MPH	5	S	R	N		INV	SURVY	3
12	BLUE CREEK ROAD	33001	2		NOTE			BULLET HOLE IN SIGN A			S	R		INV	SURVY	3	
13	BLUE CREEK ROAD	33001	3		BARR	2	3X8	RD WE	ABANDONED APPROACH	2	W	ON	S	S	R		INV
15	BLUE CREEK ROAD	33001	3		NOTE			DO NOT REPLC BARR; HWY REN			S	R		INV	SUR		
16	BLUE CREEK ROAD	33001	4		POLE	S	3		5	S	R			INV	SURVY	3	
17	BLUE CREEK ROAD	33001	4	A	SIGN	INF	30X48	WE GN	LANDFILL >	4	S	R	N		INV	SURVY	3
19	BLUE CREEK ROAD	33001	5		POLE	S	CHAN	3		5	S	R		INV	SURVY	3	
20	BLUE CREEK ROAD	33001	5	A	SIGN	H1R	12X36	YE BK		5	S	R	N		INV	SURVY	3
21	BLUE CREEK ROAD	33001	6		POLE	S	PIPE	3		4	S	R		INV	SURVY	3	
22	BLUE CREEK ROAD	33001	6	A	SIGN	INF	24X72	WE GN	LANDFILL 3/4 MILES >	4	S	R	N		INV		
23	BLUE CREEK ROAD	33001	7		POLE	S	CHAN	2		4	S	R		INV	SURVY	3	
24	BLUE CREEK ROAD	33001	7	A	SIGN	MM	6X12	WE GN	MILE 1	5	S	R	N		INV	SURVY	3
25	BLUE CREEK ROAD	33001	8		POLE	W	4		4	SE	R			INV	SURVY	3	
26	BLUE CREEK ROAD	33001	8	A	SIGN	W11-3	30X30	BK YW	DEER CROSSING	4	SE	R	NW		INV	SU	
27	BLUE CREEK ROAD	33001	8	A	NOTE			BULLET HOLE IN SIGN			SE	R		INV	SURV	3	
28	BLUE CREEK ROAD	33001	8	B	SIGN	SUPP	24X18	BK YW	NEXT 5 MILES	4	SE	R	NW		INV	SURV	
29	BLUE CREEK ROAD	33001	9		POLE	W	4X4		4	SE	R			INV	SURVY	3	
30	BLUE CREEK ROAD	33001	9	A	SIGN	W1-2R	30X30	BK YW		4	SE	R	NW		INV	SURVY	3
31	BLUE CREEK ROAD	33001	9	A	NOTE			BENT AND STRAIGHTENED			SE	R		INV	SURVY	3	
32	BLUE CREEK ROAD	33001	10		POLE	S	CHAN	2		4	SE	R		INV	SURVY	3	
33	BLUE CREEK ROAD	33001	10	A	SIGN	MM	10X18	WE GN	MILE 2	3	SE	R	NW		INV	SURVY	3
34	BLUE CREEK ROAD	33001	10	B	SIGN	MM	10X18	WE GN	MILE 2	3	SE	R	SE		INV	SURVY	3

EXHIBIT 10
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HB Long Range Plan

2,-108.533089,	45.731596
3,-108.533081,	45.731525
4,-108.533074,	45.731705
5,-108.533074,	45.731705
6,-108.533081,	45.731667
7,-108.533005,	45.730057
8,-108.533005,	45.730057
12,-108.532982,	45.730083
13,-108.532982,	45.730106
15,-108.532828,	45.728031
16,-108.532814,	45.727986
17,-108.532806,	45.727990
19,-108.532829,	45.728001
20,-108.532829,	45.728000
21,-108.532792,	45.727914
22,-108.532797,	45.727920
23,-108.532814,	45.727821
24,-108.532814,	45.727821
25,-108.531752,	45.726144
26,-108.531752,	45.726144
27,-108.531305,	45.725895
28,-108.530983,	45.725736
29,-108.528762,	45.724918
30,-108.528762,	45.724918
31,-108.528755,	45.724915
32,-108.528785,	45.724917
33,-108.528785,	45.724917
34,-108.528777,	45.724906

END

END

4	1	2	-108.533112	45.732143	BLUE CREEK ROAD, 33001
1	3	2	-108.533112	45.732143	P
1	5	2	-108.533112	45.732143	INV
1	6	2	-108.533112	45.732143	SURVY
1	7	2	-108.533112	45.732143	3
2	1	2	-108.533089	45.731596	BLUE CREEK ROAD, 33001
2	2	2	-108.533089	45.731596	1
2	6	2	-108.533089	45.731596	W
2	7	2	-108.533089	45.731596	4
2	10	2	-108.533089	45.731596	4
2	12	2	-108.533089	45.731596	S
2	13	2	-108.533089	45.731596	R
2	17	2	-108.533089	45.731596	INV
2	18	2	-108.533089	45.731596	SURVY
2	19	2	-108.533089	45.731596	3
2	5	2	-108.533089	45.731596	POLE
2	1	3	-108.533081	45.731525	BLUE CREEK ROAD, 33001
2	2	2	-108.533081	45.731596	1
2	3	3	-108.533081	45.731522	A
2	6	3	-108.533081	45.731518	STN
2	7	3	-108.533081	45.731514	S
2	8	3	-108.533081	45.731510	WE GN
2	9	3	-108.533081	45.731506	WILLOW DR
2	10	3	-108.533081	45.731503	5
2	12	3	-108.533081	45.731499	S
2	13	3	-108.533081	45.731495	R
2	14	3	-108.533081	45.731491	NS
2	17	3	-108.533081	45.731487	INV
2	18	3	-108.533081	45.731483	SURVY
2	19	3	-108.533081	45.731480	3
2	5	3	-108.533081	45.731476	SIGN
2	1	4	-108.533074	45.731705	BLUE CREEK ROAD, 33001
2	2	4	-108.533074	45.731705	1
2	3	4	-108.533074	45.731705	B
2	6	4	-108.533074	45.731705	STN
2	7	4	-108.533074	45.731705	S
2	8	4	-108.533074	45.731705	WE GN
2	9	4	-108.533074	45.731705	BLUE CREEK RD
2	10	4	-108.533074	45.731705	4
2	12	4	-108.533074	45.731705	S
2	13	4	-108.533074	45.731705	R
2	14	4	-108.533074	45.731705	EW
2	17	4	-108.533074	45.731705	INV
2	18	4	-108.533074	45.731705	SURVY
2	19	4	-108.533074	45.731705	3
2	5	4	-108.533074	45.731705	SIGN
2	1	5	-108.533074	45.731705	BLUE CREEK ROAD, 33001
2	2	5	-108.533074	45.731705	1
2	3	5	-108.533074	45.731705	C
2	6	5	-108.533074	45.731705	R1-1
2	7	5	-108.533074	45.731705	30X30
2	8	5	-108.533074	45.731705	WE RD
2	10	5	-108.533074	45.731705	3
2	12	5	-108.533074	45.731705	S
2	13	5	-108.533074	45.731705	R

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2	14	5	-108.533074	45.731705	W
2	17	5	-108.533074	45.731705	INV
2	18	5	-108.533074	45.731705	SURVY
2	19	5	-108.533074	45.731705	3
2	5	5	-108.533074	45.731705	SIGN
2	1	6	-108.533081	45.731667	BLUE CREEK ROAD, 33001
2	6	6	-108.533081	45.731667	W
2	7	6	-108.533081	45.731667	4
2	10	6	-108.533081	45.731667	4
2	12	6	-108.533081	45.731667	S
2	13	6	-108.533081	45.731667	R
2	17	6	-108.533081	45.731667	INV
2	18	6	-108.533081	45.731667	SURVY
2	19	6	-108.533081	45.731667	3
2	5	6	-108.533081	45.731667	POLE
2	1	7	-108.533005	45.730057	BLUE CREEK ROAD, 33001
2	2	7	-108.533005	45.730057	2
2	3	7	-108.533005	45.730057	A
2	6	7	-108.533005	45.730057	W1-2L
2	7	7	-108.533005	45.730057	30X30
2	8	7	-108.533005	45.730057	BK YW
2	10	7	-108.533005	45.730057	4
2	12	7	-108.533005	45.730057	S
2	13	7	-108.533005	45.730057	R
2	17	7	-108.533005	45.730057	INV
2	18	7	-108.533005	45.730057	SURVY
2	19	7	-108.533005	45.730057	3
2	5	7	-108.533005	45.730057	SIGN
2	1	8	-108.533005	45.730057	BLUE CREEK ROAD, 33001
2	2	8	-108.533005	45.730057	2
2	3	8	-108.533005	45.730057	B
2	6	8	-108.533005	45.730057	W13-1
2	7	8	-108.533005	45.730057	18X18
2	8	8	-108.533005	45.730057	BK YW
2	9	8	-108.533005	45.730057	35 MPH
2	10	8	-108.533005	45.730057	5
2	12	8	-108.533005	45.730057	S
2	13	8	-108.533005	45.730057	R
2	14	8	-108.533005	45.730057	N
2	17	8	-108.533005	45.730057	INV
2	18	8	-108.533005	45.730057	SURVY
2	19	8	-108.533005	45.730057	3
2	5	8	-108.533005	45.730057	SIGN
2	9	9	-108.532967	45.730068	BULLET HOLE IN POST
5	1	10	-108.532967	45.730102	OOPS PREVIOUS ENTRY IN ERROR
2	9	11	-108.532974	45.730062	
2	9	12	-108.532982	45.730083	BULLET HOLE IN SIGN A, ARROW
2	1	13	-108.532982	45.730106	BLUE CREEK ROAD, 33001
2	6	13	-108.532982	45.730106	2
2	7	13	-108.532982	45.730106	3X8
2	8	13	-108.532982	45.730106	RD WE
2	11	13	-108.532982	45.730106	W ON S
2	10	13	-108.532982	45.730106	2
2	12	13	-108.532982	45.730106	S
2	13	13	-108.532982	45.730106	R

2	17	13	-108.532982	45.730106	INV
2	18	13	-108.532982	45.730106	SURVY
2	19	13	-108.532982	45.730106	3
2	5	13	-108.532982	45.730106	BARR
2	9	14	-108.532814	45.728028	ABANDONED APPROACH
2	9	15	-108.532828	45.728031	DO NOT REPLACE BARRICADE, HWY RENOVATION PLANNED
2	1	16	-108.532814	45.727986	BLUE CREEK ROAD,33001
2	2	16	-108.532814	45.727986	3
2	6	16	-108.532814	45.727986	S
2	7	16	-108.532814	45.727986	3
2	10	16	-108.532814	45.727986	5
2	12	16	-108.532814	45.727986	S
2	13	16	-108.532814	45.727986	R
2	17	16	-108.532814	45.727986	INV
2	18	16	-108.532814	45.727986	SURVY
2	19	16	-108.532814	45.727986	3
2	5	16	-108.532814	45.727986	POLE
2	1	17	-108.532806	45.727990	BLUE CREEK ROAD,33001
2	2	17	-108.532806	45.727990	3
2	3	17	-108.532806	45.727990	A
2	6	17	-108.532806	45.727990	INF
2	7	17	-108.532806	45.727990	30X48
2	8	17	-108.532806	45.727990	WE GN
2	9	17	-108.532806	45.727990	LANDFILL >
2	10	17	-108.532806	45.727990	4
2	12	17	-108.532806	45.727990	S
2	13	17	-108.532806	45.727990	R
2	14	17	-108.532806	45.727990	N
2	17	17	-108.532806	45.727990	INV
2	18	17	-108.532806	45.727990	SURVY
2	19	17	-108.532806	45.727990	3
2	5	17	-108.532806	45.727990	SIGN
2	1	18	-108.532806	45.728001	BLUE CREEK ROAD,33001
2	6	18	-108.532806	45.728001	S CHAN
2	7	18	-108.532806	45.728001	12X36
2	5	18	-108.532806	45.728001	PO
2	1	19	-108.532829	45.728001	BLUE CREEK ROAD,33001
2	6	19	-108.532829	45.728001	S CHAN
2	7	19	-108.532829	45.728001	3
2	10	19	-108.532829	45.728001	5
2	12	19	-108.532829	45.728001	S
2	13	19	-108.532829	45.728001	R
2	17	19	-108.532829	45.728001	INV
2	18	19	-108.532829	45.728001	SURVY
2	19	19	-108.532829	45.728001	3
2	5	19	-108.532829	45.728001	POLE
2	1	20	-108.532829	45.728000	BLUE CREEK ROAD,33001
2	3	20	-108.532829	45.728000	A
2	6	20	-108.532829	45.728000	H1R
2	7	20	-108.532829	45.728000	12X36
2	8	20	-108.532829	45.728000	YE BK
2	10	20	-108.532829	45.728000	5
2	12	20	-108.532829	45.728000	S
2	13	20	-108.532829	45.728000	R
2	14	20	-108.532829	45.728000	N

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2	17	20	-108.532829	45.728000	INV
2	18	20	-108.532829	45.728000	SURVY
2	19	20	-108.532829	45.728000	3
2	5	20	-108.532829	45.728000	SIGN
2	1	21	-108.532792	45.727914	BLUE CREEK ROAD, 33001
2	6	21	-108.532792	45.727914	S PIPE
2	7	21	-108.532792	45.727914	3
2	10	21	-108.532792	45.727914	4
2	12	21	-108.532792	45.727914	S
2	13	21	-108.532792	45.727914	R
2	17	21	-108.532792	45.727914	INV
2	18	21	-108.532792	45.727914	SURVY
2	19	21	-108.532792	45.727914	3
2	5	21	-108.532792	45.727914	POLE
2	1	22	-108.532797	45.727920	BLUE CREEK ROAD, 33001
2	3	22	-108.532797	45.727920	A
2	6	22	-108.532797	45.727920	INF
2	7	22	-108.532797	45.727920	24X72
2	8	22	-108.532797	45.727920	WE GN
2	9	22	-108.532797	45.727920	LANDFILL 3/4 MILES >
2	10	22	-108.532797	45.727920	4
2	12	22	-108.532797	45.727920	S
2	13	22	-108.532797	45.727920	R
2	14	22	-108.532797	45.727920	N
2	17	22	-108.532797	45.727920	INV
2	18	22	-108.532797	45.727920	SURVY
2	19	22	-108.532797	45.727920	3
2	5	22	-108.532797	45.727920	SIGN
2	1	23	-108.532814	45.727821	BLUE CREEK ROAD, 33001
2	6	23	-108.532814	45.727821	S CHAN
2	7	23	-108.532814	45.727821	2
2	10	23	-108.532814	45.727821	4
2	12	23	-108.532814	45.727821	S
2	13	23	-108.532814	45.727821	R
2	17	23	-108.532814	45.727821	INV
2	18	23	-108.532814	45.727821	SURVY
2	19	23	-108.532814	45.727821	3
2	5	23	-108.532814	45.727821	POLE
2	1	24	-108.532814	45.727821	BLUE CREEK ROAD, 33001
2	2	24	-108.532814	45.727821	4
2	3	24	-108.532814	45.727821	A
2	6	24	-108.532814	45.727821	MM
2	7	24	-108.532814	45.727821	6X12
2	8	24	-108.532814	45.727821	WE GN
2	9	24	-108.532814	45.727821	MILE 1
2	10	24	-108.532814	45.727821	5
2	12	24	-108.532814	45.727821	S
2	13	24	-108.532814	45.727821	R
2	14	24	-108.532814	45.727821	N
2	17	24	-108.532814	45.727821	INV
2	18	24	-108.532814	45.727821	SURVY
2	19	24	-108.532814	45.727821	3
2	5	24	-108.532814	45.727821	SIGN
2	1	25	-108.531752	45.726144	BLUE CREEK ROAD, 33001
2	2	25	-108.531752	45.726144	5

2	6	25	-108.531752	45.726144	W
2	7	25	-108.531752	45.726144	4
2	10	25	-108.531752	45.726144	4
2	12	25	-108.531752	45.726144	SE
2	13	25	-108.531752	45.726144	R
2	17	25	-108.531752	45.726144	INV
2	18	25	-108.531752	45.726144	SURVY
2	19	25	-108.531752	45.726144	3
2	5	25	-108.531752	45.726144	POLE
2	1	26	-108.531752	45.726144	BLUE CREEK ROAD,33001
2	2	26	-108.531752	45.726144	6
2	3	26	-108.531752	45.726144	A
2	6	26	-108.531752	45.726144	W11-3
2	7	26	-108.531752	45.726144	30X30
2	8	26	-108.531752	45.726144	BK YW
2	9	26	-108.531752	45.726144	DEER CROSSING
2	10	26	-108.531752	45.726144	4
2	12	26	-108.531752	45.726144	SE
2	13	26	-108.531752	45.726144	R
2	14	26	-108.531752	45.726144	NW
2	17	26	-108.531752	45.726144	INV
2	18	26	-108.531752	45.726144	SURVY
2	19	26	-108.531752	45.726144	3
2	5	26	-108.531752	45.726144	SIGN
2	9	27	-108.531305	45.725895	BULLET HOLE IN SIGN
2	1	28	-108.530983	45.725736	BLUE CREEK ROAD,33001
2	2	28	-108.530983	45.725736	6
2	3	28	-108.530983	45.725736	B
2	6	28	-108.530983	45.725736	SUPP
2	7	28	-108.530983	45.725736	24X18
2	8	28	-108.530983	45.725736	BK YW
2	9	28	-108.530983	45.725736	NEXT 5 MILES
2	10	28	-108.530983	45.725736	4
2	12	28	-108.530983	45.725736	SE
2	13	28	-108.530983	45.725736	R
2	14	28	-108.530983	45.725736	NW
2	17	28	-108.530983	45.725736	INV
2	18	28	-108.530983	45.725736	SURVY
2	19	28	-108.530983	45.725736	3
2	5	28	-108.530983	45.725736	SIGN
2	1	29	-108.528762	45.724918	BLUE CREEK ROAD,33001
2	6	29	-108.528762	45.724918	W
2	7	29	-108.528762	45.724918	4X4
2	10	29	-108.528762	45.724918	4
2	12	29	-108.528762	45.724918	SE
2	13	29	-108.528762	45.724918	R
2	17	29	-108.528762	45.724918	INV
2	18	29	-108.528762	45.724918	SURVY
2	19	29	-108.528762	45.724918	3
2	5	29	-108.528762	45.724918	POLE
2	1	30	-108.528762	45.724918	BLUE CREEK ROAD,33001
2	3	30	-108.528762	45.724918	A
2	6	30	-108.528762	45.724918	W1-2R
2	7	30	-108.528762	45.724918	30X30
2	8	30	-108.528762	45.724918	BK YW

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2	10	30	-108.528762	45.724918	4
2	12	30	-108.528762	45.724918	SE
2	13	30	-108.528762	45.724918	R
2	14	30	-108.528762	45.724918	NW
2	17	30	-108.528762	45.724918	INV
2	18	30	-108.528762	45.724918	SURVY
2	19	30	-108.528762	45.724918	3
2	5	30	-108.528762	45.724918	SIGN
2	9	31	-108.528755	45.724915	BENT AND STRAIGHTENED
2	1	32	-108.528785	45.724917	BLUE CREEK ROAD,33001
2	6	32	-108.528785	45.724917	S CHAN
2	7	32	-108.528785	45.724917	2
2	10	32	-108.528785	45.724917	4
2	12	32	-108.528785	45.724917	SE
2	13	32	-108.528785	45.724917	R
2	17	32	-108.528785	45.724917	INV
2	18	32	-108.528785	45.724917	SURVY
2	19	32	-108.528785	45.724917	3
2	5	32	-108.528785	45.724917	POLE
2	1	33	-108.528785	45.724917	BLUE CREEK ROAD,33001
2	3	33	-108.528785	45.724917	A
2	6	33	-108.528785	45.724917	MM
2	7	33	-108.528785	45.724917	6X18
2	8	33	-108.528785	45.724917	GN WE
2	9	33	-108.528785	45.724917	MILE 2
2	10	33	-108.528785	45.724917	3
2	12	33	-108.528785	45.724917	SE
2	13	33	-108.528785	45.724917	R
2	14	33	-108.528795	45.724917	NW
2	17	33	-108.528785	45.724917	INV
2	18	33	-108.528785	45.724917	SURVY
2	19	33	-108.528785	45.724917	3
2	5	33	-108.528785	45.724917	SIGN
2	1	34	-108.528777	45.724906	BLUE CREEK ROAD,33001
2	3	34	-108.528777	45.724906	C
2	6	34	-108.528777	45.724906	MM
2	7	34	-108.528777	45.724906	10X18
2	8	34	-108.528777	45.724906	WE GN
2	9	34	-108.528777	45.724906	MILE 2
2	10	34	-108.528777	45.724906	4
2	12	34	-108.528777	45.724906	SE
2	13	34	-108.528777	45.724906	R
2	14	34	-108.528777	45.724906	SE
2	17	34	-108.528777	45.724906	INV
2	18	34	-108.528777	45.724906	SURVY
2	19	34	-108.528777	45.724906	3
2	5	34	-108.528777	45.724906	SIGN
2	9	35	-108.528749	45.724889	PREV WAS CONDITION 3

1	ROAD-NAME-NUMBER	32	C
2	ASSEMBLY	3	I
3	SUB-ASSY	1	C
4	DISTANCE	5	I
5	ENTITY	5	C
6	TYPE	8	C
7	SIZE	7	C
8	COLOR	5	C
9	DESCRIPTION	26	C
10	CONDITION	1	C
11	MATERIAL	5	C
12	DIR-TRAVEL	2	C
13	LOCATION	2	C
14	ORIENTATION	2	C
15	SIGN-HT	3	I
16	LAT-CLEAR	2	I
17	ACTION	4	C
18	AUTHORITY	5	C
19	ZONE	1	I
20		0	C
21		0	C
22		0	C
23		0	C
24		0	C
25		0	C
26		0	C
27		0	C
28		0	C
29		0	C
30		0	C

EXHIBIT 10
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4B Long Range Planning

1	ROAD-NAME-NUM	32	C
2	SEGMENT	30	C
3	SURFACE	1	C
4	CONDITION	1	I
5	ACTION	4	C
6	AUTHORITY	5	C
7	ZONE	1	I
8		0	C
9		0	C
10		0	C
11		0	C
12		0	C
13		0	C
14		0	C
15		0	C
16		0	C
17		0	C
18		0	C
19		0	C
20		0	C
21		0	C
22		0	C
23		0	C
24		0	C
25		0	C
26		0	C
27		0	C
28		0	C
29		0	C
30		0	C

F1|POLE'A1''A2''A3''A4''A5''A6''C6''A7'|2|5|0
 F2|'C1''A2''C2''C3''A4''C4''C5''A5''A6''C6''C7''C8''A7'SIGN|2|5|0
 F3|'S1''A2''S3''A4''C4''C5''S4''A5''A6''C6''A7'BARR|2|5|0
 F4|'S5''S6''A4''C5''A5''A6''C6''A7'HAZD|2|5|0
 F5|INV|1|5|0
 F6|SURVY|1|6|0
 F7| |2|1|0
 F8|OOPS PREVIOUS ENTRY IN ERROR |5|1|0
 F9|< SURFACE CONDITION >?|1|4|0
 F10|< ROUTE NAME >'S2''S10''F5''F6'3|1|7|0

EXHIBIT 10
 DATE 2.18.91
 HB Long Range Plan.

S1|< BARRICADE -- LOCATED ON ROUTE NAME/NUMBER >e|2|1|0
 S2|< NOW TRAVELING ROUTE NAME/NUMBER >e|4|1|0
 S3|< BARRICADE TYPE CODE >?|2|6|0
 S4|< MATERIAL >?|2|11|0
 S5|< HAZARD -- LOCATED ON ROUTE NAME/NUMBER >e|2|1|0
 S6|< HAZARD TYPE CODE >?|2|6|0
 S7|< 7 >?|2|2|0
 S8|< 8 >?|2|2|0
 S9|< ROAD HAZARD TYPE >?|2|2|0
 S10|< SURFACE >?|1|3|0

C1|< SIGN -- LOCATED ON ROUTE NAME/NUMBER >e|2|1|0
 C2|< SUB-ASSEMBLY LETTER >?|2|3|0
 C3|< SIGN -- TYPE CODE >?|2|6|0
 C4|< COLOR >?|2|8|0
 C5|< DESCRIPTION >?|2|9|0
 C6|< LOCATION L/R/O/C >?|2|13|0
 C7|< ORIENTATION N/P/B >?|2|14|0
 C8|< SIGN HEIGHT >?|2|15|0
 C9|< SURFACE TYPE >?|1|4|0
 C10|< CONDITION CODE >?|1|5|0

A1|< POLE -- LOCATED ON ROUTE NAME/NUMBER >e|2|1|0
 A2|< ASSEMBLY NUMBER >[0]|2|2|6
 A3|< POLE -- TYPE CODE >?|2|6|0
 A4|< SIZE >?|2|7|0
 A5|< CONDITION >#|2|10|0
 A6|< DIRECTION OF TRAVEL >^|2|12|23
 A7|'A8''A9''A10'|5|18|0
 A8|INV|2|17|0
 A9|SURVY|2|18|0
 A10|3|2|19|0

LONG-RANGE PLANNING SUBCOMMITTEE
February 18, 1991

HEARING ON HB008: Resource Development Grant Proposal

PROJECT TITLE: Hydrogeology, Land Use, and Chemical Quality of the Water Resources in the Clarks Fork Yellowstone Basin, Montana

TESTIMONY PRESENTED BY: John Arrigo, Department of Health and Environmental Sciences and Robert Davis, U.S. Geological Survey

INTRODUCTION

- Joint effort between the Departments of Health and Environmental Sciences and Agriculture and the U.S. Geological Survey
- Study area lies in Carbon County and will focus on the valleys of the Clarks Fork Yellowstone River and its major tributaries, including Rock Creek, and adjacent terraces
- Includes the towns of Red Lodge, Roberts, Joliet, Edgar, Bridger, and Belfry
- Sugar beets, corn, and alfalfa grown in the valleys and irrigated by surface water, dryland small grains and hay grown on uplands
- Shallow ground water is vulnerable to contamination and most wells obtain ground water from less than 20 ft. below the surface

STATEMENT OF PROBLEM

- Ground water is used for drinking and stock watering, 20 of 24 public water supplies in the area use ground water and rural residents rely on ground water for drinking
- DAg sampling in 1986 detected trace levels of aldicarb in 6 of 17 wells that were sampled, including the Edgar School public water supply well
- Suspect that aldicarb applied to nearby sugar beet fields contaminated ground water after flood irrigation
- Presence of aldicarb in well water confirms shallow ground water that is used for drinking is vulnerable to contamination from agricultural chemicals and other sources of contamination such as septic tanks and buried fuel tank leaks
- Need exists to protect ground water quality for drinking yet still allow continued agricultural activity
- Pesticide management plans developed under the Montana Agricultural Chemical Ground Water Protection Act and wellhead protection plans developed under 1986 Amendments to the Safe Drinking Water Act can fulfill this need
- Information on ground water in the area is needed before pesticide management plans and wellhead protection plans can be implemented

PURPOSE

- Develop an understanding of the ground water flow system in the Clarks Fork Basin
- Identify the extent of existing or potential ground water contamination problems
- Provide ground water information necessary for the agencies, agricultural producers and ground water users to make sound decisions regarding protection and use of water resources
- Establish the technical basis for future ground water pollution prevention programs

OBJECTIVES

- Characterize the natural ground water flow system, including ground water quantity and quality
- Inventory existing uses of ground water
- Inventory and characterize land use practices
- Identify potential sources of ground water pollution
- Collect and analyze ground water samples to determine the extent of contamination
- Relay information to the public and agencies

HOUSE OF REPRESENTATIVES
VISITOR REGISTER

Long Range Planning SUBCOMMITTEE DATE 2-18-90
DEPARTMENT(S) DNR - RDG Program DIVISION _____

PLEASE PRINT

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NAME	REPRESENTING	
Frank Munschower	Reclamation Resch M. T. Grant. Cont. U.	
Bob Logar	City of Big Timber Carbon Co. Et al	
MARTHA L. HAVERKAMP	Town of Joliet Carbon Co. Et al	
Duane Christensen	Stillwater County	
Jesse S. Wilson	Town of Columbus	
Vic Anderson	DHES	
Pat Truster	Lake County	
Rebecca Dupuis	Lake County	
Julie Lethert	DHES	
Ken Engellant	Chouteau County	
Abe Hargestad	Dept of Health	
Mary Jo Smith	Yellowstone City	
Lisa Logan	Yellowstone Co.	
Chuck Dalby	DNRC	
David Nimick	US Geological Survey	
Gil R. Alexander	Canyon Ferry Limnological Institute	
John Amey	DHES	
Bob Davis	U.S. Geological Survey	

PLEASE LEAVE PREPARED TESTIMONY WITH SECRETARY. WITNESS STATEMENT
FORMS ARE AVAILABLE IF YOU CARE TO SUBMIT WRITTEN TESTIMONY.